

VariTough® Inverter Duty Motors

Commercial Condenser Motors with AEGIS® SGR Protection



No matter the climate.

True Inverter Duty Construction™ Motors

The Difference is U.S. MOTORS™



Why VariTough® Inverter Duty Motors?

A commercial condenser unit usually has multiple motors and is usually operating with only one variable frequency drive (VFD). This is a harsh environment in itself, but in addition, these motors need to be designed to work efficiently in the heat of the summer and also efficiently in the cooler parts of the year. Our U.S. MOTORS® VariTough® Inverter Duty Motors are not only designed to operate in a multi motor environment with one VFD, but our 4:1 ratio allows the motor to obtain the RPM's needed in the heat of the summer, and a lower RPM in the cooler parts of the year offering system efficiency, all the while protecting the condensing unit from “freezing up.”

When installing, you the expert, must select the right motor for the application. If you are replacing a Commercial Condensing motor operating through a VFD, the VariTough® Inverter Duty Construction Motor should be your first choice.



Product Overview and Features

VariTough® motors are designed with U.S. MOTORS® brand Inverter Grade® Insulation System that has had years of proven success in our commercial belt drive products leading to longer life, less downtime and lower maintenance costs. VariTough® motors are designed to meet the NEMA MG1-Part 31 design guidelines, which most drive manufacturers recommend.

What is “shaft voltage” and how do VariTough® motors handle it?

High Switching frequencies of variable frequency drives can induce damaging voltage levels to the rotor.

- Induced voltages seek a path to ground, typically through the bearings.
- The electrical currents arc between the balls and races of the bearing causing craters, pitting and fluting that contribute to premature bearing failure.

- Some have tried to solve this by using conductive grease to facilitate the voltage reaching the motor housing and ground.
- However, conductive grease has two issues:
 - The particles that are added to the grease to make it conductive contribute to bearing wear.
 - There is only limited conductivity created that does little to get the induced voltage out of the bearing and avoid damage.
- VariTough® motors offer a more effective solution to protect the bearing where “shaft voltage” may be an issue.
 - Each motor has an AEGIS® SGR Bearing Protection Ring included/mounted on the motor, providing an alternative path for electrically grounding the shaft.
 - The ring is included/assembled with the VariTough® motors and is sold separately as an accessory kit number 21.

Shaft Grounding Comparison:

	Grounding Ring*	Conductive Grease
Long-term Effectiveness	Yes	No
Easy to Install	Yes	No
Contamination Proof	Yes	N/A
Effective at any RPM	Yes	No
Maintenance Free	Yes	No

*AEGIS® SGR Grounding Ring

Motor Specifications:

Horsepower: 1/2 – 2 HP

Phase: Three

Speeds: 575, 850, 1140 RPM

Enclosure: Open Drip-Proof (ODP),
Shaft-up Design



Belly Band Mount

Catalog Number	HP	RPM	Volts	Amps	Frame	Bearings	Mount	Shaft (in.)***	Total Length	Wt. (lbs.)
1830VG	1	825	208–230/460	5.2–5.2/2.6	56YZ	Ball	Belly Band	5/8 x 6.0	16.3	43
1828VG	1	850	208–230/460	5.0–5.0/2.5	56YZ	Ball	Belly Band	5/8 x 6.0	16.8	32
1818VG	1	1140	208–230/460	4.3–4.3/2.1	56YZ	Ball	Belly Band	5/8 x 6.0	15.8	32
1832VG	1 1/2	850	208–230/460	7.2–7.2/3.6	56YZ	Ball	Belly Band	5/8 x 6.0	18.3	32
1819VG	1 1/2	1140	208–230/460	5.3–5.3/2.6	56YZ	Ball	Belly Band	5/8 x 6.0	16.3	43
8987VG	2	1140	208–230/460	7.8–7.8/3.9	56YZ	Ball	Belly Band	5/8 x 6.0	16.8	48

Rigid Base Mount

1297VG	1/2	575	480	1.9	56HZ	Ball	Rigid	5/8 x 4.25	15	50
1139VG*	1/2	575	230/460	3.1/1.6	56YZ	Ball	Rigid	5/8 x 6.0	14.4	44
1833VG	1	850	208–230/460	5.0–5.0/2.5	56YZ	Ball	Rigid	5/8 x 6.0	16.8	42
1820VG	1	1140	208–230/460	4.3–4.3/2.1	56YZ	Ball	Rigid	5/8 x 6.0	15.8	38
1831VG	1 1/2	850	208–230/460	7.2–7.2/3.6	56YZ	Ball	Rigid	5/8 x 6.0	18.3	40
1821VG	1 1/2	1140	208–230/460	5.3–5.3/2.6	56YZ	Ball	Rigid	5/8 x 6.0	16.3	44
1822VG	2	1140	208–230/460	7.8–7.8/3.9	56YZ	Ball	Rigid	5/8 x 6.0	16.8	48

*Automatic Thermal Overload Protector

VariTough® Inverter Duty Motor Features:

- Inverter duty
- Designed to NEMA MG1-Part 31
- 70°C (158°F) max ambient
- Thermostat overload detection
- AEGIS® SGR Protection Ring included and mounted
- Class F insulation system
- Double-sealed ball bearings
- Shaft-up, open drip-proof enclosure
- Continuous duty, air over
- Voltage change device
- Reversible rotation
- Keyway and flat shaft

Why VariTough® Inverter Duty Motors?

Issue:	Resolution:
<p>Use of Variable Frequency drives (VFDs) to control the motor's speed, often cause electrical occurrences that require special motor designs to insure reliable performance.</p> <ul style="list-style-type: none"> - Internal Voltage Spikes - Corona discharge between the windings 	<p><i>True Inverter Duty Construction – Inverter Grade® Insulation System</i> prevents damaging corona effect allowing higher switching frequencies and longer cable lengths.</p>
<p>Most drive manufacturers recommend meeting NEMA MG1-Part 31 Design Guidelines.</p>	<p><i>U.S. MOTORS® brands feature Inverter Grade® Insulation System</i> that has proven success in our commercial belt drive products leading to longer life, less downtime and lower maintenance costs.</p> <ul style="list-style-type: none"> - Designed to NEMA MG1-Part 31 and have a 4:1 speed ratio
<p>Demanding inverter duty applications, especially where multiple motors are driven by one VFD.</p>	<p><i>U.S. MOTORS® brands feature Thermostat Overload Detection*</i> – Provides consistent, reliable protection even in the most demanding inverter duty applications, providing better motor protection for the motors than typical “auto protected” motors.</p>
<p>Bearing damage due to electrical discharges by VFD-induced shaft voltage.</p>	<p>Includes shaft grounding which provides maintenance-free bearing protection from damaging electrical discharges caused by VFD-induced shaft voltage.</p>

*Must be wired in series with run circuit on variable frequency drive. **AEGIS® SGR Bearing Protection Ring included and mounted on motor.



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