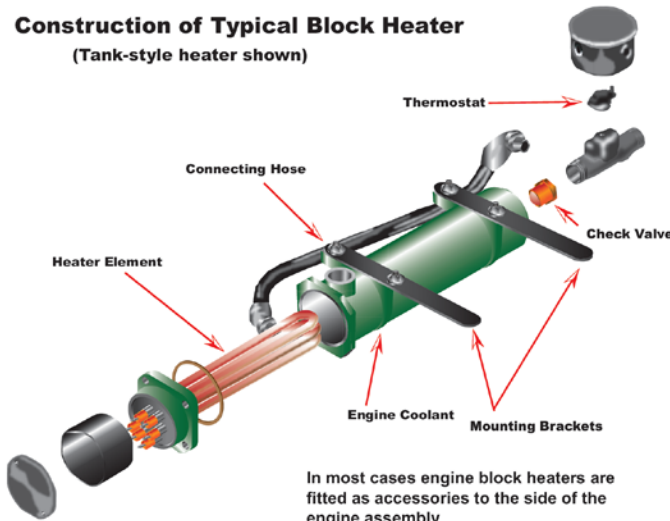




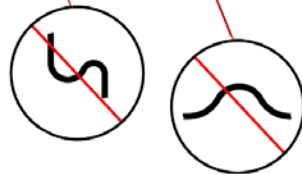
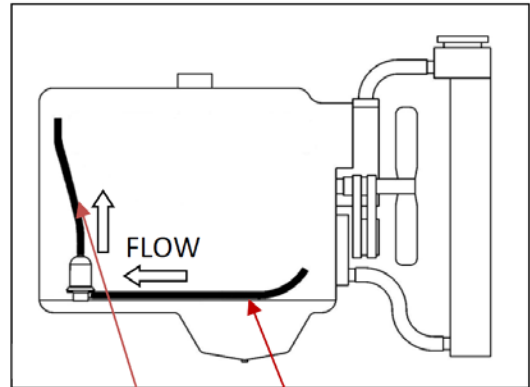
A power generator's engine heater is a critical component in providing fast, clean engine starts. Diesel generator engines start-up based on the compression ignition principle. The temperature of the air in the cylinder increases in direct proportion to the compression ratio (i.e. if the compression ratio is 18:1, the air is compressed eighteen-fold, and the temperature increase is also eighteen-fold). Emergency diesel generators start when the air in the cylinder is compressed to the temperature needed to ignite the diesel fuel. When the engine is cold, this process is not as effective.

Engine block heaters are normally supplied and installed as an accessory and form part of the original, standard equipment from all standby generator set manufacturers. They are used where the generator is subject to ambient temperature below 60° F (16° C) in order to preheat the water jacket coolant of the diesel/natural gas 'driver' engine and maintain it, thus assisting the engine start cycle for rapid, easy 'on-line' performance.

Construction of Typical Block Heater
(Tank-style heater shown)

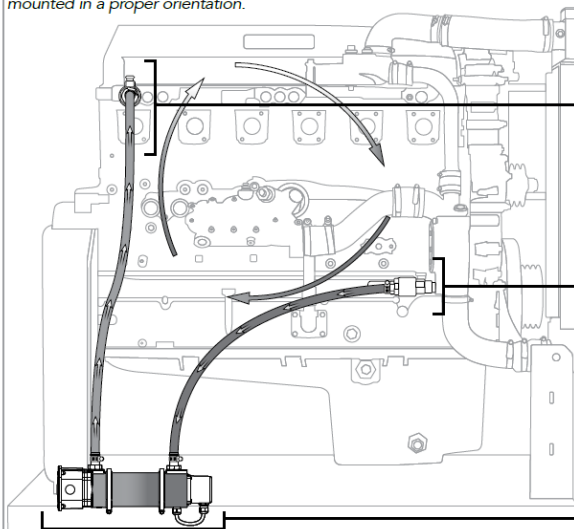


In most cases engine block heaters are fitted as accessories to the side of the engine assembly



WRONG!

