

Modifiable TITAN® Horizontal Motors

Accessories and Modifications

1. Altitude

Standard motors are designed for 3300 feet altitude and 40°C ambient temperature. Atmospheric conditions at higher altitudes inhibit the motor's ability to dissipate heat, resulting in an increased temperature rise and a reduced motor capacity. NEMA[†] standards state motor temperature will increase 1% for each 330-foot increment above the standard 3300-foot altitude design point. Ambient temperatures generally drop with an increase in altitude and are normally less than 40°C, even when installed indoors. Motors can be specifically designed for higher altitudes or derated, either due to lower ambient temperatures or by reducing output capacity.

A. 3301-6000 Feet

Frame:	449	5000	5800	6800	8000	9600
Adder:	3%	3%	3%	3%	3%	3%

- To maintain motor service factor in altitudes of 3301 to 6000 feet (1006 to 1829 meters), make the altitude adder (percent of base list price) above for applications requiring higher altitude. Contact your Nidec Motor Corporation Technical Representative to confirm Frame Size.

B. 6001-9900 Feet

Frame:	449	5000	5800	6800	8000	9600
Adder:	6%	6%	6%	6%	6%	6%

- To maintain motor service factor in altitudes of 6001 to 9900 feet (1830 to 3017 meters), make the altitude adder (percent of base list price) above for applications requiring higher altitude. Contact your Nidec Motor Corporation Technical Representative to confirm Frame Size.

C. 9901 Feet & Up

Frame:	449	5000	5800	6800	8000	9600
Adder:	12%	12%	12%	12%	12%	12%

- To maintain motor service factor in altitudes of 9901 feet & Up (3018 meters & Up), make the altitude adder (percent of base list price) above for applications requiring higher altitude. Altitudes above 9900 feet require mandatory review by the Nidec Motor Corporation Technical Representative. Contact your Nidec Motor Corporation Technical Representative to confirm Frame Size.

Motors with oil lubricated sleeve bearings may also require flood oil lubrication for altitudes greater than 3,300 ft.

- **DERATING FACTORS** -- Standard designs may be operated at the following altitude by reducing the output capacity of the motor by the derating factor shown. Does not apply to UL^{®†} Listed Hazardous Location motors. Nameplate will not acknowledge high-altitude use.

Altitude (ft.)	Derating Factor
3300-5000	0.97
5001-6600	0.94
6601-8300	0.91
8301-9900	0.88
9901-11500	0.85

- **ADJUSTMENT DUE TO REDUCED AMBIENT TEMPERATURE** -- Standard designs may be operated at the following altitudes due to reduced ambient temperatures. Does not apply to UL^{®†} Listed Hazardous Location motors. Nameplate will not acknowledge high-altitude use.

Maximum Altitude (ft.)	Ambient (°C)
3300	40°C
6600	30°C
9900	20°C

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Modifiable TITAN® Horizontal Motors Accessories and Modifications

2. Ambient

Standard designs described in this catalog are suitable for operation in ambient temperatures ranging from +40°C (104°F) to -30°C (-22°F). When standard designs are consistently exposed to ambient temperatures between -5°C (23°F) and -30°C (-22°F), special lubrication practices may be required. Additional precautions such as space heaters and/or oil sump heaters may be required depending on such factors as starting methods and duty cycle. Clearly state low ambient requirements on inquiries to your Nidec Motor Corporation Technical Representative and order documents if product will be consistently exposed to -50°C to -30°C ambients.

NOTE: The minimum ambient temperature for standard UL® Listed Hazardous Location motors is -25°C. See ARCTIC DUTY for ambient temperatures below -25°C.

Arctic Duty - Low Ambient Application

- Available option for TEFC motors applied in ambients of -30°C (-22°F) to -56°C (-70°F). Add 25% to the list price to provide any required special electrical, lubrication and mechanical features (CORRO-DUTY® features are included). UL® Listed Hazardous Location arctic duty motors require mandatory review by your Nidec Motor Corporation Technical Representative. When your inquiry is approved, add 25% to the base list price. Price does not include heaters for oil sump or motor winding.

