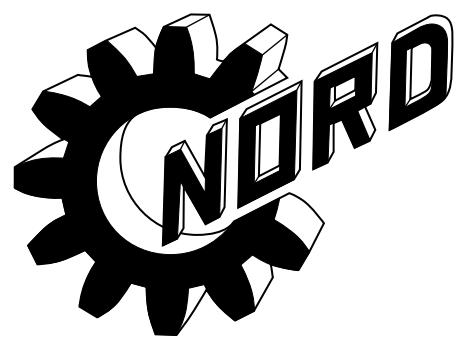


# Motors and Brakemotors

Standard and High Efficiency

**M7000/2003**





# NORD GEAR: SPANNING THE GLOBE TO SERVE YOU

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, helical shaft-mount, helical bevel, and helical worm gearboxes 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, providing each and every one of them with truly complete and efficient systems at a price/quality ratio unmatched in today's fast-changing markets.

What's more, 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.



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# Engineering Information

## Standard Design & Construction





# Engineering Information

## Standard Design & Construction

### 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, 7, 8 and 9.

- 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



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 Laborites RU recognition mark (UL standard 1004) and the CSA mark according to CSA Standard C22.2 No. 100-92

Frames 63-132  
File number 1293961 (LR112560)



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.

#### 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)
- 3600, 1800 or 1200 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
- Brakemotors

The NORD "H" line of energy efficient motors are designed to meet the efficiency levels defined in 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 [%]

hp	1	1.5	2	3	5	7.5	10	15
kW	0.75	1.1	1.5	2.2	3.7	5.5	7.5	11
Eff (%)	82.5	84.0	84.0	87.5	87.5	89.5	89.5	91.0

hp	20	25	30	40	50	60	75	100
kW	15	18.5	22	30	37	45	55	75
Eff (%)	91.0	92.4	92.4	93.0	93.0	93.6	94.1	94.5

hp	125	150	200
kW	90	110	150
Eff (%)	94.5	95.0	95.0



# Engineering Information

## Standard Design & Construction

### 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 February 3, 1995. Effective November 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 November 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.



EFF1 – indicates a high-efficiency motor.



EFF2 – indicates an improved efficiency motors.



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 energy-efficiency motors.

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

### CEMEP efficiency categories - in percent

#### efficiency [%]

kW	1.1	1.5	2.2	3	4	5.5	7.5
hp	1.5	2	3	4	5.4	7.5	10
EFF1 [%]	83.3	85.0	86.4	87.4	88.3	89.2	90.1
EFF2 [%]	76.2	78.5	81.0	82.6	84.2	85.7	87.0
EFF3 [%]	<76.2	<78.5	<81.0	<82.6	<84.2	<85.7	<87.0

kW	11	15	18.5	22	30	37	45
hp	15	20	25	30	40	50	60
EFF1 [%]	91.0	91.8	92.2	92.6	93.2	93.6	93.9
EFF2 [%]	88.4	89.4	90.0	90.5	91.4	92.0	92.5
EFF3 [%]	<88.4	<89.4	<90.0	<90.5	<91.4	<92.0	<92.5

kW	55	75	90
hp	75	100	120
EFF1 [%]	94.2	94.7	95.0
EFF2 [%]	93.0	93.6	93.9
EFF3 [%]	<93.0	<93.6	<93.9

### 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 waveforms 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.

Standard constant torque speed ranges available:

5:1 (60-12Hz) – Option code VR

10:1 (60-6Hz) – Option code VN

20:1 (80-4-Hz) – Option code VW

1000+:1 (60-0Hz) – Option codes VZ-F

See page 38 for further details

### 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 is in conformance with NEMA MG 1-1998 Section 31.4.4.2 Voltage Spikes, which requires motors to withstand:

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



# Engineering Information

## Standard Design & Construction

### Low Inertia

The motor inertia in all NORD motors is extremely low which allows for a much more dynamic motor control capability. 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. Low motor inertia is a significant advantage when using NORD motors with inverters or vector controllers.

### High Torque

The NORD motor design produces high motor starting torque. This is achieved through improved motor winding and rotor design and construction.

### Non-sparking Fan

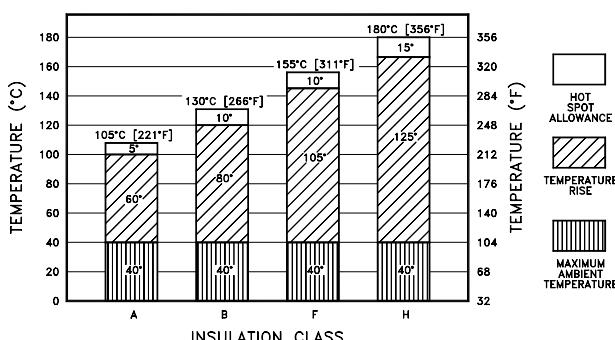
The standard NORD motor fan is a non-sparking design. The fan will also provide proper airflow in either direction of rotation.

### Terminal Block

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

### Insulation Class

NORD motors are constructed with a thermal class F insulating system. The motors are also designed for a class B temperature rise ( $80^{\circ}\text{C}$ ). 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 motors insulation system is designed to provide a superior degree of protection. NORD uses the following insulation components to:

- Magnet wire – double coated
- 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.

### Tropical Protection (Anti-fungal)

As standard the NORD motor insulation system is tropically protected. The insulating and construction components are inorganic materials so the resist fungal growth. Additional protection against moisture can be provided at an option through the NORD Severe Duty (NSD+) package and/or Epoxy Dipped Windings (ED).

### Ambient Temperature

NORD motors are designed to operate with a maximum ambient temperature of  $40^{\circ}\text{C}$  ( $104^{\circ}\text{F}$ ). If the motor's operating environment exceeds  $40^{\circ}\text{C}$ , the motor either needs to be de-rated (see table on the following page) or use an upgraded insulation.

Ambient temp [°F]	113	122	131	140
Ambient temp [°C]	45	50	55	60
Permitted power	96%	92%	87%	82%

### 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 installation elevation exceeds 3300-ft (1000 m), the motor either needs to be de-rated (see table below) or requires upgraded insulation.

Altitude [ft]	5000	6500	8200	10000	11500	13000
Altitude [m]	1500	2000	2500	3000	3500	4000
Permitted power	97%	94%	90%	86%	83%	90%



# Engineering Information

## Standard Design & Construction

### Starting Frequency

One major advantage of NORD motors and brakemotors is the ability to operate in high start-stop applications. Due to the motors optimized design, NORD motors can, under some conditions, cycle thousands of times an hour. This means that a NORD brakemotor can often be used to replace a clutch brake system.

If the motor or brakemotor is used with an inverter or vector drive, the motor's cycling capacity can be increased even more.

The following factors have to be considered when calculating the permissible starting frequency:

The permissible frequency of switching may be calculated as follows:

- Z<sub>0</sub> no-load starting frequency [starts/hour]  
– refer to brake ratings tables page 72  
Z<sub>zul</sub> permissible starting frequency [starts/hour]  
J<sub>mot</sub> moment of inertia of motor [lb-in<sup>2</sup>]  
– refer to motor performance tables  
J<sub>red</sub> external inertia reflected to motor shaft [lb-in<sup>2</sup>]  
T<sub>a</sub> required starting torque [lb-in]  
T<sub>l</sub> load torque after starting [lb-in]

$$Z_{zul} = Z_0 \times \frac{1 - \frac{T_l}{T_a}}{1 + \frac{J_{red}}{J_{mot}}}$$

### Service Factor

Motors rated 230/460V-60Hz and 332/575V-60Hz have a service factor of 1.15. All other motors have a service factor of 1.1 or 1.0.

### Available Voltages

#### Standard voltages for North America:

- 230/460V-60Hz (up to frame IEC180)  
460V-60Hz  
– wye/delta start (frame IEC200 and larger)  
332/575V-60Hz

#### Standard international voltages:

- 230/400V-50Hz (3hp and smaller)  
– usable on 380-415V supply voltages  
400/690V-50Hz (larger than 3hp)  
– usable on 380-415V supply voltages

#### Other voltages are available

- 208/360V-60Hz  
other voltages available consult NORD

### Voltage and Frequency Tolerances

Voltage tolerance ±10% based on rated voltage. Line frequency tolerance of ±5%. Combined variation in voltage and frequency of ±10% in accordance with NEMA standard MG 1.

### Duty Classes

All single-speed motor ratings in this catalog are based on continuous duty operation (S1), i.e. operation with a constant load state whose duration is sufficient to reach the thermal steady state condition. S2 is a short-time operation, meaning operation with a constant load for a specified limited time followed by a pause until the motor is completely cooled down to ambient.

S3 is a periodic operation not under the influence of the start-up, consisting of repeated similar cycles, each comprised of a period with constant load and a pause. The starting current should not noticeably affect the warming-up. For duty types S2 and S3, it is necessary to determine the duration of the operation time and the cycle time, moments of inertia of driven machine, and its speed required torque on starting breaking method.

Duty Class	Power Increase Factor	
<b>S1</b> <i>continuous</i>	Continuous operation	1.0
<b>S2</b> <i>Short-time</i>	Operation time: 60 min	1.1
	30 min	1.2
	10 min	1.4
<b>S3</b> <i>Periodic</i>	Duty cycle, ED: 60%	1.1
	40%	1.15
	25%	1.3
	15%	1.4

If a motor is designed for 100% continuous duty, S1, and shorter cycle duration factor is required, the motor power can be increased according to the table.



# Engineering Information

## Standard Design & Construction

### Enclosure

Standard enclosure type: Totally Enclosed Fan-Cooled (TEFC) with an IP55 enclosure rating. Other enclosure ratings are available, including Totally Enclosed Non-Ventilated (TENV), Totally Enclosed Blower-Cooled (TEBC), and IP65.

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

IP	1 <sup>st</sup> code number Foreign body protection	2 <sup>nd</sup> code number Water protection
0	No protection	No protection
1	Protected against solid objects 50 mm (2 in) in diameter and larger	Protecting against dripping water
2	Protected against solid objects 12 mm (1/2 in) in diameter and larger	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	Protection against sprayed water
4	Protected against solid objects 1 mm (0.04 in) in diameter and larger	Protection against splashed water
5	Protected against dust	Protection against water jets
6	Dust tight	Protection against high pressure water jets
7	--	Protections against intermittent submersion in water
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.

Above the very high degree of standard environmental protection NORD has additional options for unusual operating environments. These include NORD Severe Duty + (NSD+) protection for better external corrosion protection in wet and corrosive installations.

### Standard Construction

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



# Engineering Information

## Standard Design & Construction

### Shaft Load Forces

NORD foot and flange mount motors are designed with high capacity deep groove ball bearings. This allows for long bearing life as well as high overhung and thrust load capacity.

### Overhung Load (OHL)

Maximum values for output shaft loads are given in pounds of radial capacity as shown in the table following in the  $F_{QN}$  column.

The listed maximum loads are

- to be applied at the midpoint of the shaft
- calculated in the least favorable loading direction
- without thrust loads.

Keeping the operational loads at or below the rated capacity will ensure bearing performance for  $L_{h10}$  bearing life of at least 20,000 hours.

The permissible overhung load values listed are based on the least favorable loading direction. For higher overhung load values please contact NORD with the exact loading direction and life requirements.

### Calculating OHL

When an in-line coupling is mounted on a shaft to connect power then no overhung load exists. However, if power transmission components such as sprockets or sheaves are mounted directly onto the shaft they will deliver a rotating load at a right angle to that shaft. The effective overhung load on that shaft will be determined as follows:

$$OHL_{actual} = \frac{2 \times T \times f_z}{d_0}$$

Variable	Description
$OHL_{actual}$	Calculated OHL on motor shaft [lb]
T	Load torque on shaft [lb-in]
$d_0$	Pitch diameter of overhung component [in]
$f_z$	Power transmission component factor

Table for power transmission component factor  $f_z$

Transmission component	Factor $f_z$	Notes
Gear	1.00	17 teeth or less
Gear	1.15	18 teeth or more
Chain sprocket	1.40	13 teeth or less
Chain sprocket	1.20	13 to 20 teeth
Chain sprocket	1.00	20 teeth or more
Timing belt pulley	1.30	
V-belt pulley	1.70	
Flat belt pulley	2.50	

After calculating OHL actual compare to the overhung load capacity found in the tables.

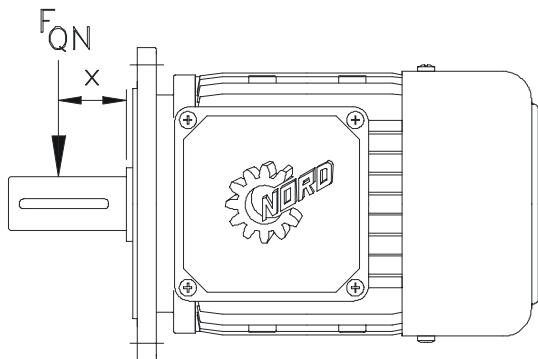
$$OHL_{actual} \leq F_{QN}$$

If  $OHL_{actual}$  exceeds the rated capacity  $F_{QN}$  of the motor then additional measures must be taken.



# Engineering Information

## Standard Design & Construction



### NEMA C-Face Mounted Motors

Motor	OHL $F_{QN}$ [lb]	Thrust $F_{AN}$ [lb]	y [in]	z [in]
63S/4-56C	103	74	5.89	6.83
63L/4-56C	103	74	5.89	6.83
71S/4-56C	103	74	6.56	7.50
71L/4-56C	103	74	6.56	7.50
80S/4-56C	169	121	7.47	8.41
80L/4-143TC	169	121	7.15	8.28
90S/4-145-TC	198	171	8.55	9.68
90L/4-145TC	198	171	8.55	9.68
100L/4-182TC	272	225	9.71	11.09
100L/40-184TC	272	225	9.71	11.09
112M/4-184TC	409	351	9.99	11.36
132S/4-213TC	602	492	12.95	14.64
132M/4-215TC	602	492	12.95	14.64

### IEC Flange & Foot Mounted Motors

Motor	OHL $F_{QN}$ [lb]	Thrust $F_{AN}$ [lb]	y [in]	z [in]
63S/4	112	99	5.71	6.16
63L/4	112	99	5.71	6.16
71S/4	112	99	6.38	6.97
71L/4	112	99	6.38	6.97
80S/4	182	157	7.13	7.91
80L/4	182	157	7.13	7.91
90S/4	193	166	8.52	9.51
90L/4	193	166	8.52	9.51
100L/4	274	225	9.69	10.87
100L/40	274	225	9.69	10.87
112M/4	414	339	10.12	11.30
132S/4	591	492	12.93	14.51
132M/4	591	492	12.93	14.51

### Load not at Shaft Midpoint

If the load is not applied to the midpoint of the shaft, the maximum overhung load capacity  $F_o$  must be modified. The new permissible overhung load  $F_{ox}$  must be calculated at a point on the shaft (x) by:

$$F_{ox} = F_{QN} \times \frac{z}{y + x}$$

Variable	Description
$F_{QN}$	permissible OHL from tables [lb]
x	distance from shaft shoulder to the point where the load is applied [in]
y	factor from table [in]
z	factor from table [in]
$F_{ox}$	new permissible OHL at 'x' distance from output shaft shoulder [lb]

(OHL<sub>adjusted</sub>) at 'x' distance from the shaft shoulder and is compared to the OHL<sub>actual</sub> value.

OHL<sub>actual</sub> < OHL<sub>adjusted</sub>

Unit sizing with this method takes into consideration non-midpoint load location and insures acceptable bearing and shaft strength.

### Thrust Loads

Loads that are directed towards or away from the motor along the axis of the shaft are considered to be AXIAL loads. Commonly this loading is called THRUST. Output shaft THRUST capacity ( $F_{AN}$ ) can be found in the previous tables adjacent to the OHL values:

- Capacity shown is lowest value of either a load directed into or away from the Unit.
- Load cannot exceed the values shown in the tables.
- Capacity listed is for pure axial loads with no overhung load.

If loads are kept at or below the rated capacity, reasonable bearing life can be expected. Contact NORD for combination loads or a more exact examination of the application.



## Performance & Ordering Data



# High Performance – Induction motor

## 230/460V-60Hz – 3ph

### 1800 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		Wtg.	Current		NEMA C-face	Mounting options				Optional - Brake Size	Torque [lb-ft]/[Nm]
	[hp]	[kW]		230V	460V		IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg		
63 S/4	0.16	0.12	8	0.88	0.44	56C	B3	A140	C90	C105	C120	BRE5 3.7 / 5
63 L/4	0.25	0.18	9	1.12	0.56	56C	B3	A140	C90	C105	C120	BRE5 3.7 / 5
71 S/4	0.33	0.25	12	1.56	0.78	56C	B3	A160	C105	C120	C140	BRE5 3.7 / 5
71 L/4	0.50	0.37	14	1.90	0.95	56C	B3	A160	C105	C120	C140	BRE5 3.7 / 5
80 S/4	0.75	0.55	18	2.70	1.35	56C	B3	A200	C120	C140	C160	BRE10 7.4 / 10
80 L/4	1	0.75	20	3.66	1.83	143TC	B3	A200	C120	C140	C160	BRE10 7.4 / 10
90 S/4	1.5	1.1	26	4.84	2.42	145TC	B3	A200	C120	C140	C160	BRE20 15 / 20
90 L/4	2	1.5	31	6.34	3.17	145TC	B3	A200	C120	C140	C160	BRE20 15 / 20
100 L/4	3	2.2	40	9.0	4.50	182TC	B3	A250	C120	C140	C160	C200 BRE40 30 / 40
100 L/40	5	3.7	46	15.2	7.62	184TC	B3	A250	C120	C140	C160	C200 BRE40 30 / 40
132 S/4	7.5	5.5	97	19.8	9.9	213TC	B3	A300	C160	C200		BRE60 44 / 60
132 M/4	10	7.5	121	25.8	12.9	215TC	B3	A300	C160	C200		BRE100 74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# High Performance – Induction Motor

## 230/460V-60Hz – 3ph

## 1800 rpm – Sync

### Performance & Ordering

**Standard efficiency • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 230V [A]	I <sub>n</sub> 460V [A]	pf	Eff. %	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
63 S/4	0.16	0.12	1700	0.88	0.44	0.66	52	5.93	2.1	2.2	2.45	F	0.00499
63 L/4	0.25	0.18	1680	1.12	0.56	0.71	57	9.38	2.1	2.2	2.75	E	0.00665
71 S/4	0.33	0.25	1710	1.56	0.78	0.64	63	12.2	2.5	2.4	3.10	G	0.0150
71 L/4	0.50	0.37	1720	1.90	0.95	0.69	71	18.3	2.45	2.6	3.55	F	0.0181
80 S/4	0.75	0.55	1710	2.70	1.35	0.71	72	27.6	2.2	2.2	3.55	F	0.0304
80 L/4	1	0.75	1650	3.66	1.83	0.74	70	38.2	2.2	2.3	3.90	G	0.0392
90 S/4	1.5	1.1	1660	4.84	2.42	0.78	73	57.0	2.7	2.6	4.45	G	0.0670
90 L/4	2	1.5	1660	6.34	3.17	0.80	74	75.9	2.55	2.5	4.65	G	0.0855
100 L/4	3	2.2	1705	9.0	4.50	0.81	82	111	2.3	2.6	4.90	G	0.107
100 L/40	5	3.7	1725	15.2	7.62	0.75	81	183	2.7	3.1	5.10	G	0.162
132 S/4	7.5	5.5	1735	19.8	9.9	0.82	86	272	2.45	2.75	5.45	G	0.553
132 M/4	10	7.5	1735	25.8	12.9	0.84	87	363	2.9	3.2	6.45	H	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

<b>Motor type</b>				
<b>Mounting option</b>				
<b>Power</b>				
<b>Voltage</b>				
<b>Frequency</b>				
Mounting position		Conduit box location		Cable entry
<b>Motor options</b>				
<b>Brake size (optional)</b>				
<b>Brake voltage (AC or DC)</b>				
<b>Brake options</b>				

# High Performance – Induction Motor

## 575V-60Hz – 3ph

### 1800 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		Wtg. [lb]	Current 575V [A]	NEMA C-face	IEC/DIN B3-foot	Mounting options				Optional - Brake Size	Brake Torque [lb-ft]/[Nm]	
	[hp]	[kW]					IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg			
63 S/4	0.16	0.12	8	0.37	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5	
63 L/4	0.25	0.18	9	0.46	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5	
71 S/4	0.33	0.25	12	0.6	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
71 L/4	0.50	0.37	14	0.80	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
80 S/4	0.75	0.55	18	1.12	56C	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
80 L/4	1	0.75	20	1.46	143TC	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
90 S/4	1.5	1.1	26	1.94	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
90 L/4	2	1.5	31	2.54	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
100 L/4	3	2.2	40	3.6	182TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
100 L/40	5	3.7	46	6.1	184TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
132 S/4	7.5	5.5	97	7.92	213TC	B3	A300	C160	C200		BRE60	44 / 60	
132 M/4	10	7.5	121	10.3	215TC	B3	A300	C160	C200		BRE100	74 / 100	

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph– standard
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# High Performance – Induction Motor

## 575V-60Hz – 3ph

## 1800 rpm – Sync

### Performance & Ordering

**Standard efficiency • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 575V [A]	pf	Eff. %	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
63 S/4	0.16	0.12	1700	0.37	0.66	52	5.93	2.1	2.2	2.45	F	0.00499
63 L/4	0.25	0.18	1680	0.46	0.71	57	9.38	2.1	2.2	2.75	E	0.00665
71 S/4	0.33	0.25	1710	0.6	0.64	63	12.2	2.5	2.4	3.10	G	0.0150
71 L/4	0.50	0.37	1720	0.80	0.69	71	18.3	2.45	2.6	3.55	F	0.0181
80 S/4	0.75	0.55	1710	1.12	0.71	72	27.6	2.2	2.2	3.55	F	0.0304
80 L/4	1	0.75	1650	1.46	0.74	70	38.2	2.2	2.3	3.90	G	0.0392
90 S/4	1.5	1.1	1660	1.94	0.78	73	57.0	2.7	2.6	4.45	G	0.0670
90 L/4	2	1.5	1660	2.54	0.80	74	75.9	2.55	2.5	4.65	G	0.0855
100 L/4	3	2.2	1705	3.6	0.81	82	111	2.3	2.6	4.90	G	0.107
100 L/40	5	3.7	1725	6.1	0.75	81	183	2.7	3.1	5.10	G	0.162
132 S/4	7.5	5.5	1735	7.92	0.82	86	272	2.45	2.75	5.45	G	0.553
132 M/4	10	7.5	1735	10.3	0.84	87	363	2.9	3.2	6.45	H	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

<b>Motor type</b>					
<b>Mounting option</b>					
<b>Power</b>					
<b>Voltage</b>					
<b>Frequency</b>					
Mounting position		Conduit box location		Cable entry	
<b>Motor options</b>					
<b>Brake size (optional)</b>					
<b>Brake voltage (AC or DC)</b>					
<b>Brake options</b>					

# High Performance – Induction Motor

## 200-208V-60Hz – 3ph

### 1800 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 208V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		Wtg. [lb]	Current 208V [A]	NEMA C-face	IEC/DIN B3-foot	Mounting options				Optional - Brake Size	Brake Torque [lb-ft]/[Nm]	
	[hp]	[kW]					IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg			
63 S/4	0.16	0.12	8	0.97	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5	
63 L/4	0.25	0.18	9	1.24	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5	
71 S/4	0.33	0.25	12	1.73	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
71 L/4	0.50	0.37	14	2.10	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
80 S/4	0.75	0.55	18	2.99	56C	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
80 L/4	1	0.75	20	4.05	143TC	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
90 S/4	1.5	1.1	26	5.35	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
90 L/4	2	1.5	31	7.01	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
100 L/4	3	2.2	40	9.95	182TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
100 L/40	5	3.7	46	16.8	184TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
132 S/4	7.5	5.5	97	21.9	213TC	B3	A300	C160	C200		BRE60	44 / 60	
132 M/4	10	7.5	121	28.5	215TC	B3	A300	C160	C200		BRE100	74 / 100	

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph – standard
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# High Performance – Induction Motor

## 200-208V-60Hz – 3ph

### 1800 rpm – Sync

## Performance & Ordering

**Standard efficiency • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 208V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 208V [A]	pf	Eff. %	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
63 S/4	0.16	0.12	1700	0.97	0.66	52	5.93	2.1	2.2	2.45	F	0.00499
63 L/4	0.25	0.18	1680	1.24	0.71	57	9.38	2.1	2.2	2.75	E	0.00665
71 S/4	0.33	0.25	1710	1.73	0.64	63	12.2	2.5	2.4	3.10	G	0.0150
71 L/4	0.50	0.37	1720	2.10	0.69	71	18.3	2.45	2.6	3.55	F	0.0181
80 S/4	0.75	0.55	1710	2.99	0.71	72	27.6	2.2	2.2	3.55	F	0.0304
80 L/4	1	0.75	1650	4.05	0.74	70	38.2	2.2	2.3	3.90	G	0.0392
90 S/4	1.5	1.1	1660	5.35	0.78	73	57.0	2.7	2.6	4.45	G	0.0670
90 L/4	2	1.5	1660	7.01	0.80	74	75.9	2.55	2.5	4.65	G	0.0855
100 L/4	3	2.2	1705	9.95	0.81	82	111	2.3	2.6	4.90	G	0.107
100 L/40	5	3.7	1725	16.8	0.75	81	183	2.7	3.1	5.10	G	0.162
132 S/4	7.5	5.5	1735	21.9	0.82	86	272	2.45	2.75	5.45	G	0.553
132 M/4	10	7.5	1735	28.5	0.84	87	363	2.9	3.2	6.45	H	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

<b>Motor type</b>					
<b>Mounting option</b>					
<b>Power</b>					
<b>Voltage</b>					
<b>Frequency</b>					
Mounting position		Conduit box location		Cable entry	
<b>Motor options</b>					
<b>Brake size (optional)</b>					
<b>Brake voltage (AC or DC)</b>					
<b>Brake options</b>					

# High Performance – Induction Motor

## 400 (380-415)V-50Hz – 3ph

### 1500 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1500rpm @ 50Hz • 4-pole

Voltages: 400V (380 – 415V) – 50Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		Wtg [lb]	Current 400V [A]	NEMA C-face	IEC/DIN B3-foot	Mounting options				Optional - Brake Size	Brake Torque [lb-ft]/[Nm]	
	[hp]	[kW]					IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg			
63 S/4	0.16	0.12	8	0.46	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5	
63 L/4	0.25	0.18	9	0.62	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5	
71 S/4	0.33	0.25	12	0.76	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
71 L/4	0.50	0.37	14	1.10	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
80 S/4	0.75	0.55	18	1.52	56C	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
80 L/4	1.0	0.75	20	2.10	143TC	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
90 S/4	1.5	1.10	26	2.81	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
90 L/4	2.0	1.50	31	3.55	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
100 L/4	3.0	2.20	40	5.22	182TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
100 L/40	4.0	3.00	46	6.54	184TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
112 M/4	5.4	4.00	66	8.30	184TC	B3	A250	C140	C160	C200	BRE60	44 / 60	
132 S/4	7.5	5.50	97	11.40	213TC	B3	A300	C160	C200		BRE60	44 / 60	
132 M/4	10.0	7.50	121	14.80	215TC	B3	A300	C160	C200		BRE100	74 / 100	

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# High Performance – Induction Motor

## 400 (380-415)V-50Hz – 3ph

### 1500 rpm – Sync

## Performance & Ordering



**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1500rpm @ 50Hz • 4-pole

Voltages: 400V (380 – 415V) – 50Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 400V [A]	pf	Eff. %	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
63 S/4	0.16	0.12	1335	0.46	0.76	50.0	7.55	1.80	1.90	2.50	E	0.00499
63 L/4	0.25	0.18	1325	0.62	0.80	56.5	11.9	1.80	1.90	2.60	E	0.00665
71 S/4	0.33	0.25	1380	0.76	0.77	61.3	15.1	2.20	2.10	3.30	F	0.0150
71 L/4	0.50	0.37	1360	1.10	0.75	62.7	23.2	2.10	2.30	3.20	E	0.0181
80 S/4	0.75	0.55	1375	1.52	0.73	71.5	34.4	1.90	2.00	3.30	E	0.0304
80 L/4	1.0	0.75	1375	2.10	0.74	69.7	45.8	2.30	2.60	4.40	G	0.0392
90 S/4	1.5	1.10	1395	2.81	0.74	76.2	65.4	2.30	2.60	4.80	G	0.0670
90 L/4	2.0	1.50	1395	3.55	0.78	78.5	87.5	3.10	3.60	5.40	H	0.0855
100 L/4	3.0	2.20	1440	5.22	0.74	80.0	82.6	2.30	3.00	5.10	G	0.107
100 L/40	4.0	3.00	1415	6.54	0.73	82.7	216	2.50	2.90	5.40	F	0.160
112 M/4	5.4	4.00	1445	8.30	0.80	86.0	236	2.30	2.80	5.30	G	0.283
132 S/4	7.5	5.50	1445	11.4	0.81	85.8	327	2.10	2.70	5.50	G	0.553
132 M/4	10.0	7.50	1445	14.8	0.84	87.0	436	2.50	2.80	5.50	G	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type					
Mounting option					
Power					
Voltage					
Frequency					
Mounting position		Conduit box location		Cable entry	
Motor options					
Brake size (optional)					
Brake voltage (AC or DC)					
Brake options					

# Energy Efficient – Induction Motor

## 230/460V-60Hz – 3ph

### 1800 rpm – Sync



## Mounting & Options

**Energy efficient** • 1.15 Service factor

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	Power		Wtg.	Current		NEMA C-face	Mounting options					Optional - Brake Torque [lb-ft]/[Nm]
	[hp]	[kW]		230V [A]	460V [A]		IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	
80 LH/4	1	.75	26	3.88	1.94	143TC	B3	A200	C120	C140	C160	n/a
90 SH/4	1.5	1.1	32	4.3	2.15	145TC	B3	A200	C120	C140	C160	n/a
90 LH/4	2	1.5	37	6.3	3.15	145TC	B3	A200	C120	C140	C160	n/a
100 LH/4	3	2.2	46	8.6	4.3	182TC	B3	A250	C120	C140	C160	n/a
112 MH/4	5	3.7	77	14.4	7.2	184TC	B3	A250	C140	C160	C200	n/a
132 SH/4	7.5	5.5	112	20.9	10.5	213TC	B3	A300	C160	C200	C200	n/a
132 MH/4	10	7.5	139	27.0	13.5	215TC	B3	A300	C160	C200	C200	n/a

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)



# Energy Efficient – Induction Motor

## 230/460V-60Hz – 3ph

### 1800 rpm – Sync

## Performance & Ordering



**Energy efficient** • 1.15 Service factor

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub>	n <sub>n</sub>	I <sub>n</sub>	230V	460V	pf	Eff.	T <sub>n</sub>	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub>
	[hp]	[kW]	[rpm]	[A]	[A]		%	[lb-in]					[lb-ft <sup>2</sup> ]
80 LH/4	1	.75	1750	3.88	1.94	0.59	82.5	36.0	4.6	4.3	6.0	L	0.0499
90 SH/4	1.5	1.1	1740	4.3	2.15	0.76	84.0	54.3	3.5	3.8	6.3	J	0.0855
90 LH/4	2	1.5	1745	6.3	3.15	0.71	84.0	72.2	4.3	4.5	6.7	K	0.0926
100 LH/4	3	2.2	1765	8.6	4.3	0.73	87.5	107	3.6	4.7	7.9	L	0.178
112 MH/4	5	3.7	1770	14.4	7.2	0.76	87.5	178	4.0	4.8	8.1	L	0.304
132 SH/4	7.5	5.5	1780	20.9	10.5	0.74	89.5	266	4.3	4.6	8.2	L	0.751
132 MH/4	10	7.5	1770	27.0	13.5	0.78	89.5	356	3.2	4.0	7.4	J	0.841

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type			
Mounting option			
Power			
Voltage			
Frequency			
Mounting position		Conduit box location	Cable entry
Motor options			

# Energy Efficient – Induction Motor

## 575V-60Hz – 3ph

### 1800 rpm – Sync



## Mounting & Options

**Energy efficient** • 1.15 Service factor

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	Power		Wtg [lb]	Current 575V [A]	NEMA C-face	IEC/DIN B3-foot	Mounting options						Optional - Brake Size	Brake Torque [lb-ft]/[Nm]
	[hp]	[kW]					IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg		
80 LH/4	1	.75	26	1.5	143TC	B3	A200	C120	C140	C160			n/a	n/a
90 SH/4	1.5	1.1	32	1.75	145TC	B3	A200	C120	C140	C160			n/a	n/a
90 LH/4	2	1.5	37	2.45	145TC	B3	A200	C120	C140	C160			n/a	n/a
100 LH/4	3	2.2	46	3.4	182TC	B3	A250	C120	C140	C160	C200		n/a	n/a
112 MH/4	5	3.7	77	5.6	184TC	B3	A250	C140	C160	C200			n/a	n/a
132 SH/4	7.5	5.5	112	8.3	213TC	B3	A300	C160	C200				n/a	n/a
132 MH/4	10	7.5	139	10.8	215TC	B3	A300	C160	C200				n/a	n/a

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)



# Energy Efficient – Induction Motor

## 575V-60Hz – 3ph

## 1800 rpm – Sync

### Performance & Ordering



**Energy efficient • 1.15 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 575V [A]	pf	Eff. %	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
80 LH/4	1	.75	1750	1.5	0.59	82.5	36.0	4.6	4.3	6.0	L	0.0499
90 SH/4	1.5	1.1	1740	1.75	0.76	84.0	54.3	3.5	3.8	6.3	J	0.0855
90 LH/4	2	1.5	1745	2.45	0.71	84.0	72.2	4.3	4.5	6.7	K	0.0926
100 LH/4	3	2.2	1765	3.4	0.73	87.5	107	3.6	4.7	7.9	L	0.178
112 MH/4	5	3.7	1770	5.6	0.76	87.5	178	4.0	4.8	8.1	L	0.304
132 SH/4	7.5	5.5	1780	8.3	0.74	89.5	266	4.3	4.6	8.2	L	0.751
132 MH/4	10	7.5	1770	10.8	0.78	89.5	356	3.2	4.0	7.4	J	0.841

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

<b>Motor type</b>			
<b>Mounting option</b>			
<b>Power</b>			
<b>Voltage</b>			
<b>Frequency</b>			
Mounting position		Conduit box location	Cable entry
Motor options			

# Energy Efficient – Induction Motor

## 400V-50Hz – 3ph

### 1500 rpm – Sync



## Mounting & Options

**Energy efficient** • 1.0 Service factor

Inverter duty • Induction motor • TEFC

Synchronous speed 1500rpm @ 50Hz • 4-pole

Voltages: 400V (380 – 415V) – 50Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	Power		Wtg. [lb]	Current 400V [A]	NEMA C-face	IEC/DIN B3-foot	Mounting options						Optional - Brake Size	Brake Torque [lb-ft]/[Nm]
	[hp]	[kW]					IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg		
90 SH/4	1.5	1.10	32	2.51	145TC	B3	A200	C120	C140	C160			n/a	n/a
90 LH/4	2.0	1.50	37	3.59	145TC	B3	A200	C120	C140	C160			n/a	n/a
100 LH/4	3.0	2.20	46	4.88	182TC	B3	A250	C120	C140	C160	C200		n/a	n/a
112 SH/4	4.0	3.00	72	6.70	184TC	B3	A250	C140	C160	C200			n/a	n/a
112 MH/4	5.4	4.00	77	8.90	184TC	B3	A250	C140	C160	C200			n/a	n/a
132 SH/4	7.5	5.50	112	12.0	213TC	B3	A300	C160	C200				n/a	n/a
132 MH/4	10	7.50	139	15.5	215TC	B3	A300	C160	C200				n/a	n/a

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)



# Energy Efficient – Induction Motor 400V-50Hz – 3ph 1500 rpm – Sync

## Performance & Ordering



**Energy efficient • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1500rpm @ 50Hz • 4-pole

Voltages: 400V (380 – 415V) – 50Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 400V [A]	pf	Eff. 100% [%]	Eff. 75% [%]	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
90 SH/4	1.5	1.10	1430	2.51	0.75	84.0	85.1	66.1	2.8	3.1	5.2	G	0.0817
90 LH/4	2.0	1.50	1435	3.59	0.71	85.0	85.3	87.8	3.6	3.7	5.6	H	0.0929
100 LH/4	3.0	2.20	1465	4.88	0.74	87.5	87.9	129	3.3	4.0	6.9	J	0.178
112 SH/4	4.0	3.00	1460	6.70	0.72	87.4	87.4	174	3.3	4.2	7.2	K	0.283
112 MH/4	5.4	4.00	1455	8.90	0.73	88.3	90.2	234	3.3	3.2	6.9	J	0.304
132 SH/4	7.5	5.50	1415	12.0	0.73	90.1	90.5	334	3.7	4.0	7.5	K	0.753
132 MH/4	10	7.50	1470	15.5	0.77	90.8	91.0	429	2.9	3.5	6.6	H	0.841

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

<b>Motor type</b>				
<b>Mounting option</b>				
<b>Power</b>				
<b>Voltage</b>				
<b>Frequency</b>				
Mounting position		Conduit box location		Cable entry
<b>Motor options</b>				

# Two-speed – Single-winding – Induction Motor

## 230V or 460V or 575V-60Hz – 3ph

### 1800/3600 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Two-speed • Single-winding • Induction motor • TEFC

Synchronous speed 1800/3600rpm @ 60Hz • 4/2-pole

Voltages: 230V or 460V or 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power [hp]	Power [kW]	Wtg. [lb]	Current			Mounting options						Optional - Brake Torque Size [lb-ft]/[Nm]		
				230V [A]	460V [A]	575V [A]	NEMA C-face	IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg			
71 S/4-2	0.28/0.37	0.21/0.28	12	1.38/1.67	0.66/0.80	0.55/0.67	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
71 L/4-2	0.40/0.60	0.30/0.45	14	2.05/2.71	0.98/1.30	0.82/1.09	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
80 S/4-2	0.65/0.80	0.48/0.60	18	2.71/3.46	1.30/1.66	1.09/1.39	56C	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
80 L/4-2	0.95/1.15	0.70/0.85	20	3.84/4.88	1.84/2.34	1.54/1.95	143TC	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
90 S/4-2	1.50/1.90	1.10/1.40	26	5.59/7.30	2.68/3.50	2.24/2.92	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
90 L/4-2	2.00/2.50	1.50/1.90	31	7.30/9.80	3.50/4.70	2.92/3.92	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
100 L/4-2	2.70/3.20	2.00/2.40	40	9.6/11.5	4.60/5.50	3.85/4.60	182TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
100 L/40-20	3.50/4.20	2.60/3.10	46	11.7/14.0	5.62/6.71	4.70/5.60	184TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
112 M/4-2	5.00/5.90	3.70/4.40	66	16.5/20.0	7.90/9.60	6.60/8.00	184TC	B3	A250	C140	C160	C200	BRE60	44 / 60	
132 S/4-2	6.30/7.90	4.70/5.90	97	19.4/25.0	9.30/12.0	7.80/10.0	213TC	B3	A300	C160	C200		BRE60	44 / 60	
132 M/4-2	8.70/10.7	6.50/8.00	121	27.1/37.6	13.0/18.0	10.9/15.0	215TC	B3	A300	C160	C200		BRE100	74 / 100	

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- 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
- 1045 carbon steel shafts
- Not designed for operation with an inverter

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# Two-speed – Single-winding – Induction Motor

## 230V or 460V or 575V-60Hz – 3ph

### 1800/3600 rpm – Sync

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Two-speed • Single-winding • Induction motor • TEFC

