

# Vertical Motors Conversions & Accessories Descriptions & Adders

DISCOUNT SYMBOL: SAME AS MOTOR BEING CONVERTED

## Bearings

### Extra High Thrust (175%)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	5%	5%	5%	5%	5%	5%

Available only on Premium Efficient Vertical HOLLOSHAFT® WPI (Type RUS, RUSI, RUE & RUEI).

## Coupling

### Change to Alternate Coupling Size

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Standard drive coupling can be changed to an alternate size at no charge, if specified at time of motor order.

## Conduit Boxes

### Accessory Conduit Box

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	901	901	901	901	901	901	901	901	901	901

A conduit can be added to the main motor conduit box for routing of accessory leads. Available on WPI and TEFC ratings.

### Rotate Conduit Box

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	235	235	235	235	235	235	235	235	235	235

Standard conduit box has lead opening facing down. This conversion includes rotating the conduit box so the lead opening is facing the desired direction. Specify direction of lead opening: Facing up; Facing left (when facing the conduit box); Facing right (when facing the conduit box)

Available at no charge if specified at time of order placement.

### Cast Iron Conduit Box

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	293	469	587	704	-	-

Replacement of steel conduit box with cast iron version.

Available on HOLLOSHAFT®, 320 frame and larger.

### Size 2 Cast Iron Box (1-3.5 NPT Openings)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	-	-	1408	1408	-	-

### Size 3 Cast Iron Box (2-3.5 NPT Openings)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	-	-	3477	3477	3477	3477

## Division 2 Self Certified & Division 2 CSA®† Certified

### (+) Refer To The Charts Below For Pricing

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	-	-

The following restrictions apply:

Contact an NMC Technical Representative to confirm availability.

Inverter suitability limited to T1-T3 T-codes.

Zone 2 markings available on separate Division 2 nameplate options.

Only Available on TEFC TUS, JUE, TVCS & TCEF Motor Types models.

Class II not available

Temp codes T-4 to T-6 not available.

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### Division 2 Self Certified & Division 2 CSA<sup>®†</sup> Certified (continued)

#### Class I, Grps. A/B/C/D T1-T3 T-Codes On Main N/P @ 1.0 SF (On TUS, JUE, TVCS & TCEF Models – Standard Rating ONLY)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	NC	NC	NC	NC	NC	NC	NC	NC	NC	-

Contact an NMC Technical Representative to confirm availability.

#### Class I, T-Code T1-T3C on Separate Division 2 Plate (Self Certified)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	100	100	100	100	100	100	100	100	100	-

Contact an NMC Technical Representative to confirm availability.

#### Class I, T-Code T1-T3C On Separate CSA Division 2 Plate (CSA)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	100	100	100	100	100	100	100	100	100	-

Contact an NMC Technical Representative to confirm availability.

## Drains (Breather/Drains)

### T-Type Breather/Drain

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	70	70	94	94	94	117	117	117	-	-

Install T-Type breather/drains in place of standard drains.

Available on 180-447 frame cast iron enclosed motors.

## Export Boxing

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	(@)	(@)	(@)	(@)	(@)	(@)	(@)	(@)	(@)	(@)

Product is boxed, packaged or crated as required for under deck exporting.

(@) Refer to Optional Export Packing Charges Section.

## Flanges

### Change P-Base Bracket to Alternate "BD" Dimension

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Replace standard "P" base bracket with one of different "BD" dimension.

Available at no charge if specified at time of motor order.

## Ground Lug

### In Conduit Box

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	108	108	108	108	108	108	108	108	108	108

Addition of ground lug in main motor conduit box.

## Leads

### Tie Back Leads

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	399	587	587	892	892	892	892	892	892	-

Reconnect dual voltage 9-lead or 12-lead motors to 3-lead single voltage. Tie back and connect leads inside frame for single voltage 3-lead conduit box connections. Specify desired voltage when ordering.

## Nameplates

### Additional Duplicate Nameplate

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	235	235	235	235	235	235	235	235	235	235

An additional duplicate nameplate for mounting on customer equipment. These additional nameplates cannot be supplied with CSA® or UL® logos.

### Additional Stamping On Main Nameplate

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	235	235	235	235	235	235	235	235	235	235

The main motor nameplate can be stamped with limited customer tagging information (20 characters max).

### Shipping Tag (#6 Paper Tag)

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

A #6 paper shipping tag, with customer tagging information, can be supplied at no charge when specified at time of motor order.

### Special I.D. Plate

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	235	235	235	235	235	235	235	235	235	235

Special identification plates can be mounted on the motor with limited customer specified tagging information (100 characters max).

### Re-Nameplate (Re-Rate)

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	235	235	235	235	235	235	235	235	235	235

Motors can be re-nameplated (after approval) for alternate ratings. Changes in horsepower, altitude, ambient, voltage, frequency, etc.

