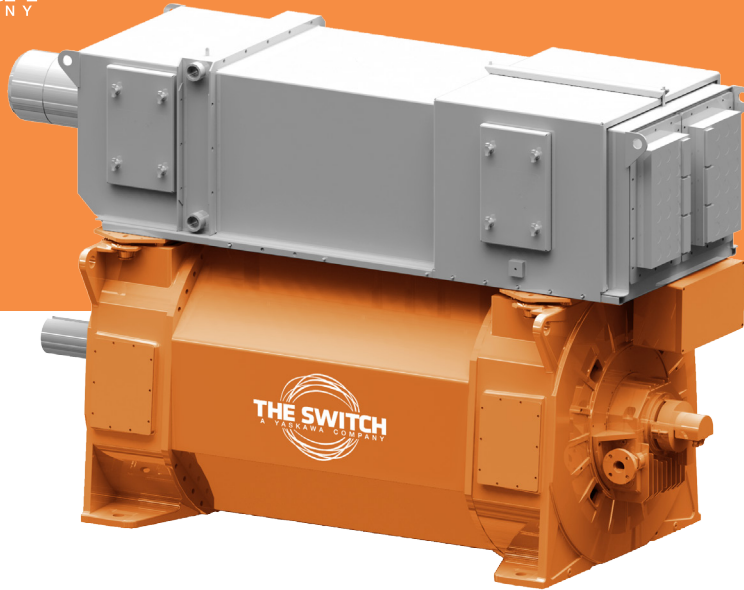




# PMM 560 5.0 MW

## 0 – 2000 rpm



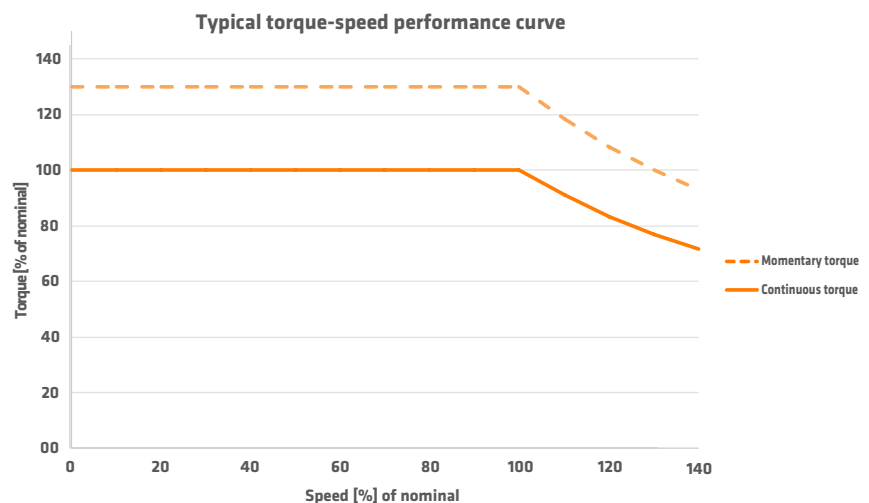
### Built for a wide range of rugged marine applications

The Switch PMM is a brushless permanent magnet synchronous machine designed and built according to international standards such as IEC. It can be delivered with various certificates issued by worldwide classification societies, including LR, BV and DNV. The machine is designed for a wide range of marine applications. It can be used either as a generator, for instance, a shaft generator, or as a motor, for example, for the main propulsion.

The Switch PMM can be tailored to meet every customer's special requirements with regards to speed range, cooling, voltage and other specifications. Excellent scalability in axial length results in the widest possible torque range. The production facility for these machines is certified according to ISO 9001 international quality standard.

### Operational range

The machine is designed to meet specific operational speed range requirements.



