

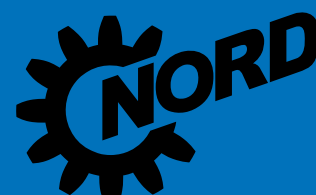
Intelligent Drivesystems



FLEXBLOC™ & MINICASE® **WORM DRIVES**

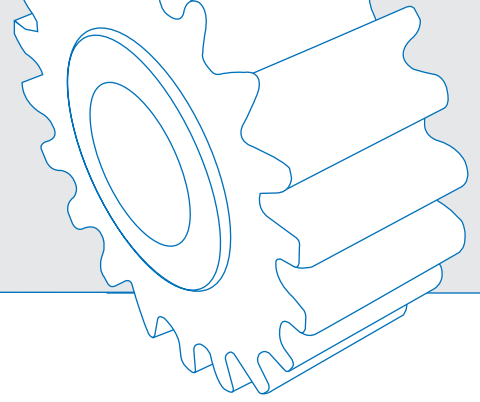
Gear Motors & Speed Reducers

G1035


DRIVESYSTEMS

FLEXBLOC & MINICASE®

Innovative Design



**FLEXBLOC™
BASIC DESIGN**

**FLEXBLOC™ SOLID
SHAFT WITH COVER**

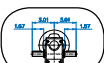
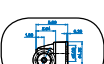
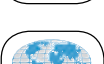


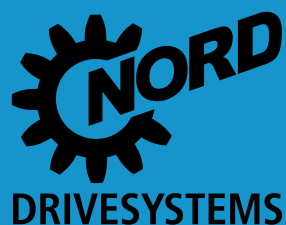
**MINICASE® GEARMOTOR
WITH SOLID SHAFT**

**MINICASE® HOLLOW SHAFT
WITH NEMA C-FACE INPUT**

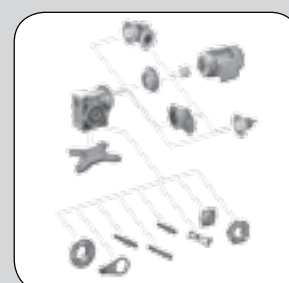
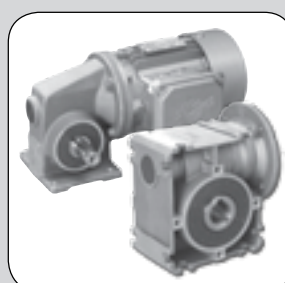


Table of Contents

	A	Common Introduction	2
	B	FLEXBLOC™ Introduction.....	9
	B	FLEXBLOC™ Ratings	29
	B	Flexbloc™ Dimensions	75
	C	Minicase® Introduction	105
	C	Minicase® Ratings.....	117
	C	Minicase® Dimensions.....	135
	D	Motors	167
	E	Brakes	221
	F	Engineering.....	235
	G	Contacts	249



www.nord.com



Introduction



FLEXBLOC™ and MINICASE®

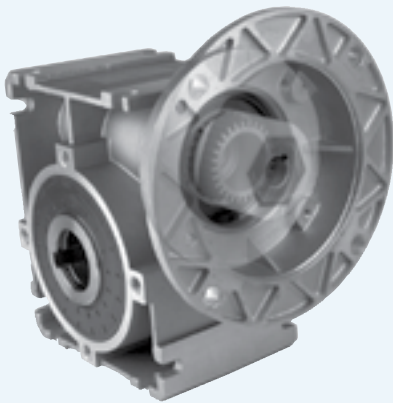
This catalog includes two series of worm gear products, the FLEXBLOC™ and MINICASE®. Both products offer you superior performance in a compact package.

FLEXBLOC™

The FLEXBLOC™ series is a modular designed product with a universally mounted footed housing. The design is accomplished with a series of component kits for simple configuration by NORD or by the customer.

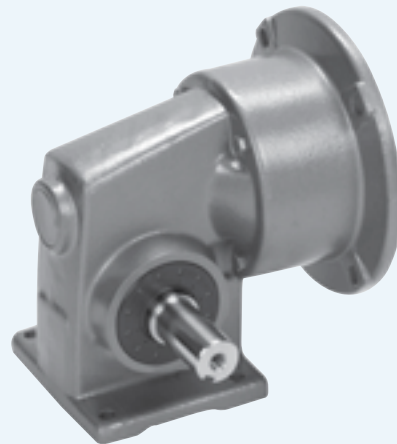
The modular component kit approach gives maximum flexibility with a series of standard parts. A good example of the adaptability is that the standard units are a hollow shaft design with the solid shaft being plugged into the hollow bore. This allows the shaft to be either right or left handed with the same components. The shaft projection may easily be changed in the field.

The modular kit approach also allows for ultra fast delivery times since all part kits are stocked at the factory and are ready to ship upon order.



MINICASE®

The MINICASE® series is a compact design that can be provided as either an integral gearmotor or as a reducer with a NEMA C-face input. One key advantage to the MINICASE® units is the smooth housing design which resists dirt build-up and simplifies wash-down. The units are assembled on a per order basis so simple product modifications, like special shafting, can easily be accommodated.





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 including 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 and a linked global network, we offer our customers:

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

Quality

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



NORD 911

Trouble? Just call 715-NORD-911 (in Canada, 905-796-3606). Need after hours service? 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.



Introduction



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. Our Brampton, Canada facility has just finished a major expansion as well.



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.

FLEXBLOC™ Design

The FLEXBLOC™ gear units center distance is displayed in the table below.



Flexbloc® .1 Units	Worm Center Distance	
SK 1SI31	1.2 inch	31 mm
SK 1SI40	1.6 inch	40 mm
SK 1SI50	2.0 inch	50 mm
SK 1SI63	2.5 inch	63 mm
SK 1SI75	3.0 inch	75 mm

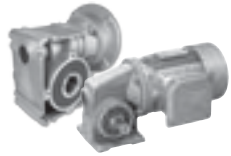
MINICASE® Design

The MINICASE® gear units center distance is displayed in the table below.



Minicase® .1 Units	Worm Center Distance	
SK 1SM31	1.2 inch	31 mm
SK 1SM40	1.6 Inch	40 mm
SK 1SM50	2.0 inch	50 mm
SK 1SM63	2.5 inch	63 mm





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.

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

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

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].

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

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

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

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 from the experience of many gear manufacturers and are in AGMA standard 6010. See page 243 for additional detail.

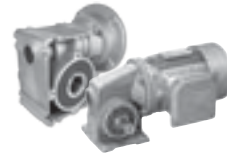
AGMA Service Classes

American Gear Manufacturers 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

Please see page 239 for additional information.

Selection Information



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 238 for additional detail.

4. Gearbox Type & Input

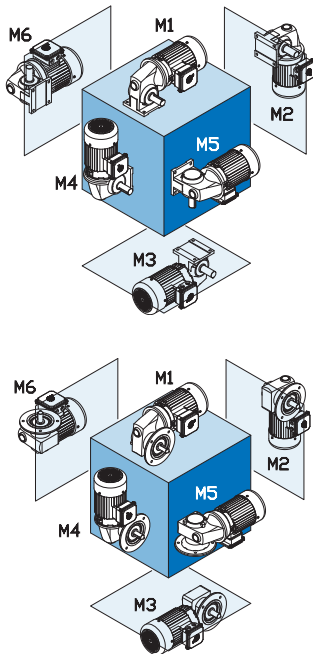
FLEXBLOC™ & MINICASE® gear drives are available in the following mechanical configurations including:

- Foot mount
- Flange mount
- Shaft 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 (FLEXBLOC™ only)

5. Mounting Position (MINICASE® only)



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.

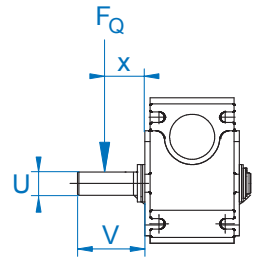
6. Options

NORD offers a number of mechanical, protective, paint and lubrication options for gear reducers and motors. Please see pages 23 & 110 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_Q] can be found in the gearmotor rating tables. Overhung load capacities should not exceed the values in the table to ensure long bearing life.

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. Contact NORD for thrust or 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



Ambient Conditions

The FLEXBLOC™ and MINICASE® housings are made from an optimized aluminum alloy, which is naturally corrosion resistant allowing for both indoor and outdoor operation. If contact with corrosive media (gases, acidic and caustic fluids, salts, etc.) occurs, contact NORD for recommendations.

The FLEXBLOC™ and MINICASE® drives are suitable for operation at ambient temperatures of -13°F to $+140^{\circ}\text{F}$ (-25°C to $+60^{\circ}\text{C}$).

Self-locking and self-braking for FLEXBLOC™ and MINICASE®			
worm ratio = 5-10	worm ratio = 15-40	worm ratio = 50-80	worm ratio = 100
No self-locking	No reliable self-locking	Self-locking at rest and without vibrations	Self-locking
No self-braking	No self-braking	No reliable self-braking	Self-braking for $n_1 < 1800 \text{ rpm}$ (SK 1Si63 : $n_1 < 850 \text{ rpm}$)



CAUTIONS



Requirements

- At low temperature, the lubricating gear oil viscosity increases, resulting in higher losses particularly during start-up. These higher losses may require an increased motor power.
- At high temperature, gear units will generate higher internal pressures which may require the gear unit to be vented. Consult NORD for recommendations.



CAUTIONS



Requirements

- It is not easy to establish precise self-locking conditions, in part because there are many factors that influence the friction in the gear mesh.
- Vibrations from nearby sources can upset the static condition of a locked gear set, causing a reduction of the friction angle to a point where motion occurs. Friction angles decrease rapidly with the very start of gear motion.
- Non-self-locking gearboxes must be selected in applications where load-direction changes during operation. Reducer back-driving can cause a sudden jamming or chatter vibration. This is especially true of applications with a mass acceleration factor, $m_{af} > 1$.
- Non-self-locking gearboxes must be selected in speed increaser applications, where the slow speed shaft is the driver, and the high speed shaft is increased in speed.
- The customer is responsible for evaluating self-locking and self-braking in each application. NORD cannot ensure self locking or self-braking in any given installation.

Self-Locking and Self-Braking

Self-locking occurs when torque is applied directly to the output shaft of the reducer, and cannot cause the input shaft to turn from rest. It also occurs when the gear wheel cannot drive the worm pinion gear in the opposite direction. Self-locking is obtained, if the lead angle of the worm is less than the friction angle, and as a consequence the efficiency for reversed driving is zero and the gear unit is said to be irreversible.

Self-braking occurs when power is removed from the system (or the motor is turned off) and the system rapidly stops from its operating speed with no noticeable coasting down period.

Self-locking and self-braking properties of worm gearboxes are dependant on the ratio of the worm-stage (see table in next column).

Selection Information



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

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, accelerations, shock or impacts
- Other abnormal conditions

Storage Before Installation

The gear units and 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 27 or 113.

NEMA C-Face Adapter Capacity

The 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]
48C	1/2
56C	1
140TC	2
180TC	5

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

Observing the Reducer's Thermal Limit

When to Contact NORD

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

Dangers of Reducer Overheating

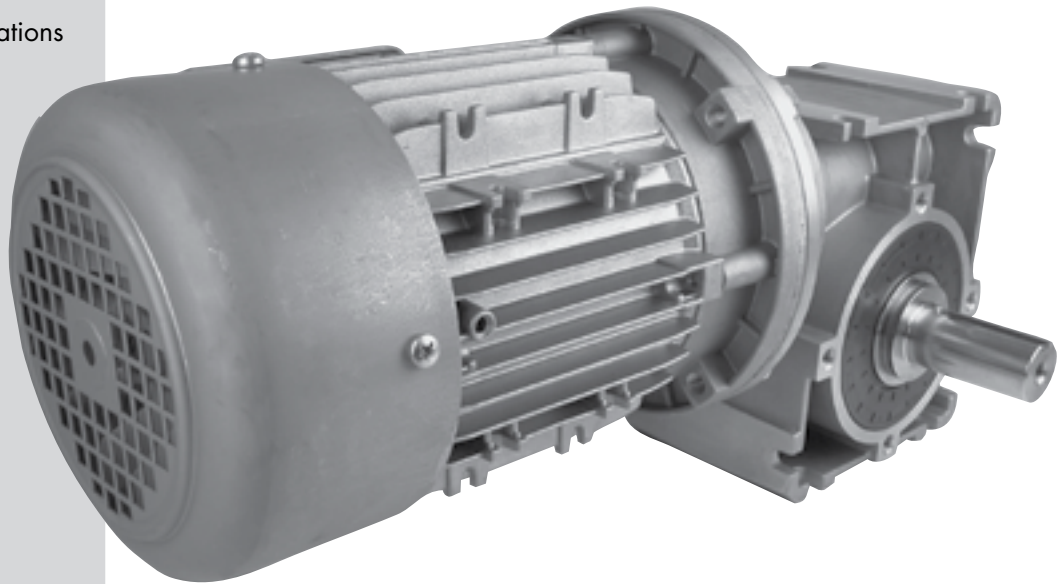
The following problems may result when the reducer's thermal capacity or maximum oil sump temperatures are exceeded:

- 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.

Flexbloc™ Introduction

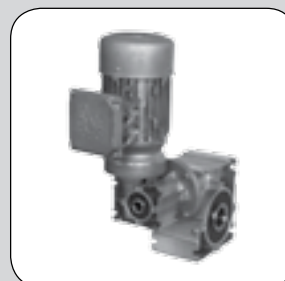
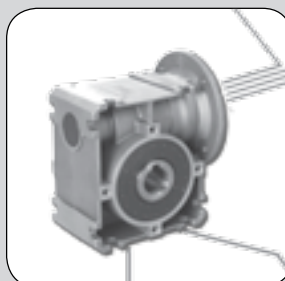
Introduction

- Introduction
- Configuration
- Standard Features
- FLEXBLOC™ Ordering
- FLEXBLOC™ Modules
- Order Form
- Mounting Configurations
- Options



UNICASE™

www.nord.com



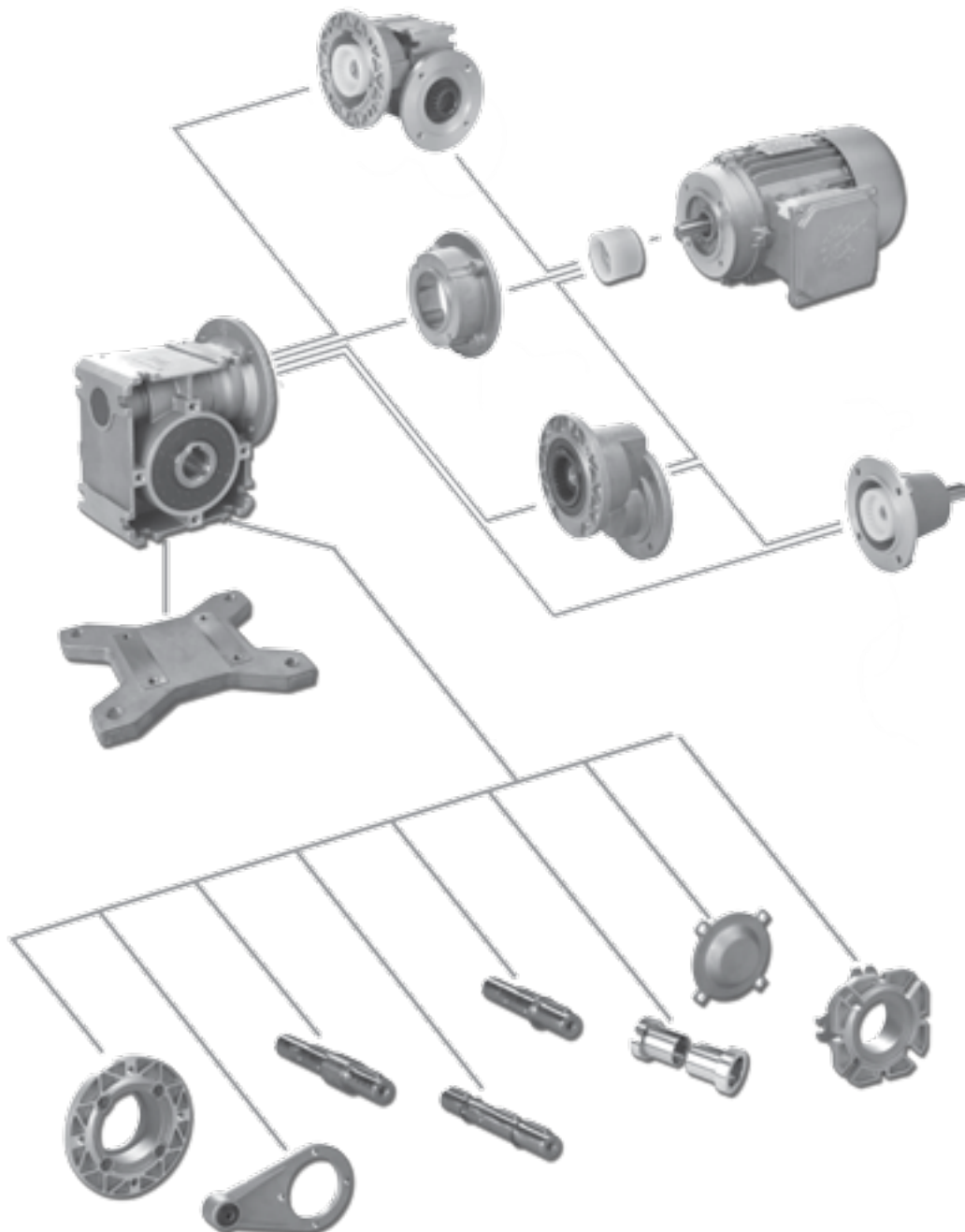
FLEXBLOC™ Ordering Guide

Gear Unit		Flexbloc Size	
SK	1SI		
Flexbloc Design		Flexbloc Size	
		☐	31
		☐	40
		☐	50
		☐	63



FLEXBLOC™

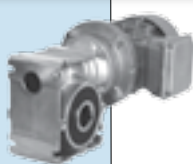
The FLEXBLOC™ series is a modular designed product with a universally mounted footed housing. The modular design is accomplished with a series of component kits for simple configuration by NORD or the end user. The modular component kit approach gives maximum flexibility with a series of standard parts. A good example of this is that the standard units are a hollow shaft design where the solid shaft is plugged into the hollow bore. This allows the shaft to be either right or left handed with the same components. Shaft projection may easily be changed.





FLEXBLOC™ Worm Configuration

Basic Design

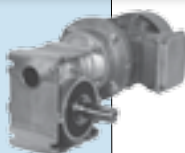


SK 1SI__
Basic Design



SK 1SI__X
Footplate

Plug-In Shaft



SK 1SI__V
Shaft Side A



SK 1SI__V
Shaft Side B



SK 1SI__L
Double Shaft



SK 1SI__VX
Shaft Side A, Footplate

Flange



SK 1SI__F
Flange Side A



SK 1SI__VF
Flange & Shaft Side A



SK 1SI__F
Flange Side B



SK 1SI__VF
Flange & Shaft Side B



SK 1SI__FF
Double Flange



SK 1SI__LFF
Double Shaft,
Double Flange

Torque Arm



SK 1SI__D
Torque Arm Side A
at 90°



SK 1SI__D
Torque Arm Side B at 90°

Shaft Cover



SK 1SI__H
Cover Side A



SK 1SI__VH
Cover Side A,
Shaft Side B



SK 1SI__H
Cover Side B

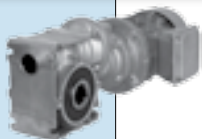


SK 1SI__VH
Cover Side B,
Shaft Side A



FLEXBLOC™ Helical Worm

10:1 Helical Input Stage



SK 1SI_/H10
H10 Position T1



SK 1SI_/H10V
H10 Position T1,
Shaft Side A

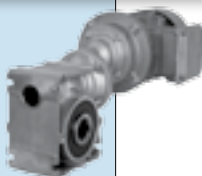


SK 1SI_/H10
H10 Position T2



SK 1SI_/H10V
H10 Position T2,
Shaft Side A

10:1 Helical Input Stage



SK 1SI_/H10
H10 Position T3



SK 1SI_/H10V
H10 Position T3,
Shaft Side A



SK 1SI_/H10
H10 Position T4



SK 1SI_/H10 V
H10 Position T4,
Shaft Side A



FLEXBLOC™ Double Worm

Double Worm



SK 1SI __/31
Double Worm - Position U1



SK 1SI __/31V
Double Worm - Position U1,
Shaft Side A



SK 1SI __/31
Double Worm - Position U2



SK 1SI __/31V
Double Worm - Position U2,
Shaft Side B

Double Worm



SK 1SI __/31
Double Worm - Position U3



SK 1SI __/31V
Double Worm - Position U3,
Shaft Side B

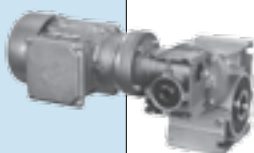


SK 1SI __/31
Double Worm - Position U4



SK 1SI __/31V
Double Worm - Position U4,
Shaft Side B

Double Worm



SK 1SI __/31
Double Worm - Position U5



SK 1SI __/31V
Double Worm - Position U5,
Shaft Side B



SK 1SI __/31
Double Worm - Position U6



SK 1SI __/31V
Double Worm - Position U6,
Shaft Side B

Double Worm



SK 1SI __/31
Double Worm - Position U7



SK 1SI __/31V
Double Worm - Position U7,
Shaft Side A



SK 1SI __/31
Double Worm - Position U8



SK 1SI __/31V
Double Worm - Position U8,
Shaft Side A



UNICASE® One-Piece Housing

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.

- Leak-free design
- Increased torsional housing strength
- Eliminates bolt-on covers and split casting
- Multi-mount features for foot or face mounting

Modular Construction

A core aspect of the FLEXBLOC™ is modularity. With standard worm and option modules the gear unit can be easily configured in over one million combinations. The units can be provided as a fully assembled gear unit configuration by NORD. FLEXBLOC™ units may also be provided as modular kits so that the final configuration may easily be assembled by the customer.

- Easily arranged to solve application requirements
- Footed, flanged or shaft mount
- C-face motor adapter or solid input shaft

Oversized Bearings Handle Tough Industrial Loads

The design of the bearing systems is a key innovation in the FLEXBLOC™ units. The output bearing is greatly oversized which provides a number of important advantages. This design results in a much larger bearing capacity than what is needed if the bearings were selected based on load forces. It also results in an output bearing that is physically much larger than competitive gear units. This also increases the overall bearing system capacity. As a byproduct of the larger bearings the internal shaft diameters increase — thus increasing the shaft strength. The gear housing also has larger output bearing bores which increase the housing strength.

- Longer bearing life
- Higher overhung load capacity

Corrosion-Resistant Aluminum Alloy Housing

The FLEXBLOC™ makes use of the many advantageous material properties of an optimized aluminum alloy for the gear housing. The aluminum alloy housing provides a higher strength to weight ratio than cast iron. 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
- Improved heat dissipation for cooler operation and longer life

Standard Worm Ratios

NORD's FLEXBLOC™ Worm units are offered in a wide range of industry standard gear ratios.

- Single worm – 5, 7.5, 10, 12.5, 15, 20, 25, 30, 40, 50, 60, 80 and 100:1
- Helical worm – 50, 75, 100, 125, 150, 200, 250, 300, 400, 500, 600, and 1000:1
- Double worm – 150, 225, 300, 375, 450, 600, 750, 900, 1200, 1500, 1800, 2400, 3000:1 and more

Food Grade Synthetic Lubricant Suitable for All Mounting Positions

The FLEXBLOC™ worm units are factory oil filled for any mounting configuration. The unit's lubrication is suitable for the life of the product so it is inherently maintenance free. The 1/2 inch shaft size gear units are filled with synthetic food grade oil.

- Maintenance-free – lubed for life
- USDA H1 incidental contact suitable

Robust Worm Gears Are Shock-Resistant

The FLEXBLOC™ worm drive gears are high capacity design and can handle high shock loads. The worm gear design also provides smooth and quiet operation.

- Quiet, smooth operation
- Longer gear life



Torque Capacities

There is a maximum permissible output torque, T_{max} , defining the load limit for continuous and uniform operation of each FLEXBLOC™ drive. For adequate service life, an appropriate service factor must be chosen for the reducer.

The drives can withstand their respective ultimate torque limits at rest, or for a short time, without being damaged. The ultimate torque limit is the absolute maximum and must not be exceeded even for peak torque conditions.

Max Permissible Continuous Torques at 1760 rpm					
Type	SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
T_{max}	266 lb-in	443 lb-in	797 lb-in	1416 lb-in	2213 lb-in

Ultimate Limit Torques					
Type	SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
T_{limit}	663 lb-in	1106 lb-in	1991 lb-in	3540 lb-in	5753 lb-in

Ratios

All ratio numbers are finite integers except 7.5:1 & 12.5:1. All FLEXBLOC™ worm gear sets are right-handed, which must be considered when determining the direction of rotation.

Efficiency

The high efficiencies of the FLEXBLOC™ are achieved by using extremely smooth tooth flanks and synthetic lubrication. The efficiency of new gearboxes increases up to the rated efficiency during initial operation as the worm gearing undergoes a natural run-in process. The power and torque figures listed in the selection tables are based on the rated efficiency η after the run-in process is complete.

Efficiencies (η)-eta [%] at $n_1 = 1750$ rpm													
Worm ratio	5	7.5	10	12.5	15	20	25	30	40	50	60	80	100
SK 1SI31	87	83	80	71	72	68	65	56	51	47	43	37	33
SK 1SI40	89	85	83	81	76	72	69	61	56	52	48	42	37
SK 1SI50	91	88	86	84	80	77	74	66	62	58	54	48	43
SK 1SI63	92	90	88	87	83	80	77	70	66	62	59	53	49
SK 1SI75	93	91	90	89	85	83	81	70	70	67	64	59	54

The efficiency of worm gears increases with the input speed due to hydrodynamic lubrication within the gearing. Therefore the units have lower efficiency during start-up. This must be considered when sizing the motor for applications that require starting under load. The following table shows standard figures for the start-up efficiency, η , based on the ratio.

Start-Up Efficiencies (η)-eta [%] at $n_1 = 1750$ rpm													
Worm ratio	5	7.5	10	12.5	15	20	25	30	40	50	60	80	100
SK 1SI31 to SK 1SI75	72	67	62	59	53	47	43	36	31	27	25	20	17

Lubrication

FLEXBLOC™ inch worm speed reducers are factory-filled with a food grade synthetic lubricant that is suitable for the life of the product. Metric FLEXBLOC™ worm modules are filled with a synthetic polyglycol lubricant. The gearboxes are designed to be maintenance-free and completely sealed.

- Inch units - Kluber: Kluber synth UH1 6-220
- Metric units - Synthetic polyglycol.

Lubricant synthetic food grade: CLP PG 220					
Type	SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
Quantity	30 ml 1.0 oz	55 ml 1.9 oz	95 ml 3.2 oz	180 ml 6.0 oz	360 ml 12 oz

Temperature Range -13°F to +104°F (-25°C to +40°C)



Radial and Axial Loads

The selection tables show the permissible radial overhung load (OHL) values. The rated OHL values shown are calculated for forces acting at the midpoint of the solid output shaft. The OHL value (FR) represents the OHL capacity for FLEXBLOC™ models with the installed solid shaft (Option V). The OHL value (FRF) represents the OHL capacity for FLEXBLOC™ models with both an output flange and a long plug-in shaft, which is required for solid shaft units with the B5 flange (Option VF). When force is acting at the face of the hollow shaft, the respective unit will have increased OHL capacity.

The figures listed for permissible axial (thrust) loads are for the worst-case conditions, also including full radial (OHL) force F_R or F_{RF} .

The hollow shafts of the FLEXBLOC™ gearboxes are supported by oversized ball bearings. Therefore FLEXBLOC™ drives have an axial load capacity in addition to the permissible radial OHL load.

Permissible axial force F_A [lb] – with full OHL					
Type	SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
Force	405 lb	720 lb	1080 lb	1415 lb	2250 lb
Force	1800 N	3200 N	4800 N	6300 N	10000 N

The permissible radial load on the midpoint of the solid input shaft Type W is 269 lb (1200 N).

Shaft Support Bearings

The FLEXBLOC™ reducer design uses oversized bearings to provide many benefits including:

- Ability to support higher overhung & thrust loads
- Longer bearing life
- Oil-safe construction due to no bolt-on bearing caps

Output shaft bearings				
SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
2 × 16005	2 × 6007	2 × 6208	2 × 6211	2 × 6213

Dimensions

Notes on the dimension drawings:

- C(BR) and AB(BR) are dimensions for brakemotors (inch)
- Inch keys are square or rectangular and per ANSI B17.1
- Flange-pilot centering: per ISO H7 class j6

Mounting Position

Each module is completely sealed and lubricated for all mounting positions.

Open Vents are available for all FLEXBLOC™ units.



FLEXBLOC® Ordering Information

FLEXBLOC™ worm units are available to order in one of two ways:

1: Ordering by Component Kits

Ordering by component part numbers allows for the ultimate design flexibility. This allows the user to assemble the modular components together in a fashion that best suits the application. NORD offers a price advantage when ordering as component kits since no assembly time is needed at the factory.

Component kits are ordered by the 8-digit part number in the catalog. Each component kit contains the required hardware and assembly instructions to assemble into a complete unit. Component kit inquiry forms are located on pages:

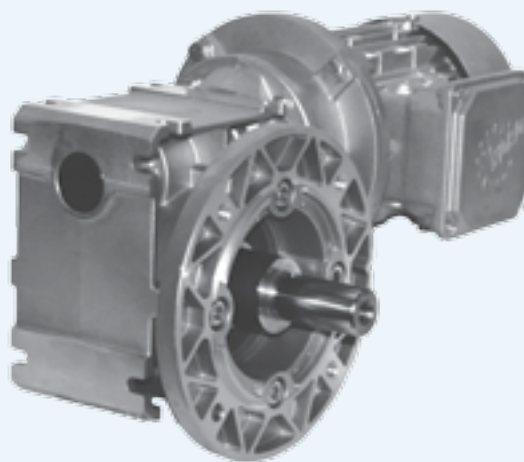
Unit	Pages
SK 1SI31	63
SK 1SI40	65
SK 1SI50	67
SK 1SI63	69
SK 1SI75	71

Example: Single reduction worm module SK 1SI50 with 20:1 reduction, 2 hp - 230/460V motor, and single extension plug-in solid shaft.

60592200 (SK 1SI50 module, ratio = 20:1)
60595500 (140TC NEMA motor adapter)
34610012 (90L/4-145TC motor, 2 hp, 230/460V)
60593010 (Plug-in shaft Ø1.00" x 50mm)

2: Ordering a completely assembled unit

When ordering as a completely assembled unit you will need to specify the complete nomenclature and the total gearbox ratio. Additional information may be required depending on the input and output options that are selected. For a guide on ordering as complete units see page 20.



Example: Single reduction worm module SK 1SI50 with 50:1 ratio, 1 hp motor 230/460V with terminal box position 1, and conduit entry location I, plug-in solid shaft side A, B5 flange side A.

Order as: SK 1SI50 VF – N56C – 80L/4, 50:1, VA, FA, KK1/I

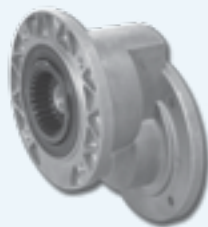


NEMA & IEC MOTOR ADAPTERS 24

For attaching standard motors

Kit contains:

- Adapter flange
- Coupling
- Nuts and bolts



HELICAL INPUT STAGE (H10) 27

Helical 10:1 gear set

Fits all size gearboxes

Lifetime synthetic lubricant

Sealed unit

Kit contains:

- Pre-assembled unit
- Bolts



SOLID INPUT SHAFT (W) 24

Fits all size gearboxes

Lifetime lubricant

Sealed unit

Kit contains:

- Pre-assembled unit
- Bolts

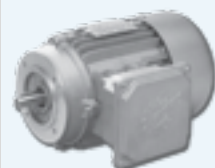


DOUBLE WORM ADAPTER 27

Mounts the SK 1SI31 to the input of the larger SK 1SI40 or 50 or 63 to produce a high reduction double worm gear unit

Kit contains:

- Adapter flange
- Coupling
- Shaft
- Keys
- Bolts



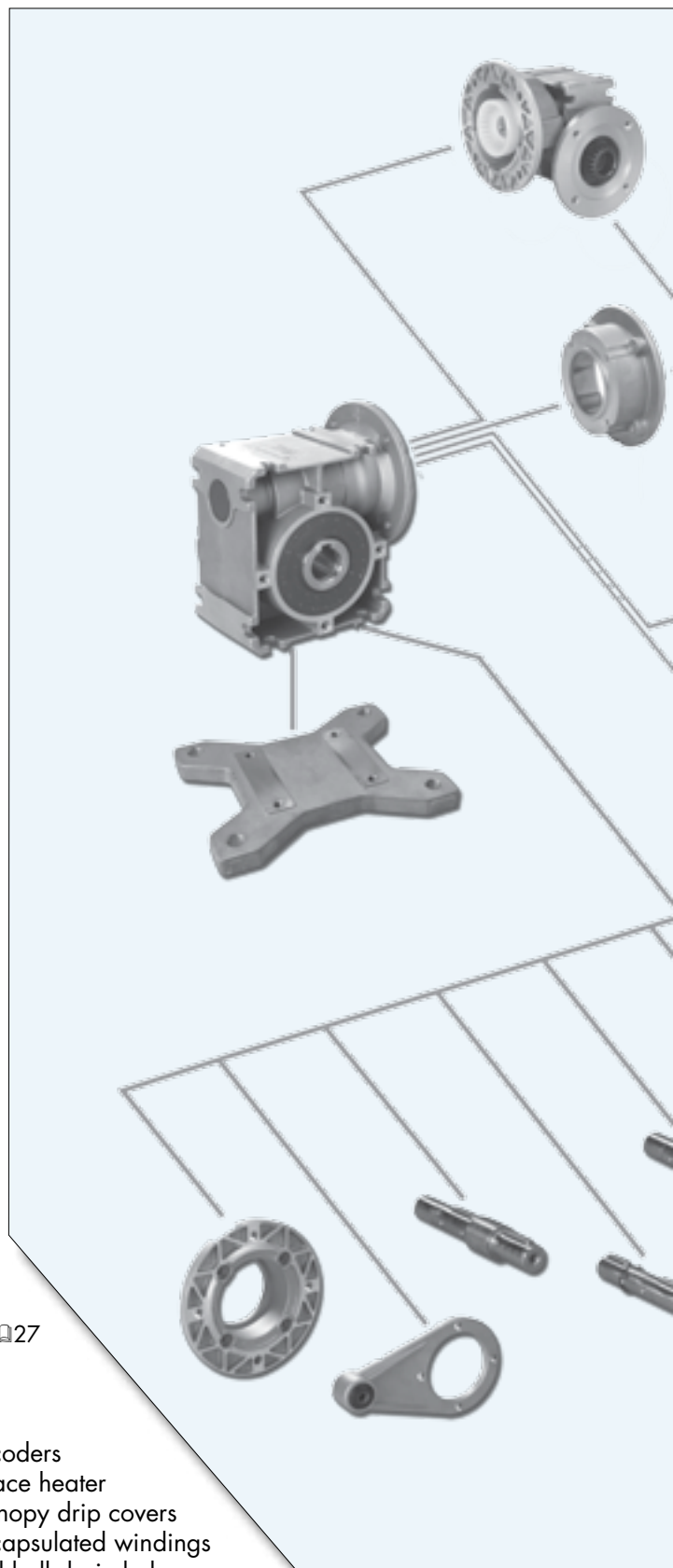
NORD C-FACE MOTORS & BRAKEMOTORS 27

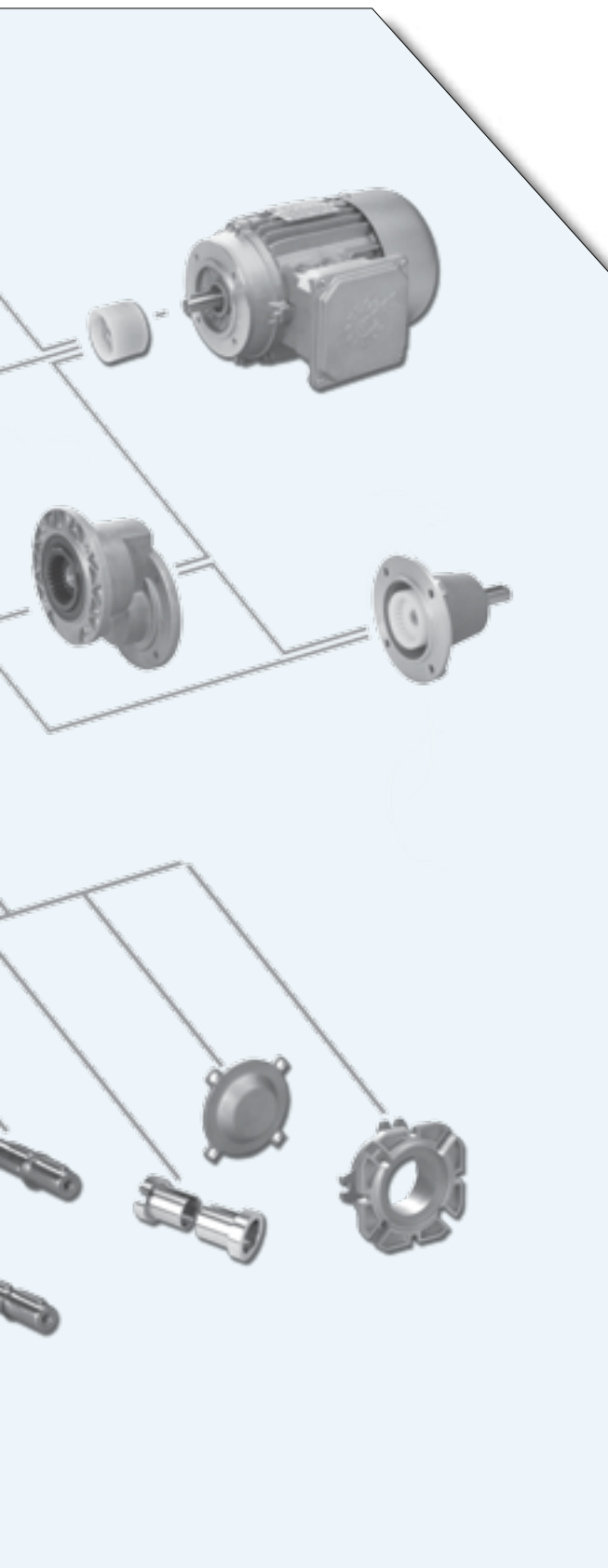
3 phase, 230/460, 60 Hertz

3 phase, 575V, 60 Hertz

Options:

- Power off brake
- Numerous brake options
- Thermistor temperature sensors
- Thermostat temperature sensors
- Blower fan
- Encoders
- Space heater
- Canopy drip covers
- Encapsulated windings
- End bell drain holes





PLUG-IN SOLID SHAFT (V) (L) 25

Inch dimensions with standard keys
Plug into standard hollow shaft
Install on either side

Kit contains:

- Shaft
- Keys
- External snap ring

Options:

- Double solid shaft

B5 OUTPUT FLANGE (F) 25

Multiple flanges available for each size gearbox. Flange pilots are centered in seal bore.

Kit contains:

- Die cast flange
- Bolts

SHAFT PROTECTION COVER (H) 26

Seals shaft end Safety protection from rotating shaft

Kit contains:

- Cover
- Bolts

FOOT PLATE (X) 26

Mounts to the bottom of the FLEXBLOC™ to provide drop-in compatibility with many worm gear reducers.

Kit contains:

- Foot plate
- Bolts

TORQUE ARM (D) 26

For shaft mounting
Rubber shock absorber installed in attachment end

Kit contains:

- Torque arm
- Bolts

SHAFT BUSHING (J) 26

Hollow shaft bushing for increased bore flexibility

- Bushings with set screw
- Key



FLEXBLOC™ Ordering Guide



FLEXBLOC™ INTRO

Gear Unit	Flexbloc Size	Reducer Options	Input	Motor	Motor Options
SK	1SI				see pages 175 - 185
Flexbloc Design		Flexbloc Size	Reducer Options		
		☐ 31 ☐ 40 ☐ 50 ☐ 63 ☐ 75	☐ V - Plug in Solid Output Shaft 25 ☐ VA ☐ VB ☐ Unassembled ☐ L - Double Solid Shaft Extension 25 ☐ F - B5 Output Flange 25 ☐ FA ☐ FB ☐ FF ☐ Unassembled ☐ D - Torque Arm 26 ☐ DA ☐ DB ☐ Unassembled ☐ H - Shaft Cover 26 ☐ HA ☐ HB ☐ Unassembled ☐ Foot Plate 26 ☐ J - Shaft Bushing _____ size 26		
Shafts					
		☐ Inch ☐ Metric			

Input Shaft	NEMA Adapter	IEC	Motors	Energy Efficient Motors
W	N48C N56C N140TC N180TC	IEC 63 IEC 71 IEC 80 IEC 90 IEC 100 IEC 112	63S/4 - 0.16hp 63L/4 - 0.25hp 71S/4 - 0.33hp 71L/4 - 0.50hp 80S/4 - 0.75hp	80LH/4 - 1hp 90SH/4 - 1.5hp 90LH/4 - 2hp 100LH/4 - 3hp 112MH/4 - 5hp Other Speeds Available

Product Specifications

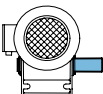
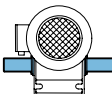
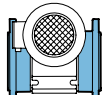
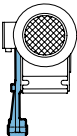
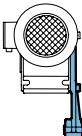
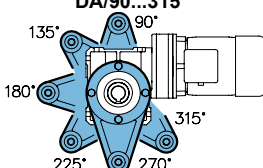
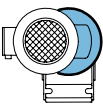
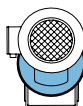
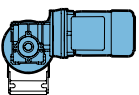
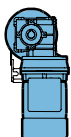
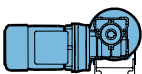
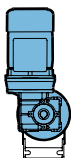
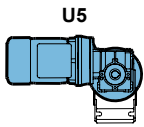
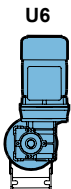
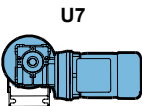
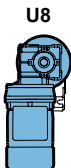
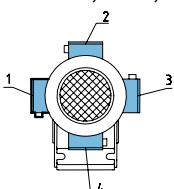
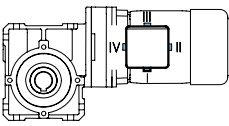
Single Worm Ratio	Helical Worm Ratio	Position	Double Worm Ratio	Position	Paint	Torque Arm Orientation (If Selected)
☐ 5	☐ 50	☐ T1	☐ 150	☐ U1	☐ No Paint (Standard)	☐ 90°
☐ 7.5	☐ 75	☐ T2	☐ 225	☐ U2	☐ Stainless Steel Paint	☐ 135°
☐ 10	☐ 100	☐ T3	☐ 300	☐ U3	☐ NSD+ (gray)	☐ 180°
☐ 12.5	☐ 125	☐ T4	☐ 375	☐ U4	☐ NSD+W (white)	☐ 225°
☐ 15	☐ 150		☐ 450	☐ U5	☐ NSD-X3 (gray)	☐ 270°
☐ 20	☐ 200		☐ 600	☐ U6	☐ NSD-X3W (white)	☐ 315°
☐ 25	☐ 250		☐ 750	☐ U7	☐ Special _____	☐ Other
☐ 30	☐ 300		☐ 900	☐ U8		
☐ 40	☐ 400		☐ 1200			
☐ 50	☐ 500		☐ 1500			
☐ 60	☐ 600		☐ 1800			
☐ 80	☐ 800		☐ 2400			
☐ 100	☐ 1000		☐ 3000			

Torque Arm Orientation (If Selected)
Torque Arm Orientation (If Selected)
☐ Side A A ☐ Side B B

Gearmotor Only Details

Voltage & Frequency	Terminal Box Position	Conduit Entry Location
☐ 230/460V-60Hz ☐ 575V-60Hz ☐ 400V-50Hz ☐ Other _____	☐ KK1 ☐ KK2 ☐ KK3 ☐ KK4 	☐ I * ☐ II ☐ III * ☐ IV
* Brakemotor options		



Basic Design			
Plug-in Shaft	VA 	VB 	L 
Flange	FA 	FB 	FF 
Torque Arm	DA/270 	DB/270 	DA/90...315 
Shaft Cover	HA 	HB 	
Helical Input Stage	T1 	T2 	T3 
Double Worm	U1 	U2 	U3 
	U4 	U5 	U6 
	U7 	U8 	
Terminal Box	KK1/I, KK2/I, KK3/I, KK4/I 		
Cable Entry	KK1/I, KK1/II, KK1/III, KK1/IV 		

Motor Order Form



FLEXBLOC™ INTRO

SK

Frame	Size	Poles	Motor Options			Brake Size	Brake Options		
63	S	4	Electrical Motor Options	Mod	Build	Brake Size	Brake Options	Mod	Build
71	SH	2	☐ H - Energy Efficient Motor		X	BRE 5	☐ HL - Hand Release Lever	X	
80	M	6	☐ TW - Thermostat		X	BRE 10	☐ FHL - Locking Hand Release Lever	X	
90	MH	4-2	☐ TF - Thermistor		X	BRE 20	☐ HLH - Hand Release Lever with Hole	X	
100	MX	8-2	☐ SH - Space Heater (select voltage) ○ 110 Volt ○ 230 Volt ○ 460 Volt		X	BRE 40	☐ RG - Corrosion Protected Brake		X
112	L	Other	☐ ISO H - Class H insulation		X	BRE 60	☐ SR - Dust and Corrosion Protected Brake		X
	LA		☐ WU - High Resistance Rotor		X	BRE 100	☐ ADJ _____ Nm - Adjust Brake Torque	X	
	LH		☐ 4-2 - 2-Speed, 4/2 Pole, 1800/3600rpm		X	BRE 150	☐ BIP66 - IP66 Brake Enclosure		X
	LX		☐ 8-2 - 2-Speed, 8/2 Pole, 900/3600rpm		X	BRE 250	☐ MIK - Micro-switch		X
			☐ ECR - Single Phase Motor		X	BRE 400	☐ BSH - Brake Heating/Bifilar Coil		X
						BRE 800	☐ NRB1 - Quiet Brake Release		X
							☐ NRB2 - Quiet Brake Motor Operation		X
							☐ FBR - Brass Fail		X
							☐ DBR - Double Brake		X
							☐ G...P - High Performance Rectifier	X	
							☐ G...V - Sealed Rectifier	X	
							☐ IR - Current Sensing Relay	X	
			Environmental Options						
			☐ NSD+ - Nord Severe Duty Paint	X					
			☐ NSDx3 - Nord Extreme Duty Paint	X					
			☐ RD - Canopy Drip Cover	X					
			☐ RDD - Double Fan Cover	X					
			☐ KB - Condensation Drain Holes (plugged)		X				
			☐ KBO - Condensation Drain Holes (open)		X				
			☐ IP66 - IP66 Enclosure Protection	X					
			☐ KKV - Terminal Box Sealed with Resin	X					
			☐ AICM - Additional Insulation		X				
			☐ EP - Epoxy Dipped Windings		X				
			Frequency Inverter Related Options						
			☐ F - Blower Fan (200-575V 1 & 3 Phase)	X					
			☐ FC - Blower Cooling Fan (115V, 1 Phase)	X					
			☐ IG _____ - Incremental Encoder		X				
			☐ IG _____ P - Incremental Encoder with Plug		X				
			☐ AG - Absolute Encoder		X				
			Additional Motor Options						
			☐ OL - Totally Enclosed Non-Ventilated (TENV)	X					
			☐ OL/H - (TENV) Without Fan Cover		X				
			☐ WE - Second Shaft Extension (Fan Side)		X				
			☐ HR - Hand Wheel		X				
			☐ Z - High Inertia Cast Iron Fan		X				
			☐ RLS - Motor Backstop (rotation viewing fan) ○ Clockwise ○ Counter-Clockwise		X				
			☐ EKK - Small Terminal Box (not UL approved)	X					
			☐ MS - Quick Power Plug Connector	X					
			Paint						
			☐ Unpainted Aluminum Alloy						
			☐ Stainless Steel Paint						
			☐ NSD+ (gray)						
			☐ NSD+W (white)						
			☐ NSD-X3 (gray)						
			☐ NSD-X3W (white)						
			☐ Special _____						
			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	Voltage & Frequency	Terminal Box Position	Conduit Entry Location
☐ Integral to gearbox ☐ NEMA C-Face ☐ IEC B5 Mount	☐ 230/460V-60Hz ☐ 575V-60Hz ☐ 208V-60Hz ☐ 400V-50Hz ☐ 115/230V, 60Hz-1-ph. ☐ Other	☐ TB1 ☐ TB2 ☐ TB3 ☐ TB4	☐ CE I * ☐ CE II ☐ CE III * ☐ CE IV * Brakemotor options



Overview of available designs

Abbreviation	Description Of Base Module	Page
SK 1SI__	FLEXBLOC™ Worm Module	24

Abbreviation	Input Options	Option Availability & Compatibility					Page
		SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75	
NEMA __	NEMA Motor Adapter						24
	• NEMA 48C	✓					-
	• NEMA 56C	✓	✓	✓	✓	✓	-
	• NEMA 140TC		✓	✓	✓	✓	-
	• NEMA 180TC				✓	✓	-
IEC __	IEC Motor Adapter						24
	• IEC 56	✓	✓	✓	✓		-
	• IEC 63	✓	✓	✓	✓		-
	• IEC 71	✓	✓	✓	✓	✓	-
	• IEC 80		✓	✓	✓	✓	-
	• IEC 90		✓	✓	✓	✓	-
	• IEC 100					✓	-
H10	Helical Input Stage		✓	✓	✓		27
W	Solid Input Shaft		✓	✓	✓	✓	24
SK 1SI__/_	Double Worm Adapter		✓	✓	✓	✓	27

Abbreviation	Output and Other Available Options	Option Availability & Compatibility					Page
		SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75	
	NEMA C-Face & IEC Motors	✓	✓	✓	✓	✓	27
	Paint Options	✓	✓	✓	✓	✓	28
D	Torque arm	✓	✓	✓	✓	✓	26
F	B5 flange	✓	✓	✓	✓	✓	25
H	Hollow shaft cover	✓	✓	✓	✓	✓	26
J	Bushing Kit			✓	✓	✓	26
L	Double Solid Shaft Extension	✓	✓	✓	✓	✓	25
LL	Long Term Storage	✓	✓	✓	✓	✓	27
OV	Breather Vent		✓	✓	✓	✓	27
V	Plug-In Solid shaft	✓	✓	✓	✓	✓	25
VF	Plug-In Solid shaft with B5 Flange	✓	✓	✓	✓	✓	25
X	Foot plate	✓	✓	✓	✓		26



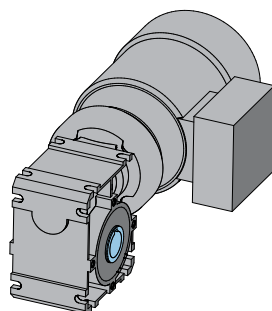
FLEXBLOC™ Worm Module (SK 1SI__)

The FLEXBLOC™ worm module is a completely sealed worm gearbox utilizing the NORD Unicas® one-piece housing. The housing is made of corrosion resistant aluminum alloy and offers foot mounting on three sides and a B14 flange on two sides. The standard design is supplied with a hollow shaft and its modular design offers a number of input and output components to be easily bolted on.

NORD offers 5 FLEXBLOC™ worm module sizes and offers 13 basic ratios for each size, with many more ratios available with helical or double worm inputs. The maintenance free FLEXBLOC™ module has oversized bearings to handle tough industrial loads and filled with synthetic lubricant.

Hollow Shafts (Standard)

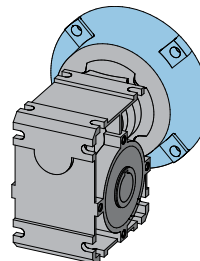
FLEXBLOC™ worm gearboxes feature standardized hollow shafts. The key is not provided for hollow shaft reducers. Key sizes are provided in the table below.



Standard Hollow Shaft Bore Diameters					
Type	SK 1S31	SK 1S40	SK 1S50	SK 1S63	SK 1S75
Inch	5/8	1	1-1/8	1-7/16	1-15/16
Key	3/16 x 3/16	1/4 x 1/4	1/4 x 1/4	3/8 x 3/8	1/2 x 3/8
mm	14	18	25	25	35
Key	5 x 5	6 x 6	8 x 7	8 x 7	10 x 8

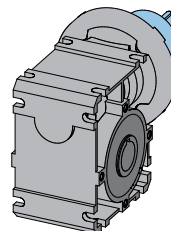
NEMA & IEC Motor Adapters (NEMA __, IEC __)

Compact in length, the NEMA and IEC motor adapters allow for the attachment of standard NEMA motor sizes 48C thru 184TC and IEC sizes 56 thru 112. The motor adapter kit includes the flange, coupling and attachment hardware.



Solid Input Shaft (W)

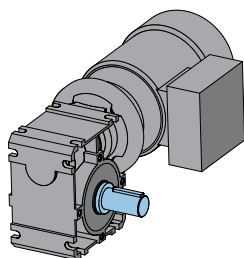
Designed to mount couplings, sheaves or sprockets, which transfer torque from the prime mover; the NORD solid input shaft kit is available as inch or metric design. It is available for FLEXBLOC™ sizes SK 1SI40, SK 1SI50 and SK 1SI63. The solid input shaft attaches to the FLEXBLOC™ module, helical input (H10) and double worm adapter. The solid input shaft kit contains the preassembled unit, bolts and has sealed for life bearing lubricant.





Plug-in Solid Shaft (V)

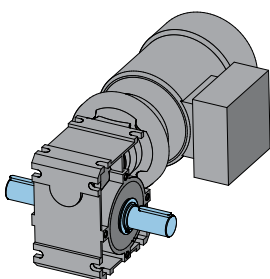
The plug-in solid shaft inserts into the standard hollow shaft FLEXBLOC™ worm module thus converting it to a solid output shaft unit. Three plug-in shaft options are available: single solid shaft extension, double solid shaft extension (L), and single solid shaft extension with a B5 flange (VF). The solid shaft can be assembled onto either side of the gear unit. The kit contains the shaft, keys, and snap rings.



Standard Plug-in Solid Shaft Diameter					
Type	SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
Dia. (In)	5/8	3/4	1	1-1/8	1-3/8
Dia. (mm)	14	18	25	25	35

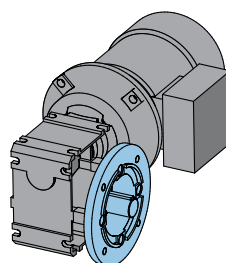
Double Solid Plug-In Shaft (L)

The double solid plug-in shaft inserts into the standard hollow shaft FLEXBLOC™ worm module converting it into a unit with a solid shaft extension on both sides. The kit contains the shaft, keys, spacers and snap rings.



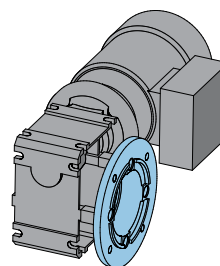
Plug-in Solid Shaft with B5 Flange (VF)

The plug-in solid shaft inserts into the standard FLEXBLOC™ worm hollow shaft module converting it to a solid output shaft unit. Three plug-in shaft options are available: single solid shaft extension, double solid shaft extension (L), and single solid shaft extension with a B5 flange (VF). The solid shaft can be assembled onto either side of the gear unit. The plug-in shaft kits are available in metric or inch extensions. The inch plug-in shaft kits are only available for the inch hollow shafts. The metric plug-in shaft kits are only available for the metric hollow shafts. The kits contain the shaft, keys, and snap rings.



B5 Flange (F)

A B5 flange provides a simple, large diameter mounting flange with clearance holes. Multiple B5 flanges are available for each gearbox size. Flange pilots self center into the shaft seal bore area on either side of the gear unit and firmly secure it to the application. The B5 flange kit contains the diecast aluminum flange and attachment bolts.



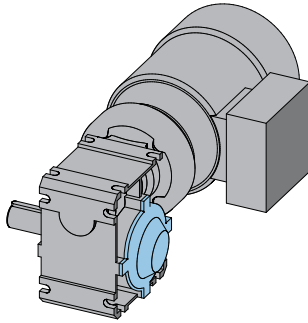
Gear Unit Options



FLEXBLOC™ INTRO

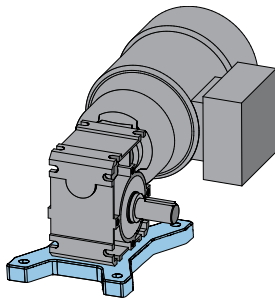
Shaft Cover (H)

The shaft cover seals the shaft end & provides protection from the rotating shaft. The kit contains the cover and bolts and may be assembled to both sides of the FLEXBLOC™ module.



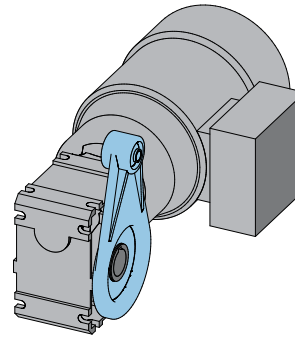
Foot Plate (X)

The footplate mounts to the bottom of the FLEXBLOC™ module to provide drop-in compatibility with many competitor worm gear units. The footplate is available for all FLEXBLOC™ modules except the SK 1SI75.



Torque Arm (D)

The torque arm is a compact and simple way to secure hollow shaft FLEXBLOC™ gear units. The NORD torque arm attaches to the B14 flange on either side of the FLEXBLOC™ module and can be rotated in 45 degree increments. The tear dropped shaped torque arm contains a rubber bushing located at the fastening hole-end to act as an absorber reducing peak shock loads. The torque arm kit contains the torque arm, bushing, and attachment bolts.



Hollow Shaft Bushing (J)

The SK 1SI50, SK 1SI63, and SK 1SI75 are available with hollow shaft bushings. This option allows greater bore flexibility. The hollow shaft bushings are only available to fit the standard inch hollow shafts and are not available for the metric hollow shafts. A hollow shaft bushing kit contains two bushings, one for each side, with a set screw and key.



Type	Bushing Bore Diameter	Kit Part Number
SK 1SI50	1 inch	60593400
SK 1SI63	1 inch	60693400
SK 1SI63	1-1/4 inch	60693420
SK 1SI75	1-1/4 inch	60793400
SK 1SI75	1-1/2 inch	60793410



Long Term Storage (LL)

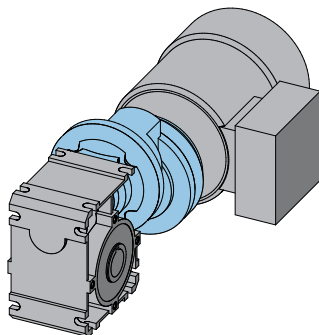
Speed reducers are frequently put in storage prior to installation for long periods of time and in some cases exposed to the elements. NORD's long term storage option protects the unit from moisture or corrosion by coating all unpainted surfaces with a dry, transparent, durable waxy film. Once installation 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 23°F and 104 °F (-5 °C and 40 °C).

Open Vent (OV)

All FLEXBLOC™ worm modules are available with an open vent. The open vent kit contains a guide on the mounting position dependent installation of the open vent. This option is not currently available for the SK 1SI31 units. P/N 60693500.

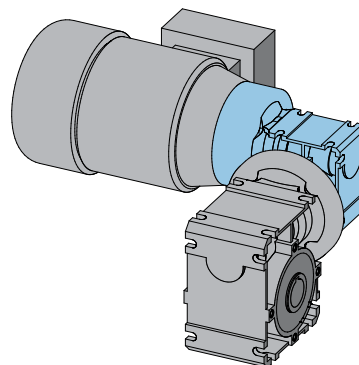
Helical Input Stage (H10)

The H10 helical input stage provides a 10:1 helical gear ratio to increase the total ratio when applied to a FLEXBLOC™ gear module. The H10 is sealed for life with synthetic lubricant. The kit is available for the SK 1SI40, SK 1SI50, SK 1SI63 and contains the preassembled unit and the attachment bolts.



Double Worm Adapter (SK 1SI__/_)

The double worm adapter allows two FLEXBLOC™ modules to be assembled together to produce a high reduction double worm gear unit. The kit contains the adapter flange, coupling, shaft, keys and attachment bolts.



NORD C-Face and IEC Motors

High performance stocked NEMA C-face motors are offered in standard efficiency, energy efficient and brakemotor designs. They are available in 208V-60Hz, 230/460V-60Hz and 575V-60Hz design and are inverter duty. The NORD stock motors will bolt directly to the appropriate NEMA or IEC adapter and power the FLEXBLOC™ module. Part numbers for stock NEMA motors are on page 74.

NORD will also assemble a NEMA C-face or IEC motor for your special requirements. We offer a range of environmental, electrical, inverter and brake and options that will suit your application. For more information on motor options see page 74.





Paint Free Design

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

Paint Coatings

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

Additionally a variety of coating options are available including our Severe Duty coatings:

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

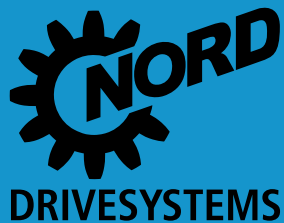
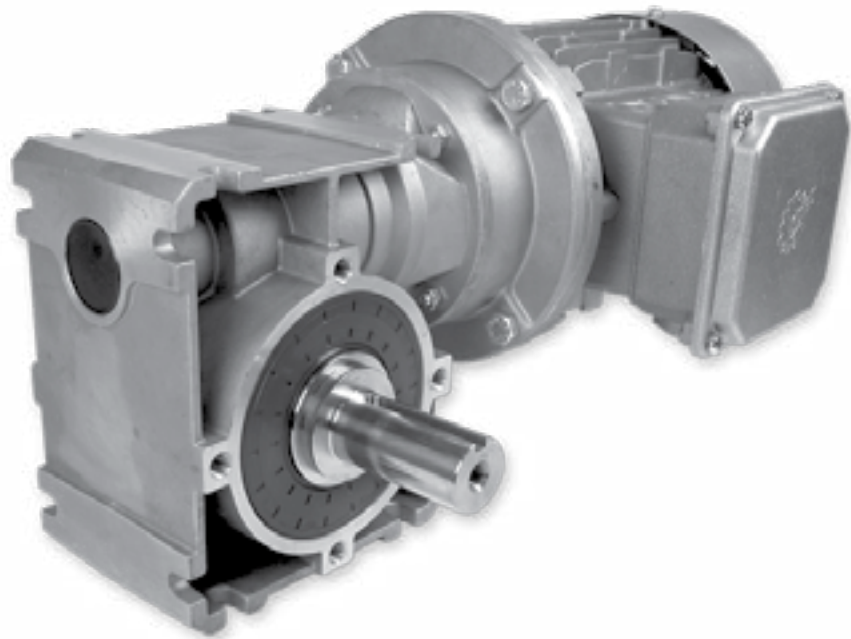
NORD Severe Duty Extreme NSD-X3	Stainless steel silver (Gray)	1 x Primer high solid alkyd system 1 x Stainless steel (316) (polyurethane) 1 x Clear top coat (polyurethane)	Indoor or outdoor more severe environment
NORD Severe Duty Extreme NSD-X3W	White	1 x Primer high solid alkyd system 1 x White (polyurethane) 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.

FLEXBLOC™ Gearmotor Ratings

Selection

- Order Form
- Unit Examples
- 0.16 hp
- 0.25 hp
- 0.33 hp
- 0.50 hp
- 0.75 hp
- 1.0 hp
- 1.5 hp
- 2.0 hp

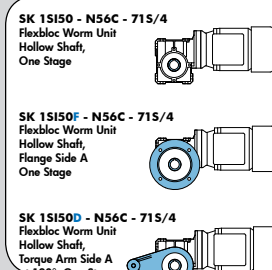


UNICASE™

www.nord.com

FLEXBLOC™
Ordering Guide

Gear Unit		Flexbloc Size	
SK	1SI		
Flexbloc Design		Flexbloc Size	
		☐ 31 ☐ 40 ☐ 50 ☐ 63 ☐ 75	☐ V - ☐ VA ☐ L - ☐ F - ☐ FA



Motor Power	Output Speed	Output Torque	Service Factor	AGMA Class	Gear Ratio	F ₂ ON
P _e	n ₂	T _e	f _s		i ₂₁	
[hp]	[rpm]	[lb-in]				
1.0	18	2786	3.3	III	94.19	30
	13	3320	3.3	III	129.00	33
	10	4069	2.9	III	165.50	36
	9.0	4441	2.7	III	183.50	36
	6.8	5567	2.3	III	241.50	36
	3.2	10580	1.2	I	510.00	32
	2.6	12885	1.0	I	645.00	28
6.4	7027	1.9	II		257.43	36
5.5	6669	2.0	III		299.28	36
4.5	7854	1.7	II		365.07	36
3.5	9716	1.4	II		468.37	36
3.2	10574	1.3	I		519.31	32
2.5	13197	1.1	I		660.60	27
6.1	7565	3.3	III		269.76	

FLEXBLOC™ Ordering Guide



GEARMOTORS

Gear Unit	Flexbloc Size	Reducer Options	Input	Motor	Motor Options
SK	1SI				
					see pages 175 - 185

Flexbloc Design	Flexbloc Size	Reducer Options
	☐ 31 ☐ 40 ☐ 50 ☐ 63 ☐ 75	☐ V - Plug in Solid Output Shaft 25 ☐ VA ☐ VB ☐ Unassembled ☐ L - Double Solid Shaft Extension 25 ☐ F - B5 Output Flange 25 ☐ FA ☐ FB ☐ FF ☐ Unassembled ☐ D - Torque Arm 26 ☐ DA ☐ DB ☐ Unassembled ☐ H - Shaft Cover 26 ☐ HA ☐ HB ☐ Unassembled ☐ Foot Plate 26 ☐ J - Shaft Bushing _____ size 26
	Shafts ☐ Inch ☐ Metric	

Input Shaft	NEMA Adapter	IEC
W	N48C N56C N140TC N180TC	IEC 63 IEC 71 IEC 80 IEC 90 IEC 100 IEC 112

Motors	Energy Efficient Motors
63S/4 - 0.16hp 63L/4 - 0.25hp 71S/4 - 0.33hp 71L/4 - 0.50hp 80S/4 - 0.75hp Other Speeds Available	80LH/4 - 1hp 90SH/4 - 1.5hp 90LH/4 - 2hp 100LH/4 - 3hp 112MH/4 - 5hp Other Speeds Available

Product Specifications

Single Worm	Helical Worm		Double Worm	
Ratio	Ratio	Position	Ratio	Position
☐ 5	☐ 50	☐ T1	☐ 150	☐ U1
☐ 7.5	☐ 75	☐ T2	☐ 225	☐ U2
☐ 10	☐ 100	☐ T3	☐ 300	☐ U3
☐ 12.5	☐ 125	☐ T4	☐ 375	☐ U4
☐ 15	☐ 150		☐ 450	☐ U5
☐ 20	☐ 200		☐ 600	☐ U6
☐ 25	☐ 250		☐ 750	☐ U7
☐ 30	☐ 300		☐ 900	☐ U8
☐ 40	☐ 400		☐ 1200	
☐ 50	☐ 500		☐ 1500	
☐ 60	☐ 600		☐ 1800	
☐ 80	☐ 800		☐ 2400	
☐ 100	☐ 1000		☐ 3000	

Paint	Torque Arm Orientation (If Selected)
☐ No Paint (Standard) ☐ Stainless Steel Paint ☐ NSD+ (gray) ☐ NSD+W (white) ☐ NSD-X3 (gray) ☐ NSD-X3W (white) ☐ Special _____	☐ 90° ☐ 135° ☐ 180° ☐ 225° ☐ 270° ☐ 315° ☐ Other
	Torque Arm Orientation (If Selected) ☐ Side A ☐ Side B

Gearmotor Only Details

Voltage & Frequency
☐ 230/460V-60Hz ☐ 575V-60Hz ☐ 400V-50Hz ☐ Other _____

Terminal Box Position
☐ KK1 ☐ KK2 ☐ KK3 ☐ KK4

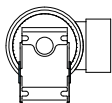
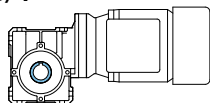
Conduit Entry Location
☐ I * ☐ II ☐ III * ☐ IV
* Brakemotor options



Examples of Available FLEXBLOC™ Units with Hollow Shaft Design

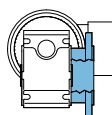
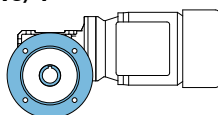
SK 1S150 - N56C - 71S/4

Flexbloc Worm Unit
Hollow Shaft,
One Stage



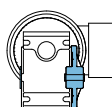
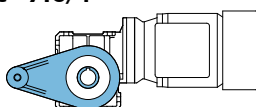
SK 1S150F - N56C - 71S/4

Flexbloc Worm Unit
Hollow Shaft,
Flange Side A
One Stage



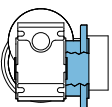
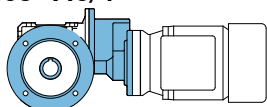
SK 1S150D - N56C - 71S/4

Flexbloc Worm Unit
Hollow Shaft,
Torque Arm Side A
at 180°, One Stage



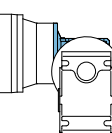
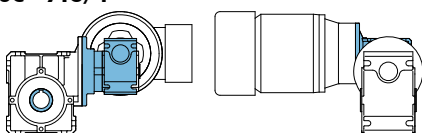
SK 1SM50/H10F - N56C - 71S/4

Flexbloc Worm Unit
Hollow Shaft,
Flange Side A,
Helical Input Stage T1,
Two Stages



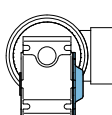
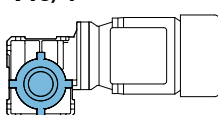
SK 1SM50/31F - N56C - 71S/4

Flexbloc Worm Unit
Hollow Shaft,
Flange Side B,
Double Worm U1,
Two Stages



SK 1SM50H - N56C - 71S/4

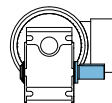
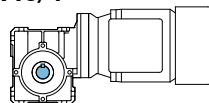
Flexbloc Worm Unit
Hollow Shaft,
Shaft Cover Side A,
One Stage



Examples of Available FLEXBLOC™ Units with Solid Shaft Design

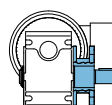
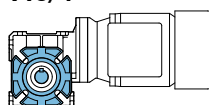
SK 1S150V - N56C - 71S/4

Flexbloc Worm Unit
Solid Shaft Side A,
One Stage



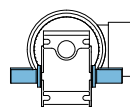
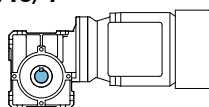
SK 1S150VF - N56C - 71S/4

Flexbloc Worm Unit
Solid Shaft Side A,
Flange Side A
One Stage



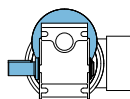
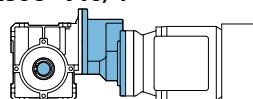
SK 1S150L - N56C - 71S/4

Flexbloc Worm Unit
Double Solid Shaft,
One Stage



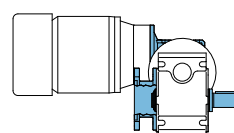
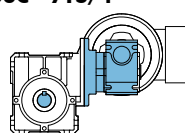
SK 1SM50/H10V - N56C - 71S/4

Flexbloc Worm Unit
Solid Shaft Side B,
Helical Input Stage T1,
Two Stages



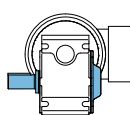
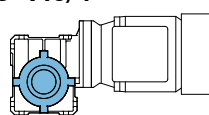
SK 1SM50/31V - N56C - 71S/4

Flexbloc Worm Unit
Solid Shaft Side A,
Flange Side B,
Double Worm U1,
Two Stages



SK 1SM50VH - N56C - 71S/4

Flexbloc Worm Unit
Solid Shaft Side B,
Shaft Cover Side A,
One Stage



0.16 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.16	340	26	7.8	5	5		259	180	SK 1SI31 - 56C - 63S/4	11	63
	227	37	6.4	7.5	7.5		295	205			
	170	48	4.8	10	10		322	225			
	136	60	3.6	12.5	12.5		344	234			
	113	64	4.0	15	15		367	234			
	85	81	2.9	20	20		401	234			
	68	97	2.3	25	25		405	234			
	57	100	2.6	30	30		405	234			
	43	122	2.0	40	40		405	234			
	34	140	1.6	50	50		405	234			
	28	154	1.4	60	60		405	232			
	21	177	1.1	80	80		405	232			
	17	196	0.9	100	100		405	232			
	340	27	12.7	5	5		608	416	SK 1SI40 - 56C - 63S/4	13	65
	227	38	10.2	7.5	7.5		693	416			
	170	50	7.5	10	10		720	414			
	136	60	6.1	12.5	12.5		720	414			
	113	68	6.4	15	15		720	414			
	85	86	4.6	20	20		720	414			
	68	103	3.6	25	25		720	414			
	57	109	4.1	30	30		720	414			
	43	134	3.0	40	40		720	414			
	34	155	2.5	50	50		720	414			
	28	172	2.1	60	60		720	414			
	21	200	1.6	80	80		720	414			
	17	221	1.4	100	100		720	412			
	340	27	21.5	5	5		1080	835	SK 1SI50 - 56C - 63S/4	17	67
	227	39	17.5	7.5	7.5		1080	844			
	170	51	12.9	10	10		1080	844			
	136	60	10.7	12.5	12.5		1080	844			
	113	72	10.8	15	15		1080	844			
	85	92	7.8	20	20		1080	844			
	68	110	6.1	25	25		1080	844			
	57	118	6.7	30	30		1080	844			
	43	148	5.0	40	40		1080	842			
	34	173	3.9	50	50		1080	842			
	28	193	3.3	60	60		1080	842			
	21	229	2.6	80	80		1080	842			
	17	257	2.1	100	100		1080	842			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.16 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.16	340	27	29.7	5	5		1418	779	SK 1SI63 - 56C - 63S/4	25	69
	227	40	29.7	7.5	7.5		1418	779			
	170	53	22.6	10	10		1418	779			
	136	60	19.1	12.5	12.5		1418	779			
	113	74	18.5	15	15		1418	779			
	85	95	13.4	20	20		1418	779			
	68	115	10.4	25	25		1418	779			
	57	125	11.3	30	30		1418	779			
	43	158	8.3	40	40		1418	779			
	34	185	6.6	50	50		1418	779			
	28	211	5.4	60	60		1418	779			
	21	253	4.1	80	80		1418	779			
	17	292	3.3	100	100		1418	779			
	34	242	2.3	50	5	10	720	412	SK 1SI40/H10 - 56C - 63S/4	15	65
	23	340	1.9	75	7.5	10	720	410			
	17	436	1.4	100	10	10	720	405			
	14	544	1.1	125	12.5	10	720	401			
	11	573	1.2	150	15	10	720	398			
	8.5	704	0.9	200	20	10	720	389			
	6.8	763	0.8	250	25	10	720	385			
	5.7	823	0.9	300	30	10	720	380			
	4.3	830	0.8	400	40	10	720	378			
	3.4	774	0.8	500	50	10	720	383			
	2.8	730	0.8	600	60	10	720	387			
	2.1	664	0.8	800	80	10	720	392			
	1.7	608	0.8	1000	100	10	720	396			
	34	248	3.7	50	5	10	1080	842	SK 1SI50/H10 - 56C - 63S/4	18	67
	23	349	3.2	75	7.5	10	1080	842			
	17	447	2.4	100	10	10	1080	839			
	14	544	1.9	125	12.5	10	1080	837			
	11	591	2.1	150	15	10	1080	837			
	8.5	728	1.6	200	20	10	1080	833			
	6.8	865	1.3	250	25	10	1080	830			
	5.7	877	1.5	300	30	10	1080	830			
	4.3	1050	1.1	400	40	10	1080	824			
	3.4	1193	0.9	500	50	10	1080	817			
	2.8	1305	0.8	600	60	10	1080	812			
	2.1	1195	0.8	800	80	10	1080	817			
	1.7	1117	0.8	1000	100	10	1080	821			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)

0.16 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.16	34	251	3.7	50	5	10	1418	779	SK 1SI63/H10 - 56C - 63S/4	26	69
	23	353	3.6	75	7.5	10	1418	779			
	17	453	3.7	100	10	10	1418	776			
	14	544	3.4	125	12.5	10	1418	774			
	11	609	3.7	150	15	10	1418	774			
	8.5	752	2.8	200	20	10	1418	770			
	6.8	880	2.2	250	25	10	1418	767			
	5.7	913	2.5	300	30	10	1418	765			
	4.3	1098	1.9	400	40	10	1418	761			
	3.4	1223	1.6	500	50	10	1418	754			
	2.8	1360	1.4	600	60	10	1418	749			
	2.1	1527	1.1	800	80	10	1418	740			
	1.7	1670	0.9	1000	100	10	1418	734			
	11	376	1.7	150	30	5	720	407	SK 1SI40/31 - 56C - 63S/4	16	65
	7.6	524	1.3	225	30	7.5	720	401			
	5.7	662	1.1	300	30	10	720	392			
	4.5	716	1.0	375	30	12.5	720	389			
	3.8	859	0.9	450	30	15	720	376			
	2.8	962	0.8	600	30	20	720	365			
	2.3	974	0.8	750	30	25	720	365			
	1.9	996	0.8	900	30	30	720	362			
	1.4	1029	0.8	1200	30	40	720	358			
	1.1	1051	0.8	1500	30	50	720	356			
	0.9	1062	0.8	1800	30	60	720	353			
	0.7	1084	0.8	2400	30	80	720	351			
	0.6	1095	0.8	3000	30	100	720	349			
	11	412	2.9	150	30	5	1080	839	SK 1SI50/31 - 56C - 63S/4	20	67
	7.6	550	2.3	225	30	7.5	1080	837			
	5.7	698	1.9	300	30	10	1080	835			
	4.5	716	1.8	375	30	12.5	1080	835			
	3.8	913	1.5	450	30	15	1080	828			
	2.8	1110	1.2	600	30	20	1080	821			
	2.3	1298	1.1	750	30	25	1080	812			
	1.9	1342	1.1	900	30	30	1080	810			
	1.4	1647	0.9	1200	30	40	1080	794			
	1.1	1892	0.8	1500	30	50	1080	779			
	0.9	1914	0.8	1800	30	60	1080	776			
	0.7	1947	0.8	2400	30	80	1080	774			
	0.6	1969	0.8	3000	30	100	1080	772			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)



0.16 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.16	11	430	4.9	150	30	5	1418	776	SK 1S163/31 - 56C - 63S/4	28	69
	7.6	577	3.8	225	30	7.5	1418	774			
	5.7	734	3.1	300	30	10	1418	772			
	4.5	716	3.3	375	30	12.5	1418	772			
	3.8	940	2.5	450	30	15	1418	765			
	2.8	1145	2.1	600	30	20	1418	758			
	2.3	1342	1.9	750	30	25	1418	749			
	1.9	1396	1.8	900	30	30	1418	747			
	1.4	1647	1.6	1200	30	40	1418	734			
	1.1	1790	1.5	1500	30	50	1418	727			
	0.9	2040	1.3	1800	30	60	1418	709			
	0.7	2291	1.2	2400	30	80	1411	689			
	0.6	2506	1.1	3000	30	100	1373	671			
	11	430	6.6	150	30	5	1800	1800	SK 1S175/40 - 56C - 63S/4	40	71
	7.6	591	5.1	225	30	7.5	1800	1800			
	5.7	752	4.1	300	30	10	1800	1800			
	4.5	716	4.4	375	30	12.5	1800	1800			
	3.8	966	3.3	450	30	15	1800	1800			
	2.8	1181	2.8	600	30	20	1800	1800			
	2.3	1387	2.4	750	30	25	1800	1800			
	1.9	1450	2.4	900	30	30	1800	1800			
	1.4	1718	2.1	1200	30	40	1800	1800			
	1.1	1969	1.8	1500	30	50	1800	1800			
	0.9	2148	1.7	1800	30	60	1800	1800			
	0.7	2434	1.5	2400	30	80	1800	1800			
	0.6	2327	1.6	3000	30	100	1800	1800			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.25 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.25	336	42	4.9	5	5		254	178	SK 1SI31 - 56C - 63L/4	12	63
	224	60	4.0	7.5	7.5		290	203			
	168	76	3.0	10	10		317	221			
	134	96	2.2	12.5	12.5		335	234			
	112	103	2.5	15	15		358	234			
	84	130	1.8	20	20		389	234			
	67	155	1.4	25	25		405	232			
	56	161	1.7	30	30		405	232			
	42	195	1.3	40	40		405	232			
	34	225	1.0	50	50		405	230			
	28	242	0.9	60	60		405	227			
	336	43	7.9	5	5		603	414	SK 1SI40 - 56C - 63L/4	15	65
	224	61	6.4	7.5	7.5		691	414			
	168	79	4.7	10	10		720	414			
	134	96	3.8	12.5	12.5		720	414			
	112	109	4.0	15	15		720	414			
	84	138	2.9	20	20		720	414			
	67	165	2.3	25	25		720	414			
	56	175	2.5	30	30		720	414			
	42	214	1.9	40	40		720	412			
	34	249	1.5	50	50		720	412			
	28	275	1.3	60	60		720	412			
	21	321	1.0	80	80		720	410			
	17	354	0.9	100	100		720	410			
	336	43	13.4	5	5		1080	835	SK 1SI50 - 56C - 63L/4	18	67
	224	63	10.9	7.5	7.5		1080	844			
	168	82	8.1	10	10		1080	844			
	134	96	6.7	12.5	12.5		1080	844			
	112	115	6.7	15	15		1080	844			
	84	147	4.9	20	20		1080	842			
	67	177	3.8	25	25		1080	842			
	56	189	4.2	30	30		1080	842			
	42	237	3.1	40	40		1080	842			
	34	277	2.5	50	50		1080	842			
	28	310	2.1	60	60		1080	842			
	21	367	1.6	80	80		1080	842			
	17	411	1.3	100	100		1080	839			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)



0.25 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.25	336	44	18.5	5	5		1418	779	SK 1SI63 - 56C - 63L/4	26	69
	224	65	18.5	7.5	7.5		1418	779			
	168	84	14.1	10	10		1418	779			
	134	96	11.9	12.5	12.5		1418	779			
	112	119	11.5	15	15		1418	779			
	84	153	8.3	20	20		1418	779			
	67	184	6.5	25	25		1418	779			
	56	201	7.1	30	30		1418	779			
	42	252	5.2	40	40		1418	779			
	34	296	4.1	50	50		1418	779			
	28	338	3.4	60	60		1418	779			
	21	405	2.6	80	80		1418	776			
	17	468	2.1	100	100		1418	776			
	34	387	1.4	50	5	10	720	407	SK 1SI40/H10 - 56C - 63L/4	16	65
	22	545	1.2	75	7.5	10	720	401			
	17	698	0.9	100	10	10	720	389			
	11	918	0.8	150	15	10	720	369			
	34	397	2.3	50	5	10	1080	839	SK 1SI50/H10 - 56C - 63L/4	20	67
	22	559	2.0	75	7.5	10	1080	837			
	17	717	1.5	100	10	10	1080	835			
	13	872	1.2	125	12.5	10	1080	830			
	11	946	1.3	150	15	10	1080	828			
	8.4	1166	1.0	200	20	10	1080	819			
	6.7	1386	0.8	250	25	10	1080	808			
	5.6	1405	0.9	300	30	10	1080	808			
	34	401	2.3	50	5	10	1418	776	SK 1SI63/H10 - 56C - 63L/4	27	69
	22	566	2.3	75	7.5	10	1418	774			
	17	726	2.3	100	10	10	1418	772			
	13	872	2.1	125	12.5	10	1418	767			
	11	975	2.3	150	15	10	1418	765			
	8.4	1204	1.7	200	20	10	1418	756			
	6.7	1410	1.4	250	25	10	1418	747			
	5.6	1462	1.6	300	30	10	1418	745			
	4.2	1759	1.2	400	40	10	1418	727			
	3.4	1959	1.0	500	50	10	1418	716			
	2.8	2179	0.9	600	60	10	1418	698			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)

0.25 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.25	11	602	1.1	150	30	5	720	396	SK 1SI40/31 - 56C - 63L/4	17	65
	7.5	839	0.8	225	30	7.5	720	378			
	11	660	1.8	150	30	5	1080	835	SK 1SI50/31 - 56C - 63L/4	21	67
	7.5	882	1.4	225	30	7.5	1080	830			
	5.6	1118	1.2	300	30	10	1080	821			
	4.5	1147	1.1	375	30	12.5	1080	819			
	3.7	1462	0.9	450	30	15	1080	806			
	2.8	1778	0.8	600	30	20	1080	785			
	11	688	3.0	150	30	5	1418	772	SK 1SI63/31 - 56C - 63L/4	29	69
	7.5	925	2.4	225	30	7.5	1418	765			
	5.6	1176	2.0	300	30	10	1418	756			
	4.5	1147	2.0	375	30	12.5	1418	758			
	3.7	1505	1.6	450	30	15	1418	743			
	2.8	1835	1.3	600	30	20	1418	722			
	2.2	2151	1.2	750	30	25	1418	700			
	1.9	2237	1.1	900	30	30	1418	693			
	1.4	2638	1.0	1200	30	40	1346	657			
	1.1	2868	0.9	1500	30	50	1296	632			
	0.9	3269	0.8	1800	30	60	1190	581			
	0.7	3670	0.8	2400	30	80	1060	518			
	11	688	4.1	150	30	5	1800	1800	SK 1SI75/40 - 56C - 63L/4	41	71
	7.5	946	3.2	225	30	7.5	1800	1800			
	5.6	1204	2.6	300	30	10	1800	1800			
	4.5	1147	2.8	375	30	12.5	1800	1800			
	3.7	1548	2.1	450	30	15	1800	1800			
	2.8	1893	1.8	600	30	20	1800	1800			
	2.2	2222	1.5	750	30	25	1800	1800			
	1.9	2323	1.5	900	30	30	1800	1800			
	1.4	2753	1.3	1200	30	40	1800	1800			
	1.1	3154	1.2	1500	30	50	1800	1800			
	0.9	3441	1.1	1800	30	60	1800	1800			
	0.7	3900	1.0	2400	30	80	1800	1800			
	0.6	3728	1.0	3000	30	100	1800	1800			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.33	342	54	3.8	5	5		248	173	SK 1SI31 - 56C - 71S/4	15	63
	228	77	3.1	7.5	7.5		284	196			
	171	99	2.3	10	10		308	214			
	137	124	1.7	12.5	12.5		326	227			
	114	133	1.9	15	15		347	234			
	86	168	1.4	20	20		376	232			
	68	201	1.1	25	25		401	230			
	57	208	1.3	30	30		405	230			
	43	252	1.0	40	40		405	227			
	34	286	0.8	50	50		405	225			
	342	55	6.1	5	5		596	414	SK 1SI40 - 56C - 71S/4	17	65
	228	79	4.9	7.5	7.5		682	414			
	171	103	3.6	10	10		720	414			
	137	124	2.9	12.5	12.5		720	414			
	114	141	3.1	15	15		720	414			
	86	178	2.2	20	20		720	414			
	68	213	1.7	25	25		720	414			
	57	226	2.0	30	30		720	412			
	43	277	1.5	40	40		720	412			
	34	321	1.2	50	50		720	410			
	29	356	1.0	60	60		720	410			
	21	415	0.8	80	80		720	407			
	342	56	10.4	5	5		1080	826	SK 1SI50 - 56C - 71S/4	21	67
	228	82	8.5	7.5	7.5		1080	844			
	171	106	6.2	10	10		1080	844			
	137	124	5.2	12.5	12.5		1080	844			
	114	148	5.2	15	15		1080	842			
	86	190	3.8	20	20		1080	842			
	68	229	2.9	25	25		1080	842			
	57	245	3.3	30	30		1080	842			
	43	306	2.4	40	40		1080	842			
	34	358	1.9	50	50		1080	842			
	29	400	1.6	60	60		1080	839			
	21	474	1.2	80	80		1080	839			
	17	531	1.0	100	100		1080	837			
	342	57	14.3	5	5		1418	779	SK 1SI63 - 56C - 71S/4	29	69
	228	83	14.3	7.5	7.5		1418	779			
	171	109	10.9	10	10		1418	779			
	137	124	9.2	12.5	12.5		1418	779			
	114	154	8.9	15	15		1418	779			
	86	198	6.4	20	20		1418	779			
	68	238	5.0	25	25		1418	779			
	57	259	5.5	30	30		1418	779			
	43	326	4.0	40	40		1418	779			
	34	383	3.2	50	50		1418	776			
	29	437	2.6	60	60		1418	776			
	21	524	2.0	80	80		1418	774			
	17	605	1.6	100	100		1418	774			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)