Synchronous speed 1800/3600rpm @ 60Hz • 4/2-pole

Voltages: 230V or 460V or 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	230V [A]	I <sub>n</sub> 460V [A]	I <sub>n</sub> 575V [A]	pf	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
71 S/4-2	0.28/0.37	0.21/0.28	1690/3335	1.38/1.67	0.66/0.80	0.55/0.67	0.73/0.86	10.4/7	2.3/2.8	2.5/3.0	3.5/3.7	H	0.0171
71 L/4-2	0.40/0.60	0.30/0.45	1660/3260	2.05/2.71	0.98/1.30	0.82/1.09	0.75/0.88	15.2/11.6	2.3/1.7	2.3/2.1	3.1/3.2	G	0.0204
80 S/4-2	0.65/0.80	0.48/0.60	1670/3340	2.71/3.46	1.30/1.66	1.09/1.39	0.77/0.82	24.5/15.1	1.9/2.0	2.2/2.2	3.1/3.5	G	0.0259
80 L/4-2	0.95/1.15	0.70/0.85	1625/3325	3.84/4.88	1.84/2.34	1.54/1.95	0.79/0.80	36.8/21.8	1.8/2.2	1.9/2.2	3.1/3.5	G	0.0344
90 S/4-2	1.50/1.90	1.10/1.40	1680/3335	5.59/7.30	2.68/3.50	2.24/2.92	0.84/0.88	56.3/35.9	1.7/1.8	2.3/2.3	3.7/3.7	G	0.0558
90 L/4-2	2.00/2.50	1.50/1.90	1655/3330	7.30/9.80	3.50/4.70	2.92/3.92	0.81/0.82	76.2/47.3	2.2/2.5	2.3/2.5	3.7/4.0	G	0.0743
100 L/4-2	2.70/3.20	2.00/2.40	1680/3395	9.60/11.50	4.60/5.50	3.85/4.60	0.75/0.85	101/59	1.9/2.2	2.2/2.4	3.6/4.3	G	0.107
100 L/40-20	3.50/4.20	2.60/3.10	1655/3390	11.70/14.0	5.62/6.71	4.70/5.60	0.87/0.88	133/78	2.0/2.3	2.3/2.4	3.7/4.7	G	0.143
112 M/4-2	5.00/5.90	3.70/4.40	1720/3485	16.5/20.0	7.90/9.60	6.60/8.00	0.84/0.83	183/107	2.1/2.6	2.9/3.3	4.7/5.7	J	0.283
132 S/4-2	6.30/7.90	4.70/5.90	1760/3485	19.4/25.0	9.30/12.0	7.80/10.0	0.84/0.88	226/143	2.1/2.5	2.8/3.0	4.7/5.6	H	0.553
132 M/4-2	8.70/10.7	6.50/8.00	1740/3500	27.1/37.6	13.0/18.0	10.9/15.0	0.83/0.79	315/193	2.4/2.9	2.9/3.2	5.1/5.9	K	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

Motor type			
Mounting option			
Power			
Voltage			
Frequency			
Mounting position		Conduit box location	Cable entry
Motor options			
Brake size (optional)			
Brake voltage (AC or DC)			
Brake options			

# Two-speed – Single-winding – Induction Motor

## 400V-50Hz – 3ph

### 1500/3000 rpm – Sync



## Mounting & Options

**Standard efficiency • 1.0 Service factor**

Two-speed • Single-winding • Induction motor • TEFC

Synchronous speed 1500/3000rpm @ 60Hz • 4/2-pole

Voltages: 400V – 50Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	Power		Wtg. [lb]	Current 400V [A]	Mounting options								Optional - Brake Size	Torque [lb-ft]/[Nm]
	[hp]	[kW]			NEMA C-face	IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg		
71 S/4-2	0.28/0.38	0.21/0.28	12	0.66/0.80	56C	B3	A160	C105	C120	C140	C140	C140	BRE5	3.7 / 5
71 L/4-2	0.4/0.6	0.30/0.45	14	0.98/1.30	56C	B3	A160	C105	C120	C140	C140	C140	BRE5	3.7 / 5
80 S/4-2	0.64/0.8	0.48/0.60	18	1.30/1.66	56C	B3	A200	C120	C140	C160	C160	C160	BRE10	7.4 / 10
80 L/4-2	0.94/1.14	0.70/0.85	20	1.84/2.34	143TC	B3	A200	C120	C140	C160	C160	C160	BRE10	7.4 / 10
90 S/4-2	1.47/1.88	1.10/1.40	26	2.68/3.50	145TC	B3	A200	C120	C140	C160	C160	C160	BRE20	15 / 20
90 L/4-2	2.01/2.55	1.50/1.90	31	3.50/4.70	145TC	B3	A200	C120	C140	C160	C160	C160	BRE20	15 / 20
100 L/4-2	2.68/3.22	2.00/2.40	40	4.60/5.50	182TC	B3	A250	C120	C140	C160	C160	C200	BRE40	30 / 40
100 L/40-20	3.49/4.16	2.60/3.10	46	5.62/6.71	184TC	B3	A250	C120	C140	C160	C160	C200	BRE40	30 / 40
112 M/4-2	5/5.9	3.70/4.40	66	7.90/9.60	184TC	B3	A250	C140	C160	C200	C200	C200	BRE60	44 / 60
132 S/4-2	6.3/7.9	4.70/5.90	97	9.30/12.0	213TC	B3	A300	C160	C200	C200	C200	C200	BRE60	44 / 60
132 M/4-2	8.7/10.7	6.50/8.00	121	13.0/18.0	215TC	B3	A300	C160	C200	C200	C200	C200	BRE100	74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- 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
- 1045 carbon steel shafts
- Not designed for operation with an inverter

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# Two-speed – Single-winding – Induction Motor

## 400V-50Hz – 3ph

### 1500/3000 rpm – Sync

## Performance & Ordering



**Standard efficiency • 1.0 Service factor**

Two-speed • Single-winding • Induction motor • TEFC

Synchronous speed 1500/3000rpm @ 60Hz • 4/2-pole

Voltages: 400V – 50Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 400V [A]	pf	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
71 S/4-2	0.28/0.38	0.21/0.28	1410/2780	0.66/0.80	0.73/0.86	30.4/9.3	2.1/2.5	2.3/2.7	3.6/3.9	F	0.0171
71 L/4-2	0.4/0.6	0.30/0.45	1385/2715	0.98/1.30	0.75/0.88	43.8/14.6	2.1/1.6	2.1/1.9	3.3/3.4	F	0.0204
80 S/4-2	0.64/0.8	0.48/0.60	1390/2785	1.30/1.66	0.77/0.82	75.4/19.9	1.7/1.8	1.8/2.0	3.3/3.6	F	0.0259
80 L/4-2	0.94/1.14	0.70/0.85	1355/2770	1.84/2.34	0.79/0.80	110/27.7	1.6/2.0	1.7/2.0	3.3/3.6	F	0.0344
90 S/4-2	1.47/1.88	1.10/1.40	1400/2780	2.68/3.50	0.84/0.88	145/44	1.5/1.6	2.1/2.1	3.9/3.9	E	0.0558
90 L/4-2	2.01/2.55	1.50/1.90	1380/2775	3.50/4.70	0.81/0.82	264/65.1	2.0/2.3	2.1/2.3	3.9/4.2	F	0.0743
100 L/4-2	2.68/3.22	2.00/2.40	1400/2830	4.60/5.50	0.75/0.85	275/72.9	1.7/2.0	2.0/2.2	3.7/4.5	F	0.107
100 L/40-20	3.49/4.16	2.60/3.10	1380/2825	5.62/6.71	0.87/0.88	349/95.9	1.8/2.1	2.1/2.2	3.9/4.9	F	0.143
112 M/4-2	5/5.9	3.70/4.40	1435/2905	7.90/9.60	0.84/0.83	477/135	1.9/2.4	2.6/3.0	4.9/6.0	H	0.283
132 S/4-2	6.3/7.9	4.70/5.90	1465/2905	9.30/12.0	0.84/0.88	630/184	1.9/2.3	2.5/2.7	4.9/5.8	G	0.553
132 M/4-2	8.7/10.7	6.50/8.00	1450/2915	13.0/18.0	0.83/0.79	914/247	2.2/2.6	2.6/2.9	5.4/6.2	J	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

<b>Motor type</b>				
<b>Mounting option</b>				
<b>Power</b>				
<b>Voltage</b>				
<b>Frequency</b>				
Mounting position		Conduit box location		Cable entry
<b>Motor options</b>				
<b>Brake size (optional)</b>				
<b>Brake voltage (AC or DC)</b>				
<b>Brake options</b>				

# Two-speed – Two-winding – Induction Motor

## 230V or 460V or 575V-60Hz – 3ph

### 900/3600 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Two-speed • Two-winding • Induction motor • TEFC

Synchronous speed 900/3600rpm @ 60Hz • 8/2-pole

Voltages: 230V or 460V or 575V – 60Hz • Three-phase

Periodic Duty S3-40% • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation

Type	Power		Wtg [lb]	Current			Mounting options						Optional - Brake		
	[hp]	[kW]		230V [A]	460V [A]	575V [A]	NEMA C-face	IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	Brake Size [lb-ft]/[Nm]	Torque [lb-ft]/[Nm]	
71 S/8-2 WU	0.06/0.30	0.045/0.22	12	0.80/1.21	0.40/0.61	0.32/0.48	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
71 L/8-2 WU	0.08/0.40	0.06/0.30	14	0.97/1.37	0.48/0.68	0.38/0.55	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5	
80 S/8-2 WU	0.13/0.60	0.10/0.45	18	1.28/2.56	0.64/1.28	0.51/1.03	56C	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
80 L/8-2 WU	0.17/0.74	0.13/0.55	20	1.32/2.30	0.66/1.15	0.53/0.92	143TC	B3	A200	C120	C140	C160	BRE10	7.4 / 10	
90 S/8-2 WU	0.27/1.07	0.20/0.80	26	1.96/4.33	0.98/2.17	0.78/1.73	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
90 L/8-2 WU	0.40/1.60	0.30/1.20	31	3.12/5.89	1.56/2.94	1.25/2.36	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20	
100 L/8-2 WU	0.54/2.15	0.40/1.60	40	3.17/7.19	1.58/3.59	1.27/2.88	182TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
100 L/80-20 WU	0.75/3.00	0.55/2.20	46	3.91/9.27	1.96/4.63	1.57/3.71	184TC	B3	A250	C120	C140	C160	C200	BRE40	30 / 40
112 M/8-2 WU	1.00/4.00	0.75/3.00	66	5.61/14.1	2.81/7.06	2.24/5.65	184TC	B3	A250	C140	C160	C200	BRE60	44 / 60	
132 S/8-2 WU	1.35/5.40	1.00/4.00	97	6.93/14.8	3.46/7.40	2.77/5.92	213TC	B3	A300	C160	C200		BRE60	44 / 60	
132 M/8-2 WU	1.90/7.40	1.40/5.50	121	8.73/22.3	4.36/11.2	3.49/8.94	215TC	B3	A300	C160	C200		BRE100	74 / 100	

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- 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
- 1045 carbon steel shafts
- Not designed for operation with an inverter

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# Two-speed – Two-winding – Induction Motor

## 230V or 460V or 575V-60Hz – 3ph

### 900/3600 rpm – Sync

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Two-speed • Two-winding • Induction motor • TEFC

Synchronous speed 900/3600rpm @ 60Hz • 8/2-pole

Voltages: 230V or 460V or 575V – 60Hz • Three-phase

Periodic Duty S3-40% • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	230V [A]	I <sub>n</sub> 460V [A]	I <sub>n</sub> 575V [A]	pf	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
71 S/8-2 WU	0.06/0.30	0.045/0.22	696/3078	0.80/1.21	0.40/0.61	0.32/0.48	0.65/0.91	6.52/7.13	2.1/1.3	2.0/1.2	1.5/2.3	C	0.0171
71 L/8-2 WU	0.08/0.40	0.06/0.30	690/3102	0.97/1.37	0.48/0.68	0.38/0.55	0.61/0.90	8.77/9.75	2.2/1.8	2.2/1.9	1.7/2.7	C	0.0204
80 S/8-2 WU	0.13/0.60	0.10/0.45	642/3042	1.28/2.56	0.64/1.28	0.51/1.03	0.67/0.77	15.3/14.9	1.5/1.3	1.4/1.6	1.6/2.7	E	0.0259
80 L/8-2 WU	0.17/0.74	0.13/0.55	348/3108	1.32/2.30	0.66/1.15	0.53/0.92	0.69/0.88	19.8/18	1.3/1.8	1.3/1.6	1.6/3.6	D	0.0344
90 S/8-2 WU	0.27/1.07	0.20/0.80	768/3228	1.96/4.33	0.98/2.17	0.78/1.73	0.65/0.87	26.6/25.1	2.0/2.9	2.0/2.7	2.1/4.0	H	0.0558
90 L/8-2 WU	0.40/1.60	0.30/1.20	636/3093	3.12/5.89	1.56/2.94	1.25/2.36	0.55/0.83	52.5/41.1	1.8/3.0	1.3/2.3	1.6/3.8	F	0.0743
100 L/8-2 WU	0.54/2.15	0.40/1.60	738/3342	3.17/7.19	1.58/3.59	1.27/2.88	0.67/0.90	55.3/48.4	1.6/2.2	1.9/2.3	2.2/4.2	F	0.107
100 L/80-20 WU	0.75/3.00	0.55/2.20	756/3282	3.91/9.27	1.96/4.63	1.57/3.71	0.67/0.90	74/66.8	1.4/1.9	1.7/2.0	2.2/4.0	E	0.143
112 M/8-2 WU	1.00/4.00	0.75/3.00	792/3312	5.61/14.1	2.81/7.06	2.24/5.65	0.54/0.75	96.4/91.3	2.6/2.3	2.2/3.0	3.0/5.2	J	0.283
132 S/8-2 WU	1.35/5.40	1.00/4.00	756/3252	6.93/14.8	3.46/7.40	2.77/5.92	0.53/0.93	134/126	2.4/2.6	2.1/2.2	2.6/4.7	F	0.553
132 M/8-2 WU	1.90/7.40	1.40/5.50	720/3282	8.73/22.3	4.36/11.2	3.49/8.94	0.53/0.93	197/171	2.3/2.6	2.0/2.2	3.3/4.3	F	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

<b>Motor type</b>			
<b>Mounting option</b>			
<b>Power</b>			
<b>Voltage</b>			
<b>Frequency</b>			
Mounting position		Conduit box location	Cable entry
<b>Motor options</b>			
<b>Brake size (optional)</b>			
<b>Brake voltage (AC or DC)</b>			
<b>Brake options</b>			

# Two-speed – Two-winding – Induction Motor

## 400V-50Hz – 3ph

### 750/3000 rpm – Sync



## Mounting & Options

**Standard efficiency • 1.0 Service factor**

Two-speed • Two-winding • Induction motor • TEFC

Synchronous speed 750/3000rpm @ 50Hz • 8/2-pole

Voltages: 400V – 50Hz • Three-phase

Periodic Duty S3-40% • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation



Type	Power		Wtg. [lb]	Current 400V [A]	NEMA C-face	Mounting options						Optional - Brake Brake Size [lb-ft]/[Nm]
	[hp]	[kW]				IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	
71 S/8-2 WU	0.06/0.29	0.045/0.22	12	0.46/0.70	56C	B3	A160	C105	C120	C140	C140	BRE5 3.7 / 5
71 L/8-2 WU	0.08/0.4	0.06/0.30	14	0.56/0.79	56C	B3	A160	C105	C120	C140	C140	BRE5 3.7 / 5
80 S/8-2 WU	0.13/0.6	0.10/0.45	18	0.74/1.48	56C	B3	A200	C120	C140	C160	C160	BRE10 7.4 / 10
80 L/8-2 WU	0.17/1.04	0.13/0.55	20	0.76/1.33	143TC	B3	A200	C120	C140	C160	C160	BRE10 7.4 / 10
90 S/8-2 WU	0.27/1.07	0.20/0.80	26	1.13/2.50	145TC	B3	A200	C120	C140	C160	C160	BRE20 15 / 20
90 L/8-2 WU	0.41/1.61	0.30/1.20	31	1.80/3.40	145TC	B3	A200	C120	C140	C160	C160	BRE20 15 / 20
100 L/8-2 WU	0.54/2.14	0.40/1.60	40	1.83/4.15	182TC	B3	A250	C120	C140	C160	C200	BRE40 30 / 40
100 L/80-20 WU	0.74/2.9	0.55/2.20	46	2.26/5.35	184TC	B3	A250	C120	C140	C160	C200	BRE40 30 / 40
112 M/8-2 WU	1.01/4	0.75/3.00	66	3.24/8.15	184TC	B3	A250	C140	C160	C200	C200	BRE60 44 / 60
132 S/8-2 WU	1.34/5.4	1.00/4.00	97	4.00/8.55	213TC	B3	A300	C160	C200	C200	C200	BRE60 44 / 60
132 M/8-2 WU	1.88/7.4	1.40/5.50	121	5.04/12.9	215TC	B3	A300	C160	C200	C200	C200	BRE100 74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- 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
- 1045 carbon steel shafts
- Not designed for operation with an inverter

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# Two-speed – Two-winding – Induction Motor

## 400V-50Hz – 3ph

### 750/3000 rpm – Sync

## Performance & Ordering



**Standard efficiency • 1.0 Service factor**

Two-speed • Two-winding • Induction motor • TEFC

Synchronous speed 750/3000rpm @ 50Hz • 8/2-pole

Voltages: 400V – 50Hz • Three-phase

Periodic Duty S3-40% • 40°C Ambient • up to 3300ft Elevation

Class B temperature rise • Class F insulation

Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> [rpm]	I <sub>n</sub> 230V [A]	pf	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>	Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]
71 S/8-2 WU	0.06/0.29	0.045/0.22	580/2565	0.46/0.70	0.65/0.91	6.52/7.13	2.1/1.3	2.0/1.2	1.5/2.3	C	0.0171
71 L/8-2 WU	0.08/0.4	0.06/0.30	575/2585	0.56/0.79	0.61/0.90	8.77/9.75	2.2/1.8	2.2/1.9	1.7/2.7	C	0.0204
80 S/8-2 WU	0.13/0.6	0.10/0.45	535/2535	0.74/1.48	0.67/0.77	15.3/14.9	1.5/1.3	1.4/1.6	1.6/2.7	E	0.0259
80 L/8-2 WU	0.17/0.74	0.13/0.55	540/2590	0.76/1.33	0.69/0.88	19.8/18	1.3/1.8	1.3/1.6	1.6/3.6	D	0.0344
90 S/8-2 WU	0.27/1.07	0.20/0.80	640/2690	1.13/2.50	0.65/0.87	26.6/25.1	2.0/2.9	2.0/2.7	2.1/4.0	H	0.0558
90 L/8-2 WU	0.4/1.61	0.30/1.20	530/2480	1.80/3.40	0.55/0.83	52.5/41.1	1.8/3.0	1.3/2.3	1.6/3.8	G	0.0743
100 L/8-2 WU	0.54/2.14	0.40/1.60	615/2785	1.83/4.15	0.67/0.90	55.3/48.4	1.6/2.2	1.9/2.3	2.2/4.2	G	0.107
100 L/80-20 WU	0.74/2.9	0.55/2.20	630/2735	2.26/5.35	0.67/0.90	74/66.8	1.4/1.9	1.7/2.0	2.2/4.0	E	0.143
112 M/8-2 WU	1.01/4	0.75/3.00	660/2760	3.24/8.15	0.54/0.75	96.4/91.3	2.6/2.3	2.2/3.0	3.0/5.2	J	0.283
132 S/8-2 WU	1.34/5.4	1.00/4.00	630/2710	4.00/8.55	0.53/0.93	134/126	2.4/2.6	2.1/2.2	2.6/4.7	G	0.553
132 M/8-2 WU	1.88/7.4	1.40/5.50	600/2735	5.04/12.9	0.53/0.93	197/171	2.3/2.6	2.0/2.2	3.3/4.3	G	0.753

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block – bold items are required ordering information**

<b>Motor type</b>				
<b>Mounting option</b>				
<b>Power</b>				
<b>Voltage</b>				
<b>Frequency</b>				
Mounting position		Conduit box location		Cable entry
<b>Motor options</b>				
<b>Brake size (optional)</b>				
<b>Brake voltage (AC or DC)</b>				
<b>Brake options</b>				

# Capacitor-start + Capacitor-run

## 115/230V-60Hz – 1ph

### 1800 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Capacitor-start + Capacitor-run • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 115/230V – 60Hz • Single-phase

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

Class B temperature rise • Class F insulation

Type	Power		Wtg. [lb]	Current 115V [A]		NEMA C-face		IEC/DIN B3-foot		Mounting options		Optional - Brake Size	Optional - Brake Torque [lb-ft]/[Nm]	
	[hp]	[kW]		230V [A]	B3	A140	C90	C105	C120	B5-flg	B14-flg	B14-flg		
63 S/4 EAR	0.16	0.12	10	2.50	1.27	56C	B3	A140	C90	C105	C120	C120	BRE5	3.7 / 5
63 L/4 EAR	0.25	0.18	12	3.76	1.91	56C	B3	A140	C90	C105	C120	C120	BRE5	3.7 / 5
71 S/4 EAR	0.33	0.25	16	4.12	2.30	56C	B3	A160	C105	C120	C140	C140	BRE5	3.7 / 5
71 L/4 EAR	0.5	0.37	17	5.22	2.61	56C	B3	A160	C105	C120	C140	C140	BRE5	3.7 / 5
80 S/4 EAR	0.75	0.55	23	8.40	4.32	56C	B3	A200	C120	C140	C160	C160	BRE10	7.4 / 10
80 L/4 EAR	1.0	0.75	27	12.8	6.10	143TC	B3	A200	C120	C140	C160	C160	BRE10	7.4 / 10
90S/4 EAR	1.5	1.10	33	18.9	9.30	145TC	B3	A200	C120	C140	C160	C160	BRE20	15 / 20
90 L/4 EAR	2.0	1.50	38	21.1	10.4	145TC	B3	A200	C120	C140	C160	C160	BRE20	15 / 20

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts
- Not designed for operation with an inverter

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



# Capacitor-start + Capacitor-run

## 115/230V-60Hz – 1ph

## 1800 rpm – Sync

### Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Capacitor-start + Capacitor-run • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 115/230V – 60Hz • Single-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> 115 V [rpm]	n <sub>n</sub> 230 V [rpm]	I <sub>n</sub> 115 V [A]	I <sub>n</sub> 230 V [A]	115 V pf	230 V pf	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub> 115 V	T <sub>a</sub> /T <sub>n</sub> 230 V	T <sub>k</sub> /T <sub>n</sub> 115 V	T <sub>k</sub> /T <sub>n</sub> 230 V	J <sub>m</sub> [lb-ft <sup>2</sup> ]
63 S/4 EAR	0.16	0.12	1550	1530	2.50	1.27	0.89	0.89	6.51	2.09	1.47	1.73	1.73	0.00499
63 L/4 EAR	0.25	0.18	1565	1545	3.76	1.91	0.84	0.84	10.1	2.09	1.84	1.71	1.71	0.00665
71 S/4 EAR	0.33	0.25	1620	1570	4.12	2.30	0.99	0.99	12.8	2.10	1.45	1.60	1.84	0.0171
71 L/4 EAR	0.5	0.37	1555	1550	5.22	2.61	0.86	0.85	20.3	1.85	1.58	1.50	1.45	0.0204
80 S/4 EAR	0.75	0.55	1650	1635	8.40	4.32	0.95	0.86	28.6	2.08	1.90	1.65	1.65	0.0259
80 L/4 EAR	1.0	0.75	1645	1620	12.8	6.10	0.81	0.84	38.3	1.66	1.72	1.65	1.63	0.0344
90S/4 EAR	1.5	1.10	1680	1670	18.9	9.30	0.85	0.82	56.3	2.05	1.80	2.00	1.90	0.0546
90 L/4 EAR	2.0	1.50	1690	1690	21.1	10.4	0.94	0.90	74.6	1.88	1.65	1.77	1.89	0.0736

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type				
Mounting option				
Power				
Voltage				
Frequency				
Mounting position		Conduit box location		Cable entry
Motor options				
Brake size (optional)				
Brake voltage (AC or DC)				
Brake options				

# Capacitor-run

## 115/230V-60Hz – 1ph

### 1800 rpm – Sync



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Capacitor-run • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 115/230V – 60Hz • Single-phase

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

Class B temperature rise • Class F insulation

Type	Power		Wtg. [lb]	Current		Mounting options						Optional - Brake Size	Torque [lb-ft]/[Nm]
	[hp]	[kW]		115V [A]	230V [A]	NEMA C-face	IEC/DIN B3-foot	IEC/DIN B5-flg	IEC/DIN B14-flg	IEC/DIN B14-flg	IEC/DIN B14-flg		
63 S/4 EHB	0.16	0.12	9	2.50	1.27	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5
63 L/4 EHB	0.25	0.18	11	3.76	1.91	56C	B3	A140	C90	C105	C120	BRE5	3.7 / 5
71 S/4 EHB	0.33	0.25	15	4.12	2.30	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5
71 L/4 EHB	0.5	0.37	16	7.10	3.57	56C	B3	A160	C105	C120	C140	BRE5	3.7 / 5
80 S/4 EHB	0.75	0.55	22	8.40	4.32	56C	B3	A200	C120	C140	C160	BRE10	7.4 / 10
80 L/4 EHB	1.0	0.75	26	12.8	6.10	143TC	B3	A200	C120	C140	C160	BRE10	7.4 / 10
90S/4 EHB	1.5	1.10	32	18.9	9.30	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20
90 L/4 EHB	2.0	1.50	37	21.1	10.4	145TC	B3	A200	C120	C140	C160	BRE20	15 / 20

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts
- Not designed for operation with an inverter

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**Capacitor-run  
115/230V-60Hz – 1ph  
1800 rpm – Sync**

E191510

C<sup>®</sup> CSA US  
LR112560

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Capacitor-start • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 115/230V – 60Hz • Single-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub> [hp]	P <sub>n</sub> [kW]	n <sub>n</sub> 115 V [rpm]	n <sub>n</sub> 230 V [rpm]	I <sub>n</sub> 115 V [A]	I <sub>n</sub> 230 V [A]	115 V pf	230 V pf	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub> 115 V	T <sub>a</sub> /T <sub>n</sub> 230 V	T <sub>k</sub> /T <sub>n</sub> 115 V	T <sub>k</sub> /T <sub>n</sub> 230 V	J <sub>m</sub> [lb-ft <sup>2</sup> ]
63 S/4 EHB	0.16	0.12	1550	1530	2.50	1.27	0.89	0.87	6.51	0.87	0.87	1.73	1.73	0.00499
63 L/4 EHB	0.25	0.18	1565	1545	3.76	1.91	0.84	0.84	10.1	0.72	0.72	1.71	1.71	0.00665
71 S/4 EHB	0.33	0.25	1620	1570	4.12	2.30	0.99	0.99	12.8	0.88	0.92	1.60	1.84	0.0171
71 L/4 EHB	0.5	0.37	1555	1550	7.10	3.57	0.86	0.85	20.3	0.57	0.61	1.50	1.45	0.0204
80 S/4 EHB	0.75	0.55	1650	1635	8.40	4.32	0.95	0.86	28.6	0.41	0.59	1.65	1.65	0.0259
80 L/4 EHB	1.0	0.75	1645	1620	12.8	6.10	0.81	0.84	38.3	0.41	0.50	1.65	1.63	0.0344
90S/4 EHB	1.5	1.10	1680	1670	18.9	9.30	0.85	0.82	56.3	0.45	0.43	2.00	1.90	0.0546
90 L/4 EHB	2.0	1.50	1690	1690	21.1	10.4	0.94	0.90	74.6	0.41	0.65	1.77	1.89	0.0736

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type				
Mounting option				
Power				
Voltage				
Frequency				
Mounting position		Conduit box location		Cable entry
Motor options				
Brake size (optional)				
Brake voltage (AC or DC)				
Brake options				



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## Notes



# Inverter/Vector Duty Engineering Information





# Inverter/Vector Duty Engineering Information

## Inverter/Vector Duty

NORD single speed motors are Inverter/Vector Duty. The construction of the NORD motor insulating system takes into account the non-sinusoidal waveforms 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.



### 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 is in conformance with NEMA MG 1-1998 Section 31.4.4.2 Voltage Spikes, which requires motors to withstand:

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

### Constant torque speed range

NORD motors can be selected for a very wide speed range at constant torque. The selection of a motor for a given constant torque speed range must take into account the motor thermal cooling ability and its torque producing capacity. For most fan cooled motor operation at low frequencies is limited by the motors thermal capacity. Operation at speeds, above base frequencies, is restricted by torque capacity and by the voltage limit of the frequency inverter. Consult the curves "Motor Performance Self Cooled – TEFC" and "Motor Performance Forced Cooled – TEBC" to properly select a speed range. Following the selection curves are motor ratings tables with four pre selected frequency ranges, 5:1, 10:1, 20:1 and 1000:1.

### Maximum motor speed and frequency

NORD 4-pole motors are designed for operation up to 3600 rpm with a maximum line frequency of 120 Hz.

### Zero speed operation

Operation of a NORD motor at zero speed is possible depending on the drive inverter control method and the motor cooling characteristics. To produce torque at zero speed the motor must be sized sufficiently for

adequate cooling (consult the curves "Motor Performance Self Cooled – TEFC" and "Motor Performance Forced Cooled – TEBC"). Also the inverter or vector controller must be capable of producing torque at zero motor speed. This typically requires closed loop control with an encoder (NORD option IG) or other feedback device. Consult the AC drive manufacturer for details.

### Thermal protection

It is good practice to use motor thermal protection on motors used with frequency inverters or vector controllers. NORD offers thermostats (option TW) and thermistors (option TF) to provide motor thermal protection.

### Motor speed and torque

When operating a motor on an inverter the motor output speed is essentially proportional to the supply frequency. If the supply frequency is increased the motor speed will also increase. If the supply frequency is decreased the motor speed will also decrease.

Induction motors are constant slip devices. This will cause the proportional relationship between output speed and input frequency to vary slightly.

Most applications for gearmotors and variable frequency inverters require constant torque. This means that the required torque is constant independent of output speed. NORD motors are well suited for these constant torque applications. Following is a typical operating characteristic chart for NORD motors used on constant torque inverters. This chart demonstrates the frequency range NORD motors produce constant torque and constant power. This chart does not take into account any thermal limits of the motor at low frequencies. Thermal limits will be addressed later in this catalog.

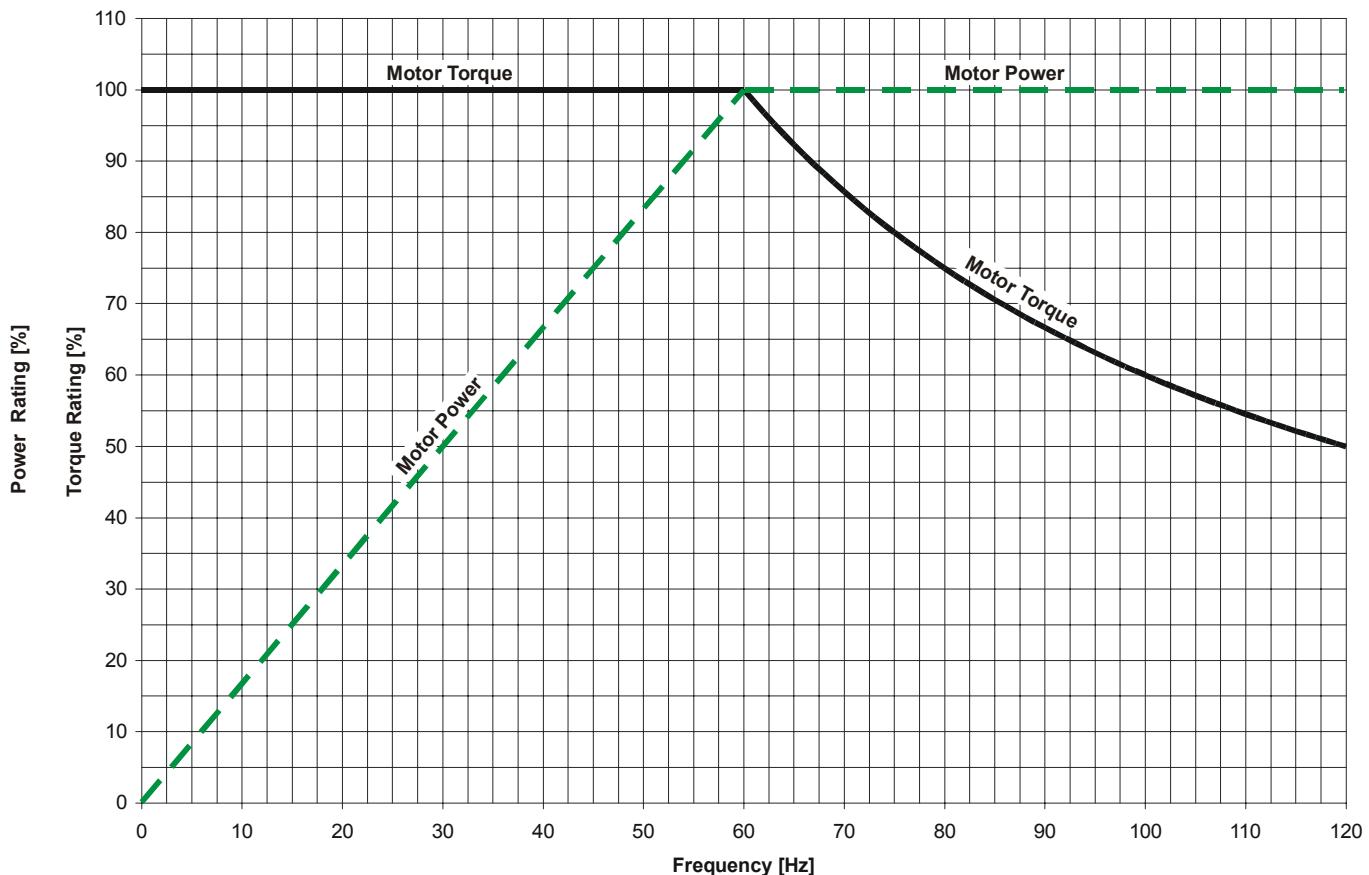
### High Dynamic Operation

NORD motors are designed to deliver extremely high dynamic performance with modern frequency inverters. A key design element is a low mass moment of inertia design. The low inertia design allows for higher cycling capacity, lower operating temperature and more motor torque delivered to the load in dynamic applications.



# Inverter/Vector Duty Engineering Information

## Motor Speed and Torque



Output speed based on variable frequency:

$$\text{Output speed}_{Hz} (n_{Hz}) = \frac{1800rpm \times f_{Hz}}{60Hz} - \text{Slip}_{rpm}$$

Power below 60Hz base speed: (the power above base speed is constant at the rated power)

$$HP_{Hz} = P_{Rated} \times \frac{f_{Hz}}{60Hz}$$

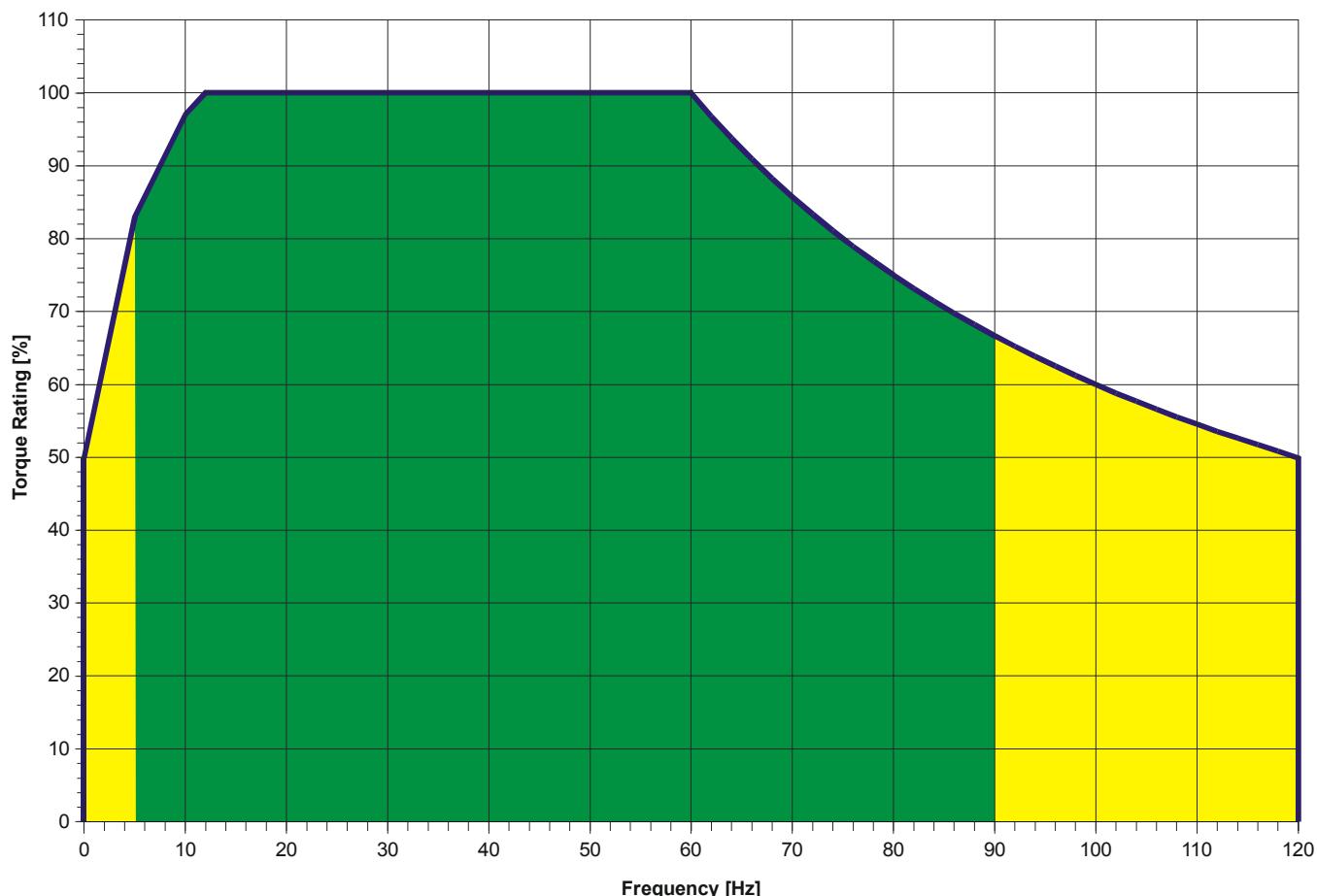
The output torque capacity of the motor can be calculated from the speed and power

$$T_{Hz} = \frac{HP_{Hz} \times 63025}{n_{Hz}}$$



# Inverter/Vector Duty Engineering Information

## Motor Performance Self Cooled - TEFC



NORD motors can safely operate over a frequency range of 0Hz to 120Hz. The dark shaded zone below the curve on the above chart indicates the safe continuous operating zone. The lighter shaded zones below 5Hz and above 90Hz indicates cautionary performance limited by the inverter or vector controller.

