

Intelligent Drivesystems, Worldwide Services



Smooth Surface Motors

Unique Washdown Design

HM & HMT Model Motors
Manufactured from Corrosion Resistant Aluminum Alloy

PRODUCT OVERVIEW
M7010



Spanning the globe To serve you

Since 1965, NORD has become well established in the power transmission industry and grown to global proportions on the strength of product performance, superior customer service, and intelligent drive solutions. NORD is constantly improving and expanding its products to meet a never-ending variety of industrial challenges.

NORD designs and manufactures drive systems engineered for adaptability. NORD's innovative drive solutions are specified and utilized for a range of applications in nearly every industry throughout the world.

NORD Drivesystems' product portfolio is extensive and continuously evolving in order to meet the needs of today's fast-changing markets. NORD's range of drive equipment includes: helical in-line, helical shaft-mount, helical-bevel, helical-worm and worm gear units with torques from 90 lb-in to 2,200,000 lb-in, readily available AC motors and from 1/6 HP to 250 HP, variable frequency drives up to 250 HP, and mechanical variable speed drives.

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

NORD makes its wide product range easily available through a global network that includes representation in over 60 countries. By providing all of our customers with prompt delivery, and expert support services, we are firmly committed to exceeding customer expectations and being responsive to the ideas and specifications of every customer, anywhere in the world.



NORD Smooth Surface Motors

NORD Smooth Surface Motors are ideal for applications in food processing, bottling, pharmaceuticals, poultry and meat processing, bakeries, snack foods, dairy, marine and coastal areas, waste water, damp and wet areas and areas where sanitation and cleanliness is essential. The product offering includes four continuous duty, premium efficient motor sizes ranging from 0.5 to 1.5 HP with an IEC B14 flange mount and many possibilities to configure as a NORD integral gearmotor assembly. Motor options are varied and include brakes, thermal overload protection, space heaters, potted terminal boxes, condensation drain holes, and connectivity solutions.

NORD Smooth Surface Motors include both the HM and HMT series. The HM Series motors are made from a high-strength, naturally corrosion resistant aluminum alloy and can be supplied with a variety of protective coatings and finishes. The HMT Series motors are supplied with NORD's exclusive NSD^{upH} Sealed Surface Conversion System. The NORD HMT Series Smooth Surface motor can also be offered as part of a wide range of integral gearmotor or motorized reducer solution's complete with NSD^{upH}.

NORD NSD^{upH} product solutions have been field-proven to rival more costly stainless steel motor and options. NSD^{upH} is resistant to blistering, flaking and peeling, offers extreme corrosion resistance across a wide pH range, and a surface that is 1000 times harder than paint.

Features and Benefits

- Minimum IP66 ingress protection rating.
- Threaded cable entry holes
- Lip seals on both shaft ends
- Sealed and gasketed terminal boxes.
- Continuous Duty (S1) / Premium Efficient (IE3) / Non-ventilated (TENV).
- Common 50 Hz and 60 Hz voltages.
- Inverter/vector duty wiring and insulation.
- Rated for voltage spikes per NEMA MG1-2011, section 31.4.4.2
- Moisture resistant varnished dipped windings.

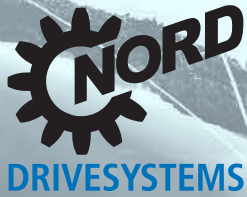


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Company Overview

Since 1965, NORD has become well established in the power transmission industry and grown to global proportions on the strength of product performance, superior customer service, and intelligent drive solutions.

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NORD does far more than manufacture the world's finest drive components. We provide our customers with optimum drive configurations for their specific purposes, providing each and every one with truly complete and efficient systems at a price/quality ratio unmatched in today's competitive markets.

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 delivery
- Greater product versatility
- Shorter lead times
- Timely shipping
- Global Availability



Global Availability

NORD makes its wide product range easily available through a global network that includes representation in over 60 countries. Providing all customers with prompt delivery, and expert support services, we are firmly committed to exceeding customer expectations and being totally responsive to the ideas and specifications of every customer, anywhere in the world.

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 Waukegan, WI, Charlotte, NC, Corona, CA, Brampton, ON, and Monterrey, Mexico, resulting in an ever-increasing capacity in the United States and Canada and giving our customers the shortest lead times in the industry.





Manufacturing

NORD Gear continually invests in the latest research, manufacturing and automation technology. This ensures our ability to provide you with the utmost quality at an affordable price. Not only do we invest in our North American facilities, we invest in our factories throughout the world. We continually try to improve our practices to provide our customers with the most superior product available.

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 and assembly.

