

# Modifiable TITAN® Horizontal Motors

## Accessories and Modifications

### 28. Lubrication

#### A. Arrange-To-Accommodate Flood Oil Lube System

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	1035	1035	1035	1035	1035

- Motor provided with all plumbing connections to accept a Customer supplied flood oil lubrication system.
- Available on Sleeve Bearing Motors only.

#### B. Constant Level Oiler (Standard Cage)

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	985	985	985	985	985

- Standard oiler is TRICO®† brand, or equal, with 8 ounce reservoir.
- Standard Cage & Piping
- Available on Sleeve Bearing Motors only.

#### C. Constant Level Oiler (Stainless Steel Cage)

Frame:	449	5000	5800	6800	8000	9600
Adder:	N/A	2370	2370	2370	2370	2370

- Standard oiler is TRICO®† brand, or equal, with 8 ounce reservoir.
- Stainless Steel Cage & Piping
- Available on Sleeve Bearing Motors only.

#### D. Oil Mist Provision (Ball Bearing Motors Only)

Frame:	449	5000	5800	6800	8000	9600
Adder:	1390	1390	1390	N/A	N/A	N/A

- Includes providing the Motor with provisions to accommodate Oil Mist Lubrication. The Oil Mist Lubrication System is supplied by others.
- An Oil Mist Lubrication System (supplied by others) is a centralized system in which the energy of compressed gas, usually air taken from the plant supply, is used to atomize oil. The oil is then conveyed by air in a low pressure distribution system to application fittings on the Motor (mist fittings which meter oil to bearing housings).
- Available on Enclosed Motors only.

### 29. Marine Duty

#### (Ball Bearing Motors only)

Frame:	449	5000	5800	6800	8000	9600
Adder:	5%	5%	5%	5%	5%	5%

CORRO-DUTY® motors meet IEEE-45™ specifications, both above and below deck, in both enclosed and hazardous location enclosures. Add INPRO/SEAL®† seals for above deck service. Open motors are approved for below deck. If motor is to be used as dockside transfer (not on ship/barge), use standard motor with CORRO-DUTY® features plus a space heater. For ship board applications and bow thruster drives, refer to the Inquiry Group.

NOTE: IEEE-45™ requires that motors exposed to the weather, seas, splashing or other severe moisture conditions either be watertight or protected by watertight enclosures. Since electric motors "breathe" during operation, they cannot be constructed as watertight. Above-deck motors must be protected by suitable watertight enclosures.



# Modifiable TITAN® Horizontal Motors

## Accessories and Modifications

### 30. Multi-Speed Motors

(Ball Bearing Motors only)

Frame:	449	5000	5800	6800	8000	9600
Adder:	(+)	(+)	(+)	(+)	(+)	(+)

(+) Multi-Speed Adders:	<u>Load Type</u>	<u>One Winding</u>	<u>Two Winding</u>
	Variable Torque	70%	100%
	Constant Torque	80%	140%
	Constant Horsepower	90%	170%

- Adder is percent of Base List Price. Use the Base List Price of the High Horsepower and Speed.
- Contact your Nidec Motor Corporation Technical Representative to confirm frame size.
- Contact Nidec Motor Corporation Marketing Department for Net Price.

### 31. Nameplates

#### A. Additional Duplicate Nameplate

Frame:	449	5000	5800	6800	8000	9600
Adder:	60	60	60	60	60	60

- An additional Duplicate Nameplate for mounting on Customer equipment can be furnished when specified at time of order placement.
- These additional Nameplates cannot be supplied with CSA®† or UL®† Logos.

#### B. Additional Stamping On Main Nameplate

Frame:	449	5000	5800	6800	8000	9600
Adder:	100	100	100	100	100	100

- Make the above adder for limited Customer tagging information (20 characters max) stamped on the main motor nameplate, if specified at time of Motor order.

#### C. Phase Sequencing Plate

Frame:	449	5000	5800	6800	8000	9600
Adder:	115	115	115	115	115	115

- Direction Of Rotation must be specified at order entry.

#### D. Rotation Arrow Plate

Frame:	449	5000	5800	6800	8000	9600
Adder:	115	115	115	115	115	115

- Metal plate mounted on Motor with arrow showing Direction Of Rotation.
- Customer must specify required direction of rotation:
  - Counter Clockwise Facing Opposite Drive End
  - Counter Facing Opposite Drive End
  - Dual Rotation (Not Available On All Ratings)
- Supplied as standard (no charge) on Motors with Uni-Directional Fans.