- **Below 5Hz** many AC inverter or Vector drives provide poor speed regulation. Consult the AC drive manufacture for their recommendations. These performance limits are not due to the NORD motor but the control method of the AC drive.
- **Above 90Hz** a motor's overload capacity is limited. This is due to the limited voltage generated by the AC drive. When a motor is operated above 60Hz the overload capacity is reduced as a square function of the increased frequency. Typically above 90Hz the overload

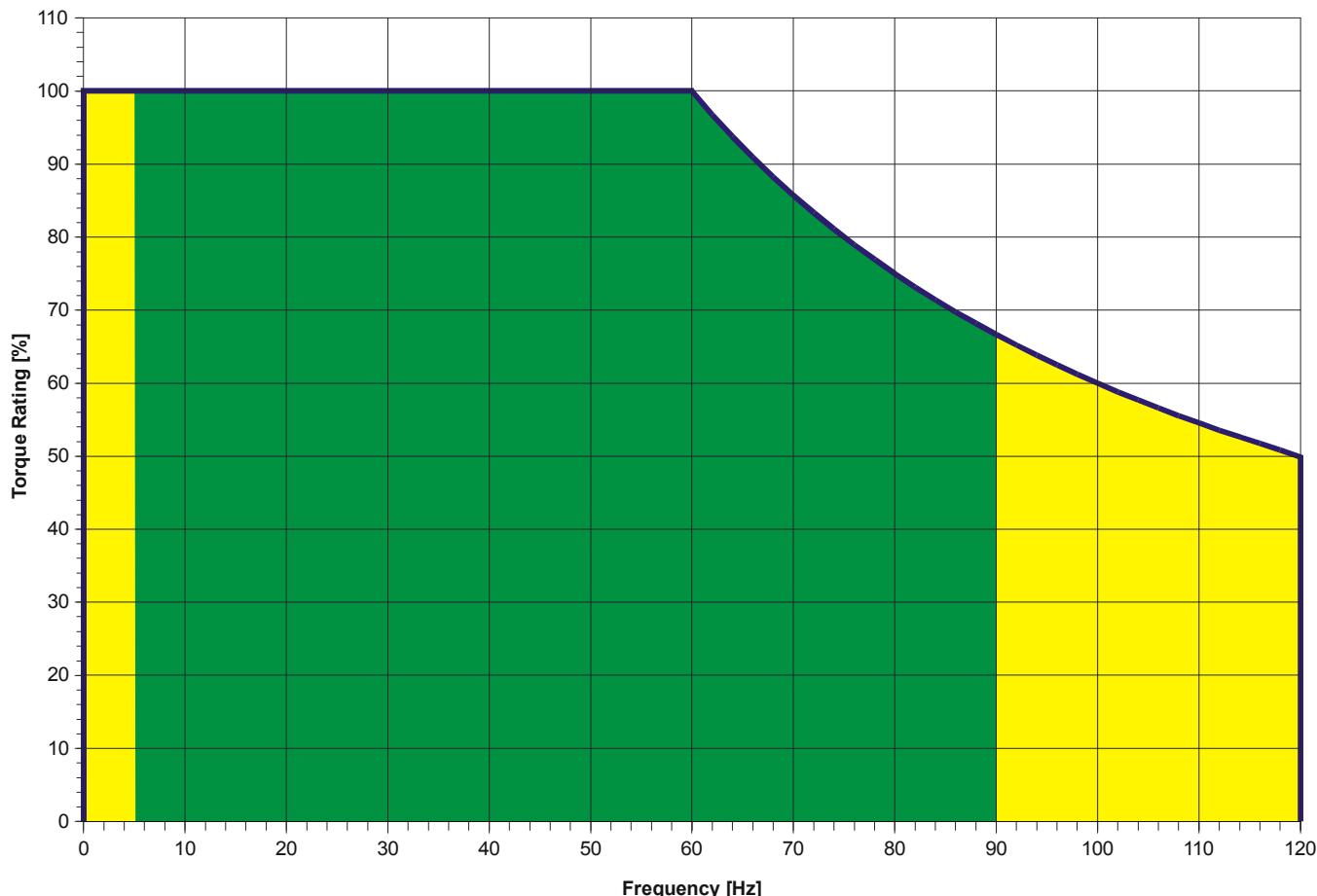
capacity is reduced to below 150%, which can cause a problem for some applications.

- **Between 0Hz and 12Hz** the NORD motors can not produce as much torque as at their 60Hz rating. This is due to the reduced cooling air-flow by the motor fan at lower speeds. If constant torque is required down to zero speed NORD can provide optional separately powered motor cooling fans (TEBC-operation). See the next page for the performance characteristic.



# Inverter/Vector Duty Engineering Information

## Motor Performance Forced Cooled - TEBC



NORD motors can safely operate over a frequency range of 0Hz to 120Hz. The dark shaded zone below the curve on the above chart indicates the safe continuous operating zone. The lighter shaded zones below 5Hz and above 90Hz indicate cautionary performance limited by the inverter or vector controller.

Any NORD TEFC motor can be converted to a TEBC (Totally Enclosed Blower Cooled) motor by adding a NORD separately powered ventilator fan.

- **Below 5Hz** many AC inverter or Vector drives provide poor speed regulation. Consult the AC drive manufacturer for their recommendations. These performance limits are not due to the NORD motor but the control method of the AC drive.

- **Above 90Hz** a motor's overload capacity is limited. This is due to the limited voltage generated by the AC drive. When a motor is operated above 60Hz the overload capacity is reduced as a square function of the increased frequency. Typically above 90Hz the overload capacity is reduced to below 150%, which can cause a problem for some applications.



# Inverter/Vector Duty Engineering Information

## Notes



## Performance & Ordering Data Inverter/Vector Operation



**5:1 (60-12Hz) – Constant Torque  
230/460V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		n <sub>60</sub> *	n <sub>12</sub> *	Current		Mounting options						Wtg.	Optional-Brake			
	[hp]	[kW]			60Hz [rpm]	12Hz [rpm]	230V [A]	460V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	Brake Size	Torque [lb-in]
63 S/4-VR	0.16	0.12	1700	260	0.88	0.44	56C	B3	A140	C90	C105	C120	C120	C120	8	BRE5	3.7 / 5
63 L/4-VR	0.25	0.18	1680	240	1.12	0.56	56C	B3	A140	C90	C105	C120	C120	C120	9	BRE5	3.7 / 5
71 S/4-VR	0.33	0.25	1710	270	1.56	0.78	56C	B3	A160	C105	C120	C140	C140	C140	12	BRE5	3.7 / 5
71 L/4-VR	0.50	0.37	1720	280	1.90	0.95	56C	B3	A160	C105	C120	C140	C140	C140	14	BRE5	3.7 / 5
80 S/4-VR	0.75	0.55	1710	270	2.70	1.35	56C	B3	A200	C120	C140	C160	C160	C160	18	BRE10	7.4 / 10
80 L/4-VR	1	0.75	1650	210	3.66	1.83	143TC	B3	A200	C120	C140	C160	C160	C160	20	BRE10	7.4 / 10
90 S/4-VR	1.5	1.1	1660	220	4.84	2.42	145TC	B3	A200	C120	C140	C160	C160	C160	26	BRE20	15 / 20
90 L/4-VR	2	1.5	1660	220	6.34	3.17	145TC	B3	A200	C120	C140	C160	C160	C160	31	BRE20	15 / 20
100 L/4-VR	3	2.2	1750	310	9.0	4.50	182TC	B3	A250	C120	C140	C160	C160	C200	40	BRE40	30 / 40
100 L/40-VR	5	3.7	1725	285	15.2	7.62	184TC	B3	A250	C120	C140	C160	C160	C200	46	BRE40	30 / 40
132 S/4-VR	7.5	5.5	1735	295	19.8	9.9	213TC	B3	A300	C160	C200	C200	C200	C200	97	BRE60	44 / 60
132 M/4-VR	10	7.5	1750	310	25.8	12.9	215TC	B3	A300	C160	C200	C200	C200	C200	121	BRE100	74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**5:1 (60-12Hz) – Constant Torque  
230/460V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	n <sub>60*</sub> 60Hz [rpm]	n <sub>12*</sub> 12Hz [rpm]	T <sub>60-12</sub> 60Hz [lb-in]	Motor across-the-line data								Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]	
					n <sub>n</sub> 60Hz [rpm]	I <sub>n</sub> 230V [A]	I <sub>n</sub> 460V [A]	pf	Eff. [%]	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>		
63 S/4-VR	0.16	0.12	1700	260	5.93	1700	0.88	0.44	0.66	52	5.93	2.1	2.2	2.45	F 0.00499
63 L/4-VR	0.25	0.18	1680	240	9.38	1680	1.12	0.56	0.71	57	9.38	2.1	2.2	2.75	E 0.00665
71 S/4-VR	0.33	0.25	1710	270	12.2	1710	1.56	0.78	0.64	63	12.2	2.5	2.4	3.10	G 0.0150
71 L/4-VR	0.50	0.37	1720	280	18.3	1720	1.90	0.95	0.69	71	18.3	2.45	2.6	3.55	F 0.0181
80 S/4-VR	0.75	0.55	1710	270	27.6	1710	2.70	1.35	0.71	72	27.6	2.2	2.2	3.55	F 0.0304
80 L/4-VR	1	0.75	1650	210	38.2	1650	3.66	1.83	0.74	70	38.2	2.2	2.3	3.90	G 0.0392
90 S/4-VR	1.5	1.1	1660	220	57	1660	4.84	2.42	0.78	73	57.0	2.7	2.6	4.45	G 0.0670
90 L/4-VR	2	1.5	1660	220	75.9	1660	6.34	3.17	0.80	74	75.9	2.55	2.5	4.65	G 0.0855
100 L/4-VR	3	2.2	1750	310	111	1705	9.0	4.50	0.81	82	111	2.3	2.6	4.90	G 0.107
100 L/40-VR	5	3.7	1725	285	183	1725	15.2	7.62	0.75	81	183	2.7	3.1	5.10	G 0.162
132 S/4-VR	7.5	5.5	1735	295	272	1735	19.8	9.9	0.82	86	272	2.45	2.75	5.45	G 0.553
132 M/4-VR	10	7.5	1750	310	363	1735	25.8	12.9	0.84	87	363	2.9	3.2	6.45	H 0.753

\* - Based on constant slip – Actual speed will vary with inverter control method

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

n<sub>60</sub> - Full-load speed inverter operation at 60Hz

n<sub>12</sub> - Full-load speed inverter operation at 12Hz

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>60-12</sub> - Full-load torque inverter operated at 60Hz to 12Hz

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type				
Mounting option				
Power				
Voltage				
Frequency				
Mounting position		Conduit box location		Cable entry
Motor options				
Brake size (optional)				
Brake voltage (AC or DC)				
Brake options				



# 5:1 (60-12Hz) – Constant Torque

## 575V-60Hz – 3ph

### 1800 rpm – Sync – Inverter/Vector Duty

## Mounting & Options



**Standard/energy efficient • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		$n_{60}^*$		Current		Mounting options						Wtg. [lb]	Optional-Brake	
	[hp]	[kW]	60Hz [rpm]	12Hz [rpm]	575V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg		Brake Size	Torque [lb-in]
63 S/4-VR	0.16	0.12	1700	260	0.37	56C	B3	A140	C90	C105	C120	C120	8	BRE5	3.7 / 5
63 L/4-VR	0.25	0.18	1680	240	0.46	56C	B3	A140	C90	C105	C120	C120	9	BRE5	3.7 / 5
71 S/4-VR	0.33	0.25	1710	270	0.6	56C	B3	A160	C105	C120	C140	C140	12	BRE5	3.7 / 5
71 L/4-VR	0.50	0.37	1720	280	0.80	56C	B3	A160	C105	C120	C140	C140	14	BRE5	3.7 / 5
80 S/4-VR	0.75	0.55	1710	270	1.12	56C	B3	A200	C120	C140	C160	C160	18	BRE10	7.4 / 10
80 LH/4-VR#	1	0.75	1750	310	1.5	143TC	B3	A200	C120	C140	C160	C160	26	BRE10#	7.4 / 10
90 SH/4-VR#	1.5	1.1	1740	300	1.75	145TC	B3	A200	C120	C140	C160	C160	32	BRE20#	15 / 20
90 L/H4-VR#	2	1.5	1745	305	2.45	145TC	B3	A200	C120	C140	C160	C160	37	BRE20#	15 / 20
100 LH/4-VR#	3	2.2	1765	325	3.4	182TC	B3	A250	C120	C140	C160	C200	46	BRE40#	30 / 40
112MH/4-VR#	5	3.7	1770	330	5.6	184TC	B3	A250	C140	C160	C200	C200	77	BRE40#	30 / 40
132 SH/4-VR#	7.5	5.5	1780	340	8.3	213TC	B3	A300	C160	C200	C200	C200	112	BRE60#	44 / 60
132 MH/4-VR#	10	7.5	1770	330	10.8	215TC	B3	A300	C160	C200	C200	C200	139	BRE100#	74 / 100

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph– standard
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**5:1 (60-12Hz) – Constant Torque  
575V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

## Performance & Ordering

**Standard/energy efficient • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	n <sub>60*</sub> 60Hz [rpm]	n <sub>12*</sub> 12Hz [rpm]	T <sub>60-12</sub> 60Hz [lb-in]	Motor across-the-line data								Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]	
					n <sub>n</sub> 60Hz [rpm]	I <sub>n</sub> 575V [A]	pf	Eff. [%]	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>			
63 S/4-VR	0.16	0.12	1700	260	5.93	1700	0.37	0.66	52	5.93	2.1	2.2	2.45	F	0.00499
63 L/4-VR	0.25	0.18	1680	240	9.38	1680	0.46	0.71	57	9.38	2.1	2.2	2.75	E	0.00665
71 S/4-VR	0.33	0.25	1710	270	12.2	1710	0.6	0.64	63	12.2	2.5	2.4	3.10	G	0.0150
71 L/4-VR	0.50	0.37	1720	280	18.3	1720	0.80	0.69	71	18.3	2.45	2.6	3.55	F	0.0181
80 S/4-VR	0.75	0.55	1710	270	27.6	1710	1.12	0.71	72	27.6	2.2	2.2	3.55	F	0.0304
80 LH/4-VR*	1	0.75	1750	310	36.0	1750	1.5	0.59	82.5	36.0	4.6	4.3	6.0	L	0.0499
90 SH/4-VR*	1.5	1.1	1740	300	54.3	1740	1.75	0.76	84.0	54.3	3.5	3.8	6.3	J	0.0855
90 L/H4-VR*	2	1.5	1745	305	72.2	1745	2.45	0.71	84.0	72.2	4.3	4.5	6.7	K	0.0926
100 LH/4-VR*	3	2.2	1765	325	107	1765	3.4	0.73	87.5	107	3.6	4.7	7.9	L	0.178
112MH/4-VR*	5	3.7	1770	330	178	1770	5.6	0.76	87.5	178	4.0	4.8	8.1	L	0.304
132 SH/4-VR*	7.5	5.5	1780	340	266	1780	8.3	0.74	89.5	266	4.3	4.6	8.2	L	0.751
132 MH/4-VR*	10	7.5	1770	330	356	1770	10.8	0.78	89.5	356	3.2	4.0	7.4	J	0.841

\* - Based on constant slip – Actual speed will vary with inverter control method

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

n<sub>60</sub> - Full-load speed inverter operation at 60Hz

n<sub>12</sub> - Full-load speed inverter operation at 12Hz

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>60-12</sub> - Full-load torque inverter operated at 12Hz to 60Hz

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate

**Order Block – bold items are required ordering information**

<b>Motor type</b>				
<b>Mounting option</b>				
<b>Power</b>				
<b>Voltage</b>				
<b>Frequency</b>				
Mounting position		Conduit box location		Cable entry
<b>Motor options</b>				
<b>Brake size (optional)</b>				
<b>Brake voltage (AC or DC)</b>				
<b>Brake options</b>				

# 10:1 (60-6Hz) – Constant Torque

## 230/460V-60Hz – 3ph

### 1800 rpm – Sync – Inverter/Vector Duty



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		n <sub>60</sub> *	n <sub>6</sub> *	Current		Mounting options						Wtg.	Optional-Brake			
	[hp]	[kW]			60Hz [rpm]	6Hz [rpm]	230V [A]	460V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	Brake Size	Torque [lb-in]
63 S/4-VN	0.12	0.09	1680	60	0.66	0.33	56C	B3	A140	C90	C105	C120	C120	C120	8	BRE5	3.7 / 5
63 L/4-VN	0.16	0.12	1700	80	0.85	0.43	56C	B3	A140	C90	C105	C120	C120	C120	9	BRE5	3.7 / 5
71 S/4-VN	0.25	0.18	1720	100	1.09	0.54	56C	B3	A160	C105	C120	C140	C140	C140	12	BRE5	3.7 / 5
71 L/4-VN	0.33	0.25	1715	95	1.55	0.77	56C	B3	A160	C105	C120	C140	C140	C140	14	BRE5	3.7 / 5
80 S/4-VN	0.50	0.37	1725	105	2.16	1.08	56C	B3	A200	C120	C140	C160	C160	C160	18	BRE10	7.4 / 10
80 L/4-VN	0.75	0.55	1715	95	3.0	1.50	143TC	B3	A200	C120	C140	C160	C160	C160	20	BRE10	7.4 / 10
90 S/4-VN	1	0.75	1730	110	3.8	1.92	145TC	B3	A200	C120	C140	C160	C160	C160	26	BRE20	15 / 20
90 L/4-VN	1.5	1.1	1720	100	5.1	2.55	145TC	B3	A200	C120	C140	C160	C160	C160	31	BRE20	15 / 20
100 L/4-VN	2	1.5	1750	130	7.0	3.5	182TC	B3	A250	C120	C140	C160	C200	C200	40	BRE40	30 / 40
100 L/40-VN	3	2.2	1745	125	10.6	5.3	184TC	B3	A250	C120	C140	C160	C200	C200	46	BRE40	30 / 40
132 S/4-VN	5	3.7	1765	145	15.2	7.6	213TC	B3	A300	C160	C200	C200	C200	C200	97	BRE60	44 / 60
132 M/4-VN	7.5	5.5	1765	145	20.5	10.2	215TC	B3	A300	C160	C200	C200	C200	C200	121	BRE100	74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**10:1 (60-6Hz) – Constant Torque  
230/460V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	n <sub>60*</sub> 60Hz [rpm]	n <sub>6*</sub> 6Hz [rpm]	T <sub>60-6</sub> 60Hz [lb-in]	n <sub>n</sub> 60Hz [rpm]	I <sub>n</sub> 230V [A]	I <sub>n</sub> 460V [A]	pf	Motor across-the-line data					Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]	
									Eff.	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>			
63 S/4-VN	0.12	0.09	1680	60	4.7	1680	0.66	0.33	0.68	52	4.7	2.7	2.8	3.27	H	0.00499
63 L/4-VN	0.16	0.12	1700	80	5.9	1700	0.85	0.43	0.68	52	5.9	3.3	3.4	3.60	J	0.00665
71 S/4-VN	0.25	0.18	1720	100	9.2	1720	1.09	0.54	0.68	63	9.2	3.3	3.1	4.40	J	0.0150
71 L/4-VN	0.33	0.25	1715	95	12.1	1715	1.55	0.77	0.61	65	12.1	3.6	3.9	4.33	K	0.0181
80 S/4-VN	0.50	0.37	1725	105	18.3	1725	2.16	1.08	0.59	73	18.3	3.3	3.3	4.44	J	0.0304
80 L/4-VN	0.75	0.55	1715	95	27.6	1715	3.0	1.50	0.64	72	27.6	3.0	3.2	4.69	J	0.0392
90 S/4-VN	1	0.75	1730	110	36.4	1730	3.8	1.92	0.66	74	36.4	4.2	4.0	5.60	K	0.0670
90 L/4-VN	1.5	1.1	1720	100	55	1720	5.1	2.55	0.72	76	55	3.5	3.4	5.78	J	0.0855
100 L/4-VN	2	1.5	1750	130	72	1750	7.0	3.5	0.70	76	72	3.5	4.0	6.29	K	0.107
100 L/40-VN	3	2.2	1745	125	108	1745	10.6	5.3	0.62	86	108	3.8	4.3	6.61	L	0.162
132 S/4-VN	5	3.7	1765	145	178	1765	15.2	7.6	0.71	86	178	3.6	4.0	6.81	K	0.553
132 M/4-VN	7.5	5.5	1765	145	268	1765	20.5	10.2	0.88	88	268	3.8	4.1	7.67	K	0.753

\* - Based on constant slip – Actual speed will vary with inverter control method

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

n<sub>60</sub> - Full-load speed inverter operation at 60Hz

n<sub>6</sub> - Full-load speed inverter operation at 6Hz

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>60</sub> - Full-load torque inverter operated at 6Hz to 60Hz

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type					
Mounting option					
Power					
Voltage					
Frequency					
Mounting position		Conduit box location		Cable entry	
Motor options					
Brake size (optional)					
Brake voltage (AC or DC)					
Brake options					

# 10:1 (60-6Hz) – Constant Torque

## 575V-60Hz – 3ph

### 1800 rpm – Sync – Inverter/Vector Duty



## Mounting & Options



**Standard/energy efficient • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		$n_{60}^*$		Current		Mounting options						Wtg. [lb]	Optional-Brake	
	[hp]	[kW]	60Hz [rpm]	6Hz [rpm]	575V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg		Brake Size	Torque [lb-in]
63 S/4-VN	0.12	0.09	1680	60	0.26	56C	B3	A140	C90	C105	C120	C120	8	BRE5	3.7 / 5
63 L/4-VN	0.16	0.12	1700	80	0.34	56C	B3	A140	C90	C105	C120	C120	9	BRE5	3.7 / 5
71 S/4-VN	0.25	0.18	1720	100	0.44	56C	B3	A160	C105	C120	C140	C140	12	BRE5	3.7 / 5
71 L/4-VN	0.33	0.25	1715	95	0.62	56C	B3	A160	C105	C120	C140	C140	14	BRE5	3.7 / 5
80 S/4-VN	0.50	0.37	1725	105	0.86	56C	B3	A200	C120	C140	C160	C160	18	BRE10	7.4 / 10
80 LH/4-VN#	0.75	0.55	1750	132	1.48	143TC	B3	A200	C120	C140	C160	C160	26	BRE10#	7.4 / 10
90 SH/4-VN#	1	0.75	1760	138	1.49	145TC	B3	A200	C120	C140	C160	C160	32	BRE20#	15 / 20
90 L/H4-VN#	1.5	1.1	1755	136	2.22	145TC	B3	A200	C120	C140	C160	C160	37	BRE20#	15 / 20
100 LH/4-VN#	2	1.5	1780	159	2.88	182TC	B3	A250	C120	C140	C160	C200	46	BRE40#	30 / 40
112MH/4-VN#	3	2.2	1775	157	4.72	184TC	B3	A250	C140	C160	C200	C200	77	BRE40#	30 / 40
132 SH/4-VN#	5	3.7	1750	129	6.94	213TC	B3	A300	C160	C200	C200	C200	112	BRE60#	44 / 60
132 MH/4-VN#	7.5	5.5	1780	160	9.48	215TC	B3	A300	C160	C200	C200	C200	139	BRE100#	74 / 100

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic- pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
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- F & FC – TEBC Separate power cooling fan (pg 67)
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- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph– standard
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**10:1 (60-6Hz) – Constant Torque  
575V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

**Standard/energy efficient** • 1.0 Service factor  
 Inverter duty • Induction motor • TEFC  
 Synchronous speed 1800rpm @ 60Hz • 4-pole  
 Voltages: 575V – 60Hz • Three-phase  
 Continuous Duty • 40°C Ambient • up to 3300ft Elevation  
 Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	n <sub>60*</sub> 60Hz [rpm]	n <sub>6*</sub> 6Hz [rpm]	T <sub>60-6</sub> 60Hz [lb-in]	Motor across-the-line data								Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]	
					n <sub>n</sub> 60Hz [rpm]	I <sub>n</sub> 575V [A]	pf	Eff.	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>			
63 S/4-VN	0.12	0.09	1680	60	4.7	1680	0.26	0.68	52	4.7	2.7	2.8	3.27	H	0.00499
63 L/4-VN	0.16	0.12	1700	80	5.9	1700	0.34	0.68	52	5.9	3.3	3.4	3.60	J	0.00665
71 S/4-VN	0.25	0.18	1720	100	9.2	1720	0.44	0.68	63	9.2	3.3	3.1	4.40	J	0.0150
71 L/4-VN	0.33	0.25	1715	95	12.1	1715	0.62	0.61	65	12.1	3.6	3.9	4.33	K	0.0181
80 S/4-VN	0.50	0.37	1725	105	18.3	1725	0.86	0.59	73	18.3	3.3	3.3	4.44	J	0.0304
80 LH/4-VN#	0.75	0.55	1750	132	27	1750	1750	0.45	84	27	6.0	5.6	5.9	N	0.0499
90 SH/4-VN#	1	0.75	1760	138	35.9	1760	1760	0.61	83	35.9	4.7	5.1	6.7	L	0.0855
90 L/H4-VN#	1.5	1.1	1755	136	53.8	1755	1755	0.61	84	53.8	5.4	5.7	6.9	M	0.0926
100 LH/4-VN#	2	1.5	1780	159	70.9	1780	1780	0.58	89	70.9	5.5	7.2	8.9	P	0.178
112MH/4-VN#	3	2.2	1775	157	106	1775	1775	0.55	86	106	6.8	8.2	9.9	R	0.304
132 SH/4-VN#	5	3.7	1750	129	180	1750	1750	0.60	90	180	6.2	6.6	9.9	P	0.751
132 MH/4-VN#	7.5	5.5	1780	160	266	1780	1780	0.65	91	266	4.3	5.4	8.3	M	0.841

\* - Based on constant slip – Actual speed will vary with inverter control method

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

P <sub>n</sub>	- Full-load power	T <sub>a</sub>	- Locked-rotor torque
n <sub>n</sub>	- Full-load speed	T <sub>a</sub> /T <sub>n</sub>	- Locked-rotor torque ratio
n <sub>60</sub>	- Full-load speed inverter operation at 60Hz	T <sub>k</sub>	- Break-down torque
n <sub>6</sub>	- Full-load speed inverter operation at 6Hz	T <sub>k</sub> /T <sub>n</sub>	- Break-down torque ratio
I <sub>n</sub>	- Full-load current	pf	- Power factor
I <sub>a</sub>	- Locked-rotor current	Eff.	- Nominal efficiency
I <sub>a</sub> /I <sub>n</sub>	- Locked-rotor current ratio (%)	J <sub>m</sub>	- Motor inertia
T <sub>n</sub>	- Full-load torque	Wtg.	- Weight - approximate
T <sub>60-6</sub>	- Full-load torque inverter operated at 6Hz to 60Hz		

**Order Block** – bold items are required ordering information

<b>Motor type</b>			
<b>Mounting option</b>			
<b>Power</b>			
<b>Voltage</b>			
<b>Frequency</b>			
Mounting position		Conduit box location	Cable entry
<b>Motor options</b>			
<b>Brake size (optional)</b>			
<b>Brake voltage (AC or DC)</b>			
<b>Brake options</b>			

# 20:1 (80-4Hz) – Constant Torque

## 230/460V-60Hz – 3ph

### 1800 rpm – Sync – Inverter/Vector Duty



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		n <sub>80</sub> *	n <sub>4</sub> *	Current		Mounting options						Wtg. [lb]	Optional-Brake			
	[hp]	[kW]			80Hz [rpm]	4Hz [rpm]	230V [A]	460V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	Brake Size	Torque [lb-in]
63 S/4-VW	0.16	0.12	2200	45	0.88	0.44	56C	B3	A140	C90	C105	C120	C120	C120	8	BRE5	3.7 / 5
63 L/4-VW	0.25	0.18	2190	30	1.12	0.56	56C	B3	A140	C90	C105	C120	C120	C120	9	BRE5	3.7 / 5
71 S/4-VW	0.33	0.25	2255	53	1.56	0.78	56C	B3	A160	C105	C120	C140	C140	C140	12	BRE5	3.7 / 5
71 L/4-VW	0.50	0.37	2230	60	1.90	0.95	56C	B3	A160	C105	C120	C140	C140	C140	14	BRE5	3.7 / 5
80 S/4-VW	0.75	0.55	2250	53	2.70	1.35	56C	B3	A200	C120	C140	C160	C160	C160	18	BRE10	7.4 / 10
80 L/4-VW	1	0.75	2250	10	3.66	1.83	143TC	B3	A200	C120	C140	C160	C160	C160	20	BRE10	7.4 / 10
90 S/4-VW	1.5	1.1	2260	15	4.84	2.42	145TC	B3	A200	C120	C140	C160	C160	C160	26	BRE20	15 / 20
90 L/4-VW	2	1.5	2260	15	6.34	3.17	145TC	B3	A200	C120	C140	C160	C160	C160	31	BRE20	15 / 20
100 L/4-VW	3	2.2	2305	83	9.0	4.50	182TC	B3	A250	C120	C140	C160	C200	C200	40	BRE40	30 / 40
100 L/40-VW	5	3.7	2275	64	15.2	7.62	184TC	B3	A250	C120	C140	C160	C200	C200	46	BRE40	30 / 40
132 S/4-VW	7.5	5.5	2235	71	19.8	9.9	213TC	B3	A300	C160	C200	C200	C200	C200	97	BRE60	44 / 60
132 M/4-VW	10	7.5	2235	83	25.8	12.9	215TC	B3	A300	C160	C200	C200	C200	C200	121	BRE100	74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**20:1 (80-4Hz) – Constant Torque  
230/460V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	n <sub>80*</sub> 80Hz [rpm]	n <sub>4*</sub> 4Hz [rpm]	T <sub>80-4</sub> 80Hz [lb-in]	Motor across-the-line data									Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]	
					n <sub>n</sub> 60Hz [rpm]	230V [A]	I <sub>n</sub> 460V [A]	pf	Eff. [%]	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>			
63 S/4-VW	0.16	0.12	2200	45	4.58	1700	0.88	0.44	0.66	52	5.93	2.1	2.2	2.45	F	0.00499
63 L/4-VW	0.25	0.18	2190	30	7.2	1680	1.12	0.56	0.71	57	9.38	2.1	2.2	2.75	E	0.00665
71 S/4-VW	0.33	0.25	2255	53	9.2	1710	1.56	0.78	0.64	63	12.2	2.5	2.4	3.10	G	0.0150
71 L/4-VW	0.50	0.37	2230	60	14.1	1720	1.90	0.95	0.69	71	18.3	2.45	2.6	3.55	F	0.0181
80 S/4-VW	0.75	0.55	2250	53	21	1710	2.70	1.35	0.71	72	27.6	2.2	2.2	3.55	F	0.0304
80 L/4-VW	1	0.75	2250	10	28	1650	3.66	1.83	0.74	70	38.2	2.2	2.3	3.90	G	0.0392
90 S/4-VW	1.5	1.1	2260	15	42	1660	4.84	2.42	0.78	73	57.0	2.7	2.6	4.45	G	0.0670
90 L/4-VW	2	1.5	2260	15	56	1660	6.34	3.17	0.80	74	75.9	2.55	2.5	4.65	G	0.0855
100 L/4-VW	3	2.2	2305	83	82	1705	9.0	4.50	0.81	82	111	2.3	2.6	4.90	G	0.107
100 L/40-VW	5	3.7	2275	64	138	1725	15.2	7.62	0.75	81	183	2.7	3.1	5.10	G	0.162
132 S/4-VW	7.5	5.5	2235	71	203	1735	19.8	9.9	0.82	86	272	2.45	2.75	5.45	G	0.553
132 M/4-VW	10	7.5	2235	83	270	1735	25.8	12.9	0.84	87	363	2.9	3.2	6.45	H	0.753

\* - Based on constant slip – Actual speed will vary with inverter control method

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

n<sub>80</sub> - Full-load speed inverter operation at 80Hz

n<sub>4</sub> - Full-load speed inverter operation at 4Hz

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>80-4</sub> - Full-load torque inverter operated at 4Hz to 80Hz

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

Motor type				
Mounting option				
Power				
Voltage				
Frequency				
Mounting position		Conduit box location		Cable entry
Motor options				
Brake size (optional)				
Brake voltage (AC or DC)				
Brake options				

# 20:1 (80-4Hz) – Constant Torque

575V-60Hz – 3ph

1800 rpm – Sync – Inverter/Vector Duty



## Mounting & Options



**Standard/energy efficient** • 1.0 Service factor

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		n <sub>80</sub> *		Current		Mounting options						Wtg. [lb]	Optional-Brake	
	[hp]	[kW]	80Hz [rpm]	4Hz [rpm]	575V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg		Brake Size	Torque [lb-in]
63 S/4-VW	0.16	0.12	2200	45	0.37	56C	B3	A140	C90	C105	C120	C120	8	BRE5	3.7 / 5
63 L/4-VW	0.25	0.18	2190	30	0.46	56C	B3	A140	C90	C105	C120	C120	9	BRE5	3.7 / 5
71 S/4-VW	0.33	0.25	2255	53	0.6	56C	B3	A160	C105	C120	C140	C140	12	BRE5	3.7 / 5
71 L/4-VW	0.50	0.37	2230	60	0.80	56C	B3	A160	C105	C120	C140	C140	14	BRE5	3.7 / 5
80 S/4-VW	0.75	0.55	2250	53	1.12	56C	B3	A200	C120	C140	C160	C160	18	BRE10	7.4 / 10
80 LH/4-WR#	1	0.75	2315	83	1.5	143TC	B3	A200	C120	C140	C160	C160	26	BRE10#	7.4 / 10
90 SH/4-WR#	1.5	1.1	2315	75	1.75	145TC	B3	A200	C120	C140	C160	C160	32	BRE20#	15 / 20
90 L/H4-WR#	2	1.5	2320	79	2.45	145TC	B3	A200	C120	C140	C160	C160	37	BRE20#	15 / 20
100 LH/4-WR#	3	2.2	2360	94	3.4	182TC	B3	A250	C120	C140	C160	C200	46	BRE40#	30 / 40
112MH/4-WR#	5	3.7	2350	98	5.6	184TC	B3	A250	C140	C160	C200	C200	77	BRE40#	30 / 40
132 SH/4-WR#	7.5	5.5	2300	105	8.3	213TC	B3	A300	C160	C200	C200	C200	112	BRE60#	44 / 60
132 MH/4-WR#	10	7.5	2365	98	10.8	215TC	B3	A300	C160	C200	C200	C200	139	BRE100#	74 / 100

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
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- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph– standard
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**20:1 (80-4Hz) – Constant Torque  
575V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

E191510

C-S-A-US  
LR112560

## Performance & Ordering

**Standard/energy efficient • 1.0 Service factor**

Inverter duty • Induction motor • TEFC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	P <sub>n</sub>	n <sub>80*</sub>	n <sub>4*</sub>	T <sub>80-4</sub>	Motor across-the-line data								Code	J <sub>m</sub>	
					n <sub>n</sub> 60Hz [rpm]	I <sub>n</sub> 575V [A]	pf	Eff.	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>			
[hp]	[kW]	80Hz [rpm]	4Hz [rpm]	80Hz [lb-in]											
63 S/4-VW	0.16	0.12	2200	45	4.58	1700	0.37	0.66	52	5.93	2.1	2.2	2.45	F	0.00499
63 L/4-VW	0.25	0.18	2190	30	7.2	1680	0.46	0.71	57	9.38	2.1	2.2	2.75	E	0.00665
71 S/4-VW	0.33	0.25	2255	53	9.2	1710	0.6	0.64	63	12.2	2.5	2.4	3.10	G	0.0150
71 L/4-VW	0.50	0.37	2230	60	14.1	1720	0.80	0.69	71	18.3	2.45	2.6	3.55	F	0.0181
80 S/4-VW	0.75	0.55	2250	53	21	1710	1.12	0.71	72	27.6	2.2	2.2	3.55	F	0.0304
80 LH/4-WR#	1	0.75	2315	83	27.2	1750	1.5	0.59	82.5	36.0	4.6	4.3	6.0	L	0.0499
90 SH/4-WR#	1.5	1.1	2315	75	40.8	1740	1.75	0.76	84.0	54.3	3.5	3.8	6.3	J	0.0855
90 L/H4-WR#	2	1.5	2320	79	54.3	1745	2.45	0.71	84.0	72.2	4.3	4.5	6.7	K	0.0926
100 LH/4-WR#	3	2.2	2360	94	80.2	1765	3.4	0.73	87.5	107	3.6	4.7	7.9	L	0.178
112MH/4-WR#	5	3.7	2350	98	134	1770	5.6	0.76	87.5	178	4.0	4.8	8.1	L	0.304
132 SH/4-WR#	7.5	5.5	2300	105	206	1780	8.3	0.74	89.5	266	4.3	4.6	8.2	L	0.751
132 MH/4-WR#	10	7.5	2365	98	267	1770	10.8	0.78	89.5	356	3.2	4.0	7.4	J	0.841

\* - Based on constant slip – Actual speed will vary with inverter control method

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

n<sub>80</sub> - Full-load speed inverter operation at 80Hz

n<sub>4</sub> - Full-load speed inverter operation at 4Hz

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>80-4</sub> - Full-load torque inverter operated at 4Hz to 80Hz

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate



**Order Block** – bold items are required ordering information

<b>Motor type</b>			
<b>Mounting option</b>			
<b>Power</b>			
<b>Voltage</b>			
<b>Frequency</b>			
Mounting position		Conduit box location	Cable entry
<b>Motor options</b>			
<b>Brake size (optional)</b>			
<b>Brake voltage (AC or DC)</b>			
<b>Brake options</b>			

# 1000+ : 1 (60-0Hz) – Constant Torque

230/460V-60Hz – 3ph

1800 rpm – Sync – Inverter/Vector Duty



## Mounting & Options



**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEBC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		n <sub>60</sub> *	n <sub>0</sub> *	Current		Mounting options						Wtg.	Optional-Brake			
	[hp]	[kW]			60Hz [rpm]	0Hz [rpm]	230V [A]	460V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	Brake Size	Torque [lb-in]
63 S/4-VZ-F	0.16	0.12	1700	0	0.88	0.44	56C	B3	A140	C90	C105	C120	C105	C120	8	BRE5	3.7 / 5
63 L/4-VZ-F	0.25	0.18	1680	0	1.12	0.56	56C	B3	A140	C90	C105	C120	C105	C120	9	BRE5	3.7 / 5
71 S/4-VZ-F	0.33	0.25	1710	0	1.56	0.78	56C	B3	A160	C105	C120	C140	C120	C140	12	BRE5	3.7 / 5
71 L/4-VZ-F	0.50	0.37	1720	0	1.90	0.95	56C	B3	A160	C105	C120	C140	C120	C140	14	BRE5	3.7 / 5
80 S/4-VZ-F	0.75	0.55	1710	0	2.70	1.35	56C	B3	A200	C120	C140	C160	C120	C140	18	BRE10	7.4 / 10
80 L/4-VZ-F	1	0.75	1650	0	3.66	1.83	143TC	B3	A200	C120	C140	C160	C120	C140	20	BRE10	7.4 / 10
90 S/4-VZ-F	1.5	1.1	1660	0	4.84	2.42	145TC	B3	A200	C120	C140	C160	C120	C140	26	BRE20	15 / 20
90 L/4-VZ-F	2	1.5	1660	0	6.34	3.17	145TC	B3	A200	C120	C140	C160	C120	C140	31	BRE20	15 / 20
100 L/4-VZ-F	3	2.2	1750	0	9.0	4.50	182TC	B3	A250	C120	C140	C160	C160	C200	40	BRE40	30 / 40
100 L/40-VZ-F	5	3.7	1725	0	15.2	7.62	184TC	B3	A250	C120	C140	C160	C160	C200	46	BRE40	30 / 40
132 S/4-VZ-F	7.5	5.5	1735	0	19.8	9.9	213TC	B3	A300	C160	C200	C200	C200	C200	97	BRE60	44 / 60
132 M/4-VZ-F	10	7.5	1750	0	25.8	12.9	215TC	B3	A300	C160	C200	C200	C200	C200	121	BRE100	74 / 100

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph – standard
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**1000+1 (60-0Hz) – Constant Torque  
230/460V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

## Performance & Ordering

**Standard efficiency • 1.0 Service factor**

Inverter duty • Induction motor • TEBC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 230/460V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	P <sub>n</sub> [hp]	n <sub>60*</sub> 60Hz [rpm]	n <sub>0</sub> 0Hz [rpm]	T <sub>60-0</sub> 60Hz [lb-in]	Motor across-the-line data								Code Letter	J <sub>m</sub> [lb-ft <sup>2</sup> ]	
					n <sub>n</sub> 60Hz [rpm]	230V [A]	I <sub>n</sub> 460V [A]	pf	Eff. [%]	T <sub>n</sub> [lb-in]	T <sub>a</sub> /T <sub>n</sub>	T <sub>k</sub> /T <sub>n</sub>	I <sub>a</sub> /I <sub>n</sub>		
63 S/4-VZ-F	0.16	0.12	1700	0	5.93	1700	0.88	0.44	0.66	52	5.93	2.1	2.2	2.45	F 0.00499
63 L/4-VZ-F	0.25	0.18	1680	0	9.38	1680	1.12	0.56	0.71	57	9.38	2.1	2.2	2.75	E 0.00665
71 S/4-VZ-F	0.33	0.25	1710	0	12.2	1710	1.56	0.78	0.64	63	12.2	2.5	2.4	3.10	G 0.0150
71 L/4-VZ-F	0.50	0.37	1720	0	18.3	1720	1.90	0.95	0.69	71	18.3	2.45	2.6	3.55	F 0.0181
80 S/4-VZ-F	0.75	0.55	1710	0	27.6	1710	2.70	1.35	0.71	72	27.6	2.2	2.2	3.55	F 0.0304
80 L/4-VZ-F	1	0.75	1650	0	38.2	1650	3.66	1.83	0.74	70	38.2	2.2	2.3	3.90	G 0.0392
90 S/4-VZ-F	1.5	1.1	1660	0	57	1660	4.84	2.42	0.78	73	57.0	2.7	2.6	4.45	G 0.0670
90 L/4-VZ-F	2	1.5	1660	0	75.9	1660	6.34	3.17	0.80	74	75.9	2.55	2.5	4.65	G 0.0855
100 L/4-VZ-F	3	2.2	1750	0	111	1705	9.0	4.50	0.81	82	111	2.3	2.6	4.90	G 0.107
100 L/40-VZ-F	5	3.7	1725	0	183	1725	15.2	7.62	0.75	81	183	2.7	3.1	5.10	G 0.162
132 S/4-VZ-F	7.5	5.5	1735	0	272	1735	19.8	9.9	0.82	86	272	2.45	2.75	5.45	G 0.553
132 M/4-VZ-F	10	7.5	1750	0	363	1735	25.8	12.9	0.84	87	363	2.9	3.2	6.45	H 0.753