Worldwide Standards

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

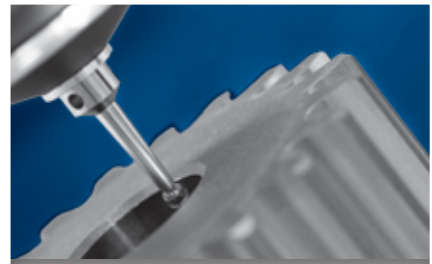


Energy Efficiency

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.

NORD 911

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



Smooth Body Motors Order Form



Intro

SK	Frame	Size	Poles	Assy Type	Motor Options
	80 90 100	SH LH	4	HM HMT ²	<input type="checkbox"/> SH - Space Heater (select voltage) ¹ <input type="radio"/> 110 Volt <input type="radio"/> 230 Volt <input type="radio"/> 460 Volt <input type="checkbox"/> TW - Thermostat ¹ <input type="checkbox"/> TF - Thermistor ¹ <input type="checkbox"/> KKV - Terminal Box Sealed with Resin <input type="checkbox"/> KB - Condensation Drain Holes - Plugged <input type="checkbox"/> KBO - Condensation Drain Holes - Open <input type="checkbox"/> RS - Round Connector

All Motors are Premium Efficient or IE3 design

¹ Requires a large terminal box if motor voltage is 230/460V 60Hz

² Includes NSD^{tuph}

Additional Motor Information

Motor Voltage & Frequency

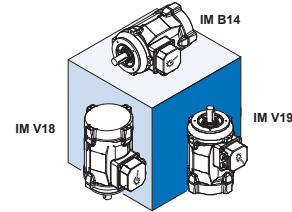
- 230/460V 60Hz
- 575V 60Hz
- 230/400V 50Hz
- 575V 50Hz

Paint Options (HM motors only)

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

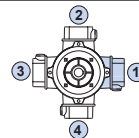
Mounting Position

- IM B14
- IM V18
- IM V19



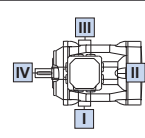
Terminal Box Position

- 1
- 2
- 3
- 4



Conduit Entry Location

- I
- II
- III
- IV



Ordering Example:

SK	Frame	Size	Poles	Assy Type	Motor Options
	100	SH	4	HMT	KKV ² RS ³ TW ⁴

¹ SK 100 SH / 4 HMT : 1HP Smooth Surface Motor with NSD^{tuph}

² KKV : Potted Terminal Box

³ RS : Round motor power connector

⁴ TW : Thermostat



Standards

All motors are in accordance with existing standards and regulations:

NEMA MG 1 - Motors and Generators:

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

UL 1004 – Electric Motors

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

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






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

Inverter/Vector Duty

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



IEC 60038 – Standard voltages

	<p>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.</p>
	<p>Many NORD motors from frame size 63 to 315 are an Underwriters Laboratories Recognized component per UL standard 1004.</p> <ul style="list-style-type: none"> ■ Frames 63-180 File number E191510 ■ Frames 200+ File number E227215
	<p>The Canadian Standards Association CUS mark indicates that CSA has tested and approved NORD motors according to both US and Canadian standards. It is equivalent to the Underwriters Laboratories RU recognition mark (UL standard 1004) and the CSA mark according to CSA Standard C22.2 No. 100-04</p> <ul style="list-style-type: none"> ■ Frames 63-180 File number LR112560 ■ Frame 200+ File number LR13494
	<p>NORD Premium Efficient motors up to frame 180 have been evaluated by the United States Department of Energy and received a Certificate of Compliance to certify the efficiency ratings.</p>
	<p>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.</p>



Standard Motor Construction

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

Some of the standard design benefits include:

- Shaft lip seals on both ends of the motor shafts.
- Stator to endbell connections sealed to exclude moisture.
- Double coated magnetic wire insulation.
- Inverter/vector duty insulation system conforms to NEMA MG1-2011, section 31.4.4.2 voltage spikes.
- Moisture resistant varnish dipped windings with improved varnish materials.
- Inorganic insulating components for tropical protection.
- Conduit box sealed with gaskets.
- Corrosion resistant alloy materials.
- Threaded cable entry holes.

Terminal Block

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

Inverter/Vector Duty – Voltage Spikes

All NORD motors are constructed with an insulating system designed to withstand the repeated voltage spikes generated by modern AC vector drives. The insulation system withstands the ratings in conformance with NEMA MG 1-2011 Section 31.4.4.2 Voltage Spikes.