High Ambient Application

- To provide motors suitable for installation in ambient temperatures between 41°C and 65°C, make the list price addition shown below. Motor temperature rise will change from stated price book values with ambient temperatures above 40°C. Price book stated efficiency levels, frame sizes and lubrication specifications are also subject to change. For confirmed data, refer to your Nidec Motor Corporation Technical Representative. Ambient temperature ratings over 65°C are not available.

A. 41°C to 50°C

Frame:	449	5000	5800	6800	8000	9600
Adder:	3%	3%	3%	3%	3%	3%

B. 51°C to 60°C

Frame:	449	5000	5800	6800	8000	9600
Adder:	6%	6%	6%	6%	6%	6%

C. 61°C to 65°C

Frame:	449	5000	5800	6800	8000	9600
Adder:	12%	12%	12%	12%	12%	12%

Motors with oil lubricated sleeve bearings may also require flood oil lubrication for ambient temperature greater than 40°C.

Motors with 1.15 SF may be derated to 1.0 SF for use in a 50°C ambient with no reduction in nameplate H.P. (Rated output). Non-Hazardous Location motors with 1.0 SF can be derated to accommodate ambient temperatures 40°C to 50°C by applying the following correction factors. Correction factors can be used, but actual performance will differ from published values.

AMBIENT TEMPERATURE	45°C	50°C
Rated Output reduced to	95 %	90 %

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3. Assembly Position

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/C	N/C	N/C	N/C	N/C	N/C

- The standard Assembly Position is considered "F1". "F2" Assembly Position is available at no charge when specified at time of Motor order. "F3" Assembly Position is available on TITAN® ODP/WPI Motors in 5008/5010/5012 and TEFC Motors in 5008/5010/5012 & 5810/5812 Frames.
- Contact your Nidec Motor Corporation Technical Representative with Frame Size and Enclosure for availability of Wall or Ceiling Mounted Assembly Positions.

4. Automotive Duty (TEFC Only)

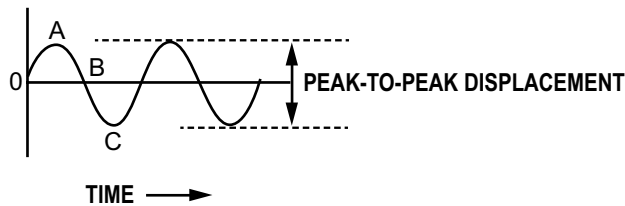
- Totally Enclosed Fan Cooled Automotive Duty motors are available in "U" frame construction. These motors meet frame, temperature rise and other electrical requirements for auto duty, meeting GENERAL MOTORS™ GM-7EH, FORD™ EM1, and CHRYSLER®† NPEM-105 specifications. For base list price, increase requested rating by two horsepower.

5. Balance, Special

(Not Available With Roller Bearings)

Frame:	449	5000	5800	6800	8000	9600
Adder:	2020	2020	2020	2020	2020	2020

NEMA®† standard MG1, Part 7, requires vibration readings to be measured in terms of velocity and stated as inches per second (IPS). Velocity is defined as the maximum speed at which displacement occurs. It takes into consideration both maximum displacement and time. To illustrate velocity, think of a point moving along a typical sine wave in a rising and falling fashion. As the point rises to its peak displacement (Point A), the velocity of movement is zero since it is about to change direction and must stop to do so. Changing direction, the point accelerates towards its peak displacement in the opposite direction (Point C). Midway between the peak displacement values (Point B), velocity is at its maximum. Since the velocity of motion is changing throughout its cycle, the highest peak is selected for measurement.



Nidec Motor Corporation balances all horizontal motors to meet the standard limits shown below. For special balance, make the list adder shown above.

VIBRATION LEVEL

Poles	Velocity (IPS-PEAK)	Velocity (IPS-PEAK)
	Standard	Special
2	0.12	0.10
4	0.12	0.06
6	0.12	0.06
8	0.09	0.06
10	0.08	0.05
12	0.06	0.04

6. Bases

A. Dowel Pin Holes

Frame:	449	5000	5800	6800	8000	9600
Adder:	145	145	145	145	145	145

- Includes Dowel Pin Pilot holes (pins supplied by others).
- Standard (no charge) on 5000 & 5800 Frame Motors with ODP/WPI/WPII/TEFC Enclosures.

