

PMM 850M

0–400 rpm



Designed and built for shaft generator and propulsion motor applications

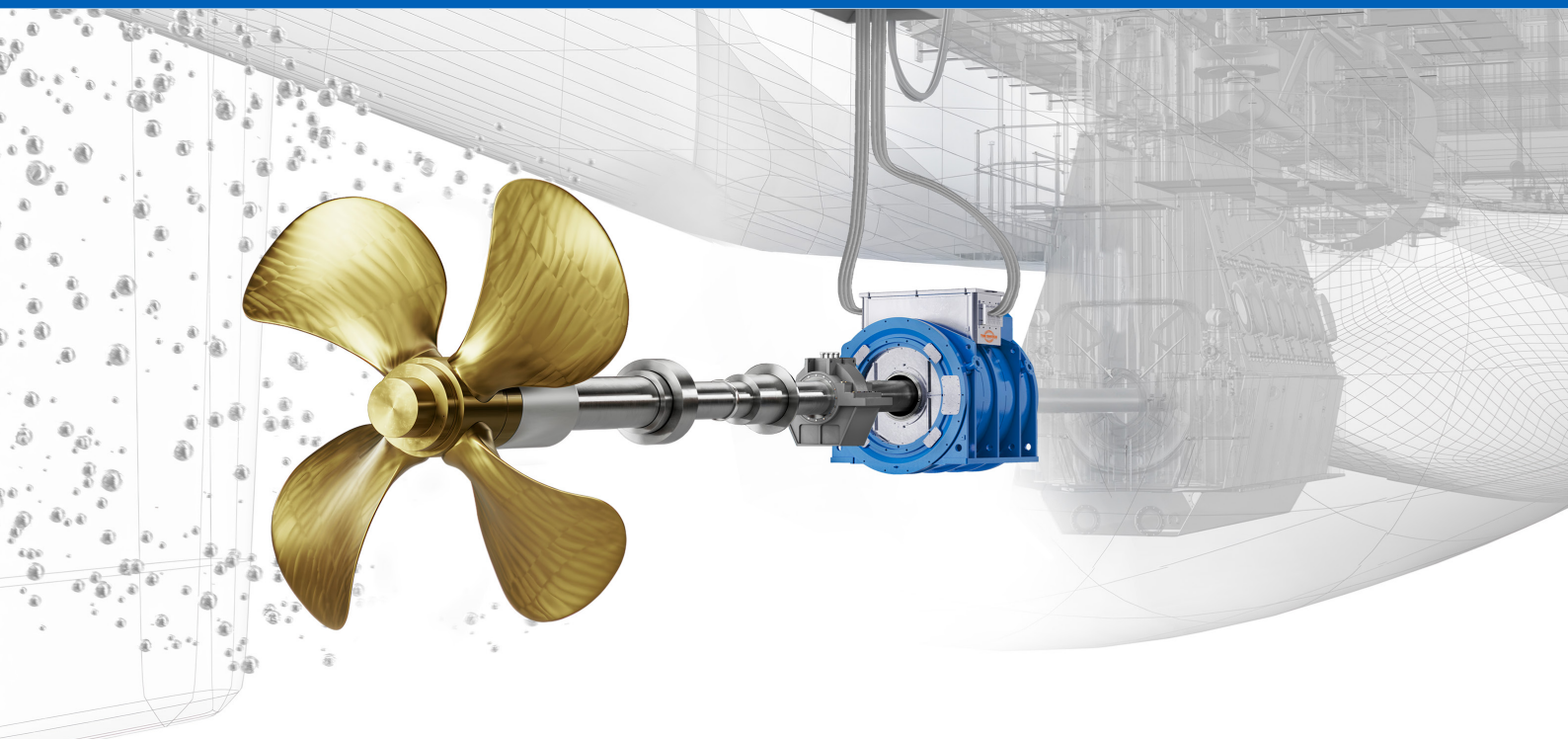
For various vessel types, such as bulk carriers, LNG carriers, product tankers and more.

- 100% designed for marine applications
- Optimized for vessels with narrow hulls
- Brushless permanent magnet (PM) synchronous machine
- High efficiency, reducing fuel consumption and lowering emissions
- Compact and lightweight design
- Easy to install
- Low operating costs
- Built according to international standards
- Water-jacket cooling
- Certificates from leading classification societies worldwide

Always tailored to application-specific requirements by adjusting:

- Speed range
- Cooling
- Voltage
- Machine length based on torque
- Other key parameters

Each machine is comprehensively tested in our own testing facilities before delivery.



