

**Coupling, Mount Customer's Half Coupling**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	1200	1200	1200	1200	1200	1200

- \* Customer's one-piece coupling half can be factory mounted on Motor Shaft on Frame Sizes 449 and larger. Coupling half must be finish machined and key seated to motor shaft dimensions and sent transportation prepaid and properly identified to the motor factory before the start of motor manufacture.
- \* Motors will be dynamically balanced prior to installing the half coupling and will not be rebalanced after coupling assembly.

**Crusher Duty**

**(TEFC & TEAAC Only)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	15 %	15 %	15 %	15 %	15 %	15 %

- \* Adder is percent of Base List Price.
- \* Crusher Duty includes a special rotor design, increased locked rotor and breakdown torques, end turn bracing, and lock washers.
- \* 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.

**Current Transformers**

**Arrange To Accommodate (Per CT)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	550	550	550	550	550	550

- \* Arrange Motor to accommodate Customer supplied Current Transformers.
- \* Must supply details of Current Transformers at order entry.

**Window Type**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	4400	4400	4400	4400	4400	4400

- \* USEM's standard offering is Qty-3 Window Type (ABB Style 7524, Type IMC) mounted in Oversized Main Conduit Box.
  - For ABB Style BYZ, double the list adder shown above.
- \* For other types of Current Transformers, refer complete details to your Emerson Technical Representative.

**Drains (Breather/Drains)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	300	300	300	300	300	300

- \* Standard construction on Enclosed Non-Explosionproof 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/Breather options are available:
  - Brass T-Type Drains/Breathers
  - Stainless Steel T-Type Drains/Breathers
  - Explosionproof (UL Listed) Drains
- \* If Drains/Breathers are selected for Explosionproof Motors, must select Explosionproof Drains/Breathers.
- \* Drains/Breathers not available on ODP Motors.

**Drip Cover (Canopy Cap)**

**With Vertical Lifting Provisions**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	900	1200	1500	N/A	N/A	N/A

- \* Provides protection for the Motor in a Vertical Shaft Down position.
- \* Available on 449-5800 Frames, TEFC Only.

**Dual Mounting**

**With No Frame Change**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	1250	1400	N/A	N/A	N/A

\* 5000 and 5800 Frame Open or Weather Protected Motors can be supplied with dual mounting holes with the above adder. The following options are available:

- 5008 & 5007/507 Mounting Holes
- 5010 & 5009/509 Mounting Holes
- 5012 & 5011 Mounting Holes
- 5810 & 5809/589 Mounting Holes
- 5811 & 5810 Mounting Holes
- 5812 & 5811 Mounting Holes
- 5813 & 5812 Mounting Holes

\* Use this adder if the standard Frame size is the larger of the two listed.

**ODP/WPI, With Frame Jump**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	3000	N/A	N/A	N/A	N/A

- \* 5000 Frame ODP or WPI Motors can be supplied with dual mounting holes with the above adder. The following options are available:
  - 5008 & 5007/507 Mounting Holes
  - 5010 & 5009/509 Mounting Holes
  - 5012 & 5011 Mounting Holes

\* Use this adder if a Frame "jump" is required (adder covers the frame jump).  
 Example: If the standard Frame is 5006, and 5007 Mounting is required, then a 5008 Frame is used with Dual Mounting for 5008/5007.

**WPII, With Frame Jump**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	4250	N/A	N/A	N/A	N/A

- \* 5000 Frame WPII Motors can be supplied with dual mounting holes with the above adder. The following options are available:
  - 5008 & 5007/507 Mounting Holes
  - 5010 & 5009/509 Mounting Holes
  - 5012 & 5011 Mounting Holes

\* Use this adder if a Frame "jump" is required (adder covers the frame jump).  
 Example: If the standard Frame is 5006, and 5007 Mounting is required, then a 5008 Frame is used with Dual Mounting for 5008/5007.

## Efficiency Class

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	(3)	(3)	(3)	(3)	(3)	(3)

- \* (3) See Base List Price Section for pricing.
- \* USEM supplies Titan Motors in two Efficiency Classes:
  - Standard Efficiency
  - Premium Efficiency
- \* All Efficiency Levels are based on IEEE-112, Method B.

