

Permanent Magnet Machine

PM138

BENEFITS

- ▶ Machine room space savings
- ▶ Layout flexibility
- ▶ Construction cost savings
- ▶ Energy savings
- ▶ Increased reliability
- ▶ Improved control and ride

Otis incorporates state-of-the-art compact permanent magnet machine technology into Elevonic and OTIS4000 systems. Included among the many benefits are improved power efficiencies and increased hoisting capacities.

FEATURES

Permanent Magnets

The high performance rare-earth Neodymium Iron Boron (NdFeB) permanent magnets used in the PM138 and 30T Machines are based on intermetallic compounds that contain so called "rare-earth" elements.

These magnets are perhaps misnamed given that the lighter rare-earth element used (Neodymium) is, in fact, more abundant than lead or tin.

The name relates to Neodymium's position in the classic periodic table of elements. Of all the rare-earth magnet types, NdFeB has the highest energy content and is ideally suited for permanent magnet machine applications.

Space Savings and Flexibility

Otis' Permanent Magnet (PM) machines provide increased hoisting capacity in a smaller machine package. The smaller machine provides space savings of 40 percent in area and 50 percent in cubic volume, which means improved machine room layout flexibility and reduced construction and installation costs because of associated weight reduction.

Energy Savings

In addition to the electrical current required to produce torque, conventional asynchronous motors (induction motors) require electrical current to excite the magnetic field in the rotor. This current, typically around 6 to 10 percent of the total current input into the machine, contributes to a lower power factor, additional power loss and reduced efficiencies.

Permanent magnet synchronous machines obtain constant rotor field excitation by using permanent magnets in their rotor construction. No additional current is required for rotor magnetisation.

Rare-earth permanent magnet motors deliver improved power factors and zero slip across the range of operation. The result is a 10 percent improvement in motor efficiency and associated energy savings.

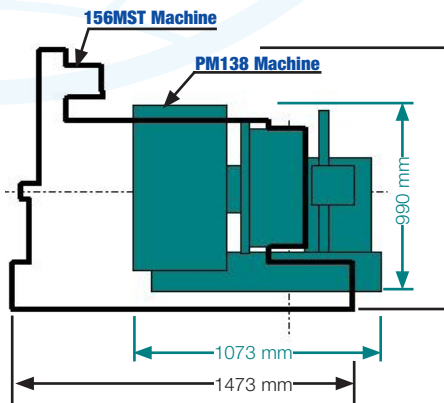
Increased Reliability

The PM138 and 30T Machines cool by natural convection, eliminating fan noise in the machine room and reducing elevator downtime.

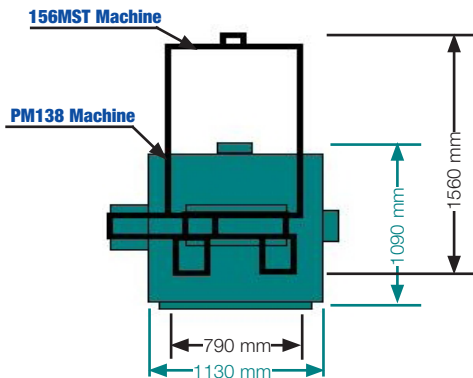
Improved Control and Ride

With the application of permanent-magnet, field-oriented vector control, VVVF drive systems deliver improved rotational control, and smoothing "jerk-in" and "jerk-out" velocity profiling for better ride quality and precise stopping accuracy.

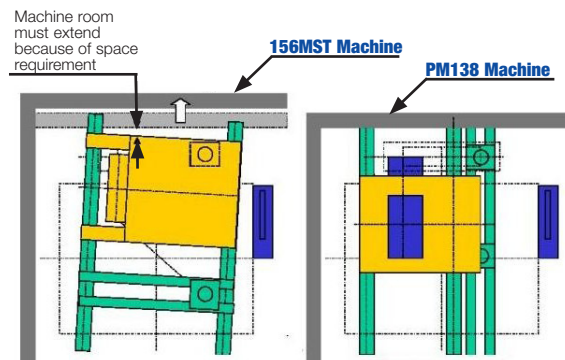
Comparison of PM138 and 156MST Machines



Profile Comparison



Footprint Comparison



Machine Room Layout Comparison

Permanent Magnet Machines

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Comparison of 30T (Permanent Magnet) and D25 Machines