\* - Based on constant slip – Actual speed will vary with inverter control method

P<sub>n</sub> - Full-load power

n<sub>n</sub> - Full-load speed

n<sub>60</sub> - Full-load speed inverter operation at 60Hz

n<sub>0</sub> - Full-load speed inverter operation at 0Hz

I<sub>n</sub> - Full-load current

I<sub>a</sub> - Locked-rotor current

I<sub>a</sub>/I<sub>n</sub> - Locked-rotor current ratio (%)

T<sub>n</sub> - Full-load torque

T<sub>60-0</sub> - Full-load torque inverter operated at 0Hz to 60Hz

T<sub>a</sub> - Locked-rotor torque

T<sub>a</sub>/T<sub>n</sub> - Locked-rotor torque ratio

T<sub>k</sub> - Break-down torque

T<sub>k</sub>/T<sub>n</sub> - Break-down torque ratio

pf - Power factor

Eff. - Nominal efficiency

J<sub>m</sub> - Motor inertia

Wtg. - Weight - approximate

**Order Block** – bold items are required ordering information

Motor type					
Mounting option					
Power					
Voltage					
Frequency					
Mounting position		Conduit box location		Cable entry	
Motor options					
Brake size (optional)					
Brake voltage (AC or DC)					
Brake options					

# 1000+1 (60-0Hz) – Constant Torque

575V-60Hz – 3ph

1800 rpm – Sync – Inverter/Vector Duty



## Mounting & Options



**Standard/energy efficient** • 1.0 Service factor

Inverter duty • Induction motor • TEBC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation

Type	Power		n <sub>60</sub> *	n <sub>0</sub> *	Current	Mounting options						Wtg.	Optional-Brake			
	[hp]	[kW]				60Hz [rpm]	0Hz [rpm]	575V [A]	NEMA C-face	IEC/DIN C-face	IEC/DIN B5-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	IEC/DIN B14-Flg	Brake Size	Torque [lb-in]
63 S/4-VZ-F	0.16	0.12	1700	0	0.37	56C	B3	A140	C90	C105	C120	C120	C120	8	BRE5	3.7 / 5
63 L/4-VZ-F	0.25	0.18	1680	0	0.46	56C	B3	A140	C90	C105	C120	C120	C120	9	BRE5	3.7 / 5
71 S/4-VZ-F	0.33	0.25	1710	0	0.6	56C	B3	A160	C105	C120	C140	C140	C140	12	BRE5	3.7 / 5
71 L/4-VZ-F	0.50	0.37	1720	0	0.80	56C	B3	A160	C105	C120	C140	C140	C140	14	BRE5	3.7 / 5
80 S/4-VZ-F	0.75	0.55	1710	0	1.12	56C	B3	A200	C120	C140	C160	C160	C160	18	BRE10	7.4 / 10
80 LH/4-VZ-F#	1	0.75	1750	0	1.5	143TC	B3	A200	C120	C140	C160	C160	C160	26	BRE10#	7.4 / 10
90 SH/4-VZ-F#	1.5	1.1	1740	0	1.75	145TC	B3	A200	C120	C140	C160	C160	C160	32	BRE20#	15 / 20
90 LH4-VZ-F#	2	1.5	1745	0	2.45	145TC	B3	A200	C120	C140	C160	C160	C160	37	BRE20#	15 / 20
100 LH/4-VZ-F#	3	2.2	1765	0	3.4	182TC	B3	A250	C120	C140	C160	C160	C200	46	BRE40#	30 / 40
112 MH/4-VZ-F#	5	3.7	1770	0	5.6	184TC	B3	A250	C140	C160	C200	C200	C200	77	BRE40#	30 / 40
132 SH/4-VZ-F#	7.5	5.5	1780	0	8.3	213TC	B3	A300	C160	C200	C200	C200	C200	112	BRE60#	44 / 60
132 MH/4-VZ-F#	10	7.5	1770	0	10.8	215TC	B3	A300	C160	C200	C200	C200	C200	139	BRE100#	74 / 100

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

### Standard Features

- Low rotor inertia
- Ball bearings
- Squirrel cage rotor / Aluminum die cast
- Shaft lip seals on both ends of the motor shafts
- Stator to end bell connections sealed to exclude moisture
- Double coated magnet wire insulation
- Inverter/vector duty insulation system conforms to NEMA MG1-1998, section 31.4.4.2 voltage spikes
- Moisture resistant varnish dipped windings – improved varnish materials
- Inorganic insulating components for tropical protection
- Moisture resistant motor windings
- Conduit box sealed with gaskets
- Corrosion resistant alloy materials
- 1045 carbon steel shafts

### Insulation system

NORD motors insulation system is designed to provide superior degree of protection. Including:

- Magnet wire – double coated
- Varnish dip impregnation
- Slot liners
- Phase paper
- Phase separators
- Top sticks
- Connecting wire sleeves

### Optional Features

- NSD+ – NSD+ Protection (pg 62)
- KD – Condensation drain holes (pg 63)
- KB – Condensation drain holes – plugged (pg 63)
- IG – Incremental encoder (specify PPR, Logic-pg 68)
- TF – PTC Thermistor (pg 65)
- TW – Thermostats (pg 65)
- MS – Power plug connector (up to 5 hp) (pg 66)
- F & FC – TEBC Separate power cooling fan (pg 67)
- Z – High inertia cast iron fan (pg 65)
- ISO H – Class H insulation (pg 63)
- EP – Epoxy dipped windings (pg 63)
- RD – Drip cover canopy (pg 64)
- RDD – Double drip cover canopy (pg 64)
- SH – Space heaters (specify voltage) (pg 64)
- WE – 2nd end shaft extension (pg 64)
- BRE – Power off brake – spring set DC coil (pg 71)
- Brake voltages (includes rectifier for AC voltages)
  - 230VAC-60/50Hz-1ph
  - 460VAC-60/50Hz-1ph
  - 575VAC-60/50Hz-1ph– standard
  - 115VAC-60/50Hz-1ph
  - 208VAC-60/50Hz-1ph
  - 400VAC-60/50Hz-1ph
  - 24VDC
- Brake options
  - HL – Manual release hand lever (pg 85)
  - FHL – Lockable manual release lever (pg 85)
  - RG – Corrosion protected (pg 85)
  - SR – Dust protection (pg 85)
  - IP66 – Sealed brake (pg 85)
  - BSG – Fast brake rectifier (pg 78)
  - IR – Brake current relay (pg 82)



**1000+1 (60-0Hz) – Constant Torque  
575V-60Hz – 3ph  
1800 rpm – Sync – Inverter/Vector Duty**

## Performance & Ordering

**Standard/energy efficient • 1.0 Service factor**

Inverter duty • Induction motor • TEBC

Synchronous speed 1800rpm @ 60Hz • 4-pole

Voltages: 575V – 60Hz • Three-phase

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

Class B temperature rise • Class F insulation



Type	$P_n$		$n_{60}^*$		$n_0^*$		$T_{60-0}$	Motor across-the-line data														
	[hp]	[kW]	60Hz	[rpm]	0Hz	[rpm]		$n_n$	60Hz	[rpm]	$I_n$	575V	[A]	pf	Eff.	[%]	$T_n$	$T_a/T_n$	$T_k/T_n$	$I_a/I_n$	Code	J <sub>m</sub>
63 S/4-VZ-F	0.16	0.12	1700	0	5.93		1700	0.37	0.66	52	5.93		2.1	2.2	2.45	F	0.00499					
63 L/4-VZ-F	0.25	0.18	1680	0	9.38		1680	0.46	0.71	57	9.38		2.1	2.2	2.75	E	0.00665					
71 S/4-VZ-F	0.33	0.25	1710	0	12.2		1710	0.6	0.64	63	12.2		2.4	2.4	3.10	G	0.0150					
71 L/4-VZ-F	0.50	0.37	1720	0	18.3		1720	0.80	0.69	71	18.3		2.45	2.6	3.55	F	0.0181					
80 S/4-VZ-F	0.75	0.55	1710	0	27.6		1710	1.12	0.71	72	27.6		2.2	2.2	3.55	F	0.0304					
80 LH/4-VZ-F#	1	0.75	1750	0	36.0		1750	1.5	0.59	82.5	36.0		4.6	4.3	6.0	L	0.0499					
90 SH/4-VZ-F#	1.5	1.1	1740	0	54.3		1740	1.75	0.76	84.0	54.3		3.5	3.8	6.3	J	0.0855					
90 LH4-VZ-F#	2	1.5	1745	0	72.2		1745	2.45	0.71	84.0	72.2		4.3	4.5	6.7	K	0.0926					
100 LH/4-VZ-F#	3	2.2	1765	0	107		1765	3.4	0.73	87.5	107		3.6	4.7	7.9	L	0.178					
112 MH/4-VZ-F#	5	3.7	1770	0	178		1770	5.6	0.76	87.5	178		4.0	4.8	8.1	L	0.304					
132 SH/4-VZ-F#	7.5	5.5	1780	0	266		1780	8.3	0.74	89.5	266		4.3	4.6	8.2	L	0.751					
132 MH/4-VZ-F#	10	7.5	1770	0	356		1770	10.8	0.78	89.5	356		3.2	4.0	7.4	J	0.841					

\* - Based on constant slip – Actual speed will vary with inverter control method

# Brakemotors are supplied as standard efficient motors the motor type will be different than shown

$P_n$  - Full-load power

$T_a$  - Locked-rotor torque

$n_n$  - Full-load speed

$T_a/T_n$  - Locked-rotor torque ratio

$n_{60}$  - Full-load speed inverter operation at 60Hz

$T_k$  - Break-down torque

$n_0$  - Full-load speed inverter operation at 0Hz

$T_k/T_n$  - Break-down torque ratio

$I_n$  - Full-load current

pf - Power factor

$I_a$  - Locked-rotor current

Eff. - Nominal efficiency

$I_a/I_n$  - Locked-rotor current ratio (%)

$J_m$  - Motor inertia

$T_n$  - Full-load torque

Wtg. - Weight - approximate

$T_{60-0}$  - Full-load torque inverter operated at 0Hz to 60Hz



**Order Block** – bold items are required ordering information

<b>Motor type</b>			
<b>Mounting option</b>			
<b>Power</b>			
<b>Voltage</b>			
<b>Frequency</b>			
Mounting position		Conduit box location	Cable entry
<b>Motor options</b>			
<b>Brake size (optional)</b>			
<b>Brake voltage (AC or DC)</b>			
<b>Brake options</b>			



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## Notes



## Options Selection & Ratings





# Options

## Selection & Ratings

### NORD Severe Duty + (NSD+) – option

NORD offers a protection package for its motors known as NORD Severe Duty + (NSD+). This additional motor protection is for wet and corrosive environments. The additional protection will ensure that the motor has a long trouble-free service life in harsh operating environments. The following are provided with the package:

- Standard NORD motor and gear unit – including all the NEW sealing and protective features
- Eteching primer undercoat
- Stainless steel (316L) protective coating – USDA/H1 approved
- Brakemotors – include a stainless steel wear plate and sealing dust boot (brake option SR)

### IP 65 enclosure – option

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

IP	1 <sup>st</sup> code number Foreign body protection	2 <sup>nd</sup> code number Water protection
6	Dust tight	
5		Protection against water jets

### IP 66 enclosure – option

NORD motors can be provided with an enclosure rated IP66. This enclosure protection is suitable for wet, high-pressure wash down and extremely dusty environments.

IP	1 <sup>st</sup> code number Foreign body protection	2 <sup>nd</sup> code number Water protection
6	Dust tight	Protection against high pressure water jets

### Totally-Enclosed Non-Ventilated “TENV” (OL or OL/H) – option

NORD motors can be provided in a non-ventilated enclosure. Non-ventilated motors can provide benefits in some operating environments. Non-ventilated motors must have larger motor frames than standard TEFC enclosure motors. The TENV motor's frame size will be twice the frame power size of the standard TEFC frame for continuous operation. For intermittent operation a motor can be operated at a 50% duty cycle at full rated power.

Consult NORD for motor performance ratings.

### Totally Enclosed Blower Cooled “TEBC” – option

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

See option “Blower Cooling Fan (F & FC)” page 67 for ratings and selection.



# Options Selection & Ratings

## Condensation Drain Holes

NORD motors can be equipped with condensation weep holes. These drain holes are placed in the motor end-bells 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 (KD) 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 (KD) – option

KD drain holes are shipped open (not plugged).

**ORDER NOTE** – Mounting position must be specified including terminal box location



Mounting position \_\_\_\_\_  
Terminal box location \_\_\_\_\_  
Cable entry location \_\_\_\_\_

### Condensation Drain Holes – plugged (KB) – option

KB drain holes are shipped by NORD closed by a sealing plug. In order for the holes to effectively drain moisture they must be opened.

**ORDER NOTE** – Mounting position must be specified including terminal box location



Mounting position \_\_\_\_\_  
Terminal box location \_\_\_\_\_  
Cable entry location \_\_\_\_\_

## Epoxy Dipped Windings (EP) – option

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.

## Class H Insulation (ISO H) – option

NORD motors can be manufactured with class H insulation system. Standard NORD motors include double coated magnetic wire windings rated class H insulation. This 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 very high number of starts per hour.
- Meets class H insulation motor specifications
- Lower operating frequency when used with frequency inverter systems

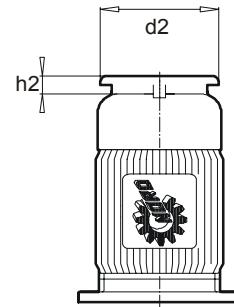


# Options

## Selection & Ratings

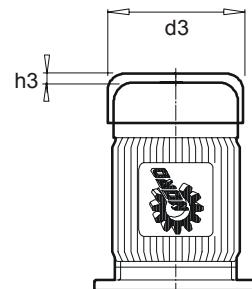
### Canopy Drip Cover (RD) – option

For wet installations where the fan end of the motor is mounted up, thus allowing water to fall into the motor's fan guard, NORD offers a canopy drip cover to block this falling water.



### Double Fan Cowl (RDD) – option

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



### Motor Space Heater (SH) – option

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

Motor Frame	Total Watts	Number of Heaters	Motor Frame	Total Watts	Number of Heaters
63	18 W	1	132	100 W	2
71	18 W	1	160	100 W	2
80	25 W	1	180	100W	2
90	50 W	2	200	120W	2
100	50 W	2	225	120W	2
112	50 W	2			

ORDER NOTE – Space heater voltage must be specified.

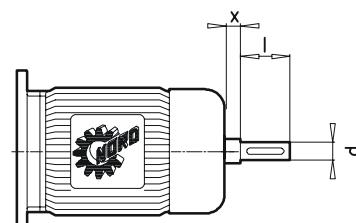
Space heater voltage \_\_\_\_\_

*Voltages available* - specify space heater voltage when ordering:

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

### Motor Second Shaft Extension (WE) – option

NORD can provide motors with a rear end shaft extension. This extension can be used as a power take-off or to mount customer supplied devices.





## Options Selection & Ratings

### Overload Protection

Current-controlled motor protection must be set according to the rated current shown on the motor nameplate. Motor operation involving high starting frequency, short-term duty or large temperature differences should be protected by internal motor thermal measuring devices.

### Thermostat (TW) – option

Three bimetallic switches are connected in series in the motor windings, one per motor phase. Upon reaching the limit temperature, this device automatically open 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.

#### Ratings:

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

### Thermistor Sensors (TF) – option

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 employed 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.

Transition temperature	150 °C +/- 5°C
Resistance < transition	20 ... 500 . Ω
Resistance > transitions	> 4 kΩ.
Rated voltage	< 7.5 V
Rated current	< 1 mA
Motor ambient	40 °C

	Current-based devices		Temperature-based devices	
	Fuses	Motor Overloads	PTC Thermistor (TF)	Bimetallic switch (TW)
↑ = Good protection				
→ = Limited protection				
↓ = No protection				
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	↓	↓	↑	↑

### High Inertia Fan (Z) – option

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.

Motor Frame	Fan inertia J <sub>f</sub> [lb·ft <sup>2</sup> ]	Motor Frame	Fan inertia J <sub>f</sub> [lb·ft <sup>2</sup> ]
71..	0.0475	100..	0.2684
80..	0.1140	112..	0.5653
90..	0.2375	132..	0.950



# Options

## Selection & Ratings

### Power Plug Quick Connector (MS) – option

The power plug quick connector type MS is a simple and fast way to connect and disconnect a motor or brakemotor. The MS connector is available on NORD three-phase motors from frame size 63 to 112. 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.

See page 110 for detailed dimensions

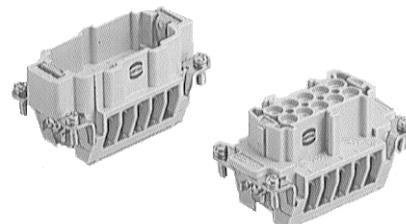


#### Advantages:

- 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

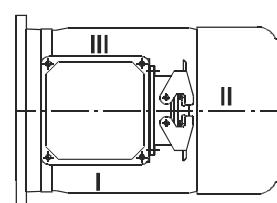
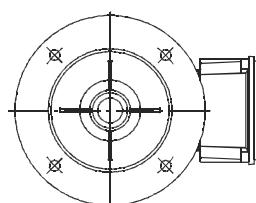
#### Plug ratings:

Manufacturer: Harting  
Connector: HAN 10 ES / HAN 10 ESS – cage clamp connectors  
Number of pins: 10 – male  
Voltage: 500VAC  
Current: 16A – continuous



#### Location options:

Terminal box at position 1  
Connector at II  
Connector can be at I or ,II or III





## Options Selection & Ratings

### Blower Cooling Fan (F & FC) – option

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

See page 108 for detailed dimensions

### 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 - 1~ ⊥(Δ)						
FC63	100 – 135	0.23	42	100 – 135	0.30	42
FC71	100 – 135	0.23	47	100 – 135	0.30	44
FC80	100 – 135	0.27	57	100 – 135	0.30	43
FC90	100 – 135	0.46	102	100 – 135	0.57	78
FC100	100 – 135	0.53	105	100 – 135	0.54	78
FC112	100 – 135	0.60	115	100 – 135	0.55	80

### 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 - 1~ ⊥(Δ)						
F63	230 – 332	0.11	38	230 – 277	0.10	27
F71	230 – 332	0.12	41	230 – 277	0.10	28
F80	230 – 332	0.13	44	230 – 277	0.11	29
F90	230 – 332	0.25	88	230 – 277	0.26	72
F100	230 – 332	0.28	88	230 – 277	0.26	70
F112	230 – 332	0.31	107	230 – 277	0.26	73
F132	230 – 332	0.27	89	230 – 277	0.29	82
Three phase low-voltage connection - 3~ Δ						
F63	220 – 332	0.08	23	220 – 290	0.10	27
F71	220 – 332	0.08	24	220 – 290	0.10	30
F80	220 – 332	0.08	25	220 – 290	0.01	29
F90	220 – 332	0.21	64	220 – 290	0.28	86
F100	220 – 332	0.21	66	220 – 290	0.27	86
F112	220 – 332	0.23	70	220 – 290	0.27	85
F132	220 – 332	0.25	74	220 – 290	0.32	96
Three phase high-voltage connection - 3~ Y						
F63	380 – 575	0.04	23	380 – 500	0.05	29
F71	380 – 575	0.04	25	380 – 500	0.05	30
F80	380 – 575	0.04	26	380 – 500	0.05	29
F90	380 – 575	0.12	62	380 – 500	0.16	82
F100	380 – 575	0.12	66	380 – 500	0.16	83
F112	380 – 575	0.13	70	380 – 500	0.16	82
F132	380 – 575	0.14	75	380 – 500	0.18	96



# Options

## Selection & Ratings

### Incremental Encoder (IG) – option

NORD can provide an incremental encoder mounted on the back of a motor or brakemotor. 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. NORD supplies encoders manufactured by Heidenhain Corp.

Encoder Type:  
Quadrature  
Differential  
Marker pulse

See page 109 for detailed dimensions

Pulse Count [PPR]	100, 250, 500, 1000, 1024, 1250, 2000, 2048, 2500, 3600, 4096, 5000	ERN 420	ERN 460	ERN 430
Heidenhain types				
Interface	TTL/RS422	TTL/RS422	HTL/Push-pull	
Operating voltage	4...6	10...30	10...30	VDC
Max current	150	150	150	MA
Max output frequency	300	300	300	kHz
Max speed	12,000	12,000	12,000	rpm
Ambient temperature	-4...+158	-4...+158	-4...+158	°F
Ambient temperature	-20...+70	-20...+70	-20...+70	°C
Enclosure	IP65	IP65	IP65	
Cable	5-ft (1.5 m) shielded jacketed cable			

ORDER NOTE – Encoder PPR and electrical interface must be specified:

Pulse count \_\_\_\_\_  
Interface \_\_\_\_\_

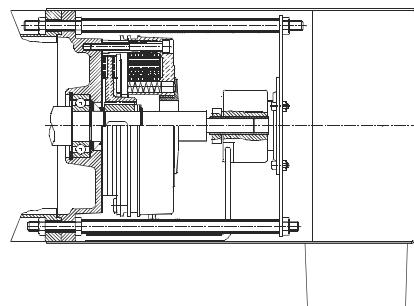
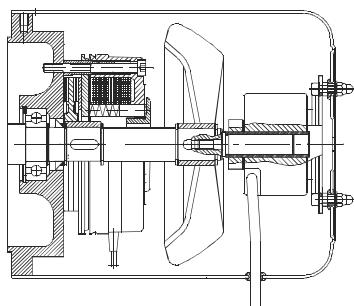
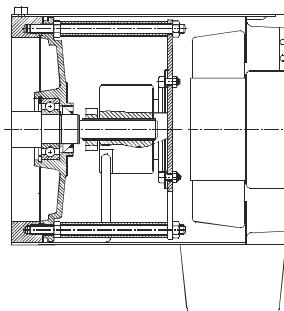
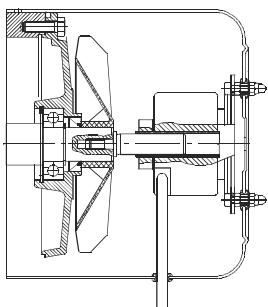


IG1 = 1024 PPR

IG2 = 2048 PPR

IG4 = 4096 PPR

other pulse counts available see table above





## Options Selection & Ratings

### Backstop (RLS) – Option

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.

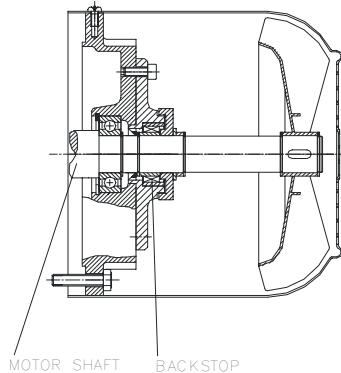
#### ORDER NOTE

The allowable direction of rotation when looking at the fan end of the motor must be specified on the order:



**clockwise or counterclockwise**

Direction of rotation \_\_\_\_\_  
(looking at the motor fan end)



Motor Frame	Backstop Torque [lb-in]	Additional Length [in]
80S & 80L	1150	2.52
90S & 90L	1150	2.95
100L	1150	3.58
112M	3270	3.66
132S & 132M	3270	4.21

### Other options

NORD has many other motor options that are not shown in this catalog. Contact NORD for information on these options.

**Small motor conduit box** – For many size motors, NORD can supply a smaller conduit box than standard.

**OVERRUNNING CLUTCH** – Some motors can be fitted with an overrunning clutch to prevent the motor from overspeeding.

**Resolver** – NORD can fit some motors with a resolver feedback device.



# Options Selection & Ratings

## Notes



## Brakes - Option Selection & Ratings





# Brakes - Options

## Selection & Ratings

### Spring-set Brakes (BRE) – Option

NORD brakes are “spring set.” When power is removed from the brake, the brake will automatically set to hold the load. NORD brakes are DC voltage brakes and in most instances are supplied with a motor mounted brake rectifier for easy connections to AC power. AC power is taken directly from the power line or from the terminal block of the motor and converted to DC by the supplied rectifier in the terminal box. If the motor is connected to a frequency inverter, soft start, or is a two-speed motor, the AC power must be supplied to the brake rectifier separately from the motor power.

When the brake is de-energized (Power Off), the braking springs exert a force against the anchor plate, which prevents the brake rotor from rotating. When the brake coil is energized (Power On), a magnetic field builds and pulls the anchor plate across the air gap to the brake casing, which frees the brake rotor and allows the motor shaft to rotate.

### Brake Selection

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

- Example for ordering: **SK 32 - 80 S/4 BRE 10** (**BRE** indicates the unit has a brake and **10** is the brake size.)

### Recommendations

- For normal applications, we recommend sizing the brake to 1.5 - 2 times the rated torque of the motor.
- For special applications, e.g. lifts, etc., it may be necessary to increase the brake size to 3 times the rated torque of the motor.
- For other drives, it may be advisable to reduce the braking torque.

Motor Frame	Motor Start/Stops per hour	Motor Length [in]	Brake Torque Max	Brake Size						
				BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150
63	8600	2.20	Nm lb-ft	<b>5</b> <b>3.7</b>	10 7.4					
71	6000	2.28	Nm lb-ft	<b>5</b> <b>3.7</b>	10 7.4					
80	5000	2.52	Nm lb-ft	<b>5</b> 3.7	<b>10</b> <b>7.4</b>	20 15				
90S	3000	2.95	Nm lb-ft		10 7.4	<b>20</b> <b>15</b>	40 30			
90L	2500	2.95	Nm lb-ft		10 7.4	<b>20</b> <b>15</b>	40 30			
100L	2000	3.58	Nm lb-ft			20 15	<b>40</b> <b>30</b>			
100L/40	1700	3.58	Nm lb-ft			20 15	<b>40</b> <b>30</b>			
112	1700	3.66	Nm lb-ft			20 15	40 30	<b>60</b> <b>44</b>		
132S	850	4.21	Nm lb-ft					<b>60</b> <b>44</b>	100 74	
132M	1000	4.21	Nm lb-ft					<b>60</b> <b>44</b>	<b>100</b> <b>74</b>	150 111
Additional weight		lb	4.4		6.6	9.9	15.4	22.1	35.3	49
Additional inertia (WK2)		lb-ft <sup>2</sup> x 10 <sup>-3</sup>	0.36	1.07	4.08	10.7	20.4	28.9	67.6	



## Brakes - Option Selection & Ratings

### Brake Performance Data

Brake Size	BRE5	BRE10	BRE20	BRE40	BRE60	BRE100	BRE150	
	[lb-ft]	3.7	7.4	15	30	44	74	110
Brake torque – max	[lb-in]	44	89	177	354	531	885	1328
	[Nm]	5	10	20	40	60	100	150
Power boil P <sub>20</sub>	[W]	22	28	39	42	50	75	76
Nominal air gap (+0.004in/+0.1mm)	[in]	0.008	0.008	0.008	0.012	0.012	0.016	0.020
	[mm]	0.2	0.2	0.2	0.3	0.3	0.4	0.5
Maximum air gap (re-adjust) a <sub>max</sub>	[in]	0.024	0.013	n/a *	0.035	0.039	0.043	0.043
	[mm]	0.6	0.8	n/a *	0.9	1.0	1.1	1.1
Maximum brake pad wear before the pad must be replaced	[in]	0.118	0.118	0.039	0.118	0.138	0.138	0.138
	[mm]	3	3	1	3	3.5	3.5	3.5
Minimum brake pad thickness	[in]	0.177	0.217	0.295	0.374	0.453	0.492	0.571
	[mm]	4.5	5.5	7.5	9.5	11.5	12.5	14.5
Maximum brake work per cycle W <sub>max</sub>	[J x 10 <sup>3</sup> ]	3	6	12	25	35	50	75
Brake work until re-adjust W <sub>r</sub>	[J x 10 <sup>7</sup> ]	5	12	20	35	60	125	200
Heat load per cycle	[J/s]	80	100	130	160	200	250	300
Release time (at start) t <sub>1</sub>	[ms]	35	45	70	80	120	160	200
Setting time (at stop) t <sub>2</sub>	[ms]	30	45	30	75	90	120	150
Coil current – 250VDC coil	[A]	0.088	0.11	0.16	0.18	0.19	0.31	0.31
Coil current – 225VDC coil	[A]	0.092	0.13	0.18	0.20	0.22	0.35	0.36
Coil current – 205VDC coil	[A]	0.11	0.13	0.22	0.24	0.28	0.44	0.45
Coil current – 180VDC coil	[A]	0.12	0.16	0.21	0.25	0.30	0.46	0.47
Coil current – 105VDC coil	[A]	0.21	0.32	0.36	0.46	0.60	0.88	0.89
Coil current – 24VDC coil	[A]	0.92	1.17	1.63	1.75	2.08	3.10	3.20

W<sub>max</sub> holds for brake pad speed of 1800 rpm

The specified release times t<sub>1</sub> (at start) and setting times (at stop) t<sub>2</sub> apply if the standard half-wave or full wave rectifiers are used with DC switching. The BSG fast rectifier can provide either faster release times or faster setting times for additional details contact NORD.

\* - Brake size BRE20 is an auto air-gap setting brake design

### Torque Adjustment

All brakes have adjustable brake torque by changing brake spring combinations. Up to brake size BRE40, the user can fine adjust the brake torque by turning the ring nut. From the factory, the ring nut will be tight against the brake casing. The braking torque is adjusted by unscrewing the ring nut a number of clicks.

Brake Size	Rated Torque (full torque) [lb-ft] 7-springs	Rated Torque [lb-ft] 5-springs	Rated Torque [lb-ft] 3-springs	Ring Nut Torque Adjustment	
				Torque Adjustment per Click [lb-ft]	Maximum Reduction in Torque [lb-ft]
BRE5	3.7	3	1	0.1	1
BRE10	7.4	5	3	0.1	2
BRE20	15	10	6	0.2	4
BRE40	30	21	13	0.7	8
BRE60	44	32	19	Does not include a ring nut	
BRE100	74	52	31	Does not include a ring nut	
BRE150	111	79	48	Does not include a ring nut	



# Brakes - Option Selection & Ratings

## Braking Work

In applications where the brake is operated frequently the brake work should be evaluated to ensure adequate brake life. Two brake work values should be evaluated. The first is the braking work compared to the braking frequency. Each brake will also have a maximum work limit for a single operation - such as an E-stop. Both limits should be reviewed to ensure adequate life.

## Rectifiers - General

The DC power required to energize the brake is not available in most applications. AC power is available in all applications since it is required to power the motor. The rectifier converts the available AC voltage to the DC voltage needed to power the brake.

### Advantages:

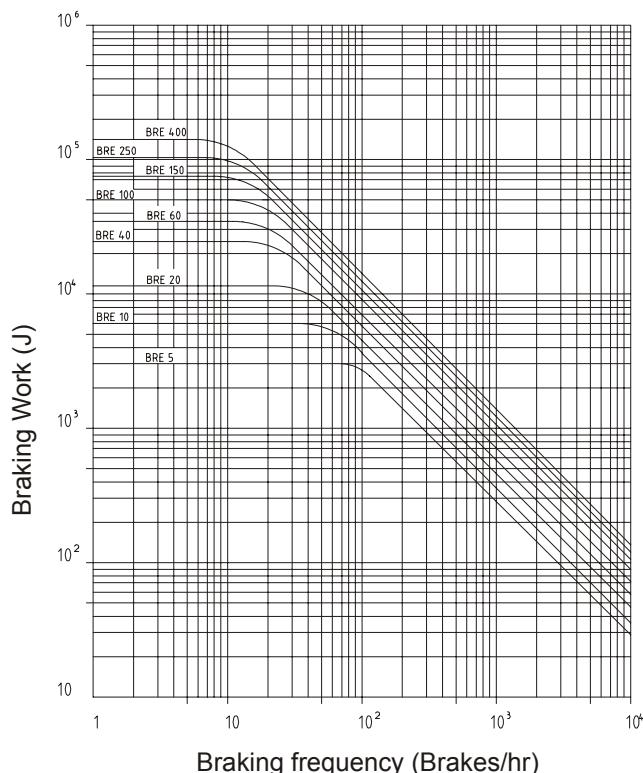
- Individual power supply for each motor
- Compact size; mounted inside motor terminal box
- Multiple voltage options
- Solid state rectifier
- Integral protection against transient voltage spikes

## Standard Rectifier

As standard, NORD integral gearmotors with a DC brake include a rectifier mounted in the motor terminal box. The rectifier supplies DC power to the brake. The rectifier can be wired to operate by supplying and removing AC power (called AC switching). Or by applying AC power to release the brake and removing the AC power and opening the DC brake circuit to set the brake (called DC switching). Wiring for DC switching gives the fastest reaction (de-energize - brake engage - stopping) time. If AC switching is used, the source power can be attached to the motor brake terminals. Tapping into the motor terminals gives the slowest de-energize time (stopping), due to the collapsing time of the motor magnetic field.

### Features

- **Half-wave** rectifier: DC voltage is 45% of the applied AC voltage
- **Full wave** rectifier: DC voltage is 90% of the applied AC voltage

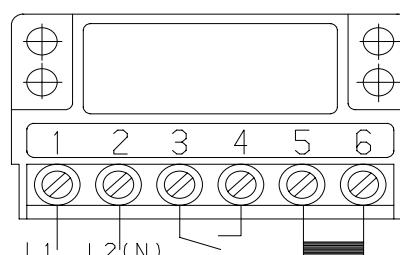


### Advantages:

- Full or half wave available
- Can be wired for slow or fast de-energize (Stopping)

## General Connection

The NORD standard brake rectifiers are a six terminal and are normally mounted in the motor's conduit box. The brake rectifier can be powered by either the connection to the motor terminal block or the power can be separately supplied.



### Terminals

- |       |                                    |
|-------|------------------------------------|
| 1 & 2 | Brake system connection AC voltage |
| 3 & 4 | Switch contact or jumper           |
| 5 & 6 | Connection brake coil              |



## Brakes - Option Selection & Ratings

### Standard Rectifier Specifications

Part #	Color	Style	Input Voltage	Current
19141000	Black	Full-wave	110-230V ± 10%	2 A
19141010	Yellow	Half-wave	230-480V ± 10%	2 A
19141020	Grey	Half-wave	500-575V ± 10%	2 A

Temperature: -10°C to 80°C (14°C to 176°C)

### Fast Brake Engagement (stopping)

The NORD brake can also be wired for faster stopping. This method is called DC switching. DC switching directly interrupts the current flow in the DC circuit on the rectifier. This practice provides much faster stopping. To implement DC switching the contact must be installed in between terminal 3 and 4 on the brake rectifier in place of the factory installed jumper. This switch must close when power is supplied to the rectifier (terminals 1 and 2) and open when power is removed.

### Rectifier Selection

AC Brake Voltage	Rectifier Type	Rectifier Part #	Brake Coil
115VAC	full-wave	19141000	105VDC
200VAC	full-wave	19141000	180VDC
230VAC	full-wave	19141000	205VDC
380VAC	half-wave	19141010	105VDC
400VAC	half-wave	19141010	180VDC
415VAC	half-wave	19141010	180VDC
460VAC	half-wave	19141010	205VDC
480VAC	half-wave	19141010	205VDC
500VAC	half-wave	19141020	225VDC
575VAC	half-wave	19141020	250VDC

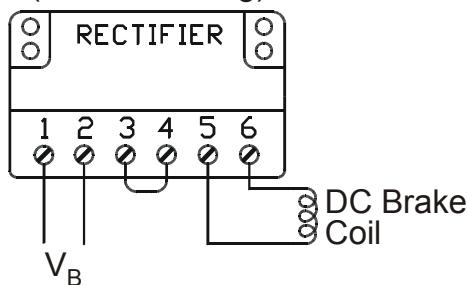
### Rectifiers IP55 – Brake option

NORD has available rectifiers that are sealed internally with a potting compound. These rectifiers can be a benefit if water is present in the motor conduit box.

### IP55 Rectifiers

Part #	Color	Style	Input Voltage	Current
19141030	Black	Full-wave	110-230V ± 10%	2 A
19141040	Yellow	Half-wave	230-480V ± 10%	2 A
19141050	Grey	Half-wave	500-575V ± 10%	2 A

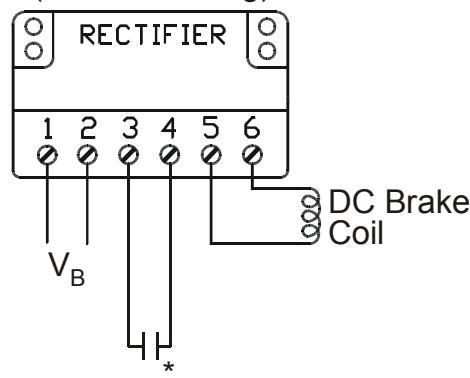
### Normal brake reaction time (AC - Switching)



V<sub>B</sub> - Brake voltage (AC)

Terminals: 1 & 2 – AC brake power input  
Terminals: 3 & 4 – DC switching fast reaction terminals  
Terminals: 5 & 6 – Brake coil, DC voltage output

### Rapid brake reaction time (DC - Switching)



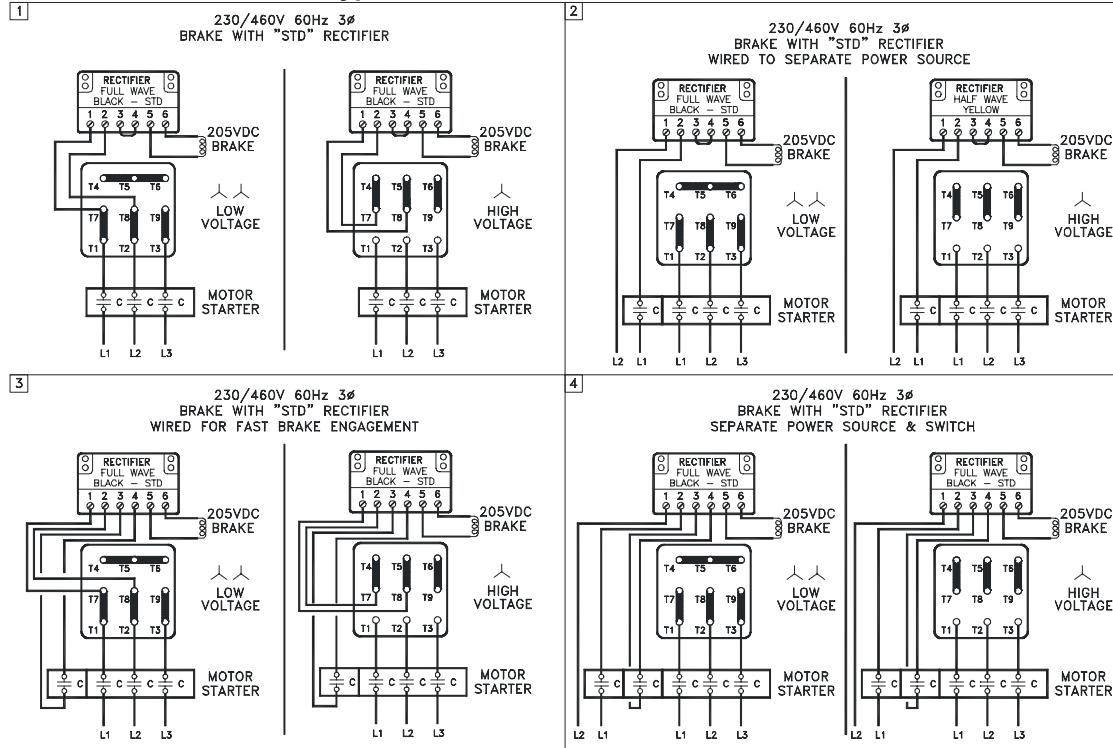
\* The normally-open contact (NO) is not supplied by NORD. It must close at the same time power is supplied to the brake.