Contact an NMC Technical Representative for approval prior to quoting.

### Firepump Label

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%

Percentage adders are percent of base list price. UL® Listed (File E187977) firepump motors are designed per UL-1004A® and meet the NFPA-20® "Standard for the Installation of Centrifugal Fire Pump Spec". This conversion is to add the firepump label.

Contact your NMC Technical Representative with exact rating to confirm that it meets the firepump requirements.

## Non-Reverse Ratchet

### Bolted Coupling - Add or Remove

<b>Frame:</b>	180	210	250	280	320	360	400	444-447	449	5000
<b>Adder:</b>	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

Remove non-reverse ratchet (NRR) and convert motor to self-release coupling (SRC) or bolted coupling.

Available at no charge if specified at time of motor order.

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### Non-Reverse Ratchet *(continued)*

#### Clockwise Non-Reverse Ratchet

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	5%	5%	5%	5%	5%	5%

Remove non-reverse ratchet (NRR) and (Counter Clockwise Rotation) and replace with a Clockwise Rotation (when looking down on the motor) non-reverse ratchet. Available only on Premium Efficient Vertical HOLLOSHAFT® WPI (Type RUSI & HUSI)

### Paint, Special

#### Special Paint

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	469	469	869	869	869	869	869	869	1714	1714

Special paint must be approved by the Conversion Center/Plant prior to quoting. A Material Safety Data Sheet (MSDS) must be sent to the Conversion Center/Plant for their review.

A special paint can be furnished (once approved) if compatible with our standard paint/primer, is commercially available, and suitable for air drying (paints containing lead or zinc cannot be used, and sand blasting is not available).

### Prints & Data (Submittals)

#### (Net Adders)

Frame:	56	140	180	210	250	280	320	360	400	444-447	449(DP)	449(TE)	5000	5800
Adder:	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)	(QP)

Submittals adders are NET ADDERS. (QP) refer to Vertical motors quick pick chart.

The following submittals are considered standard submittals, and are available at no charge if requested at time of motor order:

- Certified Dimension Print
- Performance Data
- Nameplate Data
- Instruction Manual
- Wiring Diagram
- Parts List
- Recommended Spare Parts
- Bearing Life Calculation
- Conduit Box Details
- Paint Specification
- Rotor Air Gap (Calculated)
- Rotor Inertia
- Cut Sheets For Accessories

### Space Heaters

#### (Double Adder for Explosionproof Motors)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	477	477	512	512	596	643	643	643	1326	1326

Space heaters are installed to prevent moisture condensation in the motor during times the motor is not running. NMC uses silicon rubber strip-type heaters manufactured by sandwiching a resistance wire network between two pieces of high-temperature silicon rubber and bonding the pieces together. Heaters are sized to provide approximately 10°C temperature rise above the ambient temperature.

Heaters are placed on the end turns of the motor winding. Heaters are of the low density type, which yields low surface temperature and long life. Heaters are single phase, rated 60 or 50 Hertz.

Space Heaters are available in the following voltages:

115, 230, 460 & 575 Volt

230 Volt operated at 115 Volt

## Steady Bushing Kit

(Attached To Motor Eyebolt)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	202	202	202	202	300	300	300	300	418	418

Steady bushing comes as a field-installable kit, and is shipped attached to the motor eyebolt.

## Tests

### Short Commercial Test, Un-Witnessed

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	662	662	662	662	662	662	662	662	662	662

All test adders are NET ADDERS

A Short Commercial Test, per NEMA<sup>®</sup> MG-1 Part 12, consists of no load current, locked rotor current (performed at reduced voltage, typically 25-50%), winding resistance, high potential, and bearing inspection. A test report is provided to the customer.

### Complete Initial Test, Un-Witnessed

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	3580	3580	5317	5317	5317	5317	5317	5317	5317	5317

All test adders are NET ADDERS

A Complete Initial Test consists of full load heat run, percent slip, no load current, full load current, locked rotor current, locked rotor torque, breakdown torque (calculated), efficiency & power factor at 100%, 75% & 50% full load, winding resistance, high potential, and bearing inspection. This test is performed in accordance with IEEE 112 Method B. A test report is provided to the customer. Motor will be shipped to an NMC facility with a calibrated lab for testing and will require additional leadtime.

Contact an NMC Technical Representative for availability and leadtime.

## Thermal Protection, Bearings (Upper Bracket)

### Resistance Temperature Detectors (RTD's), 10 or 120 Ohm

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	1338	1338	1338	1338	1338	1338

Resistance Temperature Detector (RTD): Precision, wire-wound resistors with a known temperature-resistance characteristic. NMC does not furnish the monitor.