## Enclosures

### Dripproof (ODP)

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	(3)	(3)	(3)	(3)	(3)

- \* (3) See Base List Price Section for pricing.
- \* Open Dripproof (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 MG-1). These are motors with ventilating openings which permit passage of external cooling air over and around the windings.
- \* Available on Titan Motors in 5000-9600 Frame. For 449 Frame and smaller ODP Motors, refer to the NEMA Custom Motor Catalog (PB202).

### Dripproof Guarded

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	800	1000	1400	0	0

- \* Use ODP List Price plus above adder.
- \* Dripproof, Guarded: An Open Dripproof enclosure with all openings, including ventilated openings giving direct access to live metal or rotating parts (except smooth rotating surfaces) are limited in size by the structural parts or by screens, baffles, grills, expanded metal or other means to prevent accidental contact with hazardous parts. Openings giving direct access to such live or rotating parts shall not permit the passage of a cylindrical rod of 0.75 inch diameter (NEMA MG1).
- \* Available on 5000-6800 Frames with the above adder; standard (no charge) on 8000 and 9600 Frames.

### Weather Protected Type I (WPI)

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	1850	3300	4200	0	0

- \* Use ODP List Price plus above adder.
- \* Weather Protected Type I (WPI): An open machine with its ventilating passages so constructed as to minimize the entrance of rain, snow and airborne particles to the electric parts, and having its ventilated openings so constructed as to prevent the passage of a cylindrical rod 0.75 inch in diameter (NEMA MG1).
- \* Available on 5000-6800 Frames with the above adder; standard on 8000 & 9600 Frames.

**Enclosures (Continued)**

**Weather Protected Type II (WPII)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	(3)	(3)	(3)	(3)	(3)

- \* (3) See Base List Price Section for pricing.
- \* Weather Protected Type II (WPII): The machine shall have, in addition to the enclosure defined for a WPI machine, the normal path of the ventilating air which enters the electric parts of the machine shall be so arranged by baffling or separate housings as to provide at least three abrupt changes in direction, none of which shall be less than 90 degrees. In addition, an area of low velocity not exceeding 600 feet per minute shall be provided in the intake air path to minimize the possibility of moisture or dirt being carried into the electric parts of the machine (NEMA MG1).
  - Space Heaters furnished at no charge on WPII, if specified at order entry.
  - Filter racks for reusable filters furnished as standard (no charge).
- \* Available on 5000-9600 Frames.

**Splash Proof Separately Ventilated (SPSV)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	2800	3900	4800	5200	5600

- \* Use ODP Base List Price plus above adder.
- \* Splash Proof Separately Ventilated (SPSV): This enclosure will meet NEMA standards for splash proof protection and prevents liquid drops or particles from entering the motor up to 100 degrees downward from vertical. Utilizes a WPII Frame Assembly and Brackets, with a modified top hat with provisions for Customer supplied ducting.
- \* Available on 5000-9600 Frames.

**Splash Proof Blower Ventilated (SPBV)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	5200	6800	8000	9000	9900

- \* Use ODP Base List Price plus above adder.
- \* Splash Proof Blower Ventilated (SPBV): This enclosure will meet NEMA standards for splash proof protection and prevents liquid drops or particles from entering the motor up to 100 degrees downward from vertical. Utilizes a WPII Frame Assembly and Brackets, with a modified top hat for motor mounted blower.
- \* Available on 5000-9600 Frames.

**Totally Enclosed Fan Cooled (TEFC)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	(3)	(3)	(3)	N/A	N/A	N/A

- \* (3) See Base List Price Section for pricing.
- \* Totally Enclosed Fan Cooled (TEFC): The TEFC type enclosure prevents free air exchange but still breathes air. A fan is attached to the shaft and pushes air over the frame during operation to help in the cooling process.
- \* Available on 449-5800 Frames.

**Enclosures (Continued)**

**Totally Enclosed Blower Cooled (TEBC)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	2200	N/A	3500	N/A	N/A	N/A

- \* Use TEFC Base List Price plus above adder.
- \* Totally Enclosed Blower Cooled (TEBC): Totally Enclosed Motor with a motor mounted constant speed blower.
- \* Available on 449 and 5800 Frames.