0.33 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page			
P ₁	n ₂	T ₂	f _B	i _{tot}	i _{worm}	i _{2nd}	F _R	F _{RF}						
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]				
0.33	342	57	30.2	5	5		1800	1800	SK 1SI75 - 56C - 71S/4	38	71			
	228	84	24.6	7.5	7.5		1800	1800						
	171	111	18.1	10	10		1800	1800						
	137	124	15.5	12.5	12.5		1800	1800						
	114	158	14.8	15	15		1800	1800						
	86	205	10.6	20	20		1800	1800						
	68	250	8.1	25	25		1800	1800						
	57	259	7.4	30	30		1800	1800						
	43	346	6.4	40	40		1800	1800						
	34	414	5.0	50	50		1800	1800						
	29	474	4.1	60	60		1800	1800						
	21	583	3.1	80	80		1800	1800						
	17	667	2.5	100	100		1800	1800						
	34	500	1.1	50	5	10	720	403				SK 1SI40/H10 - 56C - 71S/4	19	65
	23	704	0.9	75	7.5	10	720	389						
34	513	1.8	50	5	10	1080	839	SK 1SI50/H10 - 56C - 71S/4	22	67				
23	723	1.6	75	7.5	10	1080	835							
17	927	1.2	100	10	10	1080	828							
14	1128	0.9	125	12.5	10	1080	821							
11	1223	1.0	150	15	10	1080	817							
8.6	1507	0.8	200	20	10	1080	803							
34	519	1.8	50	5	10	1418	774	SK 1SI63/H10 - 56C - 71S/4	30	69				
23	732	1.8	75	7.5	10	1418	772							
17	939	1.8	100	10	10	1418	765							
14	1128	1.6	125	12.5	10	1418	758							
11	1260	1.8	150	15	10	1418	754							
8.6	1557	1.3	200	20	10	1418	740							
6.8	1823	1.1	250	25	10	1418	725							
5.7	1891	1.2	300	30	10	1418	720							
4.3	2274	0.9	400	40	10	1415	691							
3.4	2533	0.8	500	50	10	1368	668							
11	778	0.8	150	30	5	720	383	SK 1SI40/31 - 56C - 71S/4	20	65				
11	853	1.4	150	30	5	1080	830	SK 1SI50/31 - 56C - 71S/4	24	67				
7.6	1140	1.1	225	30	7.5	1080	819							
5.7	1446	0.9	300	30	10	1080	806							
4.6	1483	0.9	375	30	12.5	1080	803							

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.33 hp, 0.5 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.33	11	890	2.4	150	30	5	1418	767	SK 1S163/31 - 56C - 71S/4	32	69
	7.6	1195	1.9	225	30	7.5	1418	756			
	5.7	1520	1.5	300	30	10	1418	740			
	4.6	1483	1.6	375	30	12.5	1418	743			
	3.8	1946	1.2	450	30	15	1418	716			
	2.9	2372	1.0	600	30	20	1397	682			
	2.3	2780	0.9	750	30	25	1316	641			
	1.9	2891	0.9	900	30	30	1289	630			
	1.4	3410	0.8	1200	30	40	1148	560			
	11	890	3.2	150	30	5	1800	1800	SK 1S175/40 - 56C - 71S/4	44	71
	7.6	1223	2.5	225	30	7.5	1800	1800			
	5.7	1557	2.0	300	30	10	1800	1800			
	4.6	1483	2.1	375	30	12.5	1800	1800			
	3.8	2002	1.6	450	30	15	1800	1800			
	2.9	2447	1.4	600	30	20	1800	1800			
	2.3	2873	1.2	750	30	25	1800	1800			
	1.9	3003	1.1	900	30	30	1800	1800			
	1.4	3559	1.0	1200	30	40	1800	1800			
	1.1	4078	0.9	1500	30	50	1800	1800			
	0.9	4448	0.8	1800	30	60	1800	1800			
	0.6	4819	0.8	3000	30	100	1800	1800			
0.5	344	79	2.6	5	5		241	167	SK 1S131 - 56C - 71L/4	17	63
	229	113	2.1	7.5	7.5		272	189			
	172	145	1.6	10	10		295	205			
	138	182	1.2	12.5	12.5		311	216			
	115	196	1.3	15	15		329	230			
	86	247	1.0	20	20		356	227			
	57	308	0.9	30	30		398	223			
	344	81	4.2	5	5		590	414	SK 1S140 - 56C - 71L/4	19	65
	229	116	3.4	7.5	7.5		673	414			
	172	151	2.5	10	10		720	414			
	138	182	2.0	12.5	12.5		720	414			
	115	207	2.1	15	15		720	414			
	86	262	1.5	20	20		720	412			
	69	314	1.2	25	25		720	410			
	57	333	1.3	30	30		720	410			
	43	407	1.0	40	40		720	407			
	34	473	0.8	50	50		720	403			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)

0.5 hp Gearmotors



GEARMOTORS

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.5	344	83	7.1	5	5		1080	821	SK 1S150 - 56C - 71L/4	23	67
	229	120	5.8	7.5	7.5		1080	844			
	172	156	4.2	10	10		1080	842			
	138	182	3.5	12.5	12.5		1080	842			
	115	218	3.5	15	15		1080	842			
	86	280	2.6	20	20		1080	842			
	69	336	2.0	25	25		1080	842			
	57	360	2.2	30	30		1080	842			
	43	451	1.6	40	40		1080	839			
	34	527	1.3	50	50		1080	837			
	29	589	1.1	60	60		1080	837			
	22	698	0.8	80	80		1080	835			
	344	84	9.7	5	5		1418	779	SK 1S163 - 56C - 71L/4	31	69
	229	123	9.7	7.5	7.5		1418	779			
	172	160	7.4	10	10		1418	779			
	138	182	6.3	12.5	12.5		1418	779			
	115	226	6.1	15	15		1418	779			
	86	291	4.4	20	20		1418	779			
	69	350	3.4	25	25		1418	779			
	57	382	3.7	30	30		1418	776			
	43	480	2.7	40	40		1418	776			
	34	564	2.2	50	50		1418	774			
	29	644	1.8	60	60		1418	772			
	22	771	1.4	80	80		1418	770			
	17	891	1.1	100	100		1418	767			
	344	85	20.5	5	5		1800	1800	SK 1S175 - 56C - 71L/4	40	71
	229	124	16.7	7.5	7.5		1800	1800			
	172	164	12.3	10	10		1800	1800			
	138	182	10.5	12.5	12.5		1800	1800			
	115	232	10.1	15	15		1800	1800			
	86	302	7.2	20	20		1800	1800			
	69	368	5.5	25	25		1800	1800			
	57	382	5.1	30	30		1800	1800			
	43	509	4.3	40	40		1800	1800			
	34	609	3.4	50	50		1800	1800			
	29	698	2.8	60	60		1800	1800			
	22	858	2.1	80	80		1800	1800			
	17	982	1.7	100	100		1800	1800			
	34	755	1.2	50	5	10	1080	833	SK 1S150/H10 - 56C - 71L/4	24	67
	23	1064	1.1	75	7.5	10	1080	824			
	17	1364	0.8	100	10	10	1080	810			
	34	764	1.2	50	5	10	1418	770	SK 1S163/H10 - 56C - 71L/4	32	69
	23	1077	1.2	75	7.5	10	1418	761			
	17	1382	1.2	100	10	10	1418	747			
	14	1659	1.1	125	12.5	10	1418	734			
	11	1854	1.2	150	15	10	1418	722			
	8.6	2291	0.9	200	20	10	1411	689			
	5.7	2782	0.8	300	30	10	1316	641			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.5 hp , 0.75 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.5	11	1254	0.9	150	30	5	1080	815	SK 1SI50/31 - 56C - 71L/4	26	67
	11	1309	1.6	150	30	5	1418	752	SK 1SI63/31 - 56C - 71L/4	34	69
	7.6	1759	1.3	225	30	7.5	1418	727			
	5.7	2236	1.0	300	30	10	1418	693			
	4.6	2182	1.1	375	30	12.5	1418	698			
	3.8	2864	0.8	450	30	15	1296	632			
	11	1309	2.2	150	30	5	1800	1800	SK 1SI75/40 - 56C - 71L/4	46	71
	7.6	1800	1.7	225	30	7.5	1800	1800			
	5.7	2291	1.4	300	30	10	1800	1800			
	4.6	2182	1.5	375	30	12.5	1800	1800			
	3.8	2945	1.1	450	30	15	1800	1800			
	2.9	3600	0.9	600	30	20	1800	1800			
	2.3	4227	0.8	750	30	25	1800	1800			
	1.9	4418	0.8	900	30	30	1800	1800			
	342	123	2.7	5	5		583	414	SK 1SI40 - 56C - 80S/4	23	65
	228	176	2.2	7.5	7.5		662	414			
	171	230	1.6	10	10		720	412			
	137	277	1.3	12.5	12.5		720	412			
	114	316	1.4	15	15		720	410			
	86	399	1.0	20	20		720	407			
	68	477	0.8	25	25		720	403			
	57	507	0.9	30	30		720	403			
	342	126	4.6	5	5		1080	817	SK 1SI50 - 56C - 80S/4	27	67
	228	183	3.8	7.5	7.5		1080	842			
	171	238	2.8	10	10		1080	842			
	137	277	2.3	12.5	12.5		1080	842			
	114	332	2.3	15	15		1080	842			
	86	426	1.7	20	20		1080	839			
	68	512	1.3	25	25		1080	839			
	57	548	1.5	30	30		1080	837			
	43	686	1.1	40	40		1080	835			
	34	803	0.8	50	50		1080	833			
	342	127	6.4	5	5		1418	779	SK 1SI63 - 56C - 80S/4	34	69
	228	187	6.4	7.5	7.5		1418	779			
	171	244	4.9	10	10		1418	779			
	137	277	4.1	12.5	12.5		1418	779			
	114	345	4.0	15	15		1418	779			
	86	443	2.9	20	20		1418	776			
	68	533	2.2	25	25		1418	774			
	57	581	2.4	30	30		1418	774			
	43	731	1.8	40	40		1418	772			
	34	858	1.4	50	50		1418	767			
	29	980	1.2	60	60		1418	763			
	21	1174	0.9	80	80		1418	756			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)

0.75 hp, 1.0 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.75	342	129	13.5	5	5		1800	1800	SK 1S175 - 56C - 80S/4	44	71
	228	189	11.0	7.5	7.5		1800	1800			
	171	249	8.1	10	10		1800	1800			
	137	277	6.9	12.5	12.5		1800	1800			
	114	353	6.6	15	15		1800	1800			
	86	459	4.7	20	20		1800	1800			
	68	560	3.6	25	25		1800	1800			
	57	581	3.3	30	30		1800	1800			
	43	775	2.9	40	40		1800	1800			
	34	927	2.2	50	50		1800	1800			
	29	1063	1.8	60	60		1800	1800			
	21	1306	1.4	80	80		1800	1800			
	17	1495	1.1	100	100		1800	1800			
	11	1993	1.4	150	30	5	1800	1800	SK 1S175/40 - 56C - 80S/4	49	71
	7.6	2740	1.1	225	30	7.5	1800	1800			
	5.7	3487	0.9	300	30	10	1800	1800			
	4.6	3321	1.0	375	30	12.5	1800	1800			
1.0	330	171	2.0	5	5		576	414	SK 1S140 - 56C - 80L/4 SK 1S140 - 56C - 80LH/4	25	65
	220	245	1.6	7.5	7.5		655	412			
	165	319	1.2	10	10		713	410			
	132	384	0.9	12.5	12.5		720	407			
	110	438	1.0	15	15		720	405			
	350	161	2.1	5	5		576	414	SK 1S140 - 140TC - 80LH/4	25	65
	233	231	1.7	7.5	7.5		655	412			
	175	301	1.2	10	10		713	410			
	140	362	1.0	12.5	12.5		720	407			
	117	412	1.1	15	15		720	405			
	330	175	3.3	5	5		1080	819	SK 1S150 - 56C - 80L/4 SK 1S150 - 56C - 80LH/4	29	67
	220	254	2.7	7.5	7.5		1080	842			
	165	330	2.0	10	10		1080	842			
	132	384	1.7	12.5	12.5		1080	839			
	110	461	1.7	15	15		1080	839			
	83	592	1.2	20	20		1080	837			
	66	711	0.9	25	25		1080	835			
	55	761	1.0	30	30		1080	833			
	41	953	0.8	40	40		1080	828			
	350	165	3.5	5	5		1080	819	SK 1S150 - 140TC - 80LH/4	29	67
	233	240	2.9	7.5	7.5		1080	842			
	175	311	2.1	10	10		1080	842			
	140	362	1.8	12.5	12.5		1080	839			
	117	433	1.8	15	15		1080	839			
	88	555	1.3	20	20		1080	837			
	70	670	1.0	25	25		1080	835			
	58	722	1.1	30	30		1080	833			
	44	888	0.8	40	40		1080	828			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0) (Model type in blue is an energy efficient motor)



1.0 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
1.0	330	177	4.6	5	5		1418	779	SK 1SI63 - 56C - 80L/4 SK 1SI63 - 56C - 80LH/4	37	69
	220	259	4.6	7.5	7.5		1418	779			
	165	338	3.5	10	10		1418	779			
	132	384	3.0	12.5	12.5		1418	776			
	110	478	2.9	15	15		1418	776			
	83	615	2.1	20	20		1418	774			
	66	740	1.6	25	25		1418	770			
	55	807	1.8	30	30		1418	770			
	41	1014	1.3	40	40		1418	763			
	33	1191	1.0	50	50		1418	756			
	28	1360	0.8	60	60		1418	749			
	350	167	6.3	5	5		1418	779			
	233	245	5.0	7.5	7.5		1418	779			
	175	319	3.7	10	10		1418	779			
	140	362	3.2	12.5	12.5		1418	776			
	117	449	3.1	15	15		1418	776			
	88	577	2.2	20	20		1418	774			
	70	698	1.7	25	25		1418	770			
	58	765	1.9	30	30		1418	770			
	44	951	1.4	40	40		1418	763			
	35	1123	1.1	50	50		1418	756			
	29	1290	0.9	60	60		1418	749			
	330	179	9.7	5	5		1800	1800	SK 1SI75 - 56C - 80L/4 SK 1SI75 - 56C - 80LH/4	46	71
	220	262	7.9	7.5	7.5		1800	1800			
	165	346	5.8	10	10		1800	1800			
	132	384	5.0	12.5	12.5		1800	1800			
	110	490	4.8	15	15		1800	1800			
	83	638	3.4	20	20		1800	1800			
	66	778	2.6	25	25		1800	1800			
	55	807	2.4	30	30		1800	1800			
	41	1076	2.1	40	40		1800	1800			
	33	1287	1.6	50	50		1800	1800			
	28	1475	1.3	60	60		1800	1800			
	21	1813	1.0	80	80		1800	1800			
	17	2075	0.8	100	100		1800	1800			
	350	169	10.2	5	5		1800	1800			
	233	247	8.3	7.5	7.5		1800	1800			
	175	326	6.1	10	10		1800	1800			
	140	362	5.3	12.5	12.5		1800	1800			
	117	461	5.0	15	15		1800	1800			
	88	598	3.6	20	20		1800	1800			
	70	734	2.8	25	25		1800	1800			
	58	765	2.5	30	30		1800	1800			
	44	1009	2.2	40	40		1800	1800			
	35	1214	1.7	50	50		1800	1800			
	29	1399	1.4	60	60		1800	1800			
	22	1700	1.0	80	80		1800	1800			
	18	1902	0.9	100	100		1800	1800			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0) (Model type in blue is an energy efficient motor)

1.0 hp, 1.5 hp, 2.0 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
1.0	11	2766	1.0	150	30	5	1800	1800	SK 1SI75/40 - 56C - 80L/4 SK 1SI75/40 - 56C - 80LH/4	52	71
	7.3	3803	0.8	225	30	7.5	1800	1800			
	12	2536	1.1	150	30	5	1800	1800	SK 1SI75/40 - 140TC - 80LH/4	52	71
	8	3486	0.9	225	30	7.5	1800	1800			
1.5	348	242	1.4	5	5		554	403	SK 1SI40 - 140TC - 90SH/4	32	65
	232	347	1.1	7.5	7.5		628	410			
	174	451	0.8	10	10		677	403			
	348	247	2.4	5	5		1078	803	SK 1SI50 - 140TC - 90SH/4	36	67
	232	359	1.9	7.5	7.5		1080	842			
	174	468	1.4	10	10		1080	839			
	139	545	1.2	12.5	12.5		1080	837			
	116	655	1.2	15	15		1080	835			
	87	838	0.9	20	20		1080	830			
	348	250	4.2	5	5		1418	779	SK 1SI63 - 140TC - 90SH/4	43	69
	232	354	3.5	7.5	7.5		1418	776			
	174	479	2.5	10	10		1418	776			
	139	545	2.1	12.5	12.5		1418	774			
	116	677	2.0	15	15		1418	772			
	87	870	1.5	20	20		1418	765			
	70	1042	1.1	25	25		1418	761			
	58	1143	1.2	30	30		1418	756			
	44	1437	0.9	40	40		1418	743			
	348	253	6.8	5	5		1800	1800	SK 1SI75 - 140TC - 90SH/4	53	71
	232	371	5.5	7.5	7.5		1800	1800			
	174	489	4.1	10	10		1800	1800			
	139	545	3.5	12.5	12.5		1800	1800			
	116	694	3.3	15	15		1800	1800			
	87	904	2.4	20	20		1800	1800			
	70	1096	1.8	25	25		1800	1800			
	58	1143	1.7	30	30		1800	1800			
	44	1506	1.5	40	40		1800	1800			
	35	1812	1.1	50	50		1800	1800			
	29	2089	0.9	60	60		1800	1800			
2.0	349	328	1.8	5	5		1060	792	SK 1SI50 - 140TC - 90LH/4	40	67
	233	475	1.5	7.5	7.5		1080	839			
	175	619	1.1	10	10		1080	835	SK 1SI63 - 140TC - 90LH/4	48	69
	140	721	0.9	12.5	12.5		1080	833			
	116	871	0.9	15	15		1080	828			
	349	332	3.1	5	5		1418	779	SK 1SI63 - 140TC - 90LH/4	48	69
	233	486	2.5	7.5	7.5		1418	776			
	175	634	1.9	10	10		1418	772			
	140	720	1.6	12.5	12.5		1418	770			
	116	901	1.5	15	15		1418	765			
	87	1158	1.1	20	20		1418	756			
	70	1385	0.9	25	25		1418	745			
	58	1520	0.9	30	30		1418	738			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0) (Model type in blue is an energy efficient motor)



2.0 hp, 3.0 hp, 5.0 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Config. Page
P_1	n_2	T_2	f_B	i_{tot}	i_{worm}	i_{2nd}	F_R	F_{RF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
2.0	349	336	5.1	5	5		1800	1800	SK 1SI75 - 140TC - 90LH/4	57	71
	233	492	4.2	7.5	7.5		1800	1800			
	175	648	3.1	10	10		1800	1800			
	140	720	2.7	12.5	12.5		1800	1800			
	116	923	2.5	15	15		1800	1800			
	87	1201	1.8	20	20		1800	1800			
	70	1448	1.4	25	25		1800	1800			
	58	1520	1.3	30	30		1800	1800			
	44	2003	1.1	40	40		1800	1800			
	35	2410	0.8	50	50		1800	1800			
3.0	353	499	3.4	5	5		1800	1773	SK 1SI75 - 180TC - 100H/4	66	71
	235	733	2.8	7.5	7.5		1800	1800			
	177	962	2.1	10	10		1800	1800			
	141	1074	1.8	12.5	12.5		1800	1800			
	118	1364	1.7	15	15		1800	1800			
	88	1785	1.2	20	20		1800	1800			
	71	2160	0.9	25	25		1800	1800			
	59	2244	0.9	30	30		1800	1800			
5.0	354	828	2.1	5	5		1800	1730	SK 1SI75 - 180TC - 112MH/4	73	71
	236	1215	1.7	7.5	7.5		1800	1800			
	177	1603	1.2	10	10		1800	1800			
	142	1777	1.1	12.5	12.5		1800	1800			
	118	2270	1.0	15	15		1800	1800			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0) (Model type in blue is an energy efficient motor)

FLEXBLOC™ Selection Single Worm



GEARMOTORS

Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio $i_{2\text{nd}}$	Motor Power ~ Based on 1750 rpm										Gear Max Torque $T_{2\text{max}}$ [lb-in]	Max Input Power $P_{1\text{max}}$ [hp]	Gear Unit	NEMA Adapter	Config. Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]						
350	5	5	-	26	42	54	79	120						204	1.30	SK 1SI31	48C	63
				26	42	54	79	120	166					204	1.30	SK 1SI31	56C	63
				27	43	55	81	123	171					336	2.10	SK 1SI40	56C	65
									171	254				336	2.10	SK 1SI40	140TC	65
				27	43	56	83	126	175					584	3.56	SK 1SI50	56C	67
									175	259	345			584	3.56	SK 1SI50	140TC	67
				27	44	57	84	127	177					1044	6.30	SK 1SI63	56C	69
									177	262	349			1044	6.30	SK 1SI63	140TC	69
												510	840	1044	6.30	SK 1SI63	180TC	69
				28	44	57	85	129	179					1735	10.36	SK 1SI75	56C	71
									179	265	353			1735	10.36	SK 1SI75	140TC	71
												516	850	1735	10.36	SK 1SI75	180TC	71
233	7.5	7.5	-	37	60	77	113	172						239	1.06	SK 1SI31	48C	63
				37	60	77	113	172	236					239	1.06	SK 1SI31	56C	63
				38	61	79	116	176	245					389	1.69	SK 1SI40	56C	65
										364				389	1.69	SK 1SI40	140TC	65
				39	43	82	120	183	254					690	2.90	SK 1SI50	56C	67
										376	501			690	2.90	SK 1SI50	140TC	67
				40	65	83	123	187	259					1230	5.05	SK 1SI63	56C	69
										385	512			1230	5.05	SK 1SI63	140TC	69
												740	1219	1230	5.05	SK 1SI63	180TC	69
				41	65	84	124	189	262					2071	8.41	SK 1SI75	56C	71
										389	518			2071	8.41	SK 1SI75	140TC	71
												758	1247	2071	8.41	SK 1SI75	180TC	71
175	10	10	-	48	76	99	145	221						230	0.80	SK 1SI31	48C	63
				48	76	99	145	221						230	0.80	SK 1SI31	56C	63
				50	79	103	151	230	319					372	1.24	SK 1SI40	56C	65
										473				372	1.24	SK 1SI40	140TC	65
				51	82	106	156	238	330					664	2.14	SK 1SI50	56C	67
										490	652			664	2.14	SK 1SI50	140TC	67
				53	84	109	160	244	338					1186	3.74	SK 1SI63	56C	69
										502	668			1186	3.74	SK 1SI63	140TC	69
												965		1186	3.74	SK 1SI63	180TC	69
				53	84	111	164	249	346					2009	6.20	SK 1SI75	56C	71
										513	683			2009	6.20	SK 1SI75	140TC	71
												999	1645	2009	6.20	SK 1SI75	180TC	71
				63SI/4	63LI/4	71SI/4	71LI/4	80SI/4	80LI/4	90SHI/4	90LHI/4	100LHI/4	112MH/4					
															Service Factor < 1.0			
															Class I	Service Factor 1.0-1.39		
Nord Motors - Model type in blue is an energy efficient motor															Class II	Service Factor 1.4-1.99		

63LI4
 63LI4
 71SI4
 71LI4
 80SI4
 80LI4
 80LI4
 90SH4
 90LI4
 100LI4
 112NH4
 Nord Motors - Model type in blue is an energy efficient motor

	Service Factor < 1.0
Class I	Service Factor 1.0-1.39
Class II	Service Factor 1.4-1.99
Class III	Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Selection Single Worm

Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio $i_{2\text{nd}}$	Motor Power ~ Based on 1750 rpm										Gear Max Torque $T_{2\text{max}}$ [lb-in]	Max Input Power $P_{1\text{max}}$ [hp]	Gear Unit	NEMA Adapter	Config. Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]						
140	12.5	12.5	-	60	96	124	182							212	0.61	SK 1SI31	48C	63
				60	96	124	182							212	0.61	SK 1SI31	56C	63
				60	96	124	182	277	384					363	1.00	SK 1SI40	56C	65
				60	96	124	182	277	384					637	1.00	SK 1SI50	56C	67
										570	759			637	1.69	SK 1SI50	140TC	67
				60	96	124	182	277	384					1142	1.69	SK 1SI63	56C	69
										570	759			1142	2.91	SK 1SI63	140TC	69
				66	104									1142	2.91	SK 1SI63	180TC	69
						124	182	277	384					1912	4.77	SK 1SI75	56C	71
										570	759			1912	4.77	SK 1SI75	140TC	71
												1110	1828	1912	4.77	SK 1SI75	180TC	71
117	15	15	-	64	103	133	196							257	0.66	SK 1SI31	48C	63
				64	103	133	196							257	0.66	SK 1SI31	56C	63
				68	109	141	207	316	438					434	1.06	SK 1SI40	56C	65
				72	115	148	218	332	461					770	1.79	SK 1SI50	56C	67
										684	910			770	1.79	SK 1SI50	140TC	67
				74	119	154	226	345	478					1372	3.07	SK 1SI63	56C	69
										710	944			1372	3.07	SK 1SI63	140TC	69
												1380		1372	3.07	SK 1SI63	180TC	69
				76	120	158	232	353	490					2336	5.10	SK 1SI75	56C	71
										727	967			2336	5.10	SK 1SI75	140TC	71
												1416	2329	2336	5.10	SK 1SI75	180TC	71
88	20	20	-	81	130	168	247							239	0.49	SK 1SI31	48C	63
				81	130	168	247							239	0.49	SK 1SI31	56C	63
				86	138	178	262	399						398	0.77	SK 1SI40	56C	65
				92	147	190	280	426	592					717	1.30	SK 1SI50	56C	67
										878				717	1.30	SK 1SI50	140TC	67
				95	153	198	291	443	615					1274	2.22	SK 1SI63	56C	69
										912	1214			1274	2.22	SK 1SI63	140TC	69
				99	156	205	302	459	638					2168	3.65	SK 1SI75	56C	69
										947	1259			2168	3.65	SK 1SI75	140TC	71
												1843		2168	3.65	SK 1SI75	180TC	71
				63SI/4	63LI/4	71SI/4	71LI/4	80SI/4	80LI/4	90SH/4	90LH/4	100LH/4	112MH/4					
Nord Motors - Model type in blue is an energy efficient motor																		

Class I

Class II

Class III

Service Factor < 1.0
Service Factor 1.0-1.39
Service Factor 1.4-1.99
Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Selection Single Worm



Output Speed n ₂ [rpm]	Total Ratio i	Worm Ratio i _{worm}	2nd Ratio i _{2nd}	Motor Power ~ Based on 1750 rpm										Gear Max Torque T _{2max} [lb-in]	Max Input Power P _{1max} [hp]	Gear Unit	NEMA Adapter	Config Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T ₂)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]						
70	25	25	-	97	155	201	308							221	0.38	SK 1SI31	48C	63
				97	155	201	308							221	0.38	SK 1SI31	56C	63
				103	165	213	314	477						372	0.60	SK 1SI40	56C	65
				110	177	229	336	512	711					673	1.01	SK 1SI50	56C	67
				115	184	238	350	533	740					1195	1.72	SK 1SI63	56C	69
										1098	1460			1195	1.72	SK 1SI63	140TC	69
				120	190	250	368	560	778					2036	2.79	SK 1SI75	56C	71
										1155	1536			2036	2.79	SK 1SI75	140TC	71
												2249		2036	2.79	SK 1SI75	180TC	71
58	30	30	-	100	161	208								266	0.44	SK 1SI31	48C	63
				100	161	208								266	0.44	SK 1SI31	56C	63
				109	175	226	333	507						442	0.67	SK 1SI40	56C	65
				118	189	245	360	548	761					796	1.11	SK 1SI50	56C	67
				125	201	259	382	581	807					1416	1.86	SK 1SI63	56C	69
										1198	1593			1416	1.86	SK 1SI63	140TC	69
				139	220	259	382	581	807					1929	2.25	SK 1SI75	56C	71
										1198	1593			1929	2.25	SK 1SI75	140TC	71
												2329		1929	2.25	SK 1SI75	180TC	71
44	40	40	-	122	195	252								248	0.34	SK 1SI31	48C	63
				122	195	252								248	0.34	SK 1SI31	56C	63
				134	214	277	407							407	0.51	SK 1SI40	56C	65
				148	237	306	451	686	953					735	0.83	SK 1SI50	56C	67
				158	252	326	480	731	1014					1301	1.38	SK 1SI63	56C	69
										1505				1301	1.38	SK 1SI63	140TC	69
				166	262	346	509	775	1076					2212	2.21	SK 1SI75	56C	71
										1597	2124			2212	2.21	SK 1SI75	140TC	71
35	50	50	-	140	225	286								230	0.27	SK 1SI31	48C	63
				140	225	286								230	0.27	SK 1SI31	56C	63
				155	249	321	473							381	0.41	SK 1SI40	56C	65
				173	277	358	527	803						681	0.65	SK 1SI50	56C	67
				185	296	383	564	858	1191					1212	1.09	SK 1SI63	56C	69
				199	314	414	609	927	1287					2062	1.71	SK 1SI75	56C	71
										1910	2541			2062	1.71	SK 1SI75	140TC	71
63SI/4 63LI/4 71SI/4 71LI/4 80SI/4 80LI/4 90SHI/4 90LHI/4 100LHI/4 112MHI/4													Service Factor < 1.0					
													Class I	Service Factor 1.0-1.39				
Nord Motors - Model type in blue is an energy efficient motor													Class II	Service Factor 1.4-1.99				

63S/A	63L/A	71S/A	71L/A	80S/A	80L/A	80LH/A	90SH/A	90LH/A	100LH/A	112MH/A
Nord Motors - Model type in blue is an energy efficient motor										

	Service Factor < 1.0
	Class I Service Factor 1.0-1.39
	Class II Service Factor 1.4-1.99
	Class III Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Selection Single Worm

Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio $i_{2\text{nd}}$	Motor Power ~ Based on 1750 rpm										Gear Max Torque $T_{2\text{max}}$ [lb-in]	Max Input Power $P_{1\text{max}}$ [hp]	Gear Unit	NEMA Adapter	Config. Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]						
29	60	60	-	154	242									212	0.23	SK 1SI31	48C	63
				154	242									212	0.23	SK 1SI31	56C	63
				172	275	356								354	0.34	SK 1SI40	56C	65
				193	310	400	589							646	0.55	SK 1SI50	56C	67
				211	338	437	644	980	1360					1150	0.90	SK 1SI63	56C	69
				228	360	474	698	1063	1475					1956	1.41	SK 1SI75	56C	71
											2190			1956	1.41	SK 1SI75	140TC	71
22	80	80	-	177										195	0.18	SK 1SI31	48C	63
				177										195	0.18	SK 1SI31	56C	63
				200	321	415								327	0.27	SK 1SI40	56C	65
				229	367	474	698							593	0.43	SK 1SI50	56C	67
				253	405	524	771	1174						1044	0.69	SK 1SI63	56C	69
				275	435	583	858	1306	1813					1779	1.05	SK 1SI75	56C	71
				18	100	100	-	196										186
196														186	0.17	SK 1SI31	56C	63
221	354													301	0.23	SK 1SI40	56C	65
257	411	531												549	0.36	SK 1SI50	56C	67
292	468	605	891											974	0.57	SK 1SI63	56C	69
320	506	667	982					1495	2075					1655	0.88	SK 1SI75	56C	71

63SI4	63LI4	71SI4	71LI4	80SI4	80LI4	90SHI4	90LHI4	100LHI4	112NHI4
-------	-------	-------	-------	-------	-------	--------	--------	---------	---------

Nord Motors - Model type in blue is an energy efficient motor

	Service Factor < 1.0
Class I	Service Factor 1.0-1.39
Class II	Service Factor 1.4-1.99
Class III	Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.

FLEXBLOC™ Selection

2-Stage Worm



Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio i_{2nd}	Motor Power ~ Based on 1750 rpm										Gear Max Torque T_{2max} [lb-in]	Max Input Power P_{1max} [hp]	Gear Unit	NEMA Adapter	Config Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]						
35	50	5	10	242	387	500								549	0.38	SK 1SI40/H10	56C	65
				248	397	513	755							742	0.50	SK 1SI50/H10	56C	67
				251	401	519	764							751	0.50	SK 1SI63/H10	56C	69
23	75	7.5	10	340	545	704								637	0.31	SK 1SI40/H10	56C	65
				349	559	723	1064							1061	0.50	SK 1SI50/H10	56C	67
				353	566	732	1077							1074	0.50	SK 1SI63/H10	56C	69
18	100	10	10	436	698									611	0.24	SK 1SI40/H10	56C	65
				447	717	927	1364							1080	0.41	SK 1SI50/H10	56C	67
				453	726	939	1382							1320	0.50	SK 1SI63/H10	56C	69
14	125	12.5	10	544	918									584	0.19	SK 1SI40/H10	56C	65
				544	872	1128								1044	0.32	SK 1SI50/H10	56C	67
				544	872	1128	1659							1631	0.50	SK 1SI63/H10	56C	69
12	150	15	10	573										699	0.21	SK 1SI40/H10	56C	65
				591	946	1223								1257	0.36	SK 1SI50/H10	56C	67
				609	975	1260	1854							1772	0.50	SK 1SI63/H10	56C	69
8.8	200	20	10	704										646	0.15	SK 1SI40/H10	56C	65
				728	1166	1507								1168	0.27	SK 1SI50/H10	56C	67
				752	1204	1557	2291							2071	0.46	SK 1SI63/H10	56C	69
7	250	25	10	763										611	0.12	SK 1SI40/H10	56C	65
				865	1386									1097	0.21	SK 1SI50/H10	56C	67
				880	1410	1823	2782							1947	0.37	SK 1SI63/H10	56C	69
5.8	300	30	10	823										717	0.14	SK 1SI40/H10	56C	65
				877	1405									1292	0.24	SK 1SI50/H10	56C	67
				913	1462	1891								2301	0.42	SK 1SI63/H10	56C	69
4.4	400	40	10	830										664	0.11	SK 1SI40/H10	56C	65
				1050										1186	0.19	SK 1SI50/H10	56C	67
				1098	1759	2274								2115	0.32	SK 1SI63/H10	56C	69
3.5	500	50	10	774										620	0.09	SK 1SI40/H10	56C	65
				1193										1106	0.15	SK 1SI50/H10	56C	67
				1223	1959	2533								1974	0.27	SK 1SI63/H10	56C	69

63S/4	63L/4	71S/4	71L/4	80S/4	80L/4	90S/4	90L/4	100L/4	112NH/4
Nord Motors - Model type in blue is an energy efficient motor									

	Service Factor < 1.0
	Class I Service Factor 1.0-1.39
	Class II Service Factor 1.4-1.99
	Class III Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Selection 2-Stage Worm

Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio i_{2nd}	Motor Power ~ Based on 1750 rpm										Gear Max Torque T_{2max} [lb-in]	Max Input Power P_{1max} [hp]	Gear Unit	NEMA Adapter	Config. Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]					
2.9	600	60	10	730										584	0.08	SK 1SI40/H10	56C	65
				1305										1044	0.13	SK 1SI50/H10	56C	67
				1360	2179									1858	0.23	SK 1SI63/H10	56C	69
2.2	800	80	10	664									531	0.07	SK 1SI40/H10	56C	65	
				1195										956	0.11	SK 1SI50/H10	56C	67
				1527										1699	0.19	SK 1SI63/H10	56C	69
1.8	1000	100	10	608									487	0.06	SK 1SI40/H10	56C	65	
				1117										894	0.09	SK 1SI50/H10	56C	67
				1670										1584	0.16	SK 1SI63/H10	56C	69
				63SL4	63L4	71SL4	71L4	80SL4	80L4	90SH4	90LH4	100LH4	112NH4					
				Nord Motors - Model type in blue is an energy efficient motor														

Service Factor < 1.0

Class I Service Factor 1.0-1.39

Class II Service Factor 1.4-1.99

Class III Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Selection Double Worm



Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio $i_{2\text{nd}}$	Motor Power ~ Based on 1750 rpm										Gear Max Torque $T_{2\text{max}}$ [lb-in]	Max Input Power $P_{1\text{max}}$ [hp]	Gear Unit	NEMA Adapter	Config. Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]						
12	150	5	30	376	602	778								655	0.30	SK 1S140/31	56C	65
				412	660	853	1254							1177	0.49	SK 1S150/31	56C	67
				430	688	890	1309							2097	0.83	SK 1S163/31	56C	69
				430	688	890	1309	1993	2766					2832	0.96	SK 1S175/40	56C	71
7.8	225	7.5	30	524	839									699	0.22	SK 1S140/31	56C	65
				550	882	1140								1248	0.38	SK 1S150/31	56C	67
				577	925	1195	1759							2221	0.64	SK 1S163/31	56C	69
				591	946	1223	1800	2740	3803					3009	0.73	SK 1S175/40	56C	71
5.8	300	10	30	662										717	0.18	SK 1S140/31	56C	65
				698	1118	1446								1292	0.30	SK 1S150/31	56C	67
				734	1176	1520	2236							2301	0.52	SK 1S163/31	56C	69
				752	1204	1557	2291	3487						3106	0.60	SK 1S175/40	56C	71
4.7	375	12.5	30	716										735	0.16	SK 1S140/31	56C	65
				716	1147	1483								1319	0.27	SK 1S150/31	56C	67
				716	1147	1483	2182							2345	0.46	SK 1S163/31	56C	69
				716	1147	1483	2182	3321						3168	0.53	SK 1S175/40	56C	71
3.9	450	15	30	859										743	0.14	SK 1S140/31	56C	65
				913	1462									1345	0.24	SK 1S150/31	56C	67
				940	1505	1946	2864							2390	0.42	SK 1S163/31	56C	69
				966	1548	2002	2945							3221	0.47	SK 1S175/40	56C	71
2.9	600	20	30	962										770	0.12	SK 1S140/31	56C	65
				1110	1778									1381	0.20	SK 1S150/31	56C	67
				1145	1835	2372								2460	0.35	SK 1S163/31	56C	69
				1181	1893	2447	3600							3319	0.39	SK 1S175/40	56C	71
2.3	750	25	30	974										779	0.10	SK 1S140/31	56C	65
				1298										1407	0.18	SK 1S150/31	56C	67
				1342	2151	2780								2505	0.30	SK 1S163/31	56C	69
				1387	2222	2873	4227							3381	0.34	SK 1S175/40	56C	71
1.9	900	30	30	996										796	0.10	SK 1S140/31	56C	65
				1342										1434	0.17	SK 1S150/31	56C	67
				1396	2237	2891								2549	0.30	SK 1S163/31	56C	69
				1450	2323	3003	4418							3434	0.32	SK 1S175/40	56C	71

63S1/4	63L1/4	71S1/4	71L1/4	80S1/4	80L1/4	90S1/4	90L1/4	100L1/4	112M1/4
Nord Motors - Model type in blue is an energy efficient motor									

	Service Factor < 1.0
	Class I Service Factor 1.0-1.39
	Class II Service Factor 1.4-1.99
	Class III Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Selection Double Worm

Output Speed n_2 [rpm]	Total Ratio i	Worm Ratio i_{worm}	2nd Ratio $i_{2\text{nd}}$	Motor Power ~ Based on 1750 rpm										Gear Max Torque $T_{2\text{max}}$ [lb-in]	Max Input Power $P_{1\text{max}}$ [hp]	Gear Unit	NEMA Adapter	Config. Page
				0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp	3.0 hp	5.0 hp					
				Output Torque (T_2)														
				[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]					
1.5	1200	40	30	1029										823	0.09	SK 1SI40/31	56C	65
				1647										1487	0.15	SK 1SI50/31	56C	67
				1647	2638	3410								2637	0.27	SK 1SI63/31	56C	69
				1718	2753	3559								3558	0.30	SK 1SI75/40	56C	71
1.2	1500	50	30	1051										841	0.08	SK 1SI40/31	56C	65
				1892										1513	0.14	SK 1SI50/31	56C	67
				1790	2868									2690	0.26	SK 1SI63/31	56C	69
				1969	3154	4078								3637	0.27	SK 1SI75/40	56C	71
0.97	1800	60	30	1062										850	0.07	SK 1SI40/31	56C	65
				1914										1531	0.12	SK 1SI50/31	56C	67
				2040	3269									2726	0.22	SK 1SI63/31	56C	69
				2148	3441	4448								3682	0.24	SK 1SI75/40	56C	71
0.73	2400	80	30	1084										867	0.07	SK 1SI40/31	56C	65
				1947										1558	0.11	SK 1SI50/31	56C	67
				2291	3670									2770	0.20	SK 1SI63/31	56TC	69
				2434	3900	4819								3744	0.21	SK 1SI75/40	56C	71
0.58	3000	100	30	1095										876	0.06	SK 1SI40/31	56C	65
				1969										1575	0.11	SK 1SI50/31	56C	67
				2506										2797	0.20	SK 1SI63/31	56TC	69
				2327	3728									3779	0.19	SK 1SI75/40	56C	71

63S1/4	63L1/4	71S1/4	71L1/4	80S1/4	80L1/4	90SH1/4	90LH1/4	100LH1/4	112NH1/4
Nord Motors - Model type in blue is an energy efficient motor									

	Service Factor < 1.0
Class I	Service Factor 1.0-1.39
Class II	Service Factor 1.4-1.99
Class III	Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.

FLEXBLOC™ Ratings

Single Worm



Flexbloc Size					SK 1SI31			SK 1SI40			SK 1SI50			SK 1SI63			SK 1SI75		
Total Ratio	Worm Ratio	2nd Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	i _{worm}	i _{2nd}	n ₁ [rpm]	n ₂ [rpm]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]
5	5	-	1750	350	1.30	1.13	204	2.10	1.87	336	3.56	3.24	584	6.30	5.80	1044	10.36	9.64	1735
			1150	230	0.94	0.81	221	1.51	1.33	364	2.56	2.30	630	4.52	4.11	1127	7.35	6.77	1854
			850	170	0.77	0.66	243	1.24	1.08	401	2.10	1.87	694	3.72	3.34	1240	5.98	5.51	2041
			100	20	0.13	0.11	341	0.22	0.18	562	0.37	0.31	974	0.66	0.55	1740	1.07	0.91	2864
7.5	7.5	-	1750	233	1.06	0.88	239	1.69	1.44	389	2.90	2.55	690	5.05	4.55	1230	8.41	7.67	2071
			1150	153	0.76	0.62	255	1.22	1.03	423	2.11	1.82	747	3.68	3.24	1332	5.98	5.40	2218
			850	113	0.62	0.51	281	1.01	0.84	466	1.74	1.48	823	3.02	2.64	1466	4.92	4.39	2441
			100	13	0.11	0.08	394	0.18	0.14	653	0.31	0.24	1154	0.54	0.44	2058	0.88	0.72	3426
10	10	-	1750	175	0.80	0.64	230	1.24	1.03	372	2.14	1.84	664	3.74	3.29	1186	6.20	5.58	2009
			1150	115	0.56	0.45	244	0.90	0.74	406	1.57	1.32	721	2.69	2.34	1285	4.40	3.92	2147
			850	85	0.46	0.36	269	0.75	0.60	446	1.29	1.07	794	2.24	1.91	1414	3.66	3.19	2363
			100	10	0.08	0.06	377	0.14	0.10	627	0.24	0.18	1114	0.41	0.31	1984	0.68	0.53	3317
12.5	12.5	-	1750	140	0.61	0.47	212	1.00	0.81	363	1.69	1.41	637	2.91	2.54	1142	4.77	4.25	1912
			1150	92	0.45	0.34	233	0.72	0.57	388	1.23	1.01	693	2.12	1.80	1233	3.46	3.01	2065
			850	68	0.37	0.28	257	0.59	0.46	427	1.02	0.82	762	1.74	1.46	1357	2.85	2.45	2273
			100	8	0.07	0.05	360	0.11	0.08	599	0.19	0.14	1070	0.33	0.24	1904	0.55	0.40	3190
15	15	-	1750	117	0.66	0.48	257	1.06	0.80	434	1.79	1.43	770	3.07	2.54	1372	5.10	4.32	2336
			1150	77	0.49	0.34	280	0.77	0.57	466	1.31	1.02	836	2.24	1.81	1487	3.68	3.04	2498
			850	57	0.40	0.28	308	0.64	0.46	513	1.10	0.83	920	1.87	1.47	1637	3.03	2.47	2750
			100	7	0.07	0.05	433	0.12	0.08	720	0.21	0.14	1292	0.36	0.24	2297	0.60	0.41	3859
20	20	-	1750	88	0.49	0.33	239	0.77	0.55	398	1.30	1.00	717	2.22	1.77	1274	3.65	3.01	2168
			1150	58	0.36	0.24	259	0.57	0.39	432	0.96	0.71	776	1.63	1.26	1380	2.64	2.12	2320
			850	43	0.30	0.19	285	0.47	0.32	475	0.79	0.58	854	1.33	1.02	1518	2.15	1.72	2553
			100	5	0.01	0.03	401	0.09	0.05	667	0.16	0.10	1198	0.27	0.17	2131	0.44	0.28	3583
25	25	-	1750	70	0.38	0.25	221	0.60	0.41	372	1.01	0.75	673	1.72	1.33	1195	2.79	2.26	2036
			1150	46	0.29	0.18	243	0.45	0.30	405	0.75	0.53	729	1.26	0.95	1296	2.04	1.59	2180
			850	34	0.24	0.14	268	0.38	0.24	446	0.63	0.43	802	1.05	0.77	1426	1.70	1.29	2399
			100	4	0.04	0.02	376	0.07	0.04	626	0.13	0.07	1126	0.22	0.13	2001	0.36	0.21	3367
					SK 1SI31 Configurations			SK 1SI40 Configurations			SK 1SI50 Configurations			SK 1SI63 Configurations			SK 1SI75 Configurations		
					📖 63			📖 65			📖 67			📖 69			📖 71		

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Ratings Single Worm



Flexbloc Size					SK 1SI31			SK 1SI40			SK 1SI50			SK 1SI63			SK 1SI75		
Total Ratio	Worm Ratio	2nd Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	i _{worm}	i _{2nd}	n ₁	n ₂	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}
			[rpm]	[rpm]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]
30	30	-	1750	58	0.44	0.25	266	0.67	0.41	442	1.11	0.74	796	1.86	1.31	1416	2.25	1.79	1929
			1150	38	0.32	0.17	287	0.50	0.29	478	0.82	0.52	861	1.38	0.93	1531	1.64	1.26	2067
			850	28	0.27	0.14	316	0.42	0.24	527	0.69	0.43	948	1.15	0.76	1685	1.38	1.02	2275
			100	3	0.05	0.02	443	0.08	0.04	739	0.15	0.07	1330	0.25	0.13	2365	0.30	0.17	3192
40	40	-	1750	44	0.34	0.17	248	0.51	0.28	407	0.83	0.51	735	1.38	0.90	1301	2.21	1.54	2212
			1150	29	0.25	0.12	263	0.38	0.20	439	0.63	0.36	790	1.03	0.64	1405	1.63	1.08	2367
			850	21	0.21	0.10	290	0.32	0.16	483	0.52	0.29	870	0.86	0.52	1547	1.36	0.88	2605
			100	3	0.04	0.02	407	0.07	0.03	678	0.11	0.05	1221	0.20	0.09	2170	0.32	0.14	3655
50	50	-	1750	35	0.27	0.13	230	0.41	0.21	381	0.65	0.38	681	1.09	0.67	1212	1.71	1.15	2062
			1150	23	0.20	0.09	246	0.31	0.15	410	0.50	0.27	738	0.81	0.48	1312	1.28	0.81	2210
			850	17	0.17	0.07	271	0.26	0.12	451	0.42	0.22	812	0.70	0.39	1444	1.09	0.66	2432
			100	2	0.03	0.01	380	0.06	0.02	633	0.09	0.04	1140	0.16	0.06	2027	0.26	0.11	3413
60	60	-	1750	29	0.23	0.10	212	0.34	0.16	354	0.55	0.30	646	0.90	0.53	1150	1.41	0.91	1956
			1150	19	0.17	0.07	232	0.26	0.12	387	0.41	0.21	697	0.68	0.38	1239	1.05	0.63	2088
			850	14	0.15	0.06	256	0.22	0.10	426	0.36	0.17	767	0.58	0.31	1364	0.90	0.52	2298
			100	2	0.03	0.01	359	0.05	0.02	598	0.08	0.03	1077	0.14	0.05	1914	0.23	0.09	3225
80	80	-	1750	22	0.18	0.07	195	0.27	0.11	327	0.43	0.21	593	0.69	0.36	1044	1.05	0.62	1779
			1150	14	0.13	0.05	212	0.20	0.08	353	0.31	0.15	636	0.50	0.26	1131	0.77	0.43	1906
			850	11	0.12	0.04	233	0.18	0.07	389	0.29	0.12	700	0.47	0.21	1245	0.72	0.35	2098
			100	1	0.02	0.01	327	0.04	0.01	545	0.06	0.02	983	0.11	0.03	1748	0.17	0.06	2944
100	100	-	1750	18	0.17	0.05	186	0.23	0.08	301	0.36	0.15	549	0.57	0.27	974	0.88	0.46	1655
			1150	12	0.13	0.04	197	0.18	0.06	329	0.28	0.11	592	0.45	0.19	1053	0.68	0.32	1774
			850	9	0.10	0.03	217	0.15	0.05	362	0.24	0.09	652	0.37	0.16	1159	0.57	0.26	1953
			100	1	0.02	0.005	305	0.03	0.01	508	0.06	0.01	915	0.10	0.03	1627	0.16	0.04	2740
					SK 1SI31 Configurations			SK 1SI40 Configurations			SK 1SI50 Configurations			SK 1SI63 Configurations			SK 1SI75 Configurations		
					📖 63			📖 65			📖 67			📖 69			📖 71		

Actual speeds and torques will vary based on the motor performance data.

FLEXBLOC™ Ratings

2-Stage Helical Worm



Flexbloc Size					SK1SI40/H10			SK1SI50/H10			SK1SI63/H10		
Total Ratio	Worm Ratio	2nd Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	i _{worm}	i _{2nd}	n ₁ [rpm]	n ₂ [rpm]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]
50	5	10	1750	35	0.38	0.30	549	0.50	0.41	742	0.50	0.42	751
			1150	23	0.25	0.20	557	0.43	0.35	964	0.50	0.41	1115
			850	17	0.19	0.15	573	0.33	0.27	993	0.50	0.41	1508
			100	2	0.03	0.02	673	0.05	0.04	1166	0.08	0.07	2084
75	7.5	10	1750	23.3	0.31	0.24	637	0.50	0.39	1061	0.50	0.40	1074
			1150	15.3	0.21	0.16	647	0.35	0.28	1143	0.50	0.40	1626
			850	11.3	0.16	0.12	666	0.27	0.21	1177	0.48	0.38	2098
			100	1.3	0.02	0.02	782	0.04	0.03	1383	0.07	0.05	2464
100	10	10	1750	17.5	0.24	0.17	611	0.41	0.30	1080	0.50	0.37	1320
			1150	11.5	0.16	0.11	620	0.28	0.20	1103	0.50	0.36	1954
			850	8.5	0.12	0.09	639	0.21	0.15	1136	0.37	0.27	2024
			100	1.0	0.02	0.01	750	0.03	0.02	1334	0.05	0.04	2376
125	12.5	10	1750	14.0	0.19	0.13	584	0.32	0.23	1044	0.50	0.36	1631
			1150	9.2	0.13	0.09	593	0.22	0.15	1059	0.38	0.28	1885
			850	6.8	0.10	0.07	611	0.17	0.12	1091	0.30	0.21	1942
			100	0.8	0.01	0.01	718	0.02	0.02	1281	0.04	0.03	2280
150	15	10	1750	11.7	0.21	0.13	699	0.36	0.23	1257	0.50	0.33	1772
			1150	7.7	0.14	0.09	713	0.24	0.16	1278	0.42	0.28	2274
			850	5.7	0.11	0.07	735	0.19	0.12	1317	0.33	0.21	2343
			100	0.7	0.02	0.01	863	0.03	0.02	1547	0.05	0.03	2751
200	20	10	1750	8.8	0.15	0.09	646	0.27	0.16	1168	0.46	0.29	2071
			1150	5.8	0.10	0.06	660	0.18	0.11	1186	0.32	0.19	2109
			850	4.3	0.08	0.05	680	0.14	0.10	1435	0.24	0.15	2173
			100	1	0.01	0.01	799	0.02	0.01	799	0.04	0.02	2552
250	25	10	1750	7	0.12	0.07	611	0.21	0.12	1097	0.37	0.22	1947
			1150	5	0.09	0.05	619	0.15	0.08	1114	0.25	0.14	1981
			850	3	0.06	0.03	638	0.11	0.06	1148	0.20	0.11	2041
			100	0.4	0.01	0.00	749	0.02	0.009	1348	0.03	0.02	2396
					SK1SI40/H10 Configuration			SK1SI50/H10 Configuration			SK1SI63/H10 Configuration		
					📖 65			📖 67			📖 69		

Actual speeds and torques will vary based on the motor performance data.



FLEXBLOC™ Ratings 2-Stage Helical Worm



Flexbloc Size					SK1SI40/H10			SK1SI50/H10			SK1SI63/H10		
Total Ratio	Worm Ratio	2nd Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	i _{worm}	i _{2nd}	n ₁ [rpm]	n ₂ [rpm]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]
300	30	10	1750	5.8	0.14	0.07	717	0.24	0.12	1292	0.42	0.21	2301
			1150	3.8	0.10	0.04	731	0.17	0.08	1317	0.29	0.14	2341
			850	2.8	0.08	0.03	754	0.13	0.06	1356	0.22	0.11	2411
			100	0.3	0.01	0.005	885	0.02	0.008	1593	0.03	0.01	2832
400	40	10	1750	4.4	0.11	0.05	664	0.19	0.08	1186	0.32	0.15	2115
			1150	2.9	0.08	0.03	671	0.13	0.06	1208	0.22	0.10	2148
			850	2.1	0.06	0.02	691	0.10	0.04	1245	0.18	0.07	2213
			100	0.3	0.01	0.003	812	0.01	0.006	1462	0.03	0.01	2599
500	50	10	1750	4	0.09	0.03	620	0.15	0.06	1106	0.27	0.11	1974
			1150	2	0.06	0.02	626	0.11	0.04	1129	0.19	0.07	2006
			850	2	0.05	0.02	645	0.08	0.03	1163	0.15	0.06	2067
			100	0.2	0.01	0.002	758	0.01	0.004	1365	0.02	0.01	2427
600	60	10	1750	2.9	0.08	0.03	584	0.13	0.05	1044	0.23	0.09	1859
			1150	1.9	0.06	0.02	592	0.09	0.03	1066	0.16	0.06	1895
			850	1.4	0.04	0.01	610	0.07	0.02	1098	0.12	0.04	1952
			100	0.2	0.01	0.002	716	0.01	0.003	1290	0.02	0.01	2293
800	80	10	1750	2.2	0.07	0.02	531	0.11	0.03	956	0.19	0.06	1699
			1150	1.4	0.04	0.01	540	0.07	0.02	973	0.12	0.04	1730
			850	1.1	0.04	0.01	556	0.06	0.02	1002	0.10	0.03	1782
			100	0.1	0.00	0.001	653	0.01	0.002	1177	0.01	0.004	2093
1000	100	10	1750	1.8	0.06	0.01	487	0.09	0.02	894	0.16	0.04	1584
			1150	1.2	0.04	0.01	502	0.07	0.02	905	0.11	0.03	1610
			850	0.9	0.03	0.01	518	0.05	0.01	933	0.09	0.02	1659
			100	0.1	0.00	0.001	608	0.01	0.002	1096	0.01	0.003	1948
					SK1SI40/H10 Configuration			SK1SI50/H10 Configuration			SK1SI63/H10 Configuration		
					65			67			69		

Actual speeds and torques will vary based on the motor performance data.

FLEXBLOC™ Ratings

Double Worm



Flexbloc Size					SK1SI40/31			SK1SI50/31			SK1SI63/31			SK1SI75/40		
Total Ratio	Worm Ratio	2nd Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	i _{worm}	i _{2nd}	n ₁ [rpm]	n ₂ [rpm]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]
150	5	30	1750	11.7	0.30	0.12	655	0.49	0.22	1177	0.83	0.39	2097	0.96	0.52	2832
			1150	7.7	0.18	0.08	674	0.29	0.15	1213	0.50	0.26	2156	0.59	0.35	2911
			850	5.7	0.14	0.06	704	0.23	0.11	1267	0.40	0.20	2252	0.47	0.27	3041
			100	0.7	0.02	0.01	861	0.04	0.02	1549	0.07	0.03	2754	0.08	0.04	3718
225	7.5	30	1750	7.8	0.22	0.09	699	0.38	0.15	1248	0.64	0.27	2221	0.73	0.37	3009
			1150	5.1	0.13	0.06	712	0.21	0.10	1282	0.37	0.18	2279	0.44	0.25	3077
			850	3.8	0.10	0.04	732	0.17	0.08	1318	0.29	0.14	2343	0.38	0.19	3163
			100	0.4	0.01	0.01	877	0.03	0.01	1578	0.04	0.02	2806	0.05	0.03	3788
300	10	30	1750	5.8	0.18	0.07	717	0.30	0.12	1292	0.52	0.21	2301	0.60	0.29	3106
			1150	3.8	0.10	0.04	731	0.17	0.08	1317	0.29	0.14	2341	0.34	0.19	3160
			850	2.8	0.08	0.03	754	0.13	0.06	1356	0.22	0.11	2411	0.27	0.15	3255
			100	0.3	0.01	0.005	885	0.02	0.01	1593	0.03	0.01	2832	0.04	0.02	3823
375	12.5	30	1750	4.7	0.16	0.05	735	0.27	0.10	1319	0.46	0.17	2345	0.53	0.23	3168
			1150	3.1	0.08	0.04	747	0.14	0.07	1344	0.24	0.12	2390	0.29	0.16	3226
			850	2.3	0.06	0.03	770	0.11	0.05	1386	0.19	0.09	2464	0.23	0.12	3327
			100	0.3	0.01	0.004	929	0.02	0.01	1673	0.03	0.01	2974	0.03	0.02	4014
450	15	30	1750	3.9	0.14	0.05	743	0.24	0.08	1345	0.42	0.15	2390	0.47	0.20	3221
			1150	2.6	0.07	0.03	762	0.12	0.06	1371	0.21	0.10	2437	0.25	0.13	3291
			850	1.9	0.05	0.02	781	0.09	0.04	1406	0.16	0.07	2500	0.19	0.10	3375
			100	0.2	0.01	0.003	959	0.01	0.01	1726	0.02	0.01	3068	0.03	0.01	4142
600	20	30	1750	2.9	0.12	0.04	770	0.20	0.06	1381	0.35	0.11	2460	0.39	0.15	3319
			1150	1.9	0.05	0.02	780	0.09	0.04	1405	0.16	0.08	2497	0.19	0.10	3371
			850	1.4	0.04	0.02	806	0.07	0.03	1451	0.12	0.06	2579	0.15	0.08	3482
			100	0.2	0.01	0.003	996	0.01	0.005	1792	0.02	0.01	3186	0.02	0.01	4301
750	25	30	1750	2.3	0.10	0.03	779	0.18	0.05	1407	0.30	0.09	2505	0.34	0.13	3381
			1150	1.5	0.04	0.02	797	0.07	0.03	1435	0.13	0.06	2552	0.16	0.08	3445
			850	1.1	0.03	0.01	827	0.06	0.03	1488	0.10	0.05	2645	0.12	0.06	3571
			100	0.1	0.00	0.002	1018	0.01	0.004	1832	0.02	0.01	3257	0.02	0.01	4397
900	30	30	1750	1.9	0.10	0.02	797	0.17	0.04	1434	0.30	0.08	2549	0.32	0.11	3434
			1150	1.3	0.04	0.02	816	0.07	0.03	1469	0.12	0.05	2611	0.14	0.07	3525
			850	0.9	0.03	0.01	840	0.05	0.02	1513	0.09	0.04	2689	0.11	0.05	3630
			100	0.1	0.00	0.002	1032	0.01	0.003	1859	0.01	0.01	3304	0.02	0.01	4460
					SK1SI40/31 Configuration			SK1SI50/31 Configuration			SK1SI63/31 Configuration			SK1SI75/40 Configuration		
					📖 65			📖 67			📖 69			📖 71		

Actual speeds and torques will vary based on the motor performance data.



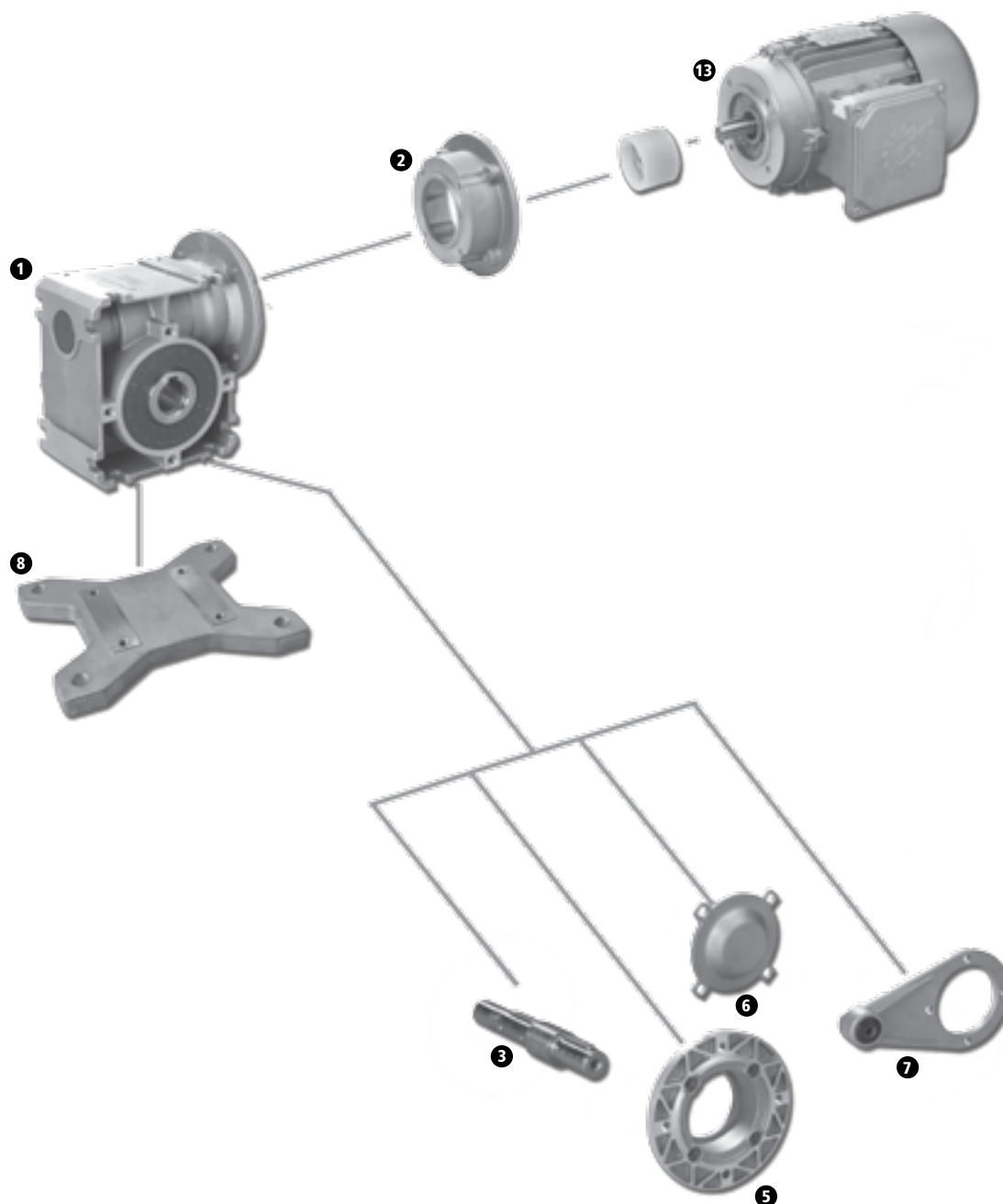
FLEXBLOC™ Ratings Double Worm



Flexbloc Size					SK1SI40/31			SK1SI50/31			SK1SI63/31			SK1SI75/40		
Total Ratio	Worm Ratio	2nd Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	i _{worm}	i _{2nd}	n ₁ [rpm]	n ₂ [rpm]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]
1200	40	30	1750	1.5	0.09	0.02	823	0.15	0.03	1487	0.27	0.06	2637	0.30	0.08	3558
			1150	1.0	0.03	0.01	839	0.05	0.02	1511	0.09	0.04	2686	0.12	0.06	3626
			850	0.7	0.02	0.01	858	0.04	0.02	1544	0.07	0.03	2744	0.08	0.04	3705
			100	0.08	0.00	0.001	1051	0.01	0.003	1892	0.01	0.004	3363	0.01	0.01	4540
1500	50	30	1750	1.2	0.08	0.02	841	0.14	0.03	1513	0.26	0.05	2690	0.27	0.07	3637
			1150	0.8	0.02	0.01	853	0.04	0.02	1536	0.07	0.03	2731	0.09	0.04	3687
			850	0.6	0.02	0.01	868	0.03	0.01	1562	0.06	0.02	2777	0.07	0.03	3750
			100	0.07	0.00	0.001	1062	0.00	0.002	1912	0.01	0.004	3398	0.01	0.00	4588
1800	60	30	1750	1.0	0.07	0.01	850	0.12	0.02	1531	0.22	0.04	2726	0.24	0.06	3682
			1150	0.6	0.02	0.01	863	0.04	0.02	1553	0.06	0.03	2761	0.07	0.04	3727
			850	0.5	0.02	0.01	875	0.03	0.01	1575	0.05	0.02	2800	0.06	0.03	3779
			100	0.06	0.00	0.001	1069	0.00	0.002	1925	0.01	0.003	3422	0.01	0.00	4620
2400	80	30	1750	0.7	0.07	0.01	867	0.11	0.02	1558	0.20	0.03	2770	0.21	0.04	3744
			1150	0.5	0.02	0.01	874	0.03	0.01	1574	0.05	0.02	2798	0.06	0.03	3777
			850	0.4	0.01	0.005	883	0.02	0.01	1590	0.04	0.02	2827	0.04	0.02	3817
			100	0.04	0.00	0.001	1079	0.00	0.001	1941	0.00	0.002	3451	0.01	0.00	4660
3000	100	30	1750	0.6	0.06	0.01	876	0.11	0.01	1575	0.20	0.03	2797	0.19	0.03	3779
			1150	0.4	0.01	0.01	881	0.02	0.01	1586	0.04	0.02	2820	0.05	0.02	3807
			850	0.3	0.01	0.004	918	0.02	0.01	1653	0.03	0.01	2938	0.04	0.02	3967
			100	0.03	0.00	0.001	1084	0.00	0.001	1951	0.00	0.002	3469	0.00	0.00	4683
					SK1SI40/31 Configuration			SK1SI50/31 Configuration			SK1SI63/31 Configuration			SK1SI75/40 Configuration		
					📖 65			📖 67			📖 69			📖 71		

Actual speeds and torques will vary based on the motor performance data.

Part Numbers SK 1SI31



1 Wormgearbox	0.625 Hollow Shaft	14 mm Hollow Shaft
i=5	60392050	60391050
i=7.5	60392080	60391080
i=10	60392100	60391100
i=12.5	60392130	60391130
i=15	60392150	60391150
i=20	60392200	60391200
i=25	60392250	60391250
i=30	60392300	60391300
i=40	60392400	60391400
i=50	60392500	60391500
i=60	60392600	60391600
i=80	60392800	60391800
i=100	60392000	60391000

2 NEMA and IEC Adapter 76 & 100	Part Number
NEMA 48C	60395500
NEMA 56C	60395510
IEC 56 B14 C105	60395100
IEC 56 B5 A120	60395200
IEC 63 B14 C90	60395010
IEC 63 B14 C120	60395110
IEC 63 B5 A140	60395210
IEC 71 B14 C105	60395020
IEC 71 B14 C140	60395120

3 Plug in Shaft - Inch 📖 103		Part Number
Shaft	0.625" x 30mm	60393010
Double Shaft	0.625" x 30mm	60393110
Shaft for Output Flange B5	0.625" x 30mm	60393210
Plug in Shaft - Metric 📖 103		Part Number
Shaft	14mm x 30mm	60393000
Double Shaft	14mm x 30mm	60393100
Shaft for Output Flange B5	14mm x 30mm	60393200

5 Output Flange B5 77	Part Number
I Flange - 105mm	60393800
II Flange, Square Flange, Female Pilot - 80mm	60393810
III Flange, Square Flange, Male Pilot - 80mm	60393820

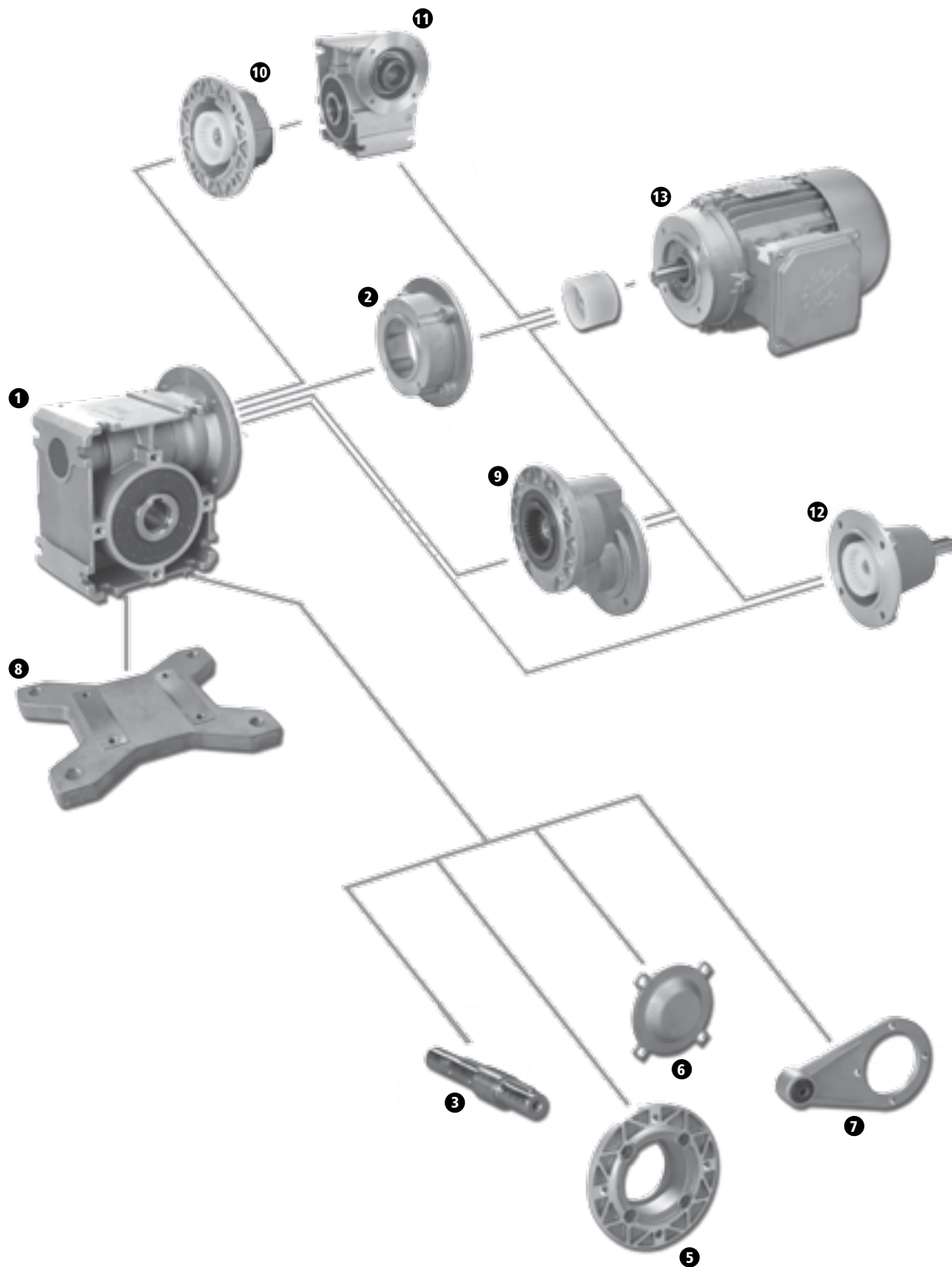
6 Shaft Cover 77	Part Number
Shaft Cover	60393950

7 Torque Arm 77	Part Number
Torque Arm	60393900

8 Foot Plate 77	Foot Hole Dimensions	Part Number
Foot Plate	0.68" / 3.31" x 4.38"	60394600

13 C-face 230/460V-60Hz Standard Efficiency Motor		Part Number
63S/4-56C	230/460V-60Hz, 1/6 hp	31110012
63L/4-56C	230/460V-60Hz, 1/4 hp	31610012
71S/4-56C	230/460V-60Hz, 1/3 hp	32110012
71L/4-56C	230/460V-60Hz, 1/2 hp	32610012
80S/4-56C	230/460V-60Hz, 3/4 hp	33110012
80L/4-56C	230/460V-60Hz, 1 hp	33610022
C-face 575V-60Hz Standard Efficiency Motor		Part Number
63S/4-56C	575V-60Hz, 1/6 hp	31110013
63L/4-56C	575V-60Hz, 1/4 hp	31610013
71S/4-56C	575V-60Hz, 1/3 hp	32110013
71L/4-56C	575V-60Hz, 1/2 hp	32610013
80S/4-56C	575V-60Hz, 3/4 hp	33110013
C-face 230/460V-60Hz Energy Efficient Motor		Part Number
80LH/4-56C	230/460V-60Hz, 1 hp	33610094

Part Numbers SK 1SI40



1 Wormgearbox	1.000 hollow shaft	18mm hollow shaft
i=5	60492050	60491050
i=7.5	60492080	60491080
i=10	60492100	60491100
i=12.5	60492130	60491130
i=15	60492150	60491150
i=20	60492200	60491200
i=25	60492250	60491250
i=30	60492300	60491300
i=40	60492400	60491400
i=50	60492500	60491500
i=60	60492600	60491600
i=80	60492800	60491800
i=100	60492000	60491000

2 NEMA and IEC Adapters 80 & 100	Part Number
NEMA 56C	60495500
NEMA 140TC	60595500
IEC 56 B14 C105	60495100
IEC 56 B5 A120	60495200
IEC 63 B14 C90	60495010
IEC 63 B14 C120	60495110
IEC 63 B5 A140	60495210
IEC 71 B14 C105	60495020
IEC 71 B14 C140	60495120
IEC 71 B5 A160	60495220
IEC 80 B14 C120	60495030
IEC 80 B14 C160	60495130
IEC 80 B5 A200	60495230
IEC 90 B14 C140	60495040
IEC 90 B14 C160	60495140

3 Plug in Shaft - Inch 103	Part Number
Shaft	0.750" x 40mm 60493010
Double Shaft	0.750" x 40mm 60493110
Shaft for Output Flange B5	0.750" x 40mm 60493210
Plug in Shaft - Metric 103	Part Number
Shaft	18mm x 40mm 60493000
Double Shaft	18mm x 40mm 60493100
Shaft for Output Flange B5	18mm x 40mm 60493200

5 Output Flange B5 81	Part Number
I Flange - 120mm	60493800
II Flange, Square Flange, Female Pilot - 110mm	60493810

6 Shaft Cover 81	Part Number
Shaft Cover	60493950

7 Torque Arm 81	Part Number
Torque Arm	60493900

8 Foot Plate 81	Foot Hole Dimensions	Part Number
Foot Plate	0.53" / 4.31"x 5.25"	60494600

Open Vent (Not shown in image)	Part Number
Open Vent	60693500

9 Helical Input Stage 96	Part Number
Helical Input Stage H10	60494000

10 Double Worm Adapter  98		Part Number
Inch	0.625"	60494110
Metric	14mm	60494100

11 Double Worm Unit
SK 1SI31
For module ratio and Adapter combination see page 63

12 Solid Input Shaft  101		Part Number
Solid Input Shaft	0.625" x 1.57"	60494210
Solid Input Shaft	16mm x 40mm	60494200

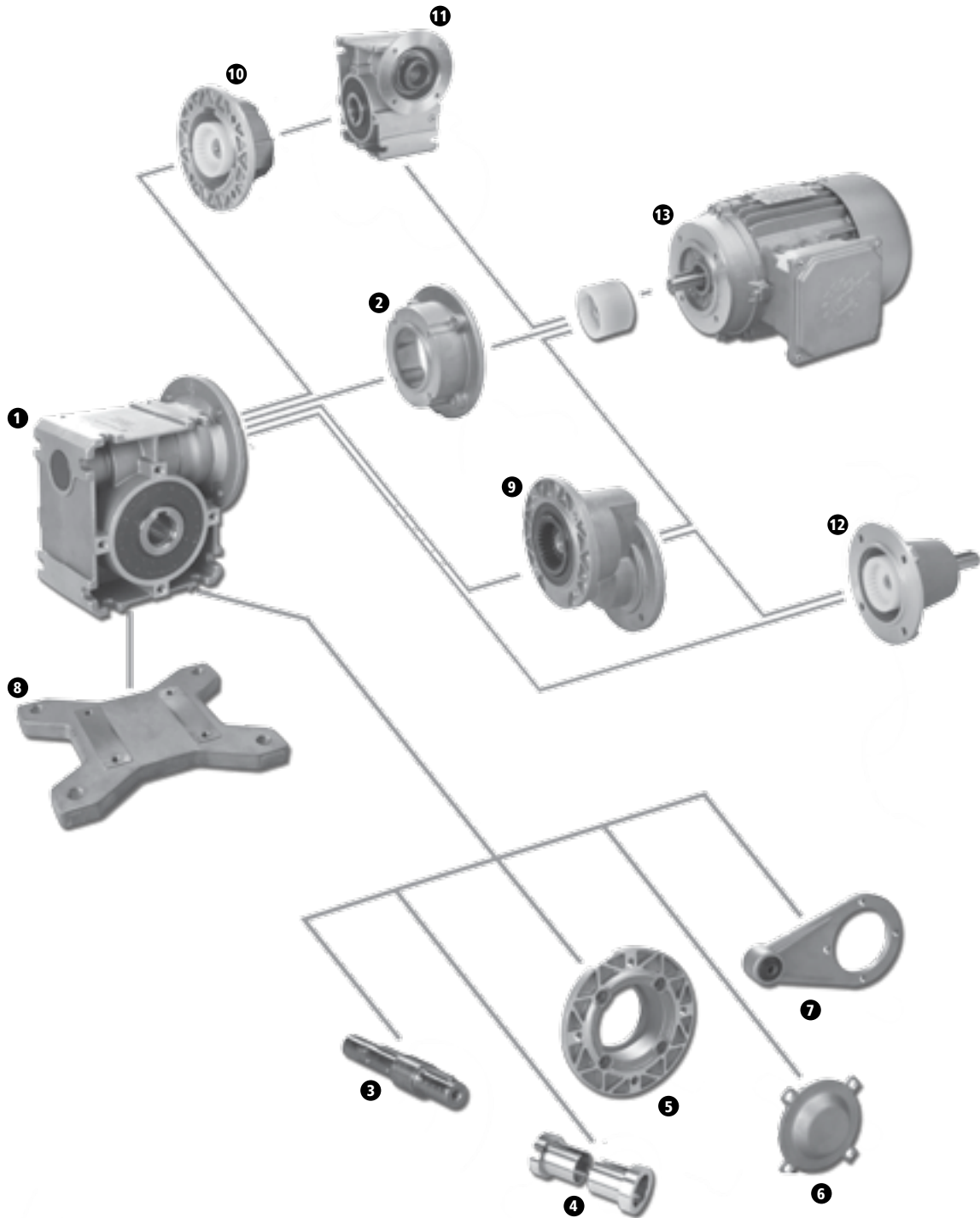
13 C-face 230/460V-60Hz Standard Efficiency Motor		Part Number
63S/4-56C	230/460V-60Hz, 1/6 hp	31110012
63L/4-56C	230/460V-60Hz, 1/4 hp	31610012
71S/4-56C	230/460V-60Hz, 1/3 hp	32110012
71L/4-56C	230/460V-60Hz, 1/2 hp	32610012
80S/4-56C	230/460V-60Hz, 3/4 hp	33110012
80L/4-56C	230/460V-60Hz, 1 hp	33610022

C-face 575V-60Hz Standard Efficiency Motor		Part Number
63S/4-56C	575V-60Hz, 1/6 hp	31110013
63L/4-56C	575V-60Hz, 1/4 hp	31610013
71S/4-56C	575V-60Hz, 1/3 hp	32110013
71L/4-56C	575V-60Hz, 1/2 hp	32610013

C-face 230/460V-60Hz Energy Efficient Motor		Part Number
80LH/4-56C	230/460V-60Hz, 1 hp	33610094
80LH/4-143TC	230/460V-60Hz, 1 hp	33610092
90SH/4-145TC	230/460V-60Hz, 1-1/2 hp	34110092
90LH/4-145TC	230/460V-60Hz, 2 hp	34610092

C-face 575V-60Hz Energy Efficient Motor		Part Number
80LH/4-56C	575V-60Hz, 1 hp	33610095
80LH/4-143TC	575V-60Hz, 1 hp	33610093
90SH/4-145TC	575V-60Hz, 1-1/2 hp	34110093
90LH/4-145TC	575V-60Hz, 2 hp	34610093

Part Numbers SK 1SI50



1 Wormgearbox	1.125 hollow shaft	25mm hollow shaft
i=5	60592050	60591050
i=7.5	60592080	60591080
i=10	60592100	60591100
i=12.5	60592130	60591130
i=15	60592150	60591150
i=20	60592200	60591200
i=25	60592250	60591250
i=30	60592300	60591300
i=40	60592400	60591400
i=50	60592500	60591500
i=60	60592600	60591600
i=80	60592800	60591800
i=100	60592000	60591000

2 NEMA and IEC Adapter 84 & 100	Part Number
NEMA 56C	60495500
NEMA 140TC	60595500
IEC 56 B14 C105	60495100
IEC 56 B5 A120	60495200
IEC 63 B14 C90	60495010
IEC 63 B14 C120	60495110
IEC 63 B5 A140	60495210
IEC 71 B14 C105	60495020
IEC 71 B14 C140	60495120
IEC 71 B5 A160	60495220
IEC 80 B14 C120	60495030
IEC 80 B14 C160	60495130
IEC 80 B5 A200	60495230
IEC 90 B14 C140	60495040
IEC 90 B14 C160	60495140

3 Plug in Shaft - Inch 103	Part Number
Shaft	1.000" x 50mm 60593010
Double Shaft	1.000" x 50mm 60593110
Shaft for Output Flange B5	1.000" x 50mm 60593210
Plug in Shaft - Metric 103	Part Number
Shaft	25mm x 50mm 60593000
Double Shaft	25mm x 50mm 60593100
Shaft for Output Flange B5	25mm x 50mm 60593200

4 Hollow Shaft Bushing 85	Part Number
Hollow Shaft Bushing	1.00" 60593400

5 Output Flange B5 85	Part Number
I Flange - 160mm	60593800
II Flange, Square Flange, Female Pilot - 125mm	60593810
III Flange, Square Flange, Male Pilot - 125mm	60593820

6 Shaft Cover 85	Part Number
Shaft Cover	60593950

7 Torque Arm 85	Part Number
Torque Arm	60593900

8 Foot Plate 85	Foot Hole Dimensions	Part Number
Foot Plate	0.64" / 4.69" x 6.38"	60594600

Open Vent (Not shown in image)	Part Number
Open Vent	60693500

9 Helical Input Stage 96	Part Number
Helical Input Stage H10	60494000

10 Double Worm Adapter 98	Part Number
Inch	0.625" 60494110
Metric	14mm 60494100

11 Double Worm Unit
SK 1SI31
For module ratio and Adapter combination see page 63

12 Solid Input Shaft 101	Part Number
Solid Input Shaft	0.625" x 1.57" 60494210
Solid Input Shaft	16mm x 40mm 60494200

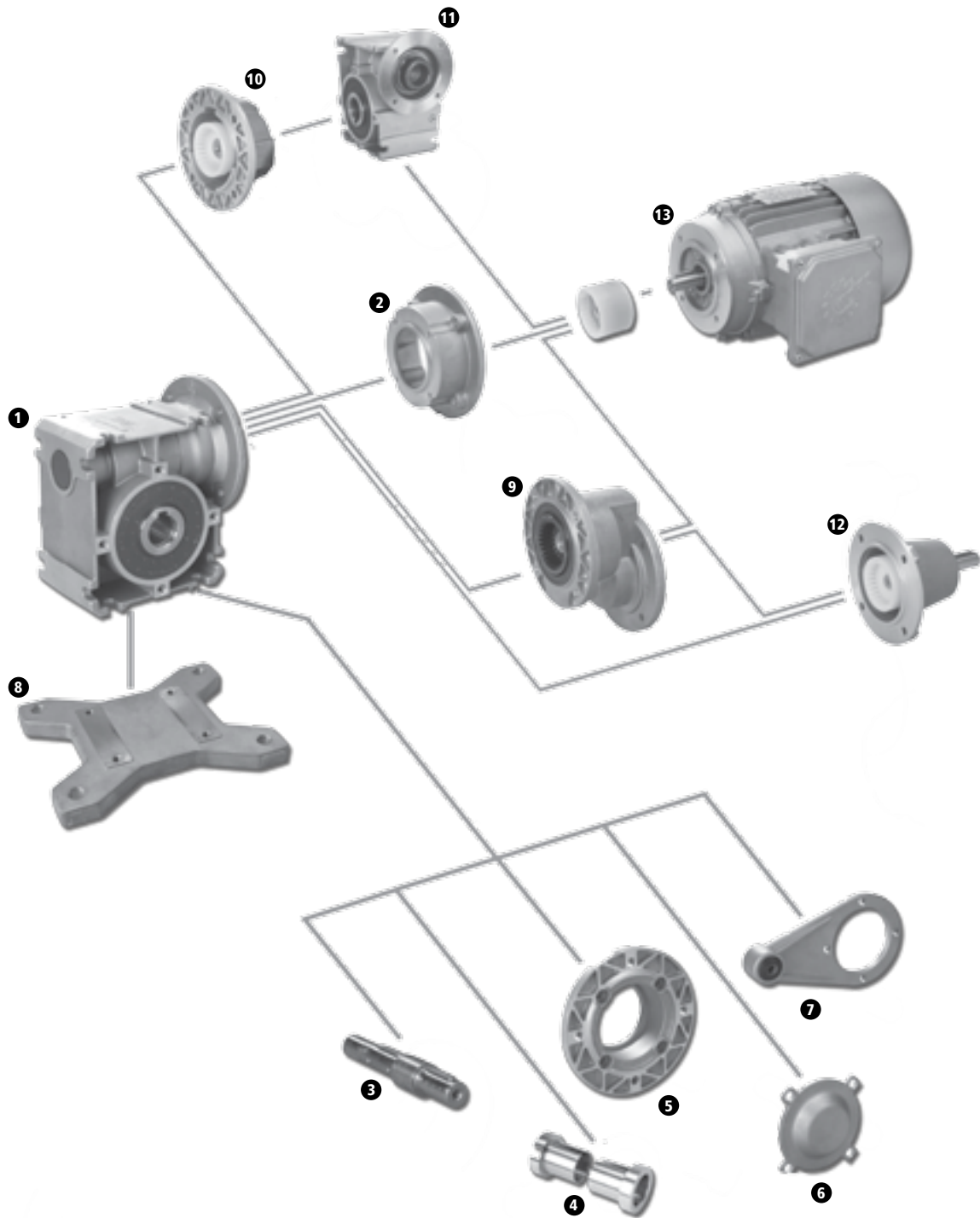
13 C-face 230/460V-60Hz Standard Efficiency Motor	Part Number
63S/4-56C	230/460V-60Hz, 1/6 hp 31110012
63L/4-56C	230/460V-60Hz, 1/4 hp 31610012
71S/4-56C	230/460V-60Hz, 1/3 hp 32110012
71L/4-56C	230/460V-60Hz, 1/2 hp 32610012
80S/4-56C	230/460V-60Hz, 3/4 hp 33110012
80L/4-56C	230/460V-60Hz, 1 hp 33610022