Available only on Vertical HOLLOSHAFT<sup>®</sup> WPI (Type RUS, RUSI, RUE & RUEI). Available on Upper Bracket Only

The following options are available:

- TB40 10 Ohm, 3 lead
- TB41 120 Ohm, 2 lead
- TB42 100 Ohm, 3 lead

### Resistance Temperature Detectors (RTD's), 100 Ohm

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	-	-	-	-	1338	1338	1338	1338	1338	1338

Resistance Temperature Detector (RTD): Precision, wire-wound resistors with a known temperature-resistance characteristic. NMC does not furnish the monitor.

Available only on Premium Efficient Vertical HOLLOSHAFT<sup>®</sup> WPI (Type RUSI & HUSI). Available on Upper Bracket Only.

The following option is available:

- TB42 100 Ohm, 3 Lead

## Thermal Protection, Windings

### Thermostats (Double Adder for Explosionproof Motors)

Frame:	180	210	250	280	320	360	400	444-447	449	5000
Adder:	265	265	265	265	418	519	519	519	519	519

Thermostats: Snap action, bi-metallic, temperature actuated switches installed on the end-turns of the motor winding. Their purpose is to activate a warning device or shut down the motor upon excessive winding temperatures. Standard arrangement is addition of 2 or 3 thermostats to the winding end-turns, connected in series with the leads brought out to the main motor conduit box.

The following options are available:

- TW01 Thermostats, normally closed
- TW02 Thermostats, normally open
- TW06 Thermostats, normally closed, hermetically sealed

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### Thermal Protection, Windings *(continued)*

#### Thermistors

<b>Frame:</b>	<b>180</b>	<b>210</b>	<b>250</b>	<b>280</b>	<b>320</b>	<b>360</b>	<b>400</b>	<b>444-447</b>	<b>449</b>	<b>5000</b>
<b>Adder:</b>	472	472	472	472	669	669	876	876	876	876

Thermistors: Non-linear resistance temperature detector made from semi-conductor material. Standard arrangement is Q-3 positive temperature coefficient (PTC) type on winding end-turns with leads brought out to the main motor conduit box.

The following options are available:

TW10 Thermistors (PTC Type), Texas Instruments®, 6 leads out

#### THERMA SENTRY®

<b>Frame:</b>	<b>180</b>	<b>210</b>	<b>250</b>	<b>280</b>	<b>320</b>	<b>360</b>	<b>400</b>	<b>444-447</b>	<b>449</b>	<b>5000</b>
<b>Adder:</b>	587	587	587	587	587	587	587	1150	1150	1150

THERMA SENTRY®: Complete protection system consisting of three thermistors and a solid state control module (shipped loose for customer mounting). It will protect the motor for locked rotor, starting overload, running overload, abnormally high ambient temperatures, voltage unbalance, high or low voltages, ventilation failure, and single phasing.

Available on non-Explosionproof motors.

The following options are available:

TW20 THERMA SENTRY®, 115/230V, SMSE, normally closed contact (SMSE = separately mounted, separately excited control module)

#### Thermocouples

<b>Frame:</b>	<b>180</b>	<b>210</b>	<b>250</b>	<b>280</b>	<b>320</b>	<b>360</b>	<b>400</b>	<b>444-447</b>	<b>449</b>	<b>5000</b>
<b>Adder:</b>	3434	3434	3434	3434	3434	3434	3434	3434	3434	3434

Thermocouples: A pair of dissimilar conductors so joined at one point that an electromotive force is developed by the thermoelectric effects. Standard arrangement is addition of thermocouples to the winding end-turns with leads brought out to the main motor conduit box.

The following options are available:

TW32 Thermocouples, Iron Constantan (Type J)

### Vibration Detector

#### Robertshaw®†, Model 366

<b>Frame:</b>	<b>180</b>	<b>210</b>	<b>250</b>	<b>280</b>	<b>320</b>	<b>360</b>	<b>400</b>	<b>444-447</b>	<b>449</b>	<b>5000</b>
<b>Adder:</b>	-	-	-	-	1878	1878	1878	1878	-	-

Available only on Premium Efficient Vertical HOLLOSHAFT® WPI (Type RUSI).

## Integral Horsepower Motor Type Code Identification Chart Vertical Motors

Type Code	Motor Description	Phase	Efficiency
AUS, RUS, RUE	WPI Vertical, HOLLOSHAFT®	Three Phase	Premium Efficient
AUI, RUSI, RUEI	WPI Vertical, HOLLOSHAFT®	Three Phase	Premium Efficient
AUR, AUC	WPI Vertical, HOLLOSHAFT®	Single Phase	Standard Efficient
AVS, RVS	WPI Vertical, Solid Shaft	Three Phase	Premium Efficient
TUS, JUE	TEFC, HOLLOSHAFT®	Three Phase	Premium Efficient
TUCI, JUCEI	TEFC, HOLLOSHAFT®	Three Phase	Premium Efficient
TVCS	TEFC, Solid Shaft	Three Phase	Premium Efficient