Technical data ¹																
Frame	850M						850M									
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Max. continuous torque [kNm]	70	81	92	103	115	126	136	147	157	168	178	189	199	210	220	231
Shaft center height [mm]	850						850									
Continuous speed range [rpm]	0–400						0–400									
Stator winding type	Form-wound winding with mica insulation						Form-wound winding with mica insulation									
Max. momentary torque [%]	130						130									
Machine mass excluding shaft or bearings [t]	9.2	9.8	10.4	11.0	11.6	12.1	12.7	13.3	13.9	14.4	15.0	15.6	16.1	16.7	17.3	17.9
Rotor mass excluding shaft or bearings [t]	1.67	1.89	2.13	2.35	2.54	2.74	2.92	3.11	3.31	3.5	3.68	3.88	4.07	4.26	4.45	4.64
Rotor inertia excluding shaft or bearings [kgm²]	570	640	730	800	870	940	1,010	1,070	1,150	1,210	1,280	1,350	1,420	1,480	1,560	1,620
Protection class	IP44						IP44									
Cooling type	IC71W (Water-jacket cooling)						IC71W (Water-jacket cooling)									
Number of poles	40						40									
Nominal voltage [V]	450/500/690						450/500/690									
Max. ambient temperature [°C]	45						45									
Max. cooling liquid temperature [°C]	38						38									
Insulation class	180						180									
Thermal class	155						155									

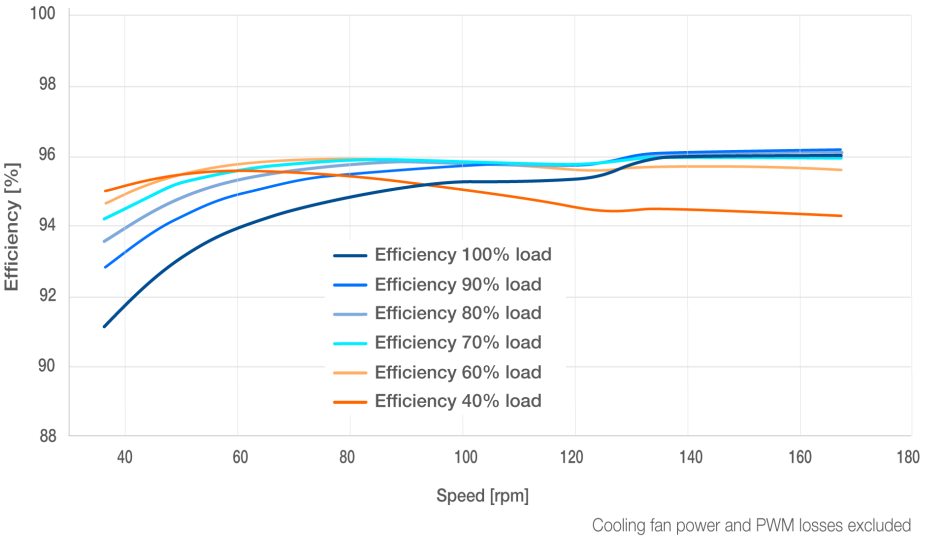
¹Numbers shown here are subject to change depending on project-specific requirements

Features	Main benefits
Excitation with Neodymium magnets	- Excellent efficiency, especially at part loads - Brushless, no slip rings needed, no wearing parts - No external exciters needed - No automatic voltage regulator (AVR) needed - Low rotor weight and inertia - In generator mode, possible to start from blackout - Very low vibration levels
Form-wound, mica-insulated winding impregnated with global VPI	- Best possible protection against mechanical vibrations, chemical corrosion and electrical surges - Proven technology with a solid track record in marine
Control with frequency converter	- Variable speed operation, decouples the machine rotation speed from grid's voltage and frequency - Maximized system efficiency - In shaft generator applications, both PTI and PTO modes available - Full torque available starting from zero speed - Momentary overloading for clearing ice loads, foreign parts on the propeller or other
IP44 protection class	- Closed system, no external particles or dirt can enter the machine
Compact machine	- Design optimized for each delivery project using proven technology and product platform - Short machine because external rotor excitation is unnecessary - No external cooling unit with air-to-water heat exchangers