### Technical data

	Frame 560-14	Frame 560-15	Frame 560-16	Frame 560-17
Max. continuous torque [kNm]	20.2	21.6	23.1	24.6
Shaft height [mm]	1000			
Speed range [rpm]	1500-1800			
Output power at 1500 rpm [kW] <sup>1</sup>	3090	3300	3540	3780
Current at 1500 rpm [A] <sup>2</sup>	2720	2910	3100	3290
Cos (φ)	0.85			
Efficiency at 1500 rpm [%]	97.4	97.4	97.5	97.5
Max. momentary torque [% of nominal]	150			
Machine weight [t]	6.8	7.1	7.4	7.7
Rotor weight [t]	1.82	1.92	2.02	2.12
Rotor inertia [kgm <sup>2</sup> ]	86	92	97	103
Protection class <sup>3</sup>	IP54			
Cooling type	IC8A6W			
Number of poles	4			
Nominal voltage [V] <sup>4</sup>	690			
Max. ambient temperature [°C]	40			
Max. cooling liquid temperature [°C]	50			
Insulation class <sup>5</sup>	F			
Thermal class	H			
Cooling fan power, max. [kW]	10.1	10.8	11.1	11.5
Cooling liquid flow rate, max. [m <sup>3</sup> /h] <sup>6</sup>	12.8	12.8	12.8	12.8

<sup>1</sup>Generator mode <sup>2</sup>Nominal voltage 690 V <sup>3</sup>Higher class optional <sup>4</sup>Medium voltage optional <sup>5</sup>H-class optional <sup>6</sup>For most powerful version

Features	Main benefits	Features
Excitation with Neodymium magnets	<ul style="list-style-type: none"> <li>- Excellent efficiency, especially at part loads</li> <li>- Brushless, no slip rings needed, no wearing parts</li> <li>- No external exciters needed</li> <li>- No automatic voltage regulator (AVR) needed</li> <li>- Low rotor weight and inertia</li> <li>- In generator mode, possible to start from blackout</li> <li>- Very low vibration levels</li> </ul>	Control with frequency converter
Redundancy	<ul style="list-style-type: none"> <li>- At part loads, possibility to use one drive/winding system to increase efficiency and reduce fuel use</li> </ul>	Form-wound, mica-insulated winding impregnated with global VPI
Protection class IP54	<ul style="list-style-type: none"> <li>- Closed system, no external particles or dirt can enter the machine</li> </ul>	Flexible design Bearing/shaft connection

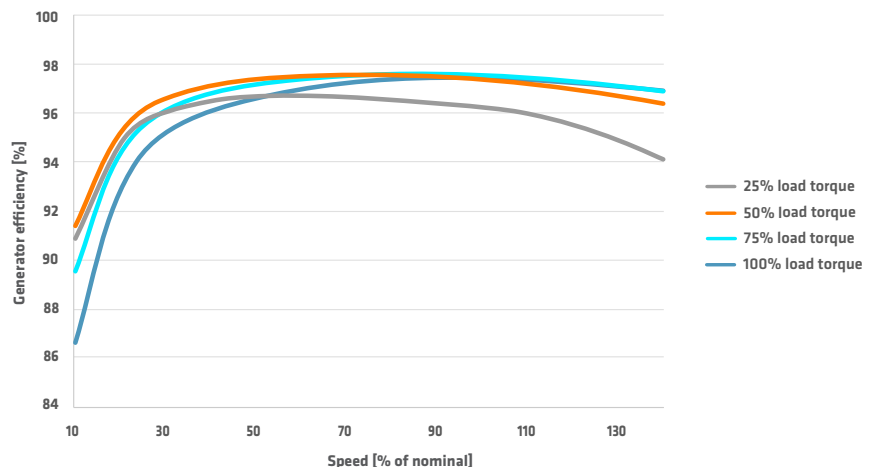
Frame 560-17	Frame 560-18	Frame 560-19	Frame 560-20	Frame 560-21	Frame 560-22
24.5	26.0	27.4	28.9	30.3	31.7
560					
0 ... 2000					
3750	3980	4200	4430	4650	4860
3290	3510	3700	3900	4100	4280
0.95					
97.5	97.5	97.5	97.5	97.6	97.6
130					
7.7	8.0	8.3	8.6	8.9	9.2
2.13	2.23	2.34	2.44	2.54	2.65
103	109	115	120	126	132
IP54					
/7 (Forced air-cooling with external air-to-liquid heat-exchanger)					
6					
450/500/690					
45					
38					
F					
B					
11.7	12.4	13.1	13.8	13.9	14.5
17.5	17.5	17.5	17.5	17.5	17.5