C-face 575V-60Hz Standard Efficiency Motor	Part Number
63S/4-56C	575V-60Hz, 1/6 hp 31110013
63L/4-56C	575V-60Hz, 1/4 hp 31610013
71S/4-56C	575V-60Hz, 1/3 hp 32110013
71L/4-56C	575V-60Hz, 1/2 hp 32610013

C-face 230/460V-60Hz Energy Efficient Motor	Part Number
80LH/4-56C	230/460V-60Hz, 1 hp 33610094
80LH/4-143TC	230/460V-60Hz, 1 hp 33610092
90SH/4-145TC	230/460V-60Hz, 1-1/2 hp 34110092
90LH/4-145TC	230/460V-60Hz, 2 hp 34610092

C-face 575V-60Hz Energy Efficient Motor	Part Number
80LH/4-56C	575V-60Hz, 1 hp 33610095
80LH/4-143TC	575V-60Hz, 1 hp 33610093
90SH/4-145TC	575V-60Hz, 1-1/2 hp 34110093
90LH/4-145TC	575V-60Hz, 2 hp 34610093

Part Numbers SK 1SI63



1 Wormgearbox	1.4375 Hollow Shaft	25mm Hollow Shaft
i=5	60692050	60691050
i=7.5	60692080	60691080
i=12.5	60692130	60691130
i=10	60692100	60691100
i=15	60692150	60691150
i=20	60692200	60691200
i=25	60692250	60691250
i=30	60692300	60691300
i=40	60692400	60691400
i=50	60692500	60691500
i=60	60692600	60691600
i=80	60692800	60691800
i=100	60692000	60691000

2 NEMA and IEC Adapter 88 & 100	Part Number
NEMA 56C	60495500
NEMA 140TC	60595500
NEMA 180TC	60695500
IEC 56 B14 C105	60495100
IEC 56 B5 A120	60495200
IEC 63 B14 C90	60495010
IEC 63 B14 C120	60495110
IEC 63 B5 A140	60495210
IEC 71 B14 C105	60495020
IEC 71 B14 C140	60495120
IEC 71 B5 A160	60495220
IEC 80 B14 C120	60495030
IEC 80 B14 C160	60495130
IEC 80 B5 A200	60495230
IEC 90 B14 C140	60695040
IEC 90 B14 C160	60695140
IEC 90 B5 A200	60695240

3 Plug in Shaft - Inch 103	Part Number
Shaft	1.125" x 50mm 60693010
Double Shaft	1.125" x 50mm 60693110
Shaft for Output Flange B5	1.125" x 50mm 60693210
Plug in Shaft - Metric 103	Part Number
Plug-in Shaft	25mm x 50mm 60693000
Double Plug-in Shaft	25mm x 50mm 60693100
Shaft for Output Flange B5	25mm x 50mm 60693200

4 Hollow Shaft Bushing 89	Part Number
Hollow Shaft Bushing	1.00" 60693400
Hollow Shaft Bushing	1.25" 60693420

5 Output Flange B5 89	Part Number
I Flange - 200mm	60693800
II Flange, Square Flange, Female Pilot - 180mm	60693810
III Flange, 160mm	60693820

6 Shaft Cover 89	Part Number
Shaft Cover	60693950

7 Torque Arm 89	Part Number
Torque Arm	60693900

8 Foot Plate 91	Foot Hole Dimensions	Part Number
Foot Plate	0.86" / 5.25" x 8.00"	60694600

Open Vent (Not shown in image)	Part Number
Open Vent	60693500

9 Helical Input Stage 96	Part Number
Helical Input Stage H10	60494000

10 Double Worm Adapter 98	Part Number
Inch	0.625" 60494110
Metric	14mm 60494100

11 Double Worm Unit
SK 1SI31
For module ratio and Adapter combination see page 63

12 Solid Input Shaft 101	Part Number
Solid Input Shaft	0.625" x 1.57" 60494210
Solid Input Shaft	16mm x 40mm 60494200

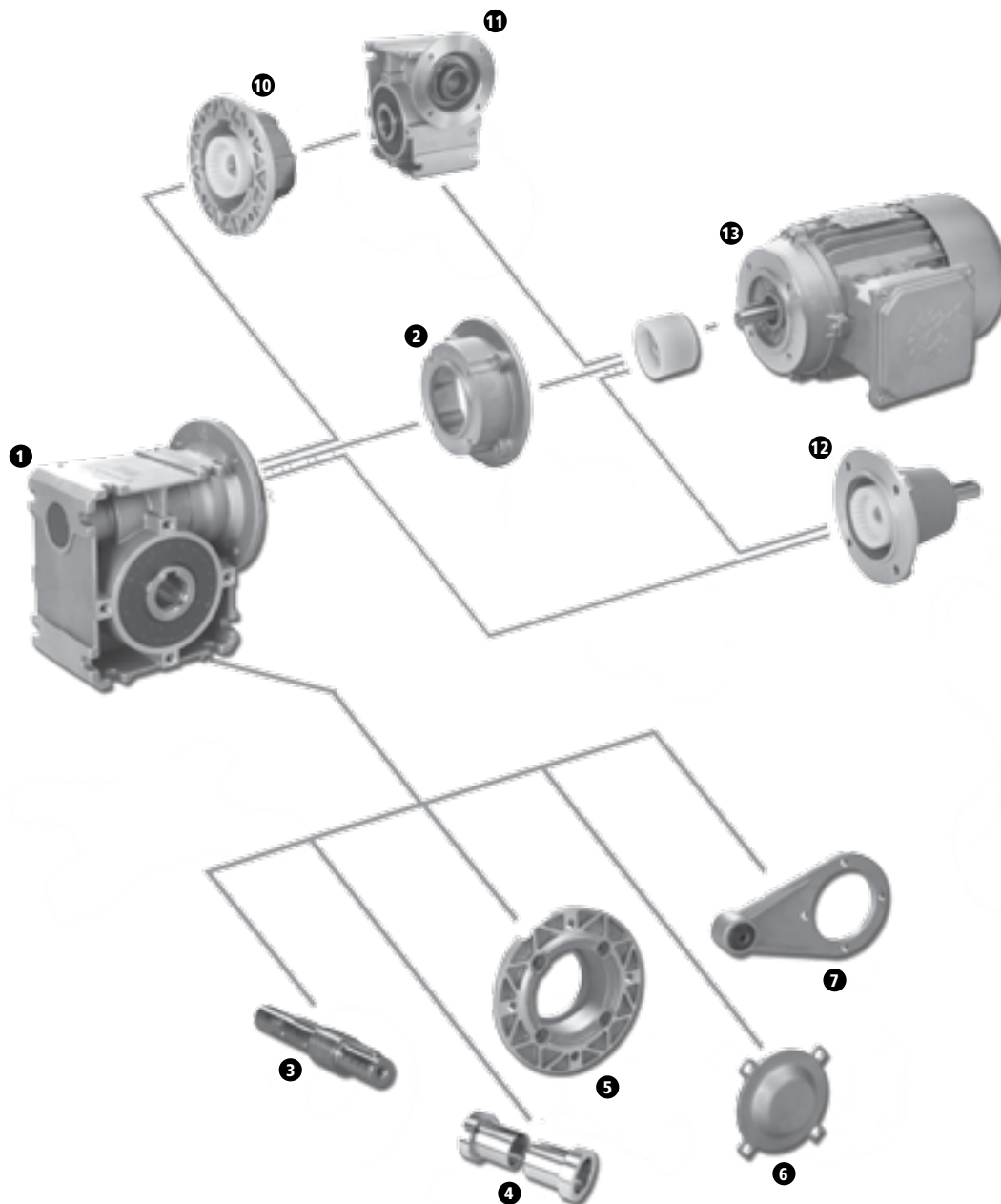
13 C-face 230/460V-60Hz Standard Efficiency Motor	Part Number
63S/4-56C	230/460V-60Hz, 1/6 hp 31110012
63L/4-56C	230/460V-60Hz, 1/4 hp 31610012
71S/4-56C	230/460V-60Hz, 1/3 hp 32110012
71L/4-56C	230/460V-60Hz, 1/2 hp 32610012
80S/4-56C	230/460V-60Hz, 3/4 hp 33110012
80L/4-56C	230/460V-60Hz, 1 hp 33610022

C-face 575V-60Hz Standard Efficiency Motor	Part Number
63S/4-56C	575V-60Hz, 1/6 hp 31110013
63L/4-56C	575V-60Hz, 1/4 hp 31610013
71S/4-56C	575V-60Hz, 1/3 hp 32110013
71L/4-56C	575V-60Hz, 1/2 hp 32610013
80S/4-56C	575V-60Hz, 3/4 hp 33110013

C-face 230/460V-60Hz Energy Efficient Motor	Part Number
80LH/4-56C	230/460V-60Hz, 1 hp 33610094
80LH/4-143TC	230/460V-60Hz, 1 hp 33610092
90SH/4-145TC	230/460V-60Hz, 1-1/2 hp 34110092
90LH/4-145TC	230/460V-60Hz, 2 hp 34610092
100LH/4-182TC	230/460V-60Hz, 3 hp 35110092
112MH/4-184TC	230/460V-60Hz, 5 hp 36110092

C-face 575V-60Hz Energy Efficient Motor	Part Number
80LH/4-56C	575V-60Hz, 1 hp 33610095
80LH/4-143TC	575V-60Hz, 1 hp 33610093
90SH/4-145TC	575V-60Hz, 1-1/2 hp 34110093
90LH/4-145TC	575V-60Hz, 2 hp 34610093
100LH/4-182TC	575V-60Hz, 3 hp 35110093
112MH/4-184TC	575V-60Hz, 5 hp 36110093

Part Numbers SK 1SI75



1 Wormgearbox	1.9375 Hollow Shaft	35mm Hollow Shaft
Ratio i=5	60792050	60791050
Ratio i=7.5	60792080	60791080
Ratio i=10	60792100	60791100
Ratio i=12.5	60792130	60791130
Ratio i=15	60792150	60791150
Ratio i=20	60792200	60791200
Ratio i=25	60792250	60791250
Ratio i=30	60792300	60791300
Ratio i=40	60792400	60791400
Ratio i=50	60792500	60791500
Ratio i=60	60792600	60791600
Ratio i=80	60792800	60791800
Ratio i=100	60792000	60791000

2 NEMA & IEC Adapter 92 & 100	Part Number
NEMA 56C	60795500
NEMA 140C	60795510
NEMA 180C	60795520
IEC 71 B14 C105	60795020
IEC 71 B14 C140	60795120
IEC 71 B5 A160	60795220
IEC 80 B14 C120	60795030
IEC 80 B14 C160	60795130
IEC 80 B5 A200	60795230
IEC 90 B14 C140	60795040
IEC 90 B14 C160	60795140
IEC 90 B5 A200	60795240
IEC 100 B14 C160	60795050
IEC 100 B14 C200	60795150
IEC 100 B5 A250	60795250
IEC 112 B14 C160	60795050
IEC 112 B14 C200	60795150
IEC 112 B5 A250	60795250

3 Plug in Output Shaft - Inch 103	Part Number
Shaft	1.375" x 70mm 60793010
Double Shaft	1.375" x 70mm 60793110
Shaft for Output Flange B5	1.375" x 70mm 60793210
Plug in Output Shaft - Metric 103	Part Number
Plug-in Shaft	35mm x 70mm 60793000
Double Plug-in Shaft	35mm x 70mm 60793100
Shaft for Output Flange B5	35mm x 70mm 60793200

4 Hollow Shaft Bushing 93	Part Number
Hollow Shaft Bushing	1.250" 60793400
Hollow Shaft Bushing	1.500" 60793410

5 Output Flange B5 93	Part Number
II Flange - 200mm	60793800

6 Shaft Cover 89	Part Number
Shaft Cover	60793950

7 Torque Arm 89	Part Number
Torque Arm	60793900

Open Vent (Not shown in image)	Part Number
Open Vent	60693500

10 Double Worm Adapter 98	Part Number
Inch	1.000" 60794100
Metric	14mm 60794000

11 Double Worm Unit
SK 1SI40
For module ratio and Adapter combination see page 65

12 Solid Input Shaft 101	Part Number
Solid Input Shaft	0.875" x 1.97" 60794210
Solid Input Shaft	24mm x 50mm 60794200

13 C-face 230/460V-60Hz Standard Efficiency Motor	Part Number
63S/4-56C	230/460V-60Hz, 1/6 hp 31110012
63L/4-56C	230/460V-60Hz, 1/4 hp 31610012
71S/4-56C	230/460V-60Hz, 1/3 hp 32110012
71L/4-56C	230/460V-60Hz, 1/2 hp 32610012
80S/4-56C	230/460V-60Hz, 3/4 hp 33110012
80L/4-56C	230/460V-60Hz, 1 hp 33610022

C-face 575V-60Hz Standard Efficiency Motor	Part Number
63S/4-56C	575V-60Hz, 1/6 hp 31110013
63L/4-56C	575V-60Hz, 1/4 hp 31610013
71S/4-56C	575V-60Hz, 1/3 hp 32110013
71L/4-56C	575V-60Hz, 1/2 hp 32610013
80S/4-56C	575V-60Hz, 3/4 hp 33110013

C-face 230/460V-60Hz Energy Efficient Motor	Part Number
80LH/4-56C	230/460V-60Hz, 1 hp 33610094
80LH/4-143TC	230/460V-60Hz, 1 hp 33610092
90SH/4-145TC	230/460V-60Hz, 1-1/2 hp 34110092
90LH/4-145TC	230/460V-60Hz, 2 hp 34610092
100LH/4-182TC	230/460V-60Hz, 3 hp 35110092
112MH/4-184TC	230/460V-60Hz, 5 hp 36110092

C-face 575V-60Hz Energy Efficient Motor	Part Number
80LH/4-56C	575V-60Hz, 1 hp 33610095
80LH/4-143TC	575V-60Hz, 1 hp 33610093
90SH/4-145TC	575V-60Hz, 1-1/2 hp 34110093
90LH/4-145TC	575V-60Hz, 2 hp 34610093
100LH/4-182TC	575V-60Hz, 3 hp 35110093
112MH/4-184TC	575V-60Hz, 5 hp 36110093

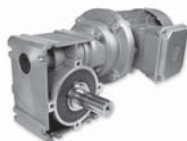
Inch FLEXBLOC™ Component Kits



CONFIGURATION

Inch Flexbloc Component Kits

	SK 1SI31, Ø 0.625	SK 1SI40, Ø 1.000	SK 1SI50, Ø 1.125	SK 1SI63, Ø 1.4375	SK 1SI75, Ø 1.9375
Worm Modules	60392050, i=5	60492050, i=5	60592050, i=5	60692050, i=5	60792050, i=5
	60392080, i=7.5	60492080, i=7.5	60592080, i=7.5	60692080, i=7.5	60792080, i=7.5
	60392100, i=10	60492100, i=10	60592100, i=10	60692100, i=10	60792100, i=10
	60392130, i=12.5	60492130, i=12.5	60592130, i=12.5	60692130, i=12.5	60792130, i=12.5
	60392150, i=15	60492150, i=15	60592150, i=15	60692150, i=15	60792150, i=15
	60392200, i=20	60492200, i=20	60592200, i=20	60692200, i=20	60792200, i=20
	60392250, i=25	60492250, i=25	60592250, i=25	60692250, i=25	60792250, i=25
	60392300, i=30	60492300, i=30	60592300, i=30	60692300, i=30	60792300, i=30
	60392400, i=40	60492400, i=40	60592400, i=40	60692400, i=40	60792400, i=40
	60392500, i=50	60492500, i=50	60592500, i=50	60692500, i=50	60792500, i=50
	60392600, i=60	60492600, i=60	60592600, i=60	60692600, i=60	60792600, i=60
	60392800, i=80	60492800, i=80	60592800, i=80	60362800, i=80	60792800, i=80
	60392000, i=100	60492000, i=100	60592000, i=100	60692000, i=100	60792000, i=100
NEMA 48C	60395500	N/A	N/A	N/A	N/A
NEMA 56C	60395510	60495500	60495500	60495500	60795500
NEMA 140TC	N/A	60595500	60595500	60595500	60795510
NEMA 180TC	N/A	N/A	N/A	60695500	60795520
Solid Input Shaft (W)	N/A	60494210, Ø 0.625	60494210, Ø 0.625	60494210, Ø 0.625	60794210, Ø 0.875
Helical Input Stage (H10)	N/A	60494000	60494000	60494000	N/A
Double Worm Adapter (/31, /41)	N/A	60494110, Ø 0.625	60494110, Ø 0.625	60494110, Ø 0.625	60794100, Ø 0.750
Plug-in Solid Shaft (V)	60393010, Ø 0.625	60493010, Ø 0.750	60593010, Ø 1.000	60693010, Ø 1.125	60793010, Ø 1.375
Double Solid Shaft (L)	60393110, Ø 0.625	60493110, Ø 0.750	60593110, Ø 1.000	60693110, Ø 1.125	60793110, Ø 1.375
Plug-in Shaft with Flange (VF)	60393210, Ø 0.625	60493210, Ø 0.750	60593210, Ø 1.000	60693210, Ø 1.125	60793210, Ø 1.375
Flange I (F)	60393800, Ø 4.13	60493800, Ø 4.72	60593800, Ø 6.30	60693800, Ø 7.87	N/A
Flange II (female pilot) (F)	60393810, Ø 3.15	60493810, Ø 4.33	60593810, Ø 4.92	60693810, Ø 7.09	60793800, Ø 7.87
Flange III (male pilot) (F)	60393820, Ø 3.15	N/A	60593820, Ø 4.92	60693820, Ø 6.30	N/A
Torque Arm (D)	60393900	60493900	60593900	60693900	60793900
Shaft Cover (H)	60393950	60493950	60593950	60693950	60793950
Hollow Shaft Bushing (J)	N/A	N/A	60593400, Ø 1.000	60693400, Ø 1.000	60793400, Ø 1.250
	N/A	N/A	N/A	60693420, Ø 1.250	60793410, Ø 1.500
Footplate (X)	60394600	60494600	60594600	60694600	N/A
Open vent (OV)	N/A	60693500	60693500	60693500	60693500



Metric Flexbloc Component Kits

	SK 1S131, Ø 14	SK 1S140, Ø 18	SK 1S150, Ø 25	SK 1S163, Ø 25	SK 1S175, Ø 35
Worm Modules	60391050, i=5	60491050, i=5	60591050, i=5	60691050, i=5	60791050, i=5
	60391050, i=7.5	60491080, i=7.5	60591080, i=7.5	60691080, i=7.5	60791080, i=7.5
	60391100, i=10	60491100, i=10	60591100, i=10	60691100, i=10	60791100, i=10
	60391130, i=12.5	60491130, i=12.5	60591130, i=12.5	60691130, i=12.5	60791130, i=12.5
	60392150, i=15	60491150, i=15	60591150, i=15	60691150, i=15	60791150, i=15
	60391200, i=20	60491200, i=20	60591200, i=20	60691200, i=20	60791200, i=20
	60391250, i=25	60491250, i=25	60591250, i=25	60691250, i=25	60791250, i=25
	60391300, i=30	60491300, i=30	60591300, i=30	60691300, i=30	60791300, i=30
	60391400, i=40	60491400, i=40	60591400, i=40	60691400, i=40	60791400, i=40
	60391500, i=50	60491500, i=50	60591500, i=50	60691500, i=50	60791500, i=50
	60391600, i=60	60491600, i=60	60591600, i=60	60691600, i=60	60791600, i=60
	60391800, i=80	60491800, i=80	60591800, i=80	60691800, i=80	60791800, i=80
	60391000, i=100	60491000, i=100	60591000, i=100	60691000, i=100	60791000, i=100
IEC 56 B14 C105	60395100	60495100	60495100	60495100	N/A
IEC 56 B5 A120	60395200	60495200	60495200	60495200	N/A
IEC 63 B14 C90	60395010*	60495010*	60495010*	60495010*	N/A
IEC 63 B14 C120	60395110	60495110	60495110	60495110	N/A
IEC 63 B5 A140	60395210	60495210	60495210	60495210	N/A
IEC 71 B14 C105	60395020*	60495020*	60495020*	60495020*	60795020*
IEC 71 B14 C140	60395120	60495120	60495120	60495120	60795120
IEC 71 B5 A160	N/A	60495220	60495220	60495220	60795220
IEC 80 B14 C120	N/A	60495030*	60495030*	60495030*	60795030*
IEC 80 B14 C160	N/A	60495130	60495130	60495130	60795130
IEC 80 B5 A200	N/A	60495230	60495230	60495230	60795230
IEC 90 B14 C140	N/A	60495040*	60495040*	60695040*	60795040*
IEC 90 B14 C160	N/A	60495140	60495140	60695140	60795140
IEC 90 B5 A200	N/A	N/A	N/A	60695240	60795240
IEC 100 B14 C160	N/A	N/A	N/A	N/A	60795050
IEC 100 B14 C200	N/A	N/A	N/A	N/A	60795150
IEC 100 B5 A250	N/A	N/A	N/A	N/A	60795250*
IEC 112 B14 C160	N/A	N/A	N/A	N/A	60795050
IEC 112 B14 C200	N/A	N/A	N/A	N/A	60795150
IEC 112 B5 A250	N/A	N/A	N/A	N/A	60795250*
Solid Input Shaft (W)	N/A	60494200, Ø 16	60494200, Ø 16	60494200, Ø 16	60794200, Ø 24
Helical Input Stage (H10)	N/A	60494000	60494000	60494000	N/A
Double Worm Adapter (/31, /40)	N/A	60494100, Ø 14	60494100, Ø 14	60494100, Ø 14	60794000, Ø 18
Plug-in Solid Shaft (V)	60393000, Ø 14	60493000, Ø 18	60593000, Ø 25	60693000, Ø 25	60793000, Ø 35
Double Solid Shaft (L)	60393100, Ø 14	60493100, Ø 18	60593100, Ø 25	60693100, Ø 25	60793100, Ø 35
Plug-in Solid Shaft with Flange (VF)	60393200, Ø 14	60493200, Ø 18	60593200, Ø 25	60693200, Ø 25	60793200, Ø 35
Flange I (F)	60393800, Ø 105	60493800, Ø 120	60593800, Ø 160	60693800, Ø 200	N/A
Flange II (female pilot) (F)	60393810, Ø 80	60493810, Ø 110	60593810, Ø 125	60693810, Ø 180	60793800, Ø 200
Flange III (male pilot) (F)	60393820, Ø 80	N/A	60593820, Ø 125	60693820, Ø 160	N/A
Torque Arm (D)	60393900	60493900	60593900	60693900	60793900
Shaft Cover (H)	60393950	60493950	60593950	60693950	60793950
Hollow Shaft Bushing (J)	N/A	N/A	N/A	N/A	N/A
	N/A	N/A	N/A	N/A	N/A
Footplate (X)	60394600	60494600	60594600	60694600	N/A
Open vent (OV)	N/A	60693500	60693500	60693500	60693500

*standard



Part Numbers C-Face Motors & Brakemotors



CONFIGURATION

C-face 230/460V-60Hz Standard Efficiency		Part Number
63S/4-56C	230/460V-60Hz, 1/6 hp	31110012
63L/4-56C	230/460V-60Hz, 1/4 hp	31610012
71S/4-56C	230/460V-60Hz, 1/3 hp	32110012
71L/4-56C	230/460V-60Hz, 1/2 hp	32610012
80S/4-56C	230/460V-60Hz, 3/4 hp	33110012
80L/4-56C	230/460V-60Hz, 1 hp	33610022

C-face 575V-60Hz Standard Efficiency		Part Number
63S/4-56C	575V-60Hz, 1/6 hp	31110013
63L/4-56C	575V-60Hz, 1/4 hp	31610013
71S/4-56C	575V-60Hz, 1/3 hp	32110013
71L/4-56C	575V-60Hz, 1/2 hp	32610013
80S/4-56C	575V-60Hz, 3/4 hp	33110013
80L/4-56C	575V-60Hz, 1 hp	33610023

C-face 230/460V-60Hz Energy Efficient		Part Number
80LH/4-56C	230/460V-60Hz, 1 hp	33610094
80LH/4-143TC	230/460V-60Hz, 1 hp	33610092
90SH/4-145TC	230/460V-60Hz, 1-1/2 hp	34110092
90LH/4-145TC	230/460V-60Hz, 2 hp	34610092
100LH/4-182TC	230/460V-60Hz, 3 hp	35110092
112MH/4-184TC	230/460V-60Hz, 5 hp	36110082

C-face 575V-60Hz Energy Efficient		Part Number
80LH/4-56C	575V-60Hz, 1 hp	33610095
80LH/4-143TC	575V-60Hz, 1 hp	33610093
90SH/4-145TC	575V-60Hz, 1-1/2 hp	34110093
90LH/4-145TC	575V-60Hz, 2 hp	34610093
100LH/4-182TC	575V-60Hz, 3 hp	35110093
112MH/4-184TC	575V-60Hz, 5 hp	36110083

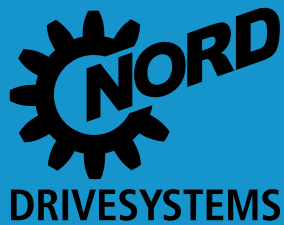
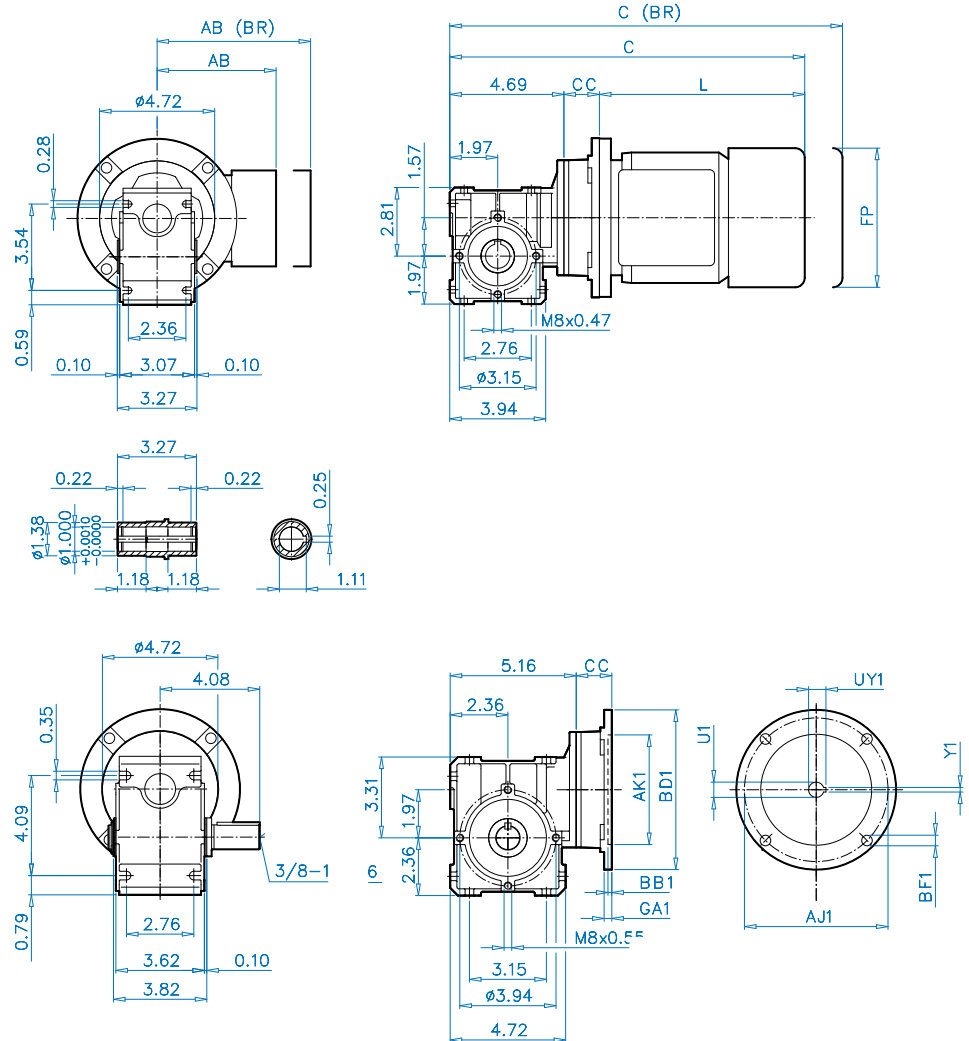
C-face 230/460V-60Hz Standard Efficiency - Brakemotor		Part Number
63S/4-56C BRE5 HL	230/460V-60Hz, 1/6 hp, 230VAC brake with hand release lever	31110034
63L/4-56C BRE5 HL	230/460V-60Hz, 1/4 hp, 230VAC brake with hand release lever	31610034
71S/4-56C BRE5 HL	230/460V-60Hz, 1/3 hp, 230VAC brake with hand release lever	32110034
71L/4-56C BRE5 HL	230/460V-60Hz, 1/2 hp, 230VAC brake with hand release lever	32610034
80S/4-56C BRE10 HL	230/460V-60Hz, 3/4 hp, 230VAC brake with hand release lever	33110034
80L/4-56C BRE10 HL	230/460V-60Hz, 1 hp, 230VAC brake with hand release lever	33610024
80LH/4-56C BRE10 HL	230/460V-60Hz, 1 hp, 230VAC brake with hand release lever	33610082
80LH/4-143TC BRE 10 HL	230/460V-60Hz, 1 hp, 230VAC brake with hand release lever	33610084
90SH/4-145TC BRE 20 HL	230/460V-60Hz, 1-1/2 hp, 230VAC brake with hand release lever	34110084
90LH/4-145TC BRE 20 HL	230/460V-60Hz, 2 hp, 230VAC brake with hand release lever	34610084
100LH/4-182TC BRE 40 HL	230/460V-60Hz, 3 hp, 230VAC brake with hand release lever	35110084
112MH/4-184TC BRE 40 HL	230/460V-60Hz, 5 hp, 230VAC brake with hand release lever	36110084

C-face 575V-60Hz Standard Efficiency - Brakemotor		Part Number
63S/4-56C BRE5 HL	575V-60Hz, 1/6 hp, 575VAC brake with hand release lever	31110035
63L/4-56C BRE5 HL	575V-60Hz, 1/4 hp, 575VAC brake with hand release lever	31610035
71S/4-56C BRE5 HL	575V-60Hz, 1/3 hp, 575VAC brake with hand release lever	32110035
71L/4-56C BRE5 HL	575V-60Hz, 1/2 hp, 575VAC brake with hand release lever	32610035
80S/4-56C BRE10 HL	575V-60Hz, 3/4 hp, 575VAC brake with hand release lever	33110035
80L/4-56C BRE10 HL	575V-60Hz, 1 hp, 575VAC brake with hand release lever	33610025
80LH/4-56C BRE10 HL	230/460V-60Hz, 1 hp, 230VAC brake with hand release lever	33610083
80LH/4-143TC BRE 10 HL	575V-60Hz, 1 hp, 230VAC brake with hand release lever	33610085
90SH/4-145TC BRE 20 HL	575V-60Hz, 1-1/2 hp, 230VAC brake with hand release lever	34110085
90LH/4-145TC BRE 20 HL	575V-60Hz, 2 hp, 230VAC brake with hand release lever	34610085
100LH/4-182TC BRE 40 HL	575V-60Hz, 3 hp, 230VAC brake with hand release lever	35110085
112MH/4-184TC BRE 40 HL	575V-60Hz, 5 hp, 230VAC brake with hand release lever	36110085

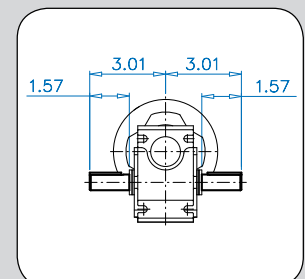
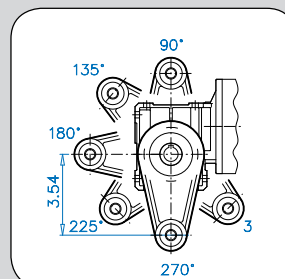
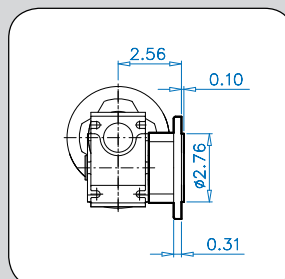
FLEXBLOC™ Dimensions

Gearmotors & C-Face Reducers

- SK 1SI31
- SK 1SI40
- SK 1SI50
- SK 1SI63
- SK 1SI75



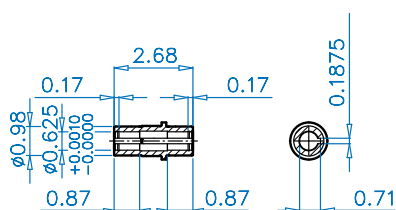
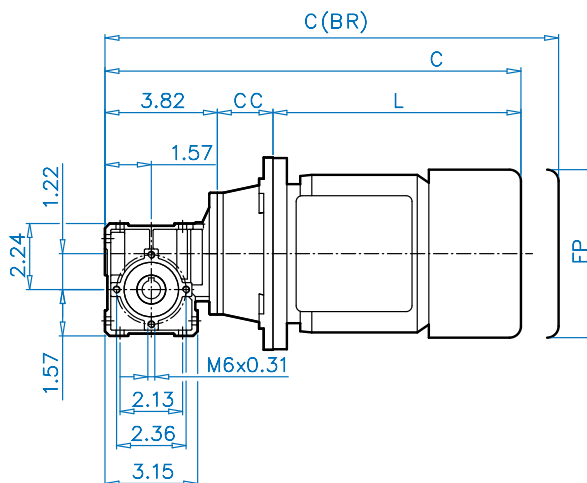
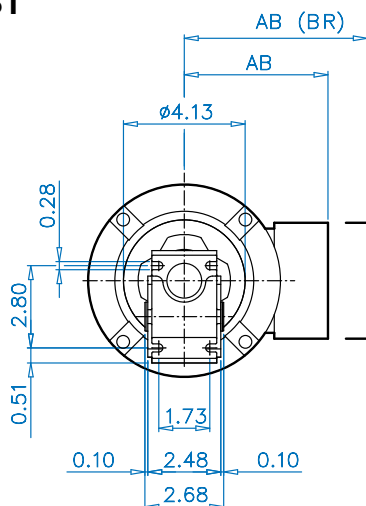
www.nord.com



SK 1SI31 - Motor SK 1SI31 - NEMA



SK 1SI31



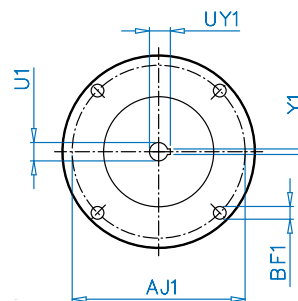
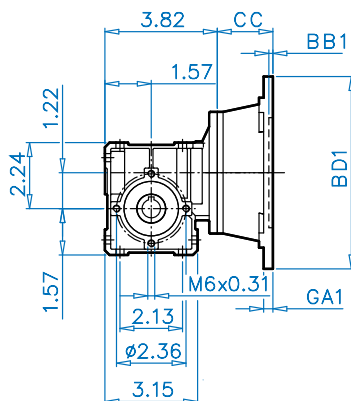
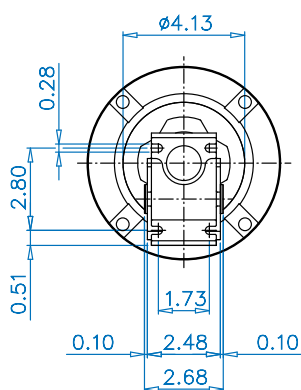
CUSTOMER SUPPLIED KEY – 3/16 x 3/16

Motor dimensions

Standard eff.	56C - 63 S/L	56 - C 71 S/L	56C - 80 S/L
Energy eff.			56C - 80 LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	13.27	14.13	15.16
C (BR)	15.47	16.42	17.68
CC	1.89	1.89	1.89
FP	5.12	5.71	6.50
L	7.56	8.43	9.45
L (BR)	9.76	10.71	11.97

(BR) denotes Brakemotor

SK 1SI31



CONFIGURATIONS SEE PAGE 63

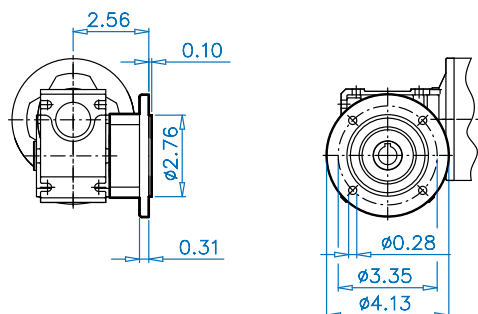
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
48C	3.75	3.00	0.16	4.33	0.29	1.50	0.25	0.500	flat	1.69	flat
56C	5.875	4.50	0.16	6.54	0.43	1.89	0.50	0.625	0.71	2.06	0.1875

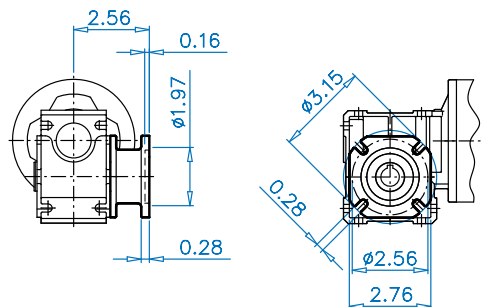


SK 1SI 31 Hollow Shaft Options

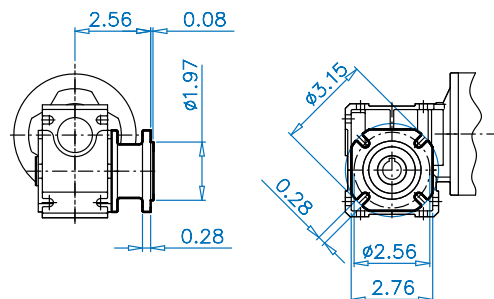
SK 1SI31 F (I Flange)



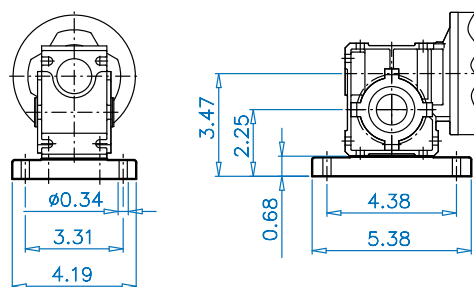
SK 1SI31 F (II Flange)



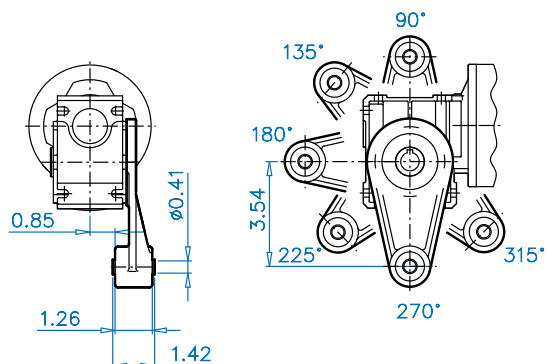
SK 1SI31 F (III Flange)



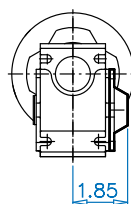
SK 1SI31 X (Footplate)



SK 1SI31 D (Torque Arm)



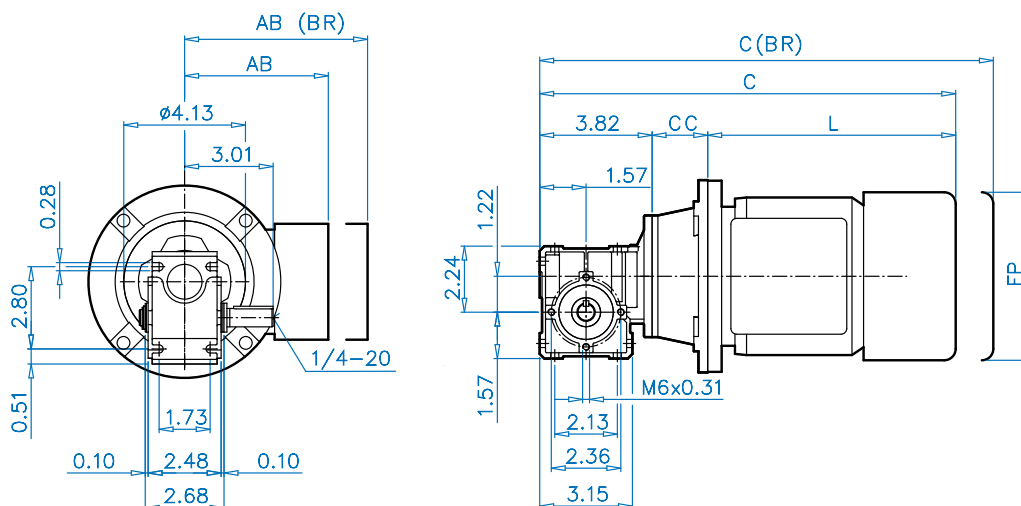
SK 1SI31 H (Shaft Cover)



SK 1SI31 - Motor SK 1SI31 - NEMA



SK 1SI31 V (Plug-In Shaft)

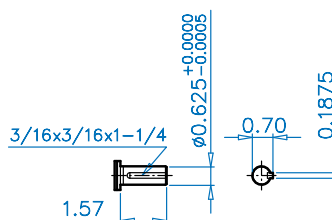


Motor dimensions

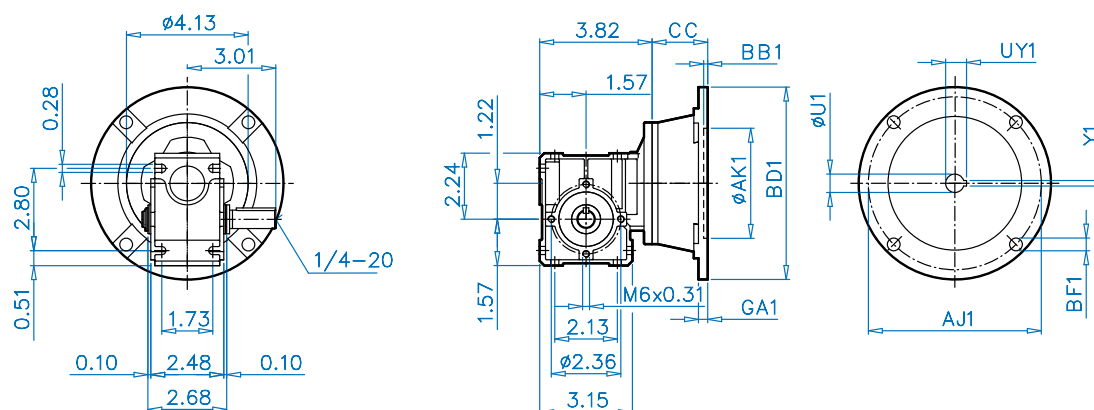
Standard eff.	56C - 63 S/L	56C - 71 S/L	56C - 80 S/L
Energy eff.			56C - 80 LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	13.27	14.13	15.16
C (BR)	15.47	16.42	17.68
CC	1.89	1.89	1.89
FP	5.12	5.71	6.50
L	7.56	8.43	9.45
L (BR)	9.76	10.71	11.97

(BR) denotes Brakemotor

SK 1SI31 V (Solid Shaft Detail)



SK 1SI31 V (Plug-In Shaft)



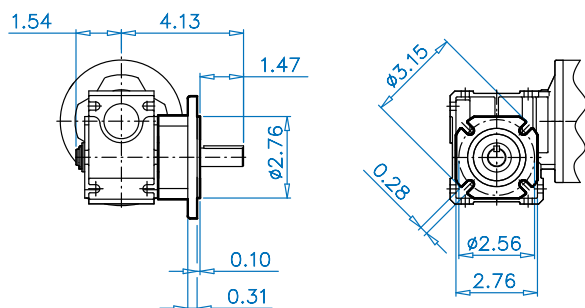
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
48C	3.75	3.00	0.16	4.33	0.29	1.50	0.25	0.500	flat	1.69	flat
56C	5.875	4.50	0.16	6.54	0.43	1.89	0.50	0.625	0.71	2.06	0.1875

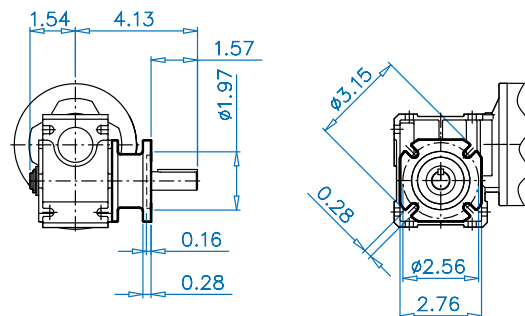


SK 1SI 31 Solid Shaft Options

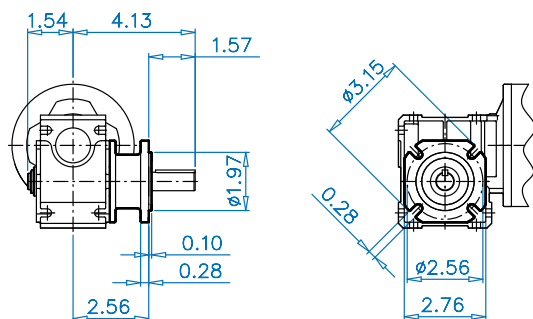
SK 1SI31 VF (Plug-In Shaft, I Flange)



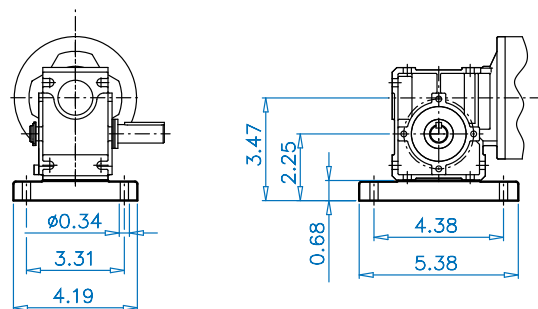
SK 1SI31 VF (Plug-In Shaft, II Flange)



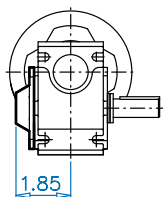
SK 1SI31 VF (Plug-In Shaft, III Flange)



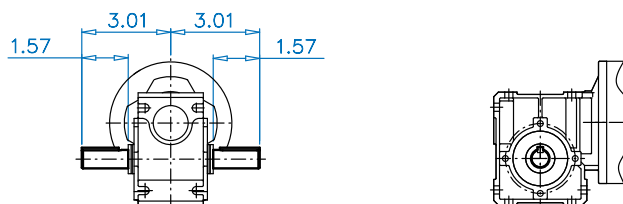
SK 1SI31 VX (Footplate)



SK 1SI31 VH (Plug-In Shaft, Shaft Cover)



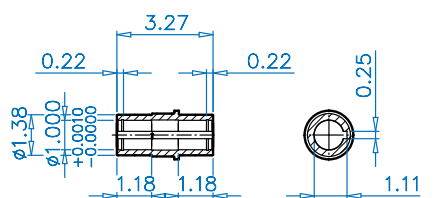
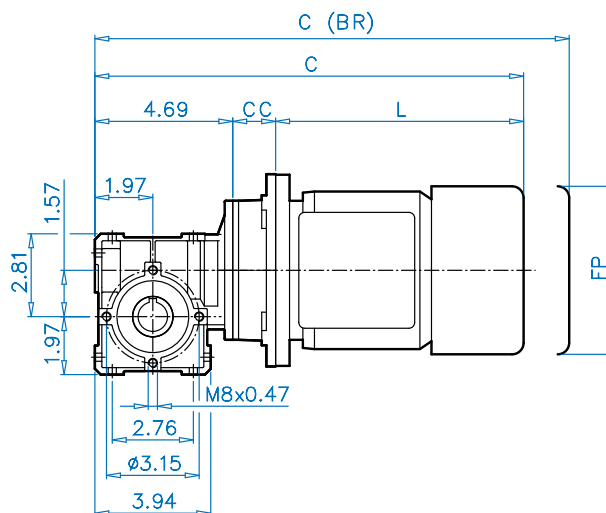
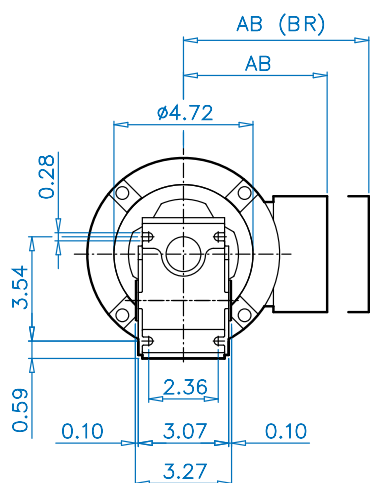
SK 1SI31 L (Double Solid Shaft)



SK 1SI40 - Motor SK 1SI40 - NEMA



SK 1SI40



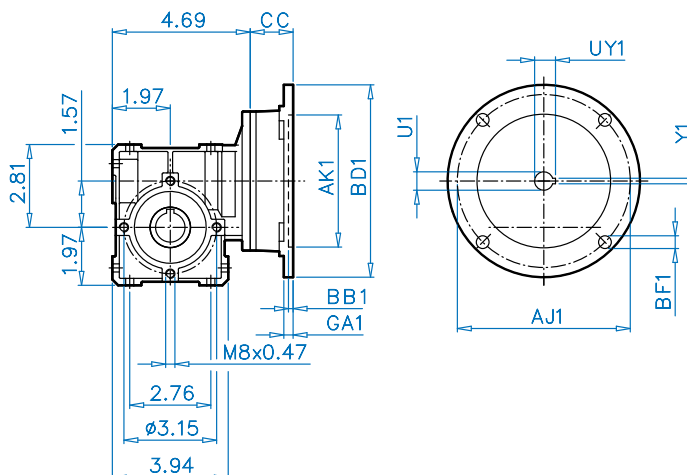
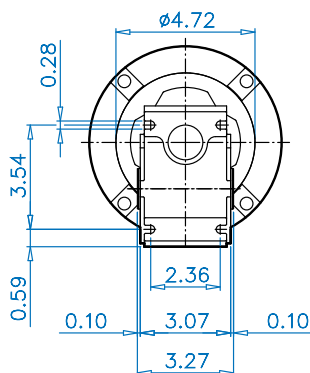
CUSTOMER SUPPLIED KEY – 1/4 x 1/4

Motor dimensions

Standard eff.	56C - 63 S/L	56C - 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L
Energy eff.			56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH
AB	4.53	4.88	5.59	5.59	5.79
AB (BR)	4.84	5.24	5.63	5.63	5.83
C	13.70	14.57	15.59	16.06	17.64
C (BR)	15.91	16.85	18.11	18.58	20.59
CC	1.46	1.46	1.46	1.93	1.93
FP	5.12	5.71	6.50	6.50	7.20
L	7.56	8.43	9.45	9.45	11.02
L (BR)	9.76	10.71	11.97	11.97	13.98

(BR) denotes Brakemotor

SK 1SI40



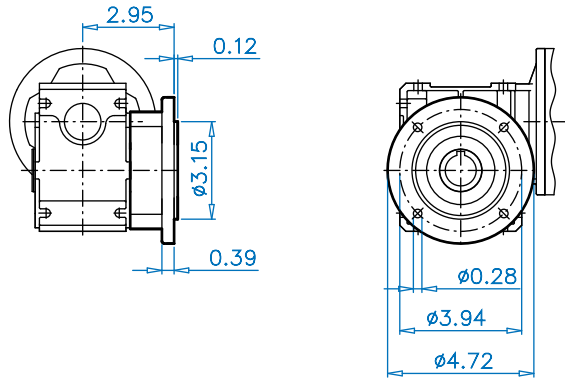
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875

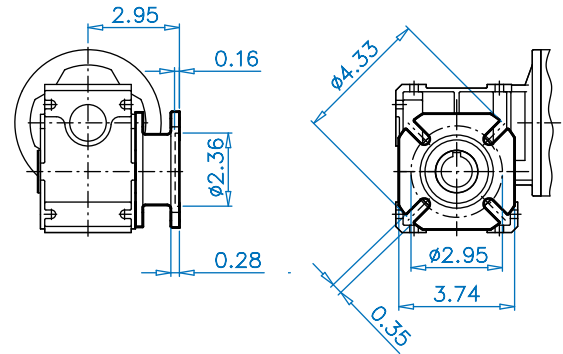


SK 1SI40 Hollow Shaft Options

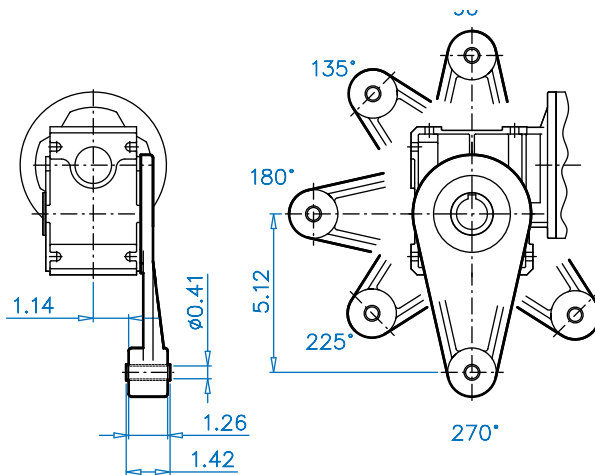
SK 1SI40 F (I Flange)



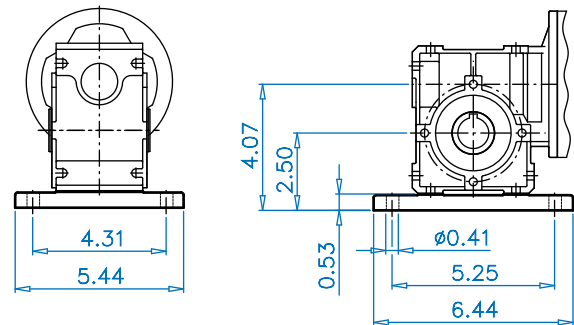
SK 1SI40 F (II Flange)



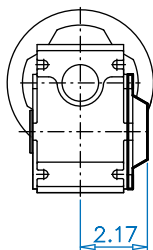
SK 1SI40 D (Torque Arm)



SK 1SI40 X (Footplate)



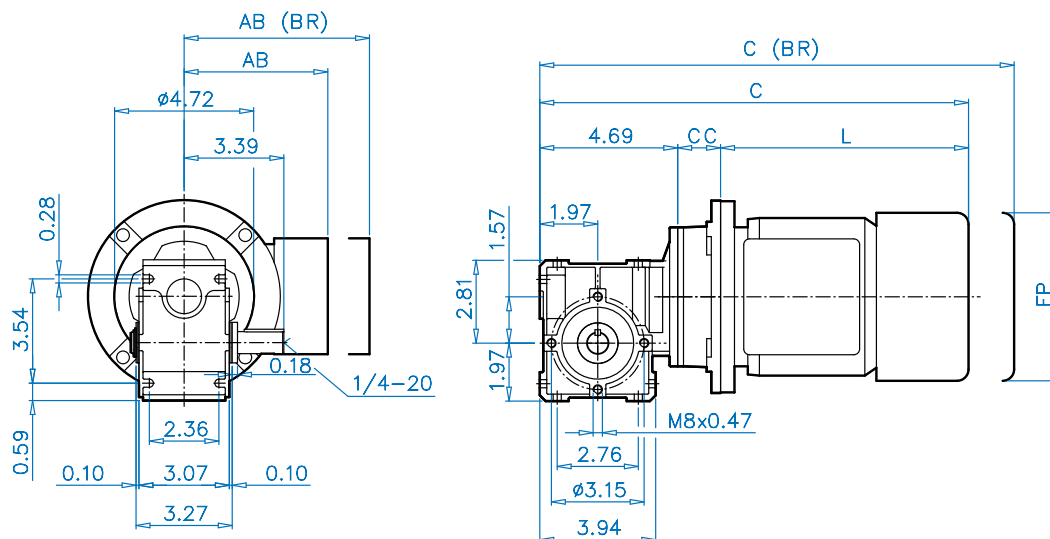
SK 1SI40 C (Shaft Cover)



SK 1SI40 - Motor SK 1SI40 - NEMA



SK 1SI40 V (Plug-In Shaft)

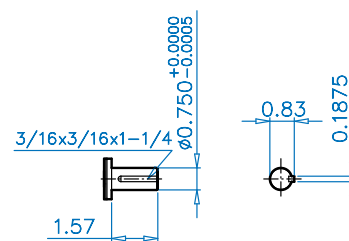


Motor dimensions

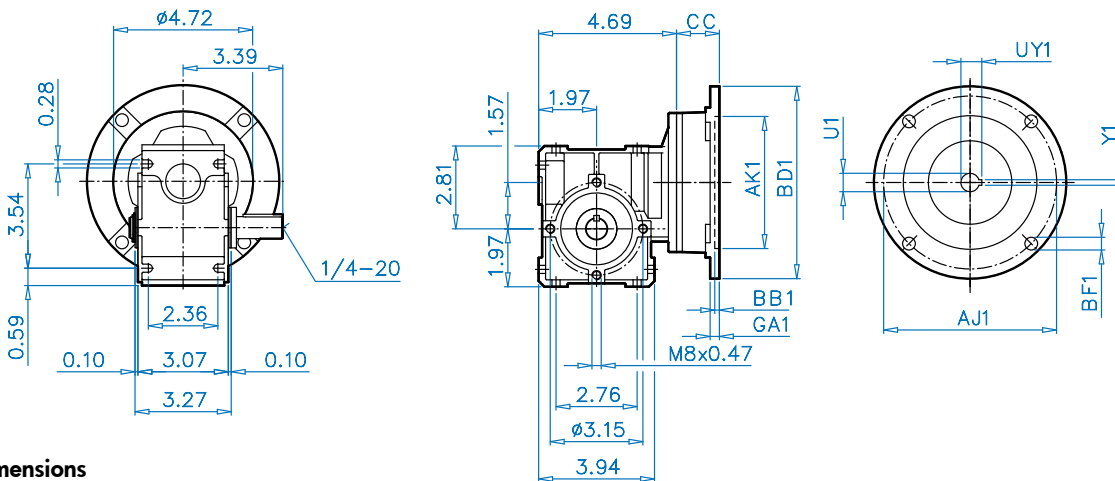
Standard eff.	56C - 63 S/L	56 - C 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L
Energy eff.			56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH
AB	4.53	4.88	5.59	5.59	5.79
AB (BR)	4.84	5.24	5.63	5.63	5.83
C	13.70	14.57	15.59	16.06	17.64
C (BR)	15.91	16.85	18.11	18.58	20.59
CC	1.46	1.46	1.46	1.93	1.93
FP	5.12	5.71	6.50	6.50	7.20
L	7.56	8.43	9.45	9.45	11.02
L (BR)	9.76	10.71	11.97	11.97	13.98

(BR) denotes Brakemotor

SK 1SI40 V (Solid Shaft Detail)



SK 1SI40 V (Plug-In Shaft)



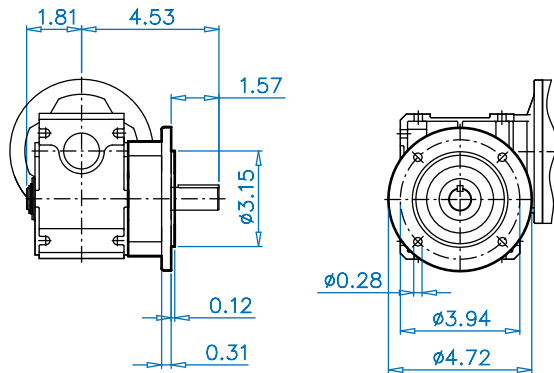
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875

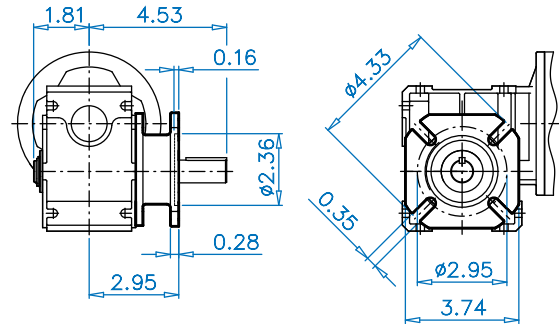


SK 1SI40 Solid Shaft Options

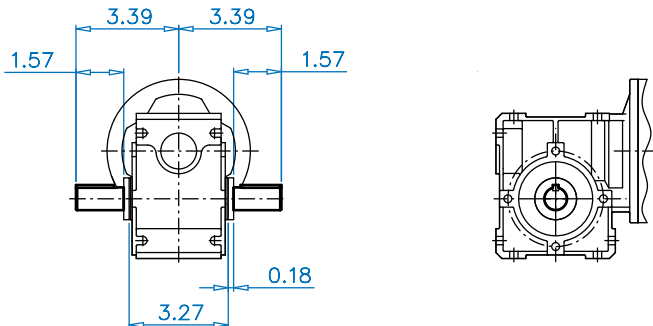
SK 1SI40 VF (Plug-In Shaft, I Flange)



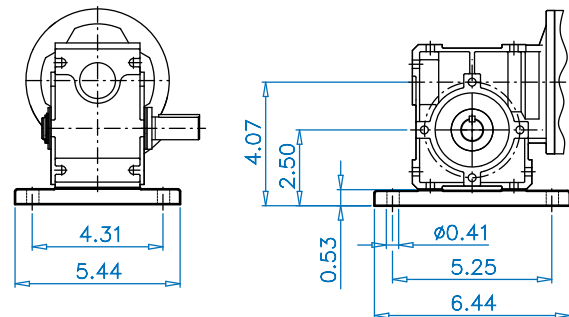
SK 1SI40 VF (Plug-In Shaft, II Flange)



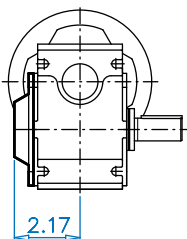
SK 1SI40 L (Double Solid Shaft)



SK 1SI40 VX (Plug-In Shaft, Footplate)



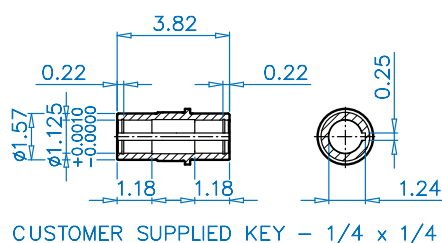
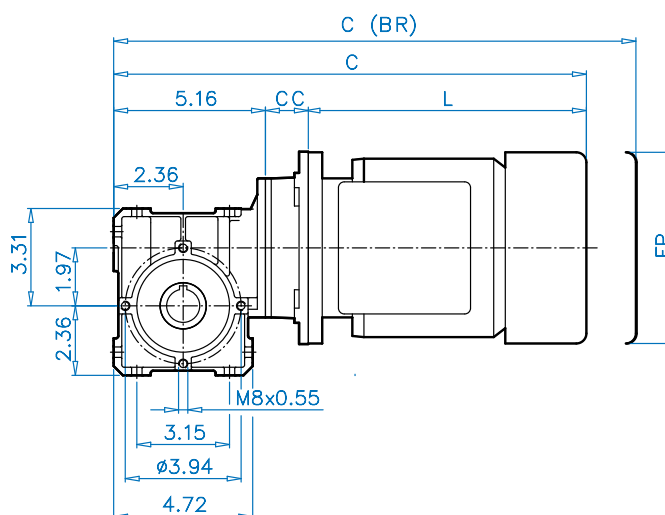
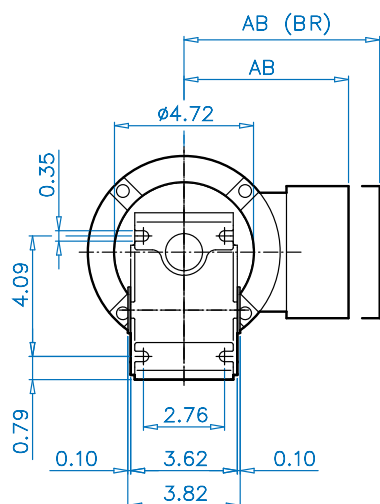
SK 1SI40 VH (Plug-In Shaft, Cover)



SK 1SI50 - Motor SK 1SI50 - NEMA



SK 1SI50



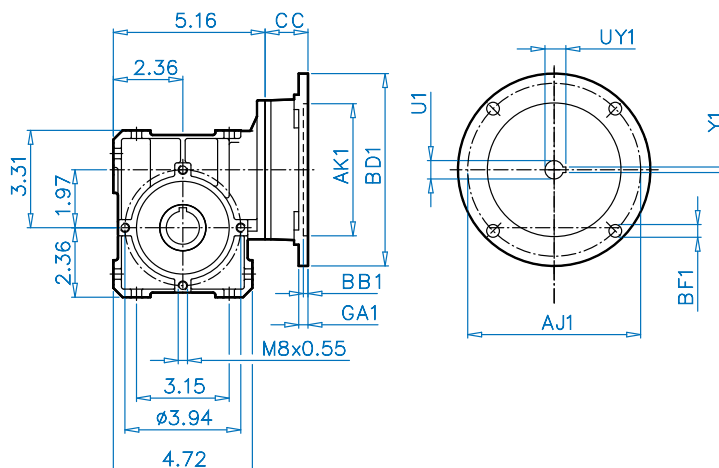
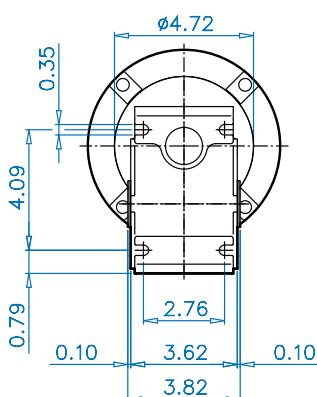
CUSTOMER SUPPLIED KEY - 1/4 x 1/4

Motor dimensions

Standard eff.	56C - 63 S/L	56C - 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L
Energy eff.			56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH
AB	4.53	4.88	5.59	5.59	5.79
AB (BR)	4.84	5.24	5.63	5.63	5.83
C	14.17	15.04	16.06	16.54	18.11
C (BR)	16.38	17.32	18.58	19.06	21.06
CC	1.46	1.46	1.46	1.93	1.93
FP	5.12	5.71	6.50	6.50	7.20
L	7.56	8.43	9.45	9.45	11.02
L (BR)	9.76	10.71	11.97	11.97	13.98

(BR) denotes Brakemotor

SK 1SI50



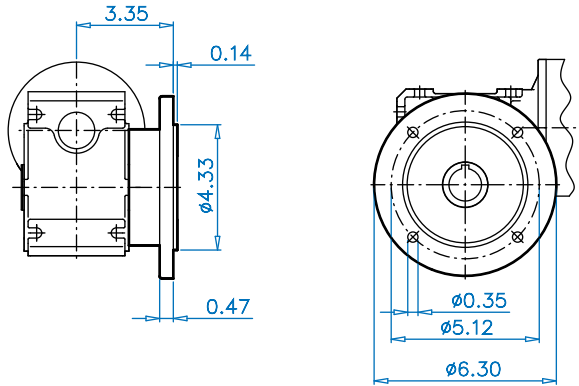
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875

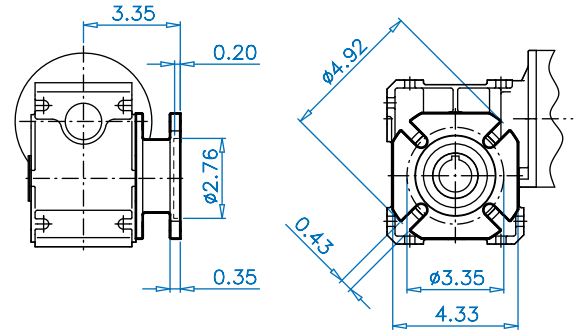


SK 1SI50 Hollow Shaft Options

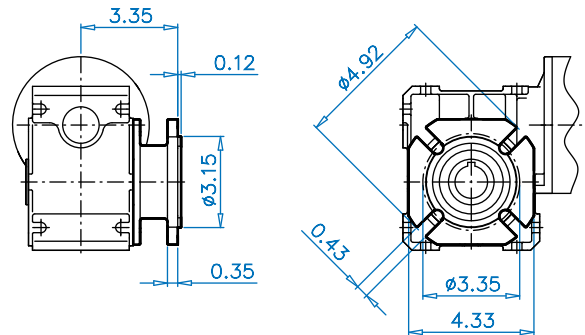
SK 1SI50 F (I Flange)



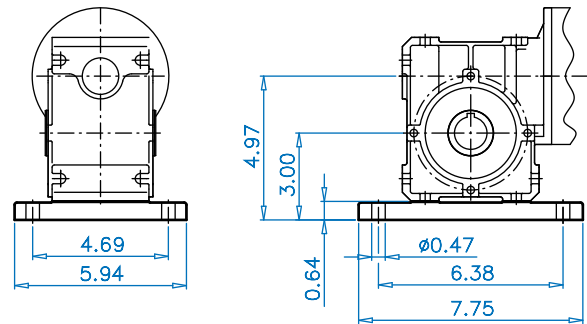
SK 1SI50 F (II Flange)



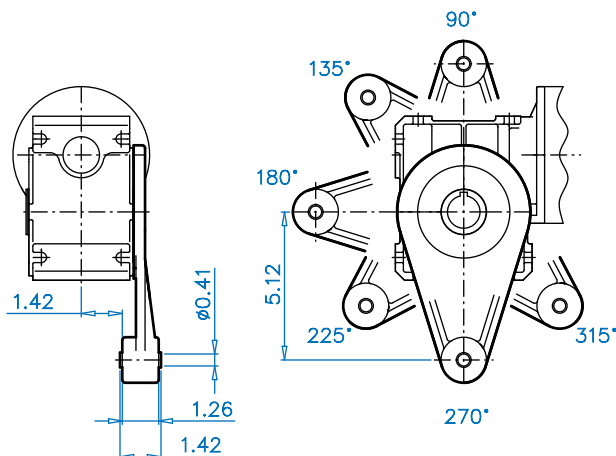
SK 1SI50 F (III Flange)



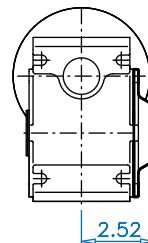
SK 1SI50 X (Footplate)



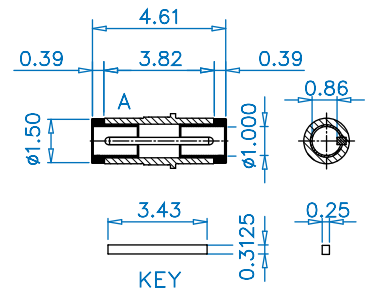
SK 1SI50 D (Torque Arm)



**SK 1SI50 H
(Shaft Cover)**



**SK 1SI50 J
(1.00" Bushing Kit)**

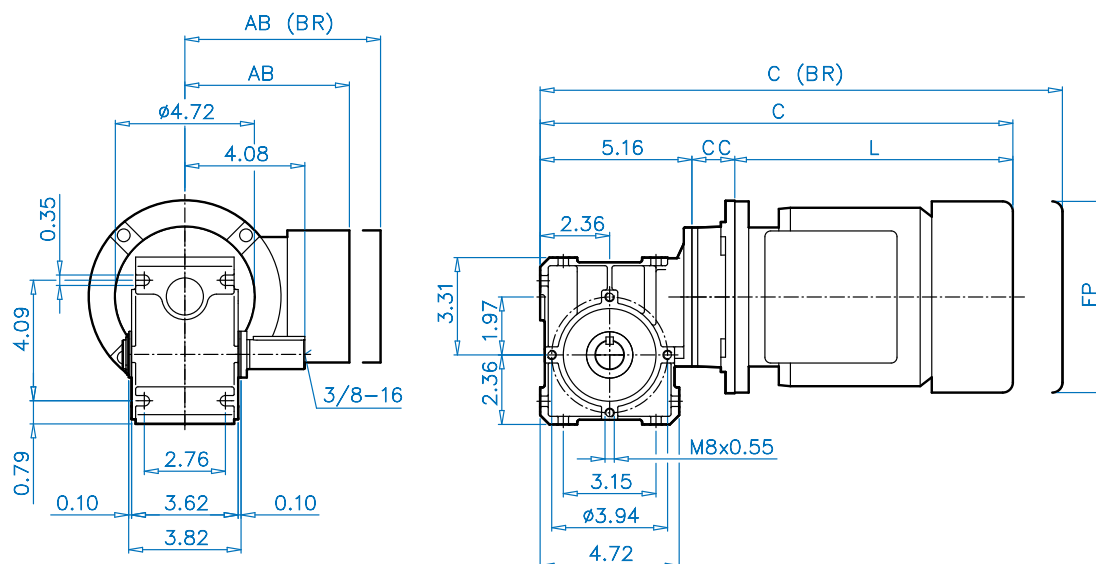


CONFIGURATIONS SEE PAGE 67

SK 1SI50 - Motor SK 1SI50 - NEMA



SK 1SI50 V (Plug-In Shaft)

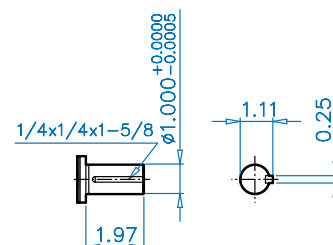


Motor dimensions

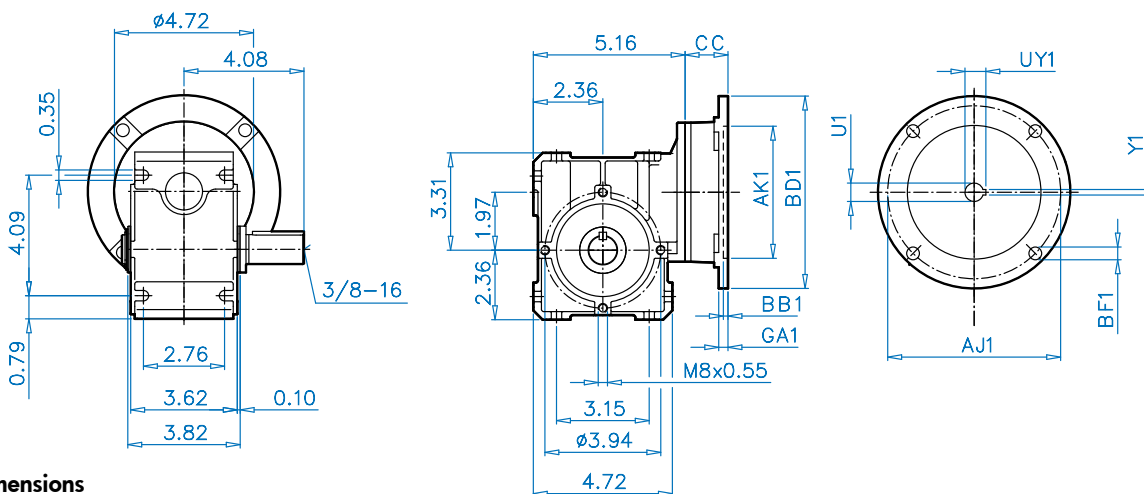
Standard eff.	56C - 63 S/L	56C - 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L
Energy eff.			56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH
AB	4.53	4.88	5.59	5.59	5.79
AB (BR)	4.84	5.24	5.63	5.63	5.83
C	14.17	15.04	16.06	16.54	18.11
C (BR)	16.38	17.32	18.58	19.06	21.06
CC	1.46	1.46	1.46	1.93	1.93
FP	5.12	5.71	6.50	6.50	7.20
L	7.56	8.43	9.45	9.45	11.02
L (BR)	9.76	10.71	11.97	11.97	13.98

(BR) denotes Brakemotor

SK 1SI50 V (Solid Shaft Detail)



SK 1SI50 V (Plug-In Shaft)



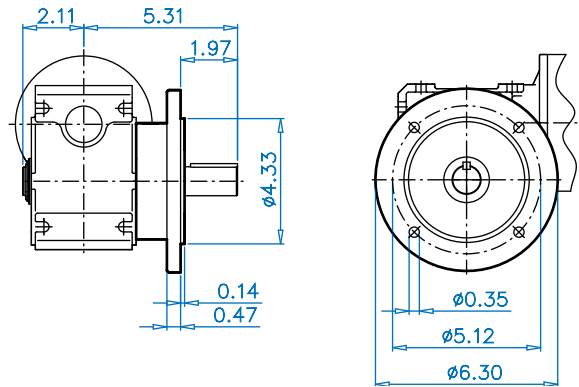
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875

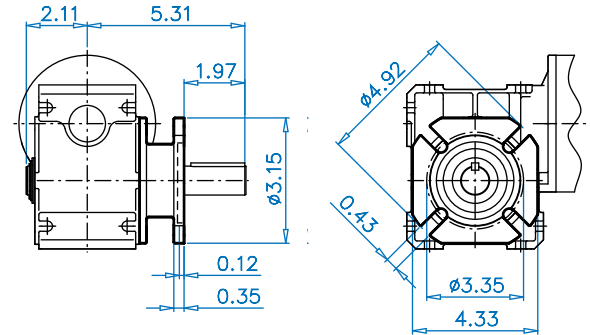


SK 1SI50 Solid Shaft Options

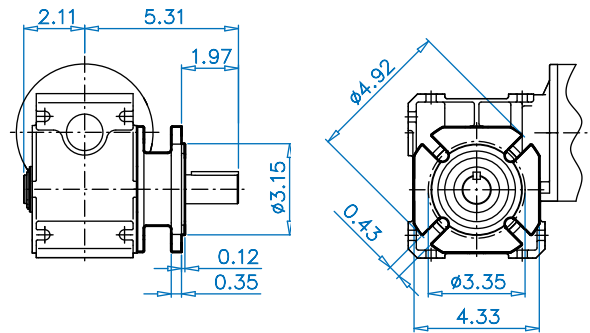
SK 1SI 50 VF (Plug-In Shaft, I Flange)



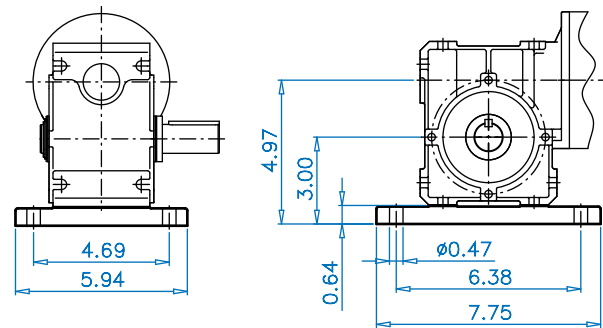
SK 1SI50 VF (Plug-In Shaft , II Flange)



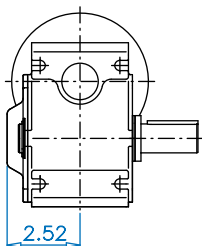
SK 1SI50 VF (Plug-In Shaft, III Flange)



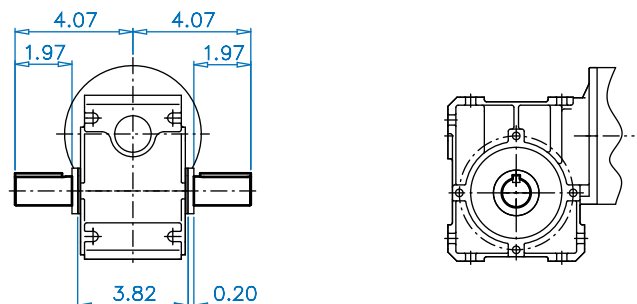
SK 1SI50 VX (Plug-In Shaft, Footplate)



SK 1SI50 VH (Plug-In Shaft, Cover)



SK 1SI50 L (Double Solid Shaft)



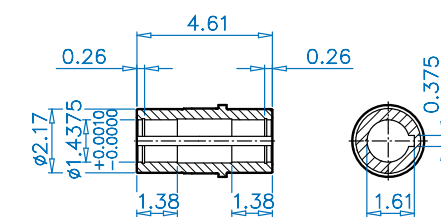
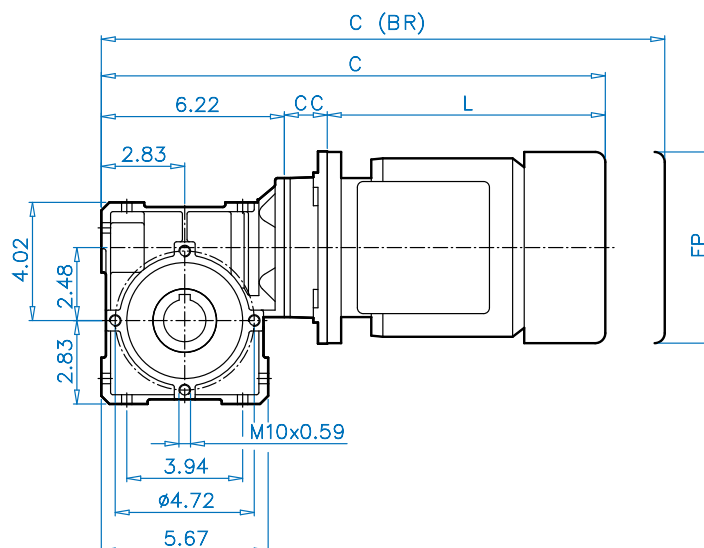
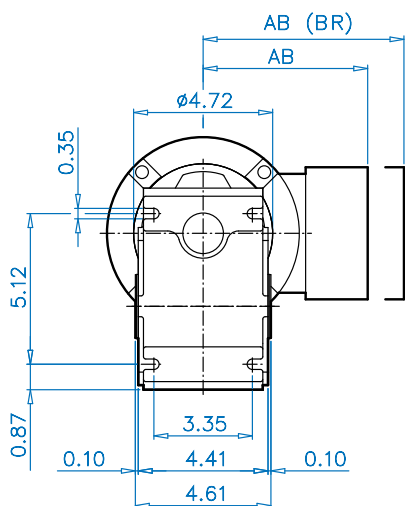
Dimensions in Inches
DIMENSIONS

CONFIGURATIONS SEE PAGE 67

SK 1SI63 - Motor SK 1SI63 - NEMA



SK 1SI63



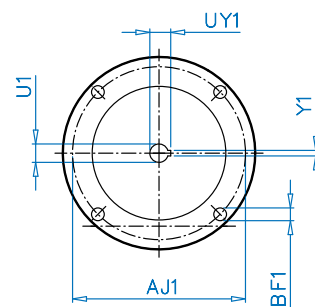
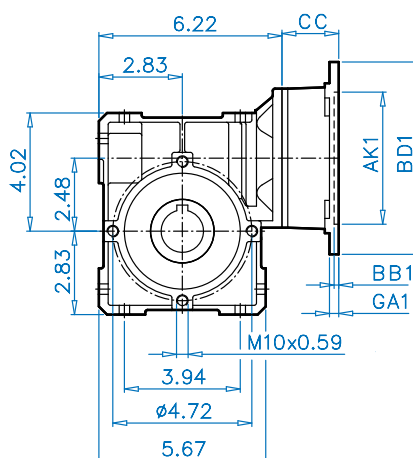
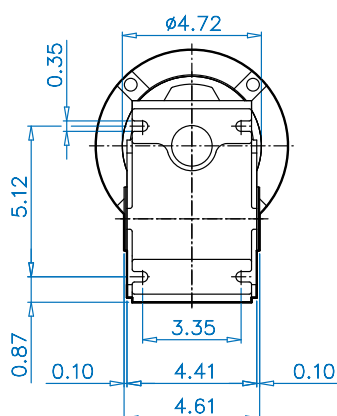
CUSTOMER SUPPLIED KEY – 3/8 x 3/8

Motor dimensions

Standard eff.	56C - 63 S/L	56C - 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L	180TC - 100 L
Energy eff.			56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH	180TC - 100L H
AB	4.53	4.88	5.59	5.59	5.79	6.65
AB (BR)	4.84	5.24	5.63	5.63	5.83	6.26
C	15.24	16.10	17.16	17.60	19.17	21.33
C (BR)	17.44	18.39	19.68	20.12	22.13	24.91
CC	1.46	1.46	1.46	1.93	1.93	3.06
FP	5.12	5.71	6.50	6.50	7.20	7.91
L	7.56	8.43	9.45	9.45	11.02	12.05
L (BR)	9.76	10.71	11.97	11.97	13.98	15.63

(BR) denotes Brakemotor

SK 1SI63



NEMA Dimensions

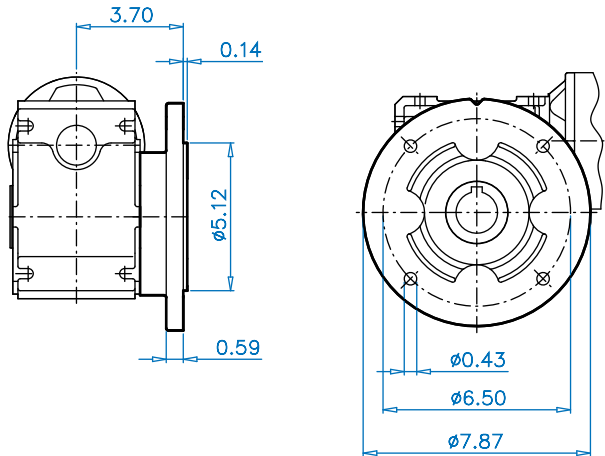
Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875
180TC	7.25	8.50	0.25	9.17	0.59	3.06	0.63	1.125	1.24	2.62	0.25