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

Insulation System

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

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

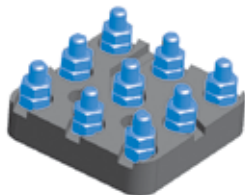
Other motor manufacturers eliminate some of these insulating components for cost reduction which leads to less reliability.

Tropical Protection (Anti-fungal)

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

High Starting Torque

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





Voltage and Frequency

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

Standard Voltages

Single speed motors
230/460V-60Hz
575V-60Hz
230/400V-50Hz
400/690V-50Hz

Voltage and Frequency Variation

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

NEMA and CSA Labeled Motors



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

Service Voltages	Utilization Voltages
240V	230V
480V	460V
600V	575V

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

US and Canadian Standard (CUS)

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

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

CE Labeled Motors

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

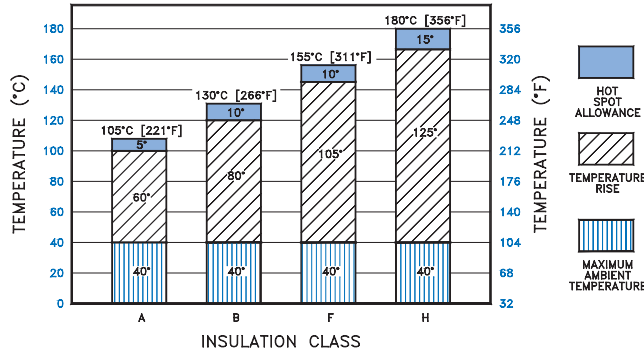
Previous Service Voltages	Current Service Voltages
220V, 380V, 660V	230V, 400V, 690V +6/-10%
240V, 415V	230V, 400V +10/-6%

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



Insulation Class

NORD motors are constructed with a thermal class F insulating system. These motors are also designed for a class B temperature rise of up to 80°C. The use of class F insulation with a class B temperature rise provides increased operating life.



Ambient Temperature

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

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

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

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’s nominal power either needs to be de-rated (see table below) or upgraded insulation systems need to be considered.

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

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



Enclosure

The NORD smooth bodied motors are Totally Enclosed Non-Ventilated (TENV) with an IP66 enclosure rating. IP Enclosures per IEC 60034-5.

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

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
S3	Sequential intermittent operation, identical run and rest cycles with a constant load. Temperature equilibrium is never reached. Starting current has little effect on temperature rise. The cyclic duration factor (cdf) indicates the portion of operation time in relation to a complete duty cycle. The typical duty cycle time is 10 minutes, unless otherwise specified. Example: S3-40% Recommended values for determination: 25, 40, 60%



Extended operation range and intermittent operation S3

In standard practice, motors may only operate for short periods or on an intermittent basis. In these instances there are less electrical losses in the motor, the motor operates much cooler and an increased power rating is possible. The following tables may be used for planning when our smooth-bodied NORD motors can be used on an intermittent basis.

The heating of unventilated motors greatly depends on the installation conditions. The maximum surface temperature may be slightly below the temperature of the windings.

400 V / 50 Hz 4 - pole Unventilated Motors																
Type	S1				S3-60%				S3-40%				S3-25%			
	P _N		I	n	P _N		I	n	P _N		I	n	P _N		I	n
	[hp]	[kW]	[A]	[rpm]	[hp]	[kW]	[A]	[rpm]	[hp]	[kW]	[A]	[rpm]	[hp]	[kW]	[A]	[rpm]
80 LH/4	0.50	0.37	0.98	1425	0.67	0.50	1.2	1390	0.85	0.63	1.5	1340	0.95	0.7	1.67	1325
90 SH/4	0.75	0.55	1.27	1435	1.0	0.75	1.61	1405	1.2	0.9	1.9	1385	1.6	1.2	2.66	1305
100 SH/4	1.0	0.75	1.65	1450	1.5	1.1	2.25	1420	1.8	1.35	2.75	1395	2.0	1.5	3.0	1390
100 LH/4	1.5	1.1	2.40	1445	2.0	1.5	3.05	1425	2.4	1.8	3.6	1410	3.0	2.2	4.4	1380

460 V / 60 Hz 4 - pole Unventilated Motors																
Type	S1				S3-60%				S3-40%				S3-25%			
	P _N		I	n	P _N		I	n	P _N		I	n	P _N		I	n
	[hp]	[kW]	[A]	[rpm]	[hp]	[kW]	[A]	[rpm]	[hp]	[kW]	[A]	[rpm]	[hp]	[kW]	[A]	[rpm]
80 LH/4	0.50	0.37	0.89	1735	0.67	0.5	1.05	1710	0.85	0.63	1.26	1680	0.95	0.7	1.38	1670
90 SH/4	0.75	0.55	1.14	1740	1.0	0.75	1.4	1720	1.2	0.9	1.62	1705	1.6	1.2	2.13	1665
100 SH/4	1.00	0.75	1.47	1755	1.5	1.1	1.95	1735	1.8	1.35	2.32	1715	2.0	1.5	2.55	1710
100 LH/4	1.50	1.1	2.14	1755	2.0	1.5	2.65	1735	2.4	1.8	3.1	1725	3.0	2.2	3.7	1710



Motor Options & Construction

NORD Smooth bodied motors are built from stocked parts and the options are added to these motors through simple modifications. Below is a list of options that are available with the smooth body design.