**Totally Enclosed Air-To-Air Cooled (TEAAC)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	N/A	(3)	(3)	(3)	N/A

- \* (3) See Base List Price Section for pricing.
- \* Totally Enclosed Air-To-Air Cooled (TEAAC): Also know as Tube Cooled (TETC). Motor is cooled by circulating the internal air through a heat exchanger which in turn, is cooled by circulating external air. It is provided with an air-to-air heat exchanger for cooling the ventilating air and a fan mounted on the rotor for circulating the internal air and a separate shaft mounted fan for circulating the external air.
- \* TEAAC Motors are supplied with steel tubes mounted in a top box and steel fans as standard.
  - Tubes are treated with an epoxy resin coating to prevent rust & corrosion.
- \* Available on 5800-8000 Frames.

**TEAAC With Stainless Steel Tubes**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	N/A	12900	16500	20000	N/A

- \* Use TEAAC Base List Price plus above adder.
- \* Same as standard TEAAC, except with Stainless Steel Tubes.
- \* Available on 5800-8000 Frames.

**Totally Enclosed Separately Ventilated (TESV)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	800	1800	3000	4800	5500

- \* Use WPII Base List Price plus above adder.
- \* Totally Enclosed Separately Ventilated (TESV): A Totally Enclosed enclosure utilizing a WPII Frame Assembly and Brackets, with a modified top hat with provisions for Customer supplied ducting.
- \* Available on 5000-9600 Frames.

**Enclosures (Continued)**

**Totally Enclosed Water-To-Air Cooled (TEWAC)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	N/A	54500	62500	70000	76200

- \* Use WPII Base List Price plus above adder.
- \* Totally Enclosed Water-To-Air Cooled (TEWAC): A totally enclosed machine which is cooled by circulating internal air which, in turn, is cooled by circulating water. It is provided with water-cooled heat exchangers mounted in the motor top hat for cooling the internal air and fans integral with the rotor shaft for circulating the internal air (NEMA MG1-1.26.7).
  - The motor is supplied with two heat exchangers mounted in the top of the motor. The heat exchanger tubes are 90 percent copper, 10 percent nickel, tube sheets and headers are of steel, and fins are aluminum. Double wall tubes are standard. Cooler is designed for use with 80F max, cooling water at a pressure not exceeding 50 psi (test at 75 psi) with a nominal fouling factor of 0.001.
  - Data required with the order:
    - > Inlet Water Temperature & Pressure
    - > Fouling Factor
    - > Any restrictions on water outlet temperature & pressure drop.
- \* Available on 5800-9600 Frames.

**Division 1, Explosionproof (UL Listed) Class I**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	(3)	(3)	N/A	N/A	N/A

- \* (3) See Base List Price Section for pricing of Class I Group D T2B Temperature Code Product.
- \* Explosionproof: A Totally Enclosed machine 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 machine by sparks, flashes or explosions of the specified gas or vapor which may occur within the machine casing (NEMA MG-1).
- \* Orders for Explosionproof Motors must specify Division, Class, Group and Temperature Code.
- \* Refer to Appendix "C" for definitions of Division, Class, Group and T-Codes.
- \* Available on 5000-5800 Frames.

**Division 1, Explosionproof (UL Listed) Class II**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	5 %	5 %	N/A	N/A	N/A

- \* Make adder against the Division 1, Explosionproof Class I Base List Price.
- \* 5000 Frame: Class I & II, Group D, F&G, T3B is available.
- \* 5800 Frame: Class I & II, Group C, D, E, F&G, T3C is available.
- \* Refer to your Emerson Technical Representative to confirm Frame Size.

**Division 2, Explosionproof (UL Listed) (DEDUCT)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	5 %	5 %	N/A	N/A	N/A

- \* Note: This is a price DEDUCT, instead of an adder. Deduct is percent of the Division 1 Explosionproof Base List Price.
- \* Division 2 Explosionproof Motors are available in the same ratings, and with the same restrictions as Division 1 Explosionproof Motors.