CONFIGURATIONS SEE PAGE 69

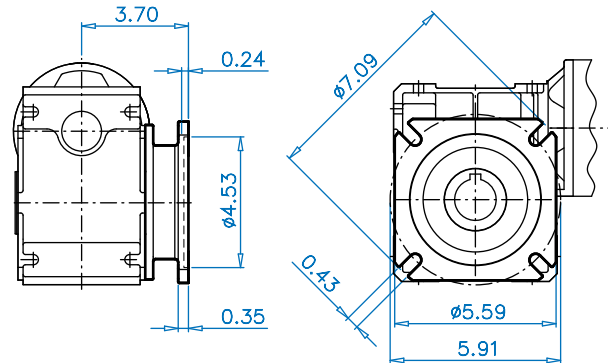


SK 1SI63 Hollow Shaft Options

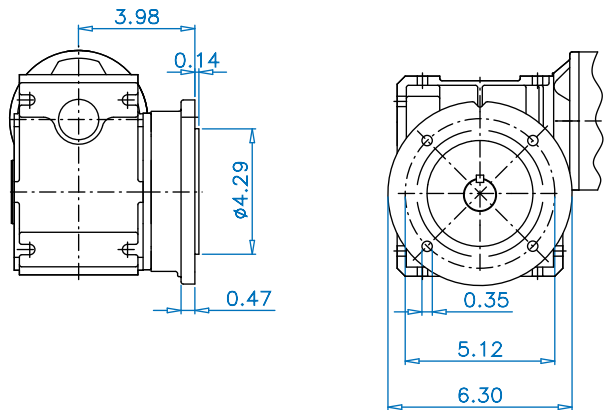
SK 1SI63 F (I Flange)



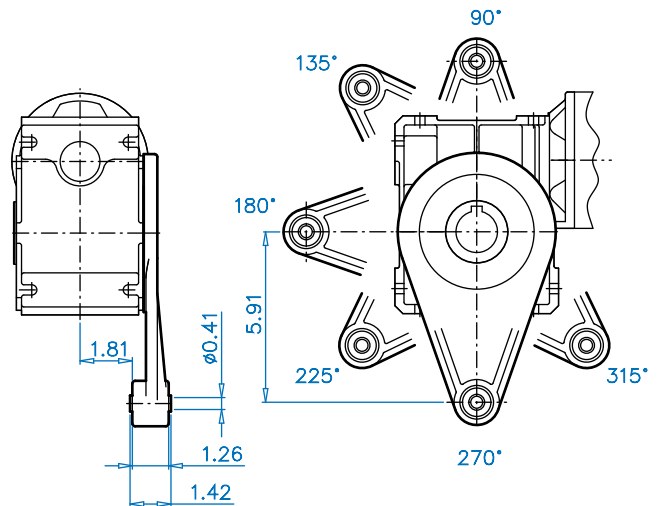
SK 1SI63 F (II Flange)



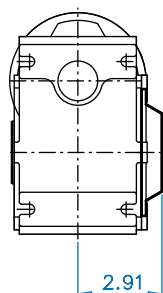
SK 1SI63 F (III Flange)



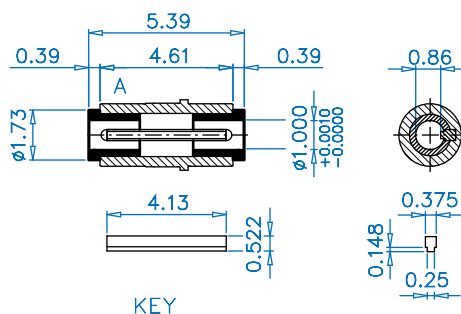
SK 1SI63 D (Torque Arm)



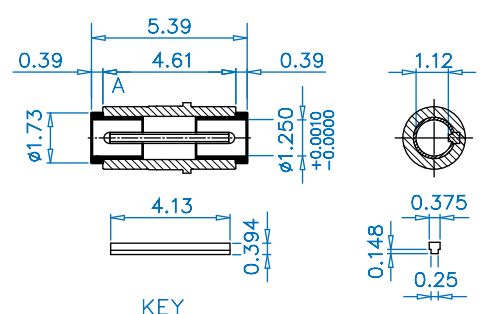
SK 1SI63 H (Cover)



SK 1SI63 J (1.00" Bushing Kit)



SK 1SI63 J (1.250" Bushing Kit)

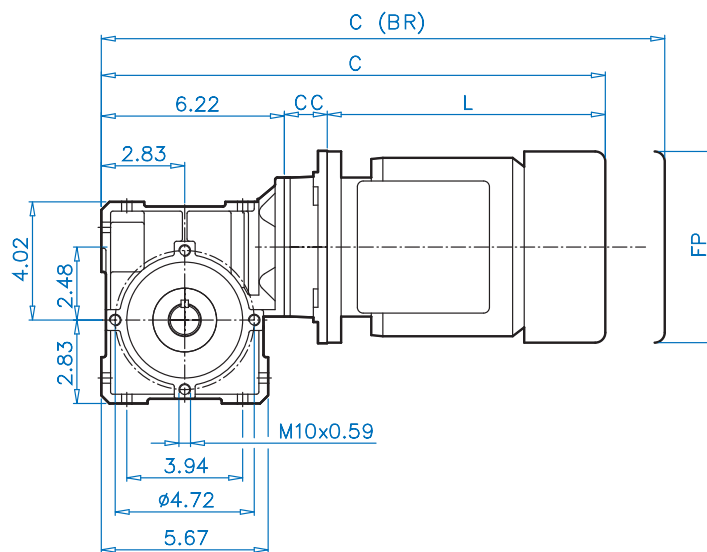
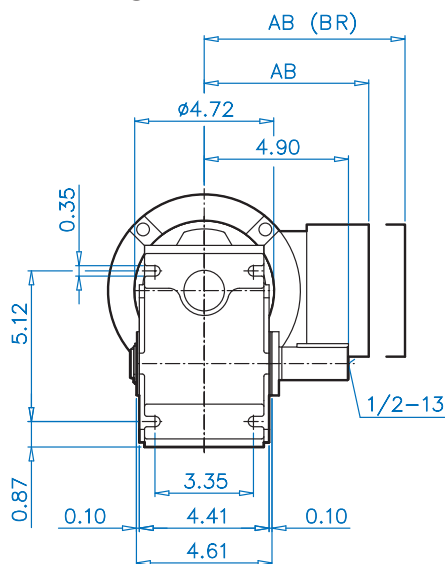


CONFIGURATIONS SEE PAGE 69

SK 1SI63 - Motor SK 1SI63 - NEMA



SK 1SI63 V (Plug-In Shaft)

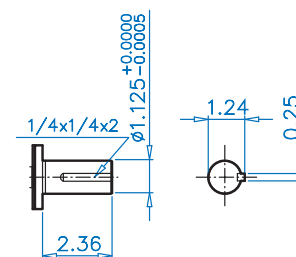


Motor dimensions

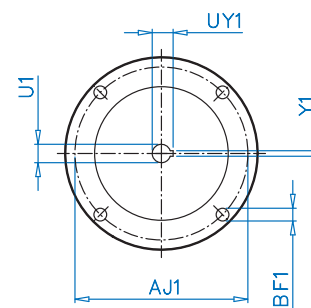
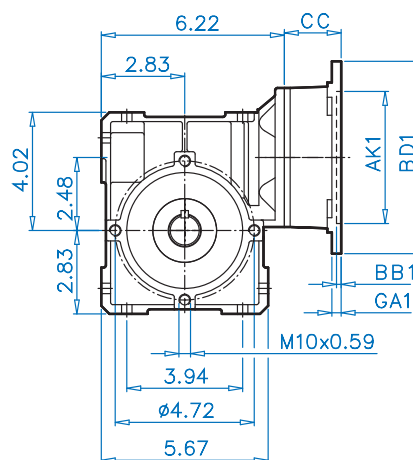
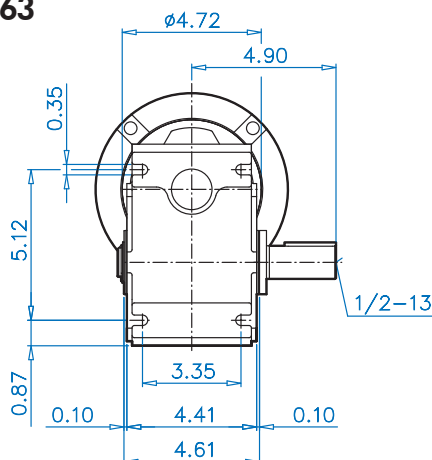
Standard eff.	56C - 63 S/L	56C - 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L	180TC - 100 L
Energy eff.			56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH	180TC - 100 LH
AB	4.53	4.88	5.59	5.59	5.79	6.65
AB (BR)	4.84	5.24	5.63	5.63	5.83	6.26
C	15.24	16.10	17.16	17.60	19.17	21.33
C (BR)	17.44	18.39	19.68	20.12	22.13	24.91
CC	1.46	1.46	1.46	1.93	1.93	3.06
FP	5.12	5.71	6.50	6.50	7.20	7.91
L	7.56	8.43	9.45	9.45	11.02	12.05
L (BR)	9.76	10.71	11.97	11.97	13.98	15.63

(BR) denotes Brakemotor

SK 1SI63 V (Solid Shaft Detail)



SK 1SI 63



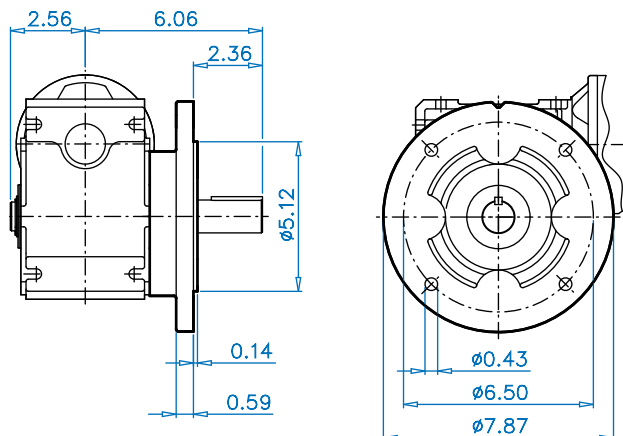
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875
180TC	7.25	8.50	0.25	9.17	0.59	3.06	0.63	1.125	1.24	2.62	0.25

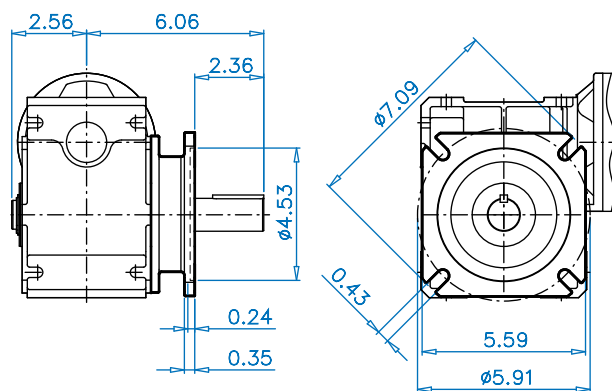


SK 1SI63 Solid Shaft Options

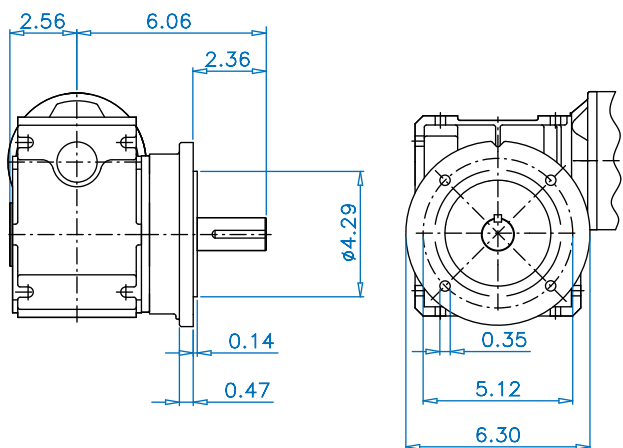
SK 1SI63 VF (Plug-In Shaft, I Flange)



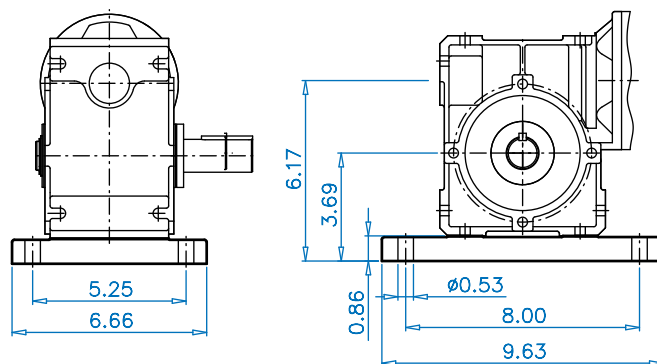
SK 1SI63 VF (Plug-In Shaft, II Flange)



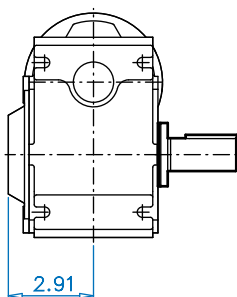
SK 1SI63 VF (Plug-In Shaft, III Flange)



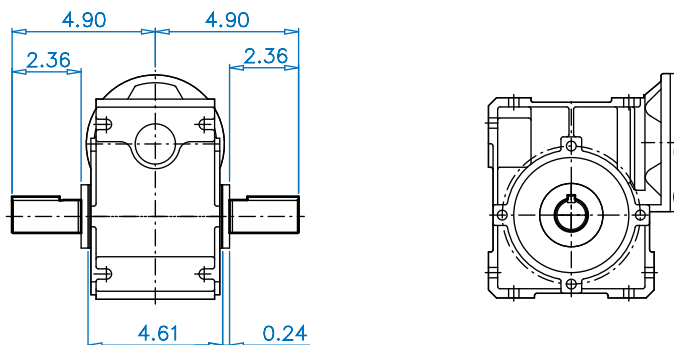
SK 1SI63 X (Plug-In Shaft, Footplate)



SK 1SI63 VH (Plug-In Shaft, Cover)



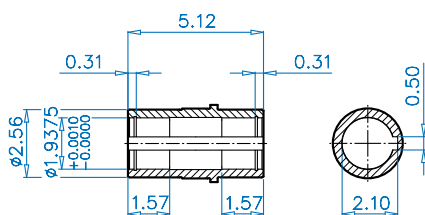
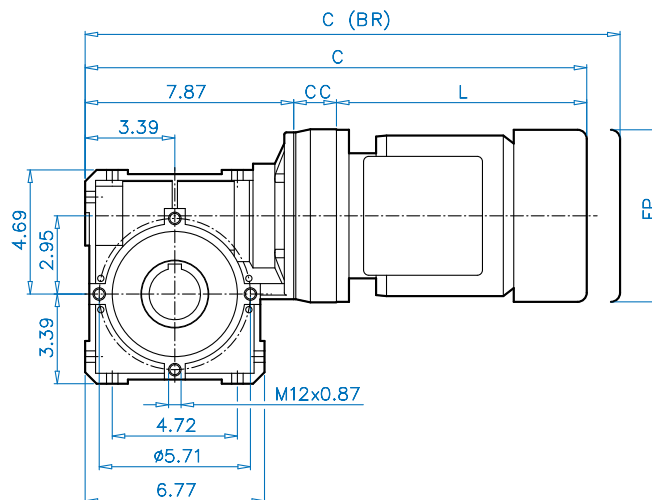
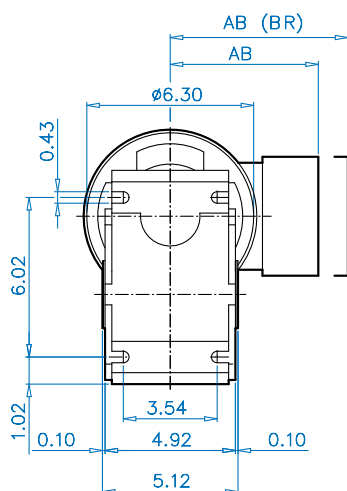
SK 1SI63 L (Double Solid Shaft)



SK 1SI75 - Motor SK 1SI75 - NEMA



SK 1SI75



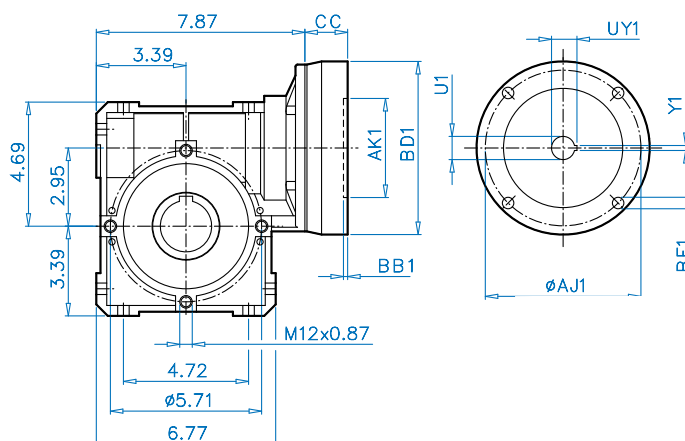
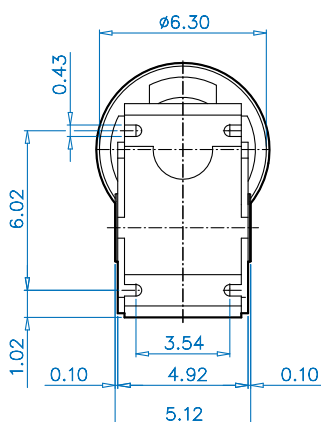
CUSTOMER SUPPLIED KEY 1/2 x 3/8

Motor dimensions

Standard eff.	56C - 71 S/L	56C - 80 S/L	140TC - 80 L	140TC - 90 S/L	180TC - 100 L	
Energy eff.		56C - 80 LH	140TC - 80 LH	140TC - 90 SH/LH	180TC - 100 LH	180TC - 112 MH
AB	4.88	5.59	5.59	5.79	6.65	7.05
AB (BR)	5.24	5.63	5.63	5.83	6.26	6.69
C	17.91	18.94	18.94	20.51	22.08	23.84
C (BR)	20.19	21.46	21.46	23.47	25.66	-
CC	1.61	1.61	1.61	1.61	2.16	2.16
FP	5.71	6.50	6.50	7.20	7.91	8.98
L	8.43	9.45	9.45	11.02	12.05	13.81
L (BR)	10.71	11.97	11.97	13.98	15.63	-

(BR) denotes Brakemotor

SK 1SI75



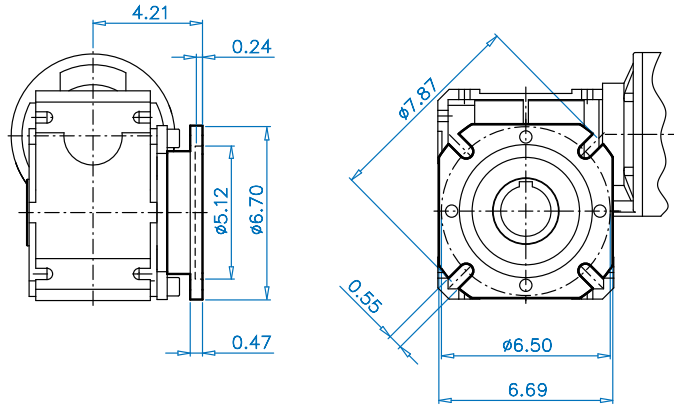
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.61	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.61	0.50	0.875	0.96	2.12	0.1875
180TC	7.25	8.50	0.25	9.17	0.59	2.16	0.63	1.125	1.24	2.62	0.25

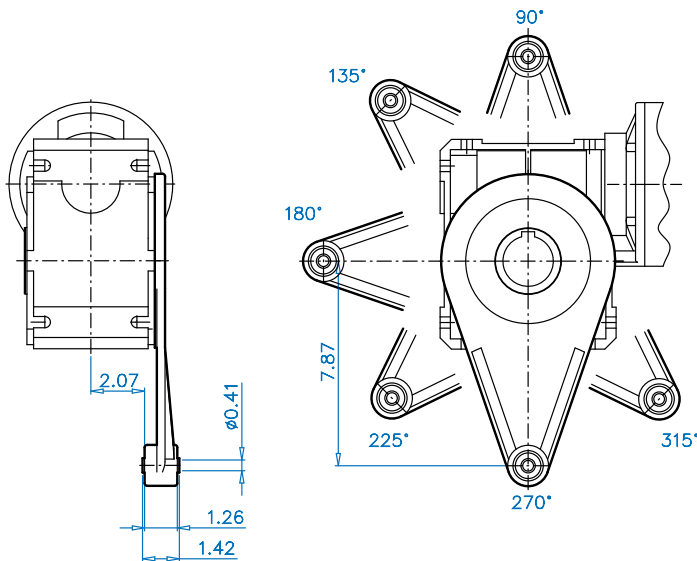


SK 1SI75 Hollow Shaft Options

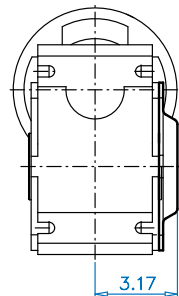
SK 1SI75 F (II Flange)



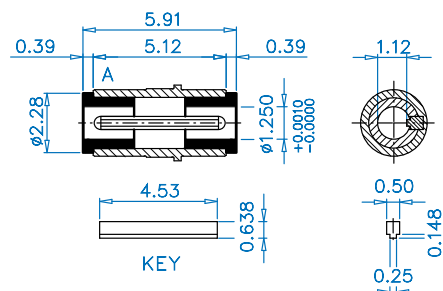
SK 1SI75 D (Torque Arm)



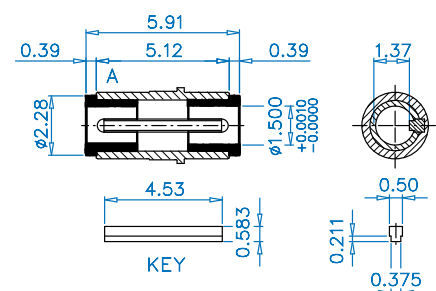
SK 1SI75 H (Cover)



SK 1SI75 J (1.25" Bushing Kit)



SK 1SI75 J (1.50" Bushing Kit)

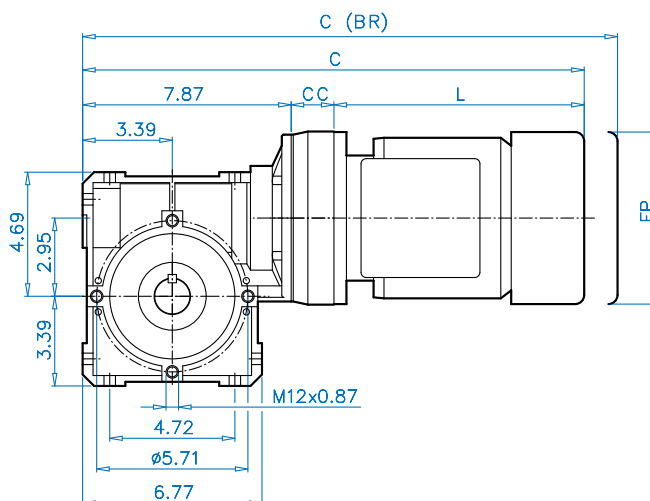
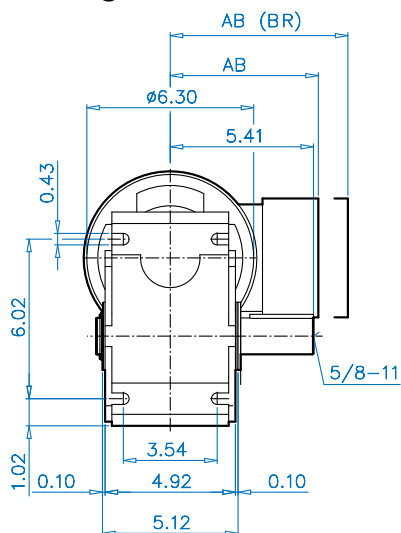


CONFIGURATIONS SEE PAGE 71

SK 1SI75 - Motor SK 1SI75 - NEMA



SK 1SI75 V (Plug-In Shaft)

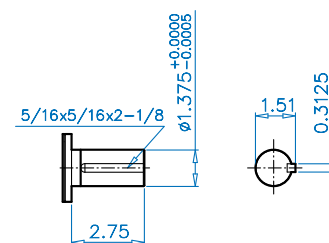


Motor dimensions

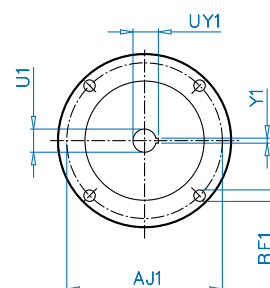
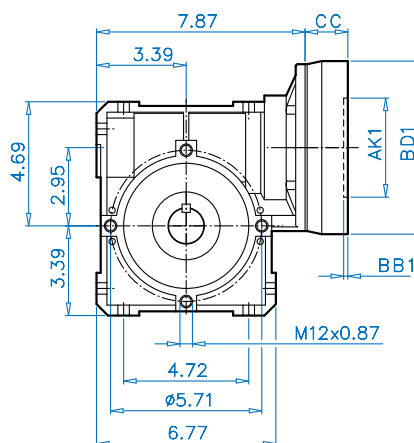
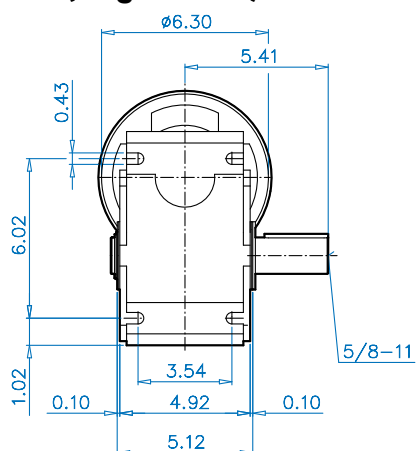
Standard eff.	56 C 71 S/L	56C 80 S/L	140TC 80 L	140TC 90 S/L	180TC 100 L	180TC 112 M
Energy eff.		56C 80 LH	140TC 80 LH	140TC 90 SH/LH	180TC 100 LH	180TC 112 MH
AB	4.88	5.59	5.59	5.79	6.65	7.05
AB (BR)	5.24	5.63	5.63	5.83	6.26	6.69
C	17.91	18.94	18.94	20.51	22.08	23.84
C (BR)	20.19	21.46	21.46	23.47	25.66	-
CC	1.61	1.61	1.61	1.61	2.16	2.16
FP	5.71	6.50	6.50	7.20	7.91	8.98
L	8.43	9.45	9.45	11.02	12.05	13.81
L (BR)	10.71	11.97	11.97	13.98	15.63	-

(BR) denotes Brakemotor

SK 1SI75 V (Solid Shaft Detail)



SK 1SI75 V (Plug-In Shaft)



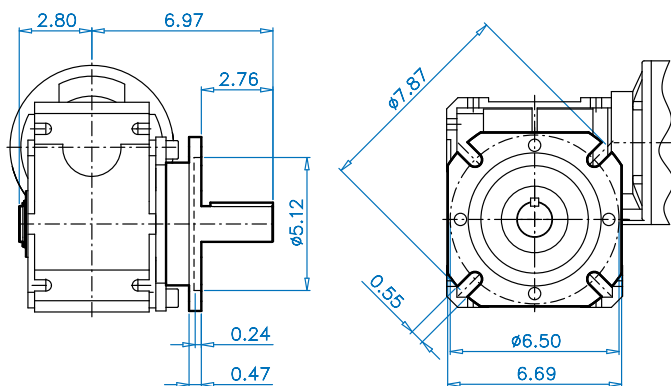
NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1
56C	5.875	4.50	0.16	6.54	0.43	1.61	0.50	0.625	0.71	2.06	0.1875
140TC	5.875	4.50	0.16	6.54	0.43	1.61	0.50	0.875	0.96	2.12	0.1875
180TC	7.25	8.50	0.25	9.17	0.59	2.16	0.63	1.125	1.24	2.62	0.25

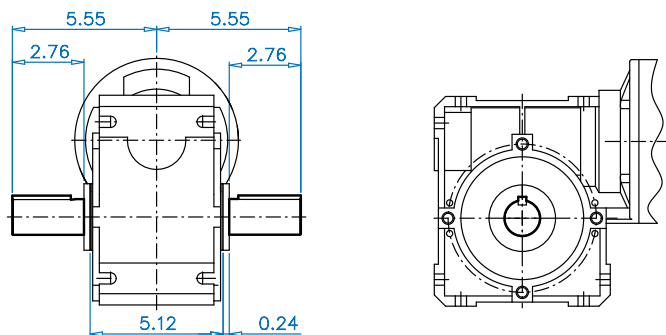


SK 1SI75 Solid Shaft Options

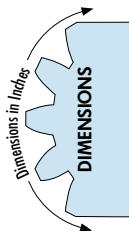
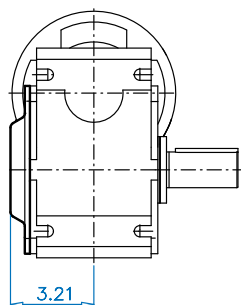
SK 1SI75 VF (Plug-in Shaft, II Flange)



SK 1SI75 L (Double Solid Shaft)



SK 1SI75 VH (Plug-In Shaft, Cover)



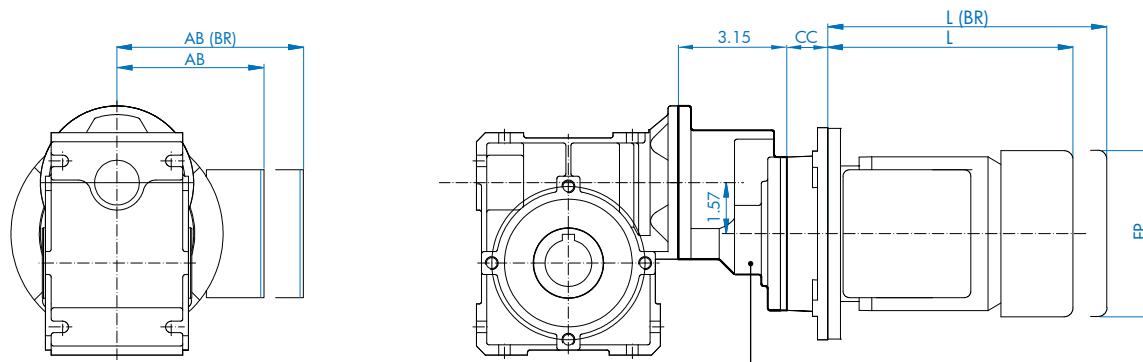
Helical Input Stage H10 SK 1SI40 - SK 1SI63 (NEMA)



Helical Input Stage (H10)

The helical input stage has a ratio of 10:1. This input stage can be attached to the wormgear modules SK1SI40, SK1SI50, and SK1SI63. Using the module helical input enables the building of 2-stage helical-worm drives.

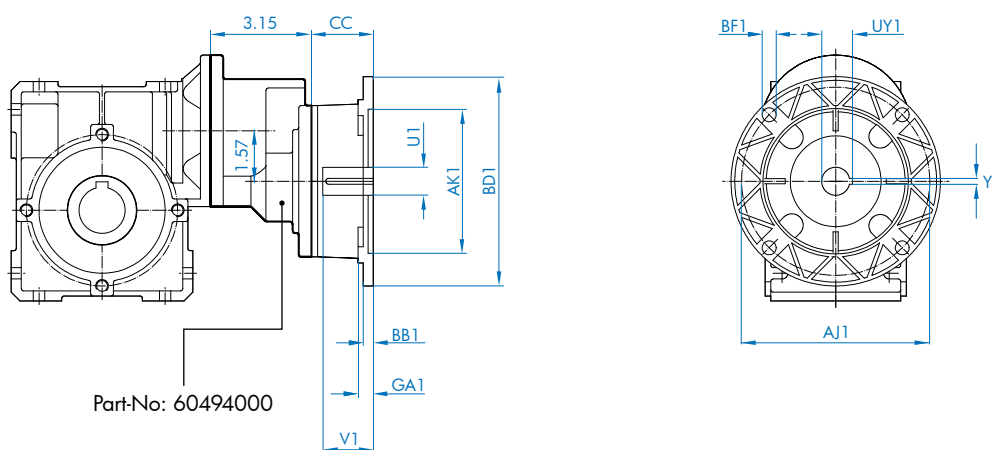
Helical-worm gearmotor



Part-No: 60494000

	/H10-56C - 63 S/L	/H10-56C - 71 S/L	/H10-56C - 80 S/L	/H10-140TC - 80 L	/H10-140TC - 90 S/L
AB	4.53	4.88	5.59	5.59	5.79
AB (BR)	4.84	5.24	5.63	5.63	5.83
CC	1.46	1.46	1.46	1.93	1.93
FP	5.12	5.71	6.50	6.50	7.20
L	7.56	8.43	9.45	9.45	11.02
L (BR)	9.76	10.71	11.97	11.97	13.98

Helical-worm speed reducer with NEMA C-face motor adapter



Part-No: 60494000

	AJ1	AK1	BB1	BD1	BF1	CC	GA1	U1	UY1	V1	Y1	Part-No
NEMA 56C	5.875	4.50	0.16	6.54	0.43	1.46	0.50	0.625	0.71	2.06	0.1875	60495500
NEMA 140TC	5.875	4.50	0.16	6.54	0.43	1.93	0.50	0.875	0.96	2.12	0.1875	60595500

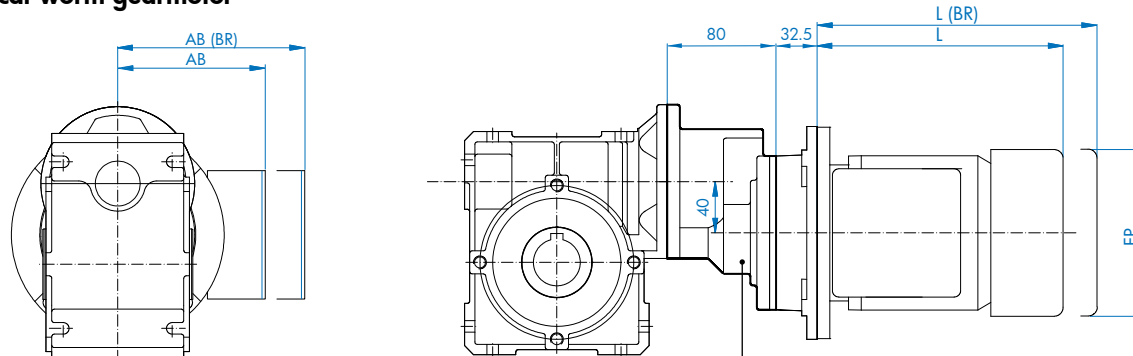


Helical Input Stage H10 SK 1SI40 - SK 1SI63 (IEC)

Helical Input Stage (H10)

The helical input stage has a ratio of 10:1. This input stage can be attached to the wormgear modules SK1SI40, SK1SI50, and SK1SI63. Using the module helical input enables the building of 2-stage helical-worm drives.

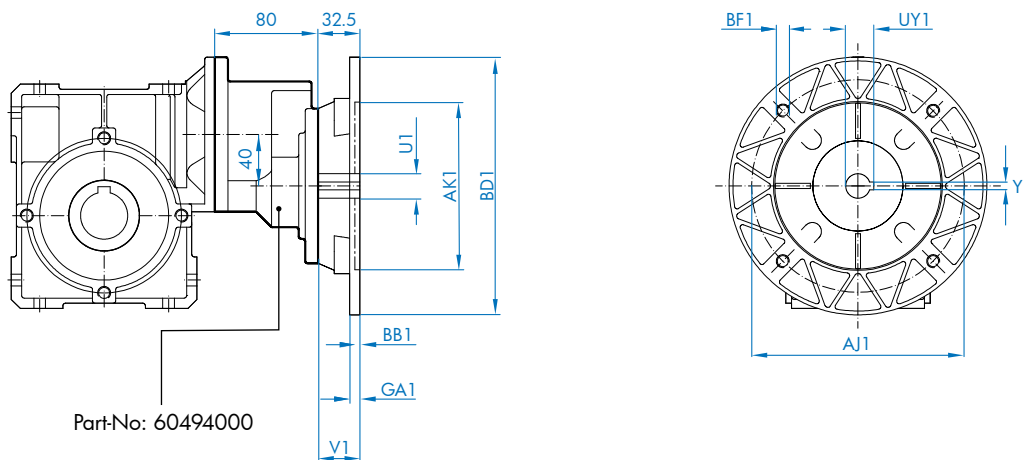
Helical-worm gearmotor



Part-No: 60494000

	/H10-63 S/L	/H10-71 S/L
AB	115	124
AB (BR)	123	133
L	192	214
L (BR)	248	272
FP	130	145

Helical - worm gearbox with IEC motor adapter



Part-No: 60494000

	IEC 56 B14 C105	IEC 56 B5 A120	IEC 63 B14 C90	IEC 63 B14 C120	IEC 63 B5 A140	IEC 71 B14 C105	IEC 71 B14 C140	IEC 71 B5 A160	IEC 80 B14 C120	IEC 80 B14 C160	IEC 80 B5 A200
AJ1	85	100	75	100	115	85	115	130	100	130	165
AK1	70	80	60	80	95	70	95	110	80	110	130
BB1	3	3.5	3	3.5	3.5	3	3.5	4	3.5	4	4
BD1	105	120	90	120	140	105	140	160	120	160	200
BF1	7	7	6	7	9	7	9	9	7	9	M10
GA1	8	8	8	8	8	8	8	8	8	8	20
U1	9	9	11	11	11	14	14	14	19	19	19
UY1	11.4	11.4	12.8	12.8	12.8	16.3	16.3	16.3	21.8	21.8	21.8
V1	20	20	23	23	23	30	30	30	40	40	40
Y1	3	3	4	4	4	5	5	5	6	6	6

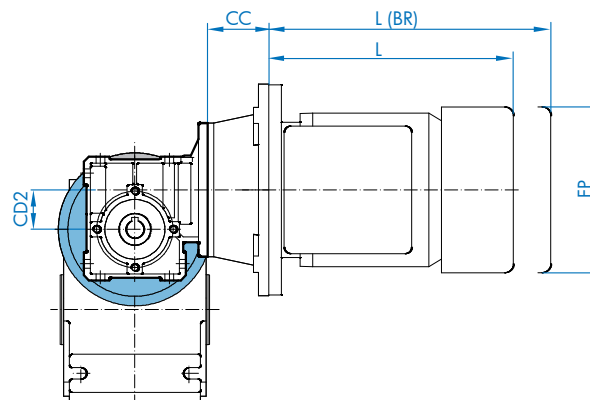
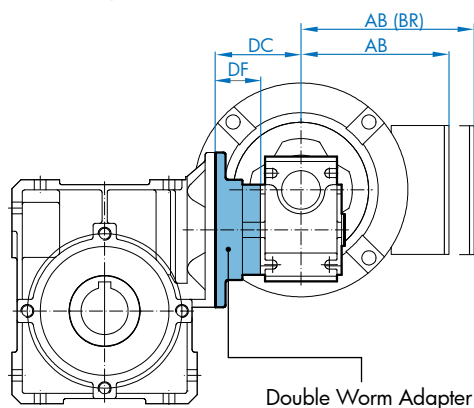
Double Worm SK 1SI40 - SK 1SI75 NEMA



Double Wormgear

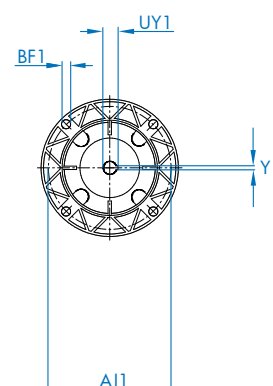
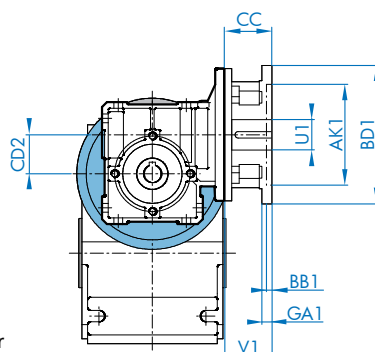
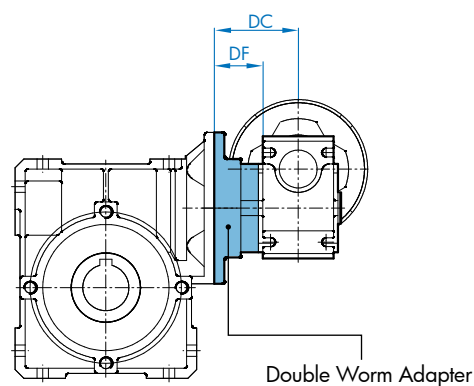
The double wormgear is an adapter that enables the fitting of two FLEXBLOC™ worm modules together.

Double-worm gearmotor



	SK 1SI40/31, SK 1SI50/31, or SK 1SI63/31			SK 1SI75/40				
	-56C - 63 S/L	-56C - 71 S/L	-56C - 80 S/L	-56C - 63 S/L	-56C - 71 S/L	-56C - 80 S/L	-140TC - 80 L	-140TC - 90 S/L
AB	4.53	4.88	5.59	4.53	4.88	5.59	5.59	5.79
AB (BR)	4.84	5.24	5.63	4.84	5.24	5.63	5.63	5.83
CC	1.89	1.89	1.89	1.46	1.46	1.46	1.93	1.93
CD2	1.18	1.18	1.18	1.57	1.57	1.57	1.57	1.57
DC	2.62	2.62	2.62	3.05	3.05	3.05	3.05	3.05
DF	1.38	1.38	1.38	1.52	1.52	1.52	1.52	1.52
FP	5.12	5.71	6.50	5.12	5.71	6.50	6.50	7.20
L	7.56	8.43	9.45	7.56	8.43	9.45	9.45	11.02
L (BR)	9.76	10.71	11.97	9.76	10.71	11.97	11.97	13.98

Double-worm speed reducer with NEMA C-face motor adapter



SK ... /31	AJ1	AK1	BB1	BD1	BF1	CC	CD2	DC	DF	GA1	U1	UY1	V1	Y1	Part-No
NEMA 48C	3.75	3.00	0.16	4.33	0.29	1.50	1.18	2.62	1.38	0.25	0.500	flat	1.69	flat	60395500
NEMA 56C	5.875	4.50	0.16	6.54	0.43	1.89	1.18	2.62	1.38	0.50	0.625	0.71	2.06	0.1875	60395510
SK 1SI75/40	AJ1	AK1	BB1	BD1	BF1	CC	CD2	DC	DF	GA1	U1	UY1	V1	Y1	Part-No
NEMA 56C	5.875	4.50	0.16	6.54	0.43	1.46	1.57	3.05	1.52	0.50	0.625	0.71	2.06	0.1875	60495500
NEMA 140TC	5.875	4.50	0.16	6.54	0.43	1.93	1.57	3.05	1.52	0.50	0.875	0.96	2.12	0.18	60595500

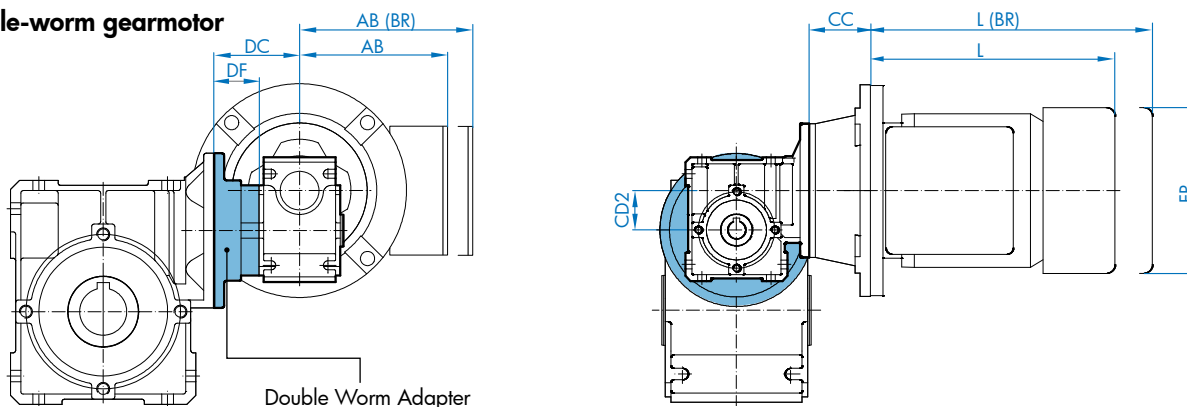


Double Worm SK 1SI40 - SK 1SI75 IEC

Double Wormgear

The double wormgear is an adapter that enables the fitting of two FLEXBLOC™ worm modules together.

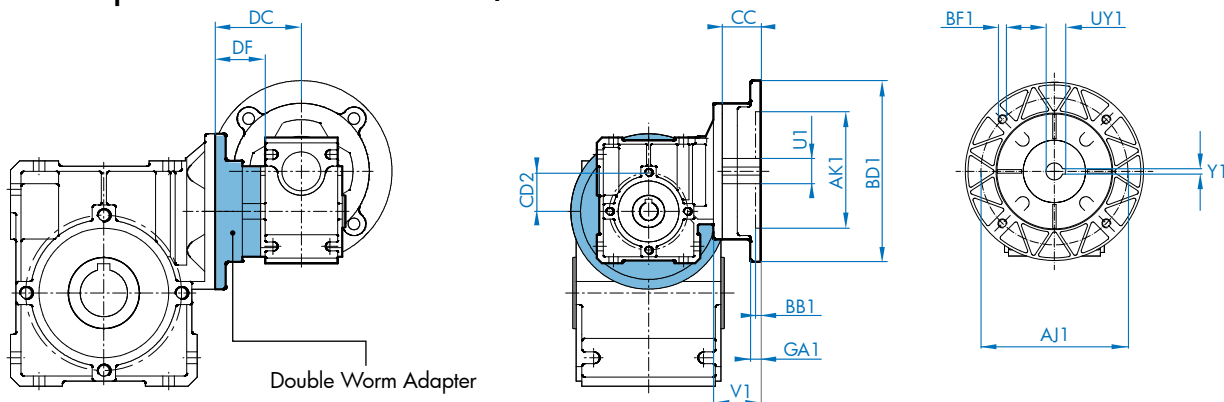
Double-worm gearmotor



	SK ... /31		SK 1SI75/40		
	63 S/L	71 S/L	63 S/L	71 S/L	80 S/L
AB	115	124	115	124	142
AB (BR)	123	133	123	133	143
L	192	214	192	214	236
L (BR)	248	272	248	272	300
FP	130	145	130	145	165

	Double Worm Kit	
	SK ... /31	SK 1SI75/40
CD2	31	40
DC	66.5	77.5
DF	35	38.5
Part-No:	60494100	60794000

Double-worm speed reducer with IEC motor adapter

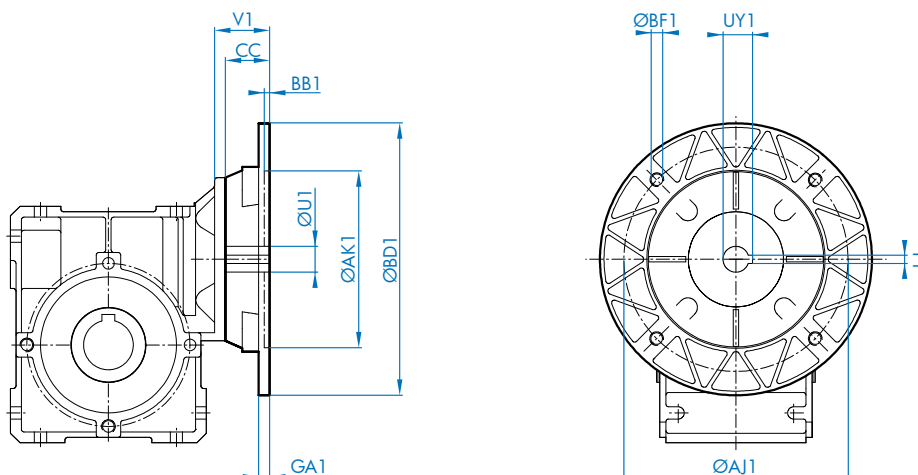


	SK ... /31					SK1SI75/40									
	IEC 63 B14 C90	IEC 63 B14 C120	IEC 63 B5 A140	IEC 71 B14 C105	IEC 71 B14 C140	IEC 63 B14 C120	IEC 63 B5 A140	IEC 71 B14 C105	IEC 71 B14 C140	IEC 71 B5 A160	IEC 80 B14 C120	IEC 80 B14 C160	IEC 80 B5 A200	IEC 90 B14 C140	IEC 90 B14 C160
AJ1	75	100	115	85	115	100	115	85	115	130	100	130	165	115	130
AK1	60	80	95	70	95	80	95	70	95	110	80	110	130	95	110
BB1	3	3.5	3.5	3	3.5	3.5	3.5	3	3.5	4	3.5	4	4	3.5	4
BD1	90	120	140	105	140	120	140	105	140	160	120	160	200	140	160
BF1	6	7	9	7	9	7	9	7	9	9	7	9	M10	9	9
CD2	31	31	31	31	31	40	40	40	40	40	40	40	40	40	40
DC	66.5	66.5	66.5	66.5	66.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5	77.5
DF	35	35	35	35	35	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
GA1	8	8	8	8	8	8	8	8	8	8	8	8	20	8	8
U1	11	11	11	14	14	11	11	14	14	14	19	19	19	24	24
UY1	12.8	12.8	12.8	16.3	16.3	12.8	12.8	16.3	16.3	16.3	21.8	21.8	21.8	27.3	27.3
V1	23	23	23	30	30	23	23	30	30	30	40	40	40	50	50
Y1	4	4	4	5	5	4	4	5	5	5	6	6	6	8	8

IEC Adapters SK 1SI31 - SK 1SI75



IEC Adapters



	AJ1	AK1	BB1	BD1	BF1	GA1	U1	UY1	V1	Y1	CC SI 31	CC SI 40	CC SI 50	CC SI 63	CC SI 75	CC H10
IEC 56 B14 C105	85	70	3	105	7	8	9	11.4	20	3	29.5	32.5	32.5	32.5		32.5
IEC 56 B5 A120	100	80	3.5	120	7	8	9	11.4	20	3	29.5	32.5	32.5	32.5		32.5
IEC 63 B14 C90 *	75	60	3	90	6	8	11	12.8	23	4	29.5	32.5	32.5	32.5		32.5
IEC 63 B14 C120	100	80	3.5	120	7	8	11	12.8	23	4	29.5	32.5	32.5	32.5		32.5
IEC 63 B5 A140	115	95	3.5	140	9	8	11	12.8	23	4	29.5	32.5	32.5	32.5		32.5
IEC 71 B14 C105 *	85	70	3	105	7	8	14	16.3	30	5	29.5	32.5	32.5	32.5		32.5
IEC 71 B14 C140	115	95	3.5	140	9	8	14	16.3	30	5	29.5	32.5	32.5	32.5	36	32.5
IEC 71 B5 A160	130	110	4	160	9	8	14	16.3	30	5	-	32.5	32.5	32.5	36	32.5
IEC 80 B14 C120 *	100	80	3.5	120	7	8	19	21.8	40	6	-	32.5	32.5	32.5		32.5
IEC 80 B14 C160	130	110	4	160	9	8	19	21.8	40	6	-	32.5	32.5	32.5	36	32.5
IEC 80 B5 A200	165	130	4	200	M10	10	19	21.8	40	6	-	32.5	32.5	32.5	36	32.5
IEC 90 B14 C140 *	115	95	3.5	140	9	8	24	27.3	50	8	-	32.5	32.5	32.5	36	-
IEC 90 B14 C160	130	110	4	160	9	8	24	27.3	50	8	-	45.5	45.5	32.5	36	-
IEC 90 B5 A200	165	130	4	200	M10	10	24	27.3	50	8	-	-	-	32.5	36	-
IEC 100 B14 C160	130	110	4	160	9		28	31.3	60	8					36	
IEC 100 B14 C200	165	130	4	200	11		28	31.3	60	8					36	
IEC 100 B5 A250 *	215	165	5	250	M12	12	28	31.3	60	8					36	
IEC 112 B14 C160	130	110	5	160	9		28	31.3	60	8					36	
IEC 112 B14 C200	165	130	5	200	11		28	31.3	60	8					36	
IEC 112 B5 A250 *	215	165	5	250	M12	12	28	31.3	60	8					36	

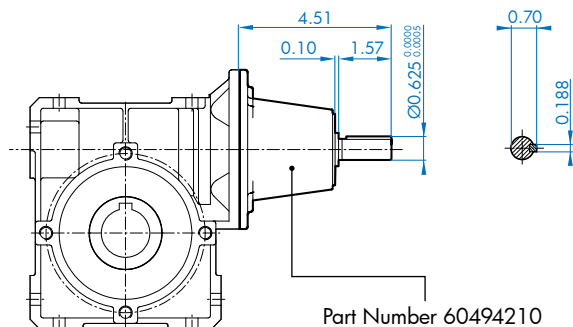
IEC Inputs	Kit Part Numbers					
	SK 1SI31	SK1SI40	SK1SI50	SK1SI63	SK1SI75	SK...H10
IEC 56 B14 C105	60395100	60495100	60495100	60495100	-	60495100
IEC 56 B5 A120	60395200	60495200	60495200	60495200	-	60495200
IEC 63 B14 C90 *	60395010 *	60495010 *	60495010 *	60495010 *	-	60495010 *
IEC 63 B14 C120	60395110	60495110	60495110	60495110	-	60495110
IEC 63 B5 A140	60395210	60495210	60495210	60495210	-	60495210
IEC 71 B14 C105 *	60395020 *	60495020 *	60495020 *	60495020 *	-	60495020 *
IEC 71 B14 C140	60395120	60495120	60495120	60495120	60795120	60495120
IEC 71 B5 A160	-	60495220	60495220	60495220	60795220	60495220
IEC 80 B14 C120 *	-	60495030 *	60495030 *	60495030 *	-	60495030 *
IEC 80 B14 C160	-	60495130	60495130	60495130	60795130	60495130
IEC 80 B5 A200	-	60495230	60495230	60495230	60795230	60495230
IEC 90 B14 C140 *	-	60495040 *	60495040 *	60695040 *	60795040 *	-
IEC 90 B14 C160	-	60495140	60495140	60695140	60795140	-
IEC 90 B5 A200	-	-	-	60695240	60795240	-
IEC 100 B14 C160	-	-	-	-	60795050	-
IEC 100 B14 C200	-	-	-	-	60795150	-
IEC 100 B5 A250 *	-	-	-	-	60795250 *	-
IEC 112 B14 C160	-	-	-	-	60795050	-
IEC 112 B14 C200	-	-	-	-	60795150	-
IEC 112 B5 A250 *	-	-	-	-	60795250 *	-

* Standard

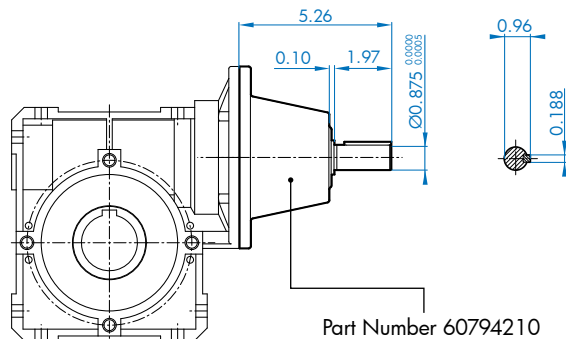


Solid Input Shaft - W SK 1SI40 - SK 1SI75

Solid Input Shaft Module **INCH**



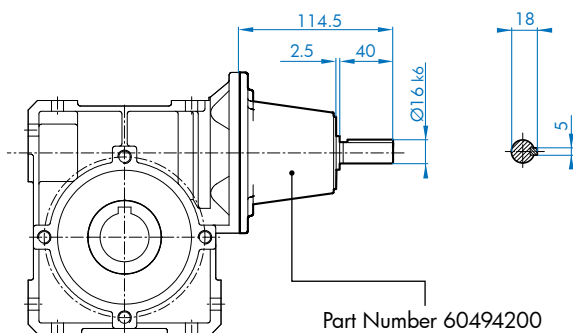
SK1SI40-SK1SI63



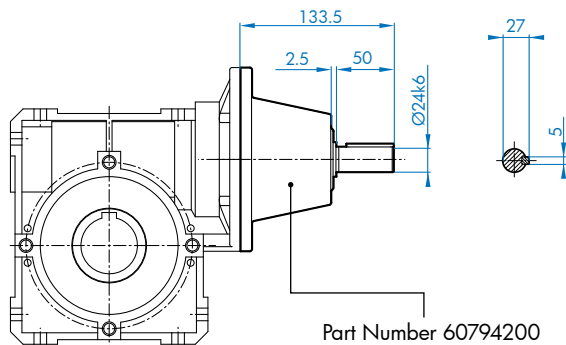
SK1SI75



Solid Input Shaft Module **METRIC**



SK1SI40-SK1SI63



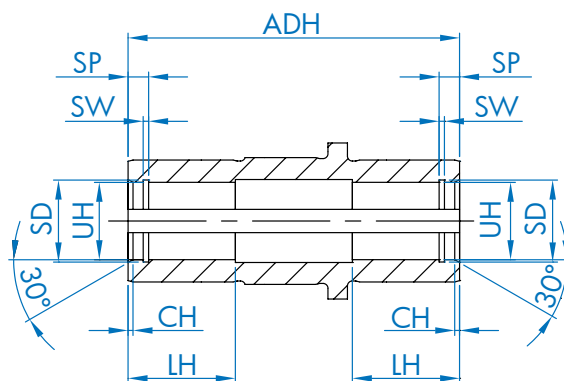
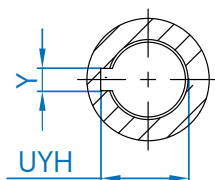
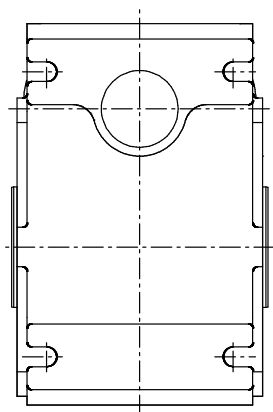
SK1SI75

CONFIGURATIONS SEE PAGE 65 - 71

Hollow Shaft Detail SK 1SI31 - SK 1SI75



Hollow Shaft Dimensions



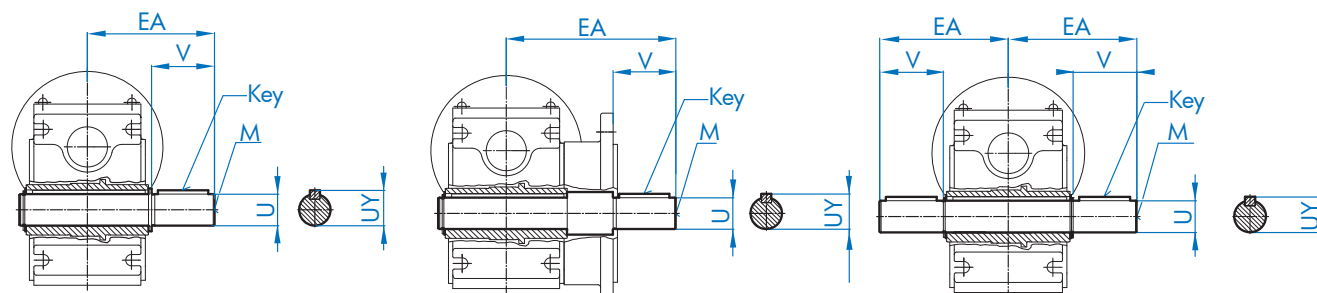
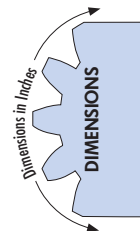
Inch	SP	SW	SD	CH	LH	ADH	UH	UYH	Y	Customer Supplied Key
SK 1SI31	0.165	0.043	0.661	0.039	0.087	2.68	0.625 + 0.0010 - 0.0000	0.709	0.187	3/16 x 3/16
SK 1SI40 SK 1SI40/31 SK 1SI40/H10	0.224	0.063	1.047	0.039	1.18	3.27	1.000 + 0.0010 - 0.0000	1.114	0.250	1/4 x 1/4
SK 1SI50 SK 1SI50/31 SK 1SI40/H10	0.224	0.063	1.181	0.039	1.18	3.82	1.125 + 0.0010 - 0.0000	1.241	0.250	1/4 x 1/4
SK 1SI63 SK 1SI63/31 SK 1SI63/H10	0.264	0.073	1.516	0.039	1.38	4.61	1.4375 + 0.0010 - 0.0000	1.605	0.375	3/8 x 3/8
SK 1SI75 SK 1SI75/40	0.315	0.085	2.036	0.059	1.57	5.12	1.9375 + 0.0012 - 0.0000	2.097	0.500	1/2 x 3/8

Metric	SP	SW	SD	CH	LH	ADH	UH	UYH	Y	Customer Supplied Key
SK 1SI31	4.2	1.1	14.6	1	22	68	14 + 0.0018 - 0.0000	16.3	5	5 x 5
SK 1SI40 SK 1SI40/31 SK 1SI40/H10	5.7	1.6	19.0	1	30	83	18 + 0.0018 - 0.0000	20.8	6	6 x 6
SK 1SI50 SK 1SI50/31 SK 1SI40/H10	5.7	1.6	26.2	1	30	97	25 + 0.0021 - 0.0000	28.3	8	8 x 7
SK 1SI63 SK 1SI63/31 SK 1SI63/H10	6.7	1.6	26.2	1	35	117	25 + 0.0021 - 0.0000	28.3	8	8 x 7
SK 1SI75 SK 1SI75/40	8.0	1.6	37.0	1.5	40	130	35 + 0.0025 - 0.0000	38.3	10	10 x 8



Flexbloc Solid Shaft Dimensions (V)

Solid Shaft Dimensions



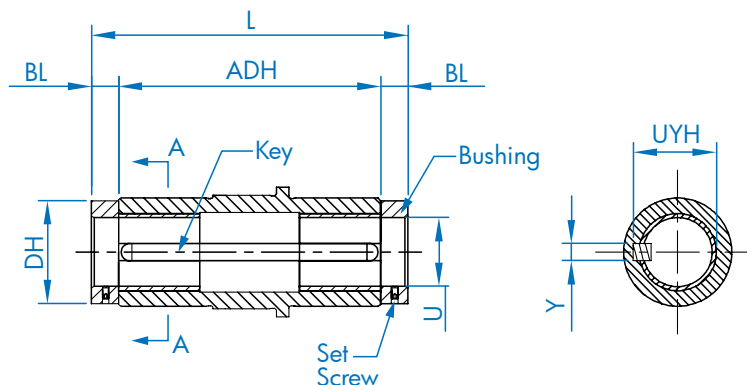
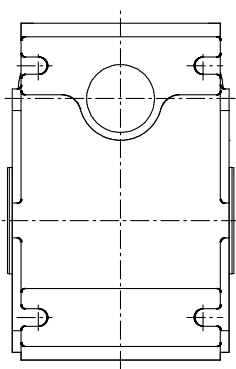
Inch	U	V	UY	M	Key
SK 1SI31	0.625 + 0.0000 - 0.0005	1.57	0.70	1/4-20 x 0.59	3/16 x 3/16 x 1-1/4
SK 1SI40 SK 1SI40/31 SK 1SI40/H10	0.750 + 0.0000 - 0.0005	1.57	0.83	1/4-20 x 0.59	3/16 x 3/16 x 1-1/4
SK 1SI50 SK 1SI50/31 SK 1SI40/H10	1.000 + 0.0000 - 0.0005	1.97	1.11	3/8-16 x 0.87	1/4 x 1/4 x 1-5/8
SK 1SI63 SK 1SI63/31 SK 1SI63/H10	1.125 + 0.0000 - 0.0005	2.36	1.24	1/2-13 x 1.10	1/4 x 1/4 x 2
SK 1SI75 SK 1SI75/40	1.375 + 0.0000 - 0.0005	2.75	1.51	5/8-11 x 1.42	5/16 x 5/16 x 2-1/8

Metric	U	V	UY	M	Key
SK 1SI31	14 + 0.0012 + 0.0001	30	16	M5 x 12.5 mm	5 x 5 x 25
SK 1SI40 SK 1SI40/31 SK 1SI40/H10	18 + 0.0012 + 0.0001	40	20.5	M6 x 16 mm	6 x 6 x 32
SK 1SI50 SK 1SI50/31 SK 1SI40/H10	25 + 0.0018 + 0.0002	50	28	M10 x 22 mm	8 x 7 x 40
SK 1SI63 SK 1SI63/31 SK 1SI63/H10	25 + 0.0018 + 0.0002	50	28	M10 x 22 mm	8 x 7 x 40
SK 1SI75 SK 1SI75/40	35 + 0.0018 + 0.0002	70	38	M12 x 28 mm	10 x 8 x 50

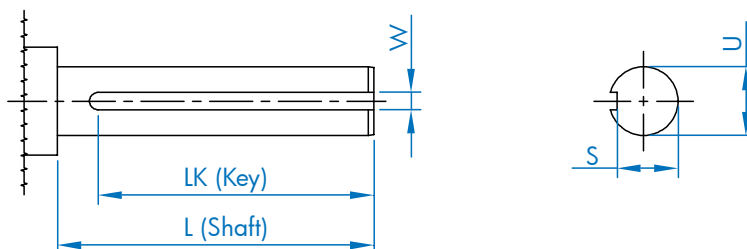
Hollow Shaft Bushing Kit (J)



Inch Hollow Shaft Bushing Kit



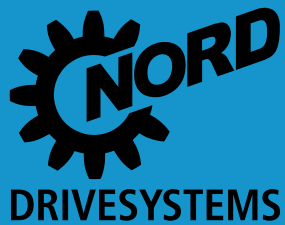
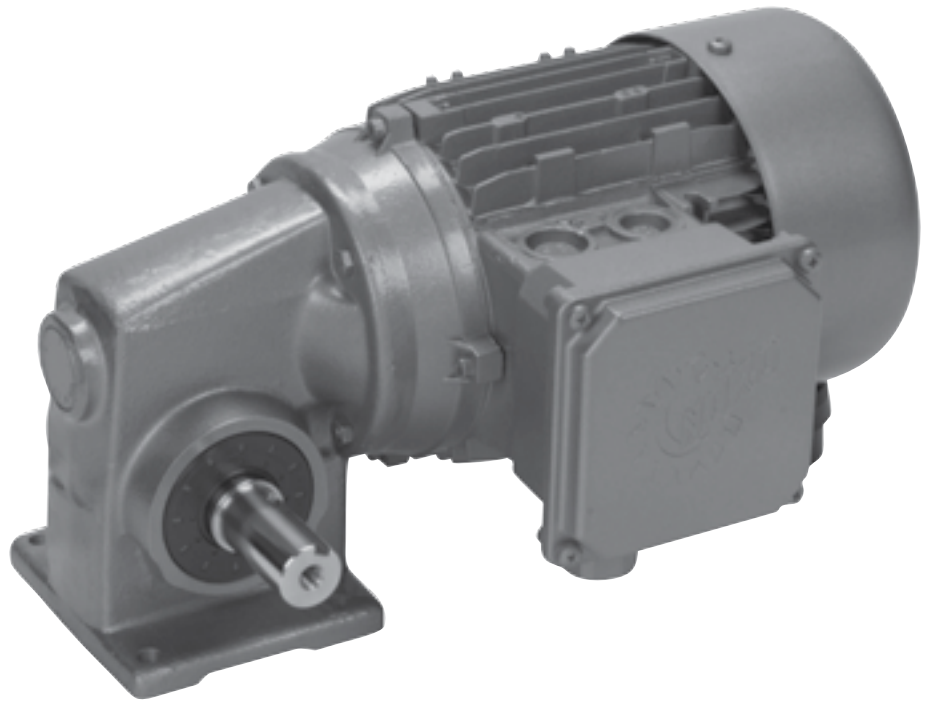
Customer Solid Shaft



Type	Hollow shaft			Bushing Kit				Customer Solid Shaft					Bushing KIT P/N
	ADH	UYH	Y	BL	DH	U	KEY	L	U	S	W	LK	
SK 1SI50 SK 1SI50/31 SK 1SI40/H10	3.82	1.241	0.25	0.39	1.50	1.000	0.25x0.3125x3.43	4.61	1.000	0.859	0.25	4.05	60593400
SK 1SI63 SK 1SI63/31 SK 1SI63/H10	4.61	1.605	0.375	0.39	1.73	1.000	0.25x0.375x0.522x4.13	5.39	1.000	0.859	0.25	4.77	60693400
SK 1SI63 SK 1SI63/31 SK 1SI63/H10	4.61	1.605	0.375	0.39	1.73	1.250	0.25x0.375x0.394x4.13	5.39	1.250	1.112	0.25	4.77	60693420
SK 1SI75 SK 1SI75/40	5.12	2.160	0.500	0.39	2.28	1.250	0.25x0.5x0.638x4.53	5.91	1.250	1.112	0.25	5.22	60793400
SK 1SI75 SK 1SI75/40	5.12	2.160	0.500	0.39	2.28	1.500	0.375x0.5x0.583x4.53	5.91	1.500	1.289	0.375	5.22	60793410

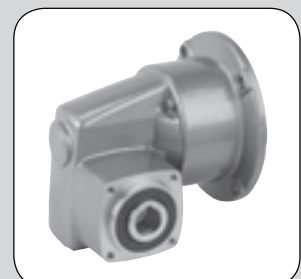
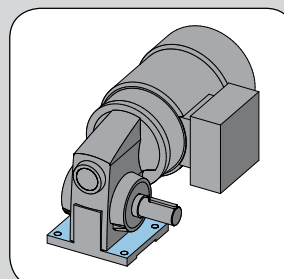
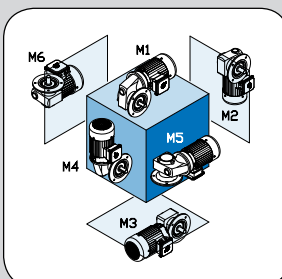
Selection

- Order Form
- Unit Examples
- 0.16 hp
- 0.25 hp
- 0.33 hp
- 0.50 hp
- 0.75 hp
- 1.0 hp
- 1.5 hp
- 2.0 hp



UNICASE[™]

www.nord.com



MINICASE[®]

Introduction



UNICASE[®] One-Piece Housing

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.

- Leak-free design
- Increased torsional housing strength
- Eliminates bolt-on covers and split casting
- Multi-mount features for foot or face mounting

Corrosion-Resistant Aluminum Alloy Housing

The MINICASE[®] makes use of the many advantageous material properties of an optimized aluminum alloy for the gear housing. The aluminum alloy housing provides a higher strength to weight ratio than cast iron. 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
- Painting is not required
- Improved heat dissipation for cooler operation and longer life

Robust Worm Gears Are Shock-Resistant

The MINICASE[®] worm drive gears are high capacity design and can handle high shock loads. The worm gear design also provides smooth and quiet operation.

- Quiet, smooth operation
- Longer gear life

Torque Capacities

There is a maximum permissible output torque, T_{max} , defining the load limit for continuous and uniform operation of each MINICASE[®] drive. For adequate service life, an appropriate service factor must be chosen for the reducer.

The drives can withstand their respective ultimate torque limits at rest, or for a short time, without being damaged. The ultimate torque limit is the absolute maximum and must not be exceeded even for peak torque conditions.

Max Permissible Continuous Torques at 1760 rpm				
Type	SK 1SM31	SK 1SM40	SK 1SM50	SK 1SM63
T_{max}	266 lb-in	443 lb-in	797 lb-in	1416 lb-in
Ultimate Limit Torques				
Type	SK 1SM31	SK 1SM40	SK 1SM50	SK 1SM63
T_{limit}	663 lb-in	1106 lb-in	1991 lb-in	3540 lb-in

Ratios

All ratio numbers are finite integers except 7.5:1 & 12.5:1. All MINICASE[®] worm gear sets are right-handed, which must be considered when determining the direction of rotation.



Efficiency

The high efficiencies of the MINICASE® are achieved by using extremely smooth tooth flanks and synthetic lubrication. The efficiency of new gearboxes increases up to the rated efficiency during initial operation as the worm gearing undergoes a natural run-in process. The power and torque figures listed in the selection tables are based on the rated efficiency η after the run-in process is complete.

Efficiencies η [%] at $n_1 = 1750$ rpm													
Worm ratio	5	7.5	10	12.5	15	20	25	30	40	50	60	80	100
SK 1SI31	87	83	80	71	72	68	65	56	51	47	43	37	33
SK 1SI40	89	85	83	81	76	72	69	61	56	52	48	42	37
SK 1SI50	91	88	86	84	80	77	74	66	62	58	54	48	43
SK 1SI63	92	90	88	87	83	80	77	70	66	62	59	53	49

The efficiency of worm gears increases with the input speed due to hydrodynamic lubrication within the gearing. Therefore the units have lower efficiency during start-up. This must be considered when sizing the motor for applications that require starting under load. The following table shows standard figures for the start-up efficiency, η , based on the ratio.

Start-Up Efficiencies

Efficiencies η [%] at $n_1 = 1750$ rpm													
Worm ratio	5	7.5	10	12.5	15	20	25	30	40	50	60	80	100
SK 1SI 31 to SK 1SI63	72	67	62	59	53	47	43	36	31	27	25	20	17

Lubrication

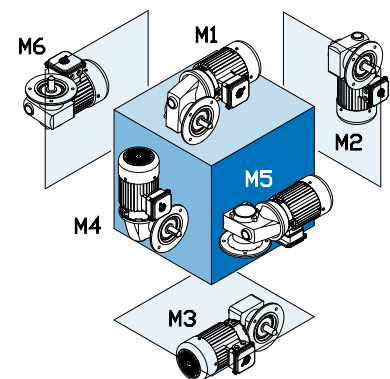
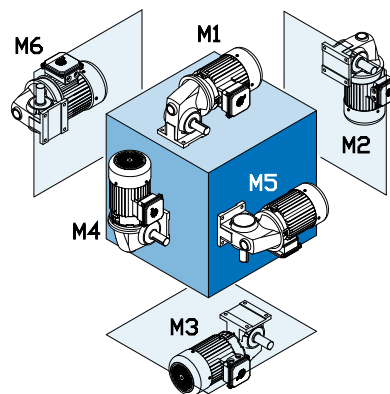
MINICASE® speed reducers are factory-filled with a synthetic lubricant that is suitable for the life of the product. The gearboxes are designed to be maintenance-free and completely sealed.

Dimensions

Some notes on the dimension drawings:

- C(BR) and AB(BR) are dimensions for brakemotors (inch)
- Inch keys are square or rectangular and per ANSI B17.1
- Flange-pilot centering: per ISO H7 class j6

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.

Mounting Position Cross Reference (old to new)

OLD	NEW
H1	M1
H2	M3
H3	M4
H4	M2
H5	M5
H6	M6

Minicase® Ordering Guide



Gear Unit	Size	Shaft/Mounting	Reducer Options	Input/Motor	Motor Options
SK	SM			-	
see page 175 - 185					
Reductions ☐ 1 ☐ 2	MINICASE® Design SM	Shaft/Mounting ☐ Blank - Solid Shaft, Foot Mount ☐ Shaft Side A ☐ Shaft Side B ☐ VF - Solid Shaft, B5 Flange Mount ☐ VZ - Solid Shaft, B14 Flange Mount ☐ LX - Double Solid Shaft, Foot Mount ☐ AX - Hollow Shaft, Foot Mount ☐ AF - Hollow Shaft, B5 Flange Mount ☐ AZ - Hollow Shaft, B14 Flange Mount ☐ AZD - Hollow Shaft, Torque Arm Mount Torque Arm Orientation ☐ 90 ☐ 180 ☐ 270	Reducer Options ☐ B - Fixing Element Kit 113 ☐ VI - Fluoro Rubber Seals 112 ☐ SM5 - Stainless Steel Output Shaft 112 ☐ SWV - Special Solid Shaft 112 ☐ SWA - Special Hollow Shaft 112	NEMA Adapter N48C N56C N140TC	Integral Motors 63S/4 - 0.16hp 63L/4 - 0.25hp 71S/4 - 0.33hp 71L/4 - 0.50hp 80S/4 - 0.75hp 80L/4 - 1hp 80LH/4 - 1hp 90S/4 - 1.5hp 90SH/4 - 1.5hp 90L/4 - 2hp 90LH/4 - 2hp

Product Specifications

Ratio
 :1
 see pages 120 - 133
 OR
Output Speed
 rpm
 see pages 120 - 133

Mounting Position

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

Paint

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

Lubricant

☐ Synthetic
☐ Food Grade
☐ Other _____

Shaft Diameter

 see page 164 - 165

Gearmotor Only Details

Voltage & Frequency

☐ 230/460V-60Hz
☐ 575V-60Hz
☐ 400V-50Hz
☐ Other _____

Terminal Box Pos.

☐ TB1
☐ TB2
☐ TB3
☐ TB4

Mtg. Pos. M1 Shown

Conduit Entry Loc.

☐ I *
☐ II
☐ III *
☐ IV

* Brakemotor options



Motor Order Form

SK

Frame

Size

Poles

Motor Options

63

71

80

90

100

112

S

SH

M

MH

MX

L

LA

LH

LX

4

2

6

4-2

8-2

Other

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

Mod

Build

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

Mod

Build

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 Position

☐ TB1
☐ TB2
☐ TB3
☐ TB4

Conduit Entry Location

☐ CE I *
☐ CE II
☐ CE III *
☐ CE IV

* Brakemotor options



Overview of available designs

Abbreviation	Description	Page
none	Solid shaft, foot mount	111
A	Keyed hollow shaft	112
B	Fixing element kit	113
D	Torque arm	112
F	B5 flange	111
L	Double solid shaft	111
LL	Long Term Storage	113
SM5	Stainless steel output shaft	112
SWA	Special hollow shaft	112
SWV	Special solid shaft	112
V	Solid shaft	111
VI	(FKM) Fluoro-rubber seals	112
X	Foot mount	108
Z	B14 flange	111
none	NSD TupH - Sealed Surface Conversion System	115
none	Paint coatings	114

Inputs

NORD's modular design allows for the following different input types:

- Integral motor
- NEMA C-Face motor adapter

NORD Integral and C-Face Motors

NORD offers high performance integral and NEMA C-face motors in standard efficiency, energy efficient and brakemotor design. They are inverter duty rated and are offered in a number of different voltages and frequencies.

Part numbers for stocked NEMA C-face motors are on page 169. NORD will also assemble a NEMA C-face motor for your special requirements. We offer a range of environmental, electrical, inverter and brake options that will suit your application. For more information on motor options see pages 175 - 185.

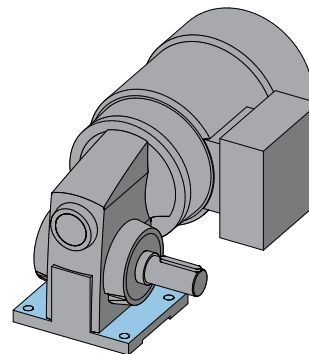
Mounting

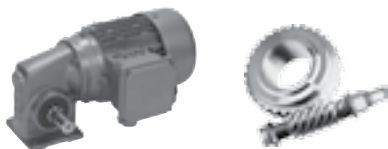
NORD offers a number of different mounting arrangements including:

- Foot (Blank or X)
- B5 flange (F)
- B14 flange (Z)
- Shaft mount (A)

Foot Mounted (Blank or X)

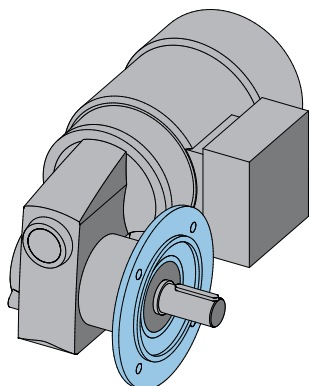
Foot or base mounting is the most common method of reducer mounting. The speed reducer is secured in place with bolts or studs to a mounting base. The reducer has mounting feet with through holes.





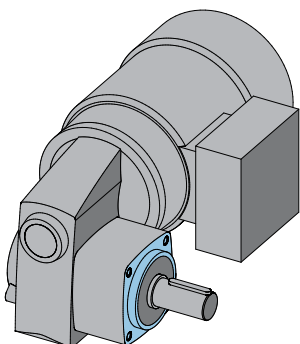
B5 Flange (F)

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. Many reducers offer a number of B5 flange diameters. This option is only available on the A side.



B14 Flange (Z)

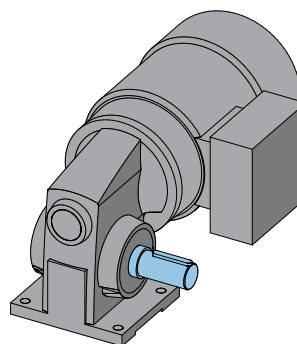
The NORD B14 flange consists of threaded holes and a centering pilot machined into the reducer housing. It is commonly used to secure the reducer to the application machine base or to mount bolt on components such as a torque arm. The B14 flange uses standard metric dimensions and allows a compact method of securing the reducer. This option is only available on the A side.



Shaft Options

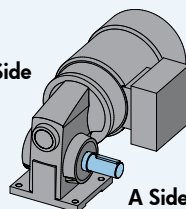
Solid Shaft (Blank or V)

NORD's standard keyed solid shafts include a centered threaded hole on the end of the solid shaft. Shafts are available as inch or metric versions. The standard shaft material is 1045 or 4140 or equivalent and is available on both sides of the reducer.



Specify the Solid Shaft Side when ordering.

B Side



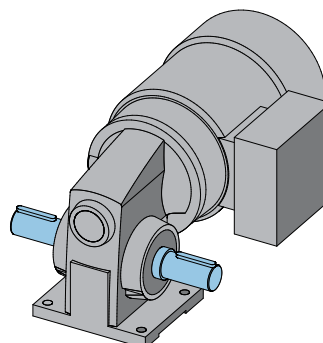
A Side

- ☐ Shaft Side A
- ☐ Shaft Side B
- ☐ Shaft Side A+B

Solid Shaft Side _____

Double Solid Shaft (L)

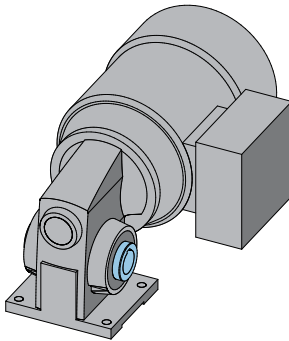
The standard solid shaft end is projected out both sides of the speed reducer. This option is commonly used to transfer torque out of both sides of the reducer or to mount a speed-monitoring device such as an encoder on one of the shaft ends.





Keyed Hollow Shaft (A)

NORD's standard keyed hollow shafts are made from SAE 1045 high carbon steel. They feature standard keyway dimensions and are available both inch and metric designs. Many NORD reducers offer a variety of hollow shaft diameters.

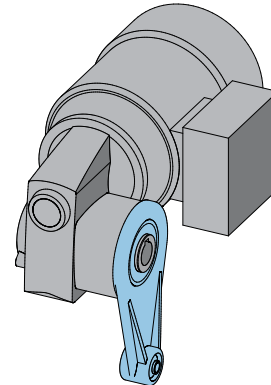


(FKM) Fluoro-rubber Seals (VI)

The NORD 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 fluoro-rubber (also called FKM) oil seals. FKM seals are rated from -30°F to 400°F (-35°C to 200°C).

Torque Arm (D)

A torque arm is a compact, simple way to secure a shaft mounted reducer. It is bolted onto the reducers B14 flange. The tear drop shaped torque arm has a rubber bushing located at the fastening hole-end to act as a shock absorber to dampen out peak shock loads. This option only available on the A side.



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 wash-down applications.

Special Solid Shaft (SWV)

Special solid shaft diameters and lengths can 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 feasibility.

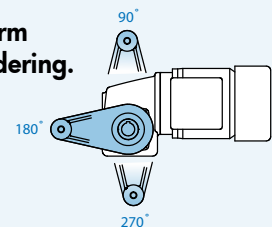
Special Hollow Shaft (SWA)

Special hollow bore shafts can also be provided. Special hollow bore shafts can be provided with special diameters, multiple keyways, and different shaft materials. Specify your shaft requirements and NORD will verify the design feasibility.



**Specify the torque arm orientation when ordering.
(90°, 180°, or 270°)**

- ☐ 90
- ☐ 180
- ☐ 270



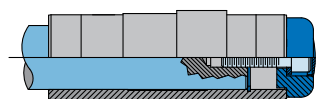
Torque arm orientation _____



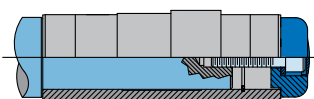
Fixing Element Kit (B) (shaft shoulder fixed and snap ring fixed)

Due to the slight oscillations inherent in any rotating shaft, NORD offers an optional "fixing element kit". This is a method to prevent the reducer from "walking out" of position. The kit includes all necessary parts to secure the shaft in the axial direction by using a tapped hole in the end of the mating male shaft.

There are two methods for securing the fixing element kit. The first involves pulling the customer supplied male shaft to the snap ring (type 1) and the second method the customer supplied shaft is shouldered (type 2) and pulled against the hollow shaft and not the snap ring.



Snap Ring Fixed (Type 1)



Shaft Shoulder Fixed (Type 2)

Long Term Storage (LL)

Speed reducers are frequently put in 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 23°F and 104 °F (-5 °C and 40 °C).



Paint Free Design

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

Paint Coatings

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

Additionally a variety of coating options are available including our Severe Duty coatings:

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

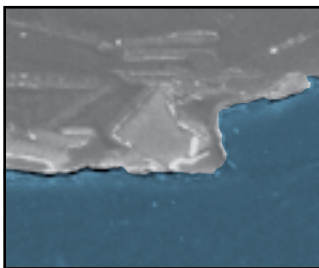
Special colors and paints possible please contact NORD with your specific requirements.



NSD TupH

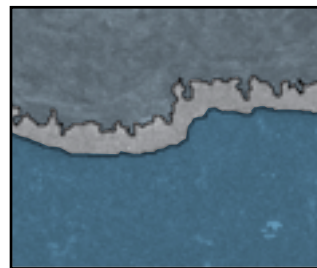
As a leader in the power transmission industry, NORD Gear is committed to providing value to industries where end users demand durable equipment to withstand a variety of harsh environments. The market has long awaited a product with such a large range of standard reducers with the corrosive resistance 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 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.

■ Paint ■ Aluminum Surface



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.

■ Sealer ■ Aluminum Surface
■ Surface Conversion

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 Minicase® worm Units with NSD^{tupH} Conversion

	SK15M31	SK15M40	SK15M50	SK15M63
N48C Input	X			
N56C Input		X	X	X
N140TC Input		X	X	X

The image shows two mechanical components. On the left is a close-up of a gear pump, featuring two meshing gears (one large and one small) housed within a cast metal casing. On the right is a motorized gear pump assembly, which includes the same gear pump unit mounted on a base and connected to a three-phase electric motor.