Motor Options

Abbreviation	Description	Page
KB	Condensation Drain Holes - Plugged	13
KBO	Condensation Drain Holes - Open	13
KKV	Terminal Box Sealed with Resin	13
RS	Round Connector	13
SH	Space Heater	13
TF	Thermistor, PTC resistor	12
TW	Thermostat, bimetallic switch	12

Motor Overload Protection

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

↑ = Good protection ↔ = Limited protection ↓ = No protection	Fuses	Motor Overloads	PTC Thermistor (TF)	Thermostat (TW & 2TW)
Over current up to 200%	↓	↑	↑	↑
High inertia starting	↓	↔	↑	↔
Frequent motor starts	↓	↔	↑	↑
Stalling	↔	↔	↔	↔
Single phasing	↓	↔	↑	↑
Supply voltage deviations	↓	↑	↑	↑
Supply frequency deviations	↓	↑	↑	↑
Inadequate motor cooling	↓	↓	↑	↑
Bearing Damage	↓	↓	↑	↑



Thermostats (TW)

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

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

WARNING

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

IMPORTANT NOTE

When ordering NORD smooth surface motors with thermostats, thermistors or space heaters, a brakemotor terminal box is required and provided as standard.

Thermistors (TF)

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

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

WARNING

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


IMPORTANT NOTE


When ordering NORD smooth surface motors with thermostats, thermistors or space heaters, a brakemotor terminal box is required and provided as standard.



Space Heater (SH)

Motors subject to extreme temperature fluctuations, severe climatic conditions or repeated heating or cooling cycles can be damaged by the formation of condensation. NORD can provide an anti-condensation space heater inside the motor to heat up the windings when the motor is not operating. This will prevent moisture from forming inside the motor. Space heaters are recommended when motors are installed in very damp or wet locations or where condensation is likely. The space heaters must not be switched on while the motor is running.

Space Heater Voltage Must Be Specified	
	<input type="radio"/> 115V – 50/60Hz
	<input type="radio"/> 230V – 50/60Hz
	<input type="radio"/> 460V – 50/60Hz
	<input type="radio"/> other voltages available on request

	<i>IMPORTANT NOTE</i>	
<p>When ordering NORD smooth surface motors with thermostats, thermistors or space heaters, a brakemotor terminal box is required and provided as standard.</p>		

Condensation Drain Holes

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

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

	<i>IMPORTANT NOTE</i>	
<p>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.</p>		

Condensation Drain Holes, Plugged (KB)

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)

KBO drain holes are shipped open (not plugged).

Terminal Box Sealed with Resin (KKV)

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

Round Connector (RS)

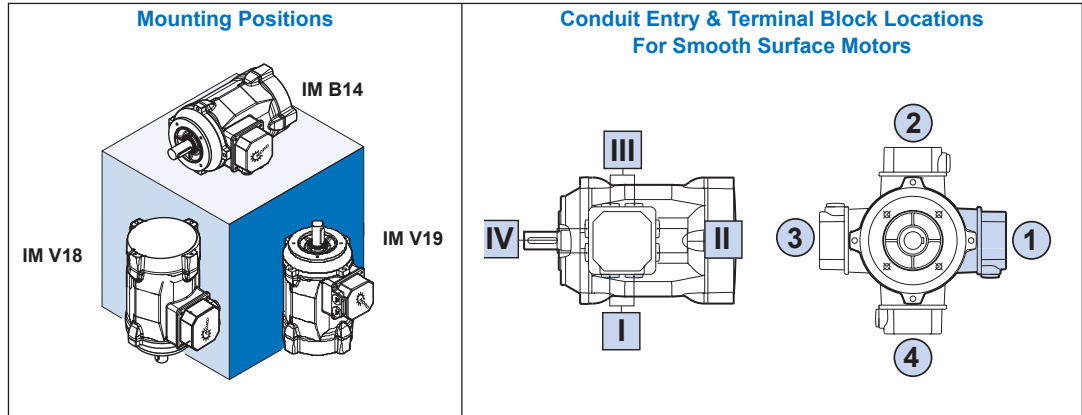
NORD can supply a round motor disconnect that is fitted to the motor terminal box in order to allow for easy field installation and replacement.