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Modifiable TITAN® Horizontal Motors Accessories and Modifications

6. Bases (continued)

B. Slide Rails

Frame:	449	5000	5800	6800	8000	9600
Adder:	3000	3700	4640	5780	N/A	N/A

- Slide Rails are Kits, and are shipped loose for Customer Mounting. The Kit includes quantity two rails and hardware.
- Available on 449-6800 Frame Motors used in belted applications.

C. Sole Plate

Frame:	449	5000	5800	6800	8000	9600
Adder:	2540	3700	4640	5540	6480	6940

- One piece Sole Plate

D. Vertical Jacking Provisions

Frame:	449	5000	5800	6800	8000	9600
Adder:	350	350	350	350	350	350

- Includes provision (holes) for Jacking Screws (screws to be provided by others)

7. Bearings

A. Roller Bearing On Drive End

Frame:	449	5000	5800	6800	8000	9600
Adder:	1040	2080	2885	CO	N/A	N/A

- Roller Bearings are only used on Belted or Chain Drive applications (not used on Direct Connected loads). Used for improved L-10 bearing life on Motors where high radial loads are present.
- Roller Bearings are available as open type only (no shields or seals).
- Belting data for the application is required when specifying Roller Bearings.
- Available on ODP/WPI/WPII/TEFC 449-6800 Frames.
 - Not available on 2-pole motors.
 - Contact your Nidec Motor Corporation Technical Representative for roller bearing availability on TEFC 6800.

B. Insulated, Ball Bearing (Adder Per End)

Frame:	449	5000	5800	6800	8000	9600
Adder:	1040	1040	1040	1270	1270	1270

- Insulated Bearing on Opposite Drive End is standard (no charge) on:
 - Inverter Duty Motors
 - All 5800 Frame & larger motors

C. Spare Set, Ball/Roller Bearings

Frame:	449	5000	5800	6800	8000	9600
Adder:	580	925	1155	1445	1620	1735

- A Spare Set (Quantity 2) of bearings supplied loose, shipped with Motor, when entered with the Motor Order.

D. Sleeve Bearings

ODP/WPI/WPII/TEAAC/TEWAC

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	17310	20195	23575	26900	28000

- Anti-friction Ball Bearings are standard on TITAN® Motors, unless otherwise noted on the Base List Price page. For Sleeve Bearing Motors to be used on coupled applications, make the adder shown above.
- Nidec Motor Corporation's unique Sleeve Bearing design offers a horizontally split case and is Spherically seated for self alignment. Each bearing includes oil ring lubrication, transparent oil level gauge, and fill and drain plugs.
- Sleeve Bearings cannot tolerate overhung load and must be used for coupled service only. Limited end float coupling must also be used to prevent possible damage to the Motor and/or driven equipment.
- Contact Nidec Motor Corporation Technical Representative for DIN style sleeve bearing availability on ODP/WPI/WPII 5008, 5010, & 5012 Frames.
- Forced-feed oil lubrication system is required on 5800, 2 pole motors (JT) motors and 8000 2 pole ® motors. See A.T.A. Flood Oil Lube System adder on page M-34.



Modifiable TITAN® Horizontal Motors Accessories and Modifications

7. Bearings (continued)

TEFC (5008/5010/5012/5810/5812/6808/6809/6811 Frames)

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	17310	20195	23575	N/A	N/A

- Anti-friction Ball Bearings are standard on TITAN® Motors, unless otherwise noted on the Base List Price page. For Sleeve Bearing Motors to be used on coupled applications, make the adder shown above.
- Sleeve bearings on TEFC are DIN style bearings. Both sleeve bearings on TEFC are insulated & provided with a Grounding Strap.
- If base rating is shown on a 449 Frame, use Base List Price of the next higher HP falling on 5000 Frame to cover oversized frame.