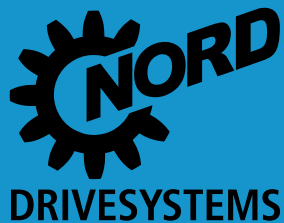
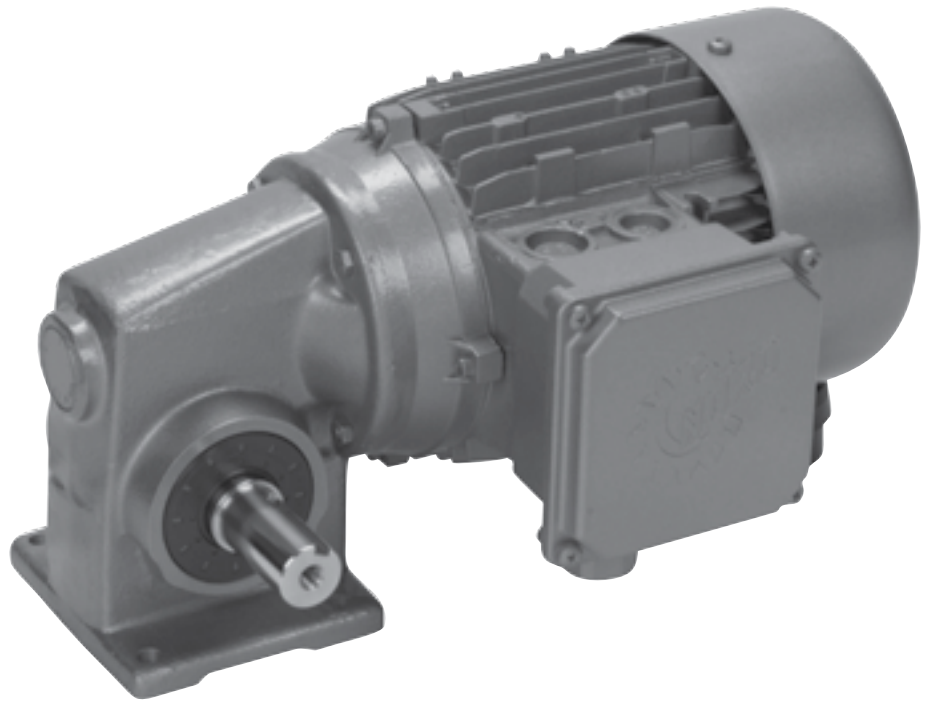


NOTES

MINICASE[®] Gearmotor Ratings

Selection

- Order Form
- Unit Examples
- 0.16 hp
- 0.25 hp
- 0.33 hp
- 0.50 hp
- 0.75 hp
- 1.0 hp
- 1.5 hp
- 2.0 hp

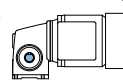


UNICASE[™]

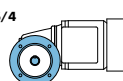
www.nord.com

Minicase Ordering Guide	
Gear Unit	Shaft/Mounting
SK	SM
Gear Reduction MINICASE[®] Design 1 2 SM S4	
Blank - Solid Shaft, Foot Mount VF - Solid Shaft, B5 Flange Mount VZ - Solid Shaft, B14 Flange Mount LX - Double Solid Shaft, Foot Mount LX - Hollow Shaft, Foot Mount AF - Hollow Shaft, B5 Flange Mount AZ - Hollow Shaft, B14 Flange Mount AZD - Hollow Shaft, Torque Flange Arm Disposition → 90 → 180 → 270	

SK 1SM50 - 80 S/4
Minicase Worm Unit
Solid Shaft Side A,
Foot Mounted
One Stage



SK 1SM50VF - 80 S/4
Minicase Worm Unit
Solid Shaft Side A,
B5 Flange Side A,
One Stage



SK 1SM50VZ - 80 S/4
Minicase Worm Unit
Solid Shaft Side A,
B14 Flange Side A



Motor Power	Output Speed	Output Torque	Service Factor	AGMA Class	Gear Ratio	F ₂ ON
P _e	n ₂	T _e	f _s		i _g	
[hp]	[rpm]	[lb-in]				
1.0	18	2786	3.3	III	94.19	30
	13	3320	3.3	III	129.00	33
	10	4069	2.9	III	165.50	36
	9.0	4441	2.7	III	183.50	36
	6.8	5567	2.3	III	241.50	36
	3.2	10580	1.2	I	510.00	32
1.5	2.6	12885	1.0	I	645.00	28
	6.4	7027	1.9	II	257.43	36
	5.5	6669	2.0	III	299.28	36
	4.5	7854	1.7	II	365.07	36
	3.5	9716	1.4	II	468.37	36
	3.2	10574	1.3	I	519.21	32
2.0	2.5	13197	1.1	I	660.60	27
	6.1	7565	3.3	III	269.76	

Minicase Ordering Guide



Gear Unit	Size	Shaft/Mounting	Reducer Options	Input/Motor	Motor Options
SK	SM				see page 175
Reductions ☐ 1 ☐ 2	MINICASE® Design SM MINICASE® Size ☐ 31 ☐ 40 ☐ 50 ☐ 63 ☐ 75	Shaft/Mounting ☐ Blank - Solid Shaft, Foot Mount ☐ Shaft Side A ☐ Shaft Side B ☐ VF - Solid Shaft, B5 Flange Mount ☐ VZ - Solid Shaft, B14 Flange Mount ☐ LX - Double Solid Shaft, Foot Mount ☐ AX - Hollow Shaft, Foot Mount ☐ AF - Hollow Shaft, B5 Flange Mount ☐ AZ - Hollow Shaft, B14 Flange Mount ☐ AZD - Hollow Shaft, Torque Arm Torque Arm Orientation ☐ 90 ☐ 180 ☐ 270	Reducer Options ☐ B - Fixing Element Kit 113 ☐ VI - Fluoro Rubber Seals 112 ☐ SM5 - Stainless Steel Output Shaft 112 ☐ SWV - Special Solid Shaft 112 ☐ SWA - Special Hollow Shaft 112	NEMA Adapter N48C N56C N140TC	Integral Motors 63S/4 - 0.16hp 63L/4 - 0.25hp 71S/4 - 0.33hp 71L/4 - 0.50hp 80S/4 - 0.75hp 80L/4 - 1hp 90S/4 - 1.5hp 90L/4 - 2hp

Product Specifications

Ratio :1 see pages 120 - 133 OR Output Speed rpm see pages 120 - 133	Mounting Position ☐ M1 ☐ M2 ☐ M3 ☐ M4 ☐ M5 ☐ M6 ☐ Special _____ 	Paint ☐ No Paint (Standard) ☐ Stainless Steel Paint ☐ NSD+ (gray) ☐ NSD+W (white) ☐ NSD-X3 (gray) ☐ NSD-X3W (white) ☐ Special _____	Lubricant ☐ Synthetic ☐ Food Grade ☐ Other _____
--	---	---	--

Shaft Diameter

 see page 164 - 165

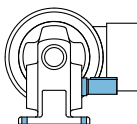
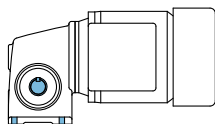
Gearmotor Only Details

Voltage & Frequency ☐ 230/460V-60Hz ☐ 575V-60Hz ☐ 400V-50Hz ☐ Other _____	Terminal Box Pos. ☐ KK1 ☐ KK2 ☐ KK3 ☐ KK4 Mtg. Pos. M1 Shown	Conduit Entry Loc. ☐ I * ☐ II ☐ III * ☐ IV * Brakemotor options
--	--	---

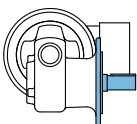
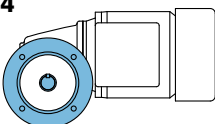


Examples of Available Helical-worm Units with Solid Shaft Design

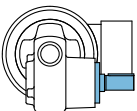
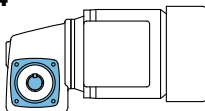
SK 1SM50 - 80 S/4
Minicase Worm Unit
Solid Shaft Side A,
Foot Mounted
One Stage



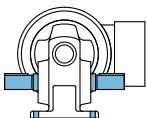
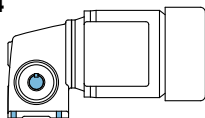
SK 1SM50VF - 80 S/4
Minicase Worm Unit
Solid Shaft Side A,
B5 Flange Side A,
One Stage



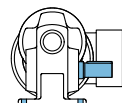
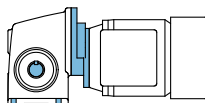
SK 1SM50VZ - 80 S/4
Minicase Worm Unit
Solid Shaft Side A,
B14 Flange Side A,
One Stage



SK 1SM50LX - 80 S/4
Minicase Worm Unit
Double Solid Shaft,
Foot Mounted
One Stage

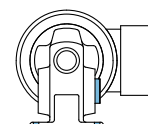
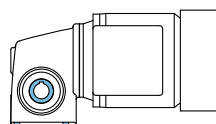


SK 2SM50 - 71 S/4
Minicase Worm Unit
Solid Shaft Side A,
Foot Mounted
Two Stage

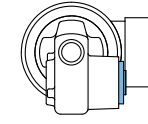
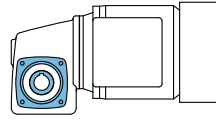


Examples of Available Helical-worm Units with Hollow Shaft Design

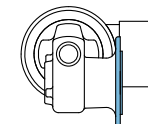
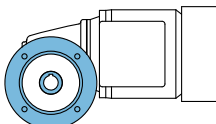
SK 1SM50AX - 80 S/4
Minicase Worm Unit
Hollow Shaft,
Foot Mounted
One Stage



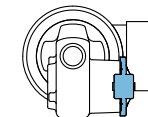
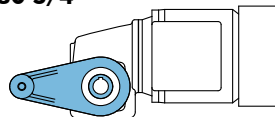
SK 1SM50AZ - 80 S/4
Minicase Worm Unit
Hollow Shaft,
B14 Flange Side A,
One Stage



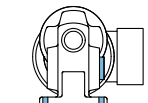
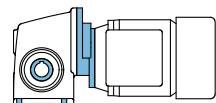
SK 1SM50AF - 80 S/4
Minicase Worm Unit
Hollow Shaft,
B5 Flange Side A,
One Stage



SK 1SM50AZD - 80 S/4
Minicase Worm Unit
Hollow Shaft,
B14 Flange Side A,
Torque Arm Side A
at 180°, One Stage



SK 2SM50AX - 71 S/4
Minicase Worm Unit
Hollow Shaft,
Foot Mounted,
Two Stage



0.16 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.16	340	26	7.8	5	5		371	419	SK 1SM31 - 63S/4	12	63
	227	37	6.4	7.5	7.5		419	419			
	170	48	4.8	10	10		416	416			
	136	57	3.7	12.5	12.5		416	416			
	113	64	4.0	15	15		416	416			
	85	81	2.9	20	20		414	414			
	68	97	2.3	25	25		412	412			
	57	100	2.6	30	30		412	412			
	43	122	2.0	40	40		410	410			
	34	140	1.6	50	50		407	407			
	28	154	1.4	60	60		403	403			
	21	177	1.1	80	80		398	398			
	17	190	1.0	100	100		396	396			
	340	27	12.7	5	5		428	428	SK 1SM40 - 63S/4	15	65
	227	38	10.2	7.5	7.5		428	428			
	170	50	7.5	10	10		428	428			
	136	60	6.0	12.5	12.5		428	428			
	113	68	6.4	15	15		425	425			
	85	86	4.6	20	20		425	425			
	68	103	3.6	25	25		425	425			
	57	109	4.1	30	30		423	423			
	43	134	3.0	40	40		423	423			
	34	155	2.5	50	50		421	421			
	28	172	2.1	60	60		419	419			
	21	200	1.6	80	80		414	414			
	17	221	1.4	100	100		412	412			
	68	124	4.0	25	5	5	423	423	SK 2SM40 - 63S/4	17	163
	45	175	3.3	37.5	7.5	5	419	419			
	34	224	2.5	50	10	5	412	412			
	27	268	2.0	62.5	12.5	5	405	405			
	23	295	2.2	75	15	5	401	401			
	17	370	1.6	100	20	5	383	383			
	14	425	1.3	125	25	5	367	367			
	11	438	1.5	150	30	5	362	362			
	8.5	525	1.1	200	40	5	331	331			
	6.8	597	0.9	250	50	5	297	297			
	5.7	664	0.8	300	60	5	257	257			
	4.3	608	0.8	400	80	5	290	290			
	3.4	564	0.8	500	100	5	313	313			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.16 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.16	68	125	6.9	25	5	5	808	808	SK 2SM50 - 63S/4	22	163
	45	179	5.7	37.5	7.5	5	806	806			
	34	230	4.3	50	10	5	801	801			
	27	287	3.3	62.5	12.5	5	797	797			
	23	309	3.7	75	15	5	794	794			
	17	388	2.7	100	20	5	785	785			
	14	455	2.2	125	25	5	774	774			
	11	474	2.5	150	30	5	772	772			
	8.5	573	1.9	200	40	5	754	754			
	6.8	641	1.6	250	50	5	738	738			
	5.7	716	1.3	300	60	5	720	720			
	4.3	811	1.1	400	80	5	693	693			
	3.4	895	0.9	500	100	5	664	664			
	131	68	15.4	13	5	2.6	1008	1260	SK 2SM63 - 63S/4	27	163
	87	99	15.4	19.5	7.5	2.6	1154	1260			
	68	128	12.0	25	5	5	1244	1260			
	65	127	12.5	26	10	2.6	1260	1260			
	52	157	9.7	32.5	12.5	2.6	1260	1260			
	45	183	9.9	37.5	7.5	5	1260	1260			
	44	177	10.4	39	15	2.6	1260	1260			
	38	226	7.4	45	5	9	1260	1260			
	34	236	7.5	50	10	5	1260	1260			
	33	223	7.6	52	20	2.6	1260	1260			
	29	279	7.0	58.5	7.5	7.8	1258	1258			
	26	268	6.0	65	25	2.6	1260	1260			
	23	322	6.3	75	15	5	1258	1258			
	22	358	5.2	78	10	7.8	1256	1256			
	19	413	4.6	90	10	9	1251	1251			
	17	400	4.7	100	20	5	1253	1253			
	16	354	4.9	104	40	2.6	1256	1256			
	15	482	4.5	117	15	7.8	1247	1247			
	14	477	3.7	125	25	5	1249	1249			
	13	403	4.0	130	50	2.6	1253	1253			
	11	501	4.2	150	30	5	1247	1247			
	9.4	687	3.0	180	20	9	1231	1231			
	8.5	609	3.2	200	40	5	1238	1238			
	6.8	686	2.6	250	50	5	1231	1231			
	5.7	770	2.2	300	60	5	1222	1222			
	4.7	988	2.1	360	40	9	1193	1193			
	4.4	1000	1.9	390	50	7.8	1190	1190			
	4.3	883	1.8	400	80	5	1208	1208			
	3.8	1128	1.7	450	50	9	1170	1170			
	3.4	984	1.5	500	100	5	1195	1195			
	3.1	1256	1.5	540	60	9	1148	1148			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.25 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.25	336	42	4.9	5	5		369	416	SK 1SM31 - 63L/4	13	136
	224	60	4.0	7.5	7.5		416	416			
	168	76	3.0	10	10		414	414			
	134	92	2.3	12.5	12.5		414	414			
	112	103	2.5	15	15		412	412			
	84	130	1.8	20	20		407	407			
	67	155	1.4	25	25		403	403			
	56	161	1.7	30	30		403	403			
	42	195	1.3	40	40		394	394			
	34	225	1.0	50	50		387	387			
	28	242	0.9	60	60		380	380			
	336	43	7.9	5	5		428	428	SK 1SM40 - 63L/4	16	142
	224	61	6.4	7.5	7.5		428	428			
	168	79	4.7	10	10		425	425			
	134	97	3.7	12.5	12.5		425	425			
	112	109	4.0	15	15		423	423			
	84	138	2.9	20	20		421	421			
	67	165	2.3	25	25		419	419			
	56	175	2.5	30	30		419	419			
	42	214	1.9	40	40		414	414			
	34	249	1.5	50	50		407	407			
	28	275	1.3	60	60		403	403			
	21	321	1.0	80	80		394	394			
	17	354	0.9	100	100		387	387			
	67	198	2.5	25	5	5	416	416	SK 2SM40 - 63L/4	19	163
	45	280	2.1	37.5	7.5	5	403	403			
	34	358	1.6	50	10	5	385	385			
	27	430	1.2	62.5	12.5	5	365	365			
	22	473	1.3	75	15	5	351	351			
	17	593	1.0	100	20	5	299	299			
	13	681	0.8	125	25	5	243	243			
	11	703	0.9	150	30	5	227	227			
	67	201	4.3	25	5	5	803	803	SK 2SM50 - 63L/4	23	163
	45	287	3.6	37.5	7.5	5	797	797			
	34	368	2.7	50	10	5	788	788			
	27	460	2.1	62.5	12.5	5	774	774			
	22	495	2.3	75	15	5	767	767			
	17	621	1.7	100	20	5	743	743			
	13	729	1.4	125	25	5	718	718			
	11	760	1.5	150	30	5	709	709			
	8.4	918	1.2	200	40	5	657	657			
	6.7	1028	1.0	250	50	5	612	612			
	5.6	1147	0.8	300	60	5	551	551			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$)



0.25 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.25	129	109	9.6	13	5	2.6	1004	1260	SK 2SM63 - 63L/4	28	163
	86	158	9.6	19.5	7.5	2.6	1152	1260			
	67	206	7.5	25	5	5	1238	1260			
	65	204	7.8	26	10	2.6	1260	1260			
	52	252	6.0	32.5	12.5	2.6	1260	1260			
	45	294	6.2	37.5	7.5	5	1258	1258			
	43	283	6.5	39	15	2.6	1258	1258			
	37	361	4.6	45	5	9	1256	1256			
	34	378	4.7	50	10	5	1253	1253			
	32	358	4.7	52	20	2.6	1256	1256			
	29	447	4.4	58.5	7.5	7.8	1251	1251			
	26	429	3.7	65	25	2.6	1251	1251			
	22	574	3.3	78	10	7.8	1240	1240			
	22	516	3.9	75	15	5	1244	1244			
	19	662	2.9	90	10	9	1233	1233			
	17	640	3.0	100	20	5	1235	1235			
	16	567	3.1	104	40	2.6	1242	1242			
	14	772	2.8	117	15	7.8	1222	1222			
	13	646	2.5	130	50	2.6	1235	1235			
	13	765	2.3	125	25	5	1222	1222			
	11	803	2.6	150	30	5	1217	1217			
	9.3	1101	1.9	180	20	9	1175	1175			
	8.4	975	2.0	200	40	5	1195	1195			
	6.7	1099	1.6	250	50	5	1177	1177			
	5.6	1233	1.4	300	60	5	1152	1152			
	4.7	1583	1.3	360	40	9	1073	1073			
	4.3	1603	1.2	390	50	7.8	1067	1067			
	4.2	1415	1.1	400	80	5	1114	1114			
	3.7	1807	1.1	450	50	9	1008	1008			
	3.4	1577	0.9	500	100	5	1073	1073			
	3.1	2013	0.9	540	60	9	936	936			



(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)

0.33 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.33	342	54	3.8	5	5		362	416	SK 1SM31 - 71S/4	16	136
	228	77	3.1	7.5	7.5		412	414			
	171	99	2.3	10	10		412	412			
	137	119	1.8	12.5	12.5		410	410			
	114	133	1.9	15	15		407	407			
	86	168	1.4	20	20		401	401			
	68	201	1.1	25	25		394	394			
	57	208	1.3	30	30		392	392			
	43	252	1.0	40	40		378	378			
	34	286	0.8	50	50		365	365			
	342	55	6.1	5	5		428	428			
	228	79	4.9	7.5	7.5		425	425			
	171	103	3.6	10	10		425	425			
	137	125	2.9	12.5	12.5		423	423			
	114	141	3.1	15	15		421	421			
	86	178	2.2	20	20		419	419			
	68	213	1.7	25	25		414	414	SK 1SM40 - 71S/4	19	142
	57	226	2.0	30	30		412	412			
	43	277	1.5	40	40		403	403			
	34	321	1.2	50	50		394	394			
	29	356	1.0	60	60		387	387			
	21	415	0.8	80	80		371	371			
	68	256	1.9	25	5	5	407	407			
	46	361	1.6	37.5	7.5	5	385	385			
	34	463	1.2	50	10	5	356	356			
	27	556	1.0	62.5	12.5	5	317	317			
	23	612	1.0	75	15	5	288	288			
	17	766	0.8	100	20	5	162	162			
	342	56	10.4	5	5		529	628	SK 2SM40 - 71S/4	21	163
	228	82	8.5	7.5	7.5		603	720			
	171	106	6.2	10	10		662	792			
	137	130	4.9	12.5	12.5		709	808			
	114	148	5.2	15	15		752	806			
	86	190	3.8	20	20		803	803			
	68	229	2.9	25	25		801	801			
	57	245	3.3	30	30		799	799			
	43	306	2.4	40	40		794	794			
	34	358	1.9	50	50		788	788			
	29	400	1.6	60	60		783	783			
	21	474	1.2	80	80		772	772			
	17	531	1.0	100	100		763	763			
	342	56	10.4	5	5		529	628	SK 1SM50 - 71S/4	23	149
	228	82	8.5	7.5	7.5		603	720			
	171	106	6.2	10	10		662	792			
	137	130	4.9	12.5	12.5		709	808			
	114	148	5.2	15	15		752	806			
	86	190	3.8	20	20		803	803			
	68	229	2.9	25	25		801	801			
	57	245	3.3	30	30		799	799			
	43	306	2.4	40	40		794	794			
	34	358	1.9	50	50		788	788			
	29	400	1.6	60	60		783	783			
	21	474	1.2	80	80		772	772			
	17	531	1.0	100	100		763	763			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.33	68	259	3.3	25	5	5	799	799	SK 2SM50 - 71S/4	25	163
	46	371	2.8	37.5	7.5	5	788	788			
	34	476	2.1	50	10	5	772	772			
	27	595	1.6	62.5	12.5	5	749	749			
	23	639	1.8	75	15	5	738	738			
	17	803	1.3	100	20	5	695	695			
	14	942	1.1	125	25	5	646	646			
	11	982	1.2	150	30	5	630	630			
	8.6	1186	0.9	200	40	5	529	529			
	6.8	1328	0.8	250	50	5	430	430			
	132	141	7.4	13	5	2.6	992	1260			
	88	205	7.4	19.5	7.5	2.6	1141	1260			
	68	266	5.8	25	5	5	1217	1260			
	66	263	6.0	26	10	2.6	1247	1260			
	53	325	4.7	32.5	12.5	2.6	1256	1256			
	46	380	4.8	37.5	7.5	5	1253	1253			
	44	366	5.0	39	15	2.6	1256	1256	SK 2SM63 - 71S/4	31	163
	38	467	3.6	45	5	9	1249	1249			
	34	488	3.6	50	10	5	1247	1247			
	33	463	3.7	52	20	2.6	1249	1249			
	29	578	3.4	58.5	7.5	7.8	1240	1240			
	26	554	2.9	65	25	2.6	1242	1242			
	23	667	3.1	75	15	5	1233	1233			
	22	742	2.5	78	10	7.8	1224	1224			
	19	856	2.2	90	10	9	1211	1211			
	17	828	2.3	100	20	5	1215	1215			
	16	732	2.4	104	40	2.6	1226	1226			
	15	998	2.2	117	15	7.8	1193	1193			
	14	989	1.8	125	25	5	1193	1193			
	13	835	1.9	130	50	2.6	1213	1213			
	11	1038	2.0	150	30	5	1186	1186			
	9.5	1423	1.4	180	20	9	1112	1112			
	8.6	1260	1.5	200	40	5	1148	1148			
	6.8	1421	1.3	250	50	5	1112	1112			
	5.7	1594	1.1	300	60	5	1069	1069			
	4.8	2046	1.0	360	40	9	923	923			
	4.4	2072	0.9	390	50	7.8	911	911			
	4.3	1829	0.8	400	80	5	1001	1001			
	3.8	2335	0.8	450	50	9	790	790			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)



0.5 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.5	344	79	2.6	5	5		353	414	SK 1SM31 - 71L/4	17	136
	229	113	2.1	7.5	7.5		398	410			
	172	145	1.6	10	10		405	405			
	138	175	1.2	12.5	12.5		398	398			
	115	196	1.3	15	15		394	394			
	86	247	1.0	20	20		378	378			
	57	308	0.9	30	30		356	356			
	344	81	4.2	5	5		425	425	SK 1SM40 - 71L/4	20	142
	229	116	3.4	7.5	7.5		423	423			
	172	151	2.5	10	10		421	421			
	138	184	2.0	12.5	12.5		416	416			
	115	207	2.1	15	15		414	414			
	86	262	1.5	20	20		405	405			
	69	314	1.2	25	25		396	396			
	57	333	1.3	30	30		392	392			
	43	407	1.0	40	40		374	374			
	34	473	0.8	50	50		351	351			
	344	83	7.1	5	5		522	623	SK 1SM50 - 71L/4	24	149
	229	120	5.8	7.5	7.5		594	716			
	172	156	4.2	10	10		650	783			
	138	191	3.3	12.5	12.5		698	803			
	115	218	3.5	15	15		736	801			
	86	280	2.6	20	20		797	797			
	69	336	2.0	25	25		790	790			
	57	360	2.2	30	30		788	788			
	43	451	1.6	40	40		776	776			
	34	527	1.3	50	50		763	763			
	29	589	1.1	60	60		749	749			
	22	698	0.8	80	80		725	725			
	69	382	2.3	25	5	5	785	785	SK 2SM50 - 71L/4	27	163
	46	545	1.9	37.5	7.5	5	758	758			
	34	700	1.4	50	10	5	725	725			
	28	875	1.1	62.5	12.5	5	671	671			
	23	941	1.2	75	15	5	648	648			
	17	1182	0.9	100	20	5	531	531			
	11	1445	0.8	150	30	5	313	313			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)



0.5 hp, 0.75 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.5	132	208	5.1	13	5	2.6	979	1260	SK 2SM63 - 71L/4	33	163
	88	301	5.1	19.5	7.5	2.6	1121	1258			
	69	391	3.9	25	5	5	1193	1253			
	66	388	4.1	26	10	2.6	1229	1253			
	53	479	3.2	32.5	12.5	2.6	1249	1249			
	46	559	3.3	37.5	7.5	5	1242	1242			
	44	539	3.4	39	15	2.6	1244	1244			
	38	687	2.4	45	5	9	1231	1231			
	34	718	2.5	50	10	5	1226	1226			
	33	681	2.5	52	20	2.6	1231	1231			
	29	851	2.3	58.5	7.5	7.8	1213	1213			
	26	815	2.0	65	25	2.6	1217	1217			
	23	982	2.1	75	15	5	1195	1195			
	22	1092	1.7	78	10	7.8	1177	1177			
	19	1260	1.5	90	10	9	1148	1148			
	17	1218	1.6	100	20	5	1154	1154			
	17	1078	1.6	104	40	2.6	1179	1179			
	15	1468	1.5	117	15	7.8	1103	1103			
	14	1454	1.2	125	25	5	1105	1105			
	13	1229	1.3	130	50	2.6	1152	1152			
	11	1527	1.4	150	30	5	1087	1087			
	9.6	2094	1.0	180	20	9	902	902			
	8.6	1854	1.0	200	40	5	992	992			
	6.9	2091	0.9	250	50	5	905	905			
0.75	342	123	2.7	5	5		423	423	SK 1SM40 - 80S/4	24	142
	228	176	2.2	7.5	7.5		419	419			
	171	230	1.6	10	10		412	412			
	137	280	1.3	12.5	12.5		403	403			
	114	316	1.4	15	15		396	396			
	86	399	1.0	20	20		376	376			
	68	477	0.8	25	25		349	349			
	57	506	0.9	30	30		340	340			
	342	126	4.6	5	5		513	617		28	149
	228	183	3.8	7.5	7.5		583	707			
	171	238	2.8	10	10		635	776			
	137	291	2.2	12.5	12.5		680	797			
	114	332	2.3	15	15		716	792			
	86	426	1.7	20	20		776	779			
	68	512	1.3	25	25		765	765			
	57	548	1.5	30	30		758	758			
	43	686	1.1	40	40		727	727			
	34	803	0.8	50	50		695	695			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0)

0.75 hp, 1.0 hp Gearmotors



Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
0.75	342	127	8.2	5	5		718	1085	SK 1SM63 - 80S/4	32	156
	228	187	6.6	7.5	7.5		824	1229			
	171	244	4.9	10	10		900	1260			
	137	301	3.8	12.5	12.5		963	1258			
	114	345	4.0	15	15		1019	1256			
	86	443	2.9	20	20		1114	1251			
	68	533	2.2	25	25		1195	1244			
	57	581	2.4	30	30		1240	1240			
	43	731	1.8	40	40		1226	1226			
	34	858	1.4	50	50		1211	1211			
	29	980	1.2	60	60		1195	1195			
	21	1174	0.9	80	80		1163	1163			
	132	317	4.4	13	5	2.6	961	1258	SK 2SM63 - 80S/4	36	163
	88	459	3.6	19.5	7.5	2.6	1098	1249			
	66	590	2.7	26	10	2.6	1202	1240			
	53	729	2.1	32.5	12.5	2.6	1226	1226			
	44	820	2.2	39	15	2.6	1215	1215			
	33	1036	1.6	52	20	2.6	1186	1186			
	29	1295	1.5	58.5	7.5	7.8	1139	1139			
	26	1241	1.3	65	25	2.6	1150	1150			
	22	1662	1.1	78	10	7.8	1051	1051			
	16	1641	1.1	104	40	2.6	1058	1058			
1.0	15	2234	1.0	117	15	7.8	842	842	SK 1SM50 - 80L/4 SK 1SM50 - 80LH/4	31	149
	13	1871	0.9	130	50	2.6	986	986			
	330	175	3.3	5	5		509	619			
	220	254	2.7	7.5	7.5		576	707			
	165	330	2.0	10	10		626	776			
	132	403	1.6	12.5	12.5		666	783			
	110	461	1.7	15	15		700	774			
	83	592	1.2	20	20		749	749			
	66	711	0.9	25	25		722	722			
	55	761	1.0	30	30		709	709			
	41	947	0.8	40	40		646	646			
	330	177	5.9	5	5		718	1085	SK 1SM63 - 80L/4 SK 1SM63 - 80LH/4	35	156
	220	259	4.7	7.5	7.5		821	1226			
	165	338	3.5	10	10		898	1256			
	132	418	2.7	12.5	12.5		963	1251			
	110	478	2.9	15	15		1013	1249			
	83	615	2.1	20	20		1107	1238			
	66	740	1.6	25	25		1181	1224			
	55	807	1.8	30	30		1217	1217			
	41	1014	1.3	40	40		1190	1190			
	33	1191	1.0	50	50		1159	1159			
	28	1360	0.8	60	60		1125	1125			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = f_B $\geq$ 2.0) (Model type in blue is an energy efficient motor)



1.0 hp, 1.5 hp , 2.0 hp Gearmotors

Motor Power	Output Speed	Output Torque	Service Factor	Total Ratio	Worm Ratio	2nd Ratio	OHL	OHL Flange Unit	Model Type	Approx. Weight	Dim. Page
P_n	n_2	T_2	f_B	i_{tot}	i_{tot}	i_{2nd}	F_Q	F_{QF}			
[hp]	[rpm]	[lb-in]					[lb]	[lb]		[lb]	
1.0	127	439	3.2	13	5	2.6	950	1251	SK 2SM63 - 80L/4 SK 2SM63 - 80LH/4	39	163
	85	637	2.6	19.5	7.5	2.6	1087	1235			
	63	819	1.9	26	10	2.6	1181	1215			
	51	1011	1.5	32.5	12.5	2.6	1190	1190			
	42	1139	1.6	39	15	2.6	1170	1170			
	32	1438	1.2	52	20	2.6	1109	1109			
	28	1798	1.1	58.5	7.5	7.8	1010	1010			
	25	1723	0.9	65	25	2.6	1033	1033			
	21	2307	0.8	78	10	7.8	806	806			
	16	2277	0.8	104	40	2.6	819	819			
1.5	332	259	2.3	5	5		488	603	SK 1SM50 - 90S/4 SK 1SM50 - 90SH/4	37	149
	221	376	1.8	7.5	7.5		549	691			
	166	490	1.4	10	10		592	754			
	133	599	1.1	12.5	12.5		623	749			
	111	684	1.1	15	15		653	729			
	83	877	0.8	20	20		671	671			
	332	262	4.0	5	5		700	1058	SK 1SM63 - 90S/4 SK 1SM63 - 90SH/4	42	156
	221	385	3.2	7.5	7.5		803	1186			
	166	502	2.4	10	10		871	1247			
	133	620	1.8	12.5	12.5		932	1238			
	111	710	1.9	15	15		979	1229			
	83	912	1.4	20	20		1060	1204			
	66	1098	1.1	25	25		1130	1177			
	55	1198	1.2	30	30		1159	1159			
	42	1505	0.9	40	40		1094	1094			
	128	652	2.1	13	5	2.6	905	1233	SK 2SM63 - 90S/4 SK 2SM63 - 90SH/4	45	163
	85	945	1.7	19.5	7.5	2.6	1035	1199			
	64	1216	1.3	26	10	2.6	1121	1154			
	51	1501	1.0	32.5	12.5	2.6	1094	1094			
	43	1690	1.1	39	15	2.6	1044	1044			
	32	2135	0.8	52	20	2.6	887	887			
2.0	332	349	3.0	5	5		684	1031	SK 1SM63 - 90L/4 SK 1SM63 - 90LH/4	46	156
	221	512	2.4	7.5	7.5		783	1150			
	166	668	1.8	10	10		846	1233			
	133	825	1.4	12.5	12.5		898	1215			
	111	944	1.5	15	15		943	1199			
	83	1214	1.0	20	20		1015	1154			
	66	1460	0.8	25	25		1073	1103			
	55	1595	0.9	30	30		1069	1069			

(AGMA Class I = f_B 1.0 - 1.39 II = f_B 1.4 - 1.99 III = $f_B \geq 2.0$) (Model type in blue is an energy efficient motor)

Minicase Selection Single Worm



GEARMOTORS

Output Speed n ₂ [rpm]	Total Ratio i	Motor Power ~ Based on 1750 rpm								Gear Max Torque T _{2max} [lb-in]	Max Input Power P _{1max} [hp]	Gear Unit	NEMA Adapter	Config. Page
		0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp					
		Output Torque (T ₂)												
		[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]					
350	5	26	42	54	79	120				204	1.30	SK 1SM31	48C	136
		27	43	55	81	123	171			336	2.10	SK 1SM40	56C	142
		27	43	56	83	126	175			584	3.56	SK 1SM50	56C	149
		27	44	57	84	127	177			1044	6.30	SK 1SM63	56C	156
							177	262	349	1044	6.30	SK 1SM63	140TC	156
233	7.5	37	60	77	113	172				239	1.06	SK 1SM31	48C	136
		38	61	79	116	176	245			389	1.69	SK 1SM40	56C	142
		39	43	82	120	183	254			690	2.90	SK 1SM50	56C	149
		40	65	83	123	187	259			1230	5.05	SK 1SM63	56C	156
								385	512	1230	5.05	SK 1SM63	140TC	156
175	10	48	76	99	145	221				230	0.80	SK 1SM31	48C	136
		50	79	103	151	230	319			372	1.24	SK 1SM40	56C	142
		51	82	106	156	238	330			664	2.14	SK 1SM50	56C	149
		53	84	109	160	244	338			1186	3.74	SK 1SM63	56C	156
								502	668	1186	3.74	SK 1SM63	140TC	156
140	12.5	60	96	124	182					212	0.61	SK 1SM31	48C	136
		60	96	124	182	277	384			363	1.00	SK 1SM40	56C	142
		60	96	124	182	277	384			637	1.00	SK 1SM50	56C	149
		60	96	124	182	277	384			1142	1.69	SK 1SM63	56C	156
								570	759	1142	2.91	SK 1SM63	140TC	156
117	15	64	103	133	196					257	0.66	SK 1SM31	48C	136
		68	109	141	207	316	438			434	1.06	SK 1SM40	56C	142
		72	115	148	218	332	461			770	1.79	SK 1SM50	56C	149
		74	119	154	226	345	478			1372	3.07	SK 1SM63	56C	156
								710	944	1372	3.07	SK 1SM63	140TC	156
88	20	81	130	168	247					239	0.49	SK 1SM31	48C	136
		86	138	178	262	399				398	0.77	SK 1SM40	56C	142
		92	147	190	280	426	592			717	1.30	SK 1SM50	56C	149
		95	153	198	291	443	615			1274	2.22	SK 1SM63	56C	156
								912	1214	1274	2.22	SK 1SM63	140TC	156
		63SL4	63LL4	71SL4	71LL4	80SL4	80LL4 80LH14	90SL4 90SH14	90LL4 90LH14					
Nord Motors - Model type in blue is an energy efficient motor												Class II	Service Factor 1.4-1.99	

Actual speeds and torques will vary based on the motor performance data.



Minicase Selection Single Worm

Output Speed n ₂ [rpm]	Total Ratio i	Motor Power ~ Based on 1750 rpm								Gear Max Torque T _{2max} [lb-in]	Max Input Power P _{1max} [hp]	Gear Unit	NEMA Adapter	Config. Page
		0.16 hp	0.25 hp	0.33 hp	0.50 hp	0.75 hp	1.0 hp	1.5 hp	2.0 hp					
		Output Torque (T ₂)												
		[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]	[lb-in]					
70	25	97	155	201	308					221	0.38	SK 1SM31	48C	136
		103	165	213	314	477				372	0.60	SK 1SM40	56C	142
		110	177	229	336	512	711			673	1.01	SK 1SM50	56C	149
		115	184	238	350	533	740			1195	1.72	SK 1SM63	56C	156
								1098	1460	1195	1.72	SK 1SM63	140TC	156
58	30	100	161	208						266	0.44	SK 1SM31	48C	136
		109	175	226	333	507				442	0.67	SK 1SM40	56C	142
		118	189	245	360	548	761			796	1.11	SK 1SM50	56C	149
		125	201	259	382	581	807			1416	1.86	SK 1SM63	56C	156
								1198	1593	1416	1.86	SK 1SM63	140TC	156
44	40	122	195	252						248	0.34	SK 1SM31	48C	136
		134	214	277	407					407	0.51	SK 1SM40	56C	142
		148	237	306	451	686	953			735	0.83	SK 1SM50	56C	149
		158	252	326	480	731	1014			1301	1.38	SK 1SM63	56C	156
								1505		1301	1.38	SK 1SM63	140TC	156
35	50	140	225	286						230	0.27	SK 1SM31	48C	136
		155	249	321	473					381	0.41	SK 1SM40	56C	142
		173	277	358	527	803				681	0.65	SK 1SM50	56C	149
		185	296	383	564	858	1191			1212	1.09	SK 1SM63	56C	156
29	60	154	242							212	0.23	SK 1SM31	48C	136
		172	275	356						354	0.34	SK 1SM40	56C	142
		193	310	400	589					646	0.55	SK 1SM50	56C	149
		211	338	437	644	980	1360			1150	0.90	SK 1SM63	56C	156
22	80	177								195	0.18	SK 1SM31	48C	136
		200	321	415						327	0.27	SK 1SM40	56C	142
		229	367	474	698					593	0.43	SK 1SM50	56C	149
		253	405	524	771	1174				1044	0.69	SK 1SM63	56C	156
18	100	196								186	0.17	SK 1SM31	48C	136
		221	354							301	0.23	SK 1SM40	56C	142
		257	411	531						549	0.36	SK 1SM50	56C	149
		292	468	605	891					974	0.57	SK 1SM63	56C	156

63S/A	63L/A	71S/A	71L/A	80S/A	80L/A	90S/A	90L/A
Nord Motors - Model type in blue is an energy efficient motor							

	Service Factor < 1.0
Class I	Service Factor 1.0-1.39
Class II	Service Factor 1.4-1.99
Class III	Service Factor 2.0 min.

Actual speeds and torques will vary based on the motor performance data.



Minicase Selection Single Worm



Minicase Size			SK 1SM31			SK 1SM40			SK 1SM50			SK 1SM63		
Total Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	n ₁ [rpm]	n ₂ [rpm]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]	P _{1max} [hp]	P _{2max} [hp]	T _{2max} [lb-in]
5	1750	350	1.30	1.13	204	2.10	1.87	336	3.56	3.24	584	6.30	5.80	1044
	1150	230	0.94	0.81	221	1.51	1.33	364	2.56	2.30	630	4.52	4.11	1127
	850	170	0.77	0.66	243	1.24	1.08	401	2.10	1.87	694	3.72	3.34	1240
	100	20	0.13	0.11	341	0.22	0.18	562	0.37	0.31	974	0.66	0.55	1740
7.5	1750	233	1.06	0.88	239	1.69	1.44	389	2.90	2.55	690	5.05	4.55	1230
	1150	153	0.76	0.62	255	1.22	1.03	423	2.11	1.82	747	3.68	3.24	1332
	850	113	0.62	0.51	281	1.01	0.84	466	1.74	1.48	823	3.02	2.64	1466
	100	13	0.11	0.08	394	0.18	0.14	653	0.31	0.24	1154	0.54	0.44	2058
10	1750	175	0.80	0.64	230	1.24	1.03	372	2.14	1.84	664	3.74	3.29	1186
	1150	115	0.56	0.45	244	0.90	0.74	406	1.57	1.32	721	2.69	2.34	1285
	850	85	0.46	0.36	269	0.75	0.60	446	1.29	1.07	794	2.24	1.91	1414
	100	10	0.08	0.06	377	0.14	0.10	627	0.24	0.18	1114	0.41	0.31	1984
12.5	1750	140	0.61	0.47	212	1.00	0.81	363	1.69	1.41	637	2.91	2.54	1142
	1150	92	0.45	0.34	233	0.72	0.57	388	1.23	1.01	693	2.12	1.80	1233
	850	68	0.37	0.28	257	0.59	0.46	427	1.02	0.82	762	1.74	1.46	1357
	100	8	0.07	0.05	360	0.11	0.08	599	0.19	0.14	1070	0.33	0.24	1904
15	1750	117	0.66	0.48	257	1.06	0.80	434	1.79	1.43	770	3.07	2.54	1372
	1150	77	0.49	0.34	280	0.77	0.57	466	1.31	1.02	836	2.24	1.81	1487
	850	57	0.40	0.28	308	0.64	0.46	513	1.10	0.83	920	1.87	1.47	1637
	100	7	0.07	0.05	433	0.12	0.08	720	0.21	0.14	1292	0.36	0.24	2297
20	1750	88	0.49	0.33	239	0.77	0.55	398	1.30	1.00	717	2.22	1.77	1274
	1150	58	0.36	0.24	259	0.57	0.39	432	0.96	0.71	776	1.63	1.26	1380
	850	43	0.30	0.19	285	0.47	0.32	475	0.79	0.58	854	1.33	1.02	1518
	100	5	0.01	0.03	401	0.09	0.05	667	0.16	0.10	1198	0.27	0.17	2131
25	1750	70	0.38	0.25	221	0.60	0.41	372	1.01	0.75	673	1.72	1.33	1195
	1150	46	0.29	0.18	243	0.45	0.30	405	0.75	0.53	729	1.26	0.95	1296
	850	34	0.24	0.14	268	0.38	0.24	446	0.63	0.43	802	1.05	0.77	1426
	100	4	0.04	0.02	376	0.07	0.04	626	0.13	0.07	1126	0.22	0.13	2001
			SK 1SM31 Dimensions			SK 1SM40 Dimensions			SK 1SM50 Dimensions			SK 1SM63 Dimensions		
			136			142			149			156		

Actual speeds and torques will vary based on the motor performance data.



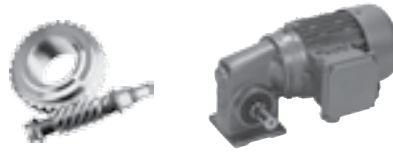
Minicase Selection Single Worm

Minicase Size			SK 1SM31			SK 1SM40			SK 1SM50			SK 1SM63		
Total Ratio	Input	Output	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque	Max Input	Max Output	Torque
i	n ₁	n ₂	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}	P _{1max}	P _{2max}	T _{2max}
	[rpm]	[rpm]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]	[hp]	[hp]	[lb-in]
30	1750	58	0.44	0.25	266	0.67	0.41	442	1.11	0.74	796	1.86	1.31	1416
	1150	38	0.32	0.17	287	0.50	0.29	478	0.82	0.52	861	1.38	0.93	1531
	850	28	0.27	0.14	316	0.42	0.24	527	0.69	0.43	948	1.15	0.76	1685
	100	3	0.05	0.02	443	0.08	0.04	739	0.15	0.07	1330	0.25	0.13	2365
40	1750	44	0.34	0.17	248	0.51	0.28	407	0.83	0.51	735	1.38	0.90	1301
	1150	29	0.25	0.12	263	0.38	0.20	439	0.63	0.36	790	1.03	0.64	1405
	850	21	0.21	0.10	290	0.32	0.16	483	0.52	0.29	870	0.86	0.52	1547
	100	3	0.04	0.02	407	0.07	0.03	678	0.11	0.05	1221	0.20	0.09	2170
50	1750	35	0.27	0.13	230	0.41	0.21	381	0.65	0.38	681	1.09	0.67	1212
	1150	23	0.20	0.09	246	0.31	0.15	410	0.50	0.27	738	0.81	0.48	1312
	850	17	0.17	0.07	271	0.26	0.12	451	0.42	0.22	812	0.70	0.39	1444
	100	2	0.03	0.01	380	0.06	0.02	633	0.09	0.04	1140	0.16	0.06	2027
60	1750	29	0.23	0.10	212	0.34	0.16	354	0.55	0.30	646	0.90	0.53	1150
	1150	19	0.17	0.07	232	0.26	0.12	387	0.41	0.21	697	0.68	0.38	1239
	850	14	0.15	0.06	256	0.22	0.10	426	0.36	0.17	767	0.58	0.31	1364
	100	2	0.03	0.01	359	0.05	0.02	598	0.08	0.03	1077	0.14	0.05	1914
80	1750	22	0.18	0.07	195	0.27	0.11	327	0.43	0.21	593	0.69	0.36	1044
	1150	14	0.13	0.05	212	0.20	0.08	353	0.31	0.15	636	0.50	0.26	1131
	850	11	0.12	0.04	233	0.18	0.07	389	0.29	0.12	700	0.47	0.21	1245
	100	1	0.02	0.01	327	0.04	0.01	545	0.06	0.02	983	0.11	0.03	1748
100	1750	18	0.17	0.05	186	0.23	0.08	301	0.36	0.15	549	0.57	0.27	974
	1150	12	0.13	0.04	197	0.18	0.06	329	0.28	0.11	592	0.45	0.19	1053
	850	9	0.10	0.03	217	0.15	0.05	362	0.24	0.09	652	0.37	0.16	1159
	100	1	0.02	0.005	305	0.03	0.01	508	0.06	0.01	915	0.10	0.03	1627
SK 1SM31 Dimensions			SK 1SM40 Dimensions			SK 1SM50 Dimensions			SK 1SM63 Dimensions					
			📖 136			📖 142			📖 149			📖 156		



Actual speeds and torques will vary based on the motor performance data.

Notes

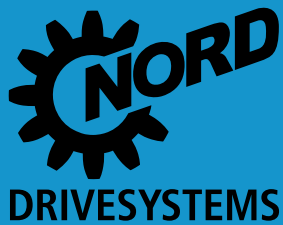
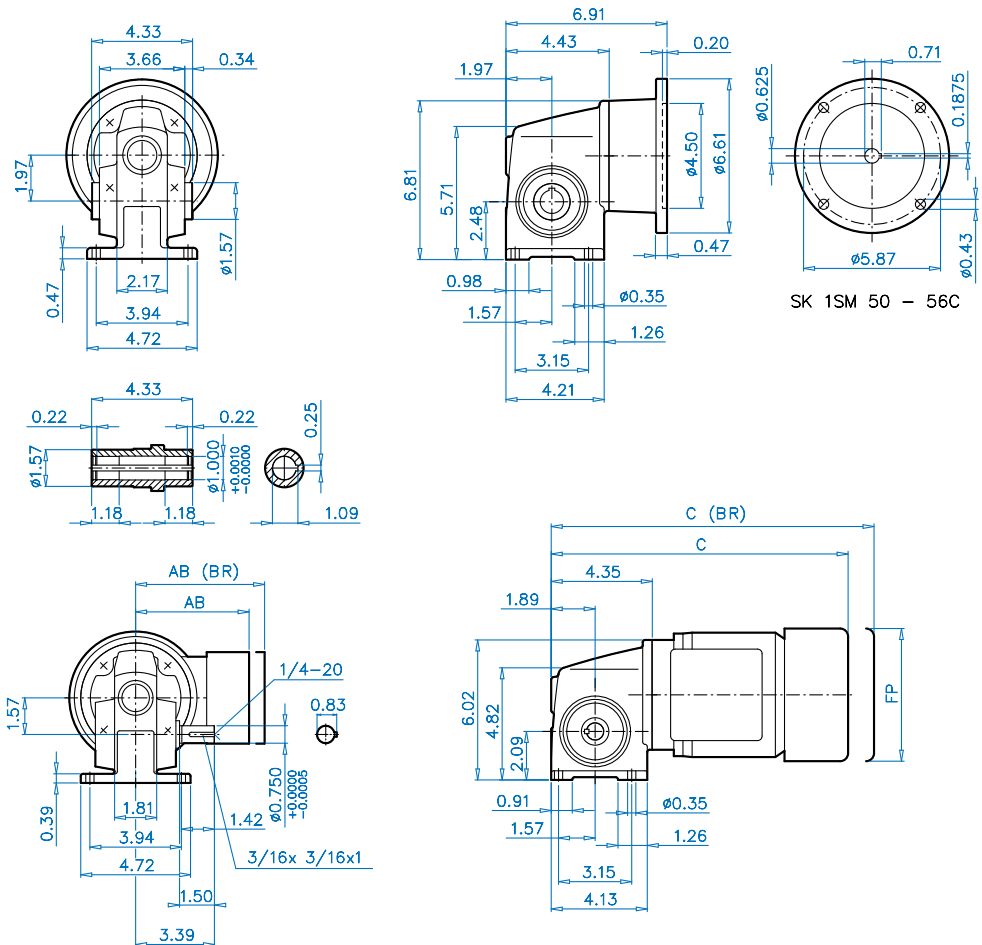


NOTES

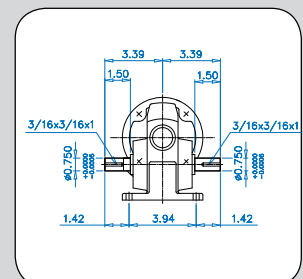
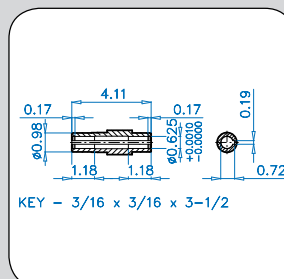
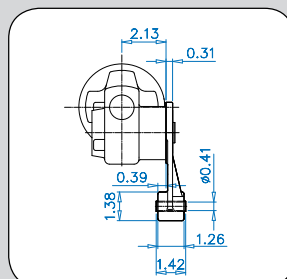
MINICASE® Dimensions

Gearmotors & C-Face Reducers

- SK 1SM31
- SK 1SM40
- SK 1SM50
- SK 1SM63



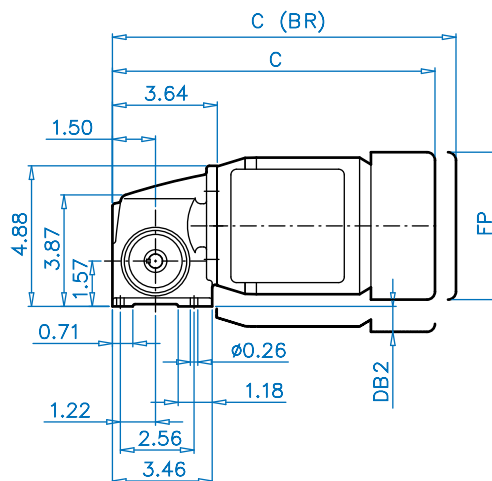
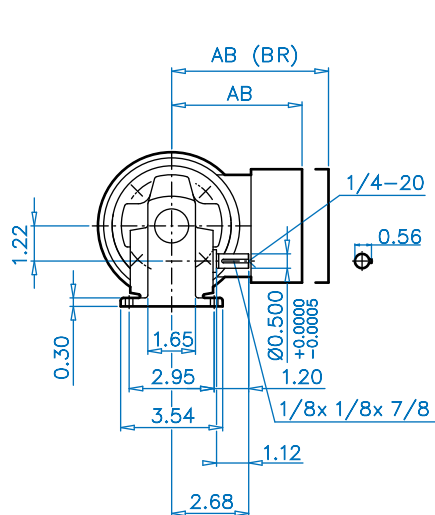
www.nord.com



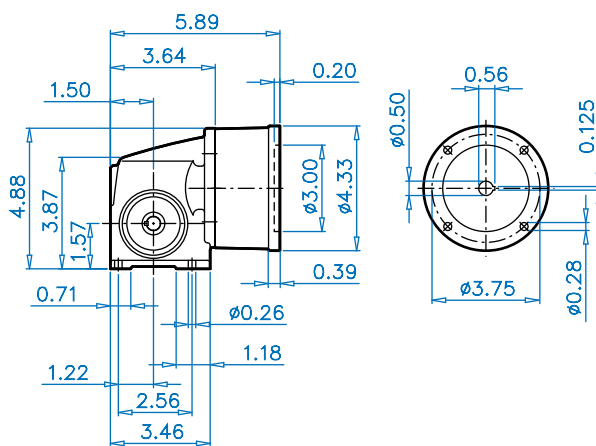
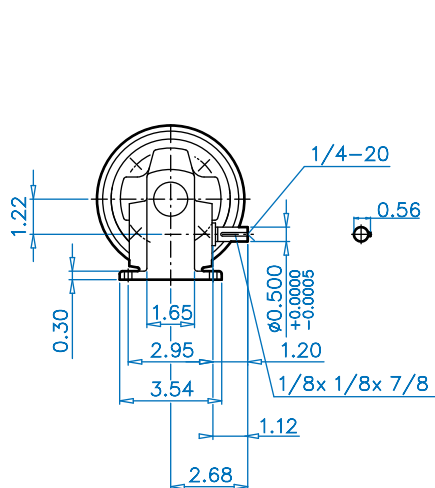
SK 1SM31



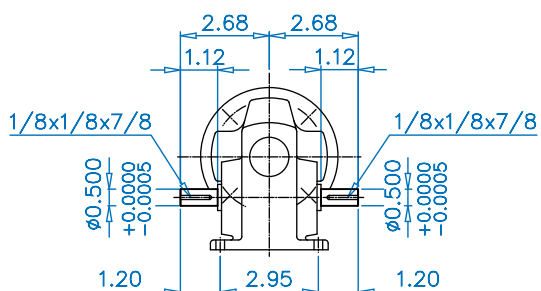
SK 1SM31 + Motor



SK 1SM31 + NEMA



SK 1SM31 LX



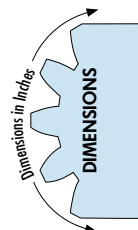
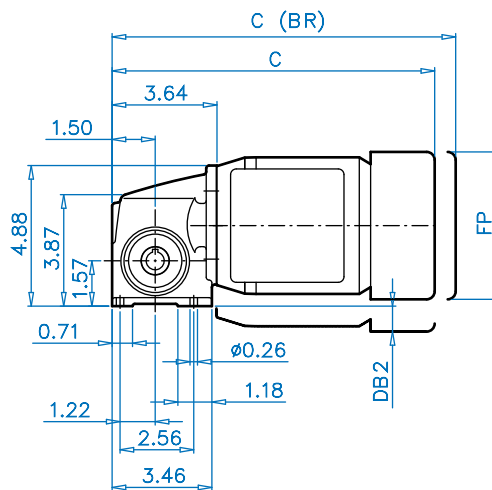
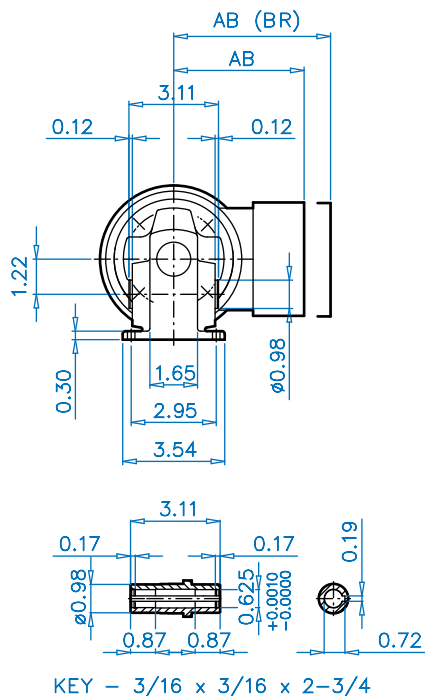
Motor dimensions

Standard efficiency	63 S/L	71 S/L
Energy efficiency		
AB	4.53	4.88
AB (BR)	4.84	5.24
C	11.18	12.05
C (BR)	13.39	14.33
FPI	5.12	5.71
DB2	-	0.06

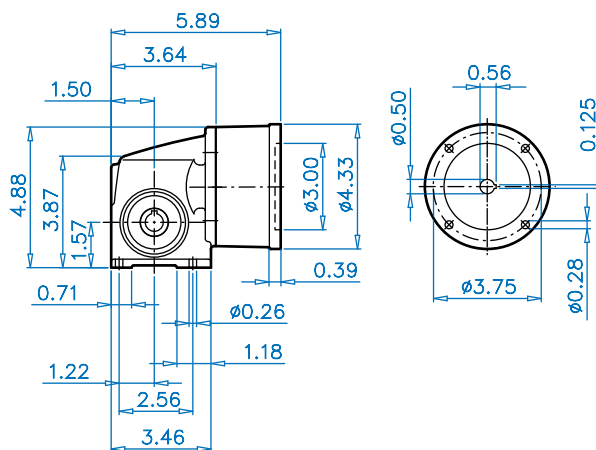
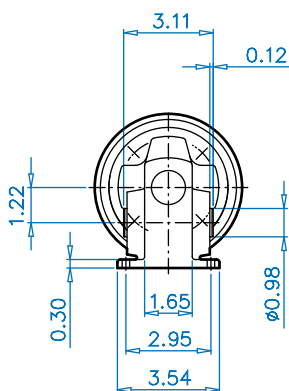
(BR) denotes Brakemotor



SK 1SM31 AX + Motor



SK 1SM31 AX + NEMA



Motor dimensions

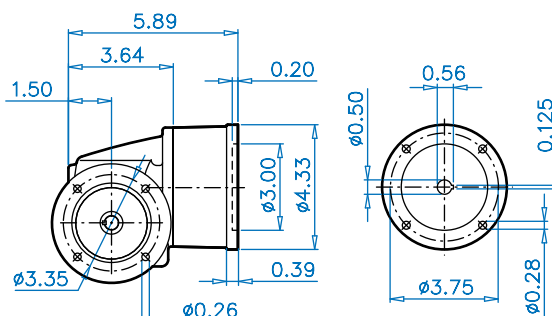
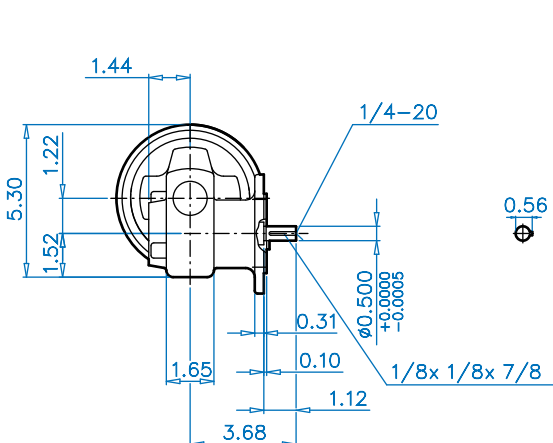
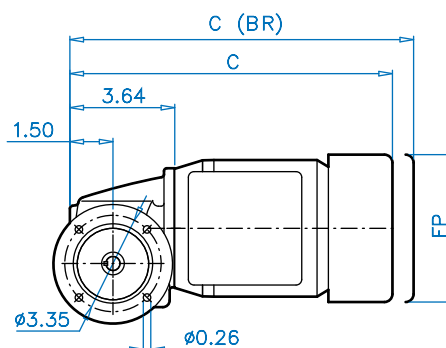
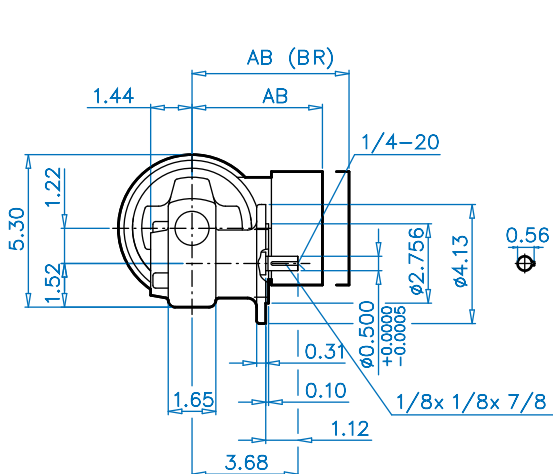
Standard efficiency	63 S/L	71 S/L
Energy efficiency		
AB	4.53	4.88
AB (BR)	4.84	5.24
C	11.18	12.05
C (BR)	13.39	14.33
FP1	5.12	5.71
DB2	-	0.06

(BR) denotes Brakemotor



DIMENSIONS

Dimensions in Inches



Standard efficiency	63 S/L	71 S/L
Energy efficiency		
AB	4.53	4.88
AB (BR)	4.84	5.24
C	11.18	12.05
C (BR)	13.39	14.33
FP	5.12	5.71

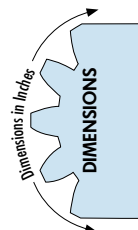
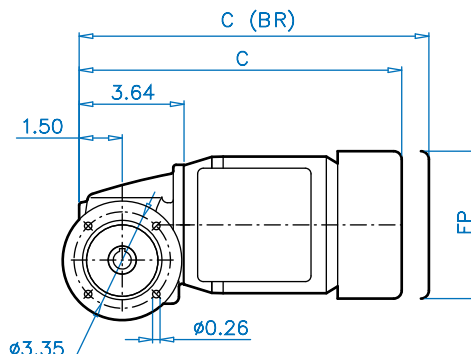
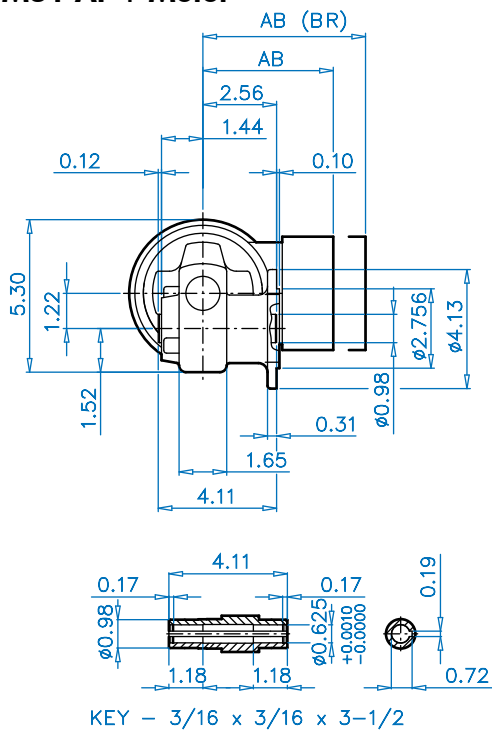
C138

G1035 - Subject to Change Without Notice

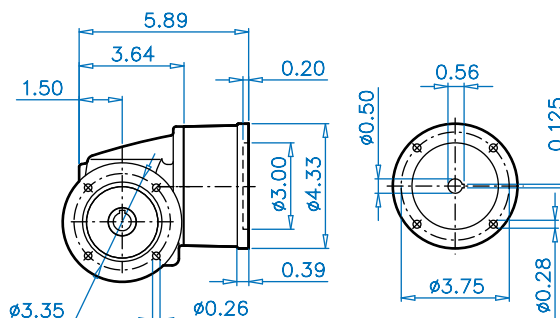
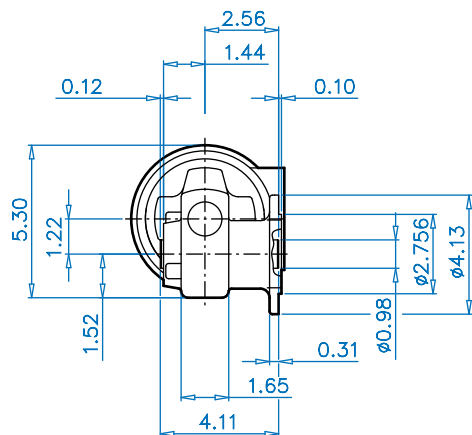
www.nord.com



SK 1SM31 AF + Motor



SK 1SM31 AF + NEMA



Motor dimensions

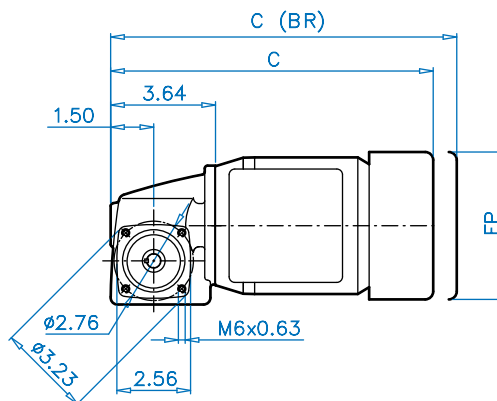
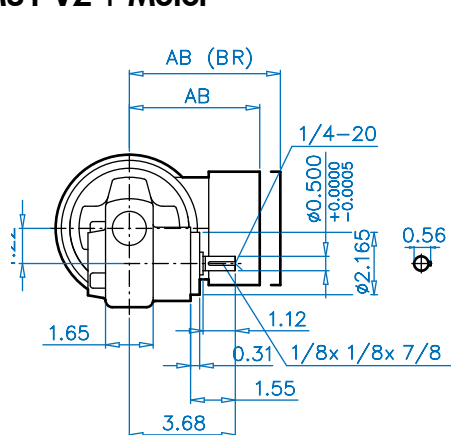
Standard efficiency	63 S/L	71 S/L
Energy efficiency		
AB	4.53	4.88
AB (BR)	4.84	5.24
C	11.18	12.05
C (BR)	13.39	14.33
FP	5.12	5.71

(BR) denotes Brakemotor

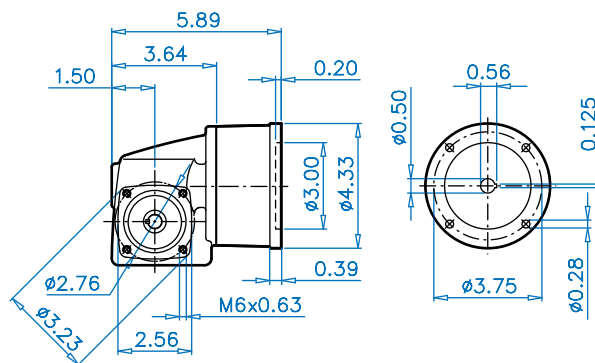
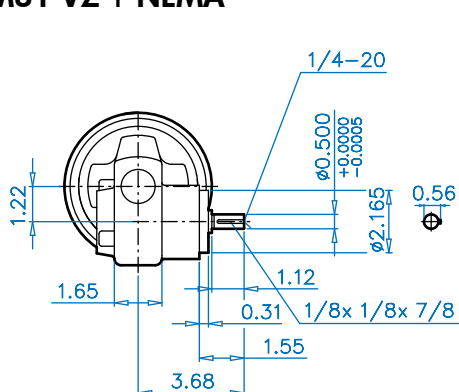
SK 1SM31 VZ



SK 1SM31 VZ + Motor



SK 1SM31 VZ + NEMA

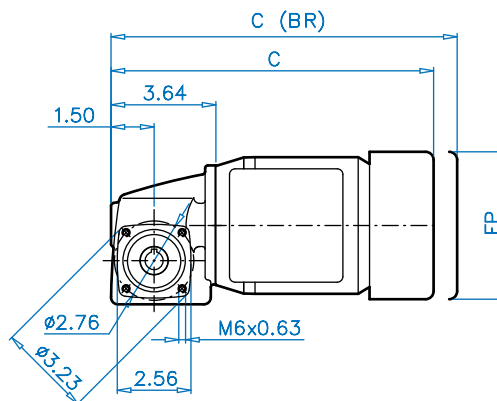
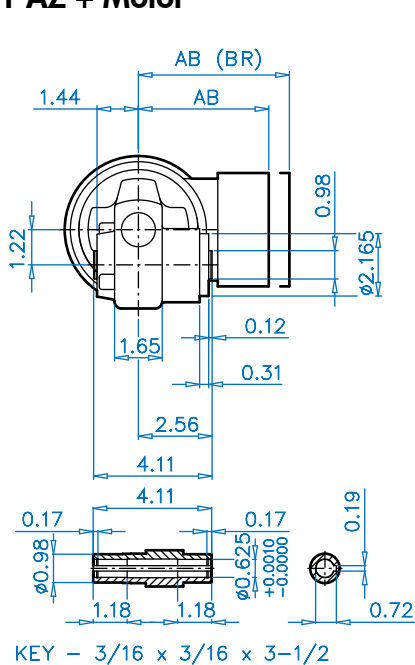


Motor dimensions

Standard efficiency	63 S/L	71 S/L
Energy efficiency		
AB	4.53	4.88
AB (BR)	4.84	5.24
C	11.18	12.05
C (BR)	13.39	14.33
FP	5.12	5.71

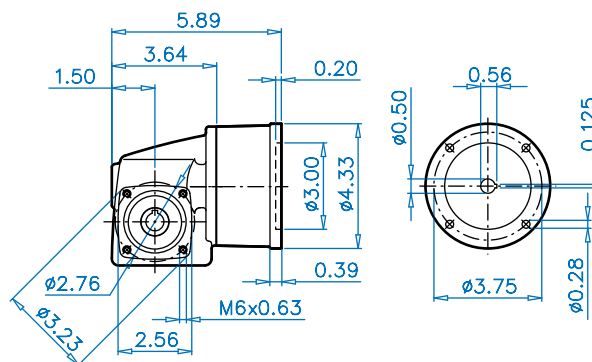
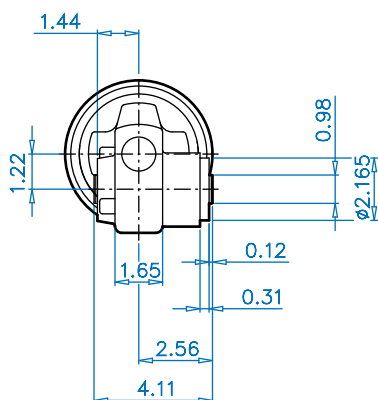
(BR) denotes Brakemotor

SK 1SM31 AZ + Motor

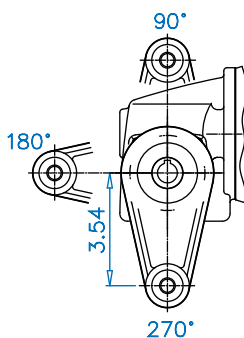
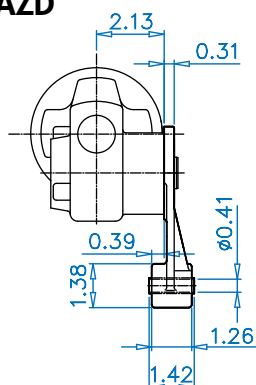


A diagram illustrating the relationship between 'DIMENSIONS' and 'Dimensions in Indtets'. It features two interlocking gears. The larger gear on the right is labeled 'DIMENSIONS' and is light blue. The smaller gear on the left is labeled 'Dimensions in Indtets' and is dark blue. A curved arrow points from the 'DIMENSIONS' gear towards the 'Dimensions in Indtets' gear, indicating a flow or relationship between the two concepts.

SK 1SM31 AZ + NEMA



SK 1SM31 AZD



Motor dimensions

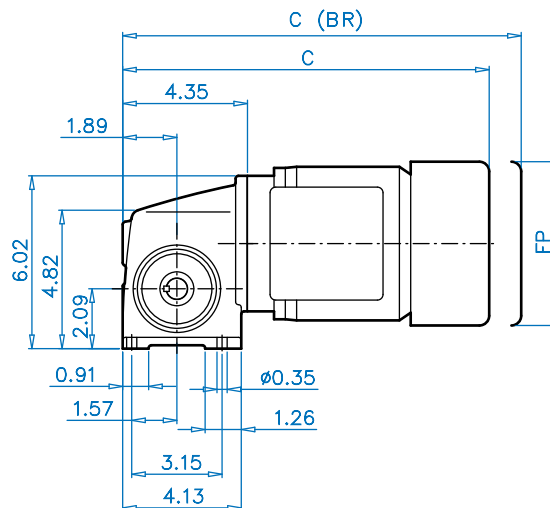
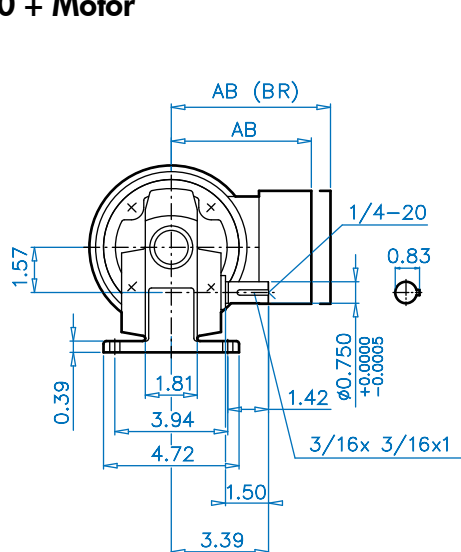
Standard efficiency	63 S/L	71 S/L
Energy efficiency		
AB	4.53	4.88
AB (BR)	4.84	5.24
C	11.18	12.05
C (BR)	13.39	14.33
FP	5.12	5.71

(BR) denotes Brakemotor

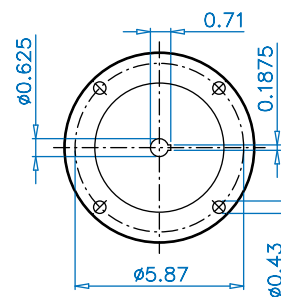
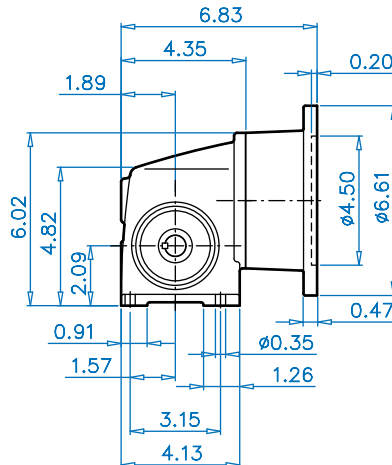
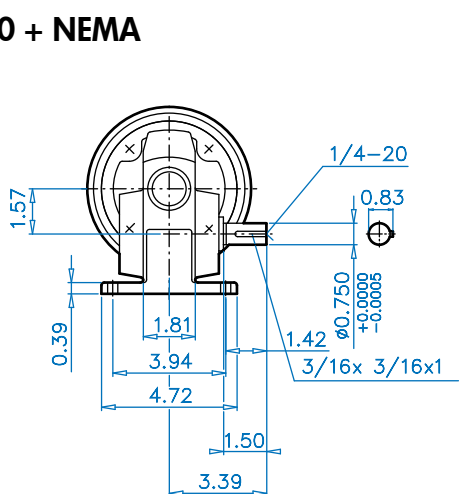
SK 1SM40



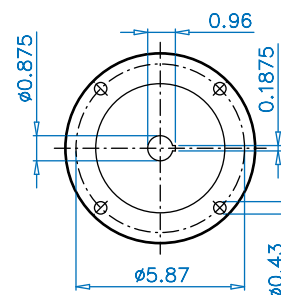
SK 1SM40 + Motor



SK 1SM40 + NEMA

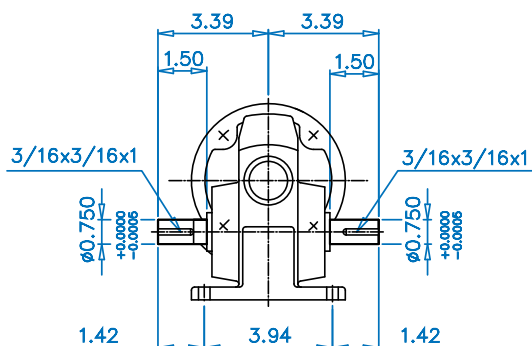


SK 1SM 40 - 56C



SK 1SM 40 - 140TC

SK 1SM40 LX



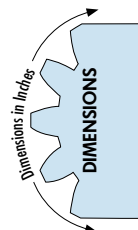
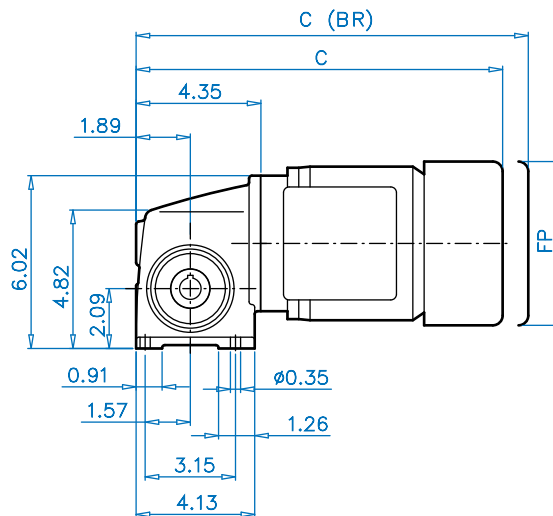
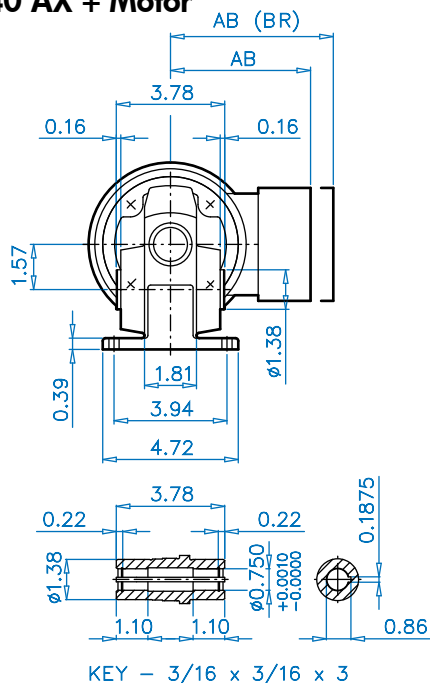
Motor dimensions

Standard efficiency	63 S/L	71 S/L	80 S/L
Energy efficiency			80 SH/LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	11.89	12.76	13.62
C (BR)	14.09	15.04	16.14
FP	5.12	5.71	6.50

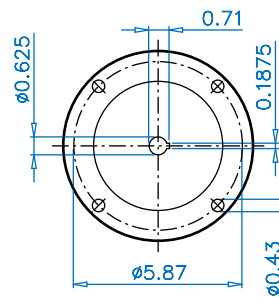
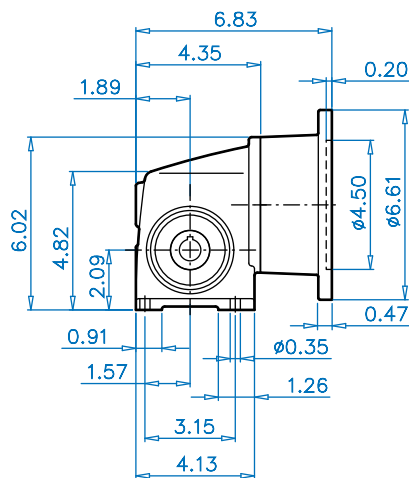
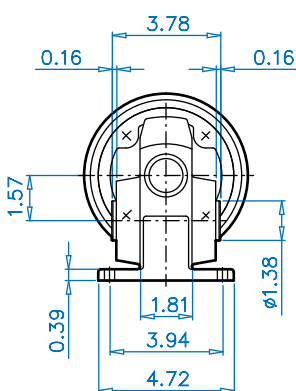
(BR) denotes Brakemotor



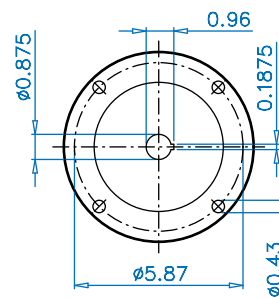
SK 1SM40 AX + Motor



SK 1SM40 AX + NEMA



SK 1SM 40 - 56C



SK 1SM 40 - 140TC

Motor dimensions

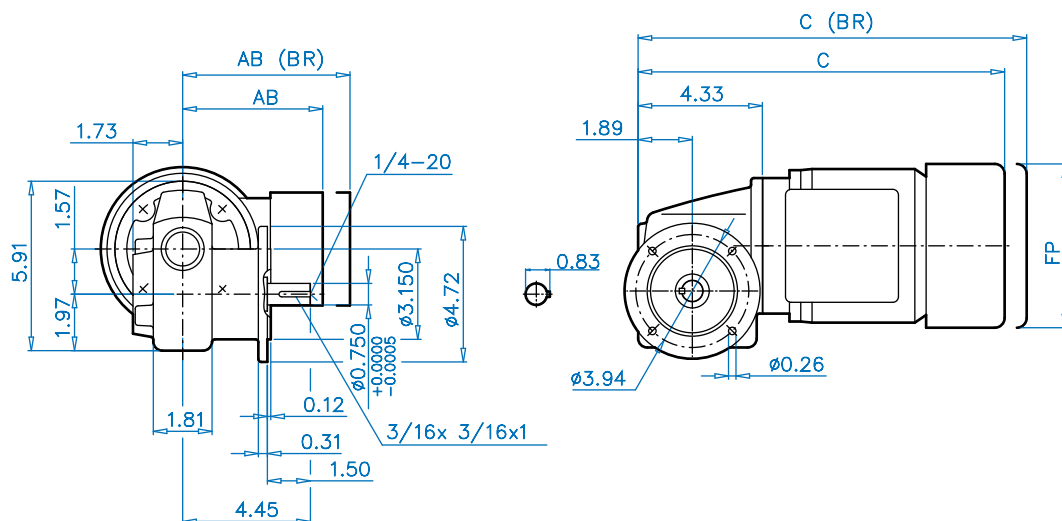
Standard efficiency	63 S/L	71 S/L	80 S/L
Energy efficiency			80 SH/LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	11.89	12.76	13.62
C (BR)	14.09	15.04	16.14
FP	5.12	5.71	6.50

(BR) denotes Brakemotor

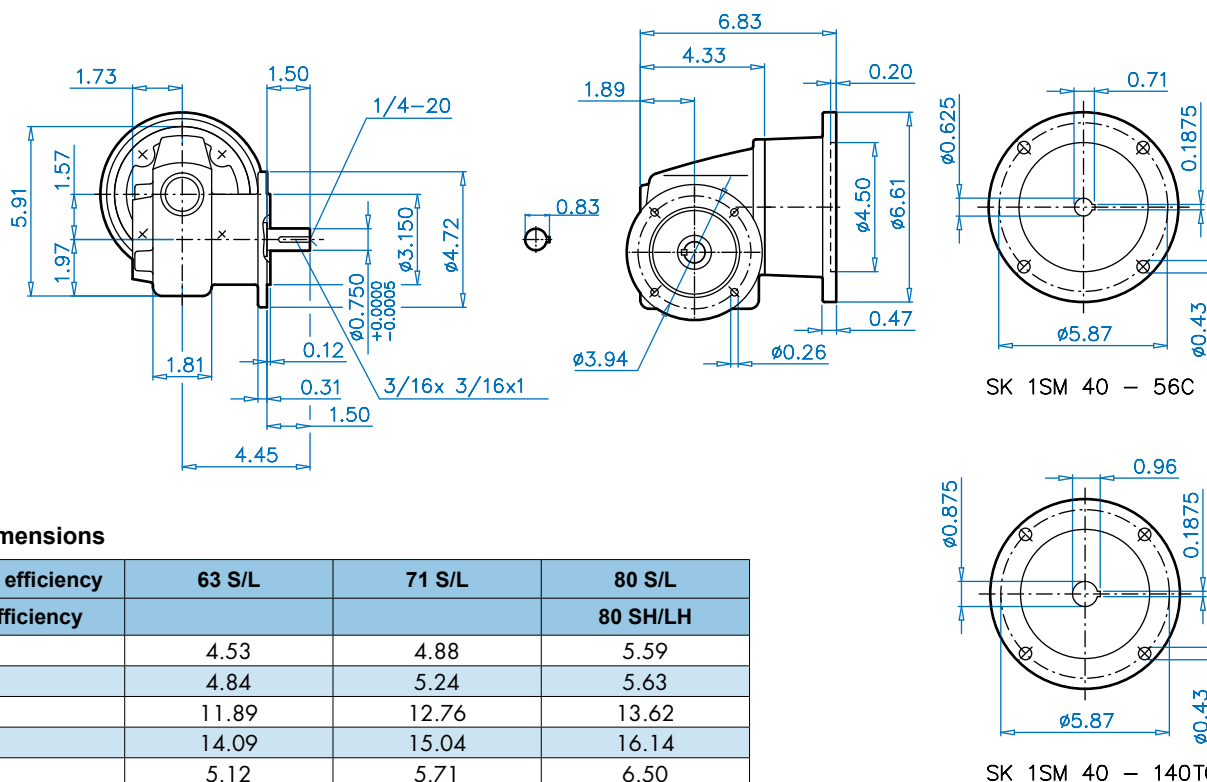
SK 1SM40 VF



SK 1SM40 VF + Motor



SK 1SM40 VF + NEMA



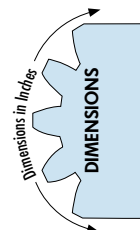
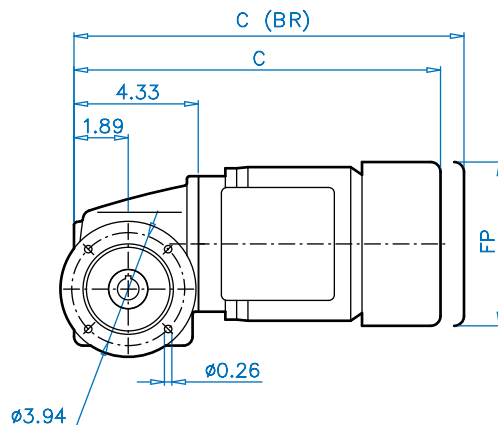
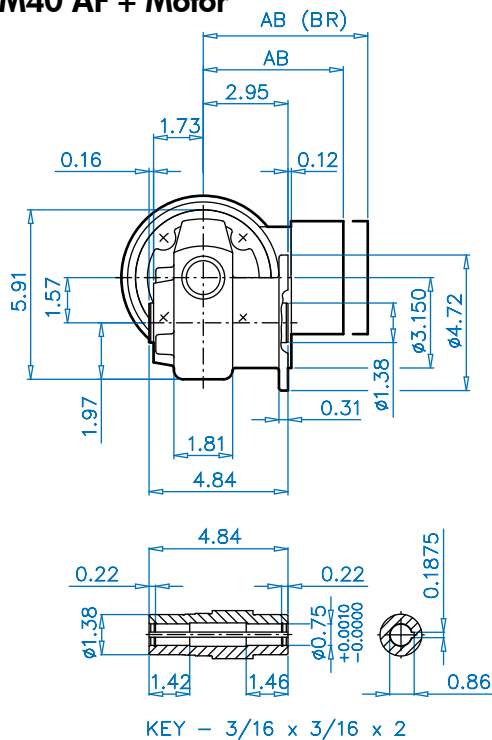
Motor dimensions