Mounting Positions & Motor Weights



Mounting Positions

The motor mounting position helps to determine the use of specific options, specify the terminal box location and the conduit entry location. When mounting motors, always secure the motor tightly to the mounting surface.



Weights

Motor Size	Units	Motor Only	Motor & IG
80LH/4 HM	[lb]	22.5	27.1
	[kg]	10.2	12.3
90SH/4 HM	[lb]	33.3	37.9
	[kg]	15.1	17.2
100 SH/4 HM	[lb]	46.5	51.1
	[kg]	21.1	23.2
100 LH/4 HM	[lb]	55.6	60.2
	[kg]	25.2	27.3



DRIVESYSTEMS

Ratings Section

Premium Efficient 230/460V & 332/575V 60Hz Ratings	16
IE3 200/400V & 400/690V 50Hz Ratings	17



Performance Data for HM/HMT PE – 230/460V & 332/575V - 60Hz



Inverter duty • TENV
Synchronous speed 1800rpm @ 60Hz • 4-pole • Three-phase
Voltages: 230/460V & 332/575– 60Hz • 1.15 Service Factor
S1 Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

Premium Efficient - 230/460V - 60Hz

Motor Type	P _n Full Load Power		N _n Full-Load Speed	I _n Full-Load Current	I _a /I _n Locked Rotor Current Ratio	T _n Full-Load Torque	T _a /T _n Locked Rotor Torque Ratio	T _k /T _n Break Down Torque Ratio	pf Power Factor	η Efficiency			J _m Motor Inertia [lb-ft ²]
	[hp]	[kW]	[rpm]	230/460V [A]	[%]	[lb-in]				1/2 [%]	3/4 [%]	4/4 [%]	
80 LH/4 HM or HMT	0.50	0.37	1735	1.78 / 0.89	650	17.97	4.2	4.3	0.68	69.8	75.6	78.2	0.045
90 SH/4 HM or HMT	0.75	0.55	1740	2.28 / 1.14	820	26.64	4.3	4.9	0.75	73.7	78.9	81.1	0.081
100 SH/4 HM or HMT	1.0	0.75	1755	2.94 / 1.47	880	36.11	4.2	4.9	0.78	79.9	83.9	85.5	0.142
100 LH/4 HM or HMT	1.5	1.1	1755	4.20 / 2.10	910	53.10	4.6	5.1	0.76	81.4	85.1	86.5	0.178

Premium Efficient - 332/575V- 60Hz

Motor Type	P _n Full Load Power		N _n Full-Load Speed	I _n Full-Load Current	I _a /I _n Locked Rotor Current Ratio	T _n Full-Load Torque	T _a /T _n Locked Rotor Torque Ratio	T _k /T _n Break Down Torque Ratio	pf Power Factor	η Efficiency			J _m Motor Inertia [lb-ft ²]
	[hp]	[kW]	[rpm]	332/575V [A]	[%]	[lb-in]				1/2 [%]	3/4 [%]	4/4 [%]	
80 LH/4 HM or HMT	0.50	0.37	1735	1.23 / 0.71	650	17.97	4.2	4.3	0.68	69.8	75.6	78.2	0.045
90 SH/4 HM or HMT	0.75	0.55	1740	1.58 / 0.91	820	26.64	4.3	4.9	0.75	73.7	78.9	81.1	0.081
100 SH/4 HM or HMT	1.0	0.75	1755	2.04 / 1.18	880	36.11	4.2	4.9	0.78	79.9	83.9	85.5	0.142
100 LH/4 HM or HMT	1.5	1.1	1755	2.96 / 1.71	910	53.10	4.6	5.1	0.76	81.4	85.1	86.5	0.178

Motor Ratings





Performance Data for HM/HMT IE3 – 230/400V & 400/690V - 50Hz

Inverter duty • TENV
Synchronous speed 1500rpm @ 50Hz • 4-pole • Three-phase
Voltages: 230/400V & 400/690– 50Hz • 1.0 Service Factor
S1 Continuous Duty • 40°C Ambient • up to 3300ft Elevation
Class B temperature rise • Class F insulation