E. Insulated, Sleeve Bearings (Adder Per End)

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	1965	1965	2540	2540	2540

- Insulated Sleeve Bearing on Opposite Drive End is standard (no charge) on:
 - Inverter Duty Motors
 - All 5800 Frame & larger ODP/WPI/WPII/TEAAC/TEWAC Motors
- If both Sleeve Bearings are to be insulated, the Ground Strap adder must also be made. Refer to "Grounding Strap" Option.

F. Spare Set, Sleeve Bearing

ODP/WPI/WPII/TEAAC/TEWAC Motors

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	15100	17570	20515	23405	24360

- A Spare Set of standard sleeve bearings supplied loose, shipped with the Motor, when entered with the Motor Order.

TEFC (5008/5010/5012/5810/5812/6808/6809/6811 Frames)

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	15100	17570	20515	N/A	N/A

- A Spare Set of DIN style sleeve bearings supplied loose, shipped with the Motor, when entered with the Motor Order.

G. Oil Sump Heaters

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	920	920	920	920	920

- Available on Sleeve Bearing Motors Only.
- Please specify single phase: 115, 230, 460 or 575 volts at order entry

Oil sump heaters are recommended for applications where the ambient temperature is consistently below -5°C (23°F) and required where the ambient temperature is consistently -15°C (5°F) and below.

H. Oil Sump Heaters with Thermostat Control

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	1490	1490	1490	1490	1490

- Available on Sleeve Bearing Motors Only.
- Please specify single phase: 115, 230, 460 or 575 volts at order entry.
- Thermostatically controlled oil sump heaters can only be used in an unclassified area. Oil sump heaters are recommended for applications where the ambient temperature is consistently below -5°C (23°F) and required where the ambient temperature is consistently -15°C (5°F) and below.



Modifiable TITAN® Horizontal Motors Accessories and Modifications

8. Conduit Box

A. Accessory Conduit Box

Frame:	449	5000	5800	6800	8000	9600
Adder:	465	465	465	465	465	465

- Adder is per Accessory Box beyond what is supplied as standard.
- Accessory Conduit Box is supplied as standard (no charge) as follows:
 - When Winding RTDs are requested, on Motors of any voltage.
 - When internal accessories, such as Winding Temperature Detectors or Space Heaters, are requested on Medium Voltage Motors.
 - NOTE: External accessories, such as Bearing Temperature Detectors or Vibration Switches, are not included.
- For NEMA® 4X Stainless Steel Accessory Conduit Box, please triple adder above. NEMA® 4X boxes are not available on UL® Listed Hazardous Location motors.

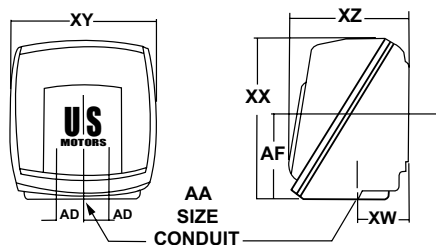
B. Accessory Conduit Box with Terminal Board

Frame:	449	5000	5800	6800	8000	9600
Adder:	930	930	930	930	930	930

- Adder is per Accessory Box beyond what is supplied as standard.
- Accessory Conduit Box is supplied as standard (no charge) as follows:
 - When Winding RTDs are requested, on Motors of any voltage.
 - When internal accessories, such as Winding Temperature Detectors or Space Heaters, are requested on Medium Voltage Motors.
 - NOTE: External accessories, such as Bearing Temperature Detectors or Vibration Switches, are not included.
- To prewire external accessories to this box, add \$590 each to the list price. Prewiring accessories is not available on UL® Listed Hazardous Location motors.
- For NEMA® 4X Stainless Steel Accessory Conduit Box with Terminal Board, please triple adder above. NEMA® 4X boxes are not available on UL® Listed Hazardous Location motors.

