



# U.S. MOTORS

## Features & Information

### U.S. Motors on Adjustable Frequency Drives (AFD):

U.S. Motors Inverter Duty Motors with "Inverter Grade®" insulation exceeded NEMA MG-1 Part 30 and 31 before the standards were established. We were a leader in the development of motors to withstand PWM drives evolution from power transistors to higher switching frequency IGBT's. Today there is an increased need for motors for light and medium duty inverter applications. Through continued research and development, including the addition of Inverter Grade II wire, all Premium and Energy Efficient Motors are inverter compatible. Inverter compatibility of motors is complex. Many factors must be taken into account to determine the suitability of types of motors. These factors include torque requirements (constant or variable), speed range, line/system voltage, cable length between drive and motor, drive switching (carrier) frequency and the motor construction. Wider speed ranges, higher voltages, higher switching frequencies and increased cable lengths all add to the severity of the application and therefore the potential for premature motor failure. Emerson Motor Company has differentiated its products into families for your ease of selection for various inverter applications.

### Applying "Inverter Grade®" Insulation Motors on Adjustable Frequency Drives:

The products in this catalog labeled "Inverter Duty" or "Vector Duty" have "Inverter Grade® Insulation". This insulation system exceeds the NEMA MG-1 Part 31 standard and has been proved in thousands of inverter installations for reliability. Emerson provides a minimum 3-year warranty on all motors that include "Inverter Grade® Insulation" and does not limit cable run between the motor and the AFD for these motors. These are the most appropriate motors for any severe inverter application or when the factors affecting a motor's suitability are undefined (such as spares). U.S. Motors is stocking the following "Inverter Grade®" insulated motors:

- \* Inverter Duty Motors good for 10:1 Variable Torque & 5:1 Constant Torque, including Vertical Type RUSI
- \* Inverter Duty Motors good for 10:1 Constant Torque
- \* Vector Duty Motors with full torque to 0 Speed & 1024 PPR, 5-28VDC Encoder
- \* 841 PLUS® Motors that meet IEEE 841 Standard & are suitable for 5:1 Constant Torque

**All Motors have 40C Ambient, 1.0 SF on Inverter Power, 3300 Ft. Max Altitude, 460 Voltage or less line power, up to 10:1 Speed Range on Variable Torque and have Class F Insulation.**

### Applying Premium Efficient Motors on Adjustable Frequency Drives:

Meet NEMA MG-1, Section IV, Part 31.4.4.2. They are suitable for use with adjustable frequency drives under the following parameters: Up to 4:1 speed range on constant torque loads, standard two year warranty.

Maximum Cable Distance AFD to Motor, Premium Efficiency			
Switching Frequency	460 Volt	230 Volt	380 Volt
3 KHz	196 ft	481 ft	295 ft
6 KHz	168 ft	340 ft	209 ft
9 KHz	113 ft	278 ft	170 ft
12 KHz	98 ft	241 ft	148 ft
15 KHz	88 ft	215 ft	132 ft
20 KHz	76 ft	186 ft	114 ft

### Applying Standard & Energy Efficient Motors 180 Frame & Larger on Adjustable Frequency

Meet NEMA MG-1, Section IV, Part 30.2.2.8. They are suitable for use with adjustable frequency drives under the following parameters: Up to 2:1 speed range on constant torque loads, one year warranty.

Maximum Cable Distance AFD to Motor, Standard or Energy Efficient			
Switching Frequency	460 Volt	230 Volt	380 Volt
3 KHz	103 ft	435 ft	218 ft
6 KHz	73 ft	307 ft	154 ft
9 KHz	59 ft	251 ft	126 ft
12 KHz	51 ft	217 ft	109 ft
15 KHz	46 ft	194 ft	98 ft
20 KHz	40 ft	168 ft	85 ft