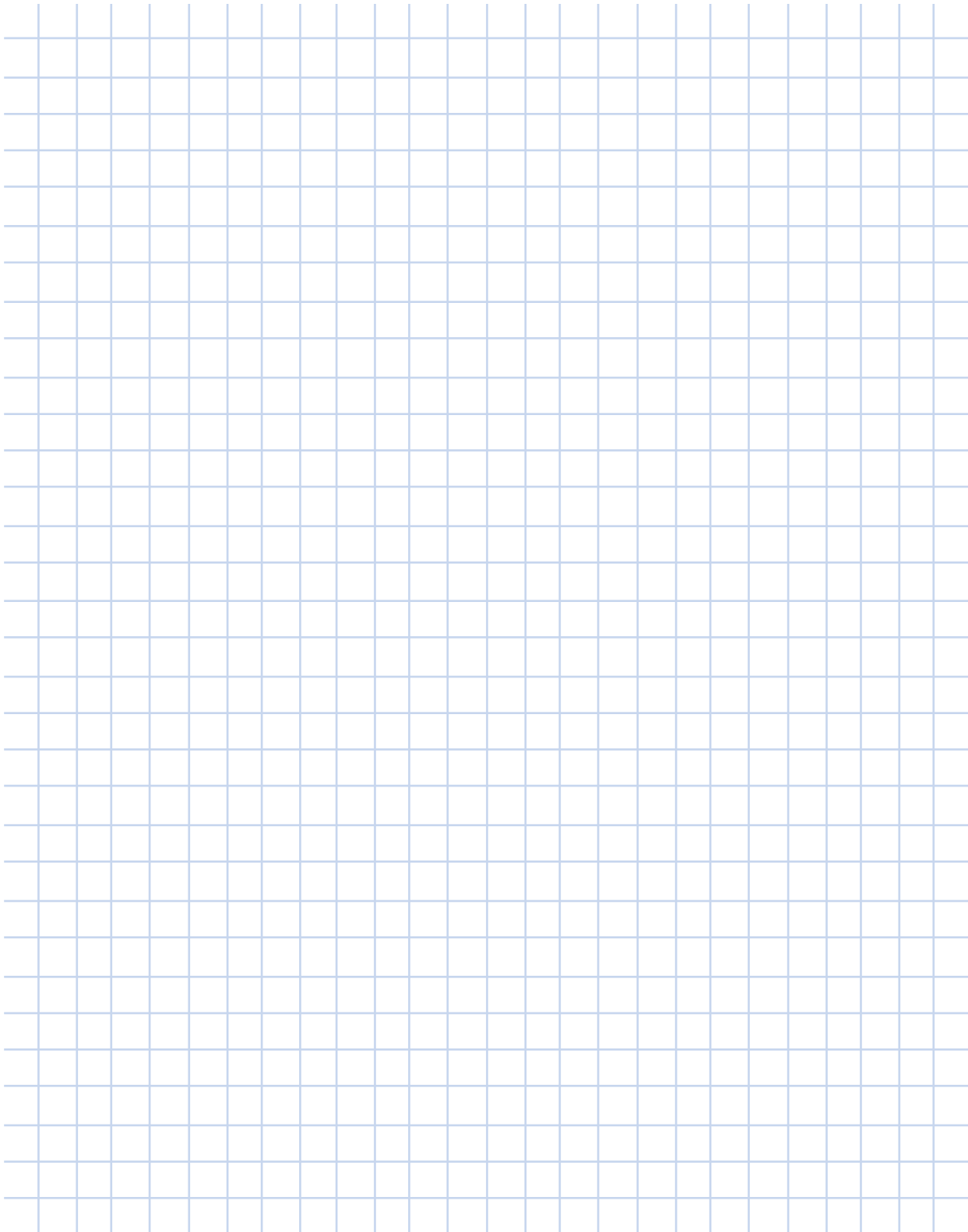
IE3 - 230/400V - 50Hz

Motor Type	P _n Full Load Power		N _n Full-Load Speed	I _n Full-Load Current	I _a /I _n Locked Rotor Current Ratio	T _n Full-Load Torque	T _a /T _n Locked Rotor Torque Ratio	T _k /T _n Break Down Torque Ratio	pf Power Factor	η Efficiency			J _m Motor Inertia
	[hp]	[kW]								[rpm]	230/400V [A]	[%]	
80 LH/4 HM or HMT	0.50	0.37	1425	1.70 / 0.98	550	21.95	3.5	3.5	0.70	73.9	78.2	79.3	0.045
90 SH/4 HM or HMT	0.75	0.55	1435	2.20 / 1.27	720	32.39	3.6	4.1	0.78	76.2	80.1	81.2	0.081
100 SH/4 HM or HMT	1.0	0.75	1450	2.86 / 1.65	770	43.72	3.5	4.1	0.80	76.9	81.0	82.5	0.142
100 LH/4 HM or HMT	1.5	1.1	1445	4.16 / 2.40	790	64.17	3.9	4.3	0.78	79.5	83.0	84.1	0.178