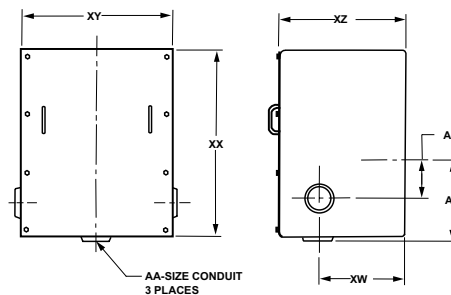
C. Oversized Main Conduit Box

TYPICAL PROFILE FOR
SIZES 1, 1.5, 2, 2.5, AND 3



Dimensions may vary up to 1/4" due to casting or fabrication variations.

TYPICAL PROFILE FOR
SIZES 3.5, 4.5, 5, 6 AND 8



The standard product is supplied with a large, single, main conduit box of cast iron or fabricated steel as shown in the table below. It typically has one usable 3-1/2 inch diameter threaded conduit hub (A-A dimension). If specified at order entry, Nidec Motor Corporation will provide up to three threaded hubs that are up to 4.0 inches in diameter available on size 3.5, 4.5, 5, 6 or 8 boxes. Most options can be rotated in 4 steps of 90 degrees to accept top, bottom or side feeder cable positions. When physical size will not allow the box to be rotated (size 3.5, 4.5, 5, 6 or 8), specify desired location of the hub(s). If not specified, the size and location will be as shown on the following pages. All conduit boxes meet NEMA® Type 4 enclosure requirements.

Standard conduit box assignments and available options are illustrated in the table on the following page. Certain accessories require an oversized main conduit box. The cost of this feature is not included in the accessory price unless otherwise stated. To interpret which conduit box is required to accommodate the desired features, refer to the index below before selecting the appropriate conduit box from the assignment table.

SELECTION INDEX

A-OPTION	Oversized terminal box for extra or larger leads or stress cones
B-OPTION	Accommodates stress cones with one of the following: lightning arrestors, surge capacitors, current transformer, or bus connection
C-OPTION	Accommodates stress cones with any two of the following: lightning arrestors, surge capacitors, current transformer, or bus connection
D-OPTION	Terminal box accommodates all components: stress cones, lightning arrestors, surge capacitors, current transformer, and bus connection

NOTE: Stress cones are not a Nidec Motor Corporation-supplied accessory but rather a method of connecting motor leads to shielded feeder cables often selected by the customer. Stress cones typically require an oversize box to simply make this connection.

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Modifiable TITAN® Horizontal Motors Accessories and Modifications

8. Conduit Box (continued)

MAIN CONDUIT BOX SELECTION TABLE

Enclosure	Frame	Voltage	Horsepower	Conduit Box Options					
				STD	A	B	C	D	
Div. 1 Hazardous Location	5000	460 & 2300	ALL	1	1.5	N/A	N/A	N/A	
	5800	4000		1.5	1.5	N/A	N/A	N/A	
TEFC	449 H5000	460	UP TO 500	2	3	4.5	5	6	
			501 & UP	3	4.5	4.5	5	6	
		5807	2300	ALL	2	3	4.5	5	6
		5809	4000	ALL	2.5	3	4.5	5	6
	5811	>= 6000	ALL	3.5	4.5	6	8	8	
	5010	460	ALL	3	3	4.5	5	6	
			3	3	4.5	5	6		
		5012	2300	ALL	3	3	4.5	5	6
		5810	4000	ALL	3	3	4.5	5	6
	5812	>= 6000	ALL	3.5	4.5	6	8	8	
	6808	460	ALL	3L	3L	4.5	5	6	
			3L	3L	4.5	5	6		
		6809	2300	ALL	3L	3L	4.5	5	6
		6811	4000	ALL	3L	3L	4.5	5	6
		>= 6000	ALL	3.5	4.5	6	8	8	
ODP WPI WPII	449	460	UP TO 500	3	3	4.5	5	6	
			501 & UP	3	4.5	4.5	5	6	
	5000	2300	ALL	3*	3	4.5	5	6	
	5800	4000	ALL	3*	3	4.5	5	6	
		>= 6000	ALL	3.5	4.5	6	8	8	
TEAAC TEWAC	6800	2300	ALL	3	4.5	4.5	5	6	
			3	4.5	4.5	5	6		
8000	4000	UP TO 1000	3	4.5	4.5	5	6		
9600		1001 & UP	4.5	4.5	4.5	5	6		
		>= 6000	ALL	3.5	4.5	6	8	8	

* SIZE 2.5 IS STANDARD ON ODP & WPI 449 FRAME

Motors rated 3300 Volt will follow same guidelines as 4000 Volt shown in the table above.