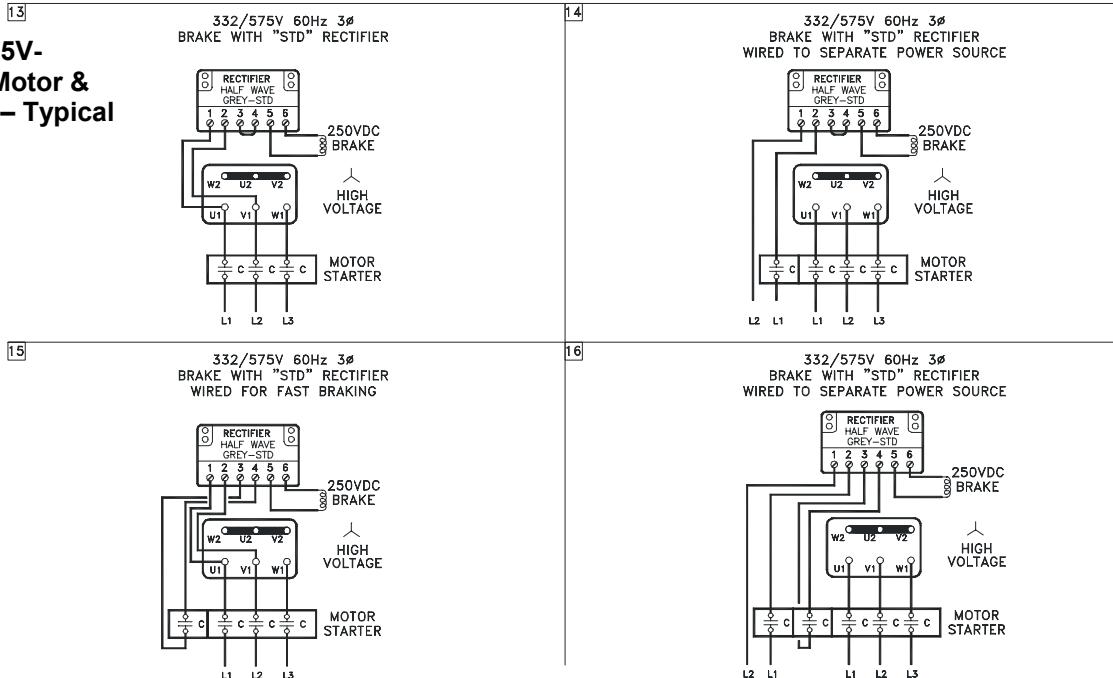
# Brakes - Option Selection & Ratings

## Typical Brake Connections

### 230/460V-60Hz Motor & Brake – Typical



### 332/575V-60Hz Motor & Brake – Typical





## Brakes - Option Selection & Ratings

### Fast Rectifier FR (BSG) – Brake option

The FR type rectifier can provide improved brake performance in both brake release time and stopping time. The FR is a hybrid full-wave and half-wave design. When power is first applied to the rectifier it operates as a full-wave rectifier for a short time and then switches to half-wave operation. Also there is built-in DC switching which is activated by a voltage sensing circuit. The rectifier can be operated in three different methods for different performance.

#### Connection method A – Fast release, normal stopping (terminals 3 & 4 jumpered)

In method A the rectifier uses a brake coil voltage rating for a standard half-wave rectifier. The brake coil DC voltage will be approximately 45% of the applied AC voltage. When voltage is first applied to the rectifier it operates full-wave (90% of the applied AC voltage). This increased voltage generates a stronger magnetic field in the brake coil, which releases the brake more rapidly.

A jumper is placed between terminals 3 and 4, which disables the rectifiers built in DC switching circuit. This produces standard brake stopping times. If the brake is powered from the motors terminal block the brake stopping time will be substantially slower than for a separately powered brake. This can be overcome through the use of an external contact between the motor terminal block (power source) and rectifier terminal 1 or 2.

#### Brake coil selection:

230VAC brake supply voltage – 105VDC coil  
400VAC brake supply voltage – 180VDC coil  
460VAC brake supply voltage – 205VDC coil  
Contact NORD for other voltages

#### Connection method B – Fast release, fast stopping (terminals 3 & 4 not jumpered)

In method B the brake is released quickly as described in method A.

Terminals 3 and 4 are not jumpered. This allows the built in DC switching function to be activated. The DC switching allows the brake to stop more rapidly. If the brake is powered from the motors terminal block the brake stopping time will be substantially slower than for a separately powered brake. This can be overcome through the use of an external contact between the motor terminal block (power source) and rectifier terminal 1 or 2.

#### Brake coil selection:

230VAC brake supply voltage – 105VDC coil  
400VAC brake supply voltage – 180VDC coil  
460VAC brake supply voltage – 205VDC coil  
Contact NORD for other voltages

#### Connection method C – Normal release, fastest stopping (terminals 3 & 4 not jumpered)

In method C the rectifier uses a brake coil selected for a full-wave rectifier. The brake coil voltage will be approximately 90% of the applied AC voltage.

NORD's fast rectifier reduces the brake stopping time. It is approximately twice (2x) as fast as the standard rectifier. When voltage is first applied to the rectifier it operates as a full-wave rectifier (90% of the applied AC voltage). This releases the brake in the standard time. After the brake is released the rectifier switches to a half-wave rectifier (45% of the applied DC voltage). This reduced voltage weakens the brakes magnetic field. With the weaker field the brake will stop more quickly when power is removed.

Terminals 3 and 4 are not jumpered. This allows the built in DC switching function to be activated. The DC switching allows the brake to stop more rapidly. If the brake is powered from the motors terminal block the brake stopping time will be substantially slower than for a separately powered brake. This can be overcome through the use of an external contact between the motor terminal block (power source) and rectifier terminal 1 or 2.

#### Brake coil selection:

230VAC brake supply voltage – 205VDC coil  
Contact NORD for other voltages

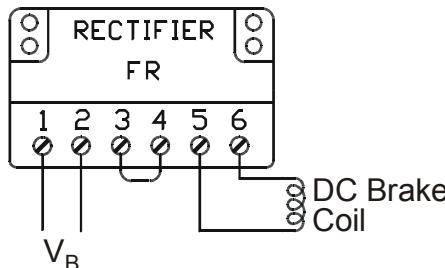
#### Advantages:

- Reduced brake wear; longer maintenance interval
- Reduced thermal load from friction at start up
- Higher permissible switching cycles of the motor
- Faster allowable brake cycle rate
- Better positioning accuracy
- Better repeatability
- Terminal box mounted
- Multiple input voltage options, ranging from 230 VAC to 500 VAC

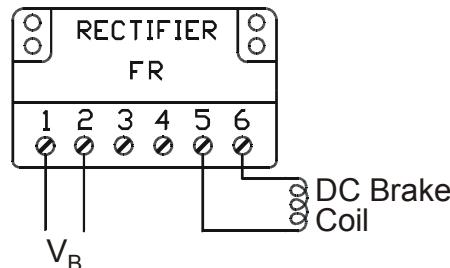


# Brakes - Option Selection & Ratings

Normal brake reaction time  
(AC - Switching)



Rapid brake reaction time  
(DC -Switching - Internal)



$V_B$  - Brake voltage (AC)

Terminals: 1 & 2 – AC brake power input  
Terminals: 3 & 4 – DC switching fast reaction terminals  
Terminals: 5 & 6 – Brake coil, DC voltage output

## Connection and application description (BSG)

The FR type rectifier can provide improved brake performance in both brake release time and stopping time. The FR is a hybrid full-wave and half-wave design. When power is first applied to the rectifier it operates as a full-wave rectifier for 250 ms and then switches to half-wave operation. Also there is built-in DC switching which is activated by a voltage sensing circuit. The rectifier can be operated in three different methods for different performance.

**The FR Rectifier jumper between terminals 3 and 4 does not work like a full-wave or half-wave standard NORD rectifier.** The rectifier internally switches to perform local DC switching.

To achieve fast release, double voltage is applied to the brake coil for approximately 0.25 seconds. This cuts the response time in half, compared to the standard rectifier.

## Specifications

Part #	Style	Input Voltage	Current
19140090	Full/half-wave	210 – 260 VAC $\pm$ 5%	0.7 A
19140170	Full/half-wave	380 – 500 VAC $\pm$ 5%	0.7 A

With two-speed motors or inverter driven motors the brake power must be separately supplied. The brake power cannot be taken from the motors terminal block.

When brake power is taken from the motors terminal block considerably slower brake stopping time results.

If fast release *and* engagement of the brake is required, the FR rectifier has to be supplied with line voltage or switched via a contact, separate from the motor.

There are two different voltage rectifiers that can be supplied. The section of the input voltage and rectifier determine the brake coil voltage. All NORD rectifiers have the part number printed on them along with technical specifications.



## Brakes - Option Selection & Ratings

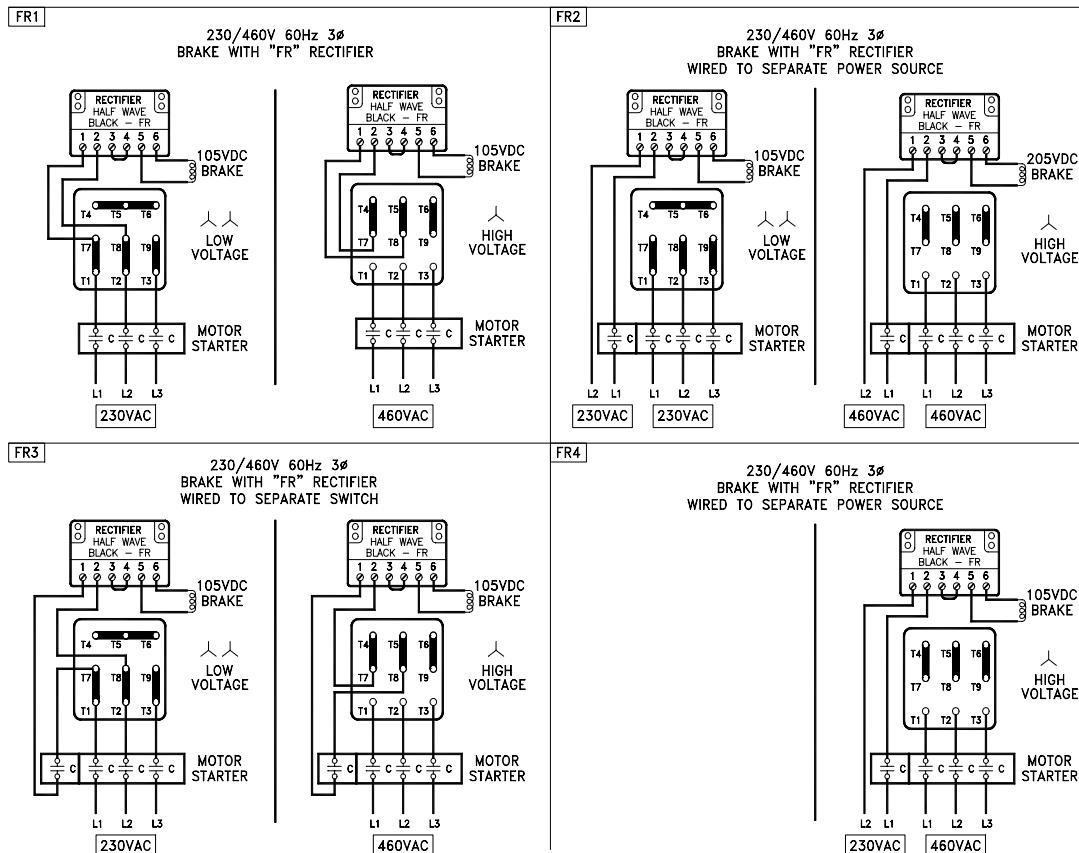
### Connection method A – Fast release, normal stopping (terminals 3 & 4 jumpered)

In method A the rectifier uses a brake coil voltage rating for a standard half-wave rectifier. The brake coil DC voltage will be approximately 45% of the applied AC voltage. When voltage is first applied to the rectifier it operates full-wave (90% of the applied AC voltage). This increased voltage generates a stronger magnetic field in the brake coil, which releases the brake more rapidly.

A jumper is placed between terminals 3 and 4, which disables the rectifiers built in DC switching circuit. This produces standard brake stopping times. If the brake is powered from the motors terminal block the brake stopping time will be substantially slower than for a separately powered brake. This can be overcome through the use of an external contact between the motor terminal block (power source) and rectifier terminal 1 or 2.

### Brake coil selection:

- 230VAC brake supply voltage – 105VDC brake coil
  - Rectifier FR 230V – P/N 19140090
- 380VAC brake supply voltage – 180VDC brake coil
  - Rectifier FR 500V – P/N 19140170
- 400VAC brake supply voltage – 180VDC brake coil
  - Rectifier FR 500V – P/N 19140170
- 460VAC brake supply voltage – 205VDC brake coil
  - Rectifier FR 500V – P/N 19140170
- 500VAC brake supply voltage – 225VDC brake coil
  - Rectifier FR 500V – P/N 19140170
- Contact NORD for other voltages





# Brakes - Option Selection & Ratings

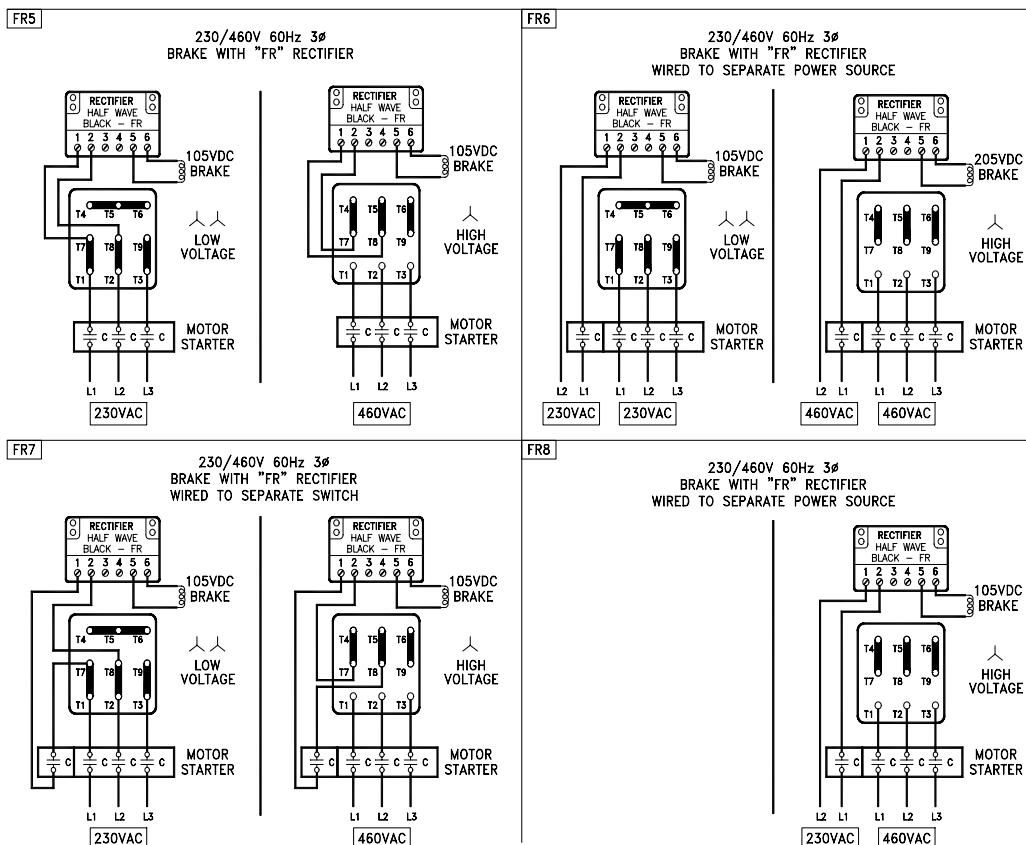
## Connection method B – Fast release, fast stopping (terminals 3 & 4 not jumpered)

In method B the brake is released quickly as described in method A.

Terminals 3 and 4 are not jumpered. This allows the built in DC switching function to be activated. The DC switching allows the brake to stop more rapidly. If the brake is powered from the motors terminal block the brake stopping time will be substantially slower than for a separately powered brake. This can be overcome through the use of an external contact between the motor terminal block (power source) and rectifier terminal 1 or 2.

### Brake coil selection:

- 230VAC brake supply voltage – 105VDC brake coil – Rectifier FR 230V – P/N 19140090
- 380VAC brake supply voltage – 180VDC brake coil – Rectifier FR 500V – P/N 19140170
- 400VAC brake supply voltage – 180VDC brake coil – Rectifier FR 500V – P/N 19140170
- 460VAC brake supply voltage – 205VDC brake coil – Rectifier FR 500V – P/N 19140170
- 500VAC brake supply voltage – 225VDC brake coil – Rectifier FR 500V – P/N 19140170
- Contact NORD for other voltages





## Brakes - Option Selection & Ratings

### Connection method C – Normal release, fastest stopping (terminals 3 & 4 not jumpered)

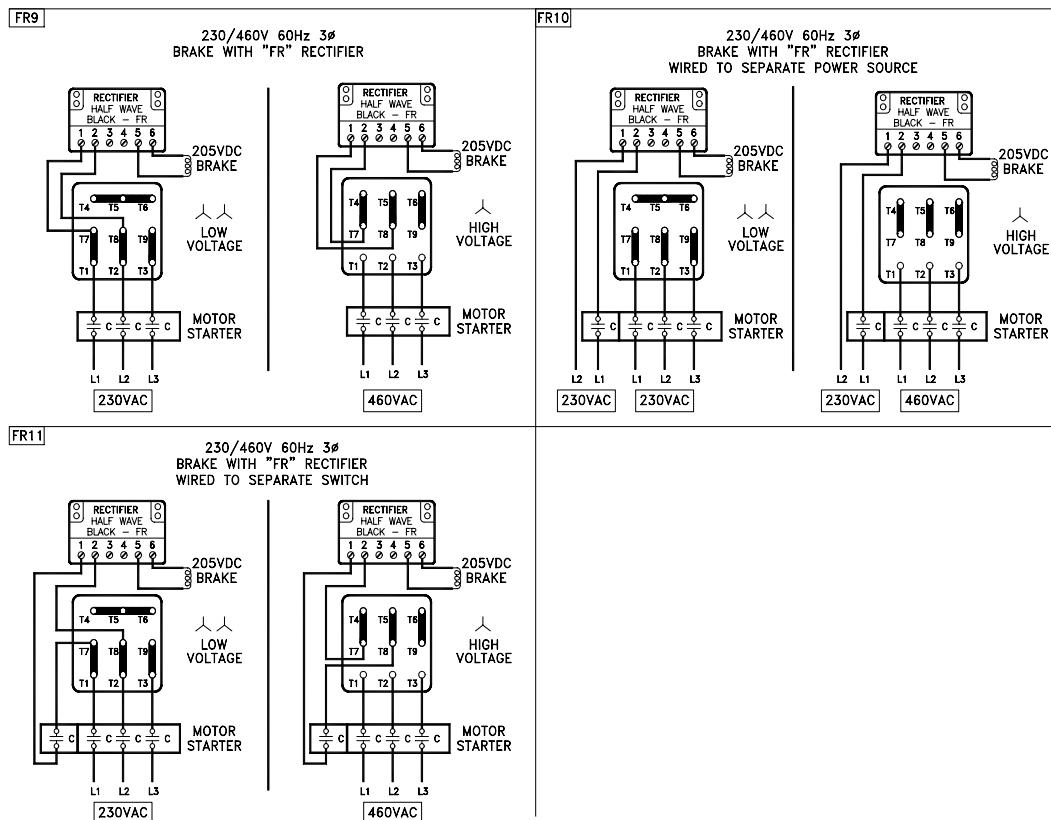
In method C the rectifier uses a brake coil selected for a full-wave rectifier. The brake coil voltage will be approximately 90% of the applied AC voltage.

NORD's fast rectifier reduces the brake stopping time. It is approximately four times (4x) as fast as the standard rectifier. When voltage is first applied to the rectifier it operates as a full-wave rectifier (90% of the applied AC voltage). This releases the brake in the standard time. After the brake is released the rectifier switches to a half-wave rectifier (45% of the applied DC voltage). This reduced voltage weakens the brakes magnetic field. With the weaker field the brake will stop more quickly when power is removed.

Terminals 3 and 4 are not jumpered. This allows the built in DC switching function to be activated. The DC switching allows the brake to stop more rapidly. If the brake is powered from the motors terminal block the brake stopping time will be substantially slower than for a separately powered brake. This can be overcome through the use of an external contact between the motor terminal block (power source) and rectifier terminal 1 or 2.

#### Brake coil selection:

- 230VAC brake supply voltage – 205VDC brake coil – Rectifier FR 230V – P/N 19140090
- Contact NORD for other voltages





# Brakes - Option Selection & Ratings

## Motor Current Brake Relay (IR) – Brake option

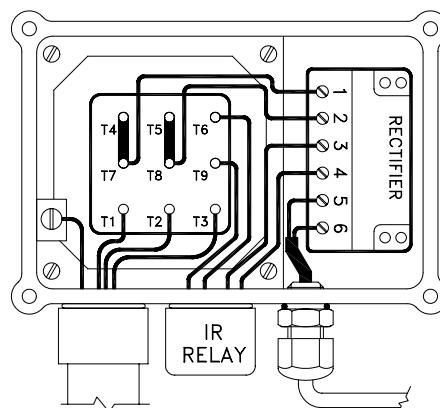
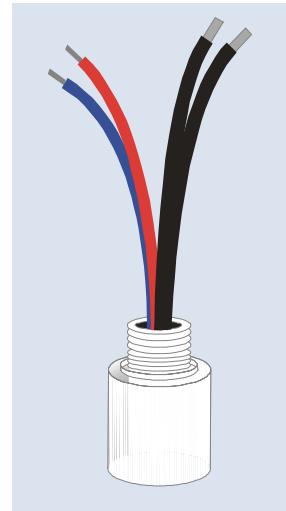
The current sensing relay, normally called the IR option, is used to achieve the brake engagement (stopping) time without the use of external control equipment or additional wiring. The relay is mounted directly on the conduit box and powered from the motor's terminal block. The power leads for the relay replace one of the brass jumper bars on the motor's 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 this allows the brake to demagnetize quickly.

### Requirements:

- Motor must be powered across-the-line (not inverter powered or controlled with a soft-start)
- The brake power must be provided from the motor's terminal block (not separately powered)
- Motor must be a single-speed (not possible with two-speed motors)

### Ratings

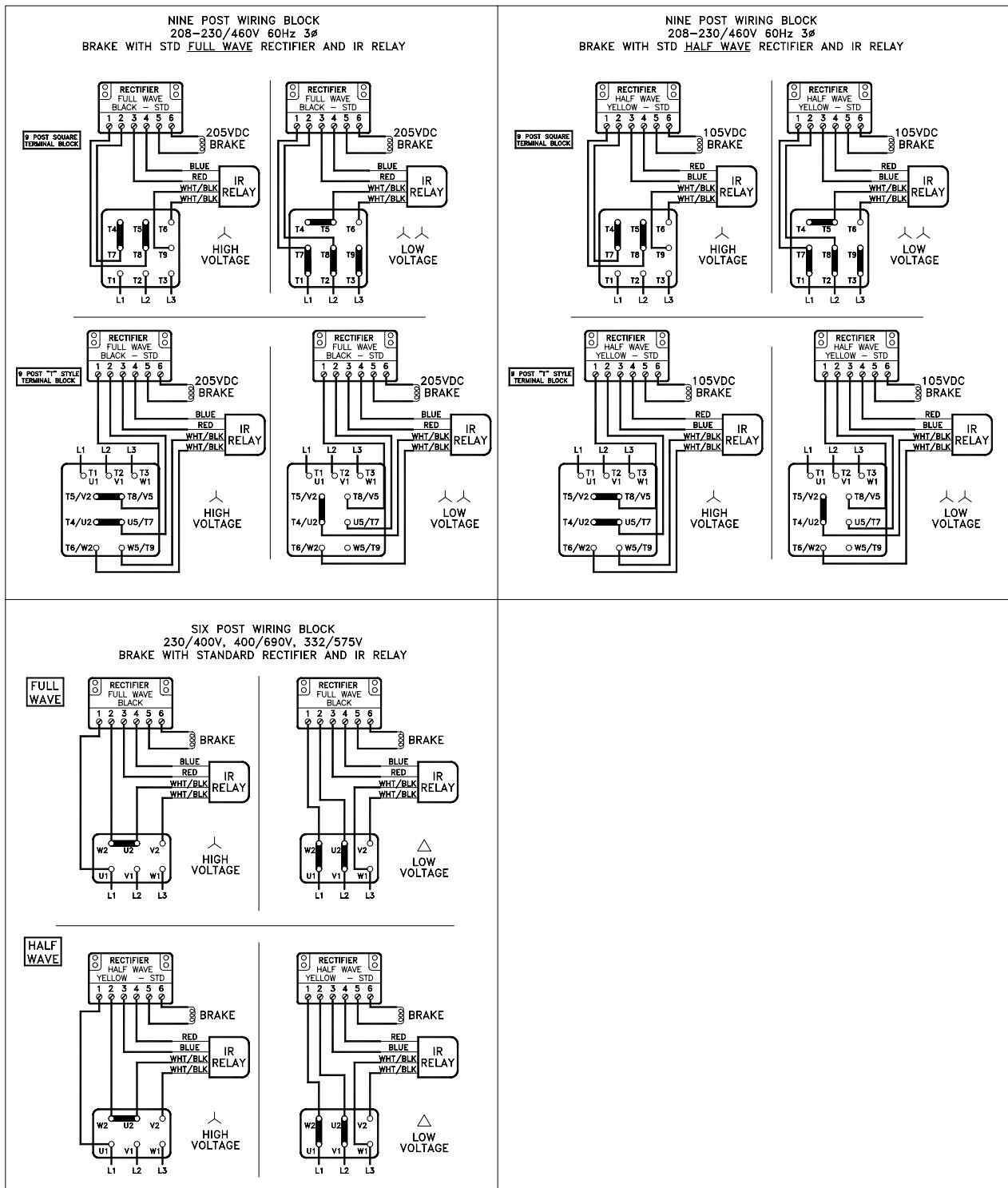
Part number	18556010	18556020
AC input current (max) – black/white wires	25 A <sub>AC</sub>	50 A <sub>AC</sub>
DC brake current (max) – red and blue wires	1 A <sub>DC</sub>	1 A <sub>DC</sub>
Ambient temperature	-40 to +75 °C -40 to 167 °F	-40 to +75 °C -40 to 167 °F
Enclosure with o-ring and mounted to a terminal box	IP65	IP65





# Brakes - Option Selection & Ratings

## IR Relay Typical Connection Diagrams.



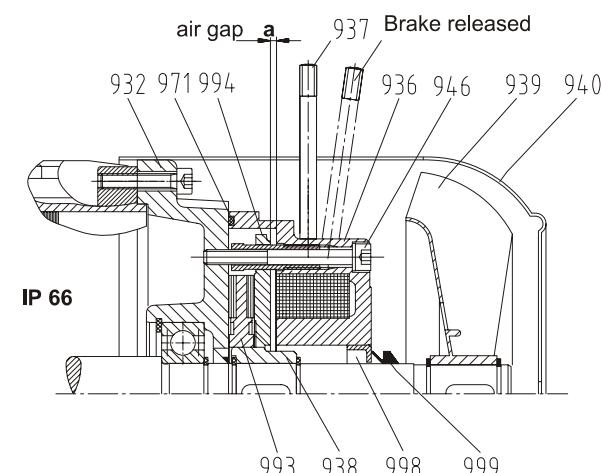
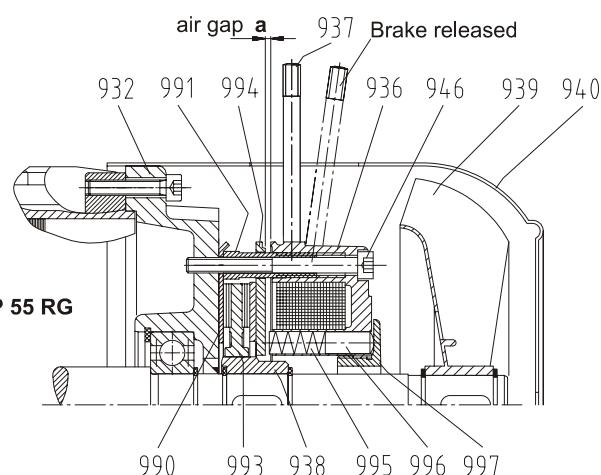
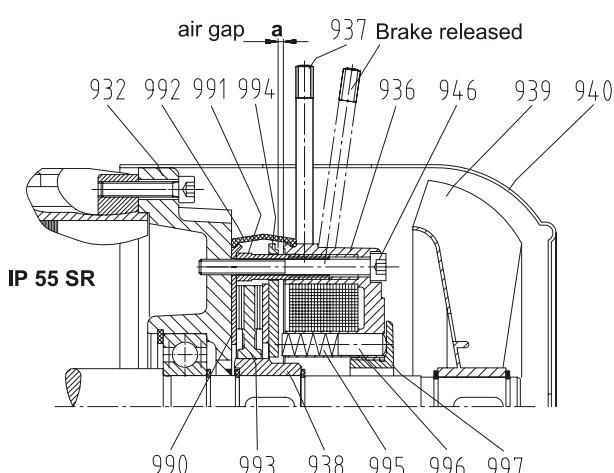
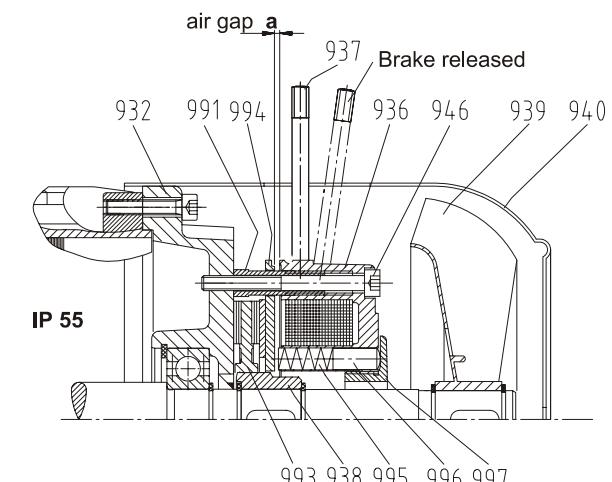


# Brakes - Option Selection & Ratings

## Environmental Protection

NORD can provide brakes with a number of different mechanical enclosures. These range from the standard open brake construction to a sealed brake. The standard brake when assembled to a NORD motor is IP 55 protected. Additional protective measures are also possible.

The standard open construction is the best for most environments due to its self cleaning and its ability to drain easily. The corrosion-protected brake (RG) provides additional protection for wet environments. Other protection options are also available.



- 932 non-drive endshield
- 936 complete brake
- 937 manual brakereference
- 938 brake hub
- 939 fan
- 940 fan-cowl
- 946 fixing screw
- 971 O-Ring

\* only for brakes 5 Nm to 40 Nm

<sup>1)</sup> not for Brakes 20 Nm and 800 Nm

- 990 friction plate
- 991 setting bolt
- 992 dust protection ring <sup>1)</sup>
- 993 brake pad
- 994 armature
- 995 spring
- 996 pressure plate \*
- 997 adjusting ring \*
- 998 Bushing / Seal
- 999 V-Ring

### Attention:

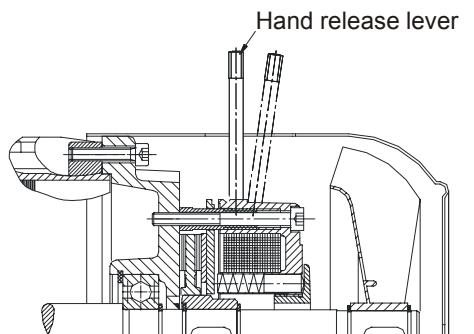
IP 66 with sizes 5 - 400 Nm (3.7 - 295.0 LB-FT) Opt. match of brake size and motor frame size on request.



## Brakes - Option Selection & Ratings

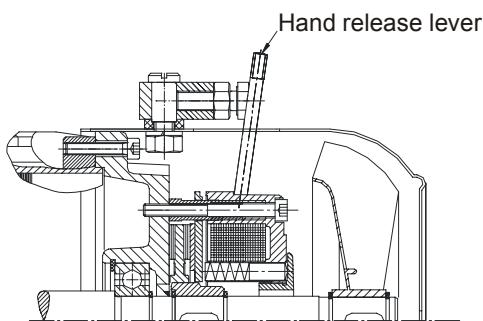
### Hand Release (HL) – Brake option

This option allows the brake to be manually released without requiring voltage to the brake. The lever has a spring return and allows the brake to be hand released and returned automatically to its set position. The hand release lever can be removed, since it is a screwed-in lever.



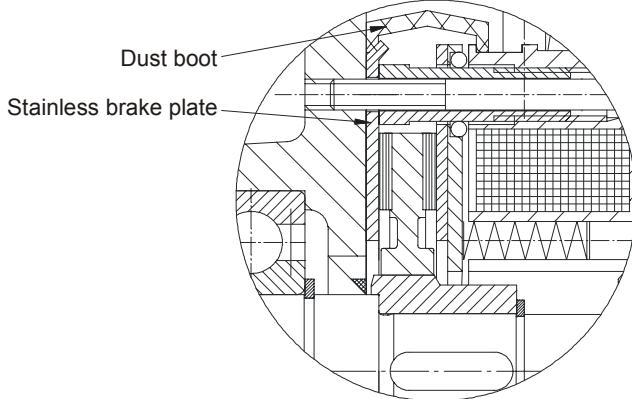
### Lockable Hand Release (FHL) – Brake option

This option allows the brake to be manually released and locked off without requiring voltage to the brake. The lock mechanism prevents the spring returning the brake to a closed state without manual action by the user. The hand release lever can be removed, since it is a screwed-in lever.



### Corrosion Protection (RG) – Brake option

The brake can be fitted with an optional stainless steel friction plate to provide additional corrosion protection in hostile and wet environments. The RG option is included with the NSD+ protection option.



### Dust Boot (SR) – Brake option

A rubber-sealing boot can be provided on the brake to provide additional protection in very dusty environments. This feature also automatically includes the stainless corrosion protected steel friction plate (RG). The SR option is included with NORD Severe Duty (NSD) units.

### Sealed Brake (IP66) – Brake option

A sealed brake can also be provided. This brake has a different mechanical housing that provides a higher degree of protection against some severe environments.

### Other Brake Options

NORD has other brake options some of which are described below. Contact NORD for more details.

**Brake heating** – Some brakes can include an anti-condensation heating circuit.

**Brake with micro-switch** – Some brakes can be provided with a micro-switch to indicate if the brake is released.



# Brakes - Option Selection & Ratings

## Notes



## Mounting Positions Engineering Information





# Mounting Positions

## Engineering Information

### Mounting Positions

NORD can provide motors in various mounting positions and conduit box and cable entry locations.