Standard efficiency	63 S/L	71 S/L	80 S/L
Energy efficiency			80 SH/LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	11.89	12.76	13.62
C (BR)	14.09	15.04	16.14
FP	5.12	5.71	6.50

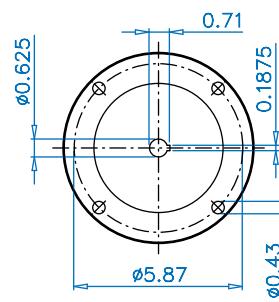
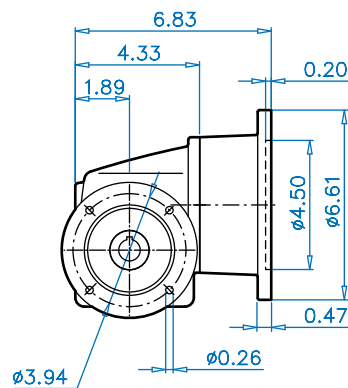
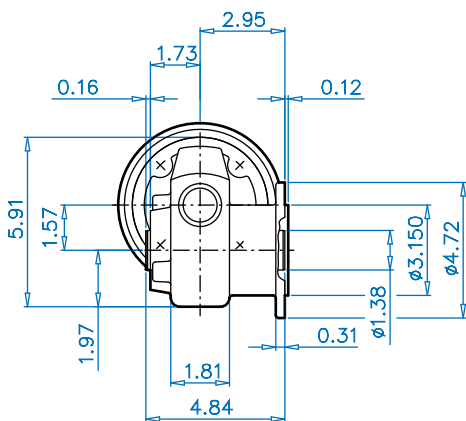
(BR) denotes Brakemotor



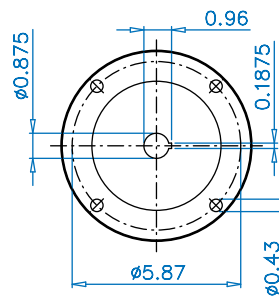
SK 1SM40 AF + Motor



SK 1SM40 AF + NEMA



SK 1SM 40 - 56C



SK 1SM 40 - 140TC

Motor dimensions

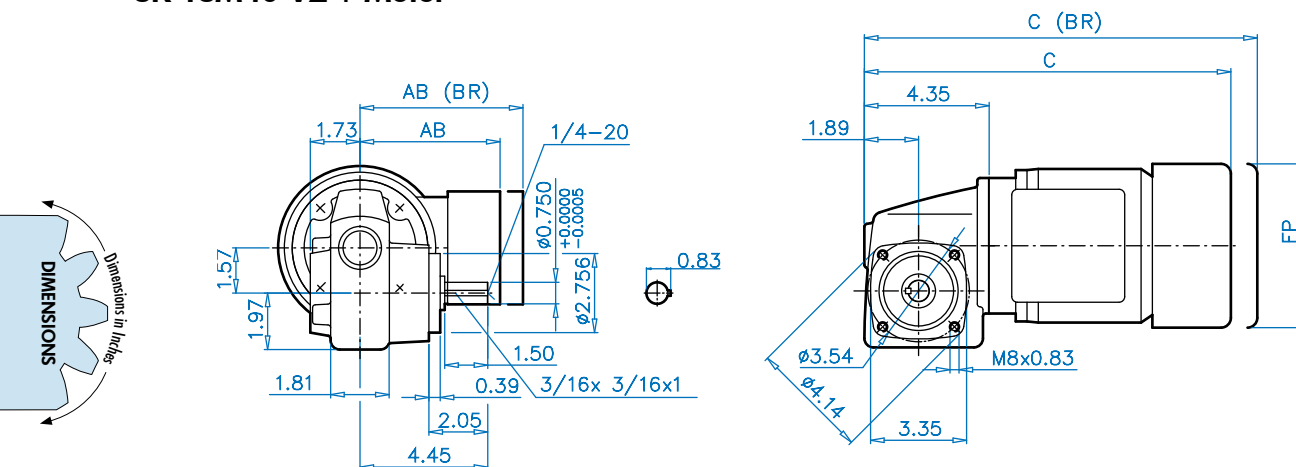
Standard efficiency	63 S/L	71 S/L	80 S/L
Energy efficiency			80 SH/LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	11.89	12.76	13.62
C (BR)	14.09	15.04	16.14
FP	5.12	5.71	6.50

(BR) denotes Brakemotor

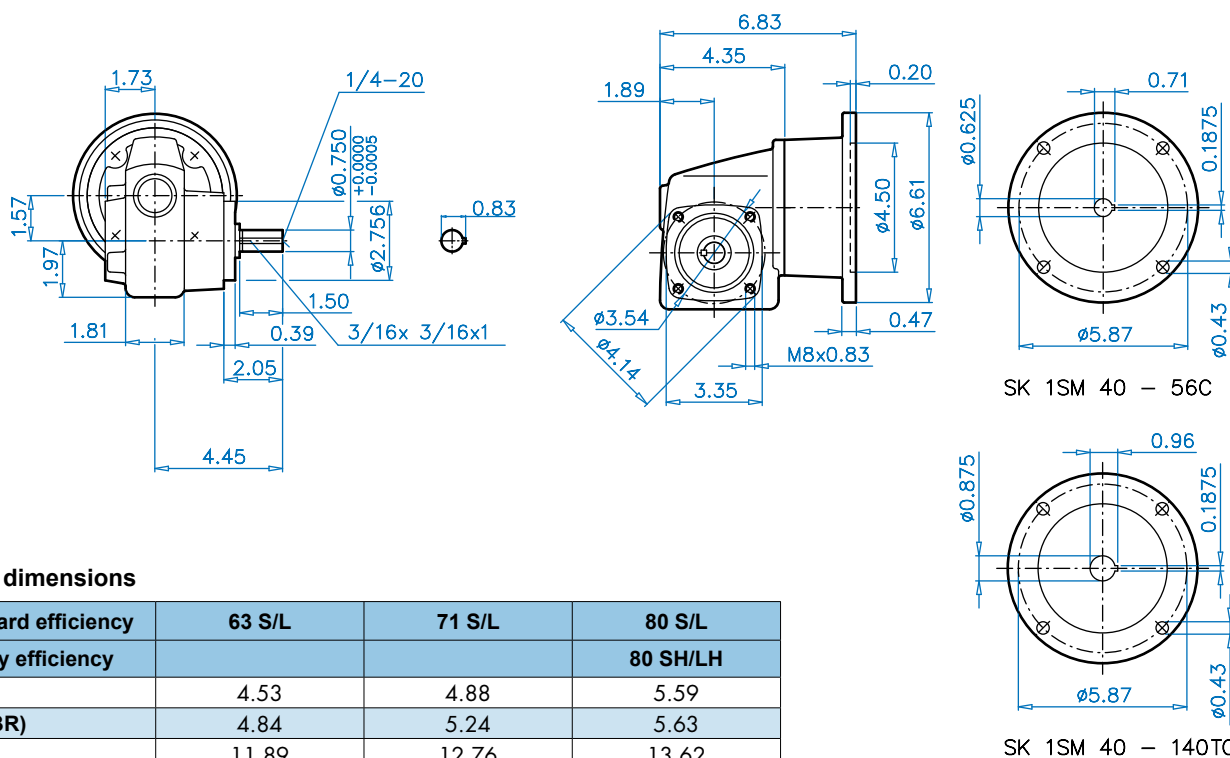
SK 1SM40 VZ



SK 1SM40 VZ + Motor



SK 1SM40 VZ + NEMA



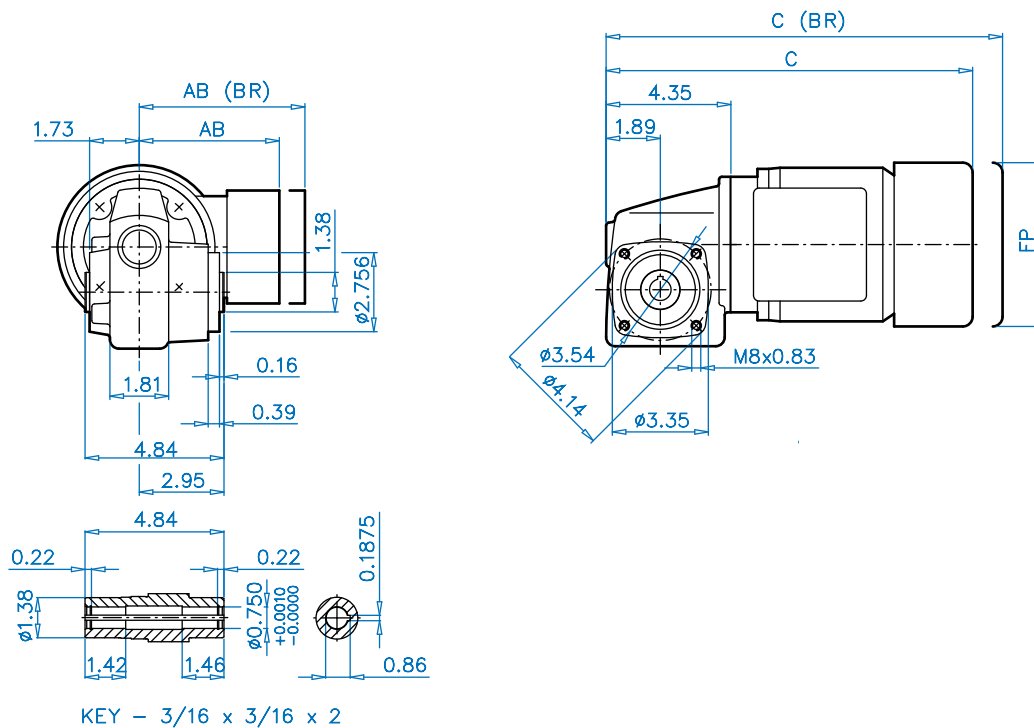
Motor dimensions

Standard efficiency	63 S/L	71 S/L	80 S/L
Energy efficiency			80 SH/LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	11.89	12.76	13.62
C (BR)	14.09	15.04	16.14
FP	5.12	5.71	6.50

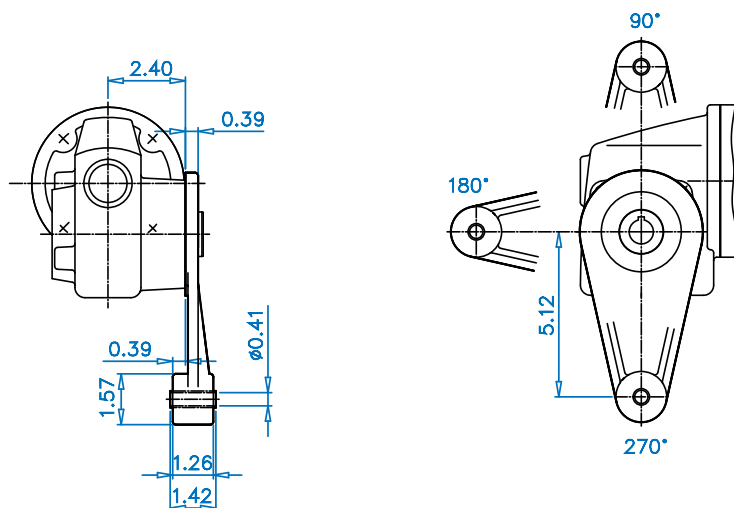
(BR) denotes Brakemotor



SK 1SM40 AZ + Motor



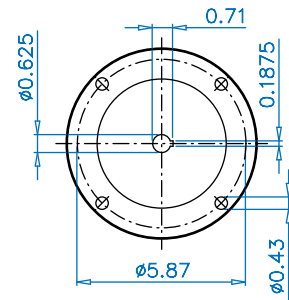
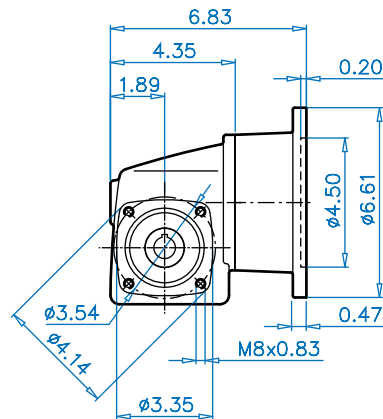
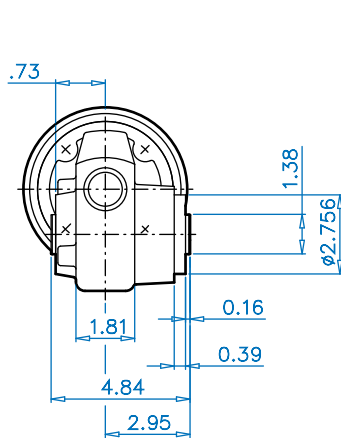
SK 1SM40 AZD



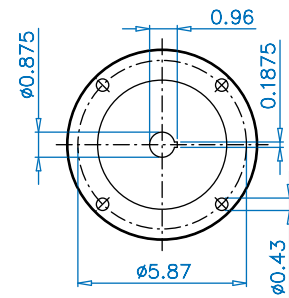
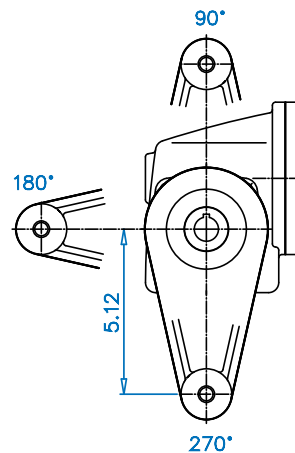
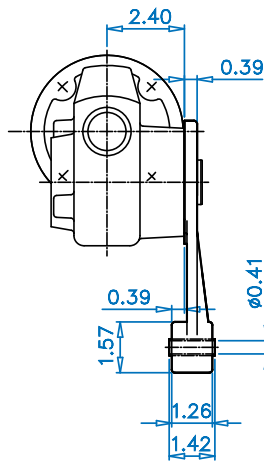
Motor dimensions

Standard efficiency	63 S/L	71 S/L	80 S/L
Energy efficiency			80 SH/LH
AB	4.53	4.88	5.59
AB (BR)	4.84	5.24	5.63
C	11.89	12.76	13.62
C (BR)	14.09	15.04	16.14
FP	5.12	5.71	6.50

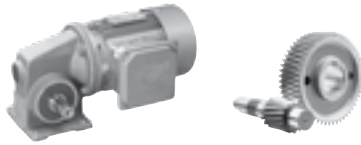
(BR) denotes Brakemotor



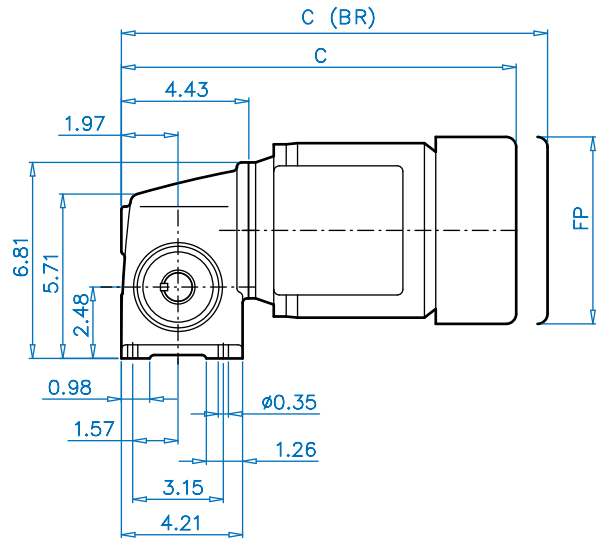
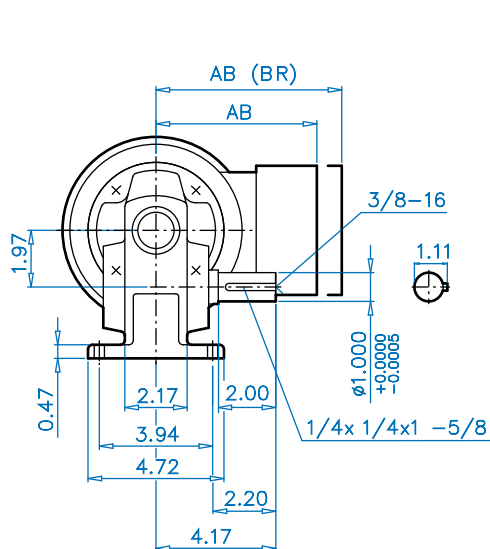
SK 1SM40 AZD



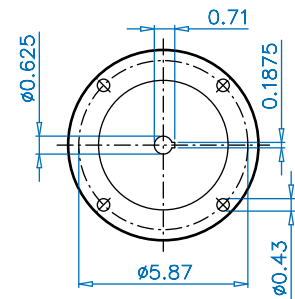
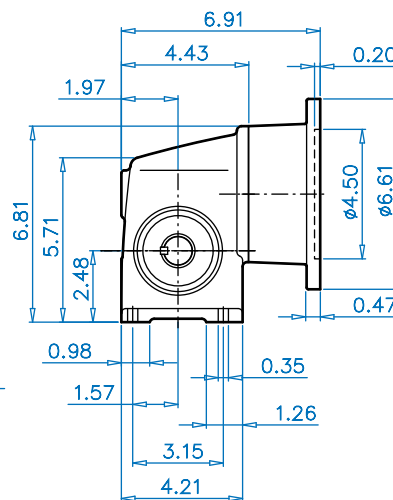
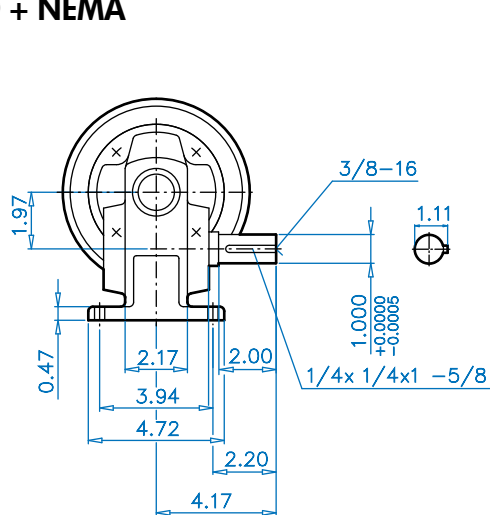
www.nord.com



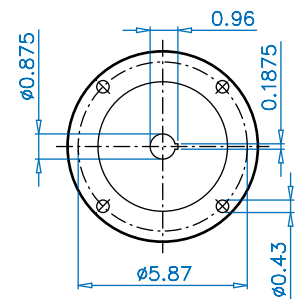
SK 1SM50 + Motor



SK 1SM50 + NEMA

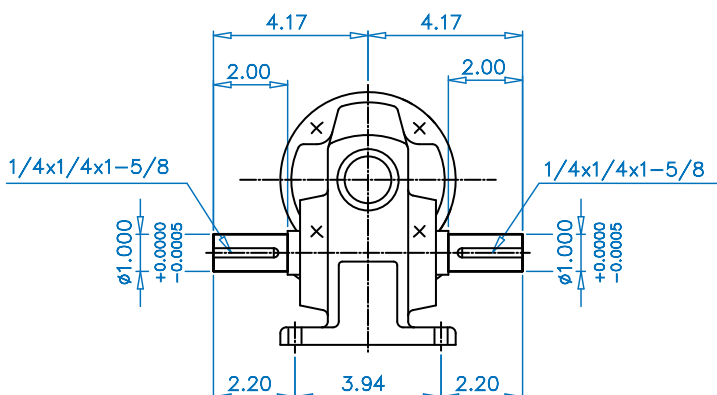


SK 1SM 50 - 56C



SK 1SM 50 - 140TC

SK 1SM50 LX



Motor dimensions

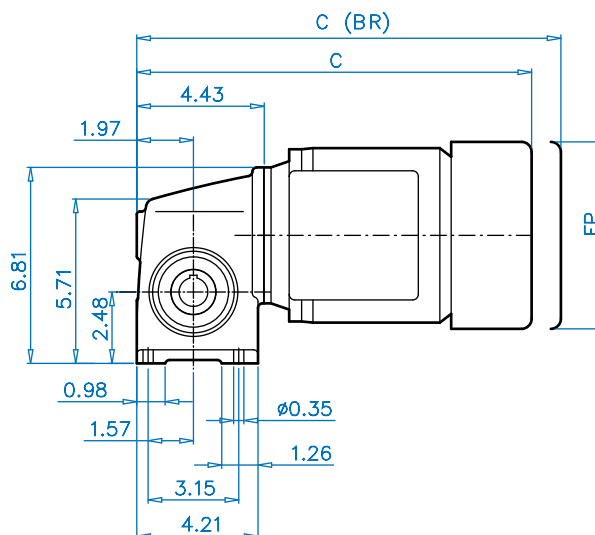
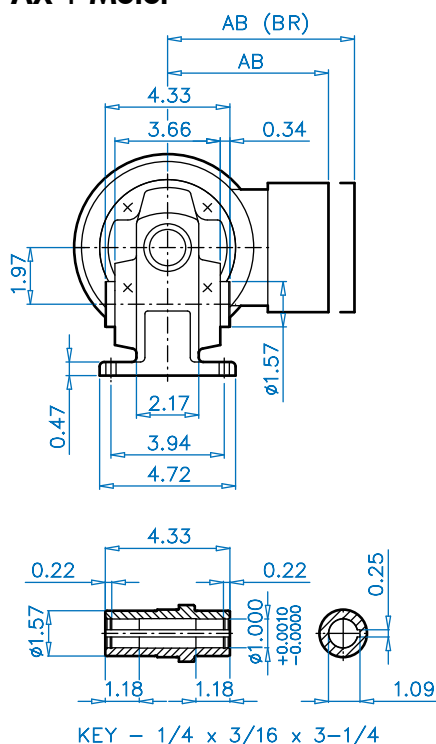
Standard efficiency	71 S/L	80 S/L	90 S
Energy efficiency		80 SH/LH	90 SH
AB	4.88	5.59	5.79
AB (BR)	5.24	5.63	5.83
C	12.83	13.70	15.28
C (BR)	15.12	16.22	18.23
FP	5.71	6.50	7.20

(BR) denotes Brakemotor

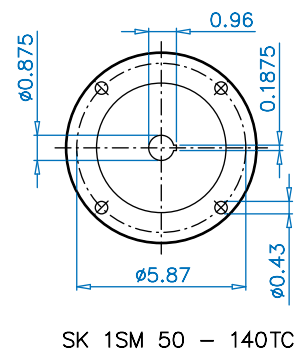
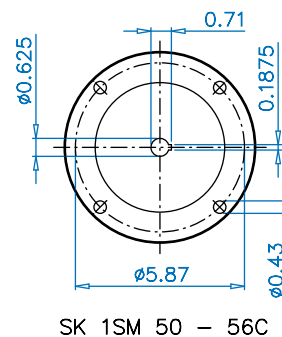
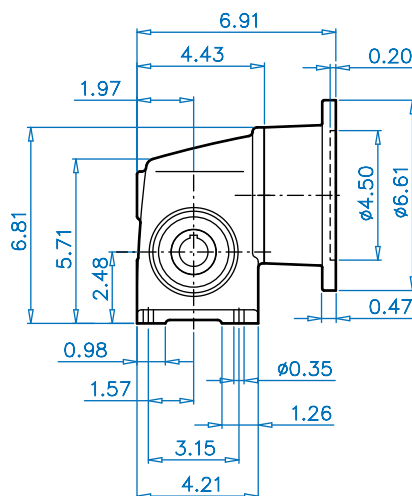
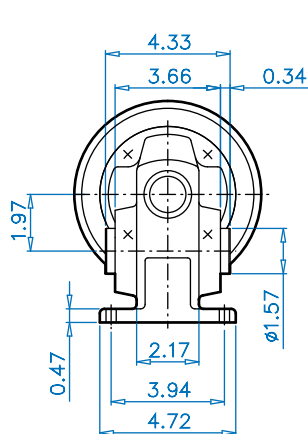
SK 1SM50 AX



SK 1SM50 AX + Motor



SK 1SM50 AX + NEMA



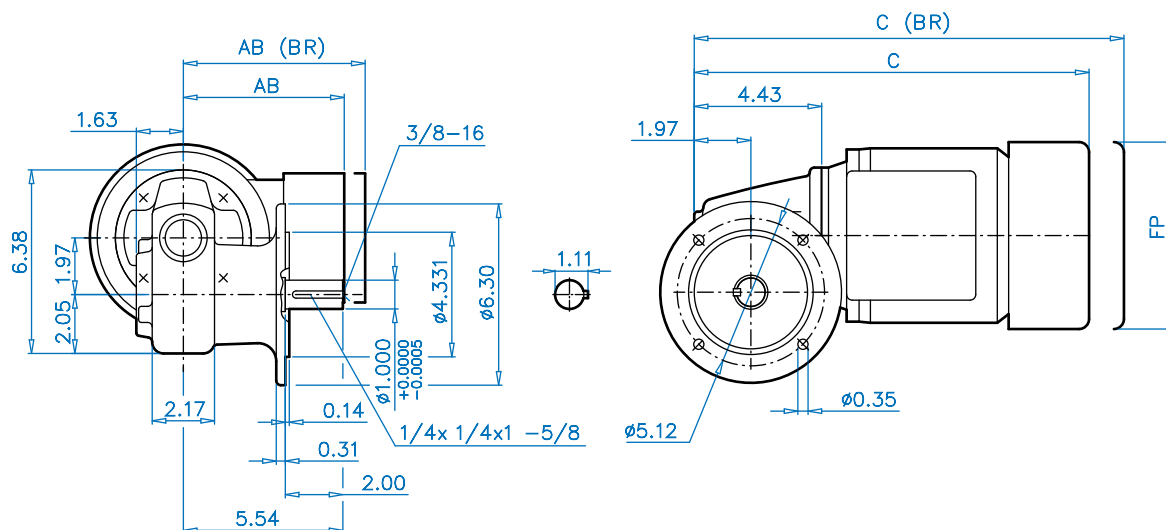
Motor dimensions

Standard efficiency	71 S/L	80 S/L	90 S
Energy efficiency		80 SH/LH	90 SH
AB	4.88	5.59	5.79
AB (BR)	5.24	5.63	5.83
C	12.83	13.70	15.28
C (BR)	15.12	16.22	18.23
FP	5.71	6.50	7.20

(BR) denotes Brakemotor

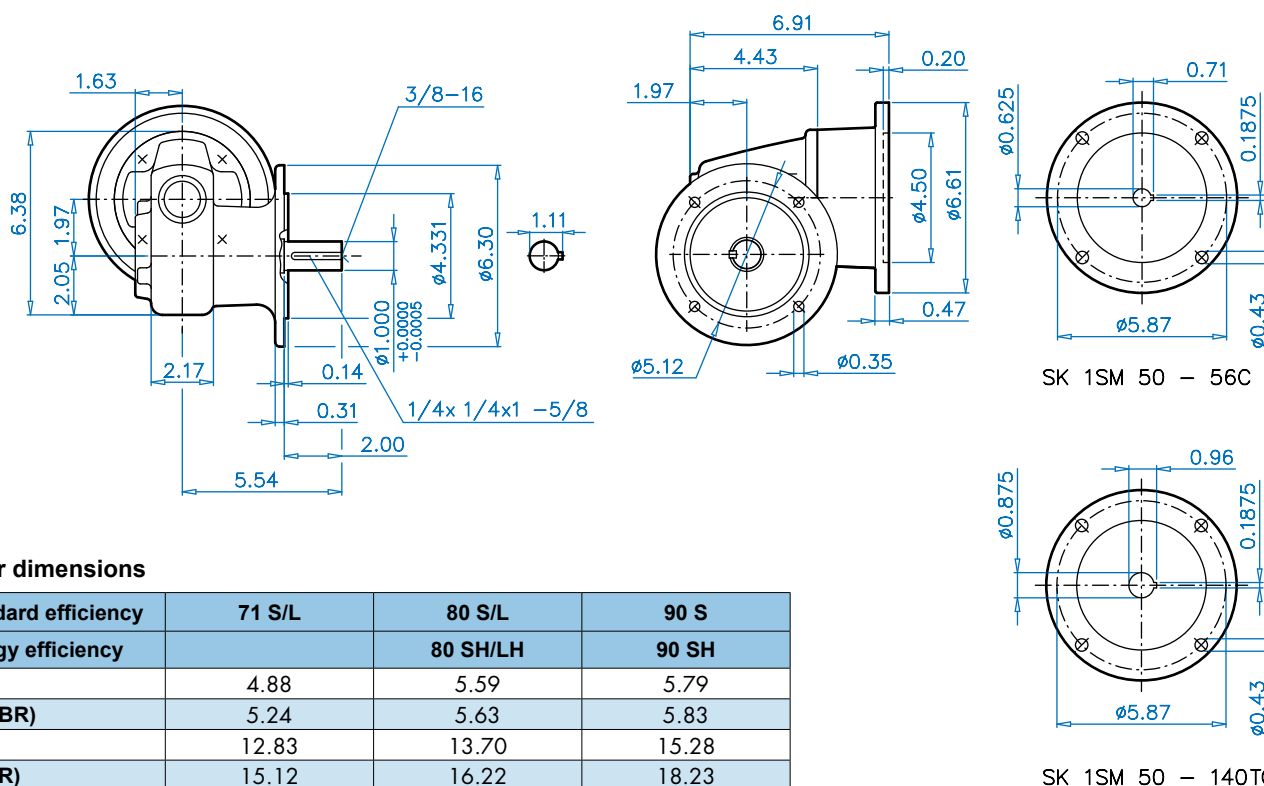


SK 1SM50 VF + Motor



A diagram illustrating the relationship between dimensions and indices. It features two interlocking gears. The larger gear on the right is light blue and labeled "DIMENSIONS". The smaller gear on the left is dark blue and labeled "Dimensions in Index". A curved arrow points from the "Dimensions in Index" gear towards the "DIMENSIONS" gear, indicating a flow or relationship between the two concepts.

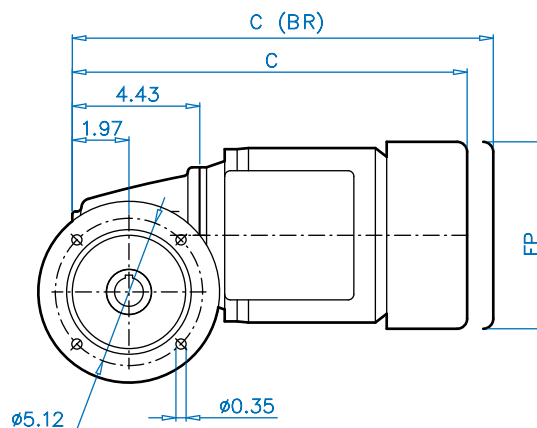
SK 1SM50 VF + NEMA



Motor dimensions

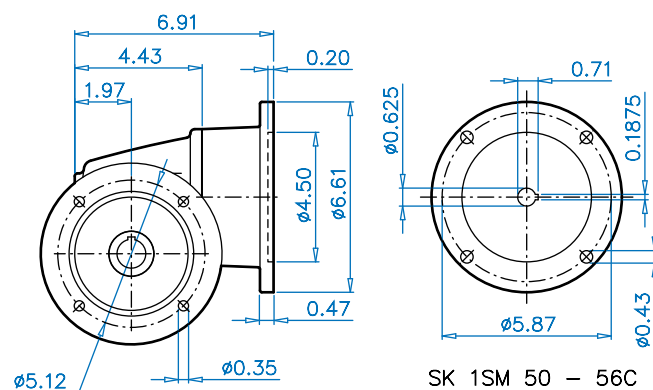
Standard efficiency	71 S/L	80 S/L	90 S
Energy efficiency		80 SH/LH	90 SH
AB	4.88	5.59	5.79
AB (BR)	5.24	5.63	5.83
C	12.83	13.70	15.28
C (BR)	15.12	16.22	18.23
FP	5.71	6.50	7.20

(BR) denotes Brakemotor



Technical drawing of a roller (Fig. 10.10). The drawing shows a cross-section of the roller with the following dimensions:

- Overall width: 3.54
- Distance from center to outer edge: 1.63
- Distance from center to inner edge: 0.24
- Distance from center to mounting flange: 0.14
- Overall height: 6.38
- Distance from center to top edge: 1.97
- Distance from center to bottom edge: 2.05
- Distance from center to mounting flange: 2.17
- Distance from center to mounting flange: 0.31
- Distance from center to mounting flange: 0.157
- Distance from center to mounting flange: 0.4331
- Distance from center to mounting flange: 0.630
- Distance from center to mounting flange: 0.31
- Distance from center to mounting flange: 0.157
- Distance from center to mounting flange: 0.4331
- Distance from center to mounting flange: 0.630

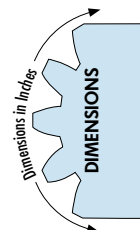
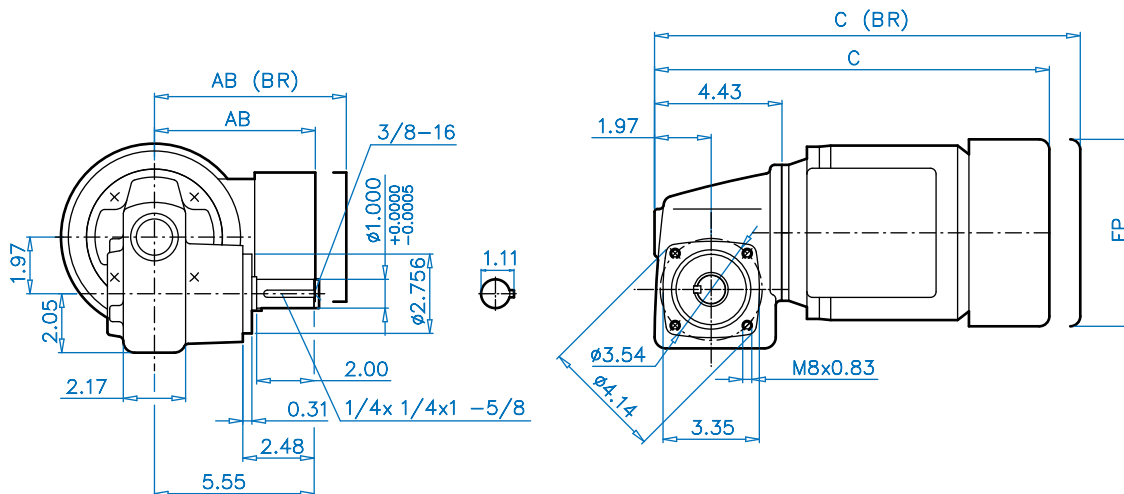


Standard efficiency	71 S/L	80 S/L	90 S
Energy efficiency		80 SH/LH	90 SH
AB	4.88	5.59	5.79
AB (BR)	5.24	5.63	5.83
C	12.83	13.70	15.28
C (BR)	15.12	16.22	18.23
FP	5.71	6.50	7.20

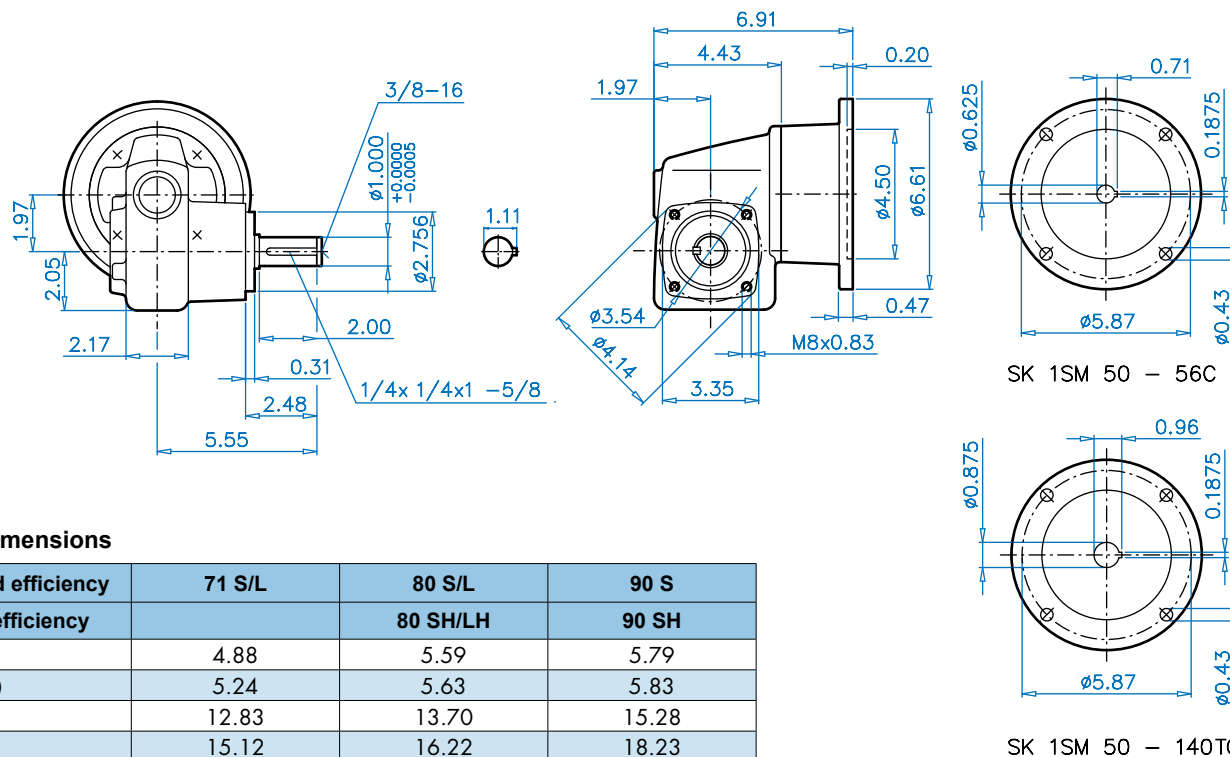
SK 1SM 50 - 140TC



SK 1SM50 VZ + Motor



SK 1SM50 VZ + NEMA



Motor dimensions

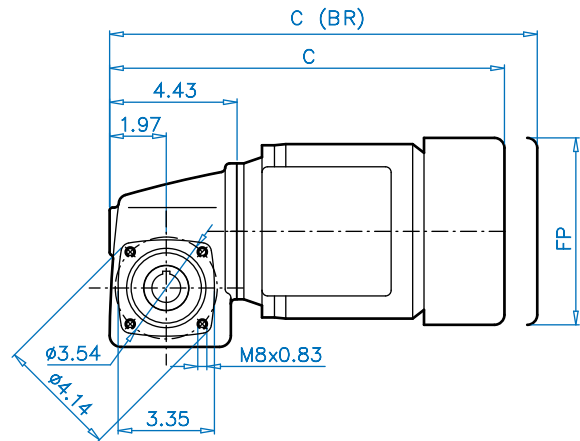
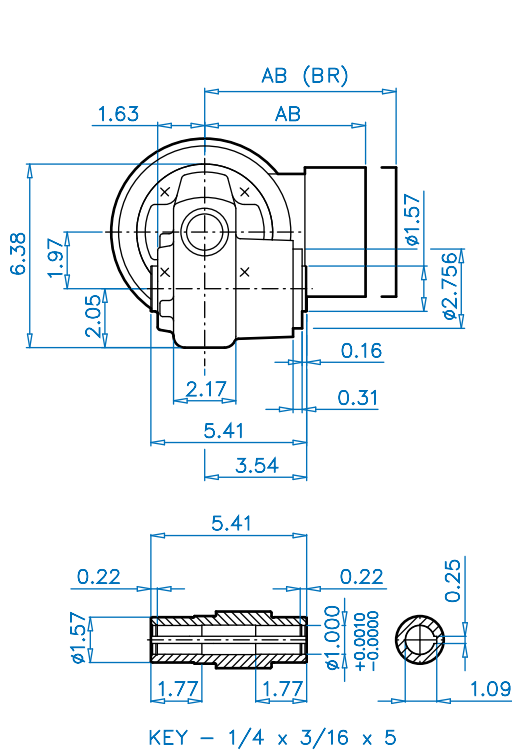
Standard efficiency	71 S/L	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH	
AB	4.88	5.59	5.79
AB (BR)	5.24	5.63	5.83
C	12.83	13.70	15.28
C (BR)	15.12	16.22	18.23
FP	5.71	6.50	7.20

(BR) denotes Brakemotor

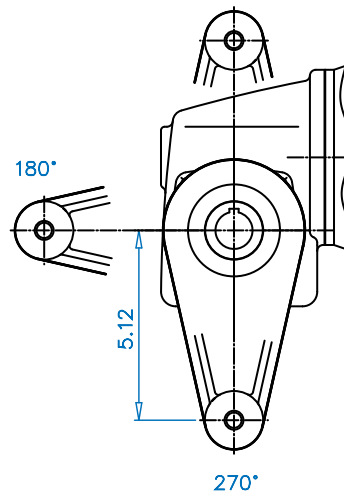
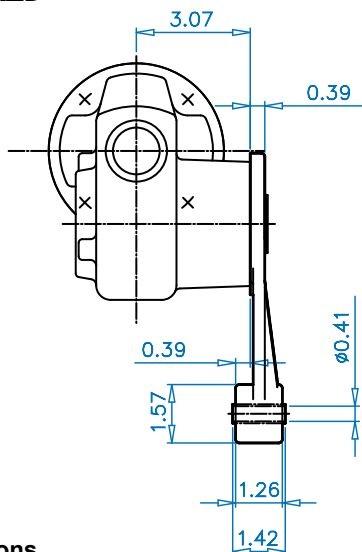
SK 1SM50 AZ



SK 1SM50 AZ + Motor



SK 1SM50 AZD



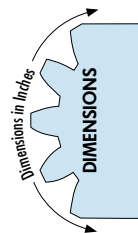
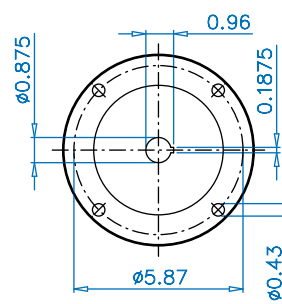
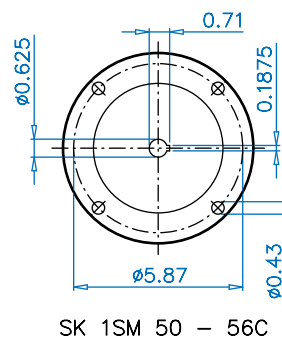
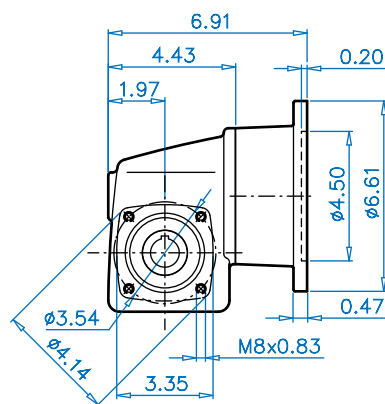
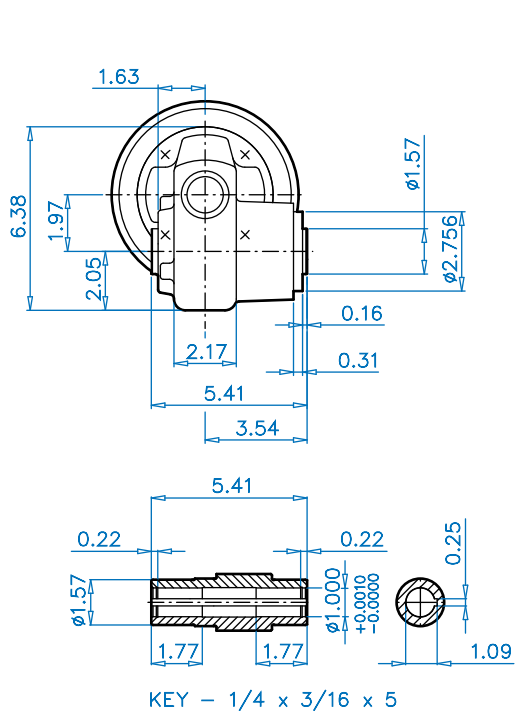
Motor dimensions

Standard efficiency	71 S/L	80 S/L	90 S
Energy efficiency		80 SH/LH	90 SH
AB	4.88	5.59	5.79
AB (BR)	5.24	5.63	5.83
C	12.83	13.70	15.28
C (BR)	15.12	16.22	18.23
FP	5.71	6.50	7.20

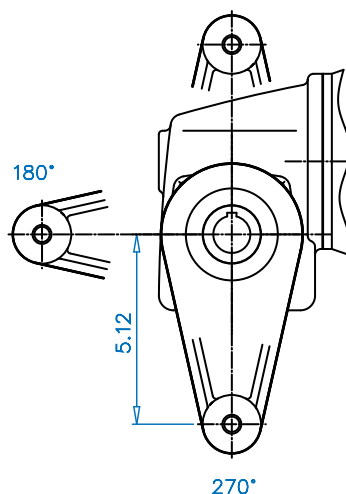
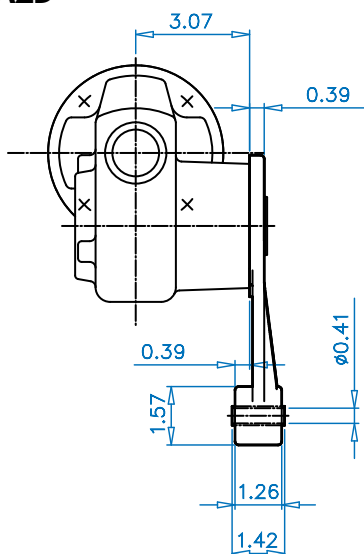
(BR) denotes Brakemotor



SK 1SM50 AZ + NEMA



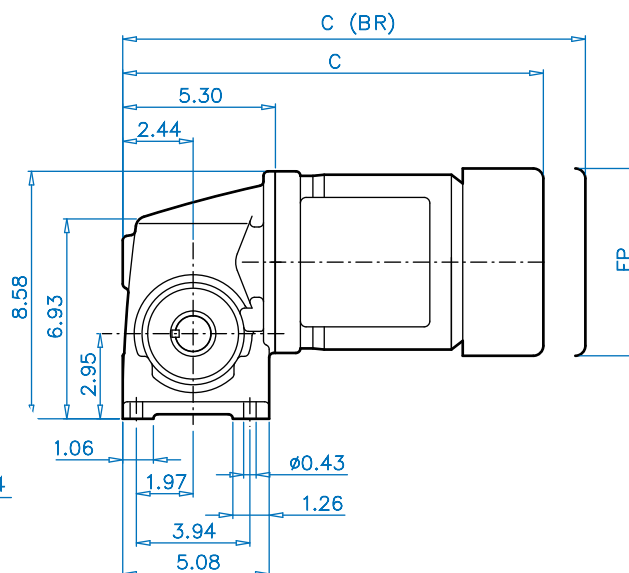
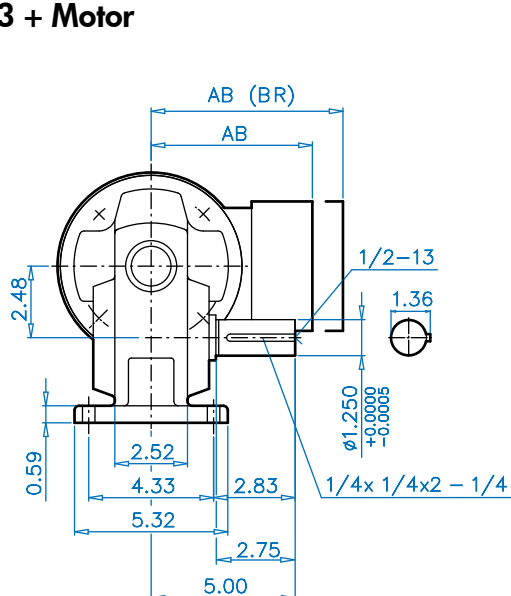
SK 1SM50 AZD



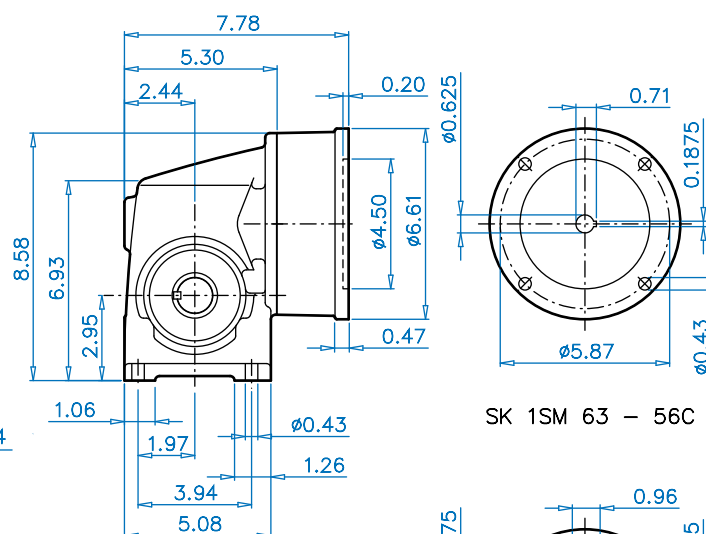
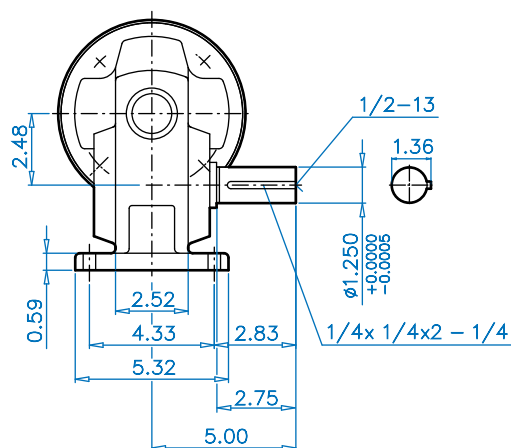
SK 1SM63



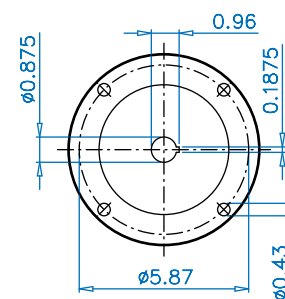
SK 1SM63 + Motor



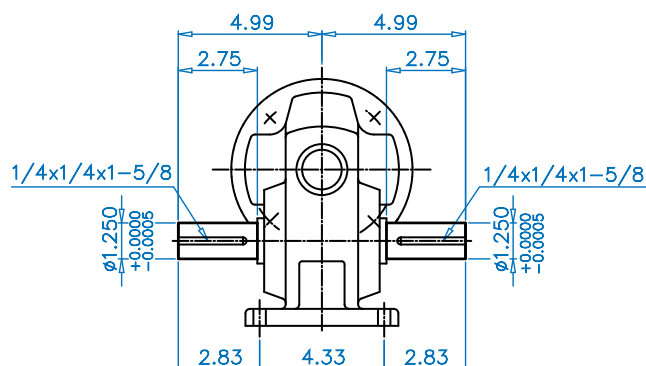
SK 1SM63 + NEMA



SK 1SM 63 - 56C



SK 1SM63 LX



Motor dimensions

SK 1SM 63 - 140TC

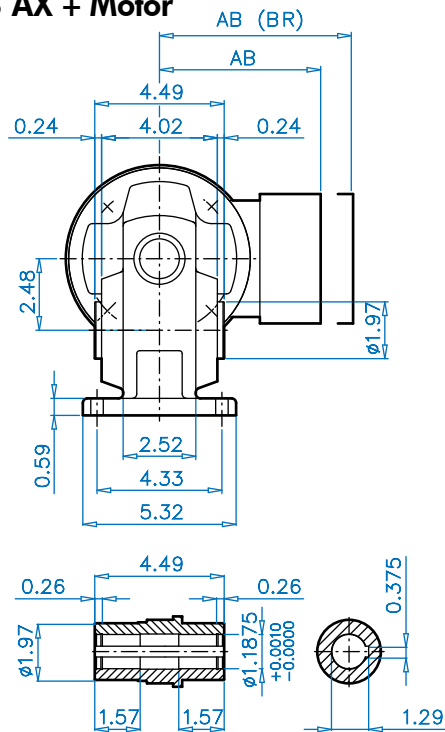
Standard efficiency	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH
AB	5.59	5.79
AB (BR)	5.63	5.83
C	14.57	16.14
C (BR)	17.09	19.09
FP	6.50	7.20

(BR) denotes Brakemotor

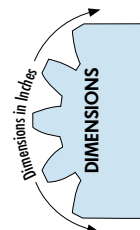
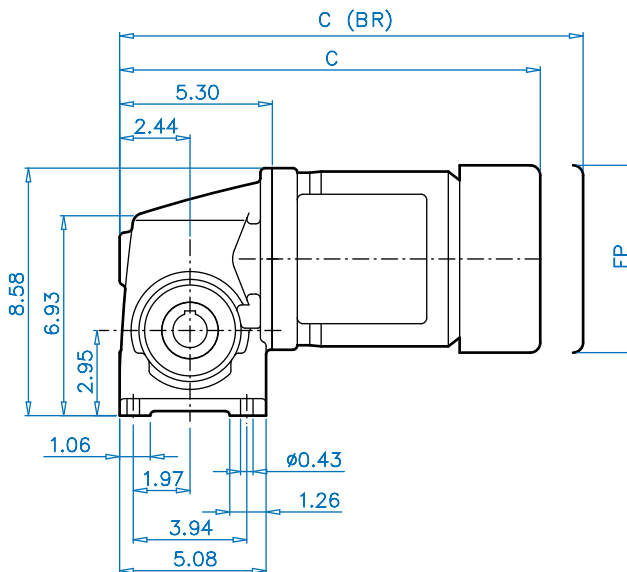


SK 1SM 63AX

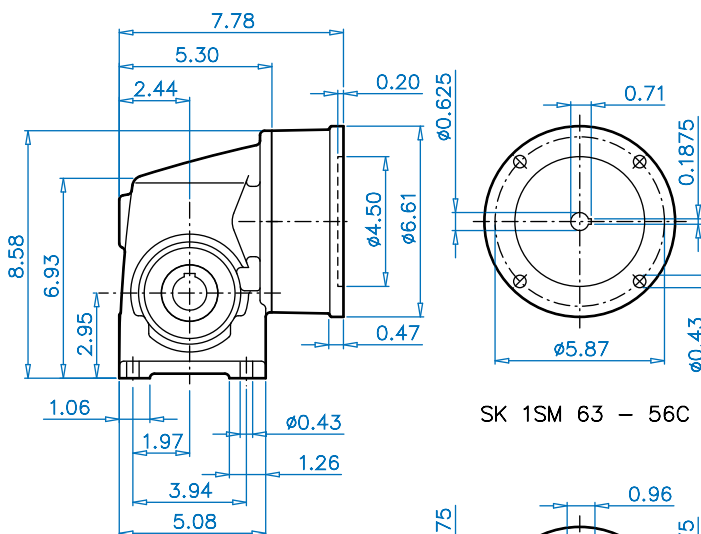
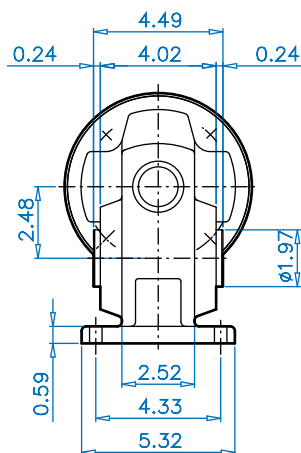
SK 1SM63 AX + Motor



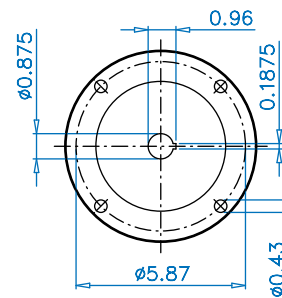
KEY - 3/8 x 1/4 x 4



SK 1SM63 AX + NEMA



SK 1SM 63 - 56C



SK 1SM 63 - 140TC

Motor dimensions

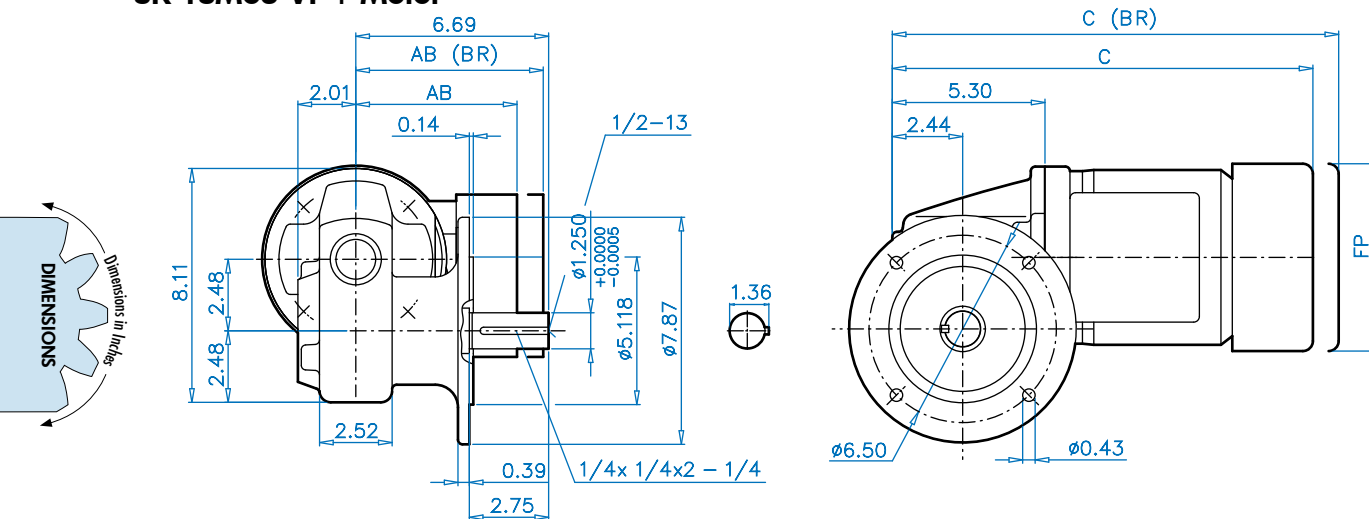
Standard efficiency	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH
AB	5.59	5.79
AB (BR)	5.63	5.83
C	14.57	16.14
C (BR)	17.09	19.09
FP	6.50	7.20

(BR) denotes Brakemotor

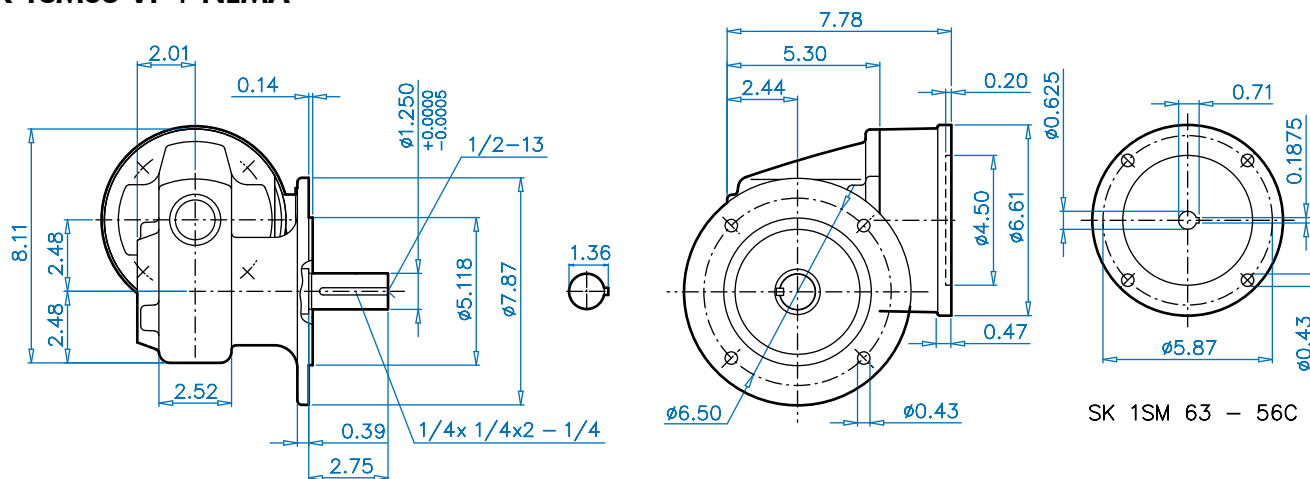
SK 1SM63 VF



SK 1SM63 VF + Motor



SK 1SM63 VF + NEMA

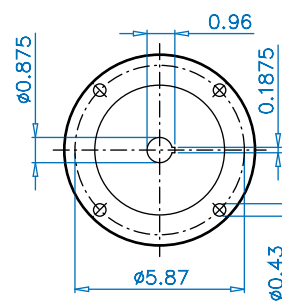


SK 1SM 63 - 56C

Motor dimensions

Standard efficiency	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH
AB	5.59	5.79
AB (BR)	5.63	5.83
C	14.57	16.14
C (BR)	17.09	19.09
FP	6.50	7.20

(BR) denotes Brakemotor

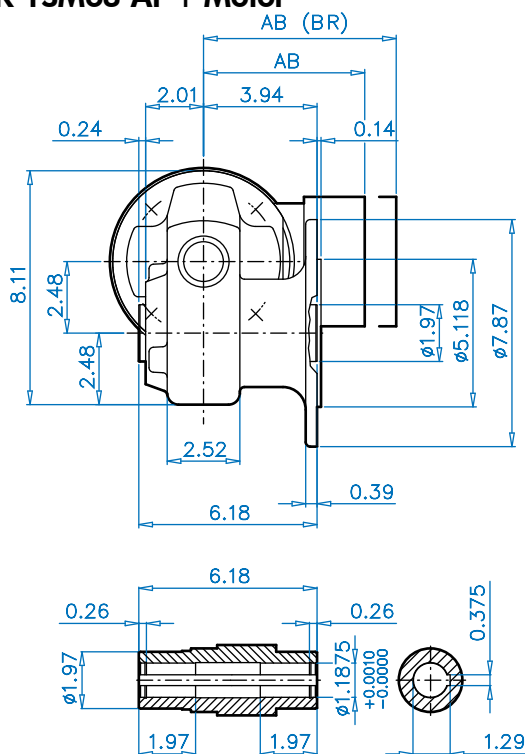


SK 1SM 63 - 140TC

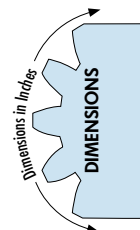
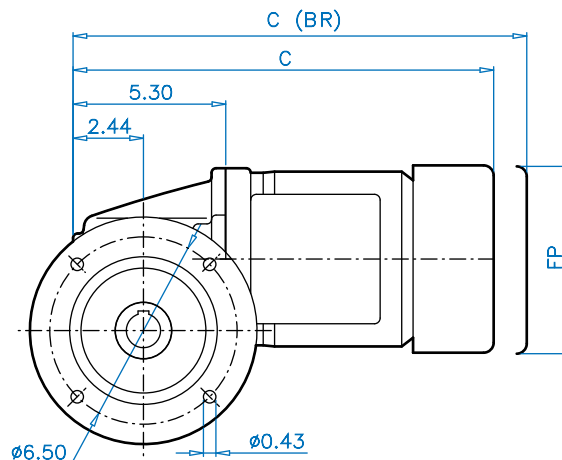


SK 1SM63 AF

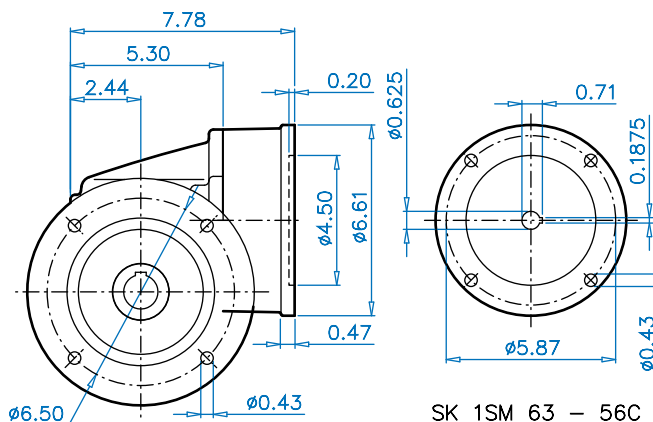
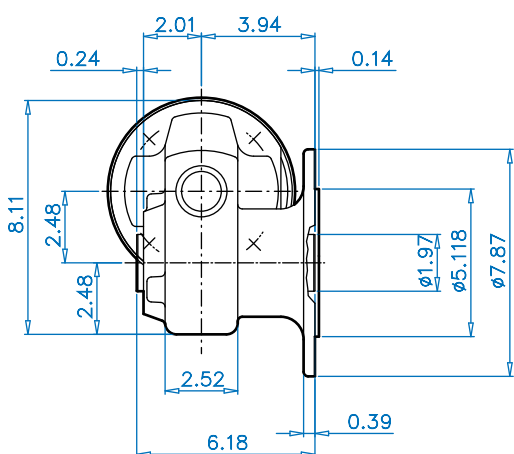
SK 1SM63 AF + Motor



KEY - 3/8 x 1/4 x 2-3/4



SK 1SM63 AF + NEMA

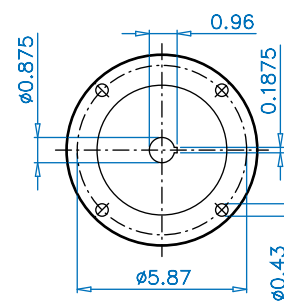


SK 1SM 63 - 56C

Motor dimensions

Standard efficiency	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH
AB	5.59	5.79
AB (BR)	5.63	5.83
C	14.57	16.14
C (BR)	17.09	19.09
FP	6.50	7.20

(BR) denotes Brakemotor

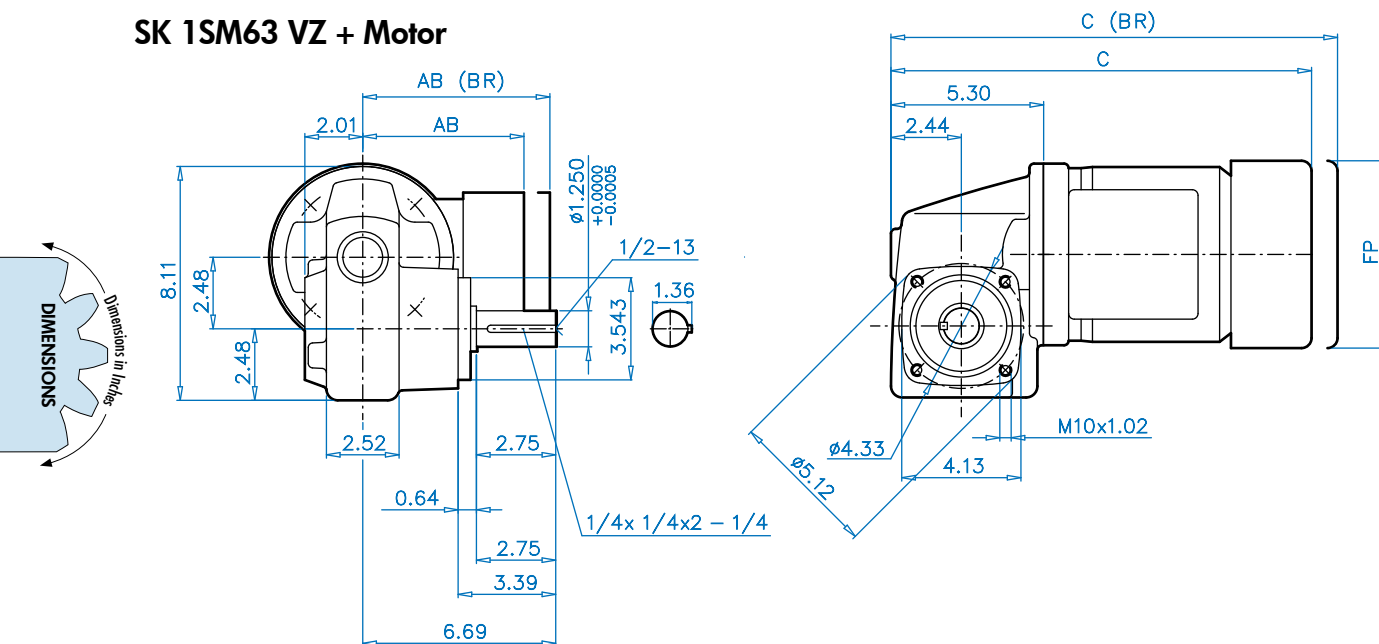


SK 1SM 63 - 140TC

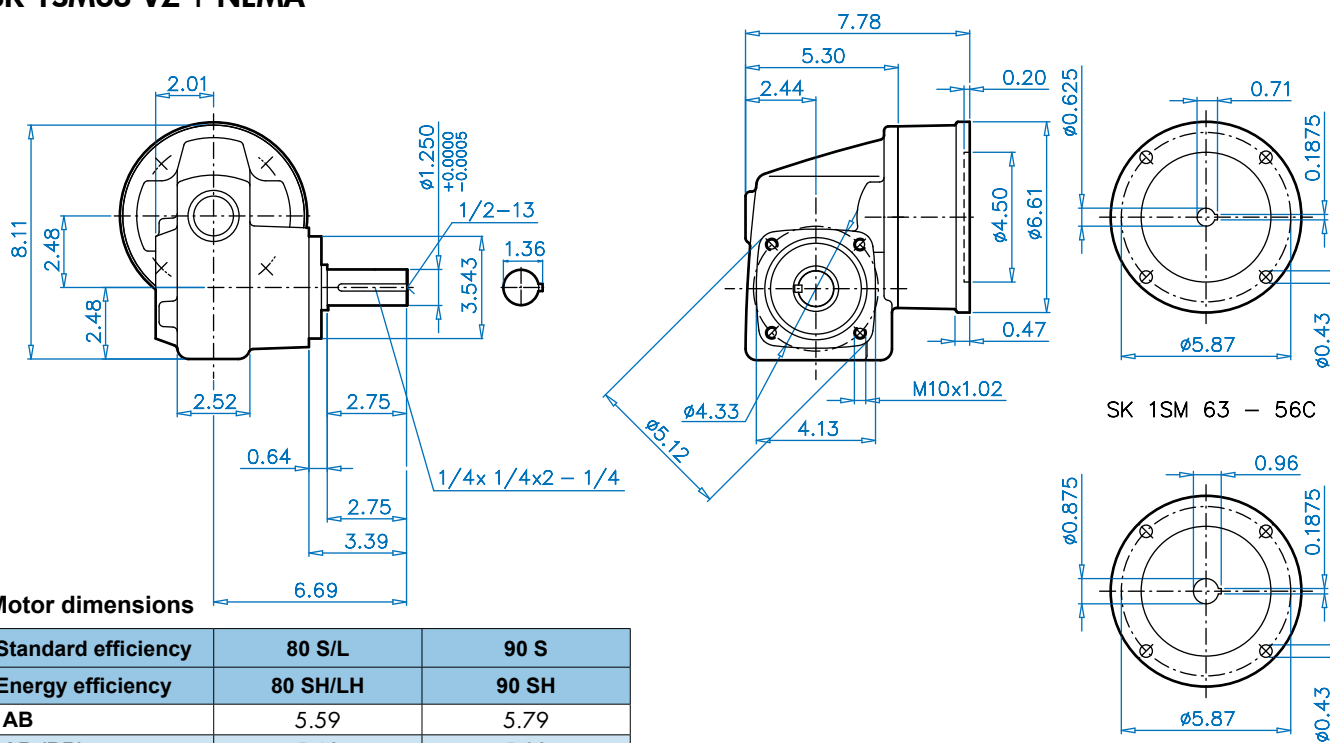
SK 1SM63 VZ



SK 1SM63 VZ + Motor



SK 1SM63 VZ + NEMA



SK 1SM 63 - 56C

SK 1SM 63 - 140TC

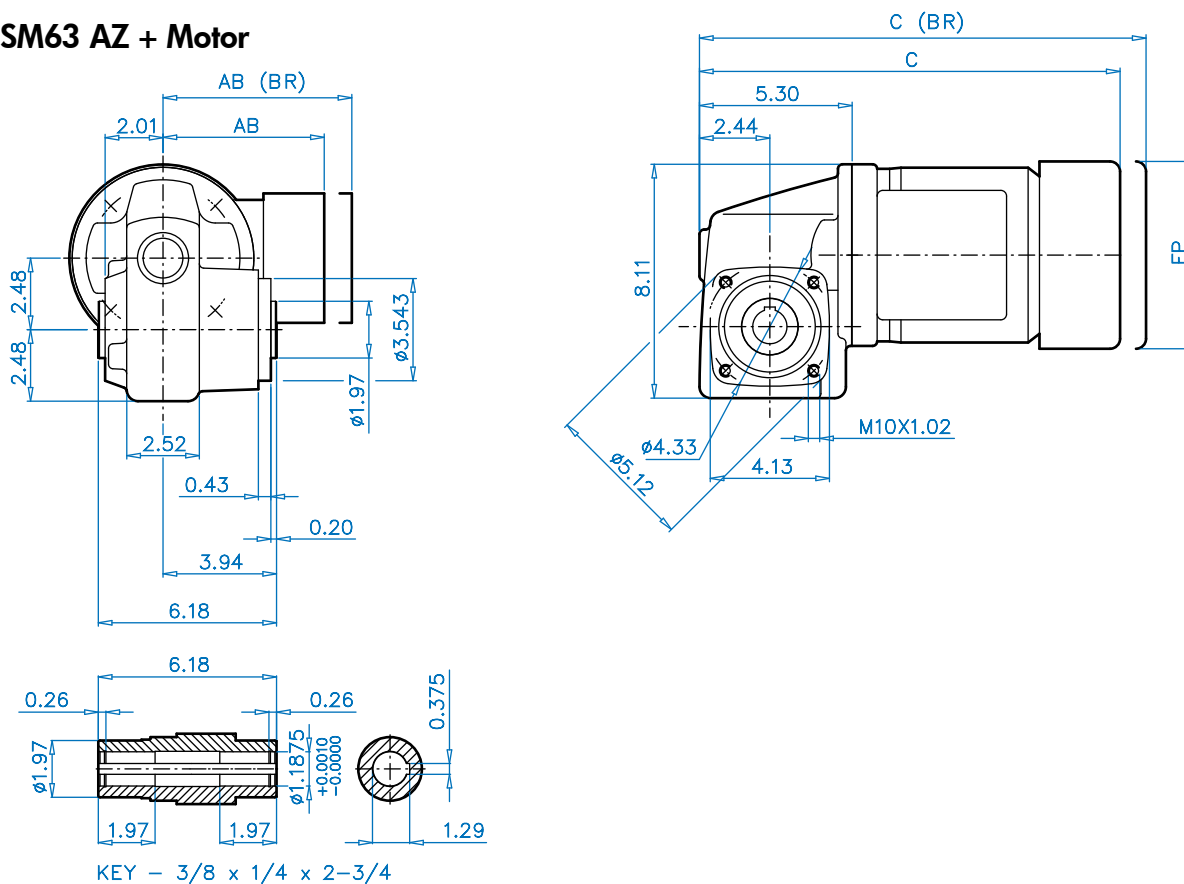
Motor dimensions

Standard efficiency	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH
AB	5.59	5.79
AB (BR)	5.63	5.83
C	14.57	16.14
C (BR)	17.09	19.09
FP	6.50	7.20

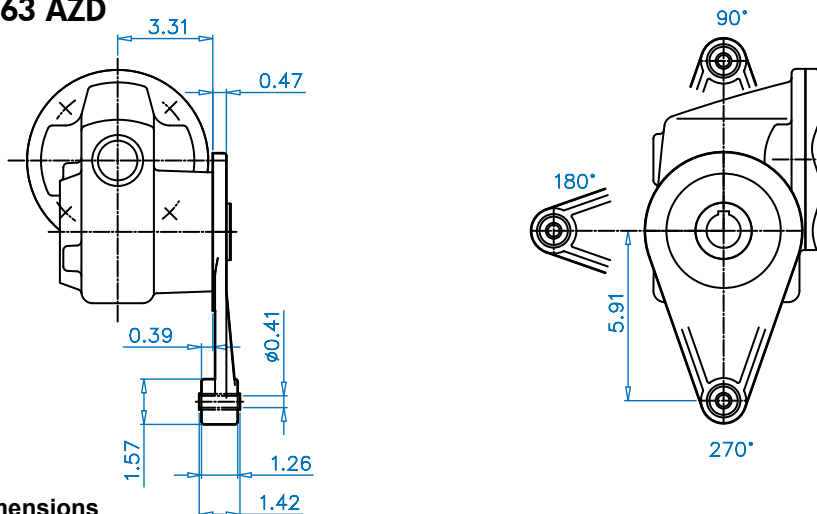
(BR) denotes Brakemotor



SK 1SM63 AZ + Motor



SK 1SM63 AZD



Motor dimensions

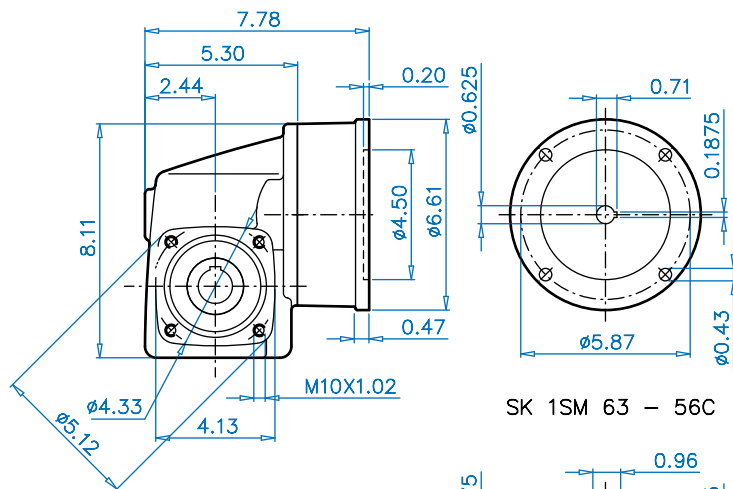
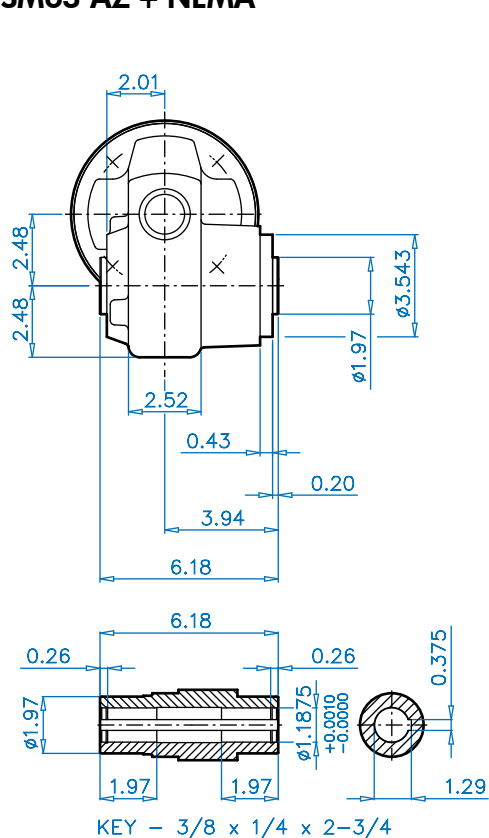
Standard efficiency	80 S/L	90 S
Energy efficiency	80 SH/LH	90 SH
AB	5.59	5.79
AB (BR)	5.63	5.83
C	14.57	16.14
C (BR)	17.09	19.09
FP	6.50	7.20

(BR) denotes Brakemotor

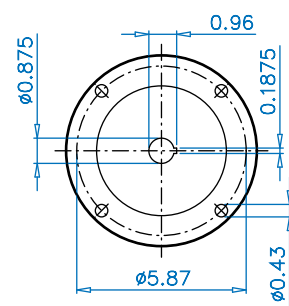
SK 1SM63 AZ



SK 1SM63 AZ + NEMA

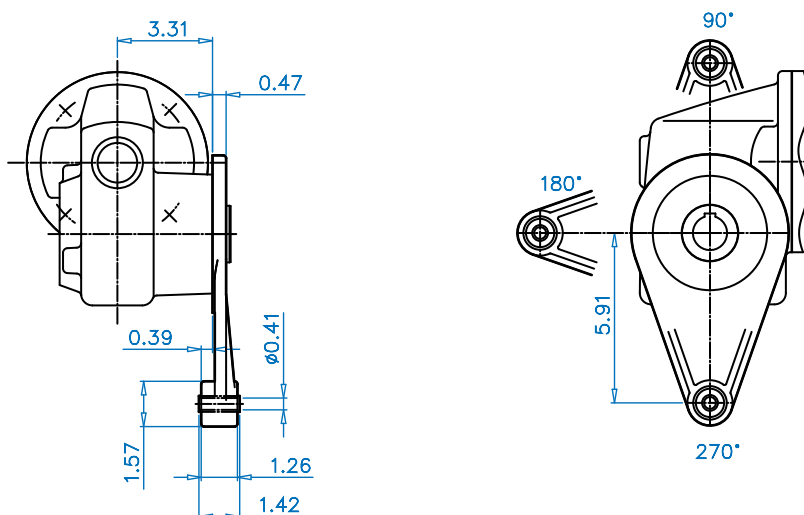


SK 1SM 63 - 56C



SK 1SM 63 - 140TC

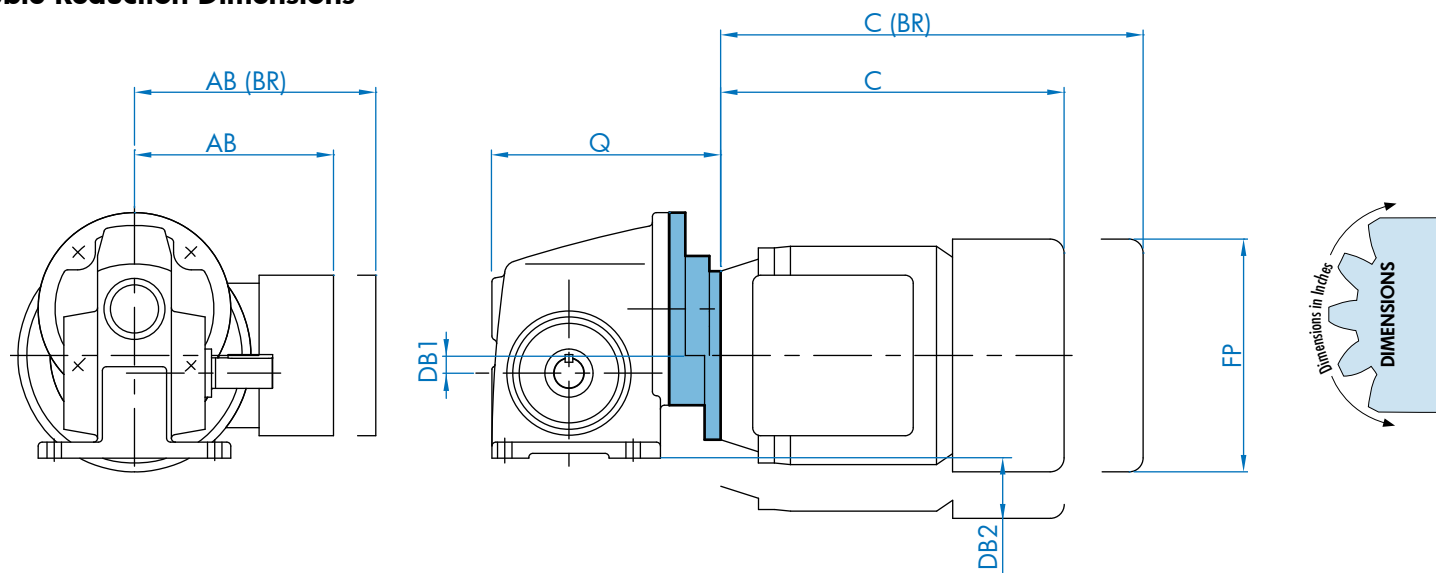
SK 1SM63 AZD





Double Reduction

Double Reduction Dimensions

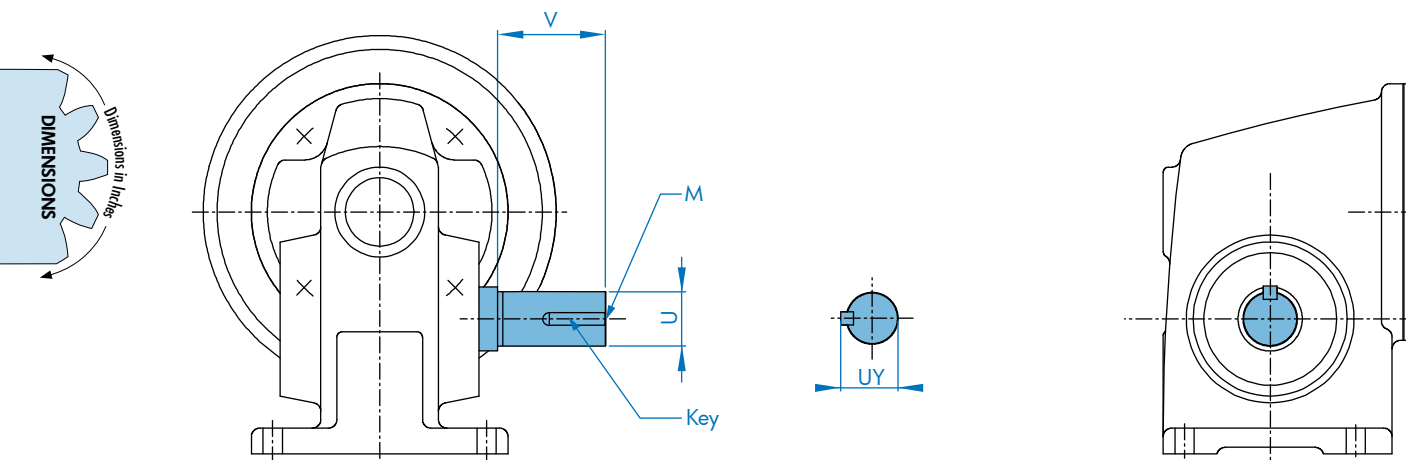


Unit	Motor	Q	C	C (BR)	AB	AB (BR)	FP	DB1	DB2
SK 2SM40	63S	5.61	7.56	9.76	4.53	4.84	5.12	0.37	0.10
	63L	5.61	7.56	9.76	4.53	4.84	5.12	0.37	0.10
	71S	5.61	8.43	10.71	4.88	5.00	5.71	0.43	0.39
	71L	5.61	8.43	10.71	4.88	5.00	5.71	0.43	0.39
SK 2SM50	63S	5.69	7.56	9.76	4.53	4.84	5.12	0.77	-
	63L	5.69	7.56	9.76	4.53	4.84	5.12	0.77	-
	71S	5.69	8.43	10.71	4.88	5.00	5.71	0.77	-
	71L	5.69	8.43	10.71	4.88	5.00	5.71	0.77	-
SK 2SM63	63S	6.28	7.56	9.76	4.53	4.84	5.12	0.63	-
	63L	6.28	7.56	9.76	4.53	4.84	5.12	0.63	-
	71S	6.28	8.43	10.71	4.88	5.00	5.71	0.63	-
	71L	6.28	8.43	10.71	4.88	5.00	5.71	0.63	-
	80S	6.28	9.29	11.81	5.59	5.63	6.50	0.63	-
	80L	6.28	9.29	11.81	5.59	5.63	6.50	0.63	-
	90S	6.28	10.87	13.82	5.79	5.83	7.21	0.63	-