Motors rated for voltages above 4800 Volt will use a Size 3.5 box as standard.

Size 8 box is only available on motors with voltages above 5000 Volt.

LIST PRICES FOR OPTIONAL MOTOR MOUNTED MAIN CONDUIT BOXES

BOX SIZE	STD. LIST ADDER	NEMA 4X STAINLESS STEEL ADDER	QTY. HUBS	AF	AD	XW	EXTERIOR			INTERIOR			CONST. MAT'L	USABLE VOLUME
							XX (H)	XY (W)	XZ (D)	XX (H)	XY (W)	XZ (D)		
1	-	N/A	1	5-5/8	-	3-15/16	14	14	10-5/8	11-3/8	12	9-1/2	C.I.	900
1.5	\$ 2,115	N/A	2	8-5/8	3	6-1/8	19	18	16-1/2	17-1/2	15	15	C.I.	3200
2	-	N/A	1	8-1/16	-	5	15	14	10-1/2	13-1/2	11-1/2	9-1/2	C.I.	1300
2.5	\$ 1,940	\$ 4,850	1	10	-	6	17-3/4	18	11-1/2	16	15	10	C.I.	2000
3	\$ 2,510	\$ 6,275	2	10-15/16	3	8-1/8	19	19-3/8	17-5/32	16-1/8	15-3/8	13-5/8	C.I.	3400
3L	\$ 2,510	N/A	2	15-1/2	3	3-5/8	22-7/8	16-3/8	15-5/16	19-13/16	12-1/2	14-9/16	C.I.	3400
3.5	\$ 2,888	\$ 7,220	3	10-13/16	4	8	24	18	14	23-3/4	17-3/4	13-5/8	F.S.	5700
4.5	\$ 4,210	\$ 10,525	3	17-13/16	4	14	30	28	20-1/8	29-1/2	27-3/4	19-3/4	F.S.	16200
5	\$ 4,825	\$ 12,100	3	12-13/16	6	14	40	36	20	39-3/4	35-3/4	19-5/8	F.S.	28000
6	\$ 5,790	\$ 14,475	3	12-13/16	6	24-1/2	40	36	29	39-1/2	35-3/4	28-5/8	F.S.	40400
8	\$ 6,948	\$ 17,370	3	12-13/16	6	24-1/2	48	36	29	47-1/2	35-1/2	28-5/8	F.S.	48200

Notes: C.I. = Cast Iron, F.S. = Fabricated Steel

NEMA® Type II: To modify a standard main conduit box arrangement to NEMA® Type II requirements, Select Bus Bar Connections with Standoff Insulators adder. This will include a Ground Lug and a Size 4.5 Conduit Box. Phase segregated conduit box arrangements are not available.

NEMA® 4X CONDUIT BOXES (Not Available on UL® Listed Hazardous Location Motors)

Nidec Motor Corporation's standard main and accessory conduit boxes will meet NEMA® 4X requirements, if special paint option on page M-36 is selected.

NEMA® 4X requirement must be noted as a requirement at time of order placement. NEMA® 4X stainless-steel main or accessory conduit boxes are also available. Stainless steel boxes will not be factory painted. Adders for stainless steel main conduit boxes have been provided above. See page M-15 for NEMA® 4X stainless steel accessory conduit box adder and page M-56 for NEMA® 4X stainless steel bearing temperature detector conduit adders.

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Modifiable TITAN® Horizontal Motors Accessories and Modifications

8. Conduit Box *(continued)*

D. Main Conduit Box Power Lead Termination Options

Bus Bar Connections with Standoff Insulators

Frame:	449	5000	5800	6800	8000	9600
Adder:	6710	6710	6710	6710	6710	6710

- Price includes an oversized Size 4.5 main conduit box. Bus bar material is copper.
- Not available on UL®† Listed Hazardous Location Motors.

