

Three Phase Modifiable NEMA®† Horizontal Motors Accessories and Modifications

9. Conduit Box (continued)

M. Oversized, TITAN® Size

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	(QP)	(QP)	(QP)	(QP)	(QP)

Refer to Quick Pick Chart for pricing. TITAN® size Conduit Boxes are available on 400-440 Frames as follows:

- Size 1.0 Cast Iron (900 cu. in.) - also fits 360 Frame
- Size 1.5 Cast Iron (3200 cu. in.) - Hazardous Location only
- Size 2.0 Cast Iron (1300 cu. in.)
- Size 2.5 Cast Iron (2000 cu. in.) - 440 Frame only
- Size 3.0 Cast Iron (3400 cu. in.) - 440 Frame only
- Size 4.5 Fabricated Steel (16,200 cu. in.) - 440 Frame only

10. Coupling, Mount Customer's Half Coupling

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	N/A	N/A	N/A	N/A	720	720	720	720	720	720	720

Nidec Motor Corporation will mount customer supplied, finished bored, key-seated and balanced half coupling on 280 frame and larger. Coupling half must be finished machined to motor shaft dimensions and sent prepaid with installation instructions to the factory prior to start of manufacture. Motors will be dynamically balanced during production and will not be rebalanced after installing half coupling.

11. Crusher Duty (TEFC Only)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	N/A	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%

Adder is percent of Base List Price. Available on Cast Iron Frame Enclosed motors, 180 Frame and larger. Crusher Duty includes a special rotor design, increased locked rotor and breakdown torque, turn bracing and lock washers. Requires a review of load inertia and load curve for application.

12. Drains/Breathers (Price Each Bracket)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)

Refer to Quick Pick Chart for pricing. Standard construction on Non-Hazardous Location motors includes drain holes in the bottom of the motor. The hole is provided at the lowest point of the motor, and serves as both a drain and a breather. In addition to Drain Holes, the following Drains/Breathers options are available:

- Brass T-Type Drains/Breathers (standard on 841 PLUS® motors)
- Stainless Steel T-Type Drains/Breathers
- Plastic Plug/Drains (standard on CORRO-DUTY® motors)
- Hazardous Duty (UL®† Listed) Drains (standard on CORRO-DUTY® Hazardous Location motors)

If Drains/Breathers are selected for Hazardous Location motors, must select Hazardous Location Drains/Breathers.

Drains/Breathers not available on the following:

- Brass or Stainless Steel not available on UNIMOUNT® or Washdown Duty motors
- Drains/Breathers not available on Open Drip Proof (ODP) motors.

13. Drip Cover (Canopy Cap)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	87	87	95	105	119	158	171	255	348	432	459	459

Provides protection to the motor in a Vertical Shaft Down position. Not available on Non-Vent (TENV) or Air-Over (TEAO) motors.

14. Efficiency Class

The Energy Independence and Security Act of 2007 (EISA) took effect on December 19, 2010, changing mandatory efficiency levels for 3-phase electric motors up to 600 volts, which are manufactured or imported into the USA. Under the EISA regulation, electric motors previously required to meet EPA efficiency levels must move up to NEMA Premium standards. These include general purpose motors from 1 to 200 horsepower. In addition, products not previously covered by EPA are required to meet EPA levels. These include U-frame, design C, close coupled pump, footless, vertical solid shaft normal thrust, 8-pole motors, and 201 to 400 horsepower design B motors.

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)

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14. Efficiency Class *(continued)*

(3) Refer to the Base List Price section for pricing. Nidec Motor Corporation supplies motors in three Efficiency Classes:

- NEMA Premium^{®†}: NEMA Premium^{®†} is an efficiency level approved by NEMA^{®†}, CEE, utilities and some government standards as an agreed-upon value for premium levels.
- Energy Efficient: Fully complies with EPAct '92 and NRCAN Efficiencies. Cannot Be Used For Motors Covered by EISA-2007 / IHP HP Motor Final Rule 2016.
- Standard Efficiency: Standard Efficient motors can only be used in situations not covered by EISA-2007 or NRCAN. Cannot Be Used For Motors Covered by EISA-2007 / IHP HP Motor Final Rule 2016.