IE3 - 400/690V- 50Hz

Motor Type	P _n Full Load Power		N _n Full-Load Speed	I _n Full-Load Current	I _a /I _n Locked Rotor Current Ratio	T _n Full-Load Torque	T _a /T _n Locked Rotor Torque Ratio	T _k /T _n Break Down Torque Ratio	pf Power Factor	η Efficiency			J _m Motor Inertia
	[hp]	[kW]								[rpm]	400/690V [A]	[%]	
80 LH/4 HM or HMT	0.50	0.37	1425	0.98 / 0.57	550	21.95	3.5	3.5	0.70	73.9	78.2	79.3	0.045
90 SH/4 HM or HMT	0.75	0.55	1435	1.27 / 0.73	720	32.39	3.6	4.1	0.78	76.2	80.1	81.2	0.081
100 SH/4 HM or HMT	1.0	0.75	1450	1.65 / 0.95	770	43.72	3.5	4.1	0.80	76.9	81.0	82.5	0.142
100 LH/4 HM or HMT	1.5	1.1	1445	2.40 / 1.39	790	64.17	3.9	4.3	0.78	79.5	83.0	84.1	0.178







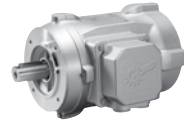
DRIVESYSTEMS

Dimensions

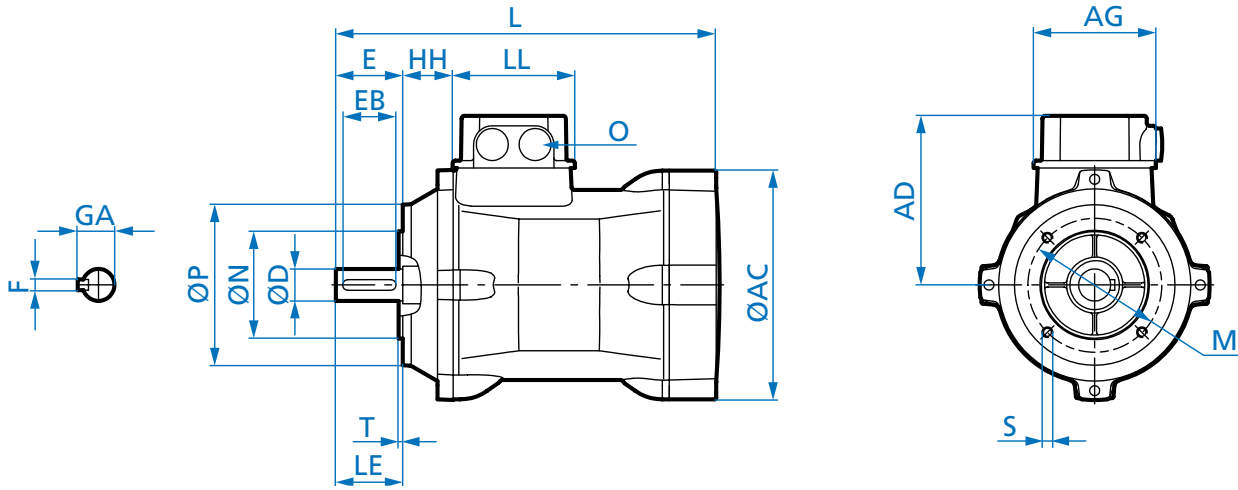
IEC B14 Flanged Smooth Body Motor Dimensions20