#### E. Shipping Tag (#6 Paper Tag)

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

- A #6 Paper Shipping Tag, with Customer tagging information, can be supplied at No Charge when specified at time of Motor order.

#### F. Special Features (I.D.) Nameplate

Frame:	449	5000	5800	6800	8000	9600
Adder:	115	115	115	115	115	115

- Special Identification Plates can be mounted on the Motor with limited Customer specified tagging information (100 characters max).

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



# Modifiable TITAN® Horizontal Motors

## Accessories and Modifications

### 31. Nameplates *(continued)*

#### G. Starting Duty Nameplate

Frame:	449	5000	5800	6800	8000	9600
Adder:	115	115	115	115	115	115

- Starting Duty Plate listing number of allowable starts in succession and required "off" time between subsequent starts.
- Customer's Load Inertia is required at order entry.
- A Starting Duty Plate is required if the Number Of Starts is anything other than "NEMA®† Standard".

### 32. Overspeed

- Percent overspeed above synchronous speed. Refer to the Inquiry Group with application details if energized or above standard speed. Standard unenergized on two poles is 20% and 25% on 4 poles and slower speeds.

### 33. Paint

#### A. CORRO-DUTY® Paint Job

Frame:	449	5000	5800	6800	8000	9600
Adder:	2%	2%	2%	2%	2%	2%

- Adder is percent of Base List Price.
- The Motor will be painted with Nidec Motor Corporation's standard CORRO-DUTY® Paint (unless Special Paint is specified) including:
  - > On Open Motors: Exterior Of Motor, Interior un-machined surfaces of brackets, bracket grills (if any), exterior un-machined surfaces of bearing caps (if any) and air deflectors (if any).
  - > On Enclosed Motors: Exterior Of Motor, Exterior un-machined surfaces of Short End Bracket, Interior un-machined surfaces of Fan Cover, metal fans (if used) and sheet metal parts exposed to exterior atmosphere (if any).
- Only applicable to Non-CORRO-DUTY® Motors (CORRO-DUTY® Paint Job is standard on CORRO-DUTY® Motors).

#### B. Special Paint

Frame:	449	5000	5800	6800	8000	9600
Adder:	1000	1000	2000	3000	3000	3000

- Adder is percent of Base List Price. Adder is for 1 coat (2-4 mils). Please double adder for 2 coats.
- Special paint may be furnished on modified products with the prior plant approval. A special paint can be furnished if compatible with our standard primer, is commercially available, and suitable for air drying. (Zinc or lead cannot be used, and sand blasting is not available). Motors can also be supplied with just the standard primer coat at no charge, if requested at time of order. All special paints are for outside surfaces only. A safety data sheet is required on special paint and should be forwarded to the plant prior to quotation.
- For main and accessory conduit boxes to meet NEMA®† 4X requirements, please add \$1000 to the list price and note the NEMA®† 4X requirement at time of order placement. All conduit boxes will be painted internally and externally with an epoxy paint. Not available on UL®† Listed Hazardous Location Motors.

### 34. Power Factor Correction Capacitors

- CAUTION -- DO NOT over correct the power factor of products described in this catalog. Correcting full-load power factor beyond approximately 95% will potentially result in severe non-warranty damage to the motor and driven equipment.
- Seek assistance from the Inquiry Group to apply this product to multispeed motors.
- On single voltage motors with part winding (PWS), Double Delta or WYE Delta starting connections, Nidec Motor Corporation recommends the capacitor be connected to the motor side of contactors 1-2-3 in the motor starter.
- If this is unacceptable, you must supply two separate capacitors each with one half of the desired KVAR rating. One capacitor should be connected to the 1-2-3 motor leads, the second connected to 4-5-6 (or 7-8-9 as applicable).
- Do not apply this accessory to a variable frequency drive. Serious damage to the VFD will result if capacitors are used in between drive and motor. Consult your drive supplier.
- Seek assistance from the Inquiry Group if any questions exist.

Application of power factor correction capacitors to three-phase squirrel cage induction motors (SCIM) is beneficial because the power used by industrial and municipal facilities has two components:

1. Real power (KW), which produces work.
2. Reactive power (KVAR) needed to generate the rotating magnetic field required for the operation of electric motors. No useful work is performed by this component.

