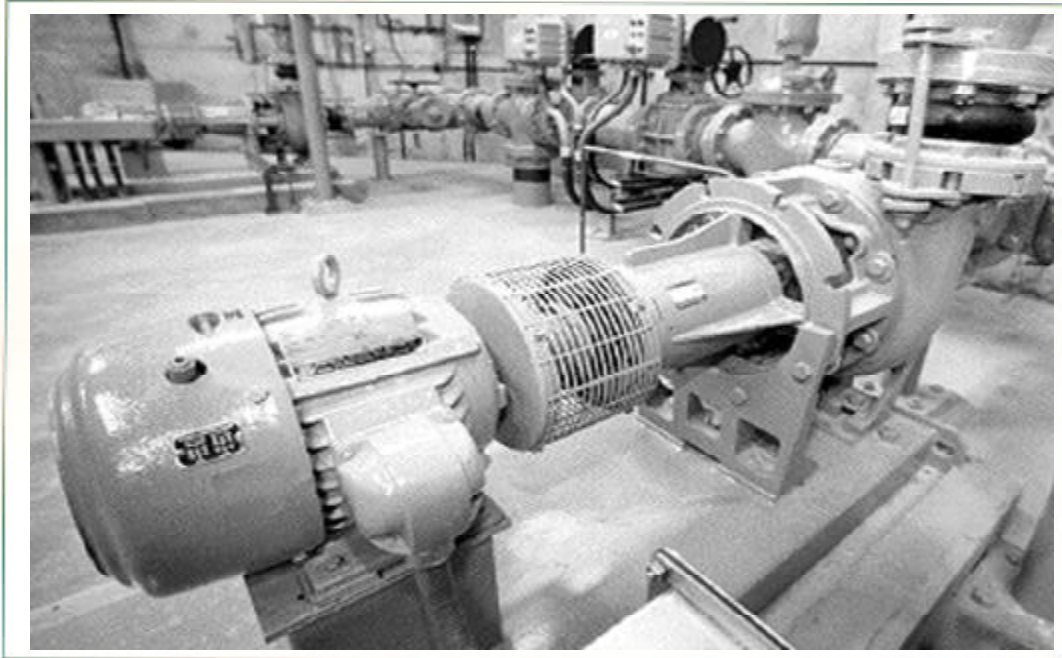


# Product Data Sheet

## Horizontal A.C. Motors

*Definite Purpose Totally Enclosed Fan Cooled  
Varidyne® Inverter Duty*



***60HP Varidyne® motors featured at a Water Treatment Plant***

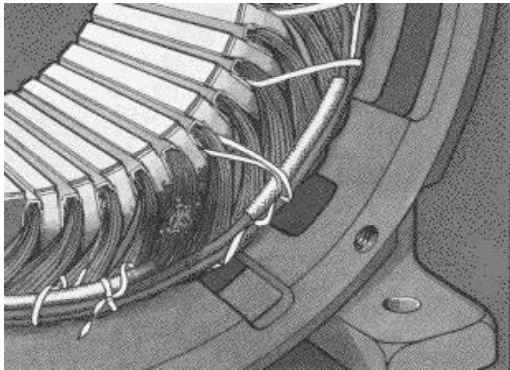
- **Totally Enclosed Fan Cooled and Open Dripproof**
- **Inverter Duty, Exceeds NEMA MG1-Part 31**
- **For use on applications powered by variable frequency drives**
- **1-400 HP, DP  
1-200 HP, TEFC  
1-200 HP, TEBC & Vector  
1-15 HP, TENV Vector**
- **10:1 Speed Range Variable Torque  
5:1 Speed Range Constant Torque  
10:1 Variable Torque  
30:1 Blower Cooled  
Vector Duty**
- **Allguard Motor Quality System**



## Product Overview

The Varidyne® Inverter Duty Motor is available for use on applications powered by adjustable frequency drives. Some applications are pumps, fans, blowers and other inverter powered applications having variable torque load profiles, as well as conveyors extruders, winders, and other constant torque applications.

Our Inverter Duty Motors are designed with a 1.0 service factor (1.15 on sinewave power) and 40° C ambient conditions. NEMA Design B is standard (NEMA Design A on vector) and the motor is designed for various speed ranges depending on the application.

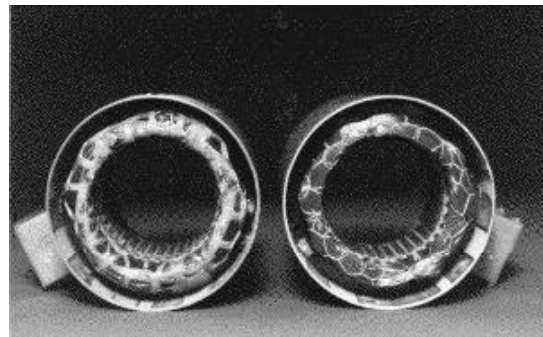


***An example of windings damaged by excessive voltage spikes***



Premium efficiency levels are standard on the inverter duty product. This allows the motor to run cooler and more effectively, whether powered by sinewave or inverter power.

The Varidyne Inverter Duty motor is designed with the Inverter Grade insulation system to protect the windings from voltage spikes caused by inverter power.



