

ENERGY EFFICIENCY WEG W22 MOTORS

WEG's W22 motor, available locally from Zest Electric Motors, provides a solution to the growing demand for energy in a burgeoning global population. By decreasing the actual energy required in specific industrial and mining applications, these energy efficient electric motors will decrease the current global energy consumption of electric motors.

This initiative to increase the efficiency of electric drives by using high efficiency electric motors and frequency inverters for variable speed applications is significant when their participation in the global energy consumption is considered.

Using latest generation computational tools such as structural (finite element method) and fluid flow analysis as well as electric design optimisation software, the WEG W22 product line was conceived.

A number of premises were adopted in the design of the WEG W22 motors, including a reduction in noise and vibration levels as well as an increase in energy and thermal efficiency, and an increase in variable speed applications by using frequency inverters.

Close attention was paid not only to the internal efficiencies of the working motor, but also to the elements constituting the external components of the designed motor:

- The frame is a fundamental component in the design because, besides constituting the mechanical structure reference, it is the main conduit responsible for the heat dissipation generated inside the electric motor. The terminal box has also been moved to the front of the frame to increase the heat dissipation area and provide a uniform air flow over the motor frame.

Careful consideration of construction materials led to the selection of FC-200 cast iron which is produced in WEG's own facilities.

Interestingly, this is the same material that is used in the company's explosion-proof motors.

- The main function of the fan, when assembled directly on the motor shaft, is to promote the air flow over the frame fins, thus dissipating the heat generated inside the motor.

WEG's design on the cooling system on these new motors was conceived using the most advanced simulation software and fluid flow analysis software, resulting in an innovative aerodynamic profile with reductions in both mechanical losses and noise.

- WEG carried out a field survey amongst installation and maintenance experts to determine optimal design performance which unearthed the importance of a new terminal box concept that prioritises the interface

with the user, providing easier access and handling of the power and accessory cables and ensuring more reliability and versatility in the motor installation.

The diagonal cut design of the terminal box base and the terminal box cover enables easier access to the electrical connection and gives a better view of the interior of the terminal box during installation procedures.

Using the same WEG exclusive BMC (polyester with 20% fibreglass) die-cast terminal blocks that are used for the terminal blocks of hazardous area motors ensures high electrical insulation resistance and durability. In addition, the accessory cable connections are made with quick coupling connectors.

- Available initially from frame size 225S/M (37 kW, 4 pole) and up to frame size 355M/L (330 kW 4 pole), the WEG W22 range will also provide outputs of up to 450 kW 4 pole in a new frame designated 355A/B.
- The lower outputs from 0.18 kW to 30 kW (frame sizes 63 to 200) will be phased in up to February 2010, and while not boasting all the design elements of the larger machines, the smaller frame sizes still incorporate many benefits of the WEG W22 concept.

Other benefits of the WEG W22 motors include:

- Maximum heat dissipation through extended frame area
- Solid integrated feet for increased mechanical rigidity and easier installation
- Flat surfaces provided on frame and end shields for vibration monitoring
- Flexibility of terminal box mounting positions
- Reduced noise pressure levels (limited TO 80 dB(A) at one metre)
- Reduced operating temperatures through optimised cooling system
- Reliability of fan cover which is able to withstand IK08 impact test
- Oversized split level terminal box for easier connection
- New connector for fast accessory assembly
- Connection reliability (terminal block prevents cable rotation)
- Electrical insulated bearing housing option
- End shield design promotes excellent heat dissipation
- Extended lubrication intervals result in lower maintenance costs
- Efficient lubrication system
- New W-seal and W3 seals provide improved protection against contaminants
- Earth terminals on both sides of frame
- New drain plugs certified to IP 55 and IP 66
- New frame range with extended outputs

- WISE insulation system with better materials for VSD applications
- Flat efficiency curves maximise energy savings
- Standard Efficiency, Premium Efficiency Plus and Top Premium Efficiency designs exceed IE 1, IE 2 and IE 3 levels defined by IEC 60034-30
- Top Premium Efficiency ratings in the same frame sizes for complete interchangeability.