Reactive power is sometimes called wattless power because inductive electrical equipment, such as a motor, must take from the electrical distribution system more current than is necessary to do work involved. The ratio of working current to total current is called power factor. The function of power factor correction capacitors is to increase the power factor by supplying the wattless power when installed at or near inductive electrical equipment.

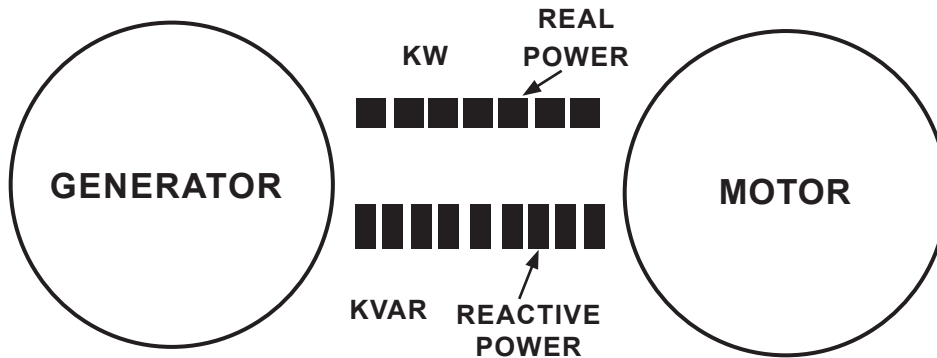
† All marks shown within this document are properties of their respective owners.



## Modifiable TITAN® Horizontal Motors Accessories and Modifications

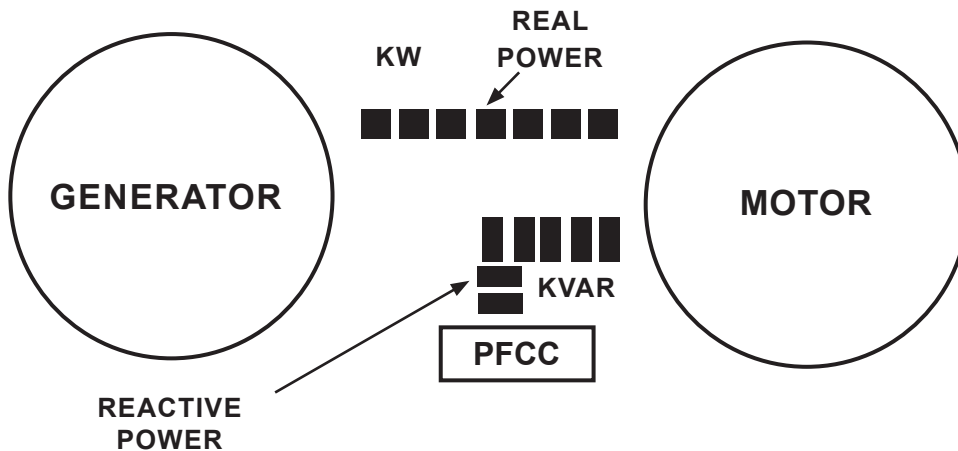
### 34. Power Factor Correction Capacitors (continued)

Here, the power feeder line must supply useful real power and reactive or magnetizing currents.



*Illustration of an SCIM under partially loaded conditions without Power Factor Correction Capacitors (PFCC).*

Installing a PFCC near the same motor will supply the reactive or magnetizing current required to operate it. The total current required of the power feeder line is reduced to the value of the useful real current only.



Power factor correction capacitors can lower electrical costs. In many areas, the cost of electricity includes a penalty charge for low power factor. Installation of power factor correction capacitors on the distribution system within the plant makes it unnecessary for the utility to supply the wattless or the non-working power required by the inductive electrical equipment connected to it. Savings in reduced generation, transmission, and distribution costs are passed on to the plant in the form of lower electrical bills.

Savings are also possible through the use of power factor correction capacitors in the form of increased KVA capacity of plant electrical distribution system. Power factor correction capacitors furnish the non-productive current requirements of the plant and make it possible to increase the plant connected load, as much as 15 to 20%, without a corresponding increase in the size of transformers, conductors and protective devices making up the distribution system servicing the load.

Listed in the engineering data section of this catalog is the maximum amount of KVAR allowed to be applied to the specific product described. This generally corrects the motor's full-load power factor of 95%. Should a customer require correction to a lower value, apply the following formula to obtain the required KVAR. KVAR is the unit for rating PFCC and is equal to 1000 volt-amperes of reactive power. This indicates how much reactive power the capacitor will provide.