Please specify a mounting position, terminal box location, brake hand release lever and cable entry location at time of order

ORDER NOTE – Mounting position must be specified including terminal box location

Mounting position \_\_\_\_\_  
Terminal box location \_\_\_\_\_  
Cable entry location \_\_\_\_\_  
Brake release lever \_\_\_\_\_

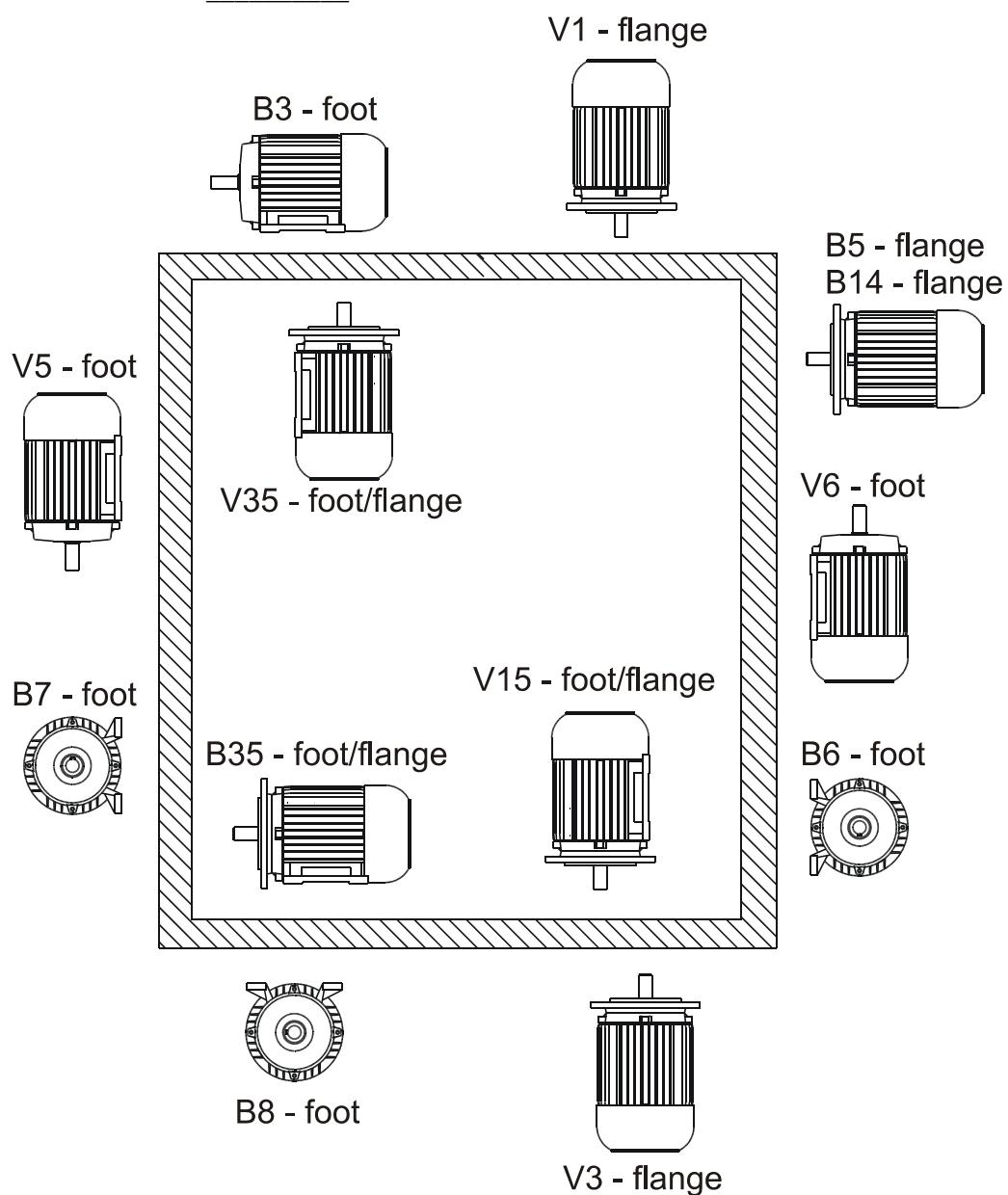


Standard arrangement **flange mounted** motor/brakemotor

Mounting positions: B5/B15  
Terminal box: TB 1  
Cable entry: CI I  
Brake lever: HL 2

Standard arrangement **foot mounted** motor/brakemotor

Mounting positions: B3  
Terminal box: TB 2  
Cable entry: CI I  
Brake lever: HL 2

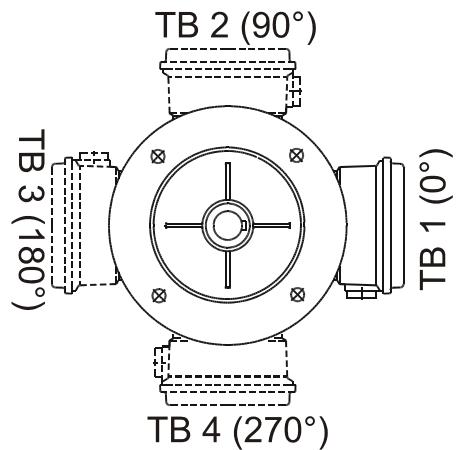
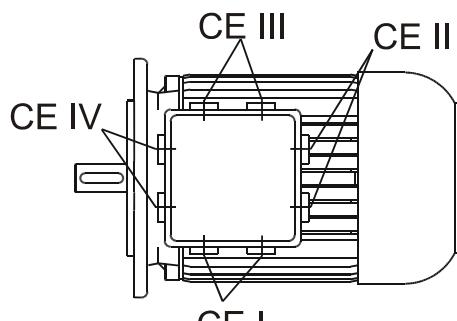




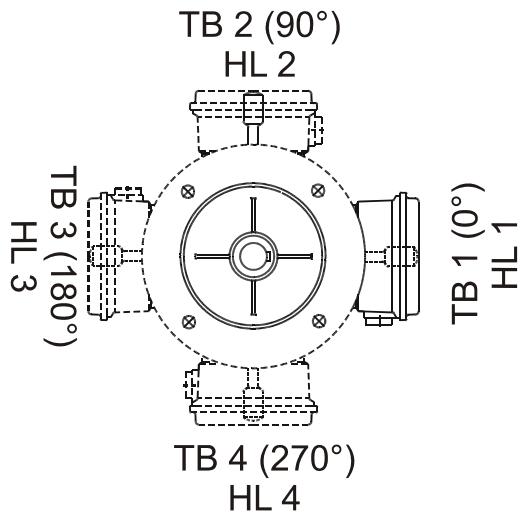
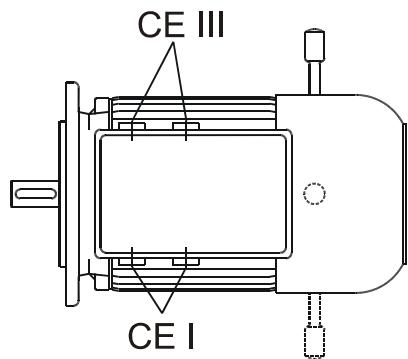
# Mounting Positions Engineering Information

## Assembly Locations

### Motor



### Brakemotor



Foot mounted motors size 63-90 are only available with terminal box location TB2



# Mounting Positions

## Engineering Information

### Notes



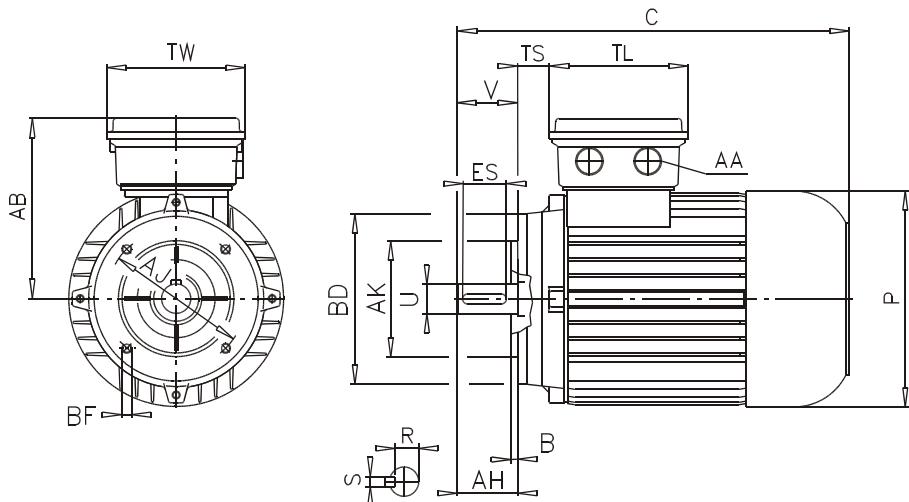
## Dimensions





# Dimensions

## NEMA C-Face Flange Motor



Flange	AJ	AK	BD	B	BF
63S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
63L -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
71S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
71L -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
80S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
80L -143TC	143TC	5.875	4.500 +0/-0.003	6.50	0.16
90S -145TC	145TC	5.875	4.500 +0/-0.003	6.50	0.16
90L -145TC	145TC	5.875	4.500 +0/-0.003	6.50	0.25
100L -182TC	182TC	7.250	8.500 +0/-0.003	9.00	0.25
100L -184TC	184TC	7.250	8.500 +0/-0.003	9.00	0.25
112M -184TC	184TC	7.250	8.500 +0/-0.003	9.00	0.25
132S -213TC	213TC	7.250	8.500 +0/-0.003	9.00	0.25
132M -215TC	215TC	7.250	8.500 +0/-0.003	9.00	0.25

AB	AH	C	P	TL	TS	TW	AA
63S -56C	4.53	2.06	9.62	5.12	3.94	0.47	3.94 1/2" NPT M20x1.5
63L -56C	4.53	2.06	9.62	5.12	3.94	0.47	3.94 1/2" NPT M20x1.5
71S -56C	4.88	2.06	9.70	5.71	3.94	0.79	3.94 1/2" NPT M20x1.5
71L -56C	4.88	2.06	9.70	5.71	3.94	0.79	3.94 1/2" NPT M20x1.5
80S -56C	5.59	2.06	11.51	6.50	4.49	1.02	4.49 3/4" NPT M25x1.5
80L -143TC	5.59	2.12	11.57	6.50	4.49	1.02	4.49 3/4" NPT M25x1.5
90S -145TC	5.79	2.12	12.16	7.20	4.49	1.18	4.49 3/4" NPT M25x1.5
90L -145TC	5.79	2.12	13.14	7.20	4.49	1.18	4.49 3/4" NPT M25x1.5
100L -182TC	6.65	2.62	14.82	7.91	4.49	1.42	4.49 1" NPT M32x1.5
100L -184TC	6.65	2.62	14.82	7.91	4.49	1.42	4.49 1" NPT M32x1.5
112M -184TC	7.05	2.62	15.45	8.98	4.49	1.77	4.49 1" NPT M32x1.5
132S -213TC	8.03	3.12	18.08	10.47	4.80	2.13	4.80 1" NPT M32x1.5
132M -215TC	8.03	3.12	19.58	10.47	4.80	2.17	4.80 1" NPT M32x1.5

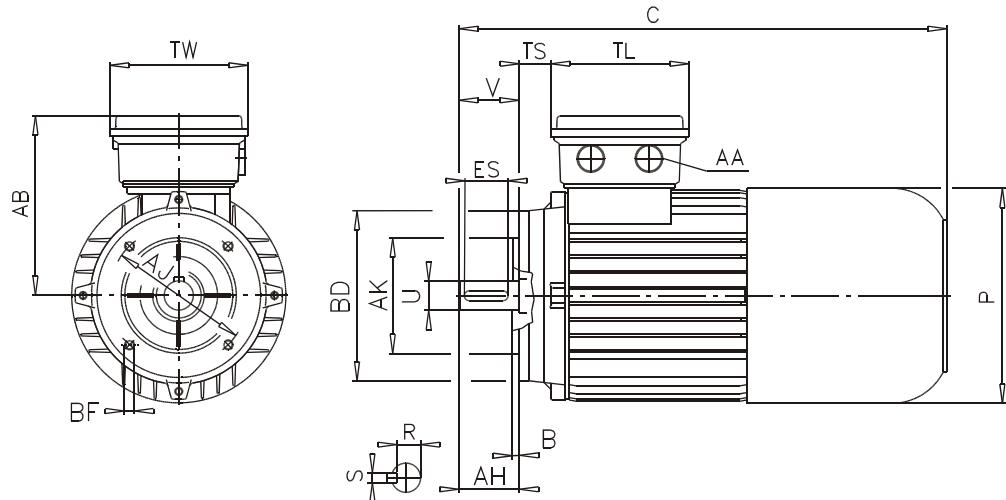
U	V	ES	R	S
63S -56C	0.625 +0/-0.0005	1.87	1.69	0.517 0.188
63L -56C	0.625 +0/-0.0005	1.87	1.69	0.517 0.188
71S -56C	0.625 +0/-0.0005	1.87	1.69	0.517 0.188
71L -56C	0.625 +0/-0.0005	1.87	1.69	0.517 0.188
80S -56C	0.625 +0/-0.0005	1.87	1.69	0.517 0.188
80L -143TC	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
90S -145TC	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
90L -145TC	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
100L -182TC	1.125 +0/-0.0005	2.75	2.25	0.986 0.250
100L -184TC	1.125 +0/-0.0005	2.75	2.25	0.986 0.250
112M -184TC	1.125 +0/-0.0005	2.75	2.25	0.986 0.250
132S -213TC	1.375 +0/-0.0005	3.37	3.37	1.201 0.313
132M -215TC	1.375 +0/-0.0005	3.37	3.37	1.201 0.313

All dimensions shown in [inch]

Dimensions subject to change without notice



# Dimensions NEMA C-Face Flange Brakemotor



Flange	AJ	AK	BD	B	BF
63S -56C	56C	5.875	4.500 +0 / -0.003	6.50	0.16
63L -56C	56C	5.875	4.500 +0 / -0.003	6.50	0.16
71S -56C	56C	5.875	4.500 +0 / -0.003	6.50	0.16
71L -56C	56C	5.875	4.500 +0 / -0.003	6.50	0.16
80S -56C	56C	5.875	4.500 +0 / -0.003	6.50	0.16
80L -143TC	143TC	5.875	4.500 +0 / -0.003	6.50	0.16
90S -145TC	145TC	5.875	4.500 +0 / -0.003	6.50	0.16
90L -145TC	145TC	5.875	4.500 +0 / -0.003	6.50	0.25
100L -182TC	182TC	7.250	8.500 +0 / -0.003	9.00	0.25
100L -184TC	184TC	7.250	8.500 +0 / -0.003	9.00	0.25
112M -184TC	184TC	7.250	8.500 +0 / -0.003	9.00	0.25
132S -213TC	213TC	7.250	8.500 +0 / -0.003	9.00	0.25
132M -215TC	215TC	7.250	8.500 +0 / -0.003	9.00	0.25

AB	AH	C	P	TL	TS	TW	AA
63S -56C	4.84	2.06	11.82	5.12	5.20	0.75	3.43 1/2" NPT M20x1.5
63L -56C	4.84	2.06	11.82	5.12	5.20	0.75	3.43 1/2" NPT M20x1.5
71S -56C	5.24	2.06	12.77	5.71	5.20	1.06	3.43 1/2" NPT M20x1.5
71L -56C	5.24	2.06	12.77	5.71	5.20	1.06	3.43 1/2" NPT M20x1.5
80S -56C	5.63	2.06	14.03	6.50	6.02	1.18	4.25 3/4" NPT M25x1.5
80L -143TC	5.63	2.12	14.09	6.50	6.02	1.18	4.25 3/4" NPT M25x1.5
90S -145TC	5.83	2.12	16.10	7.20	6.02	1.34	4.25 3/4" NPT M25x1.5
90L -145TC	5.83	2.12	16.10	7.20	6.02	1.34	4.25 3/4" NPT M25x1.5
100L -182TC	6.26	2.62	18.41	7.91	6.02	1.57	4.25 3/4" NPT M25x1.5
100L -184TC	6.26	2.62	18.41	7.91	6.02	1.57	4.25 3/4" NPT M25x1.5
112M -184TC	6.69	2.62	19.12	8.98	6.02	1.93	4.25 3/4" NPT M25x1.5
132S -213TC	7.72	3.12	23.79	10.47	7.28	1.85	5.47 3/4" NPT M25x1.5
132M -215TC	7.72	3.12	23.79	10.47	7.28	1.85	5.47 3/4" NPT M25x1.5

U	V	ES	R	S
63S -56C	0.625 +0 / -0.0005	1.87	1.69	0.517
63L -56C	0.625 +0 / -0.0005	1.87	1.69	0.517
71S -56C	0.625 +0 / -0.0005	1.87	1.69	0.517
71L -56C	0.625 +0 / -0.0005	1.87	1.69	0.517
80S -56C	0.625 +0 / -0.0005	1.87	1.69	0.517
80L -143TC	0.875 +0 / -0.0005	2.25	1.81	0.771
90S -145TC	0.875 +0 / -0.0005	2.25	1.81	0.771
90L -145TC	0.875 +0 / -0.0005	2.25	1.81	0.771
100L -182TC	1.125 +0 / -0.0005	2.75	2.25	0.986
100L -184TC	1.125 +0 / -0.0005	2.75	2.25	0.986
112M -184TC	1.125 +0 / -0.0005	2.75	2.25	0.986
132S -213TC	1.375 +0 / -0.0005	3.37	3.37	1.201
132M -215TC	1.375 +0 / -0.0005	3.37	3.37	0.313

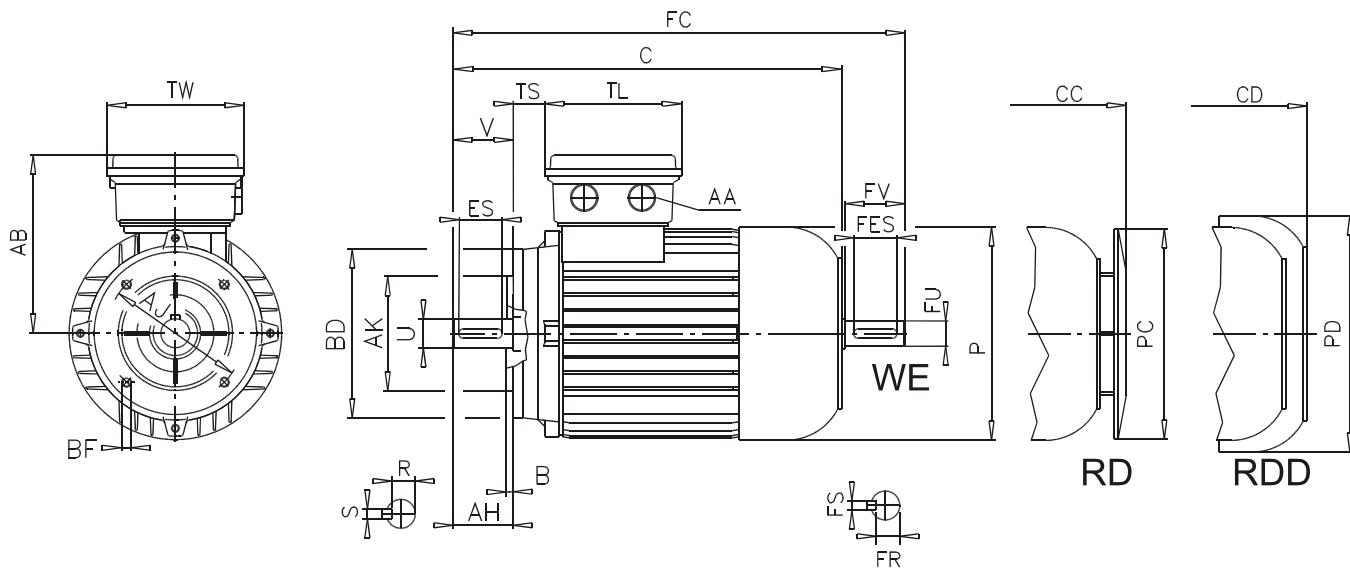
All dimensions shown in [inch]

Dimensions subject to change without notice



## Dimensions

### WE, RD, RDD - NEMA C-Face Flange Motor



Flange	AJ	AK	BD	B	BF
63S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
63L -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
71S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
71L -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
80S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
80L -143TC	143TC	5.875	4.500 +0/-0.003	6.50	0.16
90S -145TC	145TC	5.875	4.500 +0/-0.003	6.50	0.16
90L -145TC	145TC	5.875	4.500 +0/-0.003	6.50	0.25
100L -182TC	182TC	7.250	8.500 +0/-0.003	9.00	0.25
100L -184TC	184TC	7.250	8.500 +0/-0.003	9.00	0.25
112M -184TC	184TC	7.250	8.500 +0/-0.003	9.00	0.25
132S -213TC	213TC	7.250	8.500 +0/-0.003	9.00	0.25
132M -215TC	215TC	7.250	8.500 +0/-0.003	9.00	0.25

AB	AH	C	CC	CD	FC	P	PC	PD	TL	TS	TW	AA
63S -56C	4.53	2.06	9.62	10.09	10.68	11.12	5.12	4.84	6.02	3.94	0.47	3.94 1/2" NPT M20x1.5
63L -56C	4.53	2.06	9.62	10.09	10.68	11.12	5.12	4.84	6.02	3.94	0.47	3.94 1/2" NPT M20x1.5
71S -56C	4.88	2.06	9.70	10.96	11.43	12.02	5.71	5.43	6.65	3.94	0.79	3.94 1/2" NPT M20x1.5
71L -56C	4.88	2.06	9.70	10.96	11.43	12.02	5.71	5.43	6.65	3.94	0.79	3.94 1/2" NPT M20x1.5
80S -56C	5.59	2.06	11.51	12.14	12.73	13.51	6.50	6.14	7.20	4.49	1.02	4.49 3/4" NPT M25x1.5
80L -143TC	5.59	2.12	11.57	12.20	12.79	13.57	6.50	6.14	7.20	4.49	1.02	4.49 3/4" NPT M25x1.5
90S -145TC	5.79	2.12	12.16	12.79	13.38	14.68	7.20	6.93	7.91	4.49	1.18	4.49 3/4" NPT M25x1.5
90L -145TC	5.79	2.12	13.14	13.77	14.36	15.67	7.20	6.93	7.91	4.49	1.18	4.49 3/4" NPT M25x1.5
100L -182TC	6.65	2.62	14.82	15.45	15.93	17.31	7.91	7.64	8.86	4.49	1.42	4.49 1" NPT M32x1.5
100L -184TC	6.65	2.62	14.82	15.45	15.93	17.31	7.91	7.64	8.86	4.49	1.42	4.49 1" NPT M32x1.5
112M -184TC	7.05	2.62	15.45	16.08	16.95	17.86	8.98	8.58	10.43	4.49	1.77	4.49 1" NPT M32x1.5
132S -213TC	8.03	3.12	18.08	18.79	19.69	22.17	10.47	10.12	12.52	4.80	2.13	4.80 1" NPT M32x1.5
132M -215TC	8.03	3.12	19.58	20.29	21.19	23.67	10.47	10.12	12.52	4.80	2.17	4.80 1" NPT M32x1.5

U	V	ES	R	S	FU	FV	FEC	FR	FS
63S -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
63L -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
71S -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
71L -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
80S -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.625 +0/-0.0005	1.88	1.69	0.517 0.188
80L -143TC	0.875 +0/-0.0005	2.25	1.81	0.771	0.188	0.625 +0/-0.0005	1.88	1.69	0.517 0.188
90S -145TC	0.875 +0/-0.0005	2.25	1.81	0.771	0.188	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
90L -145TC	0.875 +0/-0.0005	2.25	1.81	0.771	0.188	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
100L -182TC	1.125 +0/-0.0005	2.75	2.25	0.986	0.250	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
100L -184TC	1.125 +0/-0.0005	2.75	2.25	0.986	0.250	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
112M -184TC	1.125 +0/-0.0005	2.75	2.25	0.986	0.250	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
132S -213TC	1.375 +0/-0.0005	3.37	3.37	1.201	0.313	1.375 +0/-0.0005	3.38	3.37	1.201 0.313
132M -215TC	1.375 +0/-0.0005	3.37	3.37	1.201	0.313	1.375 +0/-0.0005	3.38	3.37	1.201 0.313

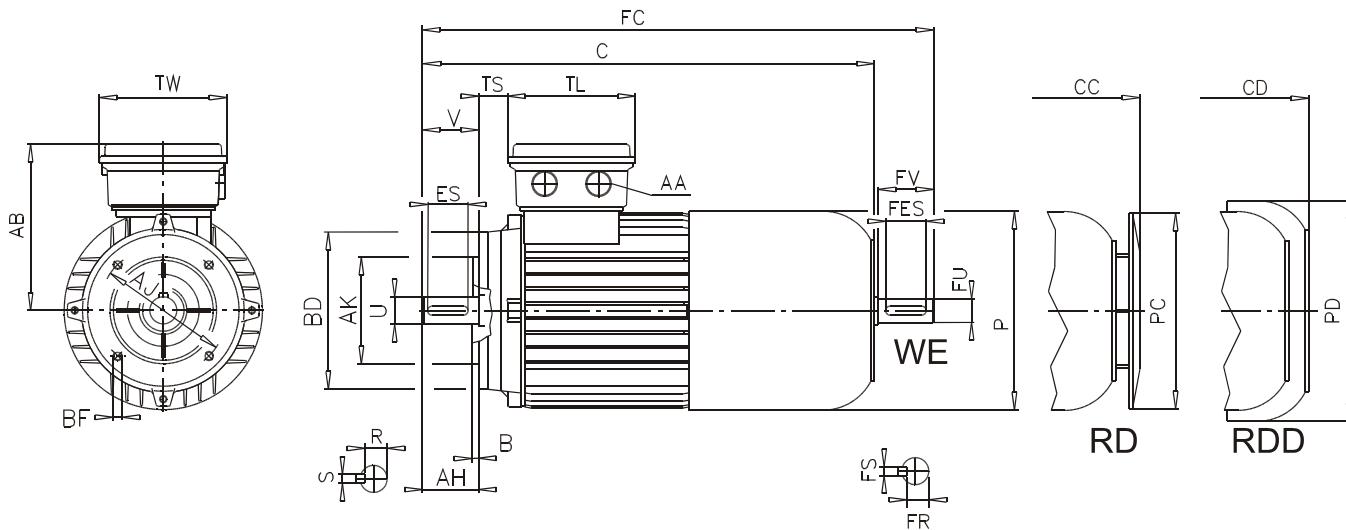
All dimensions shown in [inch]

Dimensions subject to change without notice



## Dimensions

### NEMA C-Face Flange Brakemotor - WE, RD, RDD



Flange	AJ	AK	BD	B	BF
63S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
63L -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
71S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
71L -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
80S -56C	56C	5.875	4.500 +0/-0.003	6.50	0.16
80L -143TC	143TC	5.875	4.500 +0/-0.003	6.50	0.16
90S -145TC	145TC	5.875	4.500 +0/-0.003	6.50	0.16
90L -145TC	145TC	5.875	4.500 +0/-0.003	6.50	0.25
100L -182TC	182TC	7.250	8.500 +0/-0.003	9.00	0.25
100L -184TC	184TC	7.250	8.500 +0/-0.003	9.00	0.25
112M -184TC	184TC	7.250	8.500 +0/-0.003	9.00	0.25
132S -213TC	213TC	7.250	8.500 +0/-0.003	9.00	0.25
132M -215TC	215TC	7.250	8.500 +0/-0.003	9.00	0.25
					1/2-13 x 1.18

AB	AH	C	CC	CD	FC	P	PC	PD	TL	TS	TW	AA
63S -56C	4.84	2.06	11.82	12.30	12.85	13.48	5.12	4.84	6.02	5.20	0.75	3.43 1/2"NPT M20x1.5
63L -56C	4.84	2.06	11.82	12.30	12.85	13.48	5.12	4.84	6.02	5.20	0.75	3.43 1/2"NPT M20x1.5
71S -56C	5.24	2.06	12.77	13.24	13.71	14.43	5.71	5.43	6.65	5.20	1.06	3.43 1/2"NPT M20x1.5
71L -56C	5.24	2.06	12.77	13.24	13.71	14.43	5.71	5.43	6.65	5.20	1.06	3.43 1/2"NPT M20x1.5
80S -56C	5.63	2.06	14.03	14.66	15.25	16.07	6.50	6.14	7.20	6.02	1.18	4.25 3/4"NPT M25x1.5
80L -143TC	5.63	2.12	14.09	14.72	15.31	16.13	6.50	6.14	7.20	6.02	1.18	4.25 3/4"NPT M25x1.5
90S -145TC	5.83	2.12	16.10	16.73	17.32	18.29	7.20	6.93	7.91	6.02	1.34	4.25 3/4"NPT M25x1.5
90L -145TC	5.83	2.12	16.10	16.73	17.32	18.29	7.20	6.93	7.91	6.02	1.34	4.25 3/4"NPT M25x1.5
100L -182TC	6.26	2.62	18.41	19.04	19.51	21.05	7.91	7.64	8.86	6.02	1.57	4.25 3/4"NPT M25x1.5
100L -184TC	6.26	2.62	18.41	19.04	19.51	21.05	7.91	7.64	8.86	6.02	1.57	4.25 3/4"NPT M25x1.5
112M -184TC	6.69	2.62	19.12	19.75	20.61	21.64	8.98	8.58	10.43	6.02	1.93	4.25 3/4"NPT M25x1.5
132S -213TC	7.72	3.12	23.79	24.50	25.40	27.56	10.47	10.12	12.60	7.28	1.85	5.47 3/4"NPT M25x1.5
132M -215TC	7.72	3.12	23.79	24.50	25.40	27.56	10.47	10.12	12.60	7.28	1.85	5.47 3/4"NPT M25x1.5

U	V	ES	R	S	FU	FV	FEC	FR	FS
63S -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
63L -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
71S -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
71L -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.500 +0/-0.0005	1.50	1.25	0.453 flat
80S -56C	0.625 +0/-0.0005	1.87	1.69	0.517	0.188	0.625 +0/-0.0005	1.88	1.69	0.517 0.188
80L -143TC	0.875 +0/-0.0005	2.25	1.81	0.771	0.188	0.625 +0/-0.0005	1.88	1.69	0.517 0.188
90S -145TC	0.875 +0/-0.0005	2.25	1.81	0.771	0.188	0.625 +0/-0.0005	1.88	1.69	0.517 0.188
90L -145TC	0.875 +0/-0.0005	2.25	1.81	0.771	0.188	0.625 +0/-0.0005	1.88	1.69	0.517 0.188
100L -182TC	1.125 +0/-0.0005	2.75	2.25	0.986	0.250	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
100L -184TC	1.125 +0/-0.0005	2.75	2.25	0.986	0.250	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
112M -184TC	1.125 +0/-0.0005	2.75	2.25	0.986	0.250	0.875 +0/-0.0005	2.25	1.81	0.771 0.188
132S -213TC	1.375 +0/-0.0005	3.37	3.37	1.201	0.313	1.375 +0/-0.0005	3.38	3.37	1.201 0.313
132M -215TC	1.375 +0/-0.0005	3.37	3.37	1.201	0.313	1.375 +0/-0.0005	3.38	3.37	1.201 0.313

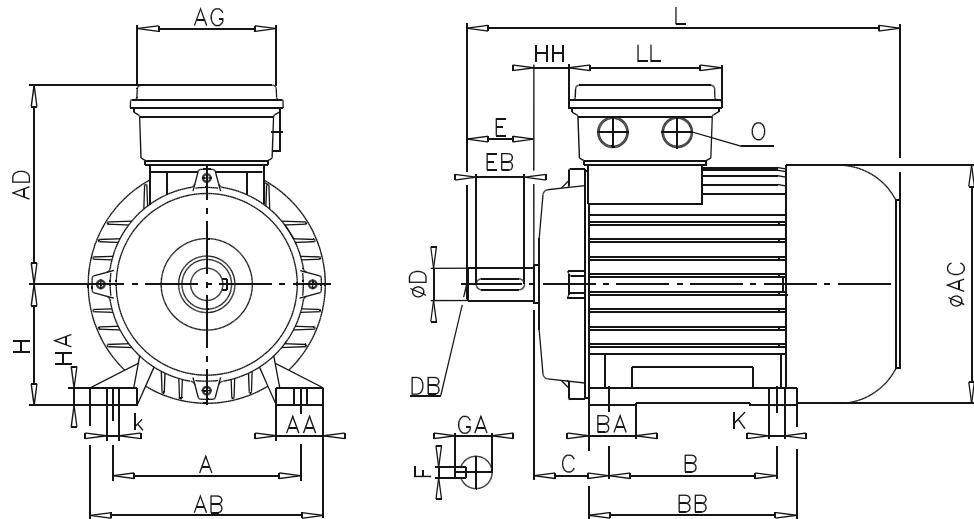
All dimensions shown in [inch]

Dimensions subject to change without notice



# Dimensions

## IEC/DIN B3 Foot-Mounted Motor



	A	AA	AB	B	BA	BB	HA	K	k
63S	100	21	120	80	27	105	9	7	12
63L	100	21	120	8/0	27	105	9	7	12
71S	112	24	136	90	24	108	10	9	14
71L	112	24	136	90	24	108	10	9	14
80S	125	30	160	100	30	125	11	9	17
80L	125	30	160	100	30	125	11	9	17
90S	140	34	174	100	35	130	12	9	17
90L	140	34	174	125	35	155	12	9	17
100L	160	37	192	140	30	175	15	12	22
112M	190	40	224	140	34	175	15	12	22
132S	216	58	260	140	37	180	18	14	30
132M	216	58	260	178	37	218	18	14	30

AC	AD	AG	C	H	HH	L	LL	O
63S	130	115	100	40	63	12	215	100 M20x1.5
63L	130	115	100	40	63	12	215	100 M20x1.5
71S	145	124	100	45	71	20	224	100 M20x1.5
71L	145	124	100	45	71	20	224	100 M20x1.5
80S	165	142	114	50	80	22	276	114 M25x1.5
80L	165	142	114	50	80	22	276	114 M25x1.5
90S	183	147	114	56	90	26	301	114 M25x1.5
90L	183	147	114	56	90	26	326	114 M25x1.5
100L	201	169	114	63	100	32	366	114 M32x1.5
112M	228	179	114	70	112	45	386	114 M32x1.5
132S	266	204	122	89	132	47	453	122 M32x1.5
132M	266	204	122	89	132	48	491	122 M32x1.5

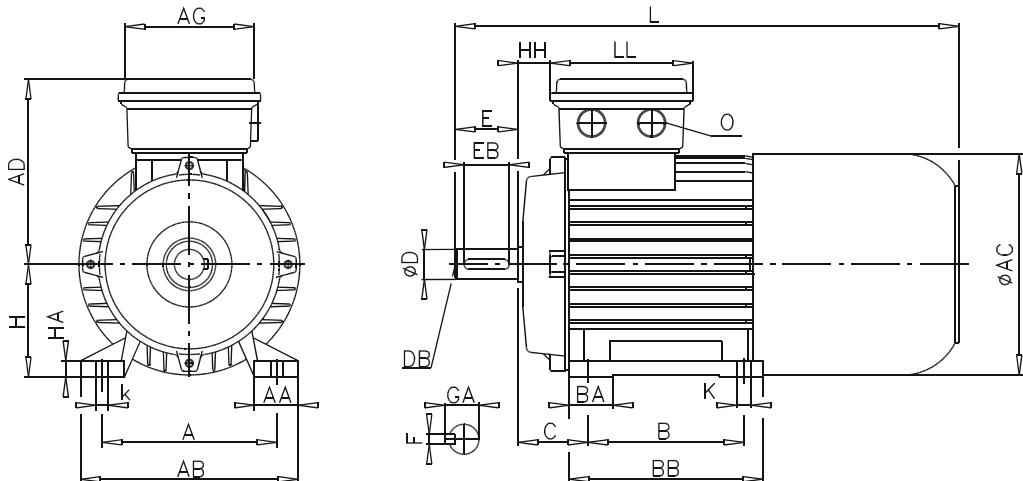
D	DB	E	EB	F	GA
63S	11 +0.008/-0.003	M4	23	16	4 12.5
63L	11 +0.008/-0.003	M4	23	16	4 12.5
71S	14 +0.008/-0.003	M5	30	20	5 16.0
71L	14 +0.008/-0.003	M5	30	20	5 16.0
80S	19 +0.009/-0.004	M6	40	32	6 21.5
80L	19 +0.009/-0.004	M6	40	32	6 21.5
90S	24 +0.009/-0.004	M8	50	40	8 27.0
90L	24 +0.009/-0.004	M8	50	40	8 27.0
100L	28 +0.009/-0.004	M10	60	50	8 31.0
112M	28 +0.009/-0.004	M10	60	50	8 31.0
132S	38 +0.018/-0.002	M12	80	70	10 41.0
132M	38 +0.018/-0.002	M12	80	70	10 41.0

All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions IEC/DIN B3 Foot-Mounted Brakemotor



	A	AA	AB	B	BA	BB	HA	K	k
63S	100	21	120	80	27	105	10	7	12
63L	100	21	120	8/0	27	105	10	7	12
71S	112	24	136	90	24	108	11	9	14
71L	112	24	136	90	24	108	11	9	14
80S	125	30	160	100	30	125	11	9	17
80L	125	30	160	100	30	125	11	9	17
90S	140	34	174	100	35	130	13	9	17
90L	140	34	174	125	35	155	13	9	17
100L	160	37	192	140	30	175	15	12	22
112M	190	40	224	140	34	175	15	12	22
132S	216	58	260	140	37	180	18	14	30
132M	216	58	260	178	37	218	18	14	30

	AC	AD	AG	C	H	HH	L	LL	O
63S	130	123	87	40	63	19	271	132	M20x1.5
63L	130	123	87	40	63	19	271	132	M20x1.5
71S	145	133	87	45	71	27	302	132	M20x1.5
71L	145	133	87	45	71	27	302	132	M20x1.5
80S	165	143	108	50	80	26	340	153	M25x1.5
80L	165	143	108	50	80	26	340	153	M25x1.5
90S	183	148	108	56	90	30	376	153	M25x1.5
90L	183	148	108	56	90	30	401	153	M25x1.5
100L	201	159	108	63	100	36	457	153	M25x1.5
112M	228	170	108	70	112	49	479	153	M25x1.5
132S	266	196	139	89	132	40	560	185	M25x1.5
132M	266	196	139	89	132	40	598	185	M25x1.5

	D	DB	E	EB	F	GA
63S	11 +0.008/-0.003	M4	23	16	4	12.5
63L	11 +0.008/-0.003	M4	23	16	4	12.5
71S	14 +0.008/-0.003	M5	30	20	5	16.0
71L	14 +0.008/-0.003	M5	30	20	5	16.0
80S	19 +0.009/-0.004	M6	40	32	6	21.5
80L	19 +0.009/-0.004	M6	40	32	6	21.5
90S	24 +0.009/-0.004	M8	50	40	8	27.0
90L	24 +0.009/-0.004	M8	50	40	8	27.0
100L	28 +0.009/-0.004	M10	60	50	8	31.0
112M	28 +0.009/-0.004	M10	60	50	8	31.0
132S	38 +0.018/-0.002	M12	80	70	10	41.0
132M	38 +0.018/-0.002	M12	80	70	10	41.0

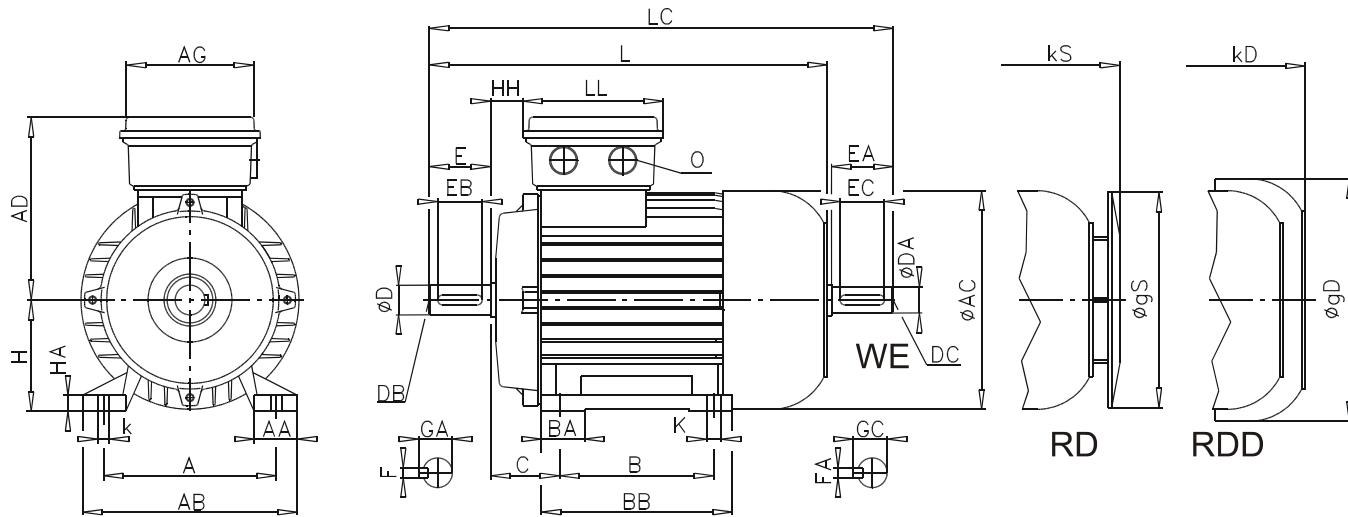
All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions

## WE, RD, RDD - IEC/DIN B3 Foot-Mounted Motor



	A	AA	AB	B	BA	BB	HA	K	k
63S	100	21	120	80	27	105	9	7	12
63L	100	21	120	8/0	27	105	9	7	12
71S	112	24	136	90	24	108	10	9	14
71L	112	24	136	90	24	108	10	9	14
80S	125	30	160	100	30	125	11	9	17
80L	125	30	160	100	30	125	11	9	17
90S	140	34	174	100	35	130	12	9	17
90L	140	34	174	125	35	155	12	9	17
100L	160	37	192	140	30	175	15	12	22
112M	190	40	224	140	34	175	15	12	22
132S	216	58	260	140	37	180	18	14	30
132M	216	58	260	178	37	218	18	14	30

	AC	AD	AG	C	H	HH	L	LC	LL	gD	gS	kD	kS	O
63S	130	115	100	40	63	12	215	238	100	153	123	242	227	M20x1.5
63L	130	115	100	40	63	12	215	238	100	153	123	242	227	M20x1.5
71S	145	124	100	45	71	20	224	268	100	169	138	268	256	M20x1.5
71L	145	124	100	45	71	20	224	268	100	169	138	268	256	M20x1.5
80S	165	142	114	50	80	22	276	309	114	183	156	307	292	M25x1.5
80L	165	142	114	50	80	22	276	309	114	183	156	307	292	M25x1.5
90S	183	147	114	56	90	26	301	348	114	201	176	332	317	M25x1.5
90L	183	147	114	56	90	26	326	373	114	201	176	357	342	M25x1.5
100L	201	169	114	63	100	32	366	422	114	225	194	394	382	M32x1.5
112M	228	179	114	70	112	45	386	440	114	265	218	424	402	M32x1.5
132S	266	204	122	89	132	47	453	551	122	318	257	494	471	M32x1.5
132M	266	204	122	89	132	48	491	589	122	318	257	532	509	M32x1.5

D	DA	DB	DC	E	EA	EB	EC	F	FA	GA	GC
63S	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
63L	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
71S	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
71L	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
80S	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
80L	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
90S	24 +0.009/-0.004	19 +0.009/-0.004	M8	M6	50	40	40	32	8	6	27.0
90L	24 +0.009/-0.004	19 +0.009/-0.004	M8	M6	50	40	40	32	8	6	27.0
100L	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
112M	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
132S	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0
132M	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0