MINICASE® Solid Shaft Dimensions



Solid Shaft Dimensions

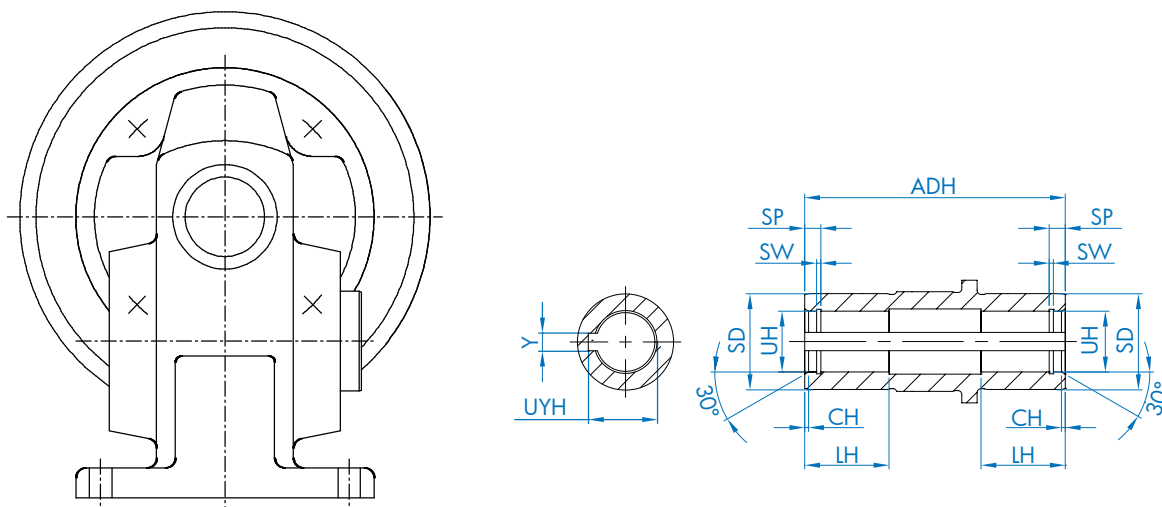


Inch	U	V	UY	M (Drill x Tap)	Key (w x h x l)
SK 1SM31	0.500 +0.0000 -0.0005	1.12	0.56	10-24 x 0.43	1/8 x 1/8 x 7/8
SK 1SM40 SK 2SM40	0.750 +0.0000 -0.0005	1.50	0.83	1/4 - 20 x 0.59	3/16 x 3/16 x 1
SK 1SM50 SK 2SM50	1.000 +0.0000 -0.0005	2.00	1.11	3/8 x 16 x 0.87	1/4 x 1/4 x 1-5/8
SK 1SM63 SK 2SM63	1.250 +0.0000 -0.0005	2.75	1.36	1/2 x 13 x 1.10	1/4 x 1/4 x 1-5/8

Metric	U	V	UY	M (Drill x Tap)	Key (w x h x l)
SK 1SM31	14 mm +0.012 +0.001	30 mm	16 mm	M5 x 12.5 mm	5 x 5 x 25 mm
SK 1SM40 SK 2SM40	16 mm +0.012 +0.001	40 mm	18 mm	M5 x 12.5 mm	5 x 5 x 32 mm
	20 mm +0.015 +0.002	40 mm	22.5 mm	M6 x 16 mm	6 x 6 x 32 mm
SK 1SM50 SK 2SM50	20 mm +0.015 +0.002	40 mm	22.5 mm	M6 x 16 mm	6 x 6 x 32 mm
	25 mm +0.015 +0.002	50 mm	28 mm	M10 x 22 mm	8 x 7 x 40 mm
SK 1SM63 SK 2SM63	25 mm +0.015 +0.002	50 mm	28 mm	M10 x 22 mm	8 x 7 x 40 mm
	30 mm +0.015 +0.002	60 mm	33 mm	M10 x 22 mm	8 x 7 x 50 mm



Hollow Shaft Dimensions



Inch	UH	Tolerance	ADH	LH	DH	SP	SW	SD	Key size w x h	UYH
SK 1SM31 AX	0.625* 0.500	+0.0008 / -0.000	3.11	0.87	0.98	0.17	0.04	0.98	3/16 x 3/16 1/8 x 1/8	0.71 0.56
SK 1SM31 AF / AZ	0.625*	+0.0008 / -0.000	4.11	1.18	0.98	0.17	0.04	0.98	3/16 x 3/16	0.71
SK 1SM40 AX SK 2SM40 AX	0.750*	+0.0008 / -0.000	3.78	1.10	1.38	0.22	0.04	1.38	3/16 x 3/16	0.84
SK 1SM40 AF / AZ SK 2SM40 AF / AZ	0.750*	+0.0008 / -0.000	4.84	1.46	1.38	0.22	0.04	1.38	3/16 x 3/16	0.84
SK 1SM50 AX SK 2SM50 AX	1.000*	+0.0008 / -0.000	4.33	1.18	1.57	0.22	0.05	1.57	1/4 x 3/16	1.08
SK 1SM50 AF / AZ SK 2SM50 AF / AZ	1.000*	+0.0008 / -0.000	5.41	1.77	1.57	0.22	0.05	1.57	1/4 x 3/16	1.08
SK 1SM63 AX SK 2SM63 AX	1.1875*	+0.0008 / -0.000	4.49	1.57	1.97	0.26	0.05	1.97	3/8 x 1/4	1.27
	1.250						0.05		1/4 x 1/4	1.37
	1.4375						0.06		3/8 x 3/8	1.61
SK 1SM63 AF / AZ SK 2SM63 AF / AZ	1.1875*	+0.0008 / -0.000	6.18	1.97	1.97	0.26	0.04	1.97	3/8 x 1/4	1.27
	1.250					0.29	0.07		1/4 x 1/4	1.37
	1.4375								3/8 x 3/8	1.61

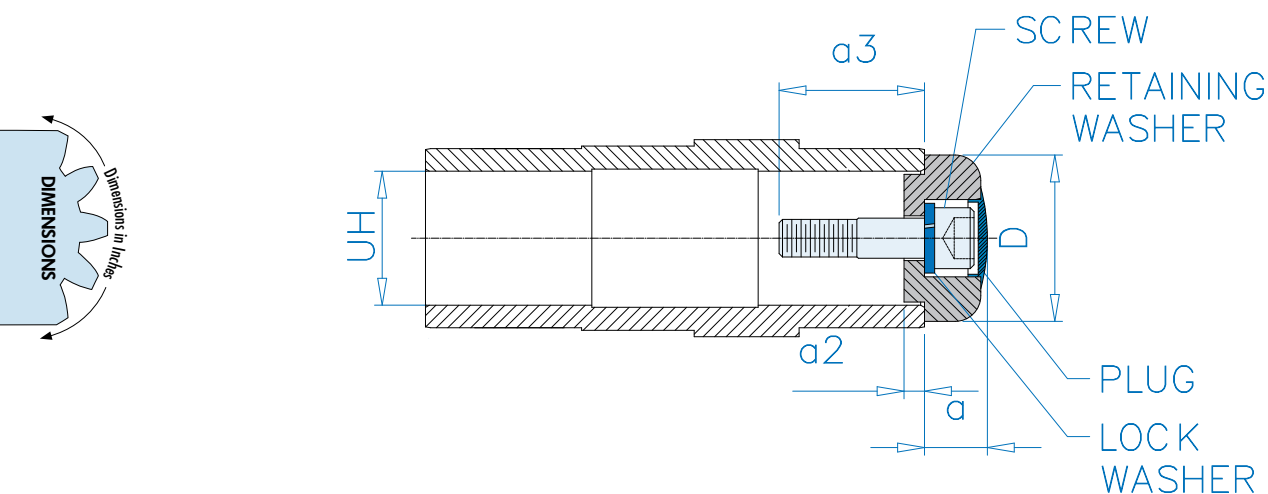
* Standard Size

Metric	UH	Tolerance	ADH	LH	DH	SP	SW	SD	Key size w x h	UYH
SK 1SM31 AX	16 mm	+0.021 / -0.000 mm	79 mm	22.1 mm	24.9 mm	4.2 mm	1.1 mm	25 mm	5 x 5 mm	18.3 mm
SK 1SM31 AF / AZ	16 mm	+0.021 / -0.000 mm	104.4 mm	30 mm	24.9 mm	4.2 mm	1.1 mm	25 mm	5 x 5 mm	18.3 mm
SK 1SM40 AX SK 2SM40 AX	20 mm	+0.021 / -0.000 mm	96 mm	27.9 mm	35.1 mm	5.7 mm	1.6 mm	35 mm	6 x 6 mm	22.8 mm
SK 1SM40 AF / AZ SK 2SM40 AF / AZ	20 mm	+0.021 / -0.000 mm	123 mm	37.1 mm	35.1 mm	5.7 mm	1.6 mm	35 mm	6 x 6 mm	22.8 mm
SK 1SM50 AX SK 2SM50 AX	25 mm	+0.021 / -0.000 mm	110 mm	30 mm	39.9 mm	5.7 mm	1.6 mm	40 mm	8 x 7 mm	28.3 mm
SK 1SM50 AF / AZ SK 2SM50 AF / AZ	25 mm	+0.021 / -0.000 mm	137.4 mm	45 mm	39.9 mm	5.7 mm	1.6 mm	40 mm	8 x 7 mm	28.3 mm
SK 1SM63 AX SK 2SM63 AX	30 mm	+0.021 / -0.000 mm	114 mm	39.9 mm	50 mm	6.7 mm	1.6 mm	50 mm	8 x 7 mm	33.3 mm
SK 1SM63 AF / AZ SK 2SM63 AF / AZ	30 mm	+0.021 / -0.000 mm	157 mm	50 mm	50 mm	6.7 mm	1.6 mm	50 mm	8 x 7 mm	33.3 mm

Fixing Element Kit



Fixing Element Kit



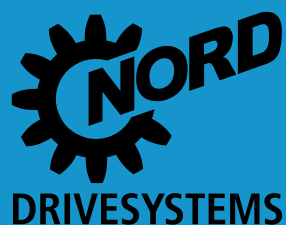
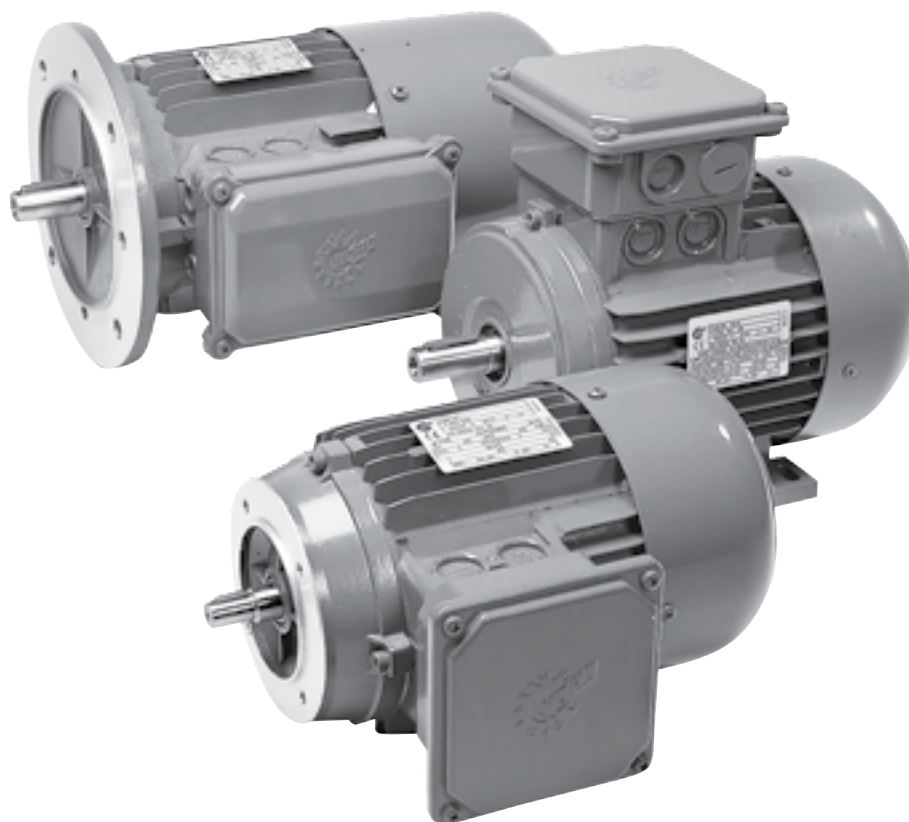
UH	D	a	a2	Screw ①	a3 ①	Screw ②	a3 ②	Screw ③	a3 ③
0.500	0.984	0.563	0.110	10 - 32 x 0.625	0.452	-	-	-	-
0.625	0.984	0.563	0.110	10 - 32 x 0.625	0.452	-	-	-	-
0.750	1.181	0.551	0.118	1/4 - 20 x 3/4	0.629	1/4 - 20 x 1	0.879	-	-
1.000	1.496	0.756	0.150	3/8 - 16 x 3/4	0.530	3/8 - 16 x 1-1/4	1.030	-	-
1.1875	1.575	0.756	0.150	7/16 - 14 x 2-1/16	1.906	-	-	-	-
1.250	1.575	0.756	0.150	7/16 - 14 x 2-1/16	1.906	-	-	-	-
1.4375	1.772	0.906	0.197	5/8 - 11 x 1-1/2	1.303	5/8 - 11 - 2-1/4	2.053	5/8 - 11 x 1	0.803

UH	D	a	a2	Screw ①	a3 ①	Screw ②	a3 ②	-	-
16	25	14.3	2.8	M5 x 20	15.6	-	-	-	-
20	30	14	3	M6 x 30	26.9	M6 x 22	18.9	-	-
25	38	19.2	3.8	M10 x 45	39.6	M10 x 30	24.6	-	-
30	40	16.28	5	M10 x 45	42.8	M10 x 30	27.8	-	-

①, ②, ③ - Each fixing element kit may contain up to 3 different kinds of screws

Motors

- Order Form
- NEMA C-Face Motors
- Engineering Information
- Options
- Environmental Options
- Inverter Options
- SK 300E Trio Inverter
- Additional Options
- Ratings Tables
- Dimensions
- Connection Diagrams

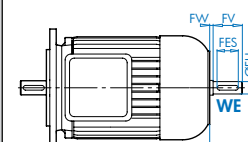


www.nord.com

**INVERTER
DUTY MOTOR**



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



Motor Order Form



SK	Frame	Size	Poles	Motor Options	Brake Size	Brake Options			
	63	S	4	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 Point ☐ NSDx3 - Nord Extreme Duty Point ☐ 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	Mod	Build	Brake Size BRE 5 BRE 10 BRE 20 BRE 40 BRE 60 BRE 100 BRE 150 BRE 250 BRE 400 BRE 800 Brake Options ☐ HL - Hand Release Lever ☐ FHL - Locking Hand Release Lever ☐ HLH - Hand Release Lever with Hole ☐ RG - Corrosion Protected Brake ☐ SR - Dust and Corrosion Protected ☐ ADJ__Nm - Adjust Brake ☐ BIP66 - IP66 Brake Enclosure ☐ MIK - Micro-switch ☐ BSH - Brake Heating/Bifilar Coil ☐ NRB1 - Quiet Brake Release ☐ NRB2 - Quiet Brake Motor Operation ☐ FBR - Brass Fail ☐ 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	Mod	Build
	71	SH	2						
	80	M	6						
	90	MH	4-2						
	100	MX	8-2						
	112	L	Other						
		LA							
		LH							
		LX							
	Paint ☐ Unpainted Aluminum Alloy ☐ Stainless Steel Paint ☐ NSD+ (gray) ☐ NSD+W (white) ☐ NSD-X3 (gray) ☐ NSD-X3W (white) ☐ Special _____								
				Hand Release Position ☐ HL1 ☐ HL2 ☐ HL3 ☐ HL4					

Mounting	Voltage & Frequency	Terminal Box Position	Conduit Entry Location
☐ Integral to gearbox ☐ NEMA C-Face ☐ IEC B5 Mount	☐ 230/460V-60Hz ☐ 575V-60Hz ☐ 208V-60Hz ☐ 400V-50Hz ☐ 115/230V, 60Hz-1-ph. ☐ Other	☐ TB1 ☐ TB2 ☐ TB3 ☐ TB4 	☐ CE I * ☐ CE II ☐ CE III * ☐ CE IV

* Brakemotor options



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 186 - 192.

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. Part numbers for stocked NEMA C-face motors are in the table below.

Assembled per Order NEMA C-Face Motors

NORD will assemble a NEMA C-face motor to your specifications based upon the available motor options 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	33610023	19.8
Energy Efficient Motors				
80LH/4-56C	1 hp	33610094	33610095	19.8
80LH/4-143TC	1 hp	33610092	33610093	19.8
90SH/4-145TC	1.5 hp	34110092	34110093	26.5
90LH/4-145TC	2 hp	34610092	34610093	30.9
100LH/4-182TC	3 hp	35610092	35610093	39.7
112MH/4-184TC	5 hp	36110082	36110083	83.6
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
80LH/4-56C BRE10 HL	1 hp	33610082 ♦	33610083 *	26.5
80LH/4-143TC BRE 10 HL	1 hp	33610084 ♦	33610085 *	26.5
90SH/4-145TC BRE 20 HL	1-1/2 hp	34110084 ♦	34110085 *	36.4
90LH/4-145TC BRE 20 HL	2 hp	34610084 ♦	34610085 *	40.8
100LH/4-182TC BRE 40 HL	3 hp	35110084 ♦	35110085 *	55.1
112MH/4-184TC BRE 40 HL	5 hp	36110084 ♦	36110085 *	61.7

♦ 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





Standards

All motors are in accordance with existing standards and regulations:

NEMA MG 1 - Motors and Generators:

- Electrical performance
- Motors for operation on variable frequency inverters

UL 1004 – Electric Motors

CSA C22.2 No. 100-92 - Motors and Generators:

Industrial Products

IEC 60034 parts 1, 5, 6, 8, 9, 11 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 14 – Mechanical vibration

IEC 60038 – Standard voltages

	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 63-132 File number E191510 Frames 160+ File number E227215
	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. 100-92 Frames 63-132 File number LR112560 Frame 160+ File number LR13494
	NORD Energy Efficient motors up to frame 160 have been evaluated by the United States Department of Energy and received a Certificate of Compliance to certify the efficiency ratings. The certificate of compliance is CC 092A.
	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.

EPAct – US Energy Efficiency

The Energy Policy Act of 1992 (EPAct) covers efficiency levels of general purpose industrial electric motors and became effective October 24, 1997. The basic goal of the law is to promote energy conservation. This law mandated energy efficiency requirements for many devices including some types of industrial electric motors. The efficiency levels are defined in NEMA MG-1 table 12-10. The regulations to implement this law have been developed by the Department of Energy (DOE).

The law covers minimum efficiency levels for general purpose motors including:

- Single-speed, polyphase NEMA T frame (and IEC equivalents)
- 1 to 200 hp (0.75 to 150 kW)
- 1200, 1800 or 3600 rpm
- NEMA design A and B
- Continuous rated
- Foot-mounted
- 230/460V-60Hz

The law excludes the following motor types from minimum efficiency levels:

- Integral gearmotors
- Brake motors

The NORD “H” line of energy efficient motors are designed to meet the efficiency levels defined by EPAct. NORD offers these motors as an option in combination with our high efficiency gear units for superior energy savings.

Efficiency levels for enclosed 4-pole motors per EPAct and NEMA MG 1 - in percent efficiency [%]

Efficiency for EPACT & NEMA MG1 4-Pole Motors

hp	1	1.5	2	3	5
kW	0.75	1.1	1.5	2.2	3.7
Eff%	82.5	84.0	84.0	87.5	87.5



Canadian Energy Efficiency

The Energy Efficiency Act and the Energy Efficiency Regulations establish minimum energy performance levels for electric motors from 1 to 200 HP (0.75 to 150 kW) for sale or lease in Canada. The Energy Efficiency Regulations were developed by Natural Resources Canada (NRCan).

Certain National Electrical Manufacturers Association (NEMA) motors have been regulated since Feb. 3, 1995. Effective Nov. 27, 1997, the Energy Efficiency Regulations were amended to include International Electrotechnical Commission (IEC) motors. This amendment also increased the minimum energy performance levels that motors must meet. For explosion-proof motors and motors contained within an integral gear assembly, the effective date of the Regulations is Nov. 27, 1999.

The regulations mandate that motors carry an energy efficiency verification mark that is authorized by Standards Council of Canada (SCC) accredited certification organization such as Canadian Standards Association (CSA).

CEMEP Agreement European Efficiency Categories

CEMEP, the association of European Electric Motor Manufacturers, has reached an agreement with the European Commission's General Directorate for Energy, that in the future all 2 and 4-pole low voltage motors from 1 to 100kW will be categorized on the basis of their efficiency. The classification will be displayed on the nameplate and in catalogs. The following categories will be used: EFF1, EFF2 and EFF3.

EFF 1	EFF1-indicates a high efficiency factor.
EFF 2	EFF2-indicates an improved efficiency factor.
EFF 3	EFF3-Indicates a standard efficiency motors.

NORD supplies both motors of EFF1 and EFF2 categories in its 4-pole motors. The category EFF2 motors are the standard efficiency motors and the EFF1 motors are the "H" line of energy efficient motors.

In the future NORD will mark all of its 50-Hz motor with the CEMEP efficiency symbols.

kW	1.1	1.5	2.2	3	4
hp	1.5	2	3	4	5.4
EFF1 [%]	83.3	85.0	86.4	87.4	88.3
EFF2 [%]	76.2	78.5	81.0	82.6	84.2
EFF3 [%]	<76.2	<78.5	<81.0	<82.6	<84.2

Inverter/Vector Duty

INVERTER DUTY MOTOR

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 inverters. NORD motors can produce full torque at zero speed if properly sized, selected and controlled.





Voltage and Frequency

NORD motors are available in a wide range of voltages and frequencies for use in North America and around the world. For a more detailed list of choices see page 175.

NORD motors designed for North American voltages (208V, 230V, 460V and 575V) conform to the voltage and frequency tolerances in NEMA MG-1. The voltage tolerance is +/-10%, the frequency tolerance is +/- 5% or a combined voltage and frequency tolerance of +/-10%.

Low Inertia

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

High Torque

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

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.

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.

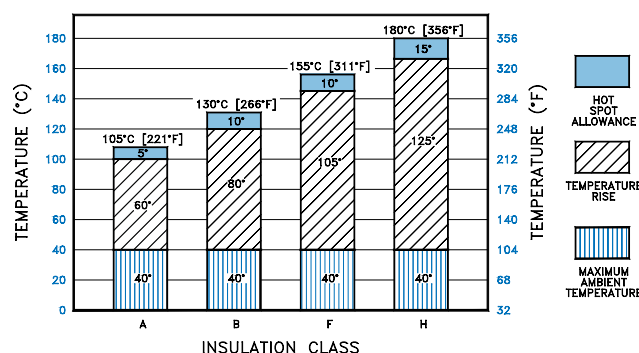


Tropical Protection (Anti-fungal)

As a company standard the NORD motor insulation system is tropically protected. The insulating & construction components are inorganic materials so they resist fungal growth.

Insulation Class

NORD motors are constructed with a thermal class F insulating system. The motors are also designed for a class B temperature rise (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.



Insulation System

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
- Phase separators
- Top sticks
- Connecting wire sleeves

Other motor manufacturers eliminate some of these insulating components for cost reduction.

Inverter/Vector Duty – Voltage Spikes

All NORD motors are constructed with an insulating system designed to withstand the repeated voltage spikes generated by modern frequency inverters. The insulation system withstands the ratings in conformance with NEMA MG 1-2006 Section 31.4.4.2 Voltage Spikes.

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



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

$$\text{Motor Rated Power} = [P_n \times \text{De-rate factor}]$$

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 either needs to be de-rated (see table below) or requires up-graded 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

$$\text{Motor Rated Power} = [P_n \times \text{De-rate factor}]$$

Service Factor

Motors rated 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.

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 minutes
S3	Intermittent operation sequential, identical run and rest cycles with 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	Run Time	Increasing factor
S2	Operating time	10 min
		30 min
S3	Cyclic duration factor (cdf)	25%
		40%
		60%
S6	Cyclic duration factor (cdf)	25%
		40%
		60%

$$\text{Motor Rated Power} = [P_n \times \text{Increasing factor}]$$



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

Protective Features

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

Standard Construction

- Shaft lip seals on both ends of the motor shafts
- Stator to endbell connections sealed to exclude moisture
- Double coated magnetic wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-2006, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- Threaded cable entry holes

Motors for Indoor Operation - Option Codes

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

Motors for Outdoor Operation - Option Codes

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

Option Code Key

KB	Condensation Drain Holes - Plugged	Page 179
SH	Space Heater	Page 177
KKV	Terminal Box Sealed with Resin	Page 179
NSD+	Nord Severe Duty Paint	Page 178
NSDx3	Nord Severe Extreme Duty X3 Paint	Page 178
RD	Canopy Drip Cover	Page 179
RDD	Double Fan Cover	Page 179
RG	Corrosion Protected Brake	Page 231



Voltage and Frequency

NORD motors are available in a number of voltages and frequencies. The standard voltages are commonly available. Optional voltages can be provided, but may include an increase in price and additional 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
230V-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	

Poles / speeds

NORD offers a variety of single speed 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 a frequency inverter.

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.

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.

US Canadian Standard (CUS)

CUS motor construction defines that NORD motors are constructed in accordance to UL 1004 (electric motors) and CSA C22.2 No. 100-92 (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.



Motor Protection

Selecting the appropriate motor protective system is a key factor in reliable motor operation. There are two common classes of motor protection; current based and motor temperature based. Electrical installation codes require at least two types of protection in the motors 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." This 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, see the table below.

↑ = Good protection ↔ = Limited protection ↓ = No protection	Fuses	Motor Overloads	PTC Thermistor (TF)	Bi-metallic Switch (TW)
Current overload up to 200%	↓	↑	↑	↑
High inertia starting	↓	↔	↑	↔
Frequent motor starts	↓	↔	↑	↑
Stalling	↔	↔	↔	↔
Single phasing	↓	↔	↑	↑
Supply voltage deviations	↓	↑	↑	↑
Supply frequency deviations	↓	↑	↑	↑
Inadequate motor cooling	↓	↓	↑	↑
Bearing Damage	↓	↓	↑	↑

Thermostat (TW)

Build

Three bimetallic switches are connected in series in the motor windings, one per motor phase. Upon reaching the limit temperature, this device automatically opens circuits. The installer is responsible to wire the thermostat into the motor control circuit. After the temperature has fallen below the trip limit, the thermostat switch re-sets automatically. The auto resetting property must be considered when designing the safety aspects of the control scheme.

TW Ratings

NC (Normally Closed)	auto resetting
Voltage	6 to 500VAC
Current	1.6 A
Resistance	less than 50 mΩ

Thermistor (TF)

Build

Three positive temperature coefficient (PTC) thermistors are connected in series in the motor windings, one per motor phase. Thermistors require an external tripping device. Upon reaching the limit temperature, the thermistors change their resistance suddenly. In connection with a tripping device, this property is engaged to monitor the motor temperature. The relay built into the tripping device has a make-and-break-contact, which is used in the control wiring. NORD does not provide the external tripping device with the TF thermistor option. You must request a thermistor tripping device separately. Many Inverters and PLCs include a built in PTC thermistor evaluation input.

TF Ratings

Transition Temperature	150 °C +/- 5°C
Resistance < Transition	20 ... 500 . Ω
Resistance > Transition	> 4k Ω.
Reed Voltage	< 7,5 V
Rated Current	< 1 mA
Motor Ambient Temp.	40°C



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 condensation inside of 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 lengthen the motor's life. Class H insulation rated motors are also an advantage in some severe applications:

- 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.
- Meets class H insulation motor specifications
- Lower operating frequency when used with frequency inverter systems

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



Flexbloc™ & Minicase® (paint free design)

The Flexbloc™ & Minicase® 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.

Paint Coatings

Mod

NORD's standard paint coating is a two component, aliphatic polyurethane finish containing a 316 stainless steel material. This gray stainless steel paint has excellent appearance 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/H1 compliant

NORD also offers a variety of severe duty paint coatings that provide a high level of protection against water and severe environments both inside and outside. NSD+ (NORD Severe Duty) consists of a 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.

Additionally a variety of coating options are available including our Severe Duty coatings:

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.



Condensation Drain Holes

NORD motors can be equipped with condensation drain holes. These are placed in the motor endbells at the lowest point possible. 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).



CAUTION



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).

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

Terminal Box Sealed with Resin (KKV)

Mod

Terminal boxes can 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, thus allowing water or debris to fall into the motor's fan guard, NORD offers a canopy drip cover to block this falling water or debris.



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.



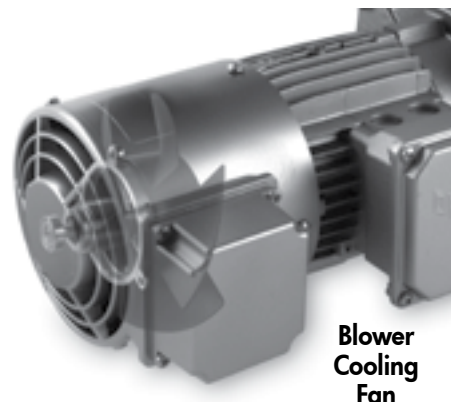
Inverter Related Options



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 with an inverter at a 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 cover and fan.



Blower Cooling Fan

Option F – 3ph & 1ph 220-575V 50/60Hz

Motor Frame	60Hz Ratings			50Hz Ratings		
	Voltage [V]	Current [A]	Power [W]	Voltage [V]	Current [A]	Power [W]
Single phase connection - Δ (Delta)						
63	230 – 277	0.11	38	230 – 277	0.10	27
71	230 – 277	0.12	41	230 – 277	0.10	28
80	230 – 277	0.13	44	230 – 277	0.11	29
90	230 – 277	0.25	88	230 – 277	0.26	72
100	230 – 277	0.28	88	230 – 277	0.26	70
112	230 – 277	0.31	107	230 – 277	0.26	73
Three phase low-voltage connection - Δ (Delta)						
63	220 – 332	0.08	23	220 – 290	0.10	27
71	220 – 332	0.08	24	220 – 290	0.10	30
80	220 – 332	0.08	25	220 – 290	0.01	29
90	220 – 332	0.21	64	220 – 290	0.28	86
100	220 – 332	0.21	66	220 – 290	0.27	86
112	220 – 332	0.23	70	220 – 290	0.27	85
Three phase high-voltage connection - Y						
63	380 – 575	0.04	23	380 – 500	0.05	29
71	380 – 575	0.04	25	380 – 500	0.05	30
80	380 – 575	0.04	26	380 – 500	0.05	29
90	380 – 575	0.12	62	380 – 500	0.16	82
100	380 – 575	0.12	66	380 – 500	0.16	83
112	380 – 575	0.13	70	380 – 500	0.16	82

Option FC – 115V 50/60Hz 1ph

Motor Frame	60Hz Ratings			50Hz Ratings		
	Voltage [V]	Current [A]	Power [W]	Voltage [V]	Current [A]	Power [W]
Single Phase Connection - Δ (Delta)						
63	100 – 135	0.23	42	100 – 135	0.30	42
71	100 – 135	0.23	47	100 – 135	0.30	44
80	100 – 135	0.27	57	100 – 135	0.30	43
90	100 – 135	0.46	102	100 – 135	0.57	78
100	100 – 135	0.53	105	100 – 135	0.54	78
112	100 – 135	0.60	115	100 – 135	0.55	80



Incremental Encoder (IG..P)

Build

NORD can provide an incremental encoder mounted on the back of a motor or brake motor. Commonly encoders are used as speed or position feedback devices for use with AC drives, motion controllers or PLC's. Below are standard encoders; however, others can be supplied on request.

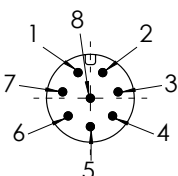


Encoder nomenclature must be specified.

Encoder nomenclature - IG _____



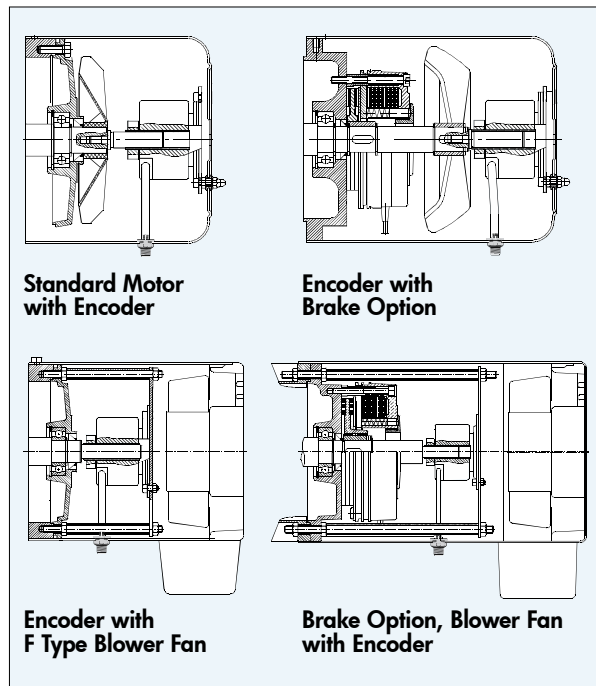
M12 Connector Interface



Wiring Diagram

Pin	Conn	Cord
1	0V	WH
2	+V	BN
3	A	GN
4	A\	YE
5	B	GY
6	B\	PK
7	Z	BU
8	Z\	RD
Nut	Gnd	Open

Encoder Type: Quadrature
Differential Marker pulse



	IG1 P	IG2 P	IG4 P	IG11 P	IG21 P	IG41 P	IG12 P	IG22 P	IG42 P	IG13 P	IG23 P	IG43 P
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
Part Number	19551500	19551510	19551520	19551502	19551511	19551522	19551501	19551512	19551521	19551503	19551513	19551523
Max Current Draw [mA]	100						150					
Max Frequency [kHz]	300											
Ambient Temperature [°F]	-4 to185											
Enclosure	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 cable is a possible source of electrical noise

Inverter Related Options



Encoders for NORD AC Drives

NORD frequency inverters with encoder inputs are designed to use TTL/RS422 encoders. There are also advantages in using an encoder with the 10-30VDC power supply system. The NORD inverters can use a wide range of pulse counts, however the 1024PPR version provides good performance with minimal interference issues. A 4096 PPR encoder can also be used and will provide increased precision in some application but has some increased concerns with noise interference.

Recommended encoder: IG11P – 1024PPR/TTL/10-30VDC

Alternate encoder: IG41P – 4096PPR/TTL/10-30VDC

Absolute Encoder (AG)

Build

Absolute encoders offer a unique value (voltage, binary count, etc.) for each mechanical position. When an absolute encoder is powered up, the position of the encoder is known. Absolute encoders are available in single or multi-turn versions. The encoder is attached under the fan cover with field bus connection outside the fan cover.

Absolute encoders can be provided to meet a variety of specifications:

- Resolution: up to 17 bits of resolution per turn (131,072 steps) with 4096 turns (12 bits of turns)
- Interfaces: Synchronous serial interface (SSI), SSI with incremental track, ProfiBus, DeviceNet, CANopen, CANlift, and other interfaces

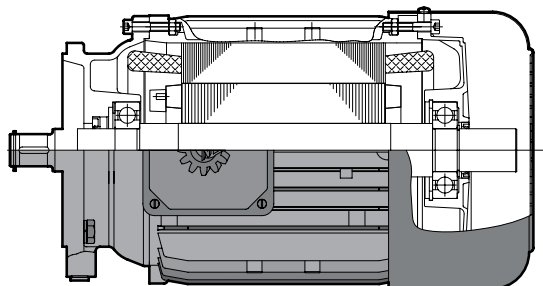




Totally Enclosed Non-Ventilated (OL) Mod

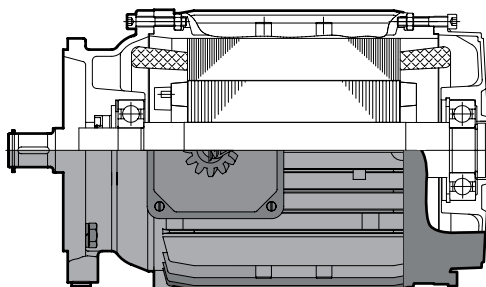
NORD can provide totally enclosed non-ventilated (TENV) motor enclosure. TENV motors provide benefits in certain operating environments; such as extremely dusty or dirty applications, where cooling fans may have material accumulation, which can be detrimental to the motor and the application. The OL 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 than 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

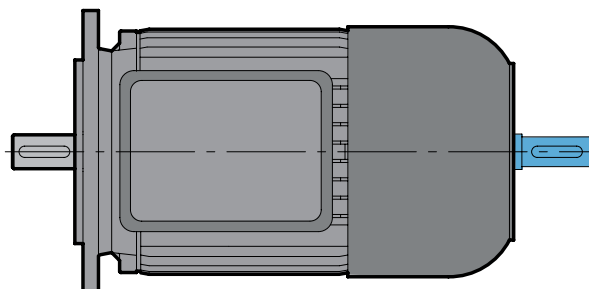
The OL/H series of TENV motors are more compact in space than the OL series. They do not include the rotor shaft extension through the back bearing end bell or the fan cover.



2nd Shaft Extension on Fan Side (WE) Build

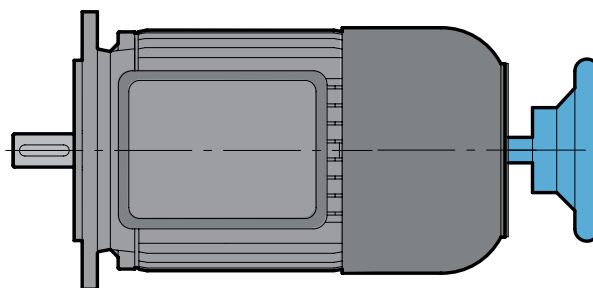
NORD can provide a second shaft extension on the fan side of the motor that protrudes through the fan cover. This extension can be used as a power take-off or to mount customer supplied devices such as encoders and tachometers.

The shaft extension can be provided on both motors with and without brakes. The shaft extension can not be used on motors with blower fans (F) or (FC). For dimensions see pages 194 - 195.



Hand Wheel (HR) Build

Motors can be supplied with a hand wheel provided on the second shaft extension. The hand wheel can be used for manual operation during power outages, or for machine positioning setup. For dimensions see pages 194 - 195.



Warning



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

Additional Options



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_2 [lb-ft ²]
71	0.0475
80	0.1140
90	0.2375
100	0.2684
112	0.5653



Motor Backstop (RLS)

Build

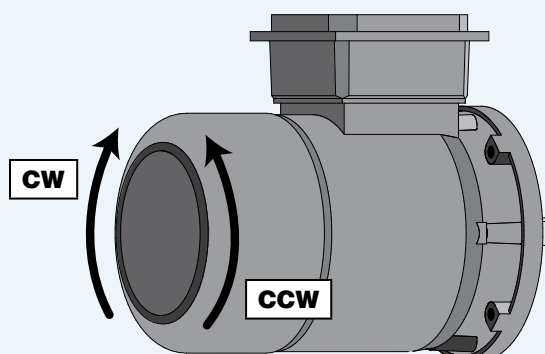
NORD can provide backstops on many motor frames. A backstop will prevent the motor from rotating in one direction. A common use is to prevent a motor from allowing a load to move backwards when power is removed. A motor brake can also be used for this same purpose. A backstop adds length to the motor. 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



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 manufacturer 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:

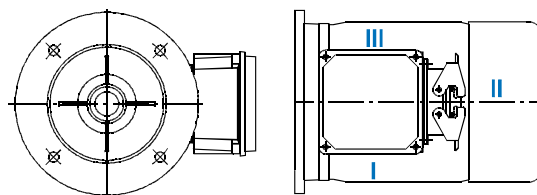
Manufacturer	Harting
Connector	HAN 10 ES/HAN 10ESS Cage Clamp Connectors
Number of Pins	10-Male
Voltage	600VAC per UL/CSA
Current	16A - Continuous

Motor 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

Power Plug Positions



Power plug position must be specified

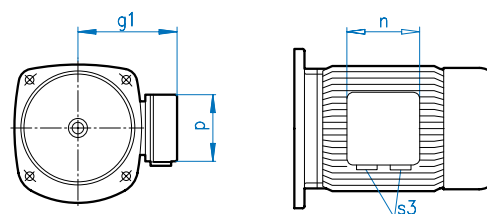
Power Plug Position

☐ I ☐ II ☐ III

Small Terminal Box (EKK)

Mod

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 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



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 Pn		Nn Full-load	In Full-Load Current		Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]		230V ^{a)}	460V ^{a)}								
			[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft²]
63S/4	0.16	0.12	1700	0.88	0.44	245	F	5.92	2.1	2.2	0.66	52	0.005
63L/4	0.25	0.18	1680	1.12	0.56	275	E	8.99	2.1	2.2	0.71	57	0.0067
71S/4	0.33	0.25	1710	1.56	0.78	310	G	12.3	2.5	2.4	0.64	63	0.017
71L/4	0.5	0.37	1720	1.90	0.95	355	F	18.0	2.45	2.6	0.69	71	0.0204
80S/4	0.75	0.55	1710	2.70	1.35	355	F	27.0	2.2	2.2	0.71	72	0.0259
80L/4	1	0.75	1650	3.66	1.83	390	G	38.1	2.2	2.3	0.74	70	0.0345
90S/4	1.5	1.1	1660	4.84	2.42	445	G	55.6	2.7	2.6	0.78	73	0.055
90L/4	2	1.5	1660	6.34	3.17	465	G	75.8	2.55	2.5	0.80	74	0.074
100L/4	3	2.2	1705	9.0	4.50	490	G	108	2.3	2.6	0.81	82	0.107
100LA/4	5	3.7	1725	15.2	7.62	510	G	180	2.7	3.1	0.75	81	0.141

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



Energy Efficient (EPAAct)

230/460V – 60Hz / EE

Inverter duty • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase

Voltages: 230/460V – 60Hz • 1.15 Service Factor

Continuous Duty • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation



Motor Type	Power Pn		Nn Full-load	In Full-Load Current		Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]		230V ^(a)	460V ^(a)								
			[rpm]	[A]	[A]	[%]		[lb-in]				[%]	[lb-ft ²]
80LH/4	1	0.75	1750	3.88	1.94	600	L	36.0	4.6	4.3	0.59	82.5	0.051
90SH/4	1.5	1.1	1740	4.3	2.15	630	J	53.1	3.5	3.8	0.76	84.0	0.085
90LH/4	2	1.5	1745	6.3	3.15	670	K	72.1	4.3	4.5	0.71	84.0	0.092
100LH/4	3	2.2	1765	8.6	4.3	790	L	105	3.6	4.7	0.73	87.5	0.178
112MH/4	5	3.7	1770	14.4	7.2	810	L	176	4.0	4.8	0.76	87.5	0.304

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

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



Performance Data



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 Pn		Nn Full-load	In Full-Load Current 575V	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]										
			[rpm]	[A]	[%]		[lb-in]				[%]	[lb-ft ²]
63S/4	0.16	0.12	1700	0.37	245	F	5.92	2.1	2.2	0.66	52	0.005
63L/4	0.25	0.18	1680	0.46	275	E	8.99	2.1	2.2	0.71	57	0.0067
71S/4	0.33	0.25	1710	0.66	310	G	12.3	2.5	2.4	0.64	63	0.017
71L/4	0.5	0.37	1720	0.8	355	F	18.0	2.45	2.6	0.69	71	0.0204
80S/4	0.75	0.55	1710	1.12	355	F	27.0	2.2	2.2	0.71	72	0.0259
80L/4	1	0.75	1650	1.46	390	G	38.1	2.2	2.3	0.74	70	0.0345
90S/4	1.5	1.1	1660	1.94	445	G	55.6	2.7	2.6	0.78	73	0.055
90L/4	2	1.5	1660	2.54	465	G	75.8	2.55	2.5	0.80	74	0.074
100L/4	3	2.2	1705	3.6	490	G	108	2.3	2.6	0.81	82	0.107
100LA/4	5	3.7	1725	6.1	510	G	180	2.7	3.1	0.75	81	0.141

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

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



Energy Efficient (EPAAct)

575V – 60Hz / EE

Inverter duty • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase

Voltages: 332/575V – 60Hz • 1.15 Service Factor

Continuous Duty • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation



Motor Type	Power Pn		Nn Full-load	In Full-Load Current 575V	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff.	Jm Inertia
	[hp]	[kW]										
80LH/4	1	0.75	1750	1.5	600	L	36.0	4.6	4.3	0.59	82.5	0.051
90SH/4	1.5	1.1	1740	1.75	630	J	53.1	3.5	3.8	0.76	84.0	0.085
90LH/4	2	1.5	1745	2.45	670	K	72.1	4.3	4.5	0.71	84.0	0.092
100LH/4	3	2.2	1765	3.4	790	L	105	3.6	4.7	0.73	87.5	0.178
112MH/4	5	3.7	1770	5.6	810	L	176	4.0	4.8	0.76	87.5	0.304

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

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



Performance Data



Standard Efficiency

200-208V – 60Hz

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



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

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

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



Standard Efficiency (EFF2)

400V – 50Hz

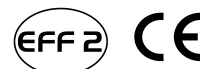
Inverter duty • TEFC

Synchronous speed 1500rpm @ 50Hz • 4-pole • Three-phase

Voltages: 400V (380-420) – 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 Full-Load Current 400V ^{a)}	I _a /I _n	Code Letter	Torque T _n	T _a /T _n	T _k /T _n	pf	Eff Full load	Eff 75% Load	Eff Class	J _m Inertia
	[hp]	[kW]												
63S/4	0.16	0.12	1335	0.55	290	H	7.60	2.7	2.7	0.64	49.9	b)	b)	0.005
63L/4	0.25	0.18	1360	0.68	330	G	11.2	2.5	2.6	0.64	56.2	b)	b)	0.007
71S/4	0.33	0.25	1380	0.76	330	F	15.3	2.2	2.1	0.77	61.6	b)	b)	0.017
71L/4	0.5	0.37	1380	1.09	360	F	22.7	2.0	2.4	0.71	64.4	b)	b)	0.021
80S/4	0.75	0.55	1375	1.52	330	E	33.8	1.9	2.0	0.73	71.5	b)	b)	0.026
80L/4	1	0.75	1375	2.10	350	F	46.1	2.0	2.1	0.74	69.6	b)	b)	0.035
90S/4	1.5	1.1	1395	2.81	440	G	66.7	2.3	2.6	0.74	76.2	75.9	EFF2	0.056
90L/4	2	1.5	1395	3.55	480	G	90.9	2.3	2.6	0.78	78.5	78.2	EFF2	0.074
100L/4	3	2.2	1440	5.22	510	G	129	2.3	3.0	0.74	81.1	81.1	EFF2	0.107
100LA/4	4	3	1415	6.54	540	G	179	2.5	2.9	0.80	82.6	82.4	EFF2	0.143
112M/4	5.4	4	1445	8.30	530	G	234	2.3	2.8	0.80	86.0	84.0	EFF2	0.261

a) Motors 3 Hp (2.2 kW) and below are rated 230D/400 Y Volts. Motors 4 Hp (3 kW) and higher are rated 400D/690Y Volts.

Motors connected at 400 Volts can safely operate between 380-420 Volts, at 50 Hz.

b) Per CEMEP, the association of European Electric Motor Manufacturers, only motors from 1 kW to 100 kW require a designated EFF Class

P _n	-	Full load power	T _a /T _n	-	Locked-rotor torque ratio
N _n	-	Full load speed	T _k	-	Break-down torque
I _n	-	Full load current	T _k /T _n	-	Break-down torque ratio
I _a	-	Locked-rotor current	pf	-	Power factor
I _a /I _n	-	Locked-rotor current ratio (%)	Eff	-	Normal efficiency
T _n	-	Full-load torque	J _m	-	Motor inertia
T _a	-	Locked-rotor torque			



Performance Data



Energy Efficient (EFF1)

400V – 50Hz / EE

Inverter duty • TEFC

Synchronous speed 1500rpm @ 50Hz • 4-pole • Three-phase

Voltages: 400V (380-420) – 50Hz • 1.0 Service Factor

Continuous Duty • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation



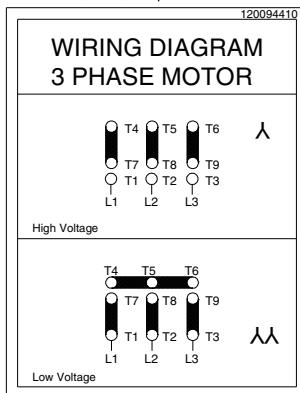
Motor Type	Power Pn		Nn Full-load	In Full-Load Current 400V ^{a)} (380-420V)	Ia/In	Code Letter	Torque Tn	Ta/Tn	Tk/Tn	pf	Eff Full load	Eff 75% load	Eff Class	Jm Inertia
	[hp]	[kW]												
90SH/4	1.5	1.1	1430	2.51	518	G	65.0	2.75	3.13	0.75	84.0	85.1	EFF1	0.0816
90LH/4	2	1.5	1435	3.59	557	H	88.4	3.63	3.73	0.72	85.0	85.3	EFF1	0.0928
100LH/4	3	2.2	1465	4.88	686	J	127	3.28	4.01	0.74	87.5	87.9	EFF1	0.178
112SH/4	4	3	1460	6.7	716	K	174	3.26	4.18	0.72	87.4	90.0	EFF1	0.282
112MH/4	5.4	4	1460	8.57	700	J	232	3.25	3.90	0.77	88.3	90.2	EFF1	0.304

a) Motors 3 Hp (2.2 kW) and below are rated 230D/400 Y Volts. Motors 4 Hp (3 kW) and higher are rated 400D/690Y Volts.
Motors connected at 400 Volts can safely operate between 380-420 Volts, at 50 Hz.

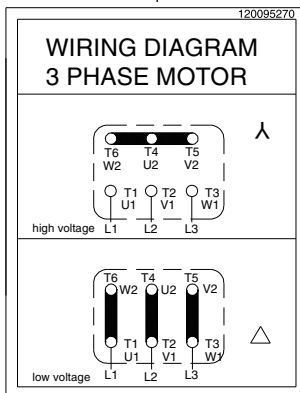
Pn	-	Full load power	Ta/Tn	-	Locked-rotor torque ratio
Nn	-	Full load speed	Tk	-	Break-down torque
In	-	Full load current	Tk/Tn	-	Break-down torque ratio
Ia	-	Locked-rotor current	pf	-	Power factor
Ia/In	-	Locked-rotor current ratio (%)	Eff	-	Normal efficiency
Tn	-	Full-load torque	Jm	-	Motor inertia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



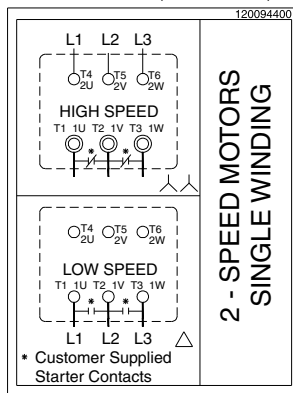
Frames 63-132
230 / 460V, 60Hz, 3Ø | 200 / 400V, 50Hz, 3Ø
190 / 380V, 60Hz, 3Ø



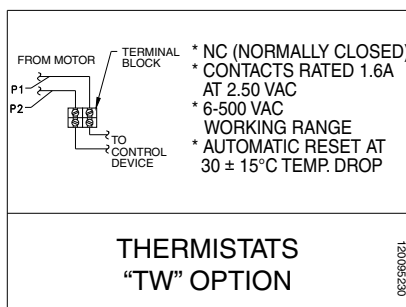
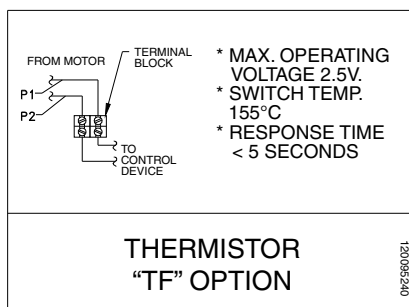
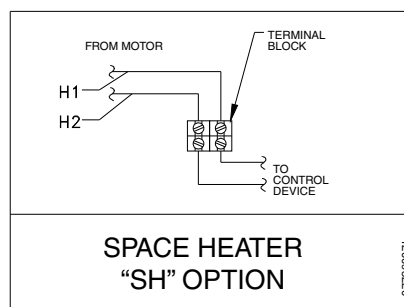
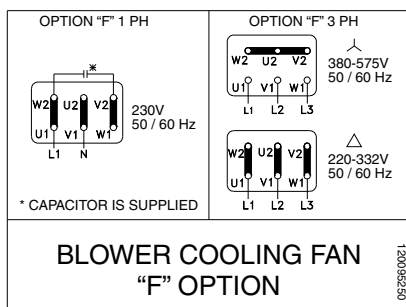
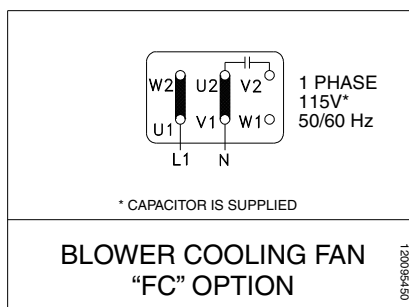
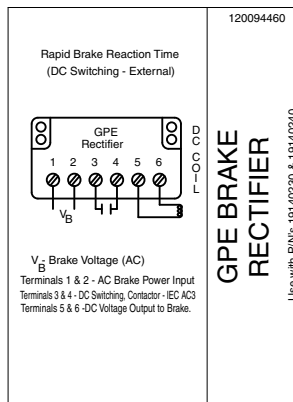
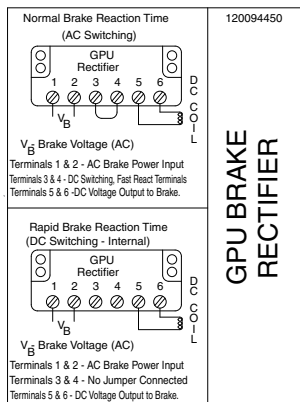
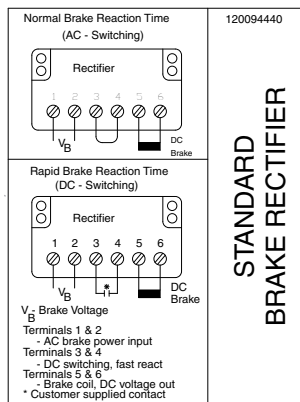
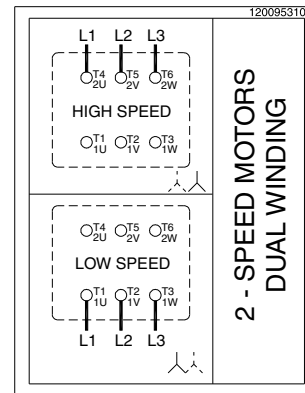
460 / 800V, 60Hz, 3Ø | 230 / 400V, 50Hz, 3Ø
208 / 360V, 60Hz, 3Ø | 400 / 690V, 50Hz, 3Ø
332 / 575V, 60Hz, 3Ø



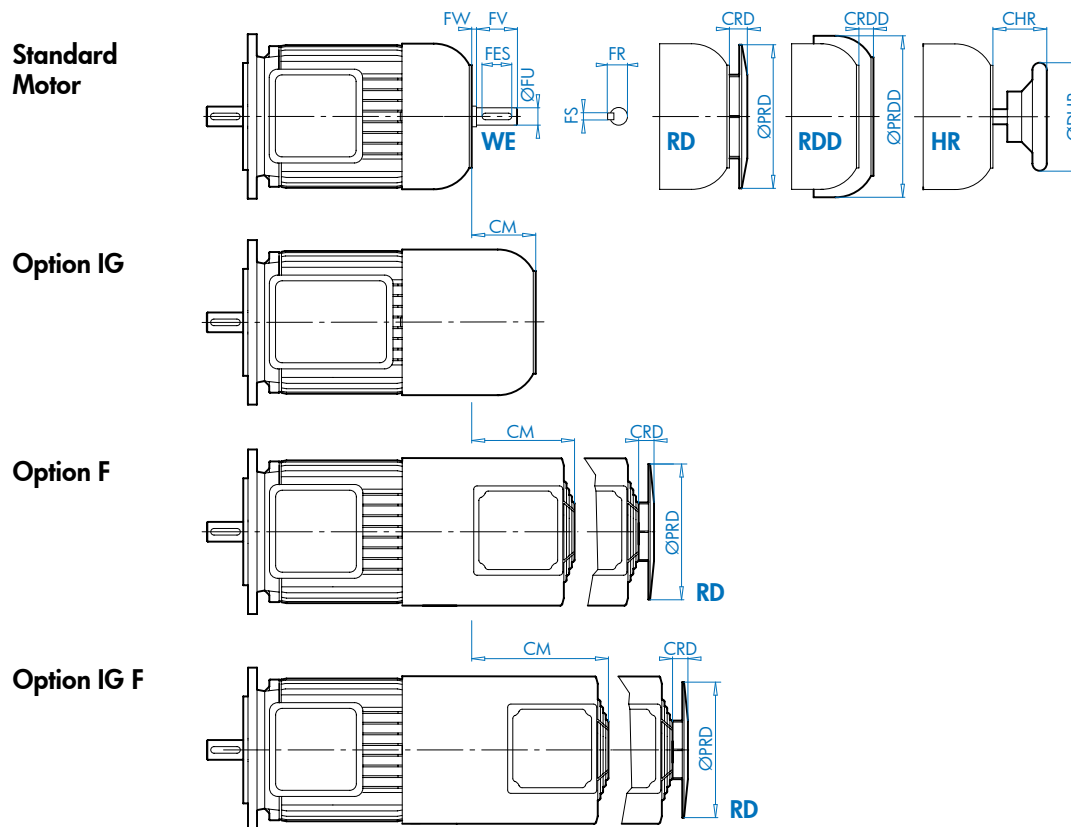
**2 - SPEED MOTORS
SINGLE WINDING (4-2 & 8-4 POLE)**



**2 - SPEED MOTORS
DUAL WINDING (8-2 POLE)**



Dimensions Motor Options

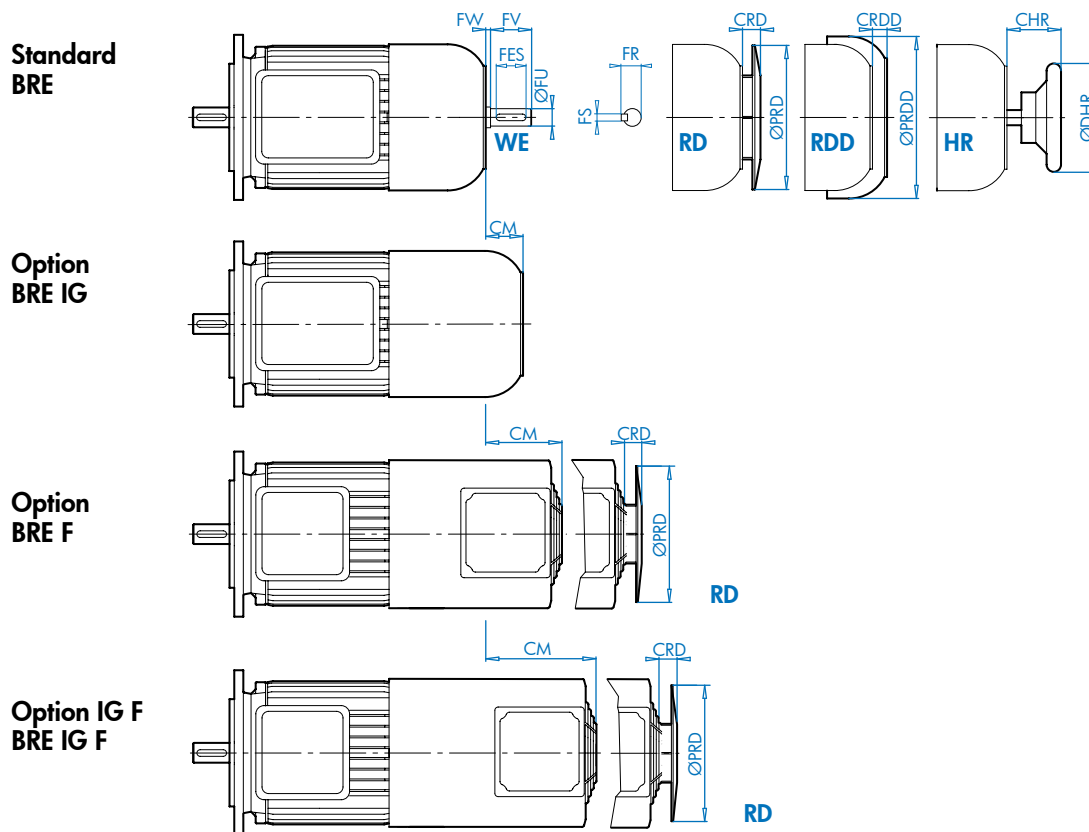


Motor Type	WE						RD		RDD		HR		IG	F	IG F	RD/IG/IGF	
	FU	FR	FV	FW	FES	FS	PRD	CRD	PRDD	CRDD	DHR	CHR	CM	CM	CM	PRD	CRD
	[mm]						[in]										
63S/L	11	12.5	23	0	16	4	4.84	0.47	6.02	1.06	3.94	1.54	2.20	3.46	6.22	5.24	1.46
71S/L	11	16.0	23	1	16	4	5.43	0.47	6.65	0.94	3.94	1.57	2.20	3.50	5.67	5.91	1.46
80S/L	14	21.5	30	3	20	5	6.14	0.63	7.20	1.22	3.94	1.93	2.40	3.54	5.51	6.69	1.57
90S/L	19	27.0	40	7	32	6	6.93	0.63	7.91	1.22	6.30	2.64	2.83	4.09	5.87	7.40	1.18
100L	24	31.0	50	6	40	8	7.64	0.63	8.86	1.10	6.30	2.95	2.71	3.74	6.10	8.27	1.10
112M	24	31.0	50	4	40	8	8.58	0.63	10.43	1.50	6.30	2.91	2.67	3.90	5.87	9.80	1.30

* Consult Factory



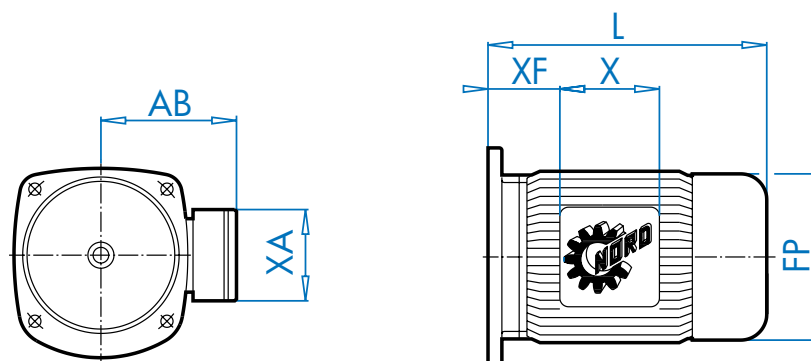
Dimensions Brakemotor Options



Motor Type	WE						RD		RDD		HR		IG	F	IG F	RD/IG/IGF	
	FU	FR	FV	FW	FES	FS	PRD	CRD	PRDD	CRDD	DHR	CHR	CM	CM	CM	PRD	CRD
	[mm]						[in]										
63S/L	11	12.5	23	3.5	16	4	4.84	0.47	6.02	1.02	0.39	1.69	2.44	3.54	4.92	5.24	1.46
71S/L	11	16.0	23	3.5	16	4	5.43	0.47	6.65	0.94	3.94	1.69	2.91	3.70	5.47	5.91	1.46
80S/L	14	21.5	30	4	20	5	6.14	0.63	7.20	1.22	3.94	1.97	2.20	3.50	5.47	6.69	1.57
90S/L	14	27.0	30	8	32	6	6.93	0.63	7.91	1.22	6.30	2.68	2.76	3.94	5.71	7.40	1.18
100L	24	31.0	50	10	40	8	7.64	0.63	8.86	0.87	6.30	3.07	2.80	4.13	5.52	8.27	1.10
112M	24	31.0	50	7	40	8	8.58	0.63	10.43	1.50	6.30	3.03	2.52	4.13	5.52	9.80	1.30

* Consult Factory

Dimensions Conduit Box & Cable Entry



Type / Flange	Options	Outline dimensions						Cable entry	
63S/L		FP	AB	XF	X	L	XA	ce	ce-adapter
B14		5.12	4.53	0.47	3.94	7.56	3.94	2 × M20×1.5	1/2" NPT
160S		5.12	4.53	0.63	3.94	7.72	3.94	2 × M20×1.5	1/2" NPT
B14	BRE	5.12	4.84	0.75	5.20	9.76	3.43	2 × M20×1.5	1/2" NPT
160S	BRE	5.12	4.84	0.91	5.20	9.92	3.43	2 × M20×1.5	1/2" NPT

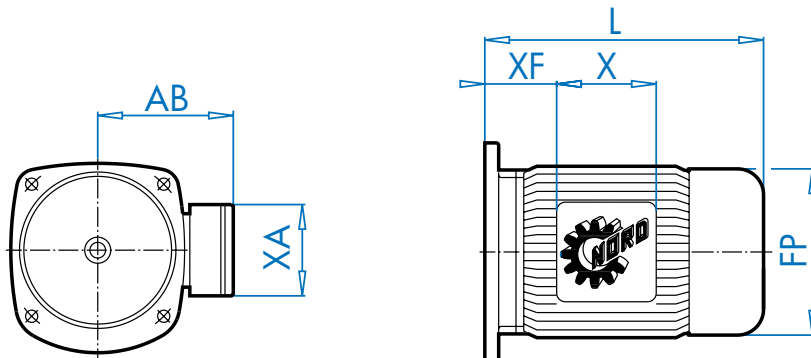
71S/L		FP	AB	XF	X	L	XA	ce	ce-adapter
B14		5.71	4.88	0.79	3.94	8.43	3.94	2 × M20×1.5	1/2" NPT
160S		5.71	4.88	1.65	3.94	9.29	3.94	2 × M20×1.5	1/2" NPT
250S		5.71	4.88	1.42	3.94	9.06	3.94	2 × M20×1.5	1/2" NPT
B14	BRE	5.75	5.24	1.06	5.20	10.71	3.43	2 × M20×1.5	1/2" NPT
160S	BRE	5.75	5.24	1.93	5.20	11.57	3.43	2 × M20×1.5	1/2" NPT
250S	BRE	5.75	5.24	1.69	5.20	11.34	3.43	2 × M20×1.5	1/2" NPT

80S/L/LH		FP	AB	XF	X	L	XA	ce	ce-adapter
B14		6.50	5.59	0.87	4.49	9.29	4.49	2 × M25×1.5	3/4" NPT
160S		6.50	5.59	1.85	4.49	10.28	4.49	2 × M25×1.5	3/4" NPT
250S		6.50	5.59	1.61	4.49	10.04	4.49	2 × M25×1.5	3/4" NPT
B14	BRE	6.50	5.63	1.02	6.02	11.81	4.25	2 × M25×1.5	3/4" NPT
160S	BRE	6.50	5.63	2.01	6.02	12.80	4.25	2 × M25×1.5	3/4" NPT
250S	BRE	6.50	5.63	1.77	6.02	12.56	4.25	2 × M25×1.5	3/4" NPT

90S/L/SH/LH		FP	AB	XF	X	L	XA	ce	ce-adapter
B14		7.20	5.79	1.02	4.49	10.87	4.49	2 × M25×1.5	3/4" NPT
160S		7.20	5.79	2.05	4.49	11.89	4.49	2 × M25×1.5	3/4" NPT
250S		7.20	5.79	1.81	4.49	11.65	4.49	2 × M25×1.5	3/4" NPT
300S		7.20	5.79	1.02	4.49	10.87	4.49	2 × M25×1.5	3/4" NPT
B14	BRE	7.20	5.83	1.18	6.02	13.82	4.25	2 × M25×1.5	3/4" NPT
160S	BRE	7.20	5.83	2.20	6.02	14.84	4.25	2 × M25×1.5	3/4" NPT
250S	BRE	7.20	5.83	1.97	6.02	14.61	4.25	2 × M25×1.5	3/4" NPT
300S	BRE	7.20	5.83	1.18	6.02	13.82	4.25	2 × M25×1.5	3/4" NPT



Dimensions Conduit Box & Cable Entry



Type / Flange 100L/L/LA/LH	Options	Outline dimensions						Cable entry	
		FP	AB	XF	X	L	XA	ce	ce-adapter
B14		7.91	6.65	1.26	4.49	12.05	4.49	2 × M32×1.5	1" NPT
160S		7.91	6.65	2.28	4.49	13.07	4.49	2 × M32×1.5	1" NPT
250S		7.91	6.65	2.05	4.49	12.83	4.49	2 × M32×1.5	1" NPT
300S		7.91	6.65	1.26	4.49	12.05	4.49	2 × M32×1.5	1" NPT
Ø 250		7.91	6.65	1.26	4.49	12.05	4.49	2 × M32×1.5	1" NPT
B14	BRE	7.91	6.26	1.42	6.02	15.63	4.25	2 × M32×1.5	1" NPT
160S	BRE	7.91	6.26	2.44	6.02	16.65	4.25	2 × M32×1.5	1" NPT
250S	BRE	7.91	6.26	2.20	6.02	16.42	4.25	2 × M32×1.5	1" NPT
300S	BRE	7.91	6.26	1.42	6.02	15.63	4.25	2 × M32×1.5	1" NPT
Ø 250	BRE	7.91	6.26	1.42	6.02	15.63	4.25	2 × M32×1.5	1" NPT

112M/SH/MH		FP	AB	XF	X	L	XA	ce	ce-adapter
B14		8.98	7.05	1.77	4.49	12.83	4.49	2 × M32×1.5	1" NPT
160S		8.98	7.05	2.91	4.49	13.98	4.49	2 × M32×1.5	1" NPT
250S		8.98	7.05	2.68	4.49	13.74	4.49	2 × M32×1.5	1" NPT
300S		8.98	7.05	1.89	4.49	12.95	4.49	2 × M32×1.5	1" NPT
Ø 250		8.98	7.05	1.77	4.49	12.83	4.49	2 × M32×1.5	1" NPT
B14	BRE	8.98	6.69	1.93	6.02	16.50	4.25	2 × M32×1.5	1" NPT
160S	BRE	8.98	6.69	3.07	6.02	17.64	4.25	2 × M32×1.5	1" NPT
250S	BRE	8.98	6.69	2.83	6.02	17.40	4.25	2 × M32×1.5	1" NPT
300S	BRE	8.98	6.69	2.05	6.02	16.61	4.25	2 × M32×1.5	1" NPT
Ø 250	BRE	8.98	6.69	1.93	6.02	16.50	4.25	2 × M32×1.5	1" NPT

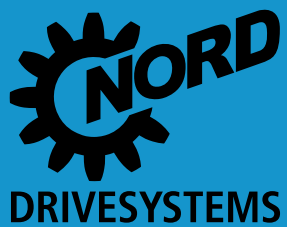


Notes



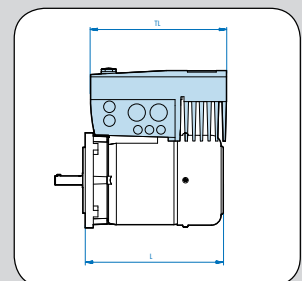
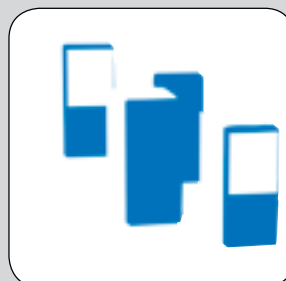
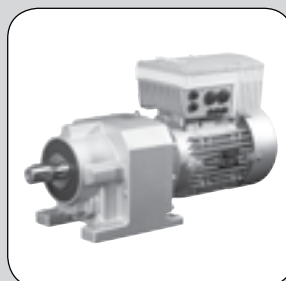
AC Vector Drives

- AC Vector Drive SK 200E
- AC Vector Drive SK 500E
- Dimensions



www.nord.com

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 - 5 hp (0.25 - 4 kW)
- 3~480V 0.75 - 10 hp (0.55 - 7.5 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 200E Inverter Selection:

Choose the SK 200E AC Vector drive based on drive features, motor power rating, input voltage and protection class.

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)





Step 1: SK 200E Inverter Selection

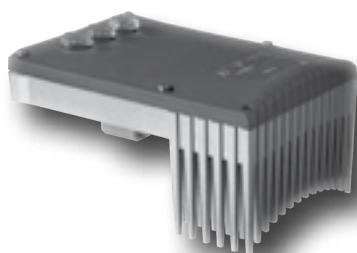
	Series	kW Rating	Input Voltage	Protection Class
SK	1	E	3	4

1	Series
205	- Basic Unit
215	- Basic Unit + Safe Stop Function
225	- Basic Unit + AS Interface
235	- Basic Unit + AS Interface + Safe Stop

2	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)

3	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)
340-A	- 380-480V, 3-phase (0.75-7.5 kW) (1-10 hp)

4	Protection Class
Blank	- IP55
-C	- IP66



NORDAC SK 200E Motor Mounted 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 205E Basic Equipment:

- ☒ Sensorless current vector control (ISD)
- ☒ Plug-in storage module (EEPROM)
- ☒ 4x digital input, PTC input, brake control (integrated rectifier)
- ☒ Brake management
- ☒ Immediate-access RS 232 diagnostic interface
- ☒ Energy saving function
- ☒ Digital input status LEDs
- ☒ Immediate-access setpoint potentiometer
- ☒ Simple field wiring
- ☒ Variable mounting possibilities for system connectors
- ☒ 24V external control voltage required
- ☒ Incremental encoder evaluation
- ☒ POSICON Positioning control

SK 215E Additional Features:

- ☒ Safety function "Safe stop" as per EN 954-1
- ☒ SK 205E basic equipment (see above)

SK 225E Additional Features:

- ☒ AS interface on board
- ☒ SK 205E basic equipment (see above)

SK 235E Additional Features:

- ☒ Safety function "Safe stop" as per EN 954-1
- ☒ AS interface on board
- ☒ SK 205E basic equipment (see above)



Step 2: SK 200E Motor Adapter Selection

SK TI4 5 **E** 1 - 6 4

5	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)

1	Series
205	- Basic Unit
215	- Basic Unit + Safe Stop Function
225	- Basic Unit + AS Interface
235	- Basic Unit + AS Interface + Safe Stop

6	# of Input Phases
1	- 1-phase
3	- 3-phase

4	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 resistors, as well as quick-disconnect power and control connectors.





Step 3: 24VDC Power Supply Selection (if required)

Module Type	Module Input Voltage*	Protection Class*
SK 7 - 24V -	8	4

* applies only to external "TU4" units

7	Module Type (Internal/External)
CU4	Internal Customer Unit
TU4	External Technology Unit
8	Module Input Voltage
123B	All 100-120V & 200-240V Units
140B	All 380-480V Units
4	Protection Class
Blank	IP55
-C	IP66

Step 3: Speed POT & L-O-R Switch (if required)

Module Type	Module Input Voltage*	Protection Class*
SK 7 - POT -	8	4

* applies only to external "TU4" units

7	Module Type (Internal/External)
CU4	Internal Customer Unit
TU4	External Technology Unit
8	Module Input Voltage
123B	All 100-120V & 200-240V Units
140B	All 380-480V Units
4	Protection Class
Blank	IP55
-C	IP66

Step 3: Fieldbus / IO Extension Selection (if required)

Module Type	Fieldbus/IOE Option	M12 Connect Option*	Protection Class*
SK 7 -	9	10	4

* applies only to external "TU4" units

7	Module Type (Internal/External)
CU4	Internal Customer Unit
TU4	External Technology Unit
9	Fieldbus, I/O Extension Module
PBR	Profibus
CAO	CANopen
DEV	DeviceNet
IOE	I/O Extension
10	M12 Connectors for Module I/O
Blank	Not required
M12	M12 Connectors Included
4	Protection Class
Blank	IP55
-C	IP66

Customer Units

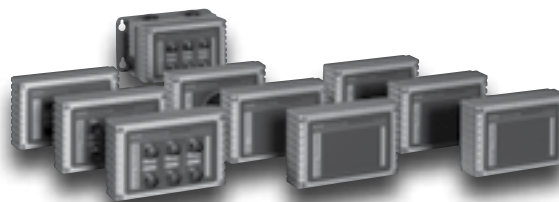
Internal customer interfaces enable the expansion of the range of functions of SK 200E AC vector drive without changing the physical size. Users have access to communication modules, an internal control power module or an I/O expansion.



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 T14-TU-XXX selection on page 204)



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- ①	④

* applies only to external "TU4" units

① Assembly Adaptor for TU4 Technology Units
BUS - For all PBR, CAO, DEV, and IOE Technology Units
NET - For all 24V and POT Technology Units

④ 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- ⑫	⑬

⑫ Dynamic Braking Resistor Location
BUS - For all PBR, CAO, DEV, and IOE Technology Units
NET - For all 24V and POT Technology Units

⑬ 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- ⑮

⑮ Selection Code for Adaptor
1 - For inverter frame sizes 1 & 2**
2 - For inverter frame size 3**
TU - For external Technology Units

** See Box ⑤ on page 202 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 (hand-held) 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.

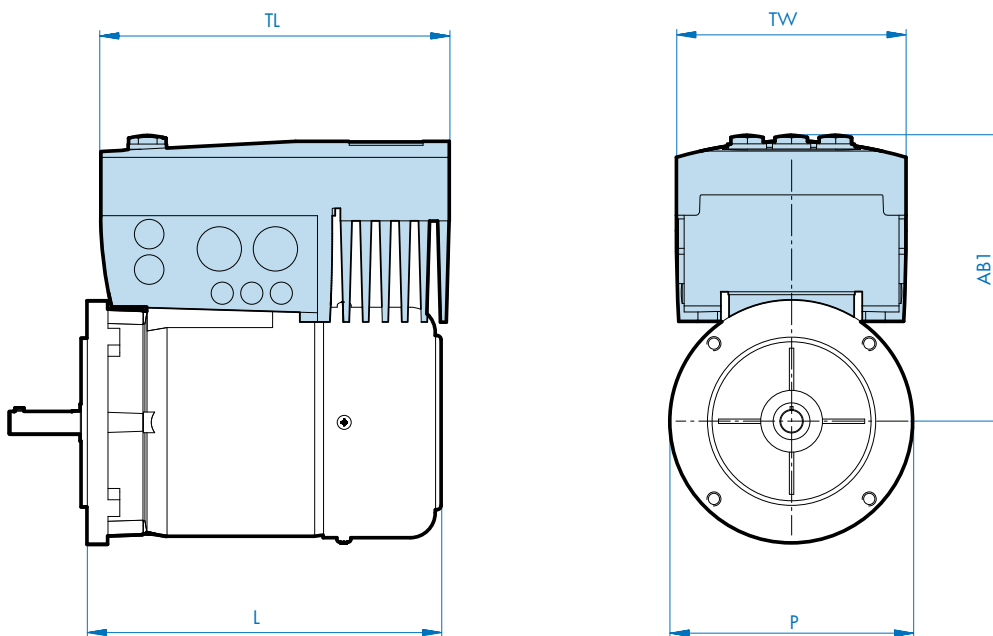
The SK CSX-3H is used in a similar fashion as the SK PAR-3H and SK PAR-2E, but implements a bright, 4-digit 7-segment LED display.

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.





Motor Dimensions with SK 200E Motor Mounted AC Vector Drive



AC Vector Drive Size	Motor	Width		Length		AB1 [in]	Weight [lbs]
		P [in]	TW [in]	L [in]	TL [in]		
Size 1	71S/L	5.71	6.14	8.43	9.29	7.91	1.36
	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	1.86
	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	3.13
	112M	8.98		12.83		10.28	
	132S/M	10.47		16.18		10.31	

AC Vector Drive SK 200E

General Specifications



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	$\frac{1}{3}$	1.7	8.9
	-370-112-O			0.37	$\frac{1}{2}$	2.2	11
	-550-112-O			0.55	$\frac{3}{4}$	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	$\frac{1}{3}$	1.7	3.9
	-370-123-A			0.37	$\frac{1}{2}$	2.2	5.8
	-550-123-A			0.55	$\frac{3}{4}$	3.0	7.3
	-750-123-A			0.75	1	4.0	10.2
	-111-123-A			1.1	$1\frac{1}{2}$	5.5	14.7



SK 200E General Specifications

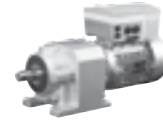
	Inverter type SK 2xxE...	Input voltage	Nominal motor power		Nominal output current rms [A]	Typical input current rms [A]
			230V [kW]	230V [hp]		
3 ~ 200 ... 240V	-250-323-A	3 ~ 200...240V -/+10% 47...63Hz	0.25	$\frac{1}{3}$	1.7	1.4
	-370-323-A		0.37	$\frac{1}{2}$	2.2	1.9
	-550-323-A		0.55	$\frac{3}{4}$	3.0	2.6
	-750-323-A		0.75	1	4.0	3.5
	-111-323-A		1.1	$1\frac{1}{2}$	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		Nominal output current rms [A]	Typical input current rms [A]
			400V [kW]	460V [hp]		
3 ~ 380 ... 500V	-550-340-A	3 ~ 380...500V -20%/+10% 47...63Hz	0.55	$\frac{3}{4}$	1.7	1.6
	-750-340-A		0.75	1	2.3	2.2
	-111-340-A		1.1	$1\frac{1}{2}$	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	$7\frac{1}{2}$	12.5	11.7
	-751-340-A		7.5	10	16	15.0

AC Vector Drive SK 200E

General Specifications



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 - 5 hp (0.25 - 4 kW) • 3~380...500V -20% +10% 0.75 - 10 hp (0.55 - 7.5 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 • Over/under-voltage • Short circuit, earthing fault • Over/underload, idling
Motor Turndown	• V/f Const Torque 10:1 • Sensorless Vector 30:1 • Closed Loop Vector 1000:1
Motor temperature Monitoring	Temperature sensor (PTC), temperature monitor (bimetal), I ² t- 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 • Energy saving mode • Sensorless Vector (ISD) • 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



NORDAC SK 500E AC Vector Drives

NORD has now expanded its 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.

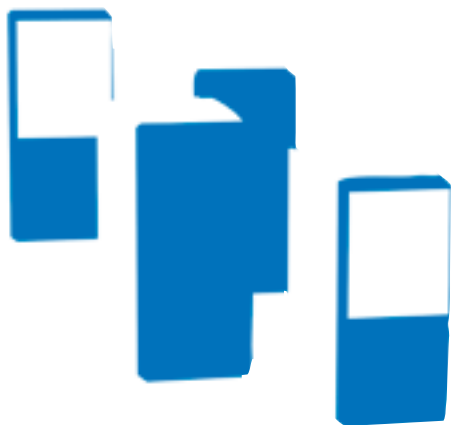
With the SK 500E series of AC vector drives, NORD offers intelligent and cost effective drive solutions with scalable equipment options, which are all fully compatible with regard to motor performance range, supply voltage and sizes. The basis for all models is a well-equipped basic unit with expansion 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 - 15 hp (0.25 - 11 kW)
- 3~240V 0.33 - 15 hp (0.25 - 11 kW)
- 3~480V 0.75 - 30 hp (0.55 - 22 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 Basic Equipment:

- ☑ Sensorless current vector control (ISD)
- ☑ Class A mains filter, up to 5m Class B motor cable
- ☑ Electro-mechanical motor brake management
- ☑ Brake chopper (brake resistor optional for 4 quadrant operation)
- ☑ 4 Switchable parameter sets
- ☑ All normal drive functions
- ☑ Process controller / PID controller (regulates temperature and pressure etc.)
- ☑ Comprehensive parameter structure
- ☑ Simple to operate
- ☑ All common bus systems
- ☑ Automatic flux optimisation (energy saving function)
- ☑ RS 232 PC diagnostic interface
- ☑ Pre-programmed with motor parameters for quick setup

SK 505E Additional Features:

- ☑ External 24V power supply
- ☑ SK 500E basic equipment (see above)

SK 510E Additional Features:

- ☑ Safety function "Safe stop" as per EN 954-1
- ☑ SK 500E basic equipment (see above)

SK 511E Additional Features:

- ☑ Safety function "Safe stop" as per EN 954-1
- ☑ CANopen on board
- ☑ SK 500E basic equipment (see above)

SK 515E Additional Features:

- ☑ External 24V power supply
- ☑ Safety function "Safe stop" as per EN 954-1
- ☑ SK 500E basic equipment (see above)

SK 520E Additional Features:

- ☑ CANopen on board
- ☑ Incremental Encoder Input
- ☑ POSICON on board
- ☑ SK 500E basic equipment (see above)

SK 530E Additional Features:

- ☑ CANopen on board
- ☑ Incremental Encoder Input
- ☑ POSICON on board
- ☑ Safety function "Safe stop" as per EN 954-1
- ☑ SK 500E basic equipment (see above)

SK 535E Additional Features:

- ☑ CANopen on board
- ☑ Incremental Encoder Input
- ☑ External 24V power supply
- ☑ POSICON on board
- ☑ Safety function "Safe stop" as per EN 954-1
- ☑ SK 500E basic equipment (see above)



Step 1: SK 200E Inverter Selection

SK **1** **E** **2** - **3**

Series kW Rating Input Voltage

1	Series
500	- Basic Unit
505	- Basic Unit + 24V Operation*
510	- Basic Unit + Safe Stop
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*

* External 24V supply required on select ratings. Please refer to Rating & Voltage Matrix below for more detail.

3	Input Voltage
112-O	- 100-120V, 1-phase (0.25-1.10 kW) (0.33-1.50 hp)
323-A	- 200-240V, 1-phase (0.25-2.20 kW) (0.33 - 3.00 hp)
323-A	- 200-240V, 3-phase (0.25-4.00 kW) (0.33-5.00hp)
340-A	- 380-480V, 3-phase (0.55-7.5 kW) (0.75-10.00 hp)

2	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)

AC VECTOR DRIVES

SK 500E Rating and Voltage Matrix

kW (hp)	SK 500E				SK 505E				SK 510E				SK 511E				SK 515E				SK 520E				SK 530E				SK 535E				
	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	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)																				⊛												⊛	

♦ 24VDC control voltage supply internal

♦ 24VDC control voltage required from external source

⊛ 24VDC control voltage supply internal or external



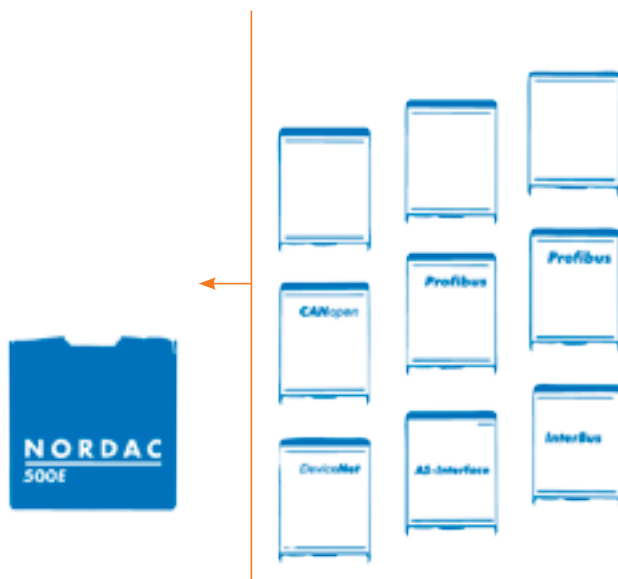
Step 2: Interface Module (Tech. Unit) Selection

Module Type
SK TU3 -

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

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

Module Type
SK BR4 -

Module Type (Internal/External)
Module Input Voltage
123B - All 100-120V & 200-240V Units
140B - All 380-480V Units
Protection Class
Blank - IP55
-C - IP66

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 using the internal brake chopper that is provided with the SK 500E.