## Modifiable TITAN® Horizontal Motors Accessories and Modifications

---

### 34. Power Factor Correction Capacitors *(continued)*

To determine KVARs needed to improve the motor's existing full-load power factor to 92%:

$$\text{Actual Power} = \frac{\text{Volts} \times \text{Amps} \times \% \text{ P.F.} \times 1.732}{1000}$$

Motor is 250 HP, 900 RPM, 460 volts with 83.1% full-load power factor TEFC energy efficient type J with 298 full load amps

$$\text{Actual Power} = \frac{460 \times 298 \times 0.831 \times 1.732}{1000}$$

Actual Power = 197.30 KW

- Obtain from table 32-1 the KW multiplier at the intersection of 83% original PF and 92% desired PF multiplier = 0.246.  
KVAR = 197.30 x 0.246 = 48.5
- Performance data indicates 63.6 KVAR is maximum, 48.5 is needed, correction to 92% is possible.
- From the 480 volt PFCC chart on page M-41 closest rating to 27.4 required KVAR but not exceeding 63.6 maximum KVAR is 50. Select catalog no. GMP20500F33 with \$2,479 list price, DS-3PC, to correct full-load power factor to 92%.



# Modifiable TITAN® Horizontal Motors

## Accessories and Modifications

### 34. Power Factor Correction Capacitors *(continued)*

ORIGINAL POWER FACTOR	KW MULTIPLIERS TO DETERMINE CAPACITOR KVAR REQUIRED															
	CORRECTED POWER FACTOR															
	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95
0.60	0.583	0.609	0.635	0.661	0.687	0.713	0.740	0.766	0.793	0.821	0.849	0.877	0.907	0.938	0.970	1.044
0.61	0.549	0.575	0.601	0.627	0.653	0.679	0.706	0.732	0.759	0.787	0.815	0.843	0.873	0.904	0.936	0.970
0.62	0.516	0.542	0.568	0.594	0.620	0.646	0.673	0.699	0.726	0.754	0.782	0.810	0.840	0.871	0.903	0.937
0.63	0.483	0.509	0.535	0.561	0.587	0.613	0.640	0.666	0.693	0.721	0.749	0.777	0.807	0.838	0.870	0.904
0.64	0.451	0.474	0.503	0.529	0.555	0.581	0.608	0.634	0.661	0.689	0.717	0.745	0.775	0.806	0.838	0.872
0.65	0.419	0.445	0.471	0.497	0.523	0.549	0.576	0.602	0.629	0.657	0.685	0.713	0.743	0.774	0.806	0.840
0.66	0.388	0.414	0.440	0.466	0.492	0.518	0.545	0.571	0.598	0.626	0.654	0.682	0.712	0.743	0.775	0.809
0.67	0.358	0.384	0.410	0.436	0.462	0.488	0.515	0.541	0.568	0.596	0.624	0.652	0.682	0.713	0.745	0.779
0.68	0.328	0.354	0.380	0.406	0.432	0.458	0.485	0.511	0.538	0.566	0.594	0.622	0.652	0.683	0.715	0.749
0.69	0.299	0.325	0.351	0.377	0.403	0.429	0.456	0.482	0.509	0.537	0.565	0.593	0.623	0.654	0.686	0.720
0.70	0.270	0.296	0.322	0.348	0.374	0.400	0.427	0.453	0.480	0.508	0.536	0.564	0.594	0.625	0.657	0.691
0.71	0.242	0.268	0.294	0.320	0.346	0.372	0.399	0.425	0.452	0.480	0.503	0.536	0.566	0.597	0.629	0.663
0.72	0.214	0.240	0.266	0.292	0.318	0.344	0.371	0.397	0.424	0.452	0.480	0.508	0.538	0.569	0.601	0.635
0.73	0.186	0.212	0.238	0.264	0.290	0.316	0.343	0.369	0.396	0.424	0.452	0.480	0.510	0.541	0.573	0.607
0.74	0.159	0.185	0.211	0.237	0.263	0.289	0.316	0.342	0.369	0.397	0.425	0.453	0.483	0.514	0.546	0.580
0.75	0.132	0.158	0.184	0.210	0.236	0.262	0.289	0.315	0.342	0.370	0.398	0.426	0.456	0.487	0.519	0.553
0.76	0.105	0.131	0.157	0.183	0.209	0.235	0.262	0.288	0.315	0.343	0.371	0.399	0.429	0.460	0.492	0.526
0.77	0.079	0.105	0.131	0.157	0.183	0.209	0.236	0.262	0.289	0.317	0.345	0.373	0.403	0.434	0.466	0.500
0.78	0.052	0.078	0.104	0.130	0.156	0.182	0.209	0.235	0.262	0.290	0.318	0.346	0.376	0.407	0.439	0.473
0.79	0.026	0.052	0.078	0.104	0.130	0.156	0.183	0.209	0.236	0.264	0.292	0.320	0.350	0.381	0.413	0.447
0.80	0.000	0.026	0.052	0.078	0.104	0.130	0.157	0.183	0.210	0.238	0.266	0.294	0.324	0.355	0.387	0.421
0.81		0.000	0.026	0.052	0.078	0.104	0.131	0.157	0.184	0.212	0.240	0.268	0.298	0.329	0.361	0.395
0.82			0.000	0.026	0.052	0.078	0.105	0.131	0.158	0.186	0.214	0.242	0.272	0.303	0.335	0.369
0.83				0.000	0.026	0.052	0.079	0.105	0.132	0.160	0.188	0.216	0.246	0.277	0.309	0.343
0.84					0.000	0.026	0.053	0.079	0.106	0.134	0.162	0.190	0.220	0.251	0.283	0.317
0.85						0.000	0.027	0.053	0.080	0.108	0.136	0.164	0.194	0.225	0.257	0.291
0.86							0.000	0.026	0.053	0.081	0.109	0.139	0.167	0.198	0.230	0.264
0.87								0.000	0.027	0.055	0.083	0.111	0.141	0.172	0.204	0.238
0.88									0.000	0.028	0.056	0.084	0.114	0.145	0.177	0.211
0.89										0.000	0.028	0.056	0.086	0.117	0.149	0.183
0.90											0.000	0.028	0.058	0.089	0.121	0.155
0.91												0.000	0.030	0.061	0.093	0.127
0.92													0.000	0.031	0.063	0.097
0.93														0.000	0.032	0.066
0.94															0.000	0.034
0.95																0.000