Example installation. The return hose continuously rises to the engine and supply hose continuously descends to the heater; the hoses have no dips, bends or high points. The heater is isolated from engine vibration and is mounted in a proper orientation.



RETURN PORT

- Select a **return** port away from the engine thermostat.
- Select a **return** port toward the rear of the engine.
- Select a **return** port away from the **supply** port.

SUPPLY PORT

- Select a **supply** port low on the engine.
- Select a **supply** port toward the front of the engine.
- Select a **supply** port away from the **return** port.

HEATER MOUNTING

- Mount the heater in the proper orientation. Ensure outlet is pointing directly upward.
- Mount the heater to a vibration-isolated surface.
- Mount the heater on the same side as the **return** port.



Engine driven standby generator sets are primarily left unattended. It is very important that the customer/operator is fully aware of the importance of this start aid. In cases where any electrical power outage could seriously disrupt critical processes or put the safety of people at risk, the **National Fire Protection Agency (NFPA) requires under code 110, that Emergency Power Supply (EPS) - such as standby generators, shall be heated as necessary in order to maintain the engine's water jacket temperature,** so that the EPS will start and carry the full emergency loads within 10 seconds after loss of primary power from the utility.

Types of Block Heaters

There are a number of different types of block heaters to operate while the engine-driven generator is shutdown in colder climates, which we describe below:

Radiator-hose heater - This heater is fitted into the bottom radiator hose and the coolant circulates by thermal convection.

The heater range is limited by available hose sizes and due to relatively low watts (typically 400 to 600 watts). This normally makes radiator hose heaters unsuitable for preheating large engines and we would rarely recommend this type for most standby generators above 15kW.

Freeze plug heater - These pre-heaters are fitted in the engine block using a freeze plug hole in the cylinder/ crankcase and protrude into the coolant chamber. They serve to circulate heated coolant throughout the block by thermal siphon action. The downside of this type is risk of coolant leaks.

Tank-style heaters - These are installed on or close to the engine and connected to the coolant circuit, and powered by single or three phase AC source via a power cord, while the engine is stationary. They are available in sizes from 500 to 9000 watts, dependent on the engine displacement and the ambient temperature encountered at site. They circulate the coolant throughout the engine and can be adjusted by a thermostat, if needed, to ensure the coolant is kept at the correct temperature. The heater is automatically shut off once start cycle is initiated by genset controller.





Benefits of Block Heaters

The key reason for using an engine block heater is to maintain the engine at a temperature above 60 °F (16 °C) to ensure it starts quickly when required. Cold engines can take a considerable time to crank up during which time the starter batteries will be heavily discharged. However apart from a starting aid, the heaters provide the following additional benefits:

Reduces engine wear - Engine wear can be reduced by up to 50%. The lubricating oil is also kept warm and thus ensures that the essential oil is immediately pumped to the critical moving parts and points of the engine during the start cycle.

Saves fuel - It is not necessary to leave engines idling to maintain them above the required starting temperature.

Reduced exhaust emissions on start - Engines are designed to emit lower emissions at their operational temperature.

Less stress on other components - Batteries when cold have a reduced ampere hour capacity and starting a cold engine can put a considerable drain on a battery system.

Avoids the risk of water condensation in the engine sump - An engine system left for a length of time in cold temperatures will see an increase in water build up due to condensation. Keeping the engine warmer than the surrounding ambient significantly reduces condensation.

Maintenance of Block Heaters

As with all key components, regular maintenance will ensure the equipment remains in full operation and ready to perform its function when required. The following are key maintenance points for engine block heaters:

Clips - Always be check these items when carrying out routine maintenance (preferably weekly in extreme conditions) on the generator to ensure that it is functioning correctly and the element is not damaged.

Hoses - Any hoses found not to be pliable should be changed every three years.

Coolant mix - It is important that the correct mix of coolant is used to avoid damage to the block heater.

Block heater is a standard accessory of all AKSA Gensets.