Only the bottom-mounted dynamic braking resistors 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.

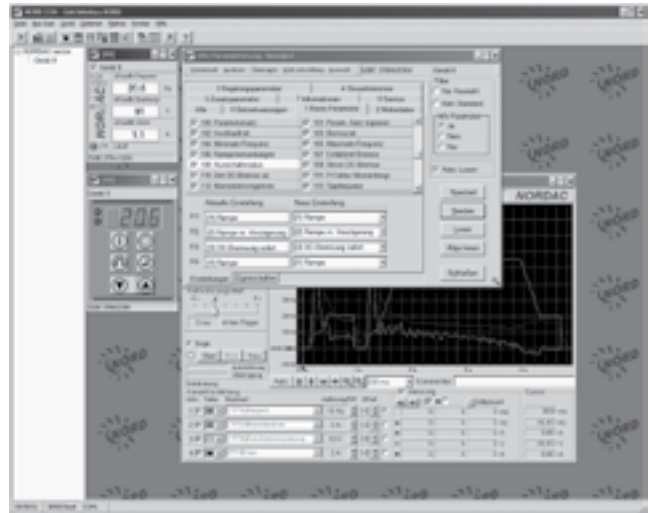


SK CSX-3H



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	$\frac{1}{3}$	1.7	8	size1: 186 x 74 x 153
	-370-112-O			0.37	$\frac{1}{2}$	2.2	10	
	-550-112-O			0.55	$\frac{3}{4}$	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	$\frac{1}{3}$	1.7	3.7 / 2.4	size1: 186 x 74 x 153
	-370-323-A		0.37	$\frac{1}{2}$	2.2	4.8 / 3.1	
	-550-323-A		0.55	$\frac{3}{4}$	3.0	6.5 / 4.2	
	-750-323-A		0.75	1	4.0	8.7 / 5.6	
	-111-323-A		1.1	$1\frac{1}{2}$	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

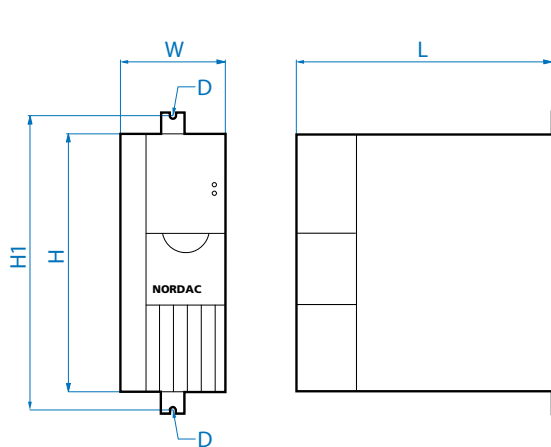
	Inverter type SK 5xxE...	Mains voltage	Nominal motor output 400 V [kW]	Nominal motor output 480 V [hp]	Nominal output current rms[A]	Typical input current rms[A]	Dimensions L x B x D [mm]
3 ~ 380 ... 480V AC VECTOR DRIVES	-550-340-A	3 ~ 380...480V -20%/+10%. 47...63Hz	0.55	$\frac{3}{4}$	1.7	2.4	size1: 186 x 74 x 153
	-750-340-A		0.75	1	2.3	3.2	
	-111-340-A		1.1	$1\frac{1}{2}$	3.1	4.3	size2: 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	size3: 241 x 98 x 174
	-401-340-A		4.0	5	9.5	13.3	
	-551-340-A		5.5	$7\frac{1}{2}$	12.5	17.5	size4: 286 x 98 x 174
	-751-340-A		7.5	10	16	22.4	
	-112-340-A		11.0	15	23	32.0	size5: 324 x 157 x 224
	-152-340-A		15.0	20	30	42.0	
	-182-340-A		18.5	25	37	52.0	size6: 364 x 183 x 234
	-222-340-A		22.0	30	45	63.0	



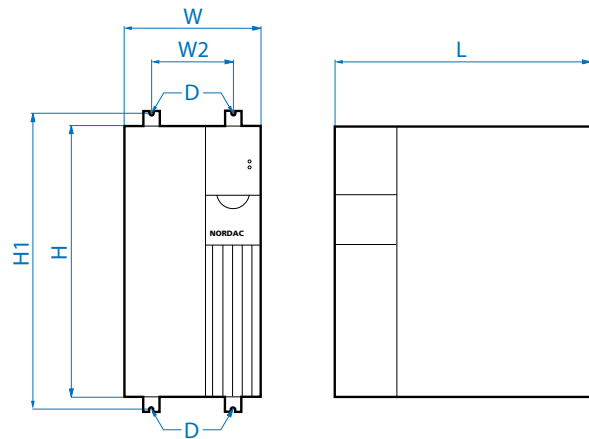
SK 500E General Specifications

Function	Specification
Power / Voltage	1~110-120V +/-10% 0.33 - 1.5 h (0.25 - 1.1 kW) 1~200-240V +/-10% 0.33 - 3 hp (0.25 - 2.2 kW) 3~200-240V +/-10% 0.33 - 1.5 hp (0.25 - 11.0 kW) 3~380-480V +/-10% 0.75 - 50 hp (0.55 - 37.0 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 - Over/under-voltage - Short circuit, earthing fault - Over/underload, idling
Motor Turndown	- V/f Constant Torque 10:1 - Sensorless Vector 30:1 - Closed Loop Vector 1000:1
Motor temperature Monitoring	Temperature sensor (PTC), temperature monitor (bimetal), I ² t- motor
Digital input	5x, 7.5 - 30V (500E), 7x, 7.5 - 35V (520-530E)
Control Methods	- V/f Constant torque - Energy saving mode - Sensorless Vector (ISD) - 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 (SK5xE only)

SK 500E AC Vector Drive Dimensions



Case Sizes 1 - 4

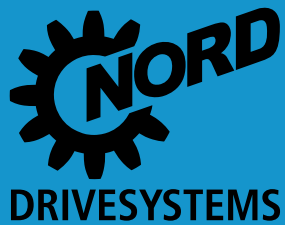
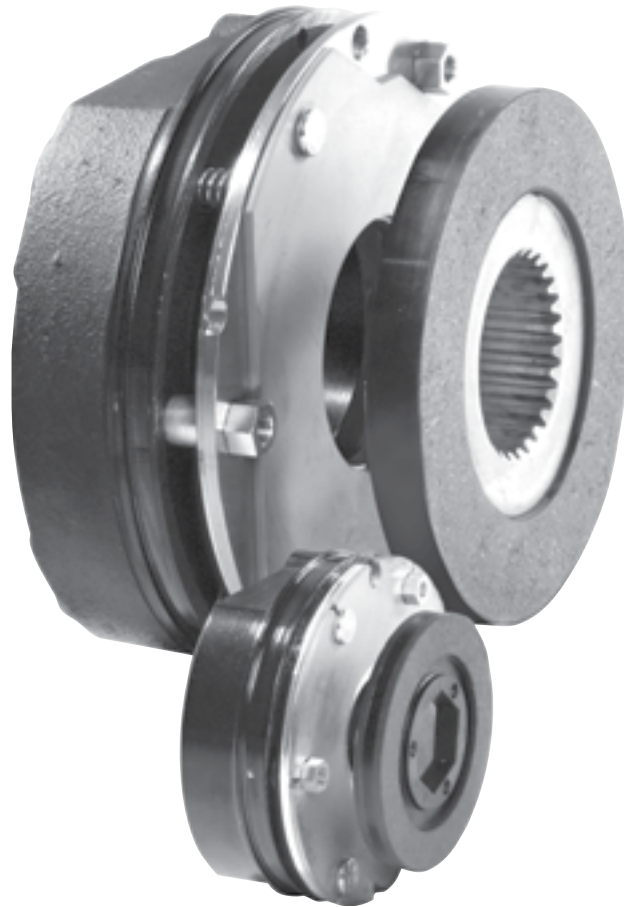


Case Sizes 5 - 6

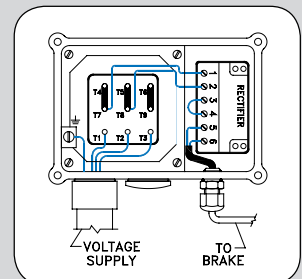
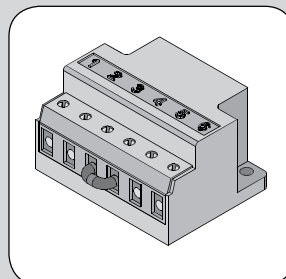
Case Size	H	H1	L	W	W2	D	Weight
Case Size 1	7.32 [186 mm]	8.66 [220 mm]	6.02 [153 mm]	2.91 [74 mm]	-	ø0.216 [5.5 mm]	3.08 lb [1.4 kg]
Case Size 2	8.90 [226 mm]	10.24 [260 mm]	6.02 [153 mm]	2.91 [74 mm]	-	ø0.216 [5.5 mm]	3.97 lb [1.8 kg]
Case Size 3	9.49 [241 mm]	10.83 [275 mm]	7.13 [181 mm]	3.86 [98 mm]	-	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]	6.18 [157 mm]	4.33 [110 mm]	ø0.216 [5.5 mm]	22.71 lb [10.3 kg]

Brakes

- Operation
- Torque Selection
- Rectifiers
- Performance Selection
- Mechanical Options
- Connection Diagrams



www.nord.com





Motor-Brake Option (BRE)

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

Advantages

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

Operation

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

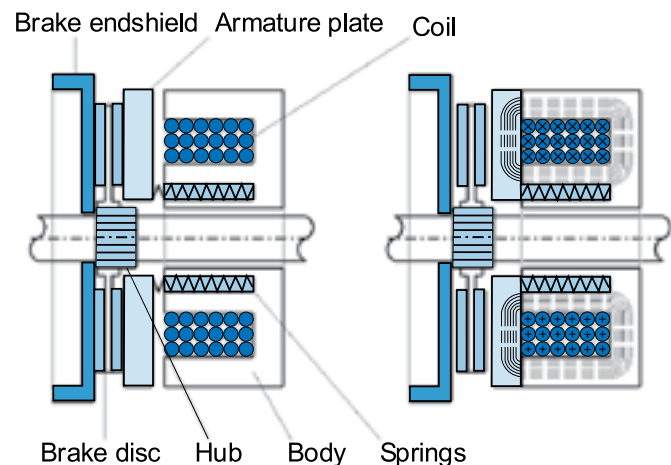
- In typical direct-across-the-line motor operation, AC brake power may be supplied from the motor's terminal board.
- If the motor is a two-speed model, or if the motor is being controlled by a variable frequency drive or electrical soft-start, then the brake rectifier must be powered from a separate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

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



Brake Engaged

Brake Released



Brake Selection

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

Selection steps

- 1) Brake torque (page 224)
- 2) Brake times (page 228)
- 3) Electrical supply and connection (page 229)
- 4) Brake options (page 231)
- 5) Brake work verification (page 234)



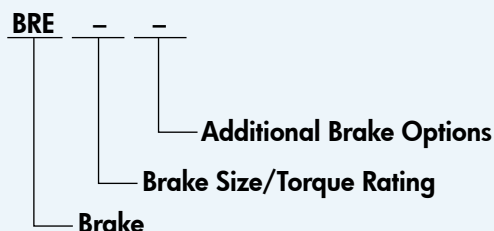
Brake Options

Abbreviation	Description	Page
ADJ	Torque Adjustment - Brake torque may be adjusted at the factory	225
FHL	Locking Hand Release Lever - Lockable manual hand release lever	231
HL	Hand Release Lever - Manual hand release lever	231
HLH	Hand Release Lever with Hole - Hand lever with 5.5mm hole	231
IR	Current Sensing Relay - Fast brake engagement (stopping) without external control equipment	232
RG	Corrosion Protected Brake - Corrosion protected brake	231
SR	Dust & Corrosion Protected Brake - Dust & corrosion protected brake	231

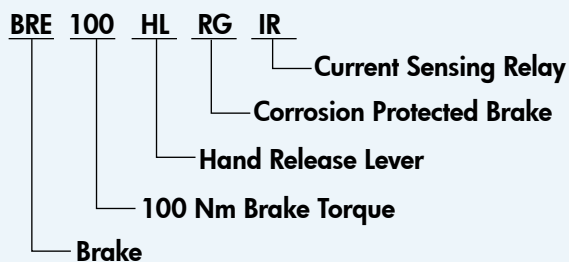
Rectifier Options

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.	226
G...V	Sealed Rectifier - Rectifiers sealed with an electrically safe resin	226
GP...	High Performance Rectifier - Improves brake release and stopping times	227

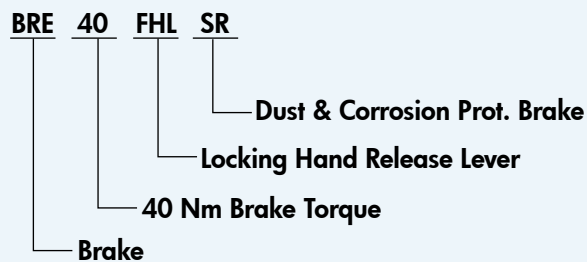
Brake Nomenclature



Ordering Examples



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



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





Brake Torque Selection

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

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

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

General Selection Considerations

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

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

Motor Frame	Units	Brake Size				
		BRE5	BRE10	BRE20	BRE40	BRE60
63S/L	Nm	5	10 ^{*1)}			
	lb-ft	3.7	7.4 ^{*1)}			
71S/L	Nm	5	10 [*]			
	lb-ft	3.7	7.4			
80S	Nm	5	10	20 [*]		
	lb-ft	3.7	7.4	15 [*]		
80L	Nm	5	10	20 [*]		
	lb-ft	3.7	7.4	15 [*]		
90S	Nm		10	20	40 [*]	
	lb-ft		7.4	15	30 [*]	
90L	Nm		10	20	40 [*]	
	lb-ft		7.4	15	30	
100L	Nm			20	40	60 ^{* 1)}
	lb-ft			15	30	44
100LA/4	Nm			20	40	60 ^{* 1)}
	lb-ft			15	30	44 ^{* 1)}
112M	Nm			20	40	60
	lb-ft			15	30	44

* BIP66 – IP66 brake not possible.

1) Brake release lever “HL” and “FHL” not possible.

2) When used as a stopping brake, evaluation of brake work is essential.

3) Designed as holding brake or emergency stop brake only.

$$1 \text{ Nm} = 0.738 \text{ lb-ft}$$

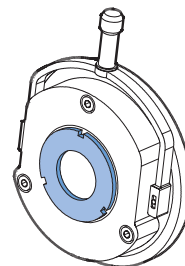
$$1 \text{ lb-ft} = 1.36 \text{ Nm}$$



Torque Adjustment (ADJ)

Mod

The brake torque can be adjusted by changing the brake spring combinations. Additionally, on brakes up to size BRE40, the user can make fine torque adjustments by turning the spanner nut. From the factory, the spanner nut will be tight against the brake casing. The braking torque is adjusted by unscrewing the spanner nut a number of clicks with a spanner wrench.



When Ordering the Torque Adjustment option
specify ADJ _____ Nm

Torque Spring Adjustments						
# Springs	Unit	BRE5	BRE10	BRE20	BRE40	BRE60
7	[Nm]	5	10	20	40	60
	[lb-ft]	3.7	7.4	14.8	29.5	44.3
5	[Nm]	3.5	7	14	28	46
	[lb-ft]	2.6	5.2	10.3	20.7	33.9
4	[Nm]	3	6	12	23	34
	[lb-ft]	2.2	4.4	8.9	17.0	25.1
3	[Nm]	2	4	8	17	26
	[lb-ft]	1.5	3.0	5.9	12.5	19.2

Reduction of Brake Torque with Spanner Nut					
	Unit	BRE5	BRE10	BRE20	BRE40
Torque Reduction per Spanner Nut Click (Adjustment Step)	[Nm]	0.2	0.2	0.3	1.0
	[lb-ft]	0.15	0.15	0.22	0.74
Lowest Torque Setting	[Nm]	0.8	1.6	4.4	5.0
	[lb-ft]	0.59	1.18	3.25	3.69



CAUTIONS



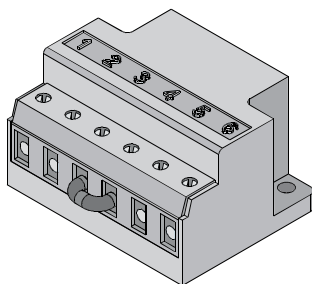
- **Brake torque** - The brake torque is measured with a mean friction radius of the brake pad surface with a circumferential speed of 1m/sec (197 fpm).
- **Brake torque tolerance** - For different applications and operating conditions, brake torque can vary from +40/-20% compared to the rated brake torque.
- **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 break in period is required. The break in time will vary depending on system loads.
- **Setting times** - The lower the brake torque, the longer the brake setting times.
- **Release times** - The lower the brake torque, the faster the brake release times.



Brake Control Rectifiers

NORD brake control rectifiers convert AC voltage to DC voltage. Rectifiers are used because most applications require AC voltage to power the motor, but DC power is required to power the brake and DC power is not typically available.

NORD brakemotors include the rectifier located inside the terminal box. NORD rectifiers have six terminals and can be powered by the motor terminal block, or by a separate power source.



Rectifier Terminals	Description
1 & 2	Brake Supply AC Voltage
3 & 4	DC-Switching Contact or Jumper
5 & 6	Connection to Brake Coil

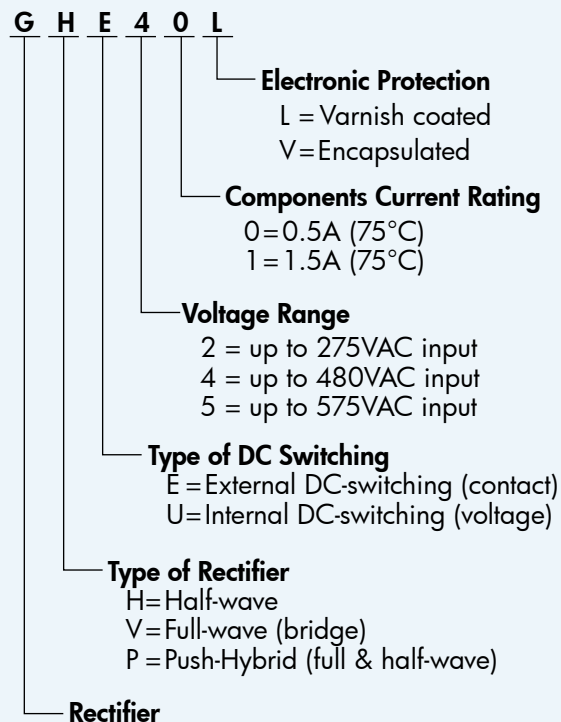
Rectifier Advantages:

- Individual power source for each brake
- Compact size, mounted inside the terminal box
- Multiple voltage options, types, and release/engagement modes available
- Mountable in remote control cabinet
- Integral protection against voltage spikes

Rectifier Types:

- **Full-wave rectifier:** The DC output voltage is 90% of the applied input AC voltage – types “GV...”
- **Half-wave rectifier:** The DC output voltage is 45% of the applied input AC voltage – types “GH...”
- **Push-hybrid rectifier (full-wave and half-wave):** The rectifier is designed to switch from an initial full-wave mode to a final half-wave mode in approximately 250 ms – types “GP...”

Rectifier Nomenclature



Standard Rectifier

NORD standard rectifiers are provided with each brake motor (except 24V DC brakes) unless a sealed or high performance rectifier is specified.

Standard Rectifier			
Nomenclature	Part #	Type	Color
GVE20L	19141000	Full-wave	Black
GHE40L	19141010	Half-wave	Yellow
GHE50L	19141020	Half-wave	Gray

Sealed Rectifiers G...V

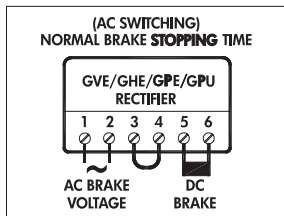
NORD offers rectifiers that are sealed with an electrically safe resin to ensure that water and moisture will not pass into the rectifier. Sealed rectifiers have the same brake performance ratings as the standard rectifier and can be beneficial if water is present in the motor's terminal box.

Sealed Rectifier			
Nomenclature	Part #	Type	Color
GVE20V	19141030	Full-wave	Black
GHE40V	19141040	Half-wave	Yellow
GHE50V	19141050	Half-wave	Gray



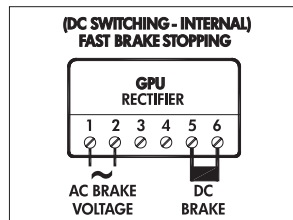
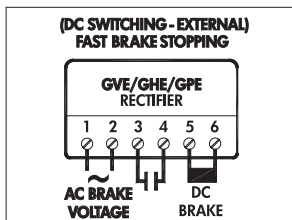
AC Switching (Standard Stopping)

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.



DC switching (Fast Stopping)

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.



GP... High Performance Rectifiers

The "GP..." high performance rectifiers improve brake release time and stopping time. The "GP..." rectifier is a push-hybrid rectifier; meaning that it initially acts as a full-wave rectifier for approximately 250 ms, after which it operates as a half-wave rectifier.

There are two types of "GP..." rectifiers. The first type utilizes External DC Switching "GPE...", this is primarily used in across-the-line applications, where the brake power is supplied from the motor terminal block. The second type utilizes Integrated DC Switching "GPU...". The built-in DC switching of the "GPU" rectifiers is supply voltage triggered. The "GPU" rectifiers can only be used when the brake is powered separately from the motor. Examples include using a frequency inverter, two-speed

motor or soft-starter. The "GPU" rectifiers are not suitable for use when the brake power is taken from the motor supply power (motor terminal block).

There are two ways to apply "GP..." rectifiers. The first is called, "overexcitation (fast brake release)" and the second is called, "reduced power holding (very fast stopping)"

GPE - High Performance Rectifier with External DC switching			
Nomenclature	Part #	Type	Color
GPE20L	19140230	Push-hybrid	Black
GPE40L	19140240	Push-hybrid	Black

GPU - High Performance Rectifier with Integrated DC switching			
Nomenclature	Part #	Type	Color
GPU20L	19140090	Push-hybrid	Black
GPU40L	19140170	Push-hybrid	Black

Overexcitation (fast brake release)

In overexcitation, the rectifier initially over-voltages (over-excites) the brake coil, causing a stronger than normal magnetic field which releases the brake quicker than normal. The rectifier then is switched to a lower holding voltage so it does not 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. In other words, the DC brake voltage should be 45% of the applied AC rectifier input voltage. This brake control is also sometimes referred to as "Voltage Forcing" or "Supercharging".

Overexcitation is commonly used in very high cycling brakemotor applications to reduce motor heating during the motor start and brake release.

Reduced Power Holding (very fast stopping)

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.





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 a separate power source.

- If the motor is powered direct across-the-line, the rectifiers 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?

Selection Suggestions

When Fast or Very Fast Stopping is Recommended

Any applications that requires rapid brake response.

- 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.

- 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*	GV/GH
	Standard	Fast (DC switching)	15*	GV/GH
	Standard	Very Fast (Reduced power holding)	40*	GPE
	Fast (Overexcitation)	Standard (AC switching)	30*	GPE
	Fast (Overexcitation)	Fast (DC switching)	35*	GPE
Separate Power Source	Standard	Standard (AC switching)	20*	GV/GH
	Standard	Fast (DC switching)	25*	GV/GH
	Standard	Very Fast (Reduced power holding)	55*	GPU
	Fast (Overexcitation)	Standard (AC switching)	45*	GPU
	Fast (Overexcitation)	Fast (DC switching)	50*	GPU

* Braking methods referenced in connection diagrams on page 193



3. What is the AC brake supply voltage?

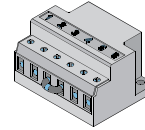
The table below determines the rectifier and DC brake voltage required, based on the AC supply voltage & braking method.

AC Brake Supply Voltage (VAC)	Braking Method	Rectifier Model Type	DC Brake Voltage (VDC)	Rectifier Part Number
115 (105-120)	20	GVE20L	105	19141000
	25	GVE20L	105	19141000
208 (200-208)	10	GVE20L	180	19141000
	15	GVE20L	180	19141000
	20	GVE20L	180	19141000
	25	GVE20L	180	19141000
	40	GPE20L	180	19140230
	55	GPU20L	180	19140090
	55	GPU20L	180	19140090
230 (220-240)	10	GVE20L	205	19141000
	10	GHE40L	105	19141010
	15	GVE20L	205	19141000
	15	GHE40L	105	19141010
	20	GVE20L	205	19141000
	20	GHE40L	105	19141010
	25	GVE20L	205	19141000
	25	GHE40L	105	19141010
	30	GPE20L	105	19140230
	35	GPE20L	105	19140230
	40	GPE20L	205	19140230
	45	GPU20L	105	19140090
	50	GPU20L	105	19140090
	55	GPU20L	205	19140090
	55	GPU20L	205	19140090
400 (380-415)	10	GHE40L	180	19141010
	15	GHE40L	180	19141010
	20	GHE40L	180	19141010
	25	GHE40L	180	19141010
460 (440-480)	10	GHE40L	205	19141010
	15	GHE40L	205	19141010
	20	GHE40L	205	19141010
	25	GHE40L	205	19141010
	30	GPE40L	205	19140240
	35	GPE40L	205	19140240
	45	GPU40L	205	19140170
	50	GPU40L	205	19140170
500	10	GHE50L	225	19141020
	15	GHE50L	225	19141020
	20	GHE50L	225	19141020
	25	GHE50L	225	19141020
575 (550-600)	10	GHE50L	250	19141020
	15	GHE50L	250	19141020
	20	GHE50L	250	19141020
	25	GHE50L	250	19141020

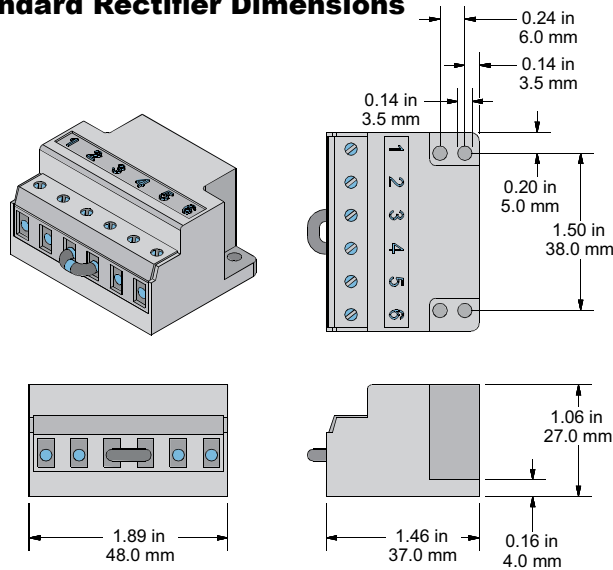


Specify Rectifier Model Type _____ And DC Brake Voltage _____

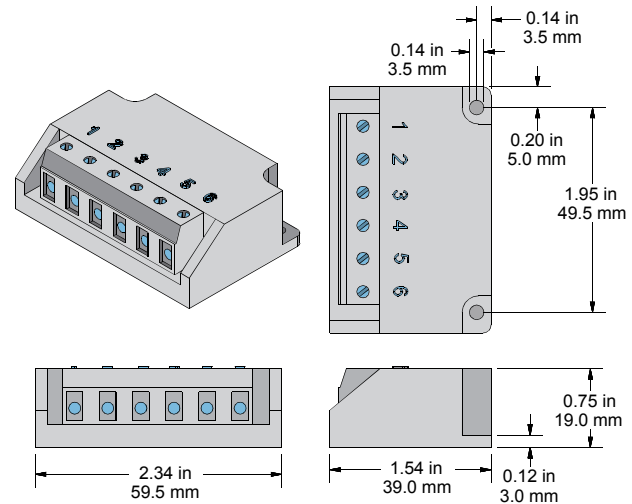
Rectifier Ratings & Dimensions



Standard Rectifier Dimensions



GP Rectifier Dimensions



Rectifier Overview

Rectifier Model Type	Part Number	Part Color	Type 1 input Voltage	Input Voltage Range	Output Voltage	Rated Output Current		DC switching Mode
						(40°C)	(75°C)	
Standard Protected Electronics “L”								
GVE20L Full-Wave	19141000	Black	230VAC	110-275VAC +/- 10%	205VDC (VDC = VAC x 0.9)	1.5Adc	1.0Adc	External Contact
GHE40L Half-Wave	19141010	Yellow	480VAC	230-480VAC +/- 10%	216VDC (VDC = VAC x 0.45)	1.0Adc	0.5Adc	External Contact
GHE50L Half-Wave	19141020	Grey	575VAC	500-575VAC +/- 10%	259VDC (VDC = VAC x 0.45)	1.0Adc	0.5Adc	External Contact
GPE20L Push-Hybrid	19140230	Black	230VAC	200-275VAC +/- 10%	205VDC / 105VDC (VDC = VAC x 0.9) / (VDC = VAC x 0.45)	0.7Adc	0.5Adc	External Contact
GPE40L Push-Hybrid	19140240	Black	480VAC	380-480VAC +/-10%	432VDC / 216VDC (VDC = VAC x 0.9) / (VDC = VAC x 0.45)	1.0Adc	0.5Adc	External Contact
GPU20L Push-Hybrid	19140090	Black	230VAC	200-275VAC +/- 10%	205VDC / 105VDC (VDC = VAC x 0.9) / (VDC = VAC x 0.45)	0.7Adc	0.5Adc	Internal Activation*
GPU40L Hybrid	19140170	Black	480VAC	380-480VAC +/-10%	432VDC / 216VDC (VDC = VAC x 0.9) / (VDC = VAC x 0.45)	1.0Adc	0.5Adc	Internal Activation*
Rectifier Electronics Protected with Potting Option “V”								
GVE20V Full-Wave	19141030	Black	230VAC	110-275VAC +/- 10%	205VDC (VDC = VAC x 0.9)	1.5Adc	1.0Adc	External Contact
GHE40V Half-Wave	19141040	Yellow	480VAC	230-480VAC +/- 10%	216VDC (VDC = VAC x 0.45)	1.0Adc	0.5Adc	External Contact
GHE50V Half-Wave	19141050	Grey	575VAC	500-575VAC +/- 10%	259VDC (VDC = VAC x 0.45)	1.0Adc	0.5Adc	External Contact

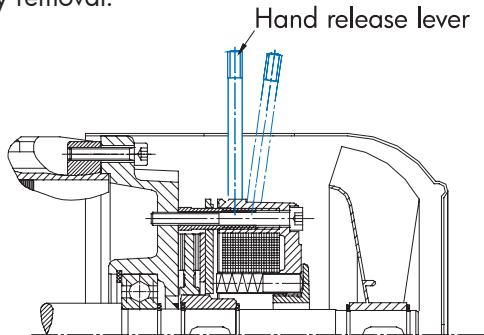
* Voltage based - deactivated with a jumper between terminals 3 & 4



Hand Release Lever (HL)

Mod

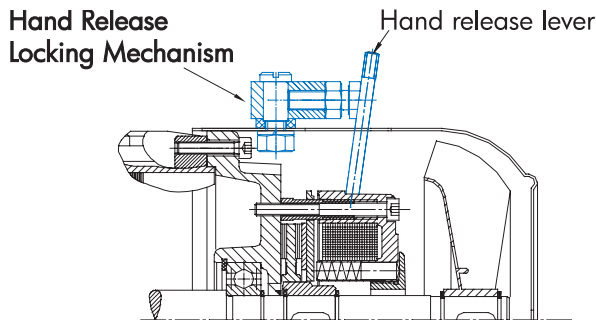
The hand release option allows the brake to be manually released without requiring that the brake be energized with voltage. The lever has a spring return that allows the brake to be hand released and returned automatically to its set position. The hand release lever can be unscrewed for easy removal.



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)

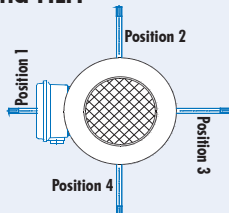
Build

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)

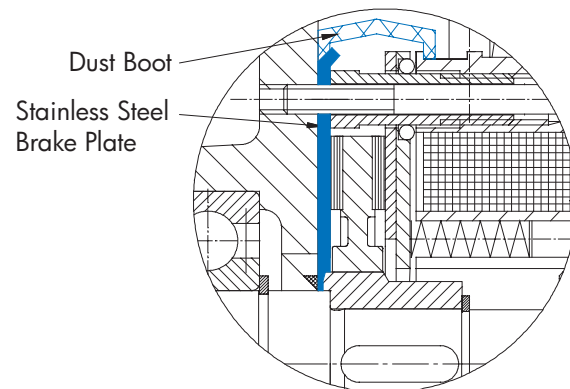
Build

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 (BIP66)

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 / Bifilar Coil (BSH)

Build

Brakes can be provided with a circuit to heat the brake while the motor and brake are inactive (at rest). This is accomplished via a second coil in winding in the brake. This coil is opposite in polarity (bifilar) as the main brake coil so when current passes through both coils, no net magnetic field is created – only heat.



Warning



Heating the brake with full operation voltage is only possible at temperatures below freezing (32°F / 0°C). If heating is also required above freezing then reduced operating voltage is required.

Options



NORD
DRIVESYSTEMS

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.

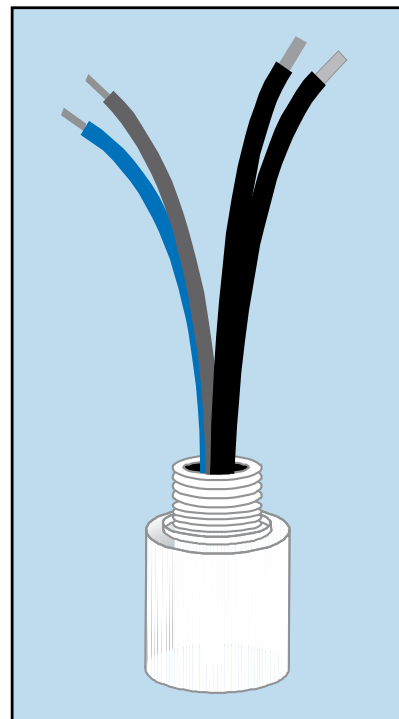


CAUTIONS



Requirements

- Brake must be powered from the motor's terminal block (not separately powered)
- Motor must be a single speed and should not be powered by a frequency inverter or soft starter.

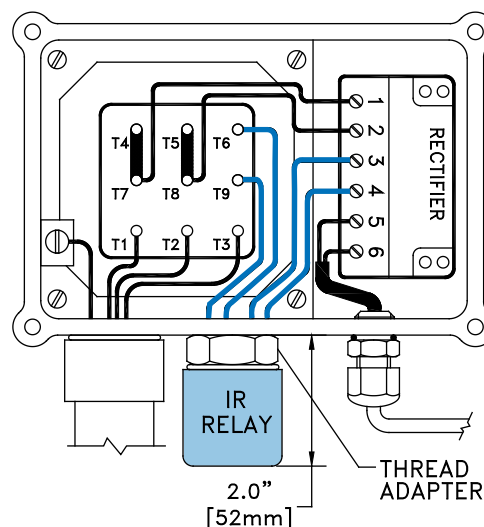


Ratings

Part number	18556010
Motor Frame Sizes	63S - 180M
AC Input Current - black/white wires	25AAC 75AAC - 0.2 s
DC Brake Current - red/blue wires	2.0 ADC
Additional Brake Setting Delay	18 ms
Ambient Temperature	- 40 to 75 °C - 40 to 167 °F
Enclosure Rating	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

* Spacer



Detailed Brake Performance Data

Brake Size		BRE5	BRE10	BRE20	BRE40	BRE60
Brake torque – max	[lb-ft]	3.7	7.4	15	30	44
	[lb-in]	44	89	177	354	531
	[Nm]	5	10	20	40	60
Power coil P ₂₀	[W]	22	28	39	42	50
Nominal air gap	[in]	0.008	0.008	0.008	0.012	0.012
	[mm]	0.2	0.2	0.2	0.3	0.3
Maximum air gap (re-adjust) a _{max}	[in]	0.024	0.013	n/a *	0.035	0.039
	[mm]	0.6	0.8	n/a *	0.9	1.0
Max brake pad wear - must be replaced	[in]	0.118	0.118	0.039	0.118	0.138
	[mm]	3	3	1	3	3.5
Minimum brake pad thickness	[in]	0.177	0.217	0.295	0.374	0.453
	[mm]	4.5	5.5	7.5	9.5	11.5
Max work per cycle W _{max}	[Jx103]	3	6	12	25	35
Work until re-adjust W _m	[Jx107]	5	12	20	35	60
Heat load per cycle	[J/s]	80	100	130	160	200
Release time (start) t ₁	[ms]	35	45	70	80	120
Release time (start) t _{1-OE}	[ms]	15	15	28	28	75
Setting time (stop) t _{2-AC}	[ms]	70	95	140	175	210
Setting time (stop) t _{2-DC}	[ms]	30	45	30	75	90
Setting time (stop) t _{2-DCRP}	[ms]	5	6	11	12	12
IR relay delay (stop) t _{2-IR}	[ms]	18	18	18	18	18
Current – 250VDC coil	[A]	0.09	0.11	0.16	0.18	0.19
Current – 225VDC coil	[A]	0.09	0.13	0.18	0.20	0.22
Current – 205VDC coil	[A]	0.11	0.13	0.22	0.24	0.28
Current – 180VDC coil	[A]	0.12	0.16	0.21	0.25	0.30
Current – 105VDC coil	[A]	0.21	0.32	0.36	0.46	0.60
Current – 24VDC coil	[A]	0.92	1.17	1.63	1.75	2.08

Release times

t₁ – Brake release time - Standard

t_{1-OE} – Brake release time – Overexcitation (GP)

Set (stop) times

t_{2-AC} – Brake set time – AC switching

t_{2-DC} – Brake set time – DC switching

t_{2-DCRP} – Brake set time – DC switching reduced power

t_{2-IR} – Additional brake stopping of the IR relay

An increased air gap will alter the braking times.

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.

$$T_{dyn} = \frac{\sum J \times n}{25.7 \times t_r}$$

$$T_{req} = (T_{dyn} \pm T_{load}) \times K$$

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: $+T_{load}$

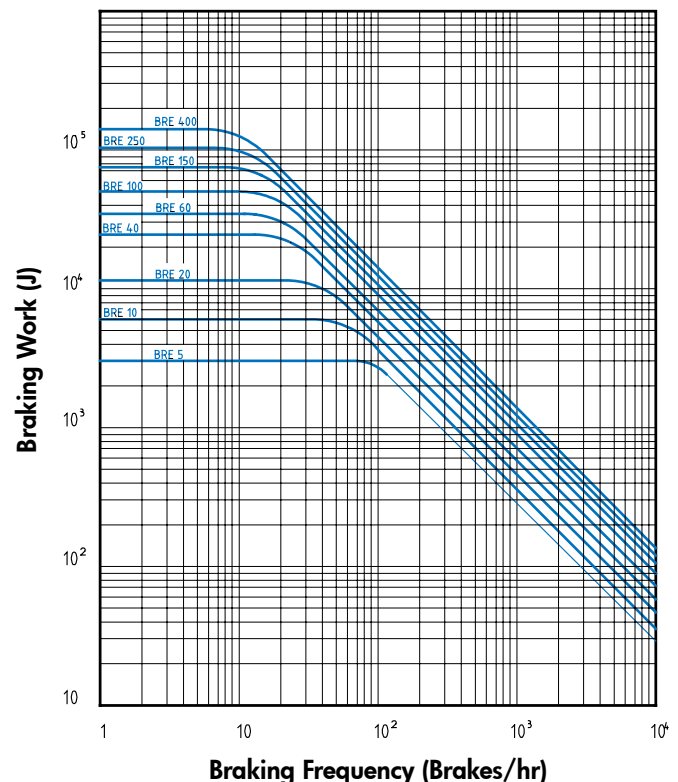
For overhauling loads use: $-T_{load}$

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.

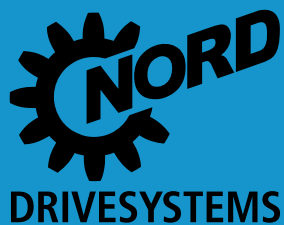
Abbreviation Key

c/h	=	Number of brakes per hour
J [lb-ft ²]	=	Inertia
J _{motor} [lb-ft ²]	=	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



Engineering

- Tolerances
- Conversion Tables
- Service Factors
- AGMA Information
- Unit Weights

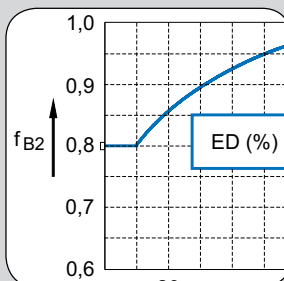


www.nord.com

Metric $\Rightarrow$ Inch

Multiply

Gram [g]
 Kilogram [kg]
 Newton [N]
 Newton meter [Nm]
 Newton meter [Nm]
 Inertia [kgm²]



Engineering AGMA Service Factors

Application	
DREDGES	
Cable reels	1.00
Conveyors	1.00
Cutter Head Drives	1.2

General Information



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 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

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

❶ Inch Pilot Tolerances per ISO286-2

Solid Shaft Diameter Tolerance [mm]		
> 10	≤ 18	+0.012 / +0.001
> 18	≤ 30	+0.015 / +0.002
> 30	≤ 50	+0.018 / +0.002

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

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

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

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



Metric $\Rightarrow$ Inch

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

Inch $\Rightarrow$ Metric

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

Temperature

°F	=	1.8 °C + 32
°C	=	0.5555 $\times$ (°F - 32)
°C	=	°K - 273.16

Linear Velocity

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

Power

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

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

$$\text{hp}_{(\text{Lift})} = \frac{\text{Wgt (lb)} \times \text{fpm}}{33000 \times \text{Efficiency}}$$

$$\text{hp}_{(\text{Slide})} = \frac{\text{Wgt (lb)} \times \mu \times \text{fpm}}{33000 \times \text{Efficiency}}$$

Torque

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

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

Electric Motor 3-phase

$$\text{hp}_{(3\text{ph-motor})} = \frac{1.732 \times V \times I \times \text{PF} \times \text{Efficiency}}{746}$$

Linear & Rotational Speed

$$\text{fpm} = 0.2618 \times \text{Dia}_{(\text{in})} \times \text{rpm}$$

$$\text{rpm} = \frac{\text{fpm} \times 3.820}{\text{Dia}_{(\text{in})}}$$

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 $\times$ 1
M8 $\times$ 1.25
M10 $\times$ 1.5
M12 $\times$ 1.5
M16 $\times$ 2
M20 $\times$ 2.5
M24 $\times$ 3



Selection – mass acceleration method

The selection tables list the produced torques, output speeds, and service factors, f_B , based on FLEXBLOC™ worm gearboxes in combination with 4-pole NORD 3-phase motors. The service factor indicates the safety of the gearbox at the given input power.

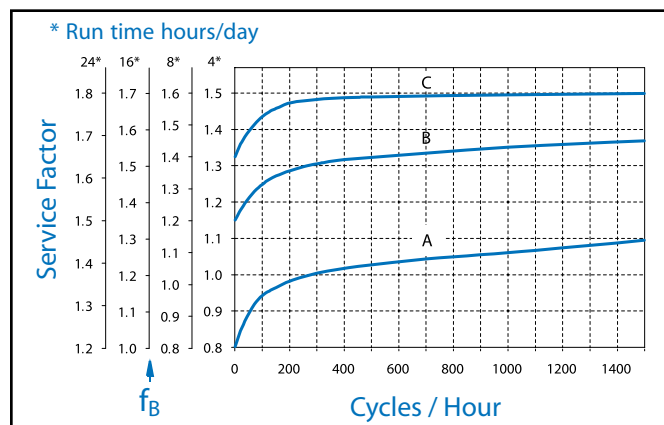
Each application has specific loading requirements such as peak loads, frequent start-ups, intermittent duty, and extreme ambient temperatures. All have a minimum service factor, f_{Bmin} , to ensure reliable operation. The unit chosen from the selection tables should have a service factor that is equal to or larger than the minimum service factor required.

The selection tables "1750/1150/850/100 rpm" can be used for motors other than 4-pole (1750 rpm) standard 3-phase models. The selection tables are based on a service factor $f_B = 1.0$. Observing the minimum service factor, f_{Bmin} , the motor power installed must not exceed P_{1max}/f_{Bmin} .

The required minimum service factor f_{Bmin} for an application is calculated as:

$$f_{Bmin} = f_{B0} \times f_{B1} \times f_{B2}$$

Factor f_{B0} accounts for the load type, A, B, or C; the start/stop frequency; and the daily operating time. Factor f_{B1} accounts for different ambient temperatures. Factor f_{B2} accounts for intermittent duty cycle. The following diagrams are used for defining the individual factors f_{B0} , f_{B1} , and f_{B2} .



Examples for gearbox loading type:

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

B Coilers, feed-mechanism drives in woodworking machines, dumbwaiters, balancing machines, thread-cutting machines, medium-sized agitators and mixers, winches, sliding doors, manure scrapers, packing machines, bending machines, and gear pumps.

C Shears, presses, punches, folding machines, tumbling barrels, vibrators, and shredders.

Other machines must be associated to A, B, or C depending on the load type they represent.

The load types A, B, and C are defined as follows:

A: uniform duty operation and $m_{af} \leq 0.25$

B: medium duty operation and $m_{af} \leq 3$

C: heavy duty operation and $m_{af} \leq 10$

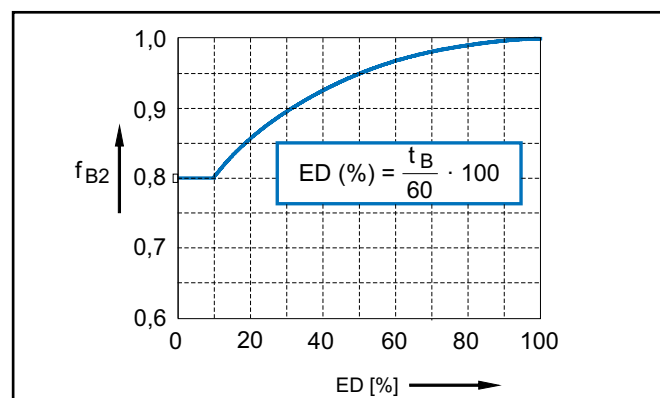
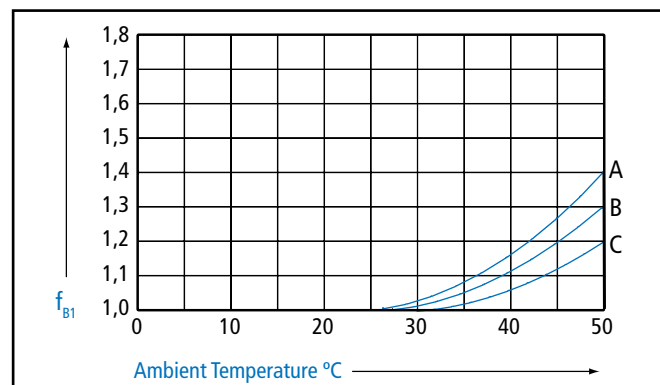
The definition of the mass-acceleration-factor m_{af} is:

$$m_{af} = \frac{J_{ex.red}}{J_{Mot}}$$

$J_{ex.red}$ = all external inertia's reflected to the motor shaft

J_{Mot} = mass moment of inertia of driving motor

In case of $m_{af} > 10$ please contact NORD.





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 intermittent 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, whichever 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 conditions exist:

- Ambient conditions. 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.



Engineering 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



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 MILLS¹⁾			
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
Supercalender 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



Engineering 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 & Blend 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 supercalendar 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 to 1.



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
Auxiliary 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

Engineering 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



Application	Load Duration			Application	Load Duration		
	Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day		Up to 3 hrs per day	3-10 hrs per day	Over 10 hrs per day
METAL STRIP PROCESSING MACHINERY				PAPER MILLS (cont)			
Bridles	1.25	1.25	1.50	Presses – Felt & Suction	1.25	1.25	1.25
Coilers and uncoilers	1.00	1.00	1.25	Pulper	1.50	1.50	1.75
Edge Trimmers	1.00	1.25	1.50	Pumps – Vacuum	1.50	1.50	1.50
Flatteners	1.00	1.25	1.50	Reel (Surface Type)	1.25	1.25	1.50
Loopers (accumulators)	1.00	1.00	1.00	Screens			
Pinch rolls	1.00	1.25	1.50	Chip	1.50	1.50	1.50
Scrap choppers	1.00	1.25	1.50	Rotary	1.50	1.50	1.50
Shears	1.50	1.50	1.75	Vibrating	1.75	1.75	1.75
Slitters	1.00	1.25	1.50	Size Press	1.25	1.25	1.25
MILLS, ROTARY TYPE				Supercalendar ³⁾	1.25	1.25	1.25
Ball & Rod				Thickener (AC Motor)	1.50	1.50	1.50
Spur Ring Gear	1.50	1.50	1.75	Thickener (DC Motor)	1.25	1.25	1.25
Helical Ring Gear	1.50	1.50	1.50	Washer (AC Motor)	1.50	1.50	1.50
Direct Connected	1.50	1.50	1.75	Washer (DC Motor)	1.25	1.25	1.25
Cement Kilns	1.50	1.50	1.50	Wind and Unwind Stand	1.00	1.00	1.00
Dryers & Coolers	1.50	1.50	1.50	Winders (Surface Type)	1.25	1.25	1.25
MIXERS CONCRETE				Yankee Dryers ²⁾	1.25	1.25	1.25
PAPER MILLS¹⁾				PLASTICS INDUSTRY –			
Agitator (Mixer)	1.50	1.50	1.50	PRIMARY PROCESSING			
Agitator for Pure liquors	1.25	1.25	1.25	Intensive Internal Mixers			
Barking Drums	1.75	1.75	1.75	Batch Mixers	1.75	1.75	1.75
Barkers – Mechanical	1.75	1.75	1.75	Continuous Mixers	1.50	1.50	1.50
Beater	1.50	1.50	1.50	Batch Drop Mill – 2 smooth rolls			
Breaker Stack	1.25	1.25	1.25	Continuous Feed, Holding & Blend Mill	1.25	1.25	1.25
Calender ²⁾	1.25	1.25	1.25	Calendars	1.50	1.50	1.50
Chipper	1.75	1.75	1.75	PLASTICS INDUSTRY –			
Chip Feeder	1.50	1.50	1.50	SECONDARY PROCESSING			
Coating Rolls	1.25	1.25	1.25	Blow Molders	1.50	1.50	1.50
Conveyors				Coating	1.25	1.25	1.25
Chip, Bark, Chemical	1.25	1.25	1.25	Film	1.25	1.25	1.25
log (including Slab)	1.75	1.75	1.75	Pipe	1.25	1.25	1.25
Couch Rolls	1.25	1.25	1.25	Pre-Plasticizers	1.50	1.50	1.50
Cutter	1.75	1.75	1.75	Rods	1.25	1.25	1.25
Cylinder Molds	1.25	1.25	1.25	Sheet	1.25	1.25	1.25
Dryers ²⁾				Tubing	1.25	1.25	1.50
Paper Machine	1.25	1.25	1.25	PULLERS – BARGE HAUL			
Conveyor Type	1.25	1.25	1.25	PUMPS			
Embosses	1.25	1.25	1.25	Centrifugal	1.00	1.00	1.25
Extruder	1.50	1.50	1.50	Proportioning	1.00	1.25	1.50
Fourdrinier Rolls (Includes Lump Breaker, Dandy Roll, Wire Turning, and Return Rolls)	1.25	1.25	1.25	Reciprocating			
Jordan	1.25	1.25	1.25	Single Acting, 3 or more cylinders	1.00	1.25	1.50
Kiln Drive	1.50	1.50	1.50	Double Acting, 2 or more cylinders	1.00	1.25	1.50
Mt. Hope Roll	1.25	1.25	1.25	Rotary			
Paper Rolls	1.25	1.25	1.25	Gear Type	1.00	1.00	1.50
				Lobe	1.00	1.00	1.25
				Vane	1.00	1.00	1.25

Engineering 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 than 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.

Gearmotor Weights [lb]

Type	63S	63 L	71 S	71 L	80 S	80 L	90 S	90 L	100 L	100 LA	112 M/4
SK 1SI31	13	14	17	19	23	25	-	-	-	-	-
SK 1SI40	16	17	20	22	26	28	34	39	-	-	-
SK 1SI50	19	20	23	25	29	31	37	42	-	-	-
SK 1SI63	26	27	30	32	36	38	44	49	60	66	-
SK 1SI75	40	41	44	46	50	52	58	63	74	80	100

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.

Reducer Weights [lb]

Type	W	48C	56C	140TC	180TC
SK 1SI31	-	4.06	4.44	-	-
SK 1SI40	7.40	-	7.16	7.24	-
SK 1SI50	10.60	-	10.30	10.38	-
SK 1SI63	17.50	-	17.28	17.36	19.74
SK 1SI75	-	-	35.20	35.20	36.20

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.

Option Kit Weights [lb]

Type	SK 1SI31	SK 1SI40	SK 1SI50	SK 1SI63	SK 1SI75
Worm Module	3.1	5.5	8.7	15.6	32.0
NEMA 48C	1.0	-	-	-	-
NEMA 56C	1.3	1.6	1.6	1.6	3.2
NEMA 140TC	-	1.7	1.7	1.7	3.2
NEMA 180TC	-	-	-	4.1	4.2
Solid Input Shaft (W)	-	1.9	1.9	1.9	-
Helical Input Stage (H10)	-	3.8	3.8	3.8	-
Double Worm Adapter	-	1.1	1.1	1.1	3.0
Plug-in Solid Shaft (V)	0.46	1.10	1.74	3.18	7.00
Double Solid Shaft (L)	0.54	1.24	2.08	3.72	7.40
B5 output Flange (F)	0.5	0.8	1.4	1.5	1.9
Torque Arm (D)	0.5	0.8	0.9	1.3	1.9
Shaft Cover (H)	0.2	0.4	0.4	0.5	0.9
Foot Plate (X)	0.60	0.68	1.10	1.78	-
Hollow Shaft Bushing Kit (J)	-	-	0.5	1.2	2.5

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 Gearmotor Weights [lb]

Type	63S	63 L	71 S	71 L	80 S	80 L	90 S	90 L
SK 1SM31	12	13	16	17	-	-	-	-
SK 1SM40	15	16	19	20	24	-	-	-
SK 1SM50	-	-	23	24	28	31	37	-
SK 1SM63	-	-	-	-	-	35	42	46

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	56C	140TC
SK 1SM31	6	9	9
SK 1SM40	10	15	15
SK 1SM50	15	21	21
SK 1SM63	24	26	26

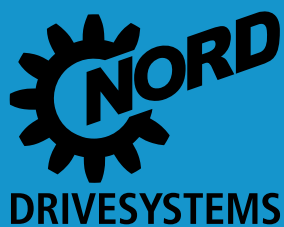
Above weights are approximate. Depending upon ratio, oil quantity and optional equipment, reducer weights may be different than shown.

Exact weights can be obtained after the unit is fully assembled.

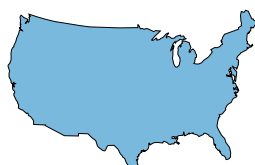
NORD Contacts

Contact Information:

- North America
- Global



www.nord.com



International Contacts - North America



United States

NORD Gear Corporation - Midwest Headquarters

800 Nord Drive, P.O. 367
Waunakee, WI 53597

toll free: 1-888-314-6673
phone: 1-608-849-7300
fax: 1-800-373-6673
eMail: info.us@nord.com

NORD Gear Corporation - East

300-E Forsyth Hall Drive
Charlotte, NC 28273

toll free: 1-888-314-6673
phone: 1-608-849-0140
fax: 1-888-259-6673
eMail: info.us@nord.com

NORD Gear Corporation - West

1180 Railroad Street
Corona, CA 92882

toll free: 1-888-314-6673
phone: 1-608-849-0190
fax: 1-888-408-6673
eMail: info.us@nord.com

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

Canada

NORD Gear Limited

41 West Drive
Brampton, Ontario L6T 4A1

toll free: 1-800-668-4378
phone: 1-905-796-3606
fax: 1-905-796-8130
eMail: info.ca@nord.com

Engrenages NORD Limitée

1405 Trans-Canada Hwy.
Suite 245
Dorval, Quebec H9P 2V9

toll free: 1-800-668-4378
phone: 1-514-421-1044
fax: 1-514-421-3973
eMail: info.ca@nord.com

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

Mexico

Mexico NORD Drivesystems SA DE CV

Mexico Regional Office
Av. Lázaro Cárdenas 1007 Pte.
San Pedro Garza García, N.L.
México, C.P. 66266

phone: +52-81-8220-9165
fax: +52-81-8220-9044
eMail: info.mx@nord.com

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



Global

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-401 0 Fax: +49-4532-401 254
Email: info@nord-de.com

Afghanistan

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@af.nord.com

Algeria

Tunesia S.I.A. Ben Djemaa & CIE

220 Avenue des Martyrs
TN - 3000 Sfax
Phone: +216-74-408 446 Fax: +216-74-408 065
Email: bendjemaa@planet.tn

Algeria

EURL Agence Maghrebine Des Echanges Commerciaux

35 Avenue 5 Juillet
Borj El Kiffane
Phone: +213-76-288837 Fax: +213-21-201209
Email: bendjemaa@planet.tn

Angola

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent
Droste Park Ext. 7, Johannesburg 2001
P.O. Box 33431
Jeppesstown 2043, South Africa
Phone: +27-11-620 1500 Fax: +27-11-620 1670
Email: powerdrives@bearingman.co.za

Argentina

Chilicote S.A.

Avda. Julio A. Roca 546
1067 Buenos Aires
Phone: +54-11-4343 8469 Fax: +54-11-4331 4278
Email: chilicote@chilicote.com.ar

Armenia

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@nord-de.com

Australia

CMG Pty Ltd.

19 Corporate Avenue
Rowville, VIC 3178
PO Box 2340, Rowville, VIC 3178 - Australia
Phone: +61-3-9237 4000 Fax: +61-3-9237 4010
Email: mark.alexander@cmggroup.com.au

Austria

Getriebebau NORD GmbH

Deggendorfstraße 8
A-4030 Linz
Phone: +43-732-31 89 20 Fax: +43-732-31 89 20-85
Email: info@nord-at.com

Bahrain

Eight Industries

P.O. Box 32095
Dubai/U.A.E.
Phone: +971-4-3200 770 Fax: +971-4-3200 771
Email: eight@emirates.net.ae

Bangladesh

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@bd.nord.com

Belarus

OOO NORD PRIVODY

P.O. 51
BY-220121 Minsk
Phone: +375-17-205 04 27 Fax: +375-17-205 04 27
Email: info@by.nord.com

Belgium

NORD Aandrijvingen België N.V.

NORD Transmission Belgique S.A.
Boutersemdreef 24
B-2240 Zandhoven
Phone: +32-3-484 59 21 Fax: +32-3-484 59 24
Email: info@nord-be.com

Bhutan

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@bt.nord.com

Bolivia

Variadores S.A.

Carrera 50 (Aut. Sur)
No. 2 Sur 271 - A.A. 053811
Medellin, Columbia
Phone: +57-94-2552200 Fax: +57-94-2557450
Email: variadores@variadores.com.co

Brazil

NORD Motoresdutores do Brasil Ltda

Rua Dr. Moacyr Antonio de Moraes, 700
Parque Santo Agostinho
Guarulhos - São Paulo
CEP 07140-285
Phone: +55-11-6402 8855 Fax: +55-11-6402 8830
Email: info@nord-br.com

International Contacts



Bulgaria

MELSICON Ltd.

P.Wolov 47-49
BG-1504 SOFIA
Phone: +359-2-9434150 Fax: +359-2-9434160
Email: melsicon@applet-bg.com

Burundi

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent
Droste Park Ext. 7, Johannesburg 2001
P.O. Box 33431 Jeppesstown 2043
South Africa
Phone: +27-11-620 1500 Fax: +27-11-620 1670
Email: daver@bearingman.co.za

Cameroon

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: export2@nord-de.com

Canada

NORD Gear Limited

41 West Drive
Brampton, Ontario L6T 4A1
Phone: (905) 796-3606 Fax: (905) 796-8130
Email: info.ca@nord.com

Chile

TDC Techno Drive Center S.A.

Los Leones No. 133-2° Piso
Providencia Santiago de Chile
Chile
Phone: +56-2-234 0084 Fax: +56-2-334 9633
Email: tdc@technodrive.cl

China

NORD (Beijing)

Power Transmission Co. Ltd.
No. 5, Tangjiacun,
Guangqudonglu, Chaoyangqu
Beijing 100022
Phone: +86-10-67704305 Fax: +86-10-67704330
Email: info@nord-cn.com

China

NORD (Suzhou)

Power Transmission Co. Ltd.
No.510 Changyang Street
Suzhou Ind. Park
Jiangsu 215021
Phone: +86-512-85180277 Fax: +86-512-85180278
Email: info@nord-cn.com

Colombia

Variadores S.A.

Carrera 50 (Aut. Sur)
No. 2 Sur 271 - A.A. 053811
Medellin
Phone: +57-4-2552200 Fax: +57-4-2557450
Email: variadores@variadores.com.co

Costa Rica

Variadores S.A.

Carrera 50 (Aut. Sur)
No. 2 Sur 271 - A.A. 053811
Medellin, Columbia
Phone: +57-94-2552200 Fax: +57-94-2557450
Email: variadores@variadores.com.co

Croatia

NORD-Pogoni d.o.o

Obrtnicka 9
HR-48260 Krizevci
Phone: +385-48-711 900 Fax: +385-48-270 494
Email: info@nord-hr.com

Cyprus

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-401 441 Fax: +49-4532-401 254
Email: export2@nord-de.com

Czech Republic

NORD-Poháněcí technika, s. r. o.

Palackého 359
500 03 Hradec Králové
Phone: +420 495 580 310 Fax: +420 495 580 312
Email: HZubr@nord-cz.com

Dem. Rep. Congo

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent
Droste Park Ext. 7, Johannesburg 2001
P.O. Box 33431 Jeppesstown 2043, South Africa
Phone: +27-11-620 1500 Fax: +27-11-620 1670
Email: daver@bearingman.co.za

Denmark

NORD-Gear Danmark A/S

Kliplev Erhvervspark 28 - Kliplev
DK - 6200 Aabenraa
Phone: +45 73 68 78 00 Fax: +45 73 68 78 10
Email: info@nord-dk.com

Ecuador

Variadores S.A.

Carrera 50 (Aut. Sur)
No. 2 Sur 271 - A.A. 053811
Medellin, Columbia
Phone: +57-94-2552200 Fax: +57-94-2557450
Email: variadores@variadores.com.co



Egypt

IED-International Engineering Development

4 Abu Gafar El Nahas Street

El Golf, Heliopolis

Cairo

Phone: +20-2-2900475

Fax: +20-2-4185637

Email: ied@thewayout.net

El Salvador

Maquinaria E Insumos Industriales, S.A.

67 Av Sur Edificio #144 Local #3,.

Col Escalon

San Salvador, C.A

Phone: +503-22243059

Fax: +503-22246272

Email: maquina@integra.com.sv

Estonia

Technobalt Eesti Ltd.

Läike tee 10

Peetri küla, Rae vald

EE-75301 Harjumaa

Phone: +372-6-684 400

Fax: +372-6-613 165

Email: info@technobalt.ee

Finland

NORD Gear Oy

Aunankorvenkatu 7

FI - 33840 Tampere

Phone: +358-3-254 1800

Fax: +358-3-254 1820

Email: info@nord-fi.com

France

NORD Réducteurs

Bureaux commerciaux

17, Av. Georges Clémenceau

FR-93421 Villepinte Cedex

Phone: +33-1-4963 0189

Fax: +33-1-4963 0811

Email: info@nord-fr.com

Germany

Getriebebau NORD GmbH & Co. KG

Postfach 12 62

Rudolf-Diesel-Strasse 1

D-22941 Bargteheide

Phone: +49-4532-401-0

Fax: +49-4532-401-253

Email: info@nord-de.com

Ghana

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1

22941 Bargteheide / Hamburg Germany

Phone: +49-4532-4010

Fax: +49-4532-401254

Email: export2@nord-de.com

Greece

Magrinox S.A.

14 Grevenon Str.

Votanikos

GR-11855 Athens

Phone: +30-210-3423201-3

Fax: +30-210-3459767, 3459928

Email: magrinox@mail.otenet.gr

Guatemala

Maquinaria E Insumos Industriales, S.A.

19 Avenida 16-56 Zona 10

Empresarial Santa Fe Bodega 4

Guatemala 01010

Phone: +502-23674490

Fax: +502-23674493

Email: maquina@inteinet.net.gt

Guinea

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1

22941 Bargteheide / Hamburg Germany

Phone: +49-4532-4010

Fax: +49-4532-401254

Email: export2@nord-de.com

Hungary

NORD Hajtastechnika Kft.

Törökök u. 5-7

HU-1037 Budapest

Phone: +36 1 437 0127

Fax: +36 1 250 5549

Email: info@nord-hu.com

Iceland

Varmaverk Ltd.

Dalshrauni 5

IS-220 Hafnarfiroei

Phone: +354-5651750

Fax: +354-5651951

Email: pall@varmaverk.is

India

NORD Drivesystems Pvt. Ltd.

282/ 2, 283/2, Plot No. 15

Mauje, Village Mann

Tal Mulshi, Adj. Hinjewadi Phase- II

Pune Maharashtra 411 057

Phone: +91-20-39801200

Fax: +91-20-39801216

Email: info@nord-in.com

Indonesia

PT. NORD Indonesia

Jln. Raya Serpong KM7,

Kompleks Rumah Multi Guna Blok D-No. 1

Pakulonan, Serpong 15310 - Tangerang

West Java

Phone: +62-21-5312 2222

Fax: +62-21-5312 2288

Email: info@nord-id.com

International Contacts



Iran

Paralog Engineering Co. Ltd.

P.O.Box 19395-7366
No. 6, Shangarf Street
Mirdamad Blvd.
Tehran 15489
Phone: +98-21-22905551 / -2 Fax: +98-21-22905550
Email: nord@Paralog.ir

Ireland

NORD Gear Limited (UK)

11 Barton Lane, Abingdon Science Park,
Abingdon,
Oxfordshire OX14 3NB
Phone: +353(0) 87 69 -48 7 11 Fax: +353 (0) 49 85 - 43 7 34
Email: pfinnegan@nord-ie.com

Israel

Ringel Bros. Ltd

Hertzel St. 134
5148 Tel-Aviv
Phone: +972-3-6824027 Fax: +972-3-6822041
Email: mringel@netvision.net.il

Italy

NORD-Motoriduttori s.r.l.

Via Newton 22
IT-40017 San Giovanni in Persiceto (BO)
Phone: +39-051-6870 711 Fax: +39-051-6870 793
Email: info@nord-it.com

Ivory Coast

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: export2@nord-de.com

Jordan

Arab Co. For Power Transmissions Technology

"GearTech Co"
P.O Box 830641
Amman 11183
Phone: +962-6-5692283 Fax: +962-6-5656750
Email: indgroup@wanadoo.jo

Kazakhstan

NORD Privody KZ

Chaykovski str.,
h.131, of.12. KZ - Almaty, 050 000
Phone: +7-3272-61 02 99 Fax: +7-3272-61 02 99
Email: info@kz.nord.com

Kenya

Jos. Hansen & Soehne (East Africa) Ltd.

Baba Dogo Road, Ruaraka
P.O.Box 30196
Nairobi
Phone: +254-2-861 637 Fax: +254-2-861 640
Email: hansenkenya@swiftkenya.com

Kongo

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Cresent
Droste Park Ext. 7, Johannesburg 2001
P.O. Box 33431 Jeppestown 2043
South Africa
Phone: +27-11-620 1500 Fax: +27-11-620 1670
Email: powerdrives@bearingman.co.za

Korea

POWERKING GEAR Co.

216-8, No-onsa,
Gwangmyung, Gyunggi, 423-080
Phone: +82-2-2615-6044 Fax: +82-2-2060-7044
Email: sales@pkgear.com

Kuwait

Eight Industries

P.O. Box 32095
Dubai/U.A.E.
Phone: +971-4-3200 770 Fax: +971-4-3200 771
Email: eight@emirates.net.ae

Kyrgyzstand

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@nord-de.com

Latvia

SIA Technobalt

Skaistkalnes 1
Riga LV - 1004
Phone: +371-7605 046 Fax: +371-7605 062
Email: technobalt@technobalt.lv

Lebanon

Hosny Homany

P.O. Box 102
Ghobery, Beirut
Phone: +961 5 480661/2 Fax: +961 5 480660
Email: hhomany@cyberia.net.lb

Liberia

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: export2@nord-de.com



Lithuania

Technobalt Group

UAB Technobalta
Titnago g.10
LT-02300 Vilnius
Phone: +370-5-260 2503 Fax: +370-5-2653288
Email: lietuva@technobalt.com

Malaysia

GTM Sdn Bhd

No. 19, Jalan Tambur 33/19,
Shah Alam Technology Park, Section 33,
40400, Shah Alam,
Selangor Darul Ehsan
Phone: +60-3-51 24 67 73 Fax: +60-3-51 24 68 10
Email: jenny.multidrive@gmail.com

Marocco

Societe Marocaine des Etablissements Moulin

14 Rue Allal Ben Ahmed AMKIK et 7,
Rue Saint Saens
Belvédère - Casablanca
Phone: +212-22-406777 Fax: +212-22-406782
Email: etsmoulin@wanadoo.net.ma

Mauritius

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent
Droste Park Ext. 7, Johannesburg 2001
P.O. Box 33431
Jeppestown 2043
South Africa
Phone: +27-11-620 1500 Fax: +27-11-620 1670
Email: powerdrives@bearingman.co.za

Mexico

NORD DRIVESYSTEMS SA DE CV

Av. Lázaro Cárdenas 1007 Pte.
San Pedro Garza García, N.L.
México, C.P. 66266
Phone: +52-81-8220-9165 Fax: +52-81-8220-9044
Email: info.mx@nord.com

Namibia

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent
Droste Park Ext. 7, Johannesburg 2001
P.O. Box 33431
Jeppestown 2043
South Africa
Phone: +27-11-620 1500 Fax: +27-11-620 1670
Email: powerdrives@bearingman.co.za

Nepal

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@np.nord.com

Netherlands

NORD Aandrijvingen Nederland B.V.

Volstraat 12
NL-2181 HA Hillegom
P.O.Box 136
NL-2180 AC Hillegom
Phone: +31-252 529544 Fax: +31-252 522222
Email: info@nord-nl.com

New Zealand

CMG Electric Motors (NZ) Limited

2 Ross Reid Avenue
East Tamaki, Auckland
Phone: +64-9-273 9162 Fax: +64-9-273 9062
Email: Mark.Alexander@cmggroup.com.au

Nigeria

Jos. Hansen & Soehne (Nigeria) Ltd.

km 16, Ikorodu Road (near Bata)
Ojota
Lagos
Phone: +234-1-4974 304 Fax: +234-1-4976 936
Email: joshansen@linkserve.com

Norway

NORD GEAR NORGE A/S

Solgaard Skog 7,
PB85
N-1501 Moss
Phone: +47-69 20 69 90 Fax: +47-69 20 69 93
Email: MHansen@nord-no.com

Oman

Eight Industries

P.O. Box 32095
Dubai/U.A.E.
Phone: +971-4-3200 770 Fax: +971-4-3200 771
Email: eight@emirates.net.ae

Pakistan

OTC

Flat # 3, 89B/C-II,
Gulberg-III
Lahore 54660
Phone: +92-42-587 2667-9 Fax: +92-42-587 2670
Email: sajjad@otc.com.pk

Panama

Variadores S.A.

Carrera 50 (Aut. Sur)
No. 2 Sur 271 - A.A. 053811
Medellin, Columbia
Phone: +57-94-2552200 Fax: +57-94-2557450
Email: variadores@variadores.com.co

International Contacts



Peru

Delcrosa S.A.

Av. Argentina 1515

Lima

Phone: +51-1-336 6614

Fax: +51-1-336 8189

Email: viviana@delcrosa.com.pe

Philippines

Mheco Mechanical Handling Equipment Company Inc

Suite 812 Herrera Tower,

Herrera cor. Valero Sts.

Salcedo Village, Makati City

P.O.Box 1004

Makati 1250

Phone: +63-2-844 8901-05

Fax: +63-2-845 1535

Email: mheco@skyinet.net

Poland

NORD Napedy sp. z o.o.

Ul. Grottera 30

PL-32-020 Wieliczka

S d Rejonowy dla Krakowa Zródmiescia

NIP: 683-17-20-355

Kapitał Zakładowy 770 000, 00 PLN

Phone: +48-0122889900

Fax: +48-0122889911

Email: biuro@nord-pl.com

Portugal

NORD Motorreductores

Apdo de Correos 166,

ES-08200 Sabadell - Spain

Phone: +34-93-723 5322

Fax: +34-93-723 3147

Email: info@nord-es.com

Qatar

Eight Industries

P.O. Box 32095

Dubai/U.A.E.

Phone: +971-4-3200 770

Fax: +971-4-3200 771

Email: eight@emirates.net.ae

Romania

S.C.NORD Drivesystems S.R.L.

Str.Nicolae Iorga,Nr.55/3

RO-550387 SIBIU

Phone: +40/269/232880

Fax: +40/269/232880

Email: UPiringer@ro.nord.com

Russian Federation

OOO NORD PRIVODY

Ul. A. Nevsky 9

RU-191167 St.Petersburg

Phone: +7-812-327 0192

Fax: +7-812-327 0192

Email: info@nord-ru.com

Rwanda

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent

Droste Park Ext. 7, Johannesburg 2001

P.O. Box 33431 Jeppeshtown 2043

South Africa

Phone: +27-11-620 1500

Fax: +27-11-620 1670

Email: powerdrives@bearingman.co.za

Saudi Arabia

Al-Musairiyy Industrial Equipment. Co.

P.O. Box 40966

Riyadh - 11511

Phone: +966-1-448 3808

Fax: +966-1-446 9244

Email: info@almusairiyy.com

Senegal

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1

22941 Bargteheide / Hamburg Germany

Phone: +49-4532-4010

Fax: +49-4532-401254

Email: export2@nord-de.com

Singapore

NORD GEAR Pte Ltd

33 Kian Teck Drive

Jurong, Singapore 628850

Phone: +65-6265-9118

Fax: +65-6265-6841

Email: info@nord-sg.com

Slovakia

NORD Pohony, s.r.o.

Juzná Trieda 74

SK - 04001 Kosice

Phone: +421-55-729 9600

Fax: +421-55-729 9599

Email: Info@nord-sk.com

Slovenia

Getriebebau NORD GmbH

Deggendorfstraße 8

A-4030 Linz

Phone: +43-732-31 89 20

Fax: +43-732-31 89 20-85

Email: info@nord-at.com

South Africa

Power Drives a division of Bearing Man Ltd.

6 Tetford Circle,

Millennium Bridge Business Park,

La Lucia Ridge 4320 (Durban)

P.O. Box 25191, Gateway 4321 (Durban)

Phone: +27-11-62 01 61 3

Fax: +27-11-62 01 67 0

Email: powerdrives@bearingman.co.za



Spain

NORD Motorreductores S.A.

Aptdo de Correos 166
ES - 08200 Sabadell
Phone: +34-93-723 5322 Fax: +34-93-723 3147
Email: info@nord-es.com

Sri Lanka

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str. 1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010 Fax: +49-4532-401254
Email: info@lk.nord.com

Sweden

NORD Drivsystem AB

Box 2097
Ryttargatan 277
SE-194 02 Upplands Väsby
Phone: +46-8-594 114 00 Fax: +46-8-594 114 14
Email: info@nord-se.com

Switzerland

Getriebebau NORD AG

Bächigenstr. 18
CH-9212 Arnegg
Phone: +41-71-38899 11 Fax: +41-71-38899 15
Email: info@nord-ch.com

Syria

Elias Brothers Co.

Al' Kowatly St. 2
P.O. Box 4282
Homs
Phone: +963-31-2771 004 Fax: +963-31-2771 003
Email: eliasbrothersco@mail.sy

Taiwan

TACT Trans-Asia Consulting & Trade Co., Ltd.

1F, No. 157-1, Sec. 1, Beisin Road.,
Sindian City,
Taipei County 231, Taiwan R.O.C.
Phone: + 886-2-29188768 Fax: + 886-2-29185985
Email: TACT@trans-asia.com.tw

Tanzania

Jos. Hansen & Soehne (Tanzania) Ltd.

Holland House, Ohio Street
P.O.Box 9521
Dar es Salaam
Phone: +255-22-211 5746 Fax: +255-22-211 2948
Email: jhs-t@africaonline.co.tz

Thailand

Charoen Muang Machinery Co. Ltd.

164/1 Wisutkasat Rd.
Banpanthom, Pranakorn
Bangkok 10200
Phone: +66-2-281 5331 Fax: +66-2-280 8033-4
Email: info@nord-sg.com

Tunisia

Tunesia S.I.A. Ben Djemaa & CIE

220 Avenue des Martyrs
TN - 3000 Sfax
Phone: +216-74-408 446 Fax: +216-74-408 065
Email: bendjemaa@planet.tn

Turkey

NORD-REMAS

Redüktör Sanayi ve
Ticaret Ltd. Sti.
Tepeören Köyü
34959 - Tuzla - Istanbul
Phone: +90-216-304 13 60 Fax: +90-216-304 13 69
Email: info@nord-tr.com

Uganda

Jos. Hansen & Soehne (Uganda) Ltd.

Workers House Plot 1
Pilkington Road
P.O.Box 2333
Kampala
Phone: +256-41-251 324 Fax: +256-41-251 325
Email: hansenuganda@africaonline.co.ug

Ukraine

GETRIEBEBAU NORD GmbH

Vasilkovskaja, 1
office 306
03040 KIEW
Phone: + 380-44-537 0615 Fax: + 380-44-537 0615
Email: vtsoka@nord-ukr.com

United Arab Emirates

Eight Industries

P.O. Box 32095
Dubai/U.A.E.
Phone: +971-4-3200 770 Fax: +971-4-3200 771
Email: eight@emirates.net.ae

United Kingdom

NORD Gear Limited (UK)

11 Barton Lane, Abingdon Science Park,
Abingdon,
Oxfordshire OX14 3NB
Phone: +44-1235-534404 Fax: +44-1235-534414
Email: info@nord-uk.com

International Contacts



United States - Midwest

NORD Gear Corporation
800 Nord Drive, P.O. 367
Waunakee, WI 53597
Phone: 1-888-314-6673
Phone: 1-608-849-7300
Email: info.us@nord.com

Fax: 1-800-373-6673

United States - West

NORD Gear Corporation
1137 W. Bradford Circle
Corona, CA 92882
Toll free: 1-888-314-6673
Phone: 1-608-849-0190
Email: info.us@nord.com

Fax: 1-888-408-6673

United States - East

NORD Gear Corporation
100 Forsyth Hall Drive
Building 100B
Charlotte, NC 28273
Toll free: 1-888-314-6673
Phone: 1-608-849-0140
Email: info.us@nord.com

Fax: 1-888-259-6673

Uzbekistan

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010
Email: info@nord-de.com

Fax: +49-4532-401254

Venezuela

Getriebebau NORD GmbH & Co. KG

Rudolf-Diesel Str.1
22941 Bargteheide / Hamburg Germany
Phone: +49-4532-4010
Email: info@nord-de.com

Fax: +49-4532-401254

Vietnam

NORD Gear Pte. Ltd

Representative office
Unit 401, 4F, An Dinh Building,
18 Nam Quoc Cang Street
Pham Ngu Lao Ward
District 1, Ho Chi Minh City, Vietnam
Phone: +84 8 925 7270
Email: info@vn.nord.com

Fax: +84 8 925 7271

Zambia

PROVIDENT INVESTMENT Ltd

Mr.Y.M.Mulambya
1st. Floor - Angoni House
Obote Avenuenue
Kitwe
Phone: +260-222 60 84
Email: provident@zamtel.zm

Fax: +260-222 67 10

Zimbabwe

Power Drives a division of Bearing Man Ltd.

Bearing Man Park, Droste Crescent
P.O. Box 33431 Jeppestown 2043
South Africa
Phone: +27-11-620 1500
Email: powerdrives@bearingman.co.za

Fax: +27-11-620 1670

NORD GEAR LIMITED

Terms and Conditions of Sale

1. CONTRACT

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

2. CONFIRMATION

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

3. PRICES

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

4. LIMITED WARRANTY

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

5. SHORTAGE AND NONCONFORMITY

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

6. FORCE MAJEURE

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

7. SHIPMENT AS UNIT

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

8. BUYER'S REFUSAL OF DELIVERY

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

9. GOODS IN TRANSIT

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

10. DELIVERY

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

11. PAYMENT OF PURCHASE PRICE

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

12. BUYER'S DEFAULT

Upon the Buyer's default, the Seller may dispose of the merchandise in any manner that it deems fit and, if it desires to resell same, may do so at private or public sale, with or without notice, and with or without the property being at the place of sale, subject, however, to applicable laws. The Seller or its assigns shall have the right to bid at such sale and may become the purchaser of the property. The proceeds of the sale shall first be applied to the expenses incurred in re-taking, repairing, storing and selling the goods, reasonable solicitor's fees included, and then shall be applied to the payment of the balance due under the contract. Any surplus amount shall be paid to the Buyer. If a deficiency results after the resale, the Buyer agrees to pay such forthwith, together with reasonable solicitor's fees, for the recovery of the goods incurred by the Seller. If upon the Buyer's default, the Seller elects not to resell any goods which it may represent, 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 provisions which are governed by a Personal Property Security Act, this contract shall serve as Security Agreement, reserving in Seller a security interest until full payment of purchase price. The provisions of the Personal Property Security Act regarding security interest shall have preference and apply if inconsistent with other terms of the conditions of sale herein. In provinces where a Personal Property Security Act does not apply, title to the goods shall remain in the Seller or its assigns until full payment of the purchase price. Buyer agrees to execute forthwith any and all documents in such a way and form as Seller may need for filing or recording the security interest under a Personal Property Security Act with the proper registers or officers, or for filing or recording the Conditional Sales Contract herein.

14. SALES AND USE TAX

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

15. INSURANCE

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

16. MODIFICATION BY SELLER

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

17. RETURNED GOODS

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

18. PACKING

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

19. EXPORT ORDER

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

20. CANCELLATION

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

21. BUYER'S RESPONSIBILITY AS TO MAINTENANCE

Buyer shall use and shall require its employees and agents to use all safety devices and guards and shall maintain the same in proper working order. Buyer shall use and require its employees and agents to use safe operating procedures in operating the equipment and shall further obey and have its employees and agents obey safety instructions given by Seller. If Buyer fails to meet the obligations herein, Buyer agrees to indemnify and save Seller harmless from any liability or obligation with regard to any personal injuries or property damages directly or indirectly connected with the operation of the equipment. Buyer further agrees to notify Seller promptly and in any event no later than ten (10) days after notice or knowledge of any accident or malfunction involving Seller's equipment which has caused personal injury or property damages and to cooperate fully with Seller in investigating and determining the causes of such accident and malfunction. In the event that Buyer fails to give such notice to Seller or to cooperate with Seller, Buyer shall be obligated to indemnify and save Seller harmless from any such claims arising from such accident.

22. MISCELLANEOUS PROVISIONS

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

23. NON ASSIGNMENT BY BUYER

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

24. APPLICABLE LAW

All contracts are governed by the applicable laws of Ontario.

25. This instrument sets forth the entire understanding and agreement of the parties hereto in respect of the subject matter hereof, and all prior undertakings between the parties hereto, together with all representations and obligations of such parties in respect of such subject matter, shall be 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 Contract and all notices or other documents relating thereto be drafted in the English language.

Les parties reconnaissent qu'elles ont requis que ce contrat et tous les avis ou autres documents qui y rapportent soient rédigés en langue anglaise.

*Terms and Conditions in French available upon request *

NORD GEAR CORPORATION

Conditions 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 communication, 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 Wauwaukee, 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 Wauwaukee, 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 Wauwaukee, 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. Seller'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 purchasers 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 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) 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 clauses 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 its creditors or otherwise sells, encumbers or disposes of the goods, or if for any other reason the Seller should deem itself insecure, the full amount of the purchase price then remaining unpaid shall at once become due and payable at the option of the Seller.

12. BUYER'S DEFAULT

Upon the Buyer's default, the Seller may dispose of the merchandise in any manner that it deems fit and, if it desires to resell same, may do so at private or public sale, with or without notice, and with or without the property being at the place of sale, subject, however, to applicable laws. The Seller or its assigns shall have the right to bid at such sale and may become the purchaser of the property. The proceeds of the sale shall first be applied to the expenses incurred in retaking, repairing, storing and selling the goods, reasonable 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 repurchase, 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 effect, 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.

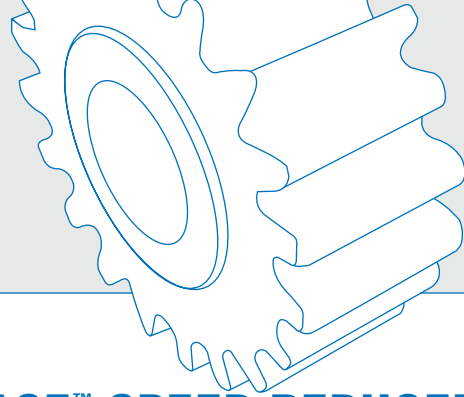


CONTACTS





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



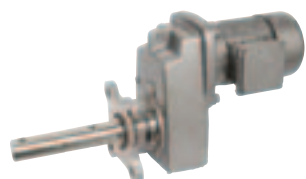
NORDBLOC®.1 HELICAL IN-LINE

- 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 4,683 lb-in
- Gear ratios – 5:1 to 3,000:1



MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS HELICAL-BEVEL

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

NORDAC AC VECTOR DRIVES



SK200E FAMILY

- Decentralized, high performance
- 380-480V, 3-phase to 10 hp
- 200-240V, 3-phase to 5 hp
- 200-240V, 1-phase to 1.5 hp
- 100-120V, 1-phase to 1 hp



SK500E FAMILY

- Compact, high performance
- 380-480V, 3-phase, to 50hp
- 200-240V, 3-phase, to 15hp
- 200-240V, 1-phase, to 3hp
- 110-120V, 1-phase, to 1.5hp



SK700E FAMILY

- Flexible high performance
- 380-460V, 3-phase, to 200hp



DRIVESYSTEMS

www.nord.com

WEST

Corona, CA (Los Angeles)
Phone: 608.849.0190

MIDWEST

Waunakee, WI (Madison)
Phone: 608.849.7300

EAST

Charlotte, NC
Phone: 608.849.0140

NORD Gear Corporation

National Customer Service Toll-Free: 888.314.6673
info.us@nord.com

NORD Gear Limited

Toll-Free in Canada: 800.668.4378
info.ca@nord.com

CANADA

Brampton, ON (Toronto)
Phone: 905.796.3606