# Modifiable TITAN® Horizontal Motors

## Accessories and Modifications

### 35. Prints and Data

When requested at time of order entry, Nidec Motor Corporation will supply at no charge a standard submittal package consisting of 5 sets of the following: motor description, features, dimension print, nameplate data and performance data. For non-standard products, data, those requiring engineering content, refer to the following chart for applicable charges (per rating). Note that pricing is net.

CODE	DESCRIPTION	NET / EACH
B/N/B	USEM AND BEARING MANUFACTURER'S PART NUMBERS	N/C
BLC	BEARING LIFE CALCULATION	\$150
C/P	CERTIFIED PRINT	N/C
C/P/A	CURRENT PULSATION ANALYSIS	\$200
D/S •	CUSTOMER DATA SHEET FILLED OUT BY USEM •	\$60
I/M	GENERAL INSTALLATION, OPERATION & MAINTENANCE MANUAL (QTY. 5 – PER ORDER ADDITIONAL COPIES (MINIMUM QTY. 5)	N/C \$5
L/N	SOUND POWER IN WATTS	\$60
L/P	SOUND PRESSURE IN dBA AT THREE FEET	\$30
MED	MASS ELASTIC DATA	\$170
N/P	NAMEPLATE DATA	N/C
P/AA	ACCELERATION TIME VS. AMPS CURVE (REQUIRES CUSTOMER'S LOAD $W_k^2$ AND LOAD SPEED TORQUE CURVE)	\$170
P/C	PERFORMANCE CURVE (SLIP OR RPM, AMPS, EFF., PF, kW VS. HORSEPOWER	\$170
P/D	PERFORMANCE DATA (SAME AS ABOVE EXCEPT IN DATA FORMAT)	N/C
P/E	EQUIVALENT CIRCUIT PARAMETERS AT FULL LOAD, 3/4, 1/2 AND LOCK	\$60
P/L	PARTS LIST (EXPLODED VIEW)	N/C
P/N	STANDARD NOISE DATA VS. CENTER BAND	\$60
P/ST	SPEED VS. TORQUE & AMPS CURVE	\$60
P/TA	SAFE STALL TIME CURVE (TIME VS. AMPS)	\$170
R/I	ROTOR INERTIA	N/C
S/P	RECOMMENDED SPARE PARTS (BEARINGS, SEALS) SEE P/L	N/C
S/S	SHAFT STIFFNESS	\$170
S/P	SHAFT PRINT	\$60
S/P	EXTERNAL WIRING (CONNECTION) DIAGRAM (INCLUDES ACCESSORY CONNECTIONS DIAGRAMS WHEN APPLICABLE)	N/C
UL	UL®† Certificate	\$1,000

NOTE: Requests for data after order has been entered, for additional data, additional copies or resubmittal after changes will carry a basic charge of \$50 net per rating in addition to the charges noted above.