15. Enclosures

A. Open Drip Proof (ODP)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

(3) See Base List Price section for pricing. Open Drip Proof (ODP): A machine in which the ventilating openings are so constructed that successful operation is not interfered with when drops of liquid or solid particles strike or enter the enclosure at any angle from 0 to 15 degrees downward from the vertical (NEMA^{®†} NG-1). These are motors with ventilating openings which permit passage of external cooling air over and around the windings.

B. Totally Enclosed, Air Over (TEAO) (DEDUCT)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Note: This is a price DEDUCT, instead of an adder. Deduct is percent of the TEFC Base List price. Totally Enclosed Air Over (TEAO): The TEAO enclosure does not utilize a fan for cooling, but is used in situations where air is being blown over the motor frame for cooling, such as in a fan application. Air velocity in feet per minute must be specified when ordering TEAO motors. For a remote mounted conduit box, refer to the "Conduit Box, Remote Mounted" option.

C. Totally Enclosed, Fan Cooled (TEFC)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

(3) See Base List Price section for pricing. Totally Enclosed, Fan Cooled (TEFC): The TEFC enclosures do not allow a free exchange of air to take place between the external environment and internal motor components. Heat generated by the motor is dissipated when the external fan forces cool air over the surface of the frame and end brackets. TEFC motors are widely applied to dust laden, abrasive and corrosive environments where maximum internal component protection is required. Since there is no free exchange of air, TEFC motors can be susceptible to internal condensation. Areas of high humidity or where great swings in day to night temperatures frequently occur can experience internal condensation. Additionally, TEFC motors applied to intermittent-duty loads can be prone to condensation as the heating (run time) and cooling (down time) cycles tend to draw moisture into the motor as it cools down and remains idle.

D. Totally Enclosed, Fan Cooled, (TEFC), STEEL EDGE[™] (Available on Price Pages 4 & 5)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	N/A	-5%	-5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Deduct is percent of Base List Price. Totally Enclosed, Fan Cooled (TEFC), STEEL EDGE[™]: Rolled Steel frame construction. Available in 182-215 Frame sizes.

TEFC Enclosure Options

CORRO-DUTY[®] Motor Construction (If no CORRO-DUTY[®] List)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

Adder is percent of Base List Price. Use this adder only if there is no CORRO-DUTY[®] Base List Price. Refer to Base List Price section. CORRO-DUTY[®] option is available on Totally Enclosed motors only. CORRO-DUTY[®] Motor Construction includes these features:

- Cast Iron construction: Frame, Endshields, Conduit Box and Fan Cover (Rolled Steel Frame on 140)
- Insulife 2000 Insulation Treatment



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15. Enclosures (continued)

- Class F Insulation
- Corrosion Resistant Mill and Chemical Duty Paint
- Shaft Slinger on Pulley End for IP54 Protection
- Ground Lug in Conduit Box
- Corrosion Resistant Zinc Plated Hardware
- 1.15 Service Factor
- Drains/Breathers
- Lead Positioning Gasket
- Stainless Steel Nameplate

Cast Iron Fan Cover Guard

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	95	104	159	248	300	314	567	918	1017	1017	1017

Available on TEFC motors with cast iron frames, 140 Frame and larger. Standard (no charge) on CORRO-DUTY[®] models.

E. Totally Enclosed, Non-Ventilated (TENV)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%

Adder is percent of Base List Price. Totally Enclosed, Non-Ventilated (TENV): A TENV type enclosure does not have a fan. CAUTION: in most cases, an oversized frame is required. Confirm the frame size before quoting.

F. Washdown Duty

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

(3) See Base List Price section for pricing. Washdown Duty: An enclosure designed for use in the food processing industry and other applications that are routinely exposed to washdown, chemicals, humidity and other severe environments. Available in 56-215 Frame sizes. For motors with Washdown Duty features in frame sizes larger than 215, refer to the "Washdown Features" option. Not available on 210 Frame, 2 Pole motors.