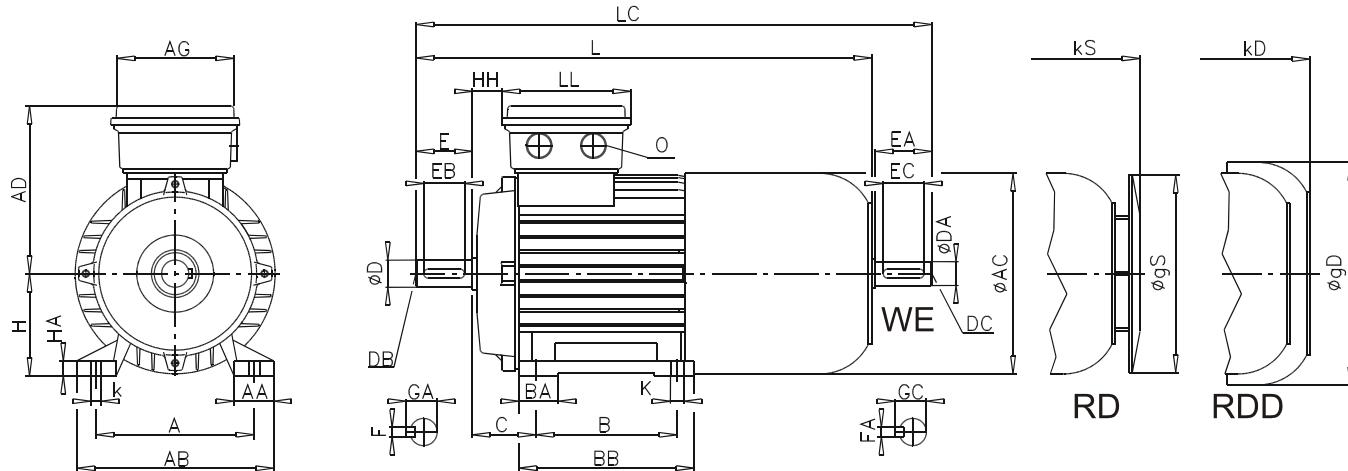
All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions

## IEC/DIN B3 Foot-Mounted Brakemotor - WE, RD, RDD



	A	AA	AB	B	BA	BB	HA	K	k
63S	100	21	120	80	27	105	10	7	12
63L	100	21	120	8/0	27	105	10	7	12
71S	112	24	136	90	24	108	11	9	14
71L	112	24	136	90	24	108	11	9	14
80S	125	30	160	100	30	125	11	9	17
80L	125	30	160	100	30	125	11	9	17
90S	140	34	174	100	35	130	13	9	17
90L	140	34	174	125	35	155	13	9	17
100L	160	37	192	140	30	175	15	12	22
112M	190	40	224	140	34	175	15	12	22
132S	216	58	260	140	37	180	18	14	30
132M	216	58	260	178	37	218	18	14	30

	AC	AD	AG	C	H	HH	L	LC	LL	gD	gS	kD	kS	O
63S	130	123	87	40	63	19	271	298	132	153	123	287	283	M20x1.5
63L	130	123	87	40	63	19	271	298	132	153	123	287	283	M20x1.5
71S	145	133	87	45	71	27	302	329	132	169	138	326	314	M20x1.5
71L	145	133	87	45	71	27	302	329	132	169	138	326	314	M20x1.5
80S	165	143	108	50	80	26	340	374	153	183	156	371	356	M25x1.5
80L	165	143	108	50	80	26	340	374	153	183	156	371	356	M25x1.5
90S	183	148	108	56	90	30	376	414	153	201	176	407	392	M25x1.5
90L	183	148	108	56	90	30	401	439	153	201	176	432	417	M25x1.5
100L	201	159	108	63	100	36	457	517	153	225	194	485	473	M25x1.5
112M	228	170	108	70	112	49	479	536	153	265	218	517	495	M25x1.5
132S	266	196	139	89	132	40	560	650	185	320	257	601	578	M25x1.5
132M	266	196	139	89	132	40	598	688	185	320	257	639	616	M25x1.5

	D	DA	DB	DC	E	EA	EB	EC	F	FA	GA	GC
63S	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5	12.5
63L	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5	12.5
71S	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0	12.5
71L	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0	12.5
80S	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5	16.0
80L	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5	16.0
90S	24 +0.009/-0.004	14 +0.008/-0.003	M8	M5	50	30*	40	32	8	6	27.0	16.0
90L	24 +0.009/-0.004	14 +0.008/-0.003	M8	M5	50	30*	40	32	8	6	27.0	16.0
100L	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0	27.0
112M	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0	27.0
132S	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0	35.0
132M	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0	35.0

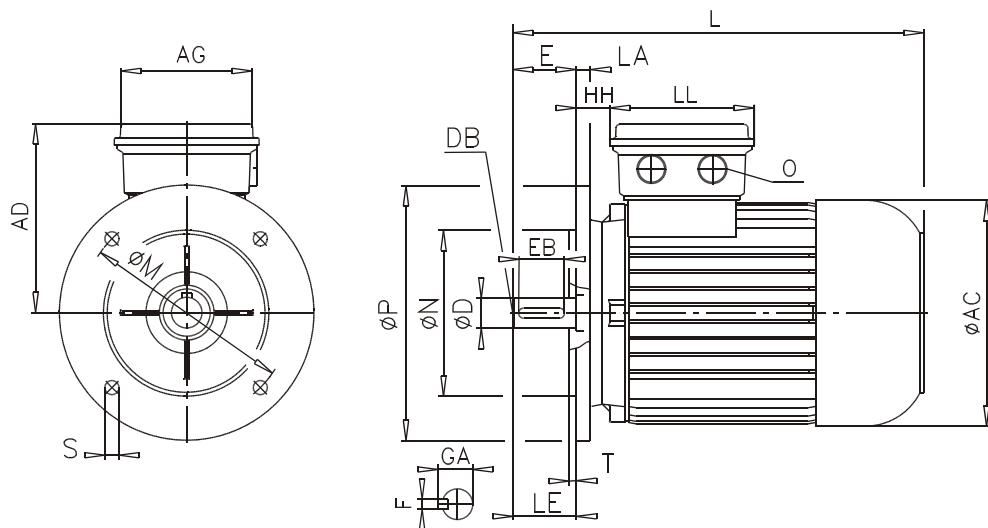
All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions

## IEC/DIN B5 Flange-Mounted Motor



Flange	LA	M	N	P	S	T
63S	A140	10	115	95 +0.013/-0.009	140	9
63L	A140	10	115	95 +0.013/-0.009	140	9
71S	A160	10	130	110 +0.013/-0.009	160	9
71L	A160	10	130	110 +0.013/-0.009	160	9
80S	A200	11	165	130 +0.014/-0.011	200	11
80L	A200	11	165	130 +0.014/-0.011	200	11
90S	A200	11	165	130 +0.014/-0.011	200	11
90L	A200	11	165	130 +0.014/-0.011	200	11
100L	A250	15	215	180 +0.014/-0.011	250	14
112M	A250	15	215	180 +0.014/-0.011	250	14
132S	A300	20	265	230 +0.016/-0.013	300	14
132M	A300	20	265	230 +0.016/-0.013	300	14

AC	AD	AG	HH	L	LE	LL	O
63S	130	115	100	12	215	23	M20x1.5
63L	130	115	100	12	215	23	M20x1.5
71S	145	124	100	20	224	30	M20x1.5
71L	145	124	100	20	224	30	M20x1.5
80S	165	142	114	22	276	40	M25x1.5
80L	165	142	114	22	276	40	M25x1.5
90S	183	147	114	26	301	50	M25x1.5
90L	183	147	114	26	326	50	M25x1.5
100L	201	169	114	32	366	60	M32x1.5
112M	228	179	114	45	386	60	M32x1.5
132S	266	204	122	47	453	80	M32x1.5
132M	266	204	122	48	491	80	M32x1.5

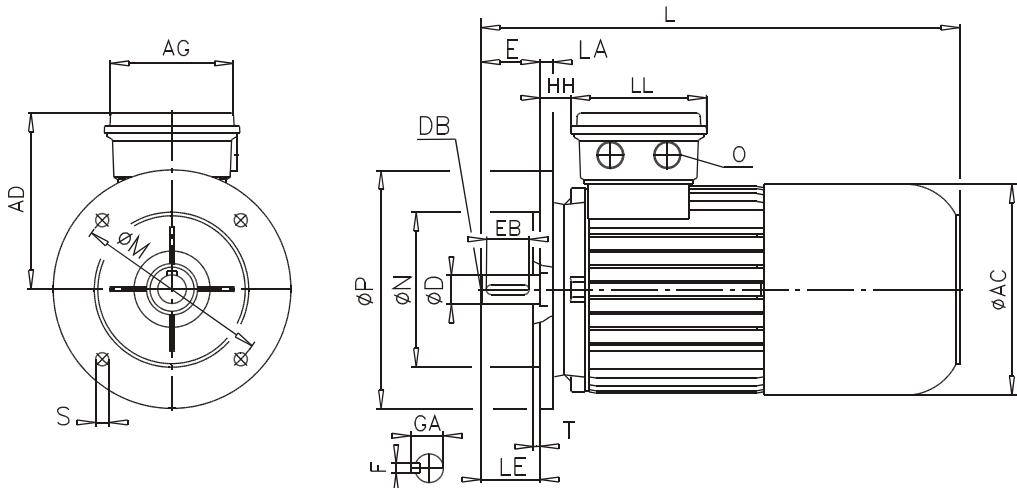
D	DB	E	EB	F	GA
63S	11 +0.008/-0.003	M4	23	16	4
63L	11 +0.008/-0.003	M4	23	16	12.5
71S	14 +0.008/-0.003	M5	30	20	5
71L	14 +0.008/-0.003	M5	30	20	5
80S	19 +0.009/-0.004	M6	40	32	6
80L	19 +0.009/-0.004	M6	40	32	6
90S	24 +0.009/-0.004	M8	50	40	8
90L	24 +0.009/-0.004	M8	50	40	8
100L	28 +0.009/-0.004	M10	60	50	8
112M	28 +0.009/-0.004	M10	60	50	8
132S	38 +0.018/+0.002	M12	80	70	10
132M	38 +0.018/+0.002	M12	80	70	10

All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions IEC/DIN B5 Flange-Mounted Brakemotor



Flange	LA	M	N	P	S	T
63S	A140	10	115	95 +0.013/-0.009	140	9
63L	A140	10	115	95 +0.013/-0.009	140	9
71S	A160	10	130	110 +0.013/-0.009	160	9
71L	A160	10	130	110 +0.013/-0.009	160	9
80S	A200	11	165	130 +0.014/-0.011	200	11
80L	A200	11	165	130 +0.014/-0.011	200	11
90S	A200	11	165	130 +0.014/-0.011	200	11
90L	A200	11	165	130 +0.014/-0.011	200	11
100L	A250	15	215	180 +0.014/-0.011	250	14
112M	A250	15	215	180 +0.014/-0.011	250	14
132S	A300	20	265	230 +0.016/-0.013	300	14
132M	A300	20	265	230 +0.016/-0.013	300	14

AC	AD	AG	HH	L	LE	LL	O
63S	130	123	87	19	271	23	M20x1.5
63L	130	123	87	19	271	23	M20x1.5
71S	145	133	87	27	302	30	M20x1.5
71L	145	133	87	27	302	30	M20x1.5
80S	165	143	108	26	340	40	M25x1.5
80L	165	143	108	26	340	40	M25x1.5
90S	183	148	108	30	376	50	M25x1.5
90L	183	148	108	30	401	50	M25x1.5
100L	201	159	108	36	457	60	M32x1.5
112M	228	170	108	49	479	60	M32x1.5
132S	266	196	139	40	560	80	M32x1.5
132M	266	196	139	40	598	80	M32x1.5

D	DB	E	EB	F	GA
63S	11 +0.008/-0.003	M4	23	16	4 12.5
63L	11 +0.008/-0.003	M4	23	16	4 12.5
71S	14 +0.008/-0.003	M5	30	20	5 16.0
71L	14 +0.008/-0.003	M5	30	20	5 16.0
80S	19 +0.009/-0.004	M6	40	32	6 21.5
80L	19 +0.009/-0.004	M6	40	32	6 21.5
90S	24 +0.009/-0.004	M8	50	40	8 27.0
90L	24 +0.009/-0.004	M8	50	40	8 27.0
100L	28 +0.009/-0.004	M10	60	50	8 31.0
112M	28 +0.009/-0.004	M10	60	50	8 31.0
132S	38 +0.018/-0.002	M12	80	70	10 41.0
132M	38 +0.018/-0.002	M12	80	70	10 41.0

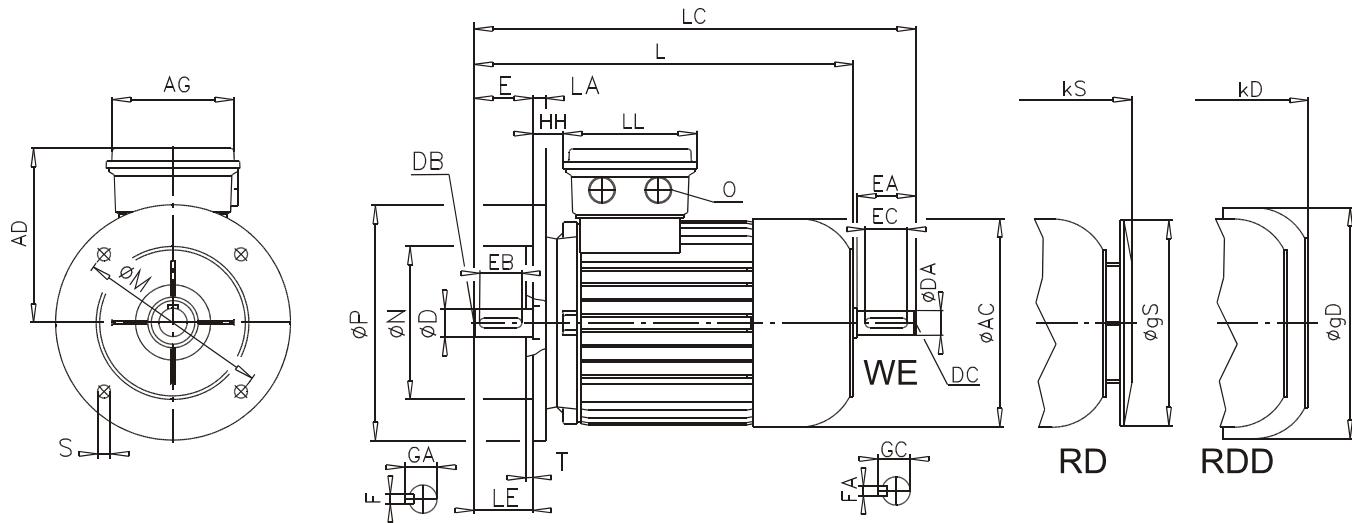
All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions

## WE, RD, RDD - IEC/DIN B5 Flange-Mounted Motor



Flange	LA	M	N	P	S	T	
63S	A140	10	115	95 +0.013/-0.009	140	9	3.0
63L	A140	10	115	95 +0.013/-0.009	140	9	3.0
71S	A160	10	130	110 +0.013/-0.009	160	9	3.5
71L	A160	10	130	110 +0.013/-0.009	160	9	3.5
80S	A200	11	165	130 +0.014/-0.011	200	11	3.5
80L	A200	11	165	130 +0.014/-0.011	200	11	3.5
90S	A200	11	165	130 +0.014/-0.011	200	11	3.5
90L	A200	11	165	130 +0.014/-0.011	200	11	3.5
100L	A250	15	215	180 +0.014/-0.011	250	14	4.0
112M	A250	15	215	180 +0.014/-0.011	250	14	4.0
132S	A300	20	265	230 +0.016/-0.013	300	14	4.0
132M	A300	20	265	230 +0.016/-0.013	300	14	4.0

AC	AD	AG	HH	L	LC	LE	LL	gD	gS	kD	kS	O
63S	130	115	100	12	215	238	23	100	153	123	242	227 M20x1.5
63L	130	115	100	12	215	238	23	100	153	123	242	227 M20x1.5
71S	145	124	100	20	224	268	30	100	169	138	268	256 M20x1.5
71L	145	124	100	20	224	268	30	100	169	138	268	256 M20x1.5
80S	165	142	114	22	276	309	40	114	183	156	307	292 M25x1.5
80L	165	142	114	22	276	309	40	114	183	156	307	292 M25x1.5
90S	183	147	114	26	301	348	50	114	201	176	332	317 M25x1.5
90L	183	147	114	26	326	373	50	114	201	176	357	342 M25x1.5
100L	201	169	114	32	366	422	60	114	225	194	394	382 M32x1.5
112M	228	179	114	45	386	440	60	114	265	218	424	402 M32x1.5
132S	266	204	122	47	453	551	80	122	318	257	494	471 M32x1.5
132M	266	204	122	48	491	589	80	122	318	257	532	509 M32x1.5

D	DA	DB	DC	E	EA	EB	EC	F	FA	GA	GC
63S	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
63L	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
71S	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
71L	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
80S	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
80L	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
90S	24 +0.009/-0.004	19 +0.009/-0.004	M8	M6	50	40	40	32	8	6	27.0
90L	24 +0.009/-0.004	19 +0.009/-0.004	M8	M6	50	40	40	32	8	6	27.0
100L	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
112M	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
132S	38 +0.018/-0.002	32 +0.018/-0.002	M12	M12	80	80	70	70	10	10	41.0
132M	38 +0.018/-0.002	32 +0.018/-0.002	M12	M12	80	80	70	70	10	10	41.0

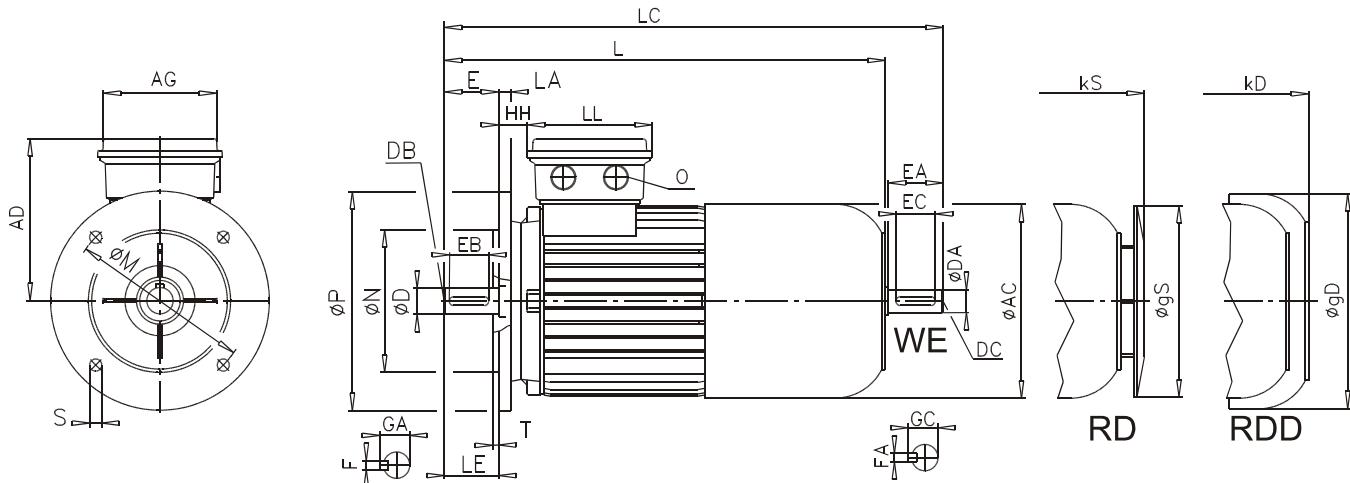
All dimensions shown in [mm]

Dimensions subject to change without notice



## Dimensions

### IEC/DIN B5 Flange-Mounted Brakemotor - WE, RD, RDD



Flange	LA	M	N	P	S	T	
63S	A140	10	115	95 +0.013/-0.009	140	9	3.0
63L	A140	10	115	95 +0.013/-0.009	140	9	3.0
71S	A160	10	130	110 +0.013/-0.009	160	9	3.5
71L	A160	10	130	110 +0.013/-0.009	160	9	3.5
80S	A200	11	165	130 +0.014/-0.011	200	11	3.5
80L	A200	11	165	130 +0.014/-0.011	200	11	3.5
90S	A200	11	165	130 +0.014/-0.011	200	11	3.5
90L	A200	11	165	130 +0.014/-0.011	200	11	3.5
100L	A250	15	215	180 +0.014/-0.011	250	14	4.0
112M	A250	15	215	180 +0.014/-0.011	250	14	4.0
132S	A300	20	265	230 +0.016/-0.013	300	14	4.0
132M	A300	20	265	230 +0.016/-0.013	300	14	4.0

AC	AD	AG	HH	L	LC	LE	LL	gD	gS	kD	kS	O
63S	130	123	87	19	271	298	23	132	153	123	287	283 M20x1.5
63L	130	123	87	19	271	298	23	132	153	123	287	283 M20x1.5
71S	145	133	87	27	302	329	30	132	169	138	326	314 M20x1.5
71L	145	133	87	27	302	329	30	132	169	138	326	314 M20x1.5
80S	165	143	108	26	340	374	40	153	183	156	371	356 M25x1.5
80L	165	143	108	26	340	374	40	153	183	156	371	356 M25x1.5
90S	183	148	108	30	376	414	50	153	201	176	407	392 M25x1.5
90L	183	148	108	30	401	439	50	153	201	176	432	417 M25x1.5
100L	201	159	108	36	457	517	60	153	225	194	485	473 M32x1.5
112M	228	170	108	49	479	536	60	153	265	218	517	495 M32x1.5
132S	266	196	139	40	560	650	80	185	320	257	601	578 M32x1.5
132M	266	196	139	40	598	688	80	185	320	257	639	616 M32x1.5

D	DA	DB	DC	E	EA	EB	EC	F	FA	GA	GC
63S	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
63L	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
71S	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
71L	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
80S	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
80L	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
90S	24 +0.009/-0.004	14 +0.008/-0.003	M8	M5	50	30*	40	32	8	6	27.0
90L	24 +0.009/-0.004	14 +0.008/-0.003	M8	M5	50	30*	40	32	8	6	27.0
100L	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
112M	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
132S	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0
132M	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	35.0

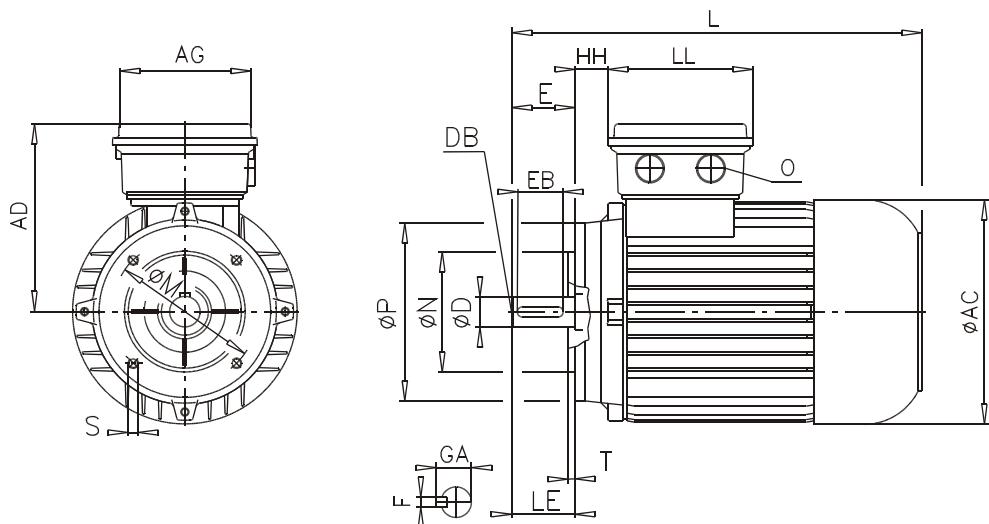
All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions

## IEC/DIN B14-Face Flange Motor



Flange	LA	N	P	S	T
63S+L	C90	8	60 +0.012/-0.007	M5 x 8	2.5
	C105	16	70 +0.012/-0.007	M6 x 16	2.5
	C120	12	80 +0.012/-0.007	M6 x12	3.0
71S+L	C105	12	70 +0.012/-0.007	M6 x12	2.5
	C120	15	80 +0.012/-0.007	M6 x15	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
80S+L	C120	12	80 +0.012/-0.007	M6 x12	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.0
90S+L	C120	15	80 +0.012/-0.007	M6 x15	3.0
	C140	15	95 +0.013/-0.009	M8 x15	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.5
100L	C120	14	80 +0.012/-0.007	M6 x14	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.5
112M	C200	16	130 +0.014/-0.011	M10 x16	4.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	12	110 +0.013/-0.009	M8 x12	3.5
132S+M	C200	17	130 +0.014/-0.011	M10 x17	4.0
	C160	12	110 +0.013/-0.009	M8 x12	3.5
	C200	18	130 +0.014/-0.011	M10 x18	4.0

AC	AD	AG	HH	L	LE	LL	O
63S+L	130	115	100	12	215	23	M20x1.5
71S+L	145	124	100	20	224	30	M20x1.5
80S+L	165	142	114	22	276	40	M25x1.5
90S	183	147	114	26	301	50	M25x1.5
90L	183	147	114	26	326	50	M25x1.5
100L	201	169	114	32	366	60	M32x1.5
112M	228	179	114	45	386	60	M32x1.5
132S	266	204	122	47	453	80	M32x1.5
132M	266	204	122	48	491	80	M32x1.5

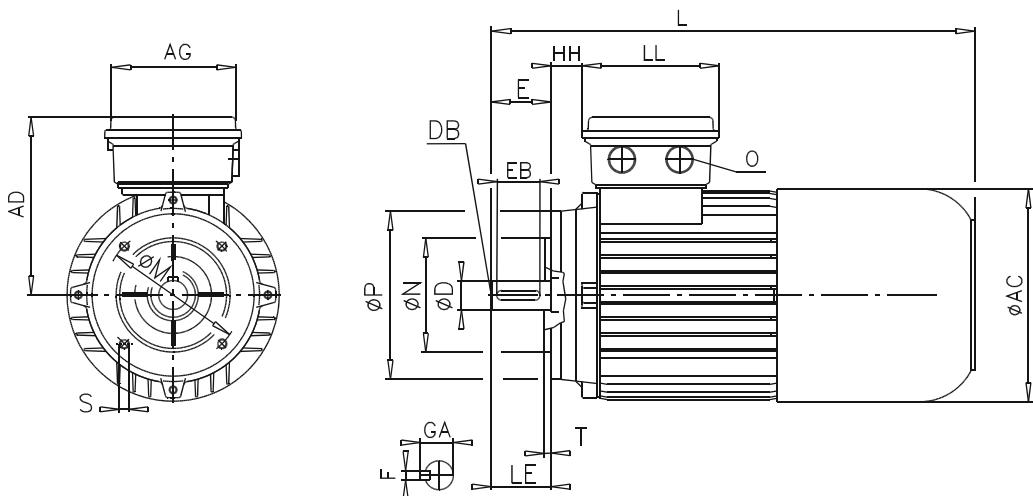
D	DB	E	EB	F	GA
63S+L	11 +0.008/-0.003	M4	23	16	4 12.5
71S+L	14 +0.008/-0.003	M5	30	20	5 16.0
80S+L	19 +0.009/-0.004	M6	40	32	6 21.5
90S	24 +0.009/-0.004	M8	50	40	8 27.0
90L	24 +0.009/-0.004	M8	50	40	8 27.0
100L	28 +0.009/-0.004	M10	60	50	8 31.0
112M	28 +0.009/-0.004	M10	60	50	8 31.0
132S	38 +0.018/+0.002	M12	80	70	10 41.0
132M	38 +0.018/+0.002	M12	80	70	10 41.0

All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions IEC/DIN B14-Face Flange Brakemotor



Flange	LA	N	P	S	T
63S+L	C90	8	60 +0.012/-0.007	M5 x 8	2.5
	C105	16	70 +0.012/-0.007	M6 x 16	2.5
	C120	12	80 +0.012/-0.007	M6 x12	3.0
71S+L	C105	12	70 +0.012/-0.007	M6 x12	2.5
	C120	15	80 +0.012/-0.007	M6 x15	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
80S+L	C120	12	80 +0.012/-0.007	M6 x12	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.0
90S+L	C120	15	80 +0.012/-0.007	M6 x15	3.0
	C140	15	95 +0.013/-0.009	M8 x15	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.5
100L	C120	14	80 +0.012/-0.007	M6 x14	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.5
112M	C200	16	130 +0.014/-0.011	M10 x16	4.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	12	110 +0.013/-0.009	M8 x12	3.5
132S+M	C200	17	130 +0.014/-0.011	M10 x17	4.0
	C160	12	110 +0.013/-0.009	M8 x12	3.5
	C200	18	130 +0.014/-0.011	M10 x18	4.0

AC	AD	AG	HH	L	LE	LL	O
63S+L	130	123	87	19	271	23	M20x1.5
71S+L	145	133	87	27	302	30	M20x1.5
80S+L	165	143	108	26	340	40	M25x1.5
90S	183	148	108	30	376	50	M25x1.5
90L	183	148	108	30	401	50	M25x1.5
100L	201	159	108	36	457	60	M32x1.5
112M	228	170	108	49	479	60	M32x1.5
132S	266	196	139	40	560	80	M32x1.5
132M	266	196	139	40	598	80	M32x1.5

D	DB	E	EB	F	GA
63S+L	11 +0.008/-0.003	M4	23	16	4
71S+L	14 +0.008/-0.003	M5	30	20	5
80S+L	19 +0.009/-0.004	M6	40	32	6
90S	24 +0.009/-0.004	M8	50	40	8
90L	24 +0.009/-0.004	M8	50	40	8
100L	28 +0.009/-0.004	M10	60	50	8
112M	28 +0.009/-0.004	M10	60	50	8
132S	38 +0.018/+0.002	M12	80	70	10
132M	38 +0.018/+0.002	M12	80	70	10

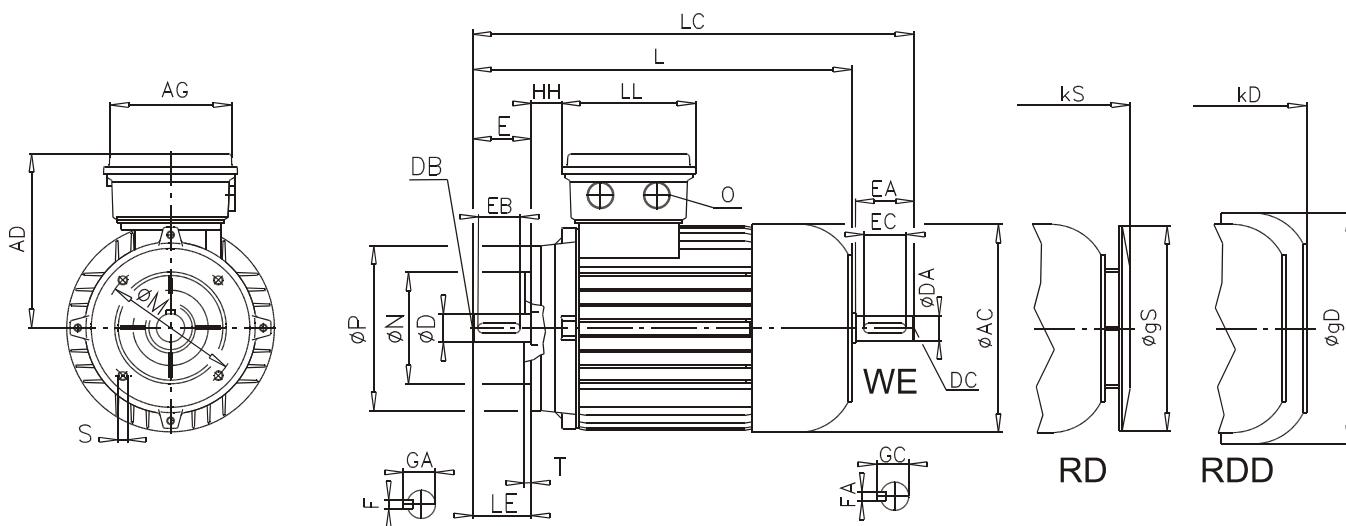
All dimensions shown in [mm]

Dimensions subject to change without notice



## Dimensions

### WE, RD, RDD - IEC/DIN B14-Face Flange Motor



	Flange	LA	N	P	S	T
63S+L	C90	8	60 +0.012/-0.007	90	M5 x 8	2.5
	C105	16	70 +0.012/-0.007	105	M6 x 16	2.5
	C120	12	80 +0.012/-0.007	120	M6 x12	3.0
71S+L	C105	12	70 +0.012/-0.007	105	M6 x12	2.5
	C120	15	80 +0.012/-0.007	120	M6 x15	3.0
	C140	16	95 +0.013/-0.009	140	M8 x16	3.0
80S+L	C120	12	80 +0.012/-0.007	120	M6 x12	3.0
	C140	16	95 +0.013/-0.009	140	M8 x16	3.0
	C160	16	110 +0.013/-0.009	160	M8 x16	3.0
90S+L	C120	15	80 +0.012/-0.007	120	M6 x15	3.0
	C140	15	95 +0.013/-0.009	140	M8 x15	3.0
	C160	16	110 +0.013/-0.009	160	M8 x16	3.5
100L	C120	14	80 +0.012/-0.007	120	M6 x14	3.0
	C140	16	95 +0.013/-0.009	140	M8 x16	3.0
	C160	16	110 +0.013/-0.009	160	M8 x16	3.5
112M	C200	16	130 +0.014/-0.011	200	M10 x16	4.0
	C140	16	95 +0.013/-0.009	140	M8 x16	3.0
	C160	12	110 +0.013/-0.009	160	M8 x12	3.5
132S+M	C200	17	130 +0.014/-0.011	200	M10 x17	4.0
	C160	12	110 +0.013/-0.009	160	M8 x12	3.5
132M	C200	18	130 +0.014/-0.011	200	M10 x18	4.0

	AC	AD	AG	HH	L	LC	LE	LL	gD	gS	kD	kS	O
63S+L	130	115	100	12	215	238	23	100	153	123	242	227	M20x1.5
71S+L	145	124	100	20	224	268	30	100	169	138	268	256	M20x1.5
80S+L	165	142	114	22	276	309	40	114	183	156	307	292	M25x1.5
90S	183	147	114	26	301	348	50	114	201	176	332	317	M25x1.5
90L	183	147	114	26	326	373	50	114	201	176	357	342	M25x1.5
100L	201	169	114	32	366	422	60	114	225	194	394	382	M32x1.5
112M	228	179	114	45	386	440	60	114	265	218	424	402	M32x1.5
132S	266	204	122	47	453	551	80	122	318	257	494	471	M32x1.5
132M	266	204	122	48	491	589	80	122	318	257	532	509	M32x1.5

D	DA	DB	DC	E	EA	EB	EC	F	FA	GA	GC
63S+L	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
71S+L	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
80S+L	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
90S	24 +0.009/-0.004	19 +0.009/-0.004	M8	M6	50	40	40	32	8	6	27.0
90L	24 +0.009/-0.004	19 +0.009/-0.004	M8	M6	50	40	40	32	8	6	27.0
100L	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
112M	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
132S	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0
132M	38 +0.018/+0.002	32 +0.018/+0.002	M12	M12	80	80	70	70	10	10	41.0

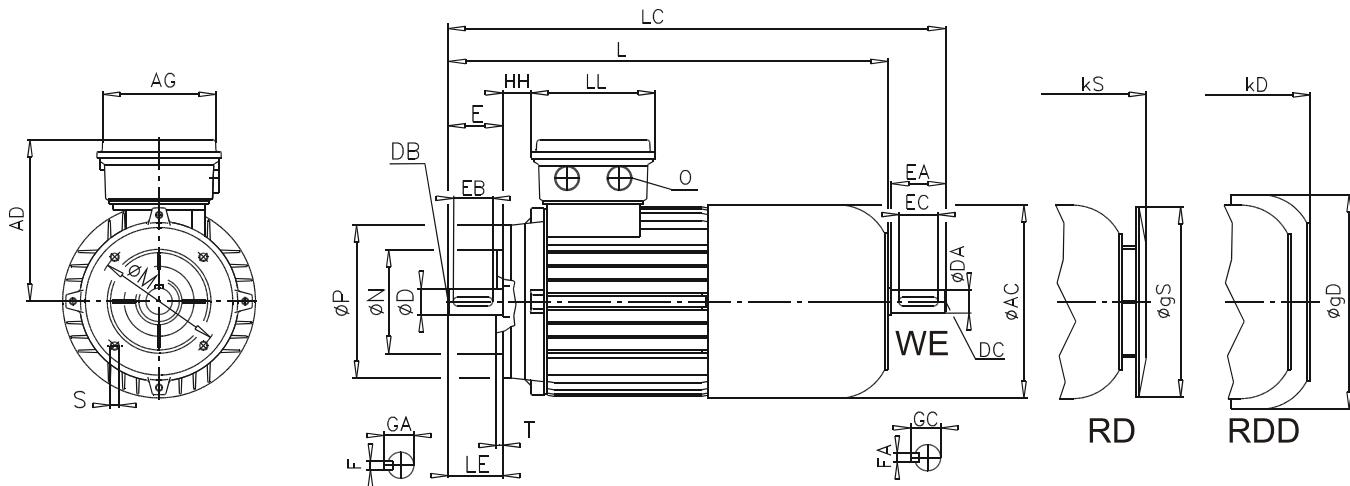
All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions

## IEC/DIN B14-Face Flange Brakemotor - WE, RD, RDD



Flange	LA	N	P	S	T
63S+L	C90	8	60 +0.012/-0.007	M5 x 8	2.5
	C105	16	70 +0.012/-0.007	M6 x 16	2.5
	C120	12	80 +0.012/-0.007	M6 x12	3.0
71S+L	C105	12	70 +0.012/-0.007	M6 x12	2.5
	C120	15	80 +0.012/-0.007	M6 x15	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
80S+L	C120	12	80 +0.012/-0.007	M6 x12	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.0
90S+L	C120	15	80 +0.012/-0.007	M6 x15	3.0
	C140	15	95 +0.013/-0.009	M8 x15	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.5
100L	C120	14	80 +0.012/-0.007	M6 x14	3.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	16	110 +0.013/-0.009	M8 x16	3.5
112M	C200	16	130 +0.014/-0.011	M10 x16	4.0
	C140	16	95 +0.013/-0.009	M8 x16	3.0
	C160	12	110 +0.013/-0.009	M8 x12	3.5
132S+M	C200	17	130 +0.014/-0.011	M10 x17	4.0
	C160	12	110 +0.013/-0.009	M8 x12	3.5
	C200	18	130 +0.014/-0.011	M10 x18	4.0

AC	AD	AG	HH	L	LC	LE	LL	gD	gS	kD	kS	O
63S+L	130	123	87	19	271	298	23	132	153	123	287	283 M20x1.5
71S+L	145	133	87	27	302	329	30	132	169	138	326	314 M20x1.5
80S+L	165	143	108	26	340	374	40	153	183	156	371	356 M25x1.5
90S	183	148	108	30	376	414	50	153	201	176	407	392 M25x1.5
90L	183	148	108	30	401	439	50	153	201	176	432	417 M25x1.5
100L	201	159	108	36	457	517	60	153	225	194	485	473 M32x1.5
112M	228	170	108	49	479	536	60	153	265	218	517	495 M32x1.5
132S	266	196	139	40	560	650	80	185	320	257	601	578 M32x1.5
132M	266	196	139	40	598	688	80	185	320	257	639	616 M32x1.5