Submittals requiring express mailing (at customer request) will be sent prepaid and the cost of the mailing added to the order price.

- When requested, Nidec Motor Corporation will fill in data on customer data sheets. Original sheets must be supplied by customer at time of order entry. Data sheets must be originals or first-generation copies on standard 8-1/2 x 11 paper, completely legible and have standard font spacing. Data sheets that do not meet Nidec Motor Corporation criteria will not be completed. For data not listed above, refer to the Nidec Motor Corporation Technical Representative for availability.
- Above represents software requirements of most heavy-industrial customers. In some cases, this is but a small portion of the data requirements of highly specialized and controlled environments. Nidec Motor Corporation recognizes our customers with these concerns and can provide software that supports their needs. Pricing varies by requirement; refer to Nidec Motor Corporation Technical Representative for special software.
- Request for detailed information for motors that are 5 years or older will be charged \$300 net per motor.
- CE Mark - Not required for motors rated above 1000 volts. Contact the Inquiry Group regarding the CE Mark for motors rated at or below 1000 volts.
- UL®† Certificate - "Motor Certificate" is available for UL®†-listed motors only. This certificate from Underwriters Laboratories states that a specific product (mode / I.D. ) conforms with specific UL standards. Add \$1,000 net each rating.



# Modifiable TITAN® Horizontal Motors

## Accessories and Modifications

### 36. Rotor, Standard And Optional Construction

- Standard rotor construction of 449, 5000 and 5800 frame TITAN® products is typically die-cast aluminum. 720 RPM and slower is typically fabricated aluminum. Optional rotor construction is available as shown below.
- Standard rotor construction of the 6800, 8000 and 9600 frame products is fabricated aluminum. Optional rotor construction is shown below.
- Nidec Motor Corporation reserves the right to deviate from the above as good engineering practice dictates.
- Optional rotor designs will change published performance characteristics.
- Fabricated copper bar rotor construction is available. Centrifugally cast end rings are fully brazed to each rotor bar. Rotor bars are swaged, preventing in-slot movement and tight bar construction. Heavy finger plates tightly hold the rotor core together, controlling internal stress and maintaining dimension stability under all loads.

#### A. Fabricated Copper Bar Motor

Frame:	449	5000	5800	6800	8000	9600
Adder:	15200	18240	20775	22300	25335	28368

- Optional rotor construction is not available on ODP 447/449 Frame and WPI 447/449 Frame.

#### B. Fabricated Aluminum Bar Rotor

Frame:	449	5000	5800	6800	8000	9600
Adder:	1375	2250	3685	STD	STD	STD

- Optional rotor construction is not available on ODP 447/449 Frame and WPI 447/449 Frame.

#### C. Rotor Corrosion Protection

Frame:	449	5000	5800	6800	8000	9600
Adder:	1750	1750	1750	1750	1750	1750

### 37. Screens

#### A. Standard Material

Frame:	449	5000	5800	6800	8000	9600
Adder:	741	925	1155	1620	N/C	N/C

#### B. Stainless Steel

Frame:	449	5000	5800	6800	8000	9600
Adder:	1185	1385	1620	2080	2600	2950

### 38. Seals

Shaft slingers or seals may be installed to prevent the ingress of dirt and liquid.  
Shaft slingers and/or seals are not available on the opposite drive end of ODP, WPI & WPII motors.

#### A. Shaft Slinger (Price Each) (Ball Bearing & Roller Bearings Motors Only)

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

- Usually made of rubber.

#### B. INPRO/SEAL®† Seals (Price Each) (Ball Bearing & Roller Bearings Motors Only)

Frame:	449	5000	5800	6800	8000	9600
Adder:	1270	1270	1270	1850	1850	1850

- This is a permanent, metallic, non-contact, non-wearing, radial-axial labyrinth pattern isolator. This design permanently retains the lubricant in the bearing housing and prevents entry of foreign material into the bearing environment.
- Not available on Class II UL®† Listed Hazardous Location motors.

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