G. Hazardous Location, (UL^{®†} Listed) Division 1 and Division 2

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)

(3) See Base List Price section for pricing. Hazardous Location: A Totally Enclosed motor whose enclosure is designed and constructed to withstand an explosion of a specified gas or vapor which may occur within it and to prevent the ignition of the specified gas or vapor surrounding the motor by sparks, flashes or explosion of the specified gas or vapor which may occur within the machine casing (NEMA^{®†} MG-1). Orders for Hazardous Location motors must specify Division, Class, Group and Temperature Code. Refer to page A4 for definitions of Division, Class, Group and T-codes. The following restrictions apply to NEMA^{®†} Frame Horizontal Motors:

- Group C not available on 210 Frame and smaller
- Group C not available on 440 Frame
- Group E not available on NEMA^{®†} Frame sizes
- Dual Label with Service Factor usually requires an oversized frame (may exceed that "Max HP * SF" values). Confirm the Frame Size before quoting.
- Terminal Strip not available.

H. 841 PLUS[®] Modifications (Available on UL^{®†} Listed Division 1 or 2 Class I Motors Only)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	935	950	1420	1895	2370	3695	4250	4960	5725	6940	7245

- Start with Premium Efficiency Hazardous Location UL^{®†} Listed Division 1 or Division 2 Base List Price. Available on Class I motor ONLY.
- 841 PLUS[®] Modifications includes the following:

- Corro-Duty[®]
- Special Foot Flatness
- Inpro/Seal[®] on Both Ends for IP55 Bearing Protection
- Special Shaft Runout
- Special Balance
- Cast Iron Fan Cover
- Non-Witnessed IEEE 841 Enhanced No Load Test

I. Division 2 Self Certified (Non-Listed) and CSA^{®†} Certified Division 2

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)

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15. Enclosures (continued)

Refer to Quick Pick Chart for pricing. Percentage adders are percent of the total list price (Base Price + All Adders). The following restrictions apply:

- Not available (not applicable) on UL^{®†} Listed Hazardous Location motors
- Must use Energy or Premium Efficiency
- Temperature codes T-4 through T-6 not available
- Available on Inverter Duty motors with temperature codes T1-T3 only
- Class II not available on Open Drip Proof (ODP) motors
- Group E not available

Use the Hazardous Location adders for all accessories. Temperature codes other than T1-T3 may result in an oversized frame. Confirm frame size prior to quoting. When Thermostats are requested, hermetically sealed thermostats are required. Zone 2 labeled motors will also be Division 2 labeled. T-code lower than T3 and/or CSA Division 2 require Nidec Motor Corporation Engineering approval prior to quote.

16. Encoders

A. (QP) Refer to Quick Pick Chart for Pricing & Available Options

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)

Encoders are not available on Hazardous Location motors.

B. Ground Brush Option

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	750	750	750	750	750	750	750	750	750	750	750	750

Ground Brush Option is in addition to the Encoder adder. The Encoder Ground Brush option is only available with the following encoders:

- Avtron^{®†} M/N AV285, AV485 or AV685

17. Endshields, C-Face/D-Flange

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	101	101	149	149	201	320	459	665	992	1088	1145	1145

Adder is for C-Face or D-Flange with feet. For footless motors, also use the "Footless" adder. Double adder for flanges on both ends.

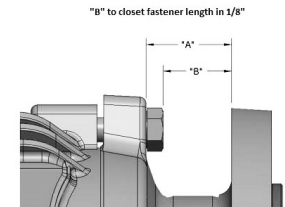
C-Face and D-Flange on Pulley End (Drive End) is available except as follows:

- D-Flange not available on Open Drip Proof (ODP) motors in 56-280 Frames
- C-Face and D-Flange not available on 449 Frame Hazardous Location motors.

C-Face is available on Short End (Opposite Drive End) except as follows:

- Not available on TEFC motors in 360 or 400 Frames
- Not available on Hazardous Location motors in 320-440 Frames
- Not available on ODP motors in 56-250 Frames
- Not available on Washdown Duty motors

Frame	"A"	"B"	Fastener
210	1.79	1.500	5/16
250	1.78	1.500	3/8
280	1.69	1.375	1/2
320	1.77	1.375	1/2
360	2.12	1.75	1/2
400	1.65	1.125	5/8
440	1.63	1.125	5/8



World Motor D-flange: Depending on mounting configuration, a stud and nut may be required.

18. Export Boxing (6% List Adder)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%

Refer to Quick Pick Chart for pricing. Adder is percent of Base List Price. Minimum charge per unit is \$75 NET. Export packaging is available from our International warehouse in Southaven, MS.