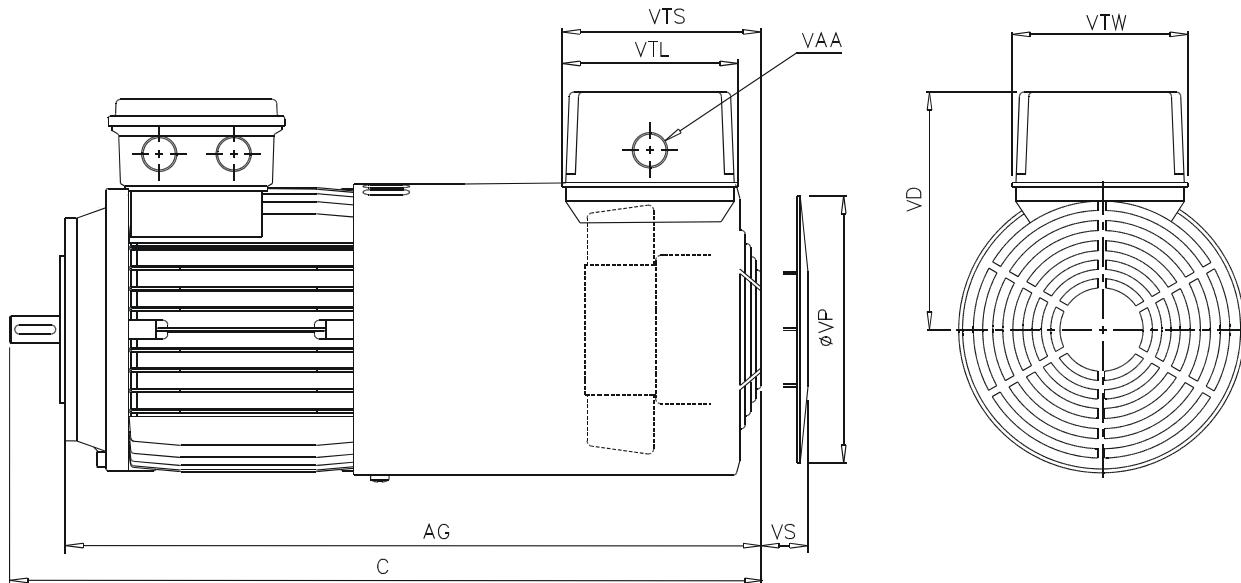
D	DA	DB	DC	E	EA	EB	EC	F	FA	GA	GC
63S+L	11 +0.008/-0.003	11 +0.008/-0.003	M4	M4	23	23	16	16	4	4	12.5
71S+L	14 +0.008/-0.003	11 +0.008/-0.003	M5	M4	30	23	20	16	5	4	16.0
80S+L	19 +0.009/-0.004	14 +0.008/-0.003	M6	M5	40	30	32	20	6	5	21.5
90S	24 +0.009/-0.004	14 +0.008/-0.003	M8	M5	50	30*	40	32	8	6	27.0
90L	24 +0.009/-0.004	14 +0.008/-0.003	M8	M5	50	30*	40	32	8	6	27.0
100L	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
112M	28 +0.009/-0.004	24 +0.009/-0.004	M10	M8	60	50	50	40	8	8	31.0
132S	38 +0.018/-0.002	32 +0.018/-0.002	M12	M12	80	80	70	70	10	10	41.0
132M	38 +0.018/-0.002	32 +0.018/-0.002	M12	M12	80	80	70	70	10	10	35.0

All dimensions shown in [mm]

Dimensions subject to change without notice



# Dimensions F & FC Ventilator Fans



## NEMA C-Face Motors and Brakemotors

Option F & FC	Motor						Motor + IG		Brakemotor		Brakemotor+IG	
	VAA	VD	VP	VS	VTL	VTS	AG	C	AG	C	AG	C
63S -56C	M16x1.5	4.67	5.45	1.52	3.89	4.39	4.30	10.83	12.89	13.78	15.84	12.28
63L -56C	M16x1.5	4.67	5.45	1.52	3.89	4.39	4.30	10.83	12.89	13.78	15.84	12.28
71S -56C	M16x1.5	5.04	6.15	1.52	3.89	4.39	4.30	10.94	13.00	13.31	15.37	12.56
71L -56C	M16x1.5	5.04	6.15	1.52	3.89	4.39	4.30	10.94	13.00	13.31	15.37	14.62
80S -56C	M16x1.5	5.41	6.97	1.64	3.89	4.39	4.30	12.20	14.26	14.96	17.02	14.96
80L -143TC	M16x1.5	5.41	6.97	1.64	3.89	4.39	4.30	12.20	14.32	14.96	17.08	17.02
90S -145TC	M16x1.5	5.82	7.70	1.23	3.89	4.80	4.30	13.54	15.66	16.89	19.01	16.81
90L -145TC	M16x1.5	5.82	7.70	1.23	3.89	4.80	4.30	13.54	15.66	16.89	19.01	16.81
100L -182TC	M16x1.5	6.19	8.61	1.15	3.89	4.80	4.30	14.76	17.38	18.31	20.93	18.46
100L -184TC	M16x1.5	6.19	8.61	1.15	3.89	4.80	4.30	14.76	17.38	18.31	20.93	18.46
112M -184TC	M16x1.5	6.68	10.20	1.35	3.89	4.80	4.30	15.16	17.78	18.70	21.32	19.06
132S -213TC	M16x1.5	7.50	12.30	1.02	3.89	5.20	4.30	19.21	22.33	22.56	25.68	22.95
132M -215TC	M16x1.5	7.50	12.30	1.02	3.89	5.20	4.30	19.21	22.33	22.56	25.68	22.95
132S -215TC	M16x1.5	7.50	12.30	1.02	3.89	5.20	4.30	19.21	22.33	22.56	25.68	22.95

Dimensions in [in] – Dimension VAA is a metric M thread

## IEC/DIN Foot & Flange Motors and Brakemotors

Option F & FC	Motor						Motor + IG		Brakemotor		Brakemotor+IG	
	VAA	VD	VP	VS	VTL	VTS	AG	C	AG	C	AG	C
63S+L	M16x1.5	114	133	37	95	107	105	275	298	350	373	312
71S+L	M16x1.5	123	150	37	95	107	105	278	308	338	368	319
80S+L	M16x1.5	132	170	40	95	107	105	306	346	376	416	376
90S *	M16x1.5	142	188	30	95	117	105	315	365	400	450	398
90S+L	M16x1.5	142	188	30	95	117	105	340	390	425	475	423
100L	M16x1.5	151	210	28	95	117	105	371	431	461	521	465
112M	M16x1.5	163	249	33	95	117	105	385	445	475	535	525
132S *	M16x1.5	183	300	25	95	127	105	443	523	528	608	538
132S+M	M16x1.5	183	300	25	95	127	105	481	561	566	646	576

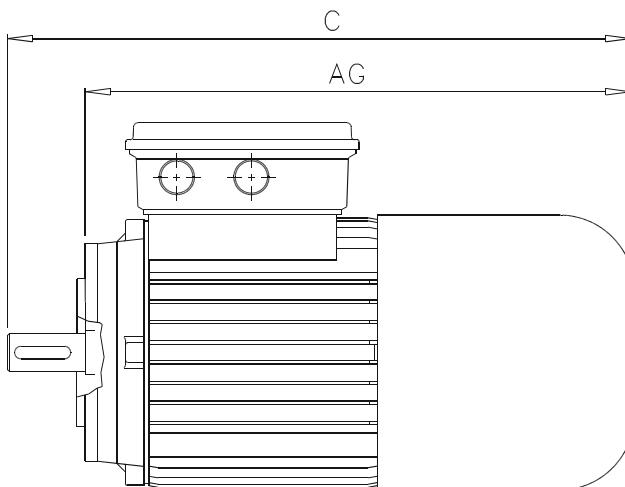
Dimensions in [mm]

\* B3 – Footed motor

Dimensions subject to change without notice



## Dimensions Incremental Encoder IG



### NEMA C-Face Motors and Brakemotors

Option IG	Motor+IG		Motor+F + IG		Brakemotor+IG		Brakemotor+F+IG	
	AG	C	AG	C	AG	C	AG	C
63S -56C	9.76	11.82	13.78	15.84	12.20	14.26	14.65	16.71
63L -56C	9.76	11.82	13.78	15.84	12.20	14.26	14.65	16.71
71S -56C	10.63	12.69	13.31	15.37	13.62	15.68	15.31	17.37
71L -56C	10.63	12.69	13.31	15.37	13.62	15.68	15.31	17.37
80S -56C	11.85	13.91	14.96	17.02	14.17	16.23	17.32	19.38
80L -143TC	11.85	13.97	14.96	17.08	14.17	16.29	17.32	19.44
90S -145TC	13.86	15.98	16.89	19.01	16.73	18.85	19.57	21.69
90L -145TC	13.86	15.98	16.89	19.01	16.73	18.85	19.57	21.69
100L -182TC	14.92	17.54	18.31	20.93	18.58	21.20	21.22	23.84
100L -184TC	14.92	17.54	18.31	20.93	18.58	21.20	21.22	23.84
112M -184TC	15.51	18.13	18.70	21.32	19.02	21.64	22.01	24.63
132S -213TC	18.94	22.06	22.56	25.68	23.23	26.35	26.50	29.62
132M -215TC	18.94	22.06	22.56	25.68	23.23	26.35	26.50	29.62

Dimensions in [in]

### IEC/DIN Foot & Flange Motors and Brakemotors

Option IG	Motor+IG		Motor + F+IG		Brakemotor+IG		Brakemotor+F+IG	
	AG	C	AG	C	AG	C	AG	C
63S+L	248	271	350	373	310	333	373	396
71S+L	270	300	338	368	346	376	411	441
80S+L	297	337	376	416	356	396	439	479
90S *	323	373	400	450	396	446	471	521
90S+L	348	398	425	475	421	471	499	549
100L	375	435	461	521	468	528	537	597
112M	394	454	475	535	483	543	559	619
132S *	436	516	528	608	545	625	635	715
132S+M	474	554	566	646	583	663	673	753

Dimensions in [mm]

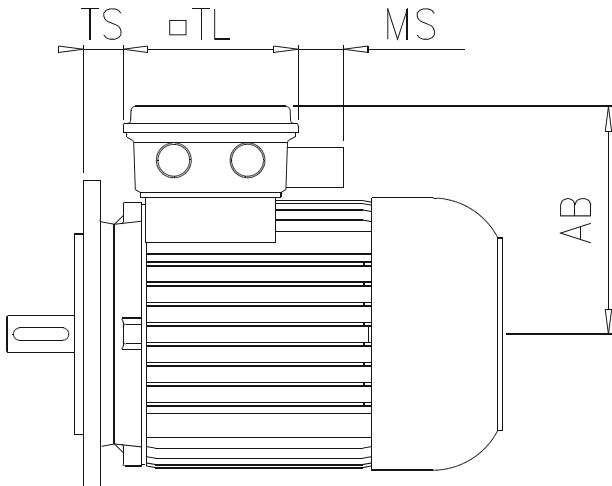
\* B3 – Footed motor

Dimensions subject to change without notice



# Dimensions

## MS Power Plug Connector



### NEMA C-Face Motors and Brakemotors

#### Option MS

	NORD Harting Plug	AB	MS	TL	TS
63S -56C	HAN 10 ES M - 2 lever	5.51	1.81	4.49 x 4.49	0.20
63L -56C	HAN 10 ES M - 2 lever	5.51	1.81	4.49 x 4.49	0.20
71S -56C	HAN 10 ES M - 2 lever	5.87	1.81	4.49 x 4.49	0.51
71L -56C	HAN 10 ES M - 2 lever	5.87	1.81	4.49 x 4.49	0.51
80S -56C	HAN 10 ES M - 2 lever	6.62	1.81	4.49 x 4.49	1.02
80L -143TC	HAN 10 ES M - 2 lever	6.62	1.81	4.49 x 4.49	1.02
90S -145TC	HAN 10 ES M - 2 lever	6.42	1.81	4.49 x 4.49	1.18
90L -145TC	HAN 10 ES M - 2 lever	6.42	1.81	4.49 x 4.49	1.18
100L -182TC	HAN 10 ES M - 2 lever	6.85	1.81	4.49 x 4.49	1.42
100L -184TC	HAN 10 ES M - 2 lever	6.85	1.81	4.49 x 4.49	1.42
112M -184TC	HAN 10 ES M - 2 lever	7.24	1.81	4.49 x 4.49	1.77

Dimensions in [in]

### IEC/DIN Foot & Flange Motors and Brakemotors

#### Option MS

	Harting Plug	AB	MS	TL	TS
63S+L	HAN 10 ES M - 2 lever	140	46	114 x 114	5
71S+L	HAN 10 ES M - 2 lever	149	46	114 x 114	13
80S+L	HAN 10 ES M - 2 lever	158	46	114 x 114	22
90S+L	HAN 10 ES M - 2 lever	163	46	114 x 114	26
100L	HAN 10 ES M - 2 lever	174	46	114 x 114	32
112M	HAN 10 ES M - 2 lever	184	46	114 x 114	45

Dimensions in [mm]

Dimensions subject to change without notice



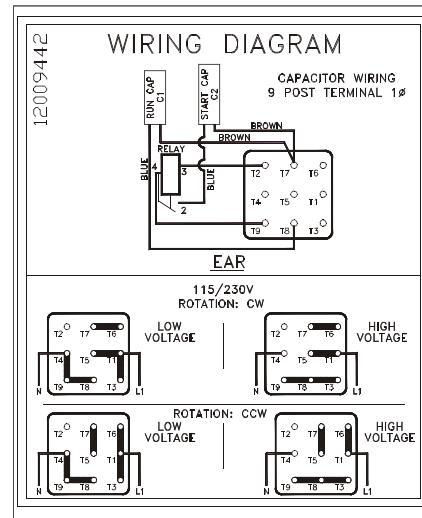
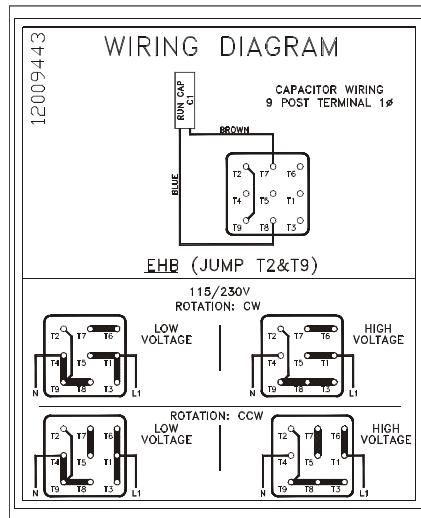
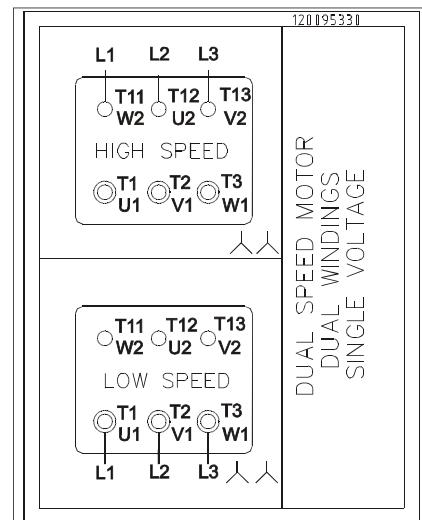
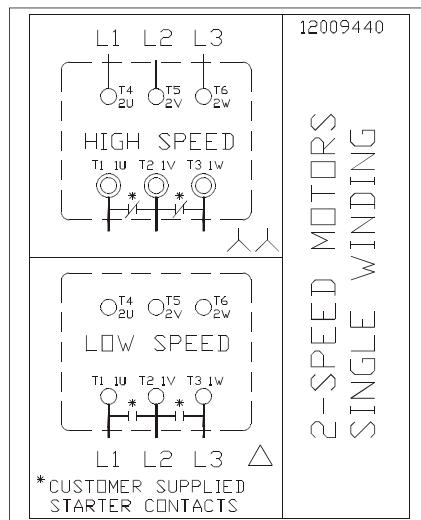
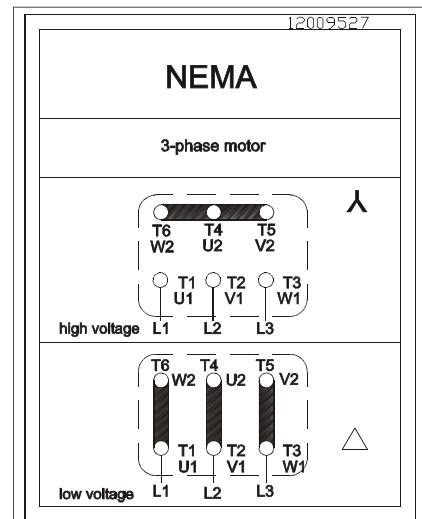
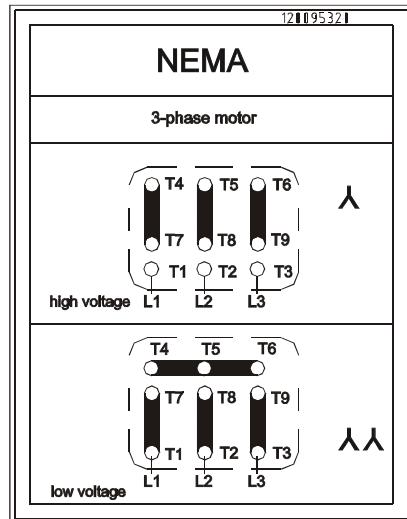
# Connection Diagrams Engineering Information





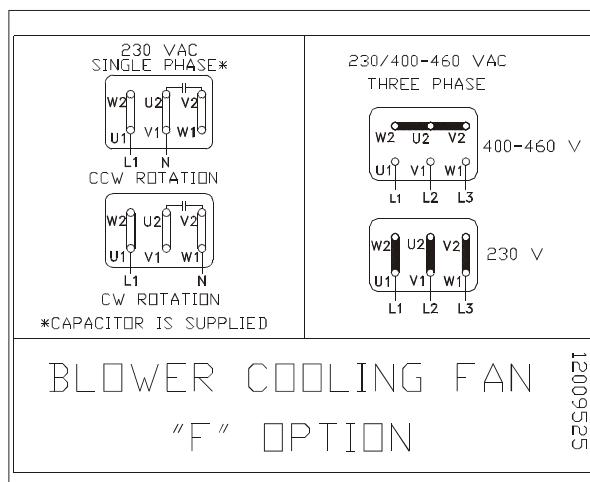
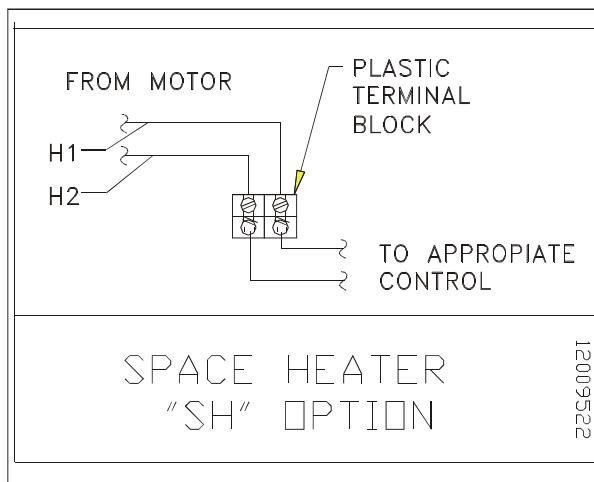
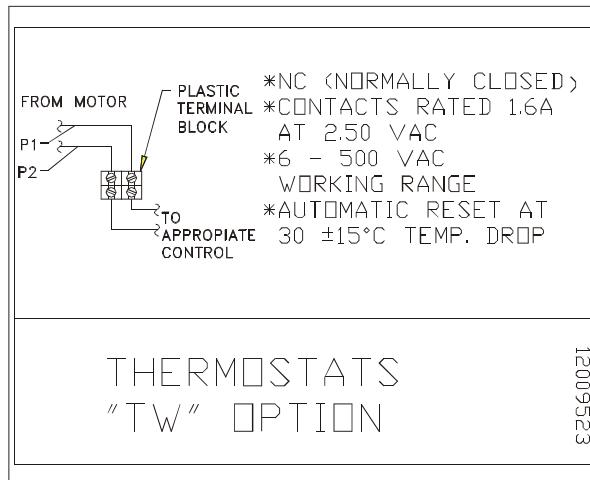
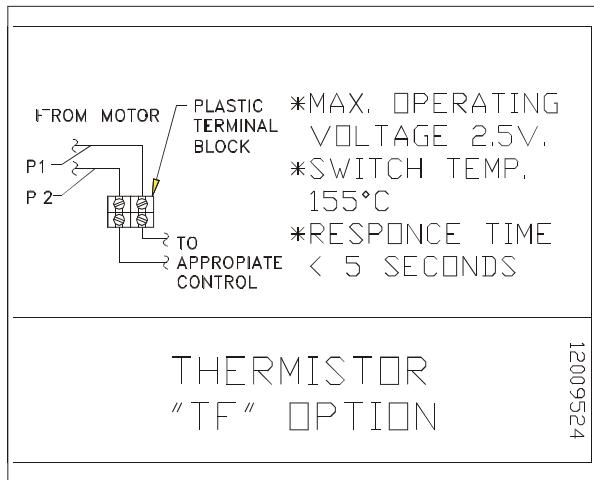
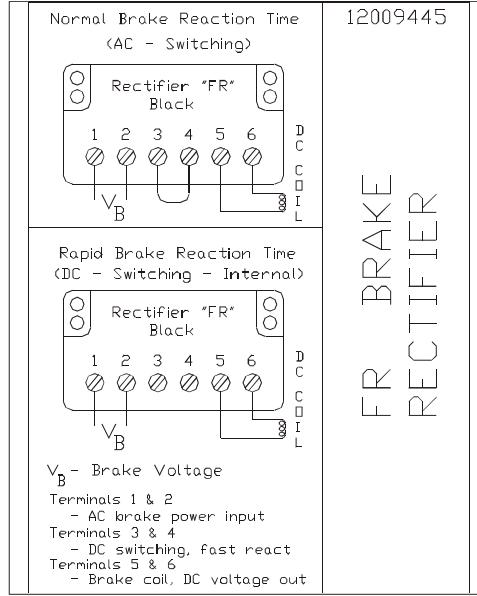
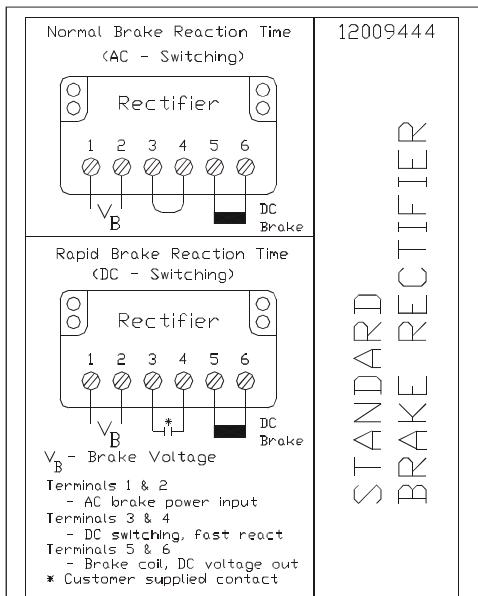
# Connection Diagrams

## Engineering Information





# Connection Diagrams Engineering Information





# Connection Diagrams

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<b>India</b>	<b>SUNIRON Technique Pvt. Ltd.</b> <b>NORD + SUNIRON</b> C-202 Bageshi Raagdari Complex D.P. Road, Aundh Pune Maharashtra - 411 007	phone: +91-20-5889373 fax: +91-20-5888872 suniron@vsnl.com	<b>Thailand</b>	<b>Uni-Drive Co., Ltd</b> 41 Lertpanya Building 17th Floor R. 1702, Soi Lertpanya, Sri Ayuthaya Road, Rajthavee Bangkok 10400	phone: +66-2-642 6870-1 fax: +66-2-642 6872 info@nord-sg.com
<b>Korea</b>	<b>Sungwon Magnetics Company</b> No. 302, Dongho Bldg, 1422-10, Kwanyang-Dong, Dongan-Ku, Anyang Korea (431-807) www.sungwonnagnet.com	phone: +82-31-421-3193 fax: +82-31-422-1754 sungwon@ktnet.co.kr	<b>Thailand</b>	<b>Exclusive distributor for inverter product in Thailand I MECHANICS CO., LTD.</b> 163 Kriangkrai Building, Wisutkasat Road Banpanthom, Pranakorn Bangkok 10200 Thailand	phone: +66-2-281 8111 fax: +66-2-281 7600 Sittipong@imechanics.co.th
<b>Korea</b>	<b>Seoul Euromotors Works</b> 301 Block 5Ra Shihwa Industrial Complex No. 313 672 Seonggok, Ansan, Kyoggi-do	phone: +82-31-432-6098 fax: +82-31-432-0281 euromotors@euromotors.co.kr	<b>Taiwan</b>	<b>TACT Trans-Asia Consulting &amp; Trade Co., Ltd.</b> Suite 1007, No. 148, SEC 4 Chung Hsiao East Road Taipai, Taiwan R.O.C.	phone: +886-2-2781 8588 fax: +886-2-2752 2436 info@nord-de.com
<b>Sri Lanka</b>	<b>Southern Automation Systems (Pvt) Ltd</b> 593, Maradana Road Colombo 10	phone: +94-75-343190 fax: +94-75-343191 dhammi@eureka.lk	<b>Vietnam</b>	<b>Viet Ha Co., Ltd.</b> 73 Lang Ha Street Ba dinh Dist., Hanoi City	phone: +84-4-8562 885 fax: +84-4-8562 892 viethaco@hn.vnn.vn
<b>Malaysia</b>	<b>GNE Corporation SDN. BHD (General Agent)</b> 2,4,6 & 8, Jalan PS 1/7, Bandar Pinggiran Subang Seksyen 1, 40150 Shah Alam, Selangor D.E.	phone: +60-3-78 47 50 48 fax: +60-3-78 47 68 89 gnek@tm.net.my			
<b>Malaysia</b>	<b>SAKTI SURIA SDN BHD (Palm Oil Agent)</b> No. 17 & 19, Jalan TPP 5 / 13 Taman Perindustrian Puchong Seksyen 5, 47100 Puchong Selangor	phone: +60-3-80 61 68 68 fax: +60-3-80 61 73 03 saktisu@tm.net.my			
<b>Philippines</b>	<b>Mheco Mechanical Handling Equipment Company Inc</b> 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 mheco@skyinet.net			



# International Contacts

# Australia / South America Middle East

## Australia / New Zealand

Australia	<b>CMG Pty Ltd.</b> 19 Corporate Avenue Rowville, VIC 3178 PO Box 2340, Rowville, VIC 3178 - Australia	phone: +61-3-9237 4000 fax: +61-3-9237 4010 Kerry.Okeeffe@cmggroup.com.au
New Zealand	<b>CMG Electric Motors (NZ) Limited</b> 2 Ross Reid Avenue East Tamaki, Auckland New Zealand	phone: +64-9-273 9162  fax: +64-9-273 9062 Kerry.Okeeffe@cmggroup.com.au

## Middle East

Emirates	<b>Eight Trading</b> P.O. Box 32095 Dubai/U.A.E.	phone: +971-4-336 9974 fax: +971-4-335 9116 eight@emirates.net.ae
Bahrain	<b>Eight Trading</b> P.O. Box 32095 Dubai/U.A.E.	phone: +971-4-336 9974 fax: +971-4-335 9116 eight@emirates.net.ae
Iran	<b>Paralog Engineering Co. Ltd.</b> P.O.Box 19395-7366 No. 6, Shangarf St. Mirdamad Blvd. Tehran - 15 489	phone: +98-21-2256003 fax: +98-21-2256005 VTIR@neda.net
Jordan	<b>ALGHANEM Trading &amp; Contracting Co.</b> Ommaya Str., Al-Abdali P.O.Box 7109 Amman 11118 - Jordan	phone: 962-6-5696500  fax: 962-6-5696560 / 5696590 sghanem@gocom.jo
Kuwait	<b>Eight Trading</b> P.O. Box 32095 Dubai/U.A.E.	phone: +971-4-336 9974 fax: +971-4-335 9116 eight@emirates.net.ae
Lebanon	<b>Hosny Homany</b> P.O. Box 102 Ghobery, Beirut	phone: +961-5-432271 fax: +961-5-432270 hhomany@cyberia.net.lb
Oman	<b>Eight Trading</b> P.O. Box 32095 Dubai/U.A.E.	phone: +971-4-336 9974 fax: +971-4-335 9116 eight@emirates.net.ae
Qatar	<b>Eight Trading</b> P.O. Box 32095 Dubai/U.A.E.	phone: +971-4-336 9974 fax: +971-4-335 9116 eight@emirates.net.ae
Saudi Arabia	<b>Al-Musairiey Industrial Equipment. Co.</b> P.O. Box 40966 Riyadh - 11511	phone: +966-1-448 3808  fax: +966-1-446 9244 info@almusairiey.com
Syria	<b>Elias Brothers Co.</b> Al' Kowatly St. 2 P.O. Box 4282 Homs/Syria	phone: +963-31-423 975 0.976 fax: +963-31-227 374 eliasbrothersco@mail.sy

## South America

Argentina	<b>Chilicote S.A.</b> Avda. Julio A. Roca 546 1067 Buenos Aires Argentina	phone: +54-11-4343 8469 fax: +54-11-4331 4278 chilicote@overnet.com.ar
Brazil	<b>Nord Motoredutores do Brasil Ltda</b> Rua Epicuro, 128 Casa Verde - São Paulo - SP Brasil CEP 02552-030	phone: +55-11-3951-5855  fax: +55-11-3955-2144 info@nord-br.com
Chile	<b>TDC Techno Drive Center S.A.</b> Los Leones No. 133-2° Piso Providencia Santiago de Chile Chile	phone: +56-2-234 1684 fax: +56-2-334 9633 tdc@technodrive.cl
Colombia	<b>Variadores S.A.</b> Carrera 50 (Aut. Sur) No. 2 Sur 271 - A.A. 053811 Medellin Colombia	phone: +57-94-2552200 fax: +57-94-2557450 variadores@epm.net.co
Venezuela	<b>VENRIAL, C.A.</b> Apartado Postal 672 YV 8050 Puerto Ordaz / Edo. Bolívar	phone: +58-286-923 4259 fax: +58-286-923 1995 venrialca@telcel.net.ve



## International Contacts

### Notes

# 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.

### 2. CONFIRMATION

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

### 3. PRICES

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

### 4. LIMITED WARRANTY

Seller warrants the goods sold hereunder to be free from defects in material and workmanship under normal use and service not arising from misuse, negligence, or accident, including but not limited to the use, installation, and transportation of the goods by the Buyer, its agents, servants, employees, or by carriers. Such obligations under this warranty are limited to remedying any deficiencies in the goods at Waunakee, Wisconsin, or at such place or places in the United States of America as may be designated by Seller. THIS WARRANTY SHALL PERTAIN TO ANY PART OR PARTS OF ANY GOODS TO WHICH BUYER OR ITS ASSIGNS HAS GIVEN WRITTEN NOTICE OF CLAIMED DEFECTS TO SELLER. NORD GEAR CORP. WARRANTS ITS PRODUCTS AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF 12 MONTHS FROM DATE OF INSTALLATION OR 18 MONTHS FROM DATE OF SHIPMENT WHICHEVER COMES FIRST ON ALL COMPONENTS, 36 MONTHS FROM DATE OF INVOICE OR 24 MONTHS FROM DATE OF INSTALLATION WHICHEVER COMES FIRST ON GEARS AND HOUSINGS ONLY. PARTS WHICH ARE SUBJECT TO OPERATIONAL WEAR AND TEAR, SUCH AS BELTS & TRACTION DISCS, ARE NOT COVERED BY THE LIMITED WARRANTY. Buyer shall be required to furnish Seller with details of such defects and this warranty shall be effective as to such goods which Seller's examination shall disclose to its satisfaction to have been defective and which at Seller's option shall promptly thereafter be returned to Seller or its nominees. 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 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. 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. Shipping dates are estimates unless parties expressly agree on time of the essence.

### 6. FORCE MAJEURE

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

### 7. SHIPMENT AS UNIT

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

### 8. BUYER'S REFUSAL OF DELIVERY

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

### 9. GOODS IN TRANSIT

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

### 10. DELIVERY

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

### 11. PAYMENT OF PURCHASE PRICE

Time of payment is of the essence under the contract. Upon default in any of the terms of the contract, or failure to comply with any of the conditions thereof, or upon seizure of the property under execution or other legal process, or if the Buyer becomes bankrupt or insolvent, or any petition for reorganization or for 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 relaking, repairing, storing and selling the goods, reasonable attorney's fees included, and then shall be applied to the payment of the balance due under the contract. Any surplus amount shall be paid to the Buyer. If a deficiency results after the resale, the Buyer agrees to pay such forthwith, together with reasonable attorney's fees, for the recovery of the goods incurred by the Seller. If upon the Buyer's default, the Seller elects not to resell any goods which it may repossess, then the cost of repossession, including reasonable attorney's fees, shall forthwith be due and payable from Buyer to Seller.

### 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 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 United States currency, with an accredited United States 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

Seller 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 indemnify and save Seller harmless from any liability or obligation with regard to any personal injuries or property damages directly or indirectly connected with the operation of the equipment. Buyer further agrees to notify Seller promptly and in any event not later than ten (10) days after notice or knowledge of any accident or malfunction involving Seller's equipment which has caused personal injury or property damages and to cooperate fully with Seller in investigating and determining the causes of such accident and malfunction. In the event that Buyer fails to give such notice to Seller or to cooperate with Seller, Buyer shall be obligated to indemnify and save Seller harmless from any such claims arising from such accident.

### 22. MISCELLANEOUS PROVISIONS

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

### 23. JURISDICTION

Any dispute arising under the contract may be brought before any court of proper jurisdiction within the United States.

### 24. NON ASSIGNMENT BY BUYER

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

### 25. APPLICABLE LAW

All contracts are governed by the applicable laws of the State of Wisconsin.

# NORD GEAR LIMITED

## Terms and Conditions of Sale

### 1. CONTRACT

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

### 2. CONFIRMATION

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

### 3. PRICES

Prices shown are list prices and may be subject to applicable discounts. Unless otherwise agreed upon in writing, prices are FOB factory 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 in which at Seller's option shall promptly thereafter be returned to Seller or to 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 repair of such goods to Seller shall be borne by Buyer. Goods sold but not manufactured by the Seller are being warranted as to defects in material and workmanship consistent with the limited warranty policy of the original manufacturer of the goods and if there is not such a limited warranty policy, the warranty shall be limited to the provisions of the preceding paragraph of Article 4 herein. Standards for the operating characteristics of the gearboxes and the gearmotors are in conformity with Seller's test. THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. THE SELLER DOES NOT ASSUME, NOR DOES IT AUTHORIZE ANY PERSON TO ASSUME, ON ITS BEHALF, ANY OTHER OBLIGATION OR LIABILITY.

### 5. SHORTAGE AND NONCONFORMITY

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

### 6. FORCE MAJEURE

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

### 7. SHIPMENT AS UNIT

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

### 8. BUYER'S REFUSAL OF DELIVERY

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

### 9. GOODS IN TRANSIT

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

### 10. DELIVERY

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

### 11. PAYMENT OF PURCHASE PRICE

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

### 12. BUYER'S DEFAULT

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

### 13. SECURITY INTEREST AND TITLE

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

### 14. SALES AND USE TAX

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

### 15. INSURANCE

The Buyer shall keep the goods insured against damage by fire, water or other casualty as required by Seller, with a company acceptable to Seller, with loss payable to Seller for the total purchase price until the Seller is fully paid. Seller, if so elected, 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

Seller shall use and shall require its employees and agents to use all safety devices and guards and shall maintain the same in proper working order. Buyer shall use and require its employees and agents to use safe operating procedures in operating the equipment and shall further obey and have its employees and agents obey safety instructions given by Seller. If Buyer fails to meet the obligations herein, Buyer agrees to indemnify and save Seller harmless from any liability or obligation with regard to any personal injuries or property damages directly or indirectly connected with the operation of the equipment. Buyer further agrees to notify Seller promptly and in any event not later than ten (10) days after notice or knowledge of any accident or malfunction involving Seller's equipment which has caused personal injury or property damages and to cooperate fully with Seller in investigating and determining the causes of such accident and malfunction. In the event that Buyer fails to give such notice to Seller or to cooperate with Seller, Seller 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 enure to the benefit of the parties hereto and their respective heirs, executors, administrators, successors and (subject to any restrictions or assignment herein above set forth) assigns, as the case may be.

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

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

"Terms and Conditions in French available upon request."



# NORD Motor Order Form



**Order Block** – bold items are required ordering information

<b>Motor type</b>				
<b>Mounting option</b>				
<b>Power</b>				
<b>Voltage</b>				
<b>Frequency</b>				
Mounting position		Conduit box location		Cable entry
Motor options				
Brake size (optional)				
Brake voltage (AC or DC)				
Brake options				

## Optional Features

NSD+ – NSD+ Protection (pg 62)  
KD – Condensation drain holes (pg 63)  
KB – Condensation drain holes – plugged (pg 63)  
IG – Incremental encoder (specify PPR, Logic-pg 68)  
TF – PTC Thermistor (pg 65)  
TW – Thermostats (pg 65)  
MS – Power plug connector (up to 5 hp) (pg 66)  
F & CF – TEBC Separate power cooling fan (pg 67)  
Z – High inertia cast iron fan (pg 65)  
ISO H – Class H insulation (pg 63)  
EP – Epoxy dipped windings (pg 63)  
RD – Drip cover canopy (pg 64)  
RDD – Double drip cover canopy (pg 64)  
SH – Space heaters (specify voltage) (pg 64)  
WE – 2nd end shaft extension (pg 64)

## Optional Brake and Brake options

BRE – Power off brake – spring set DC coil (pg 71)  
Brake voltages (includes rectifier for AC voltages)  
230VAC-60/50Hz-1ph  
460VAC-60/50Hz-1ph  
575VAC-60/50Hz-1ph  
115VAC-60/50Hz-1ph  
208VAC-60/50Hz-1ph  
400VAC-60/50Hz-1ph  
24VDC  
Brake options  
HL – Manual release hand lever (pg 85)  
FHL – Lockable manual release lever (pg 85)  
RG – Corrosion protected (pg 85)  
SR – Dust protection (pg 85)  
IP66 – Sealed brake (pg 85)  
BSG – Fast brake rectifier (pg 78)  
IR – Brake current relay (pg 82)

## NORD Gear Corporation

National Customer Service Toll Free 888-314-6673

### WEST

1121 Railroad Street  
Building 101  
Corona, CA 92882  
Phone 909-279-2600  
Fax 888-408-6673

### MIDWEST

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800 Nord Drive  
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Charlotte, NC 28273  
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Fax 888-259-6673

## NORD Gear Limited

Toll Free in Canada 800-668-4378

### CANADA

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Brampton, Ontario L6T 4A1  
Phone 905-796-3606  
Fax 905-796-8130

**www.nord.com**

# The NORD Family of Gearmotors



## HELICAL IN-LINE

Foot or Flange Mount  
1/6 to 200 hp  
Torque up to 205,000 lb-in  
Output speeds – 0.1 to 960 rpm  
Gear ratios – 1.82:1 to over 300,000:1  
Efficiency 95%+



## RIGHT ANGLE HELICAL-BEVEL 2-STAGE

Foot, Flange or Shaft Mount  
1/6 to 7.5 hp  
Torque up to 5,840 lb-in  
Output speeds – 24 to 360 rpm  
Gear ratios – 4.1:1 to 72:1  
Efficiency 95%+



## NORDBLOC® HELICAL IN-LINE

Foot or Flange Mount  
1/6 to 50 hp  
Torque up to 26,550 lb-in  
Output speeds – 4.8 to 900 rpm  
Gear ratios – 1.88:1 to over 370:1  
Industry interchange



## RIGHT ANGLE HELICAL-WORM

Foot, Flange or Shaft Mount  
1/6 to 20 hp  
Torque up to 27,585 lb-in  
Output speeds – 0.1 to 398 rpm  
Gear ratios – 4.40:1 to over 300,000:1



## PARALLEL HELICAL CLINCHER™

Shaft, Flange or Foot Mount  
1/6 to 200 hp  
Torque up to 797,000 lb-in  
Output speeds – 0.1 to 410 rpm  
Gear ratios – 4.26:1 to over 300,000:1  
Efficiency 95%+



## MINICASE® RIGHT ANGLE WORM

Foot, Flange or Shaft Mount  
1/6 to 2 hp  
Torque up to 2,390 lb-in  
Output speeds – 3 to 324 rpm  
Gear ratios – 5.40:1 to 582:1



## RIGHT ANGLE HELICAL-BEVEL

Foot, Flange or Shaft Mount  
1/6 to 200 hp  
Torque up to 283,000 lb-in  
Output speeds – 0.1 to 218 rpm  
Gear ratios – 8.04:1 to over 300,000:1  
Efficiency 95%+



## UNIBLOC™ WORM GEAR DRIVES

1/6 to 2 hp  
Modular bolt-on options  
Torque up to 3,540 lb-in.  
Output speed – 0.6 to 344 rpm  
Gear ratios – 5:1 to 3,000:1



## NORD Gear Corporation

National Customer Service Toll Free 888/314-NORD

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