Features	Main benefits
Redundancy	- With dual winding machine, possibility to safely operate the machine with reduced power in case of converter failure
Rotor	- In shaft generator applications, it is possible to decouple the rotor from the propulsion shaft line in less than 3 hours - Low-inertia design compared to other generator technologies and even permanent magnet solutions
Flexible design	- Variable machine torque by varying length (number of substacks) - Modular design allows customization - Cable interfaces in different directions in terminal boxes - Interchangeable main and star-point cable direction
Easy and fast installation	- Common bearings with propulsion shaft line - Rotor inserted in stator for transport - Easily accessible terminal boxes - HEX rubber bellow expansion joints - New eccentricity adjustment method with dial indicators
Low operating expenses	- High efficiency, lower fuel consumption - Simple, robust and reliable machine - Less maintenance - No external cooling fans, reduced fuel consumption

Typical efficiencies of The Switch PMM at various speeds and load levels

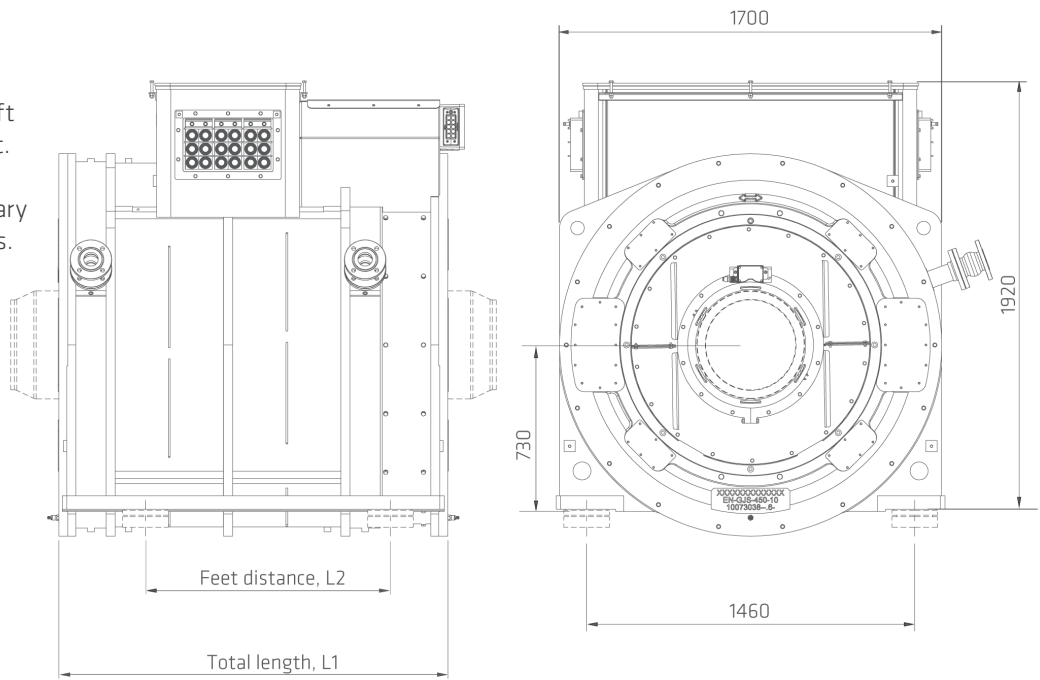
This chart illustrates typical efficiencies vs speed at different load levels, taking into account external cooling fan power consumption.



The exact efficiency value depends on the nominal speed of the application.

Technical drawings

The dimensions below are for a shaft generator without bearings or shaft. Ask about dimensions for the propulsion motor version, as they vary according to customer requirements.



Machine dimensions

Frame	850M							
	7	8	9	10	11	12	13	14
Total length, L1 [mm]	1,146	1,219	1,292	1,365	1,438	1,511	1,584	1,657
Feet distance, L2 [mm]	506	579	652	725	798	871	944	1,017

Frame	850M							
	15	16	17	18	19	20	21	22
Total length, L1 [mm]	1,730	1,803	1,876	1,949	2,022	2,095	2,168	2,241
Feet distance, L2 [mm]	1,090	1,163	1,236	1,309	1,382	1,455	1,528	1,601

Direct-drive propulsion

The Switch permanent magnet machine (PMM) can be used as a direct-drive propulsion motor in a standard configuration with its own bearings. Alternatively, it can be used as a novel concept, utilizing the common bearings between the propulsion shaft and the motor. A tandem setup is also possible on request.

