Technical note
High voltage generators for diesel and gas engines
Cooling and protection

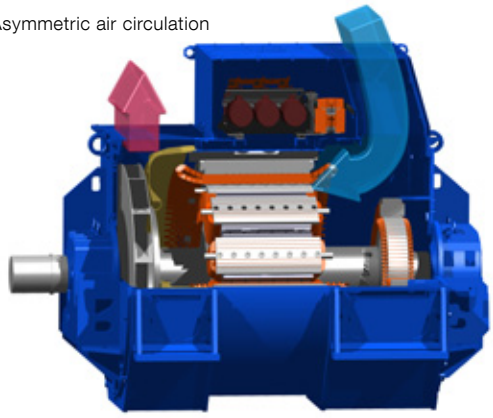
ABB is a leading supplier of generators for all marine and industrial applications. We have been manufacturing generators for more than 120 years and have extensive application experience with tens of thousands of installations all over the world. ABB offers reliable and efficient power generation with worldwide support.

There are three commonly used cooling arrangements: open air, air-to-water and air-to-air.

Open air cooling

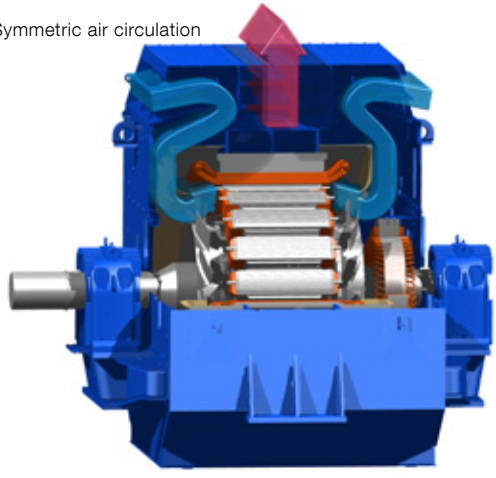
Open air cooling can be used where the air in the immediate environment is relatively clean and there is adequate air circulation. The cooling air is typically drawn in through air filters, passed through the active parts of the generator, and then exhausted back to the environment. If the engine room ventilation system cannot compensate for the temperature gradient caused by the hot air, the generator air outlet can also be ducted to allow the air to be exhausted outdoors. Open air cooling is the most typical solution for stationary indoor power plants.

Asymmetric air circulation



An open air cooled generator (IC0A1) with drip proof protection (IP23).

Symmetric air circulation



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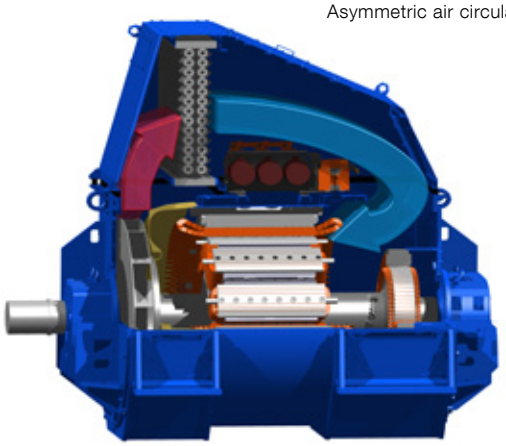
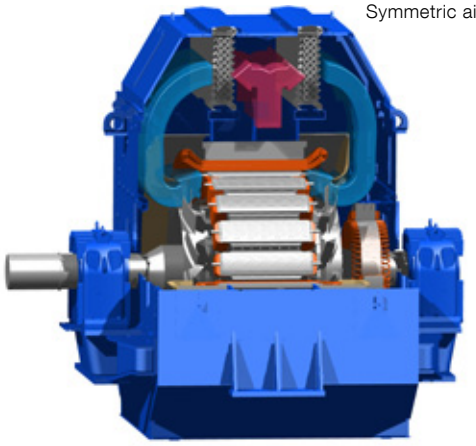


Symmetric air circulation



Totally enclosed generators (IP 44) using the air-to-water heat exchangers (IC8A1W7).

Air-to-water closed circuit cooling

The cooling air circulates in a closed circuit through the active parts of the generator and then through an air-to-water heat exchanger. This configuration passes hardly any heat to the surrounding environment, and represents an ideal solution for situations where closed circuit cooling is required due to installation outdoors, installation in a hazardous area, or whenever the quality of the surrounding air is not otherwise suitable for direct cooling. It is also ideal for installations in engine rooms with limited ventilation, such as ships.

Air-to-air closed circuit cooling

The cooling air circulates in a closed circuit through the active parts of the generator and through an air-to-air heat exchanger. This solution is generally used in situations where a closed circuit cooling system – such as air-to-water cooling – is required but water is not readily available. This cooling arrangement requires an additional shaft mounted or electric fan to ensure sufficient air flow through the cooler.

Protection

The enclosures feature protection in classes IP21, IP22,IP23, (drip proof), or IP44, IP54 and IP55, or equivalent NEMA protection classes. Generators are also available for hazardous areas in accordance with IEC/ATEX or NEC definitions.

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