Terminal Blocks for Main Power Leads (Low Voltage Motors ONLY)

Frame:	449	5000	5800	6800	8000	9600
Adder:	1450	2050	2050	N/A	N/A	N/A

- Available in Size 2.0, 2.5 & 3.0 Cast Iron Main Conduit Box ONLY.
 - Not available on UL®† Listed Hazardous Location Motors.
- Stud-Type Terminal Blocks for Main Power Leads are available when supplied with up to 9 Leads ONLY. Standard lead connection shall be supplied. If special lead connection is required, please contact Nidec Motor Corporation for availability prior to quoting

E. Current Transformers For Differential Protection

A healthy motor maintains the same magnitude of current flowing in and out of each phase of its winding. A breakdown in the insulation system alters this balance, resulting in a measurable difference when the current flowing in and out of each circuit is compared for symmetry. Any dissimilarity within an individual circuit is known as differential current and can be detected with current transformers that provide differential protection.

Differential protection is accomplished by bringing out both ends of the winding into the main motor conduit box. Both leads of each circuit pass through the center of a dedicated window-type current transformer. In a self-balancing system, the 3 CTs are located at the motor. When a fault is detected, a signal is sent to a relay (not provided by Nidec Motor Corporation) in the switchgear, taking the motor offline.

An alternate system includes 3 additional CTs in the switchgear and is commonly known as a conventional system. In most cases, the switchgear OEM provides all 6 CTs since their characteristics must be closely matched for maximum protection.

The conventional system provides a greater zone of protection (motor and cable run). However, it is significantly more expensive and less sensitive than the self-balancing method since it requires a higher fault current to trip the relay.

Window Type Current Transformers (460-4800 Volts)

Frame:	449	5000	5800	6800	8000	9600
Adder:	5080	5080	5080	5080	5080	5080

- For a quantity of 3 window-type (typically type IMC 50:5 ratio) current transformers supplied and mounted by Nidec Motor Corporation use adder above.
- Required oversize main conduit box is not included in the above list price adder.
- For 2 winding multispeed motors, double list price adder above.
- Not available on UL®† Listed Hazardous Location Motors.

Window Type Current Transformers (5000-6900 Volts)

Frame:	449	5000	5800	6800	8000	9600
Adder:	6595	6595	6595	6595	6595	6595

- For a quantity of 3 window-type (typically type IMC 50:5 ratio) current transformers supplied and mounted by Nidec Motor Corporation use adder above.
- Required oversize main conduit box is not included in the above list price adder.
- For other types of Current Transformers, refer complete details to your Nidec Motor Corporation Technical Representative.
- For 2 winding multispeed motors, double list price adder above.
- Not available on UL®† Listed Hazardous Location Motors.

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Modifiable TITAN® Horizontal Motors Accessories and Modifications

8. Conduit Box *(continued)*

Arrange-To-Accommodate (Per Current Transformer)

Frame:	449	5000	5800	6800	8000	9600
Adder:	635	635	635	635	635	635

- Arrange Motor to accommodate Customer supplied & jobsite installed Current Transformers.
- Must supply details of Current Transformers at time of order placement.

F. Drain/Breather In Main Conduit Box (Per Box)

Frame:	449	5000	5800	6800	8000	9600
Adder:	350	350	350	350	350	350

- The following options are available for Drains/Breathers in the Main Conduit Box or Accessory Conduit Box:
 - Breather/Drain In Conduit Box
 - 1/8" NPT Drain Hole in Conduit Box (Not Available On UL^{®†} Listed Hazardous Location motors)
 - 1/2" NPT Drain Hole In Conduit Box (Not Available On UL^{®†} Listed Hazardous Location motors)

G. Hinged Main Circuit Box

Frame:	449	5000	5800	6800	8000	9600
Adder:	800	800	800	800	800	800

- Hinged front cover on Size 4.5 or larger Conduit Box

H. Hinged Door with Lock & Key

Frame:	449	5000	5800	6800	8000	9600
Adder:	1210	1210	1210	1210	1210	1210

- Hinged front cover on Size 4.5 or larger Conduit Box, with key lock & 2 keys.