**Main benefits**

- 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 propeller or other
- Best possible protection against mechanical vibrations, chemical corrosion and electrical surges
- Proven technology
- Easily scalable up to medium voltages
- Modular design allows customization
- Adjustable mechanical interfaces
- Complete machine includes shaft and bearings

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

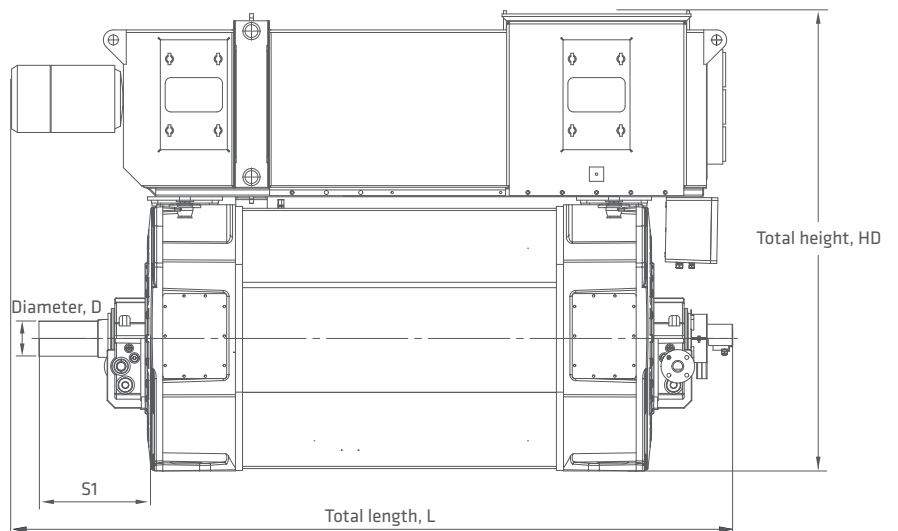
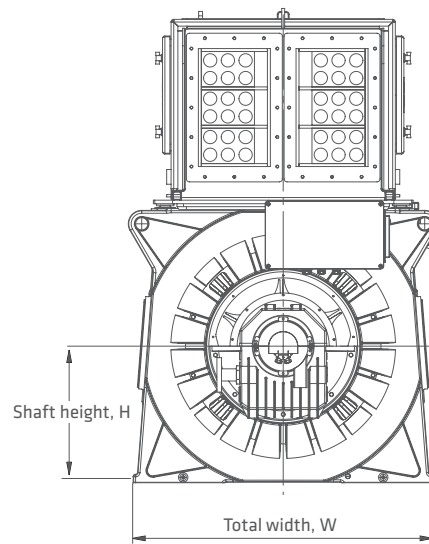
This chart illustrates typical efficiencies vs speed at different loading levels, which also takes the external cooling fan power consumption into account.



Exact efficiency value depends on the nominal speed of the application.

**Technical drawings**

Interface dimensions can be tailored according to customer specifications.



Machine dimensions	w	L	HD	H	S1	D
Frame 560-14	1230	2567	1945	560	488	190 m6
Frame 560-15		2627				
Frame 560-16		2687				
Frame 560-17		2747				
Frame 560-18		2807				
Frame 560-19		2867				
Frame 560-20		2927				
Frame 560-21		2987				
Frame 560-22		3047				