**Enclosures (Continued)**

**Division 2, Non-Listed**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	5 %	5 %	5 %	5 %	5 %	5 %

- \* Adder is percent of Base List Price.
- \* The following restrictions apply:
  - Not Available (not applicable) on Explosionproof Motors
  - Not Available on Inverter Duty
  - Class II Not Available on ODP Motors
  - Temp Codes T-4 to T-6 Not Available
  - Group E Not Available
- \* Use the Explosionproof Adders for all accessories. Accessories not available on Division 1 Explosionproof Motors are not available on Division 2 Motors.
- \* Temperature Codes other than T1-T2B may result in an oversized Frame. Confirm Frame Size prior to quoting.

**Encoders**

**(QP) Refer To Quick Pick Chart For Pricing & Available Options**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)

- \* Standard offering is Encoder Products M/N 776 (\$1500 List Adder).
- \* Flange mounted encoders are not available.

**Endshields, C-Face/D-Flange**

**(Ball Bearing Motors Only, Not Available On All Ratings)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	1270	2500	3300	N/A	N/A	N/A

- \* Make above adder for C-Face or D-Flange on Drive End.
- \* Flange construction: Cast Iron or Fabricated Steel, per USEM standards.
- \* Not available on all Enclosures or Frame Sizes. Contact your Emerson Technical Representative with rating & frame size to confirm offering.

**Export Boxing**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	1900	1900	1900	N/A	N/A	N/A

- \* Export packaging is available from our International Warehouse in Memphis, TN.
- \* Contact your Emerson Technical Representative for 6800-9600 Frames.

**Fire Pump Motor (250 HP & Less, 600V & Less)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	5 %	N/A	N/A	N/A	N/A	N/A

- \* Adder is percent of Base List Price.
- \* USEM's UL Listed (File EX5189) Fire Pump Motors are designed per UL-1004A and meet the NFPA-20 "Standard for the Installation of Centrifugal Fire Pumps".
- \* USEM UL Listed Fire Pump Motors meet the following requirements:
  - Designed to meet NEMA Design "B" limitations per NEMA MG1-1993.
  - Calculated Safe Stall Time must exceed 12 seconds (cold).
  - Motors designated for Canada must meet CSA-390 Table 2 efficiency values.
  - Suitable for the following Starting Methods:
    - > Across-The-Line Start (All Frame Sizes)
    - > Also Suitable For Wye-Start/Delta-Run
    - > Dual Voltage Motors Also Suitable For Part Winding Start on Low Voltage
    - > Single Voltage Motors Also Suitable For Part Winding Start
  - Depicting UL File Number Fire Pump Tags.

**Foot Flatness, Special**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	1250	1250	1250	1250	1250	1250

- \* 0.005" Foot Flatness from mounting hole to mounting hole.
- \* Provided as standard (no charge) on motors with IEEE-841 Features.

**Frequency, 50 Hertz**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	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 made.
- \* 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. The Secondary Rating is always 1.0 Service Factor.
- \* Refer to the Performance Data Section for Frame Sizes at 50 Hertz.

**Grease Fitting On Fill & Pressure Relief Fitting On Drain**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	130	130	130	130	130	130

- \* Grease Fitting on Fill and Plug On Drain is standard on Grease Lube Titan Motors.
- \* Make the above adder for Grease Fitting On Fill and Pressure Relief Fitting on Drain.
- \* Not Available (not applicable) on Motors with Oil Lubricated Bearings.

**Grounding**

**Conduit Box or Frame**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	300	300	300	300	300	300

- \* All Titan Motors have provisions for grounding; a grounding connector (Ground Lug) in the main Conduit Box.
- \* Use this adder for other methods of grounding:
  - In Conduit Box:
    - > Servit Post
  - On Frame:
    - > Grounding Pad (Standard on 5000-5800 Frame Open Motors)
    - > Tapped Hole on Foot (Standard on Motors With IEEE-841 Features)

**Grounding Strap (Sleeve Bearing Motors Only)**

<b>Frame:</b>	<b>449</b>	<b>5000</b>	<b>5800</b>	<b>6800</b>	<b>8000</b>	<b>9600</b>
<b>Adder:</b>	N/A	700	700	700	700	700

- \* Required on Sleeve Bearing Motors when both bearings are insulated.