***A comparison of standard insulation vs. the Inverter Grade® insulation system***

**The inverter insulation system consists of:**

- Insulife 2000 - double dip and bake with 100% Solids Polyester Varnish
- Extra slot, cell and phase insulation
- Extra end turn bracing

**Other inverter duty motor features include:**

- Dynamically balanced rotor to 1/2 NEMA
- Inverter information on the nameplate
- Three normally closed thermostats
- Premium Efficient Design

# Varidyne<sup>®</sup> Motors Establish New Standard

The demand for variable speed drives is skyrocketing. U.S. Electrical Motors believes that customers should not have to sacrifice motor reliability to enjoy the benefits of variable frequency drives. Therefore, in the early '90s U.S. Electrical Motors recognized this upward trend in inverter use and responded to the market with a motor designed for inverter duty applications. We realized the need to create a motor specifically to address the additional stress PWM drives place on motors. Our Engineering Department evaluated the drawbacks of PWM drives and created a design approach that resulted in the Varidyne, the most reliable VFD motor.

## SCIENTIFIC JOINT VENTURE

During the development stages of the Varidyne, USEM began a joint research venture with Phelps Dodge to create and improve upon the pulse endurance of the insulation system. Using a scientific approach, USEM & Phelps discovered a NEW magnet wire. With the substantially improved wire, a new insulation was designed, and the product was registered as Inverter Grade. Today we continue ongoing test programs with the latest technology drive products to evaluate VFD design applications. Our ongoing research and development program is designed to develop the best cost motor possible. Today, USEM leads the

industry with its improvements in the standards of motors for variable frequency drives.

## NEMA MG1 STANDARDS

U.S. Motors Varidyne<sup>®</sup> Motors meets the NEMA MG1 specification parts 31 introduced in 1994 and updated in 1998. The USEM "Inverter Grade" insulation system has been used in the field for more than eight years. Most Drive Manufacturers recommend performance levels stated by the more stringent guidelines of NEMA MG1 Part 31. USEM Inverter Duty motors meet these requirements. In fact, we are so confident of the Varidyne motors that we offer a three year warranty on all "Inverter Grade" Motors.

## USEM LEADS INDUSTRY

Because of our early development of Inverter Grade insulation, USEM is recognized as a leader in this field. We have been asked to develop training presentations and release educational papers regarding our position and innovation on variable frequency motor design.

## LARGE PRODUCT OFFERING

U.S. Motors maintains a broad product offering of VFD motors with stock and production motors available. Inverter Grade products can be found in the following designs: TEFC, ODP, TEBC, TENV, Explosion proof (UL listed), gearmotors, vector

duty, automotive duty and washdown duty. Contact your sales representative or our literature hotline (800-665-4850) for more information on the Varidyne<sup>®</sup> product.

## INVINCIBLE INSULATION

That's right. U.S. Electrical Motors builds their Inverter Duty Motors to withstand the most severe voltage spike levels. The complete insulation system guarantees consistent performance for better process control. A double dip and bake treatment seals the windings and protects them from moisture and dirt. Extra end turn bracing, more phase paper, and pulse resistant magnet wire achieve the stability you need. Superior reliability means no more winding failures.

U.S. Motors' Inverter Duty Motors have the guts to meet the demands of adjustable frequency controls. All Inverter Duty Motors come standard with a thermostat to avoid thermal overload. A high thermal margin provides torque at 5:1 constant torque and 10:1 variable torque.

When properly applied, U.S. Motors guarantees a 0% failure rate on its Inverter Duty Motors



## Mechanical Features

- F-1 Assembly
- Footed Construction
- Precision Balance to .08ips peak
- Diagonally Split Conduit Box With Four Position Conduit Entrance

## Electrical Features

- Meets Performance Standards Established In NEMA MG-1 Part 31
- Meets or Exceeds 1997 Federal Efficiency Standards
- Inverter Grade® Insulation System
- NEMA Design B
- 1.0 Service Factor on Inverter Power
- 1.15 on Sinewave Power
- 230/460 Volt (460V only on 405-449 Frame)

## Product Scope

<b>Horizontal Motors</b>	<ul style="list-style-type: none"> <li>• 1/3 through 4000 HP</li> <li>• Constant and variable torque ratings</li> </ul>	<ul style="list-style-type: none"> <li>• 2, 4, 6 and 8 pole</li> <li>• TEFC, Corro-Duty®, explosionproof and auto-duty</li> </ul>
<b>Vertical Motors</b>	<ul style="list-style-type: none"> <li>• 3 through 4000 HP</li> <li>• Variable torque</li> <li>• Hollowshaft® and Solid shaft designs</li> </ul>	<ul style="list-style-type: none"> <li>• 2, 4, 6 and 8 pole</li> <li>• WP 1, WP 11, TEFC and explosionproof</li> </ul>
<b>Gearmotors</b>	<ul style="list-style-type: none"> <li>• 1/3 through 75 HP</li> <li>• Constant torque speed range to 15:1</li> <li>• Ratios to 6300:1</li> </ul>	<ul style="list-style-type: none"> <li>• Right angle and parallel shaft</li> <li>• TEFC and explosionproof motors</li> </ul>
<b>Vector-Controlled Motors</b>	<ul style="list-style-type: none"> <li>• 1/3 through 200 HP; 140 through 440 frame sizes</li> <li>• Constant torque down to zero hertz</li> <li>• 1024 ppr, 5-2BY encoder standard</li> </ul>	<ul style="list-style-type: none"> <li>• 2, 4, 6 and 8 pole</li> <li>• TENV and TEBC designs</li> </ul>
<b>Blower-Cooled Motors</b>	<ul style="list-style-type: none"> <li>• 1/3 through 200 HP; 140 through 440 frame sizes</li> <li>• 30:1 constant torque operating range</li> </ul>	<ul style="list-style-type: none"> <li>• 2, 4, 6 and 8 pole</li> <li>• Auxiliary blower for cooling</li> </ul>

## Warranty

- Three (3) Year Warranty applies for inverter power and sine wave power applications



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