



High-Speed Permanent Magnet Motors and Drives for Aeration Blowers – 0.5 to 1 MW

Efficient air supply is a key component in the aeration processes within wastewater treatment plants. A reliable and well managed supply of quality air is a critical requirement for the aeration diffuser systems, for both municipal and industrial wastewater treatment plants. This is to guarantee the continuity of process operations and clean, uncontaminated discharge into the environment.

Wastewater aeration blowers, which are responsible for the supply of quality and reliable air, are a huge consumer of energy. They are also the leading candidate for cost optimisation and efficiency improvement at the wastewater treatment plant. Careful consideration is required when designing blower technology, including the associated motor and drive components, as it is critical in reducing energy consumption at waste water treatment plants. In a typical biological wastewater treatment plant, the blower system will account for up to 70% of the energy usage.

TPS are experts in the design and manufacture of permanent-magnet motors and drives to suit different types of aeration blower systems. Our permanent magnet technology solutions provide a suite of benefits including improved efficiency, high reliability, reduced Total Cost of Ownership, compact & lightweight design and near silent operation.

Key Technical Features

- ✓ Fully integrated solution includes Motor, Drive, Cooling & Controls
- ✓ Nominal Speed: 16,314 rpm to 17,319 rpm
- ✓ Power: 516 kW to 1041 kW
- ✓ Rated Torque: 406 Nm to 950 Nm
- ✓ Permanent-Magnet Motor
- ✓ Fully packaged High Speed Variable Frequency Drive with switchgear, filters, control and cooling system
- ✓ Oil-free magnetic bearing
- ✓ Capable of supporting high mass impellor ~ 14kg

Key Benefits to Waste Water Treatment Plant Operators

- ✓ Direct-drive system eliminates need for gearbox, improving system reliability, efficiency and noise
- ✓ Variable Speed control with permanent magnet motor enables very high efficiencies, even at part load and speed
- ✓ Frictionless, oil-free bearings enabling exceptionally high motor efficiency
- ✓ Significantly reduced footprint with up to 70% smaller and 90% lighter motor than equivalent geared system
- ✓ Dedicated High Speed Variable Frequency Drive, optimised for target system efficiency and operation
- ✓ Optimised control configuration for motor phasing



Figure 1 – 500 kW Motor System

Figure 2 – 1 MW Motor System

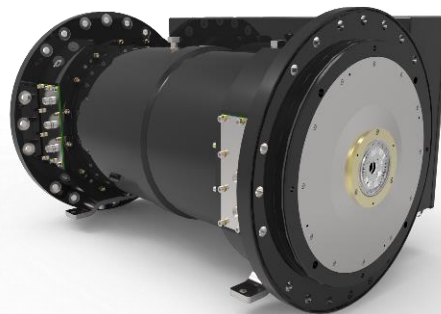
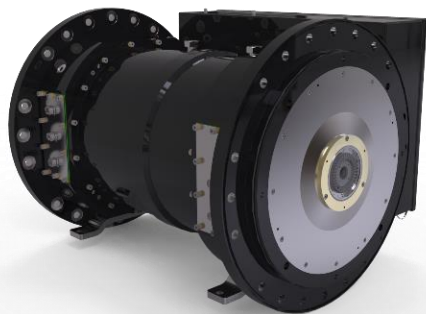


Figure 1.2 – Drive
for 500 kW Motor



Figure 2.2 – Drive
for 1MW Motor



Performance table

MOTOR SPECIFICATION		
	500 kW	1 MW
Permanent Magnet	Surface mount 4 pole design, 6-phase	Surface mount 4 pole design, 12-phase
Motor dimensions	913 mm (Length) x 759 mm (Width) x 648 mm (Height)	1080 mm (Length) x 759 mm (Width) x 648 mm (Height)
Motor Mass	546 kg	687 kg
Nominal speed	17,319 rpm	16,314 rpm
Motor	Water cooling – 18 litre /min Pressure – 2-4 Bar (<1Bar differential) Rotor air – 50 g/s Pressure – 50 mbar	Water cooling – 36 litre /min Pressure – 2-4 Bar (<1Bar differential) Rotor air – 100 g/s Pressure – 50 mbar
Motor Phases	6	12
Nominal voltage	380 to 480 V (380V with optional auto-transformer)	
Over-speed capability	6%	
Efficiency	> 94% (at nominal speed and power)	
Control	Speed or Torque	
Safety functions	Overcurrent, Overvoltage, Over-speed, Over-temperature	
Insulation	Class H operated at Class F	
Coupling type	Hirth couplings at both ends	
Bearing type	Magnetic with double-acting thrust bearing	
Ingress Protection rating	IP 54	