I. Lead Positioning Gasket

Frame:	449	5000	5800	6800	8000	9600
Adder:	235	235	235	235	235	235

- Standard (no charge) on CORRO-DUTY® Motors.
- Conduit Box Gaskets are not available on UL^{®†} Listed Hazardous Location Motors, per UL^{®†} restrictions.

J. Servit Post In Conduit Box

Frame:	449	5000	5800	6800	8000	9600
Adder:	128	128	128	128	128	128

- Make the above adder for Servit Post inside of the conduit box

K. Space Heater In Main Conduit Box

Frame:	449	5000	5800	6800	8000	9600
Adder:	1330	1330	1330	1330	1330	1330

- Space Heater available in the following voltages:
 - 115V, 230V & 460V
- Available on Size 3.5 box and larger.
- For Division 2 application, double adder above.
- For half voltage space heater (rated 240V operated on 120V), double adder above.

† All marks shown within this document are properties of their respective owners.



Modifiable TITAN® Horizontal Motors Accessories and Modifications

9. Crusher Duty

(TEFC & TEAAC Only)

Frame:	449	5000	5800	6800	8000	9600
Adder:	15%	15%	15%	15%	15%	15%

- Adder is percent of Base List Price.
- Crusher Duty includes a special rotor design, increased locked rotor torque, increased breakdown torques and end turn bracing.
- Requires a review of load inertia and load curve for application.
- If application requires Roller Bearing and/or High Strength Steel Shaft, these adders must also be made.

10. Drains and Breathers

Standard enclosed-frame products described in this catalog include drain holes in the low point of the brackets to prevent condensation buildup. Optional drain and breather elements are available and will be installed by Nidec Motor Corporation for the following list prices. CORRO-DUTY® and severe-duty motors include the first option as standard. Drains/Breathers are not available on ODP/WPI/WPII motors.

Motor Enclosure	Description of Drain And Breather	List Price
TEFC	Drain Hole-Brass Breather Drain	\$350
TEFC / Hazardous Location	Stainless Steel Drain	\$531

11. Efficiency Class

Nidec Motor Corporation offers enhanced efficiency products that feature design optimization and premium grade materials. We recognize your need for increased motor performance is driven by the potentially significant operational cost savings associated with enhanced motor efficiency. Your power costs savings are determined by a number of factors (depending on which payback method you select), including the cost of power and hours of operation. Because not all motors run 24 hours a day, 7 days a week, we offer two pre-priced efficiency options for TITAN® products.

Certain modifications (high altitude, abnormal ambient temperature, 50HZ or other frequency, lower than standard temperature rise, multispeed products, copper bar rotors, low noise designs, etc.) will cause motor performance to vary from stated values. Individual modifications that have the tendency to impact motor performance are noted in their description. Individual modifications that have the tendency to impact motor performance are noted in their description. Should any question exist, refer to your Nidec Motor Corporation Technical Representative.

A number of methods are available to evaluate the potential cost savings obtained by premium efficiency motors. Nidec Motor Corporation sales engineers will be happy to assist you and apply some of the more rigorous tests that include the time value of money at various yield rates. However, you may want to get a general idea of the benefits possible, and this can be accomplished by the simple payback method (shown below). This provides annual power cost savings when the following items are known: Your cost / kilowatt hour of power, actual hours of operation and the full load efficiency level of a standard vs. premium efficiency motor.

PAYBACK ANALYSIS

$$S = .746 \times \text{HP} \times \text{C} \times \text{N} \left[\frac{100}{\text{SE}} - \frac{100}{\text{PE}} \right]$$

Where: S = Energy savings / year @ 100% load
 C = Energy Cost \$/KWH
 N = Hours / years running time
 SE = Standard efficiency product at full load
 PE = Premium efficiency product at full load