19. UL^{®†} Listed Fire Pump

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Adder is percent of Base List Price. U.S. MOTORS[®] brand UL^{®†} listed (File EX5189) Fire Pump motors are designer per UL^{®†}-1004A (currently UL-1004-5) and meet the NFPA^{®†}-20 "Standard for the Installation of Centrifugal Fire Pump Specification." U.S. MOTORS[®] brand UL^{®†} listed Fire Pump motors meet the special design requirements listed below:

- Designed to meet NEMA^{®†} Design "B" limitations per NEMA^{®†} MG1-2011
- Calculated Safe Stall Time must exceed 12 seconds (cold)
- Applies to motors rated 500 HP or less, and 600 volts or less
- Motors designated for Canada must meet CSA-390 Table 2 efficiency values

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19. UL^{®†} Listed Fire Pump (continued)

- Suitable for the following starting methods:
 - Across-the-Line Start (All Frame Sizes)
 - Also suitable for Wye-Start/Delta-Run (250 Frame and larger)
 - Dual Voltage motors are suitable for Part Winding Start on Low Voltage (250 Frame & Larger)
 - Single Voltage motors also suitable for Part Winding Start (100 HP or larger)
- Depicting UL^{®†} File Number Fire Pump Tags

UL Listed Fire Pump NEMA frame motors (ODP & TEFC) can be supplied as Energy Efficient, since they are exempt from EISA - 2007 / IHP HP Motor Final Rule 2016 (NEMA Premium), unless the customer requests Premium Efficiency.

20. Foot Flatness, Special

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	N/A	N/A	75	75	75	225	225	225	450	450	450	450

0.005" Foot Flatness from mounting hole to mounting hole. Available on Cast Iron Frame Hazardous Location motors, 180 Frame and larger. Standard (no charge) on 841 PLUS[®] motors.

21. Footless (Round Frame)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	150	150	150	150	150	225	225	300	375	450	450	450

Footless motors require either a C-Face or D-Flange. Refer to the "Endshield, C-Face/D-Flange" option. Refer to the "Drip Cover (Canopy Cap) option and Lifting Provisions options. Mounting orientation (Horizontal, Vertical Shaft Down or Vertical Shaft Up) must be specified at order entry. Footless not available on ODP or Hazardous Location 449 Frame. ODP Energy or Premium Efficiency motors in 360-400 Frames are not available as Horizontal Footless motors. They must be built as Vertical Motors (for Vertical Motors, see Catalog PB500).

22. Frequency, 50 Hertz

A. 50 Hertz, Open Drip Proof (ODP)

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%

See Option B for TEFC and Hazardous Location 50 Hertz adder, and for notes.

B. 50 Hertz, Totally Enclosed Fan Cooled (TEFC) & Hazardous Location

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%

Adder is percent of Base List Price. The Frequency adder includes 50 Hz, 1.0 Service Factor. If higher Service Factor is required, the Service Factor adder must also be used. The Frequency adder is used when the primary rating is 50 Hertz. Some motors can be built with a Dual Rating (60 Hertz primary rating and 50 Hertz secondary rating). If 50 Hertz is specified as the secondary rating, this adder is not required.

Unless specified otherwise at order entry, the following motors have a 50 Hertz secondary rating as standard:

- Energy Efficient ODP and TEFC with 60 Hertz, 230/460 or 208-230/460 volts Primary Rating have a 50 Hertz, 190/380 Volts Secondary Rating
- Energy Efficient ODP and TEFC with 60 Hertz, 460 Volt Primary Rating have a 50 Hertz 380 Volt Secondary Rating
- The secondary rating is always 1.0 Service Factor.

23. Grease Fittings

Frame:	56	140	180	210	250	280	320	360	400	444-445	447	449
Adder:	173	173	173	173	173	173	173	173	173	173	173	173

Grease Fittings are available in a variety of options:

- Grease Fitting on Fill, with Pressure Drains
- Grease Fitting on Fill, with Plug on Drain
- Plug on Fill and Drain

Grease Fitting on Fill with Plug on Drain is standard (no charge) as follows:

- All motors (except UNIMOUNT[®]) 250 Frame and larger, both ends
- CORRO-DUTY[®] 180-210 Frame, both ends
- 56-140 Frames have sealed bearings and no grease fittings
- UNIMOUNT[®] 180-280 Frame, pulley end only
- Hazardous Location, 180-210 Frame, both ends
- 180 Frame Hostile Duty not available

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