IEC B14 Flanged Smooth Body Motors

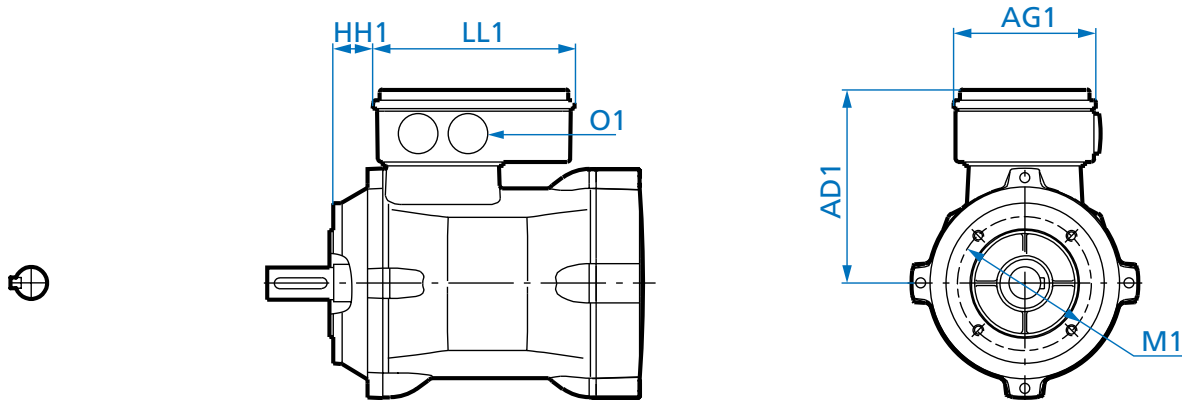


Standard Motor



Large Terminal Box

(required for TF, TW, & SH Options)



Dimensions

Motor Type	Overall		Standard Terminal Box					Large Terminal Box						
	L	AC	AD	HH	LL	AG	O	NPT	AD1	HH1	LL1	AG1	O1	NPT
80 LH/4 HM or HMT	243	154	117	33	92	92	M20 x 1.5	1/2" NPT	135	26	153	108	M25 x 1.5	3/4" NPT
90 SH/4 HM or HMT	288	171	127	37	92	92	M20 x 1.5	1/2" NPT	145	30	153	108	M25 x 1.5	3/4" NPT
100 SH/4 HM or HMT	324	192	135	43	92	92	M20 x 1.5	1/2" NPT	167	36	153	108	M32 x 1.5	1.0" NPT
100 LH/4 HM or HMT	324	192	135	43	92	92	M20 x 1.5	1/2" NPT	167	36	153	108	M32 x 1.5	1.0" NPT

Motor Type	Mounting Flange					Shaft					
	M	N	P	T	S	D	E	LE	EB	GA	F
80 LH/4 HM or HMT	100	80	120	3.0	M6 x 12	19	40	40	32	21.5	6
90 SH/4 HM or HMT	115	95	140	3.0	M8 x 15	24	50	50	40	27	8
100 SH/4 HM or HMT	130	110	160	3.5	M8 x 16	28	60	60	50	31	8
100 LH/4 HM or HMT	130	110	160	3.5	M8 x 16	28	60	60	50	31	8

All Dimensions are in mm.

UNICASE™ SPEED REDUCERS



HELICAL IN-LINE

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



NORDBLOC®.1 HELICAL IN-LINE

- Foot or Flange Mount
- Torque up to 26,550 lb-in
- Gear ratios – 1.88:1 to over 370:1



PARALLEL HELICAL CLINCHER™

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



SCP SCREW CONVEYOR PACKAGE

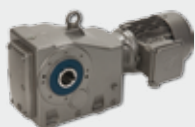
- Shaft, or Flange Mount
- Torque up to 53,100 lb-in
- Gear ratios – 4.32:1 to over 1500:1



RIGHT ANGLE

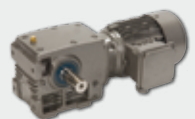
HELICAL-BEVEL 2-STAGE

- Foot, Flange or Shaft Mount
- Torque up to 5,840 lb-in
- Gear ratios – 4.1:1 to 70:1



RIGHT ANGLE HELICAL-BEVEL

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



RIGHT ANGLE HELICAL-WORM

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

HIGH PERFORMANCE MOTORS & BRAKEMOTORS



INVERTER/VECTOR DUTY

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

UNICASE™ SPEED REDUCERS



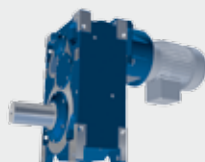
MINICASE™ RIGHT ANGLE WORM

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



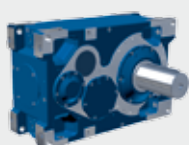
FLEXBLOC™ WORM

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



MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS PARALLEL HELICAL

- Modular bolt-on options
- Torque up to 2,027,000 lb-in
- Gear ratios – 5:1 to 1,600:1



MAXXDRIVE™ LARGE INDUSTRIAL GEAR UNITS HELICAL-BEVEL

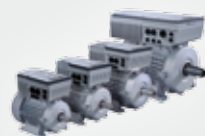
- Modular bolt-on options
- Torque up to 2,027,000 lb-in
- Gear ratios – 5:1 to 1,600:1

NORDAC AC VECTOR DRIVES



SK180E FAMILY

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



SK200E FAMILY

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



SK500E FAMILY

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



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More than 20 million totally unique product combinations guarantees that you won't need to look anywhere else.

Quality Manufacturing

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With emergency service available 24/7 we can help you out when you need us most.

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