

LIQUID COOLED ALTERNATORS

T Y P E

A A L

A A N

A A P



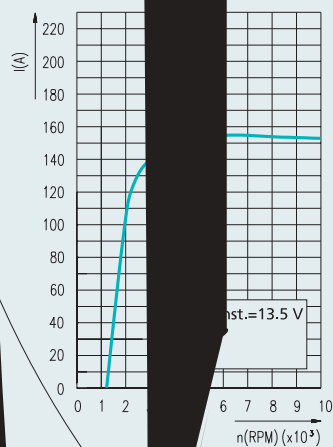
Iskra

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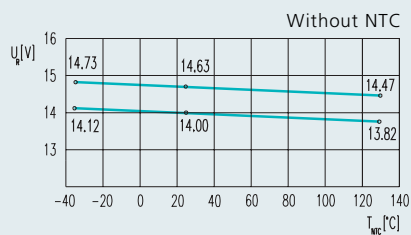
CHARACTERISTICS AND CONNECTION DIAGRAMS

ALTERNATORS TYPE AAL

Performance curve



Rated voltage settings



Connection diagram

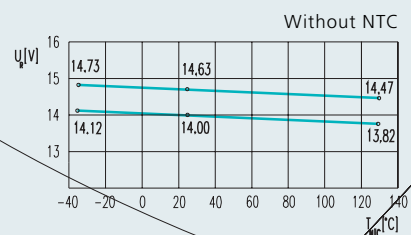
With NTC

NTC - Thermistor for temperature sensing. Available versions with or without NTC.

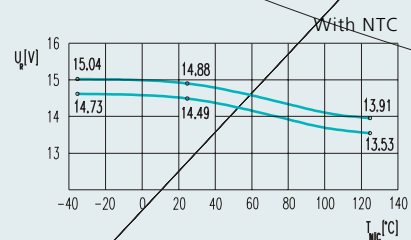
ALTERNATORS TYPE AAN

Performance curve

Rated voltage settings



Connection diagram



NTC - Thermistor for temperature sensing. Available versions with or without NTC.

ALTERNATORS TYPE AAP

Performance curve

Rated voltage settings

Default voltage setting is 14 V.
Output voltage is 13.5 V.
CPL is 13.5 V.

Connection diagram



ALTERNATOR COOLING

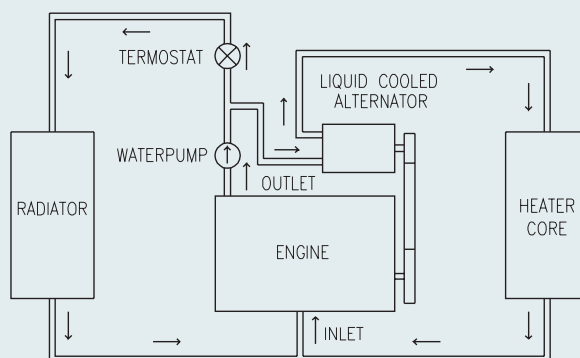
The alternator is cooled by the coolant liquid, which is used by the internal combustion engine for its cooling. The required coolant flow is ensured by water pump of the engine.

When starting a cold engine, this system enables faster warm-up of the engine to the operating temperature, because of the additional alternator heat, what indirectly enables faster warm-up of the passenger compartment and reduces the emissions of hazardous gases to the environment.

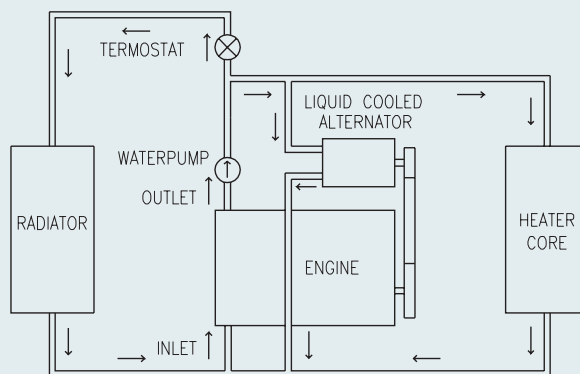
The main advantages of liquid cooling are quiet operation and efficient alternator cooling, what guarantees long life and high specific powers.

SOME POSSIBLE CONNECTION TO THE COOLING SYSTEM

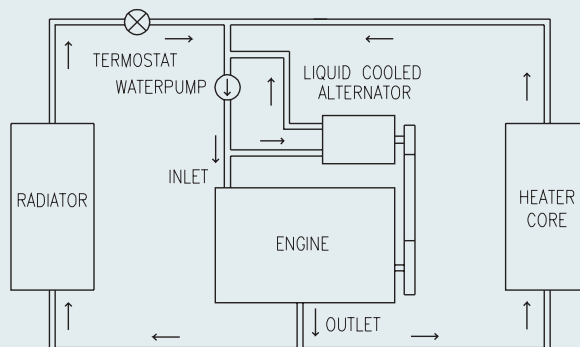
Serial connection of alternator with heater core



Parallel connection of alternator with heater core



Connection of alternator to the returning cooling liquid



Note: Real mounting should be defined by engine producer.

APPLICATION

Specific advantages of liquid-cooled alternators in comparison to classic air-cooled alternators are high output powers appropriate mostly for use on the systems with high consumption of electric energy. They are most suitable for:

- Personal vehicles of the upper class with high consumption of electric energy
- Applications in heavy duty operating conditions (excavators, wheel loaders, combines, tractors and others)
- Road and other vehicles with high consumption of electric energy (buses, trucks)
- Marine applications
- Special military applications

FEATURES

- High specific power
- Low noise level (alternator design without a fan)
- High output current already at idle running
- High efficiency
- Long life
- Faster warm-up of a cold engine to the operating temperature
- Additional heating of passenger compartment
- Lowering the temperature in the engine compartment
- Smaller dimensions

ALTERNATOR INSTALLATION

When building in the liquid-cooled alternators, it is necessary to ensure the appropriate flow of the coolant through the alternator by the pump on the engine. Installation of liquid-cooled alternators can in this way be performed in three different ways:

- Classic installation with alternator holder to the engine block and connection of the coolant liquid by the pipe
- Direct assembly of the alternator to the engine block with connection of the coolant liquid by the pipe
- Direct alternator assembly to the engine block with direct connection of the coolant liquid from the motor

DESIGN

Basically, the liquid-cooled alternator is a three-phase 12-pole synchronous generator with a built-in electronic regulator and rectifier. Efficient alternator cooling is carried out by the coolant that is used by the installed internal-combustion engine for its own cooling. The between rotor claw poles additionally installed permanent magnets increase electric power, mostly in the lower range of alternator's characteristics. The firm design and chosen materials enable favourable characteristics and long life of the alternator also in the harshest operating condition, such as low temperatures, salt spray fog, humidity, vibrations and aggressive liquids.

Stator

Stator consists of a three-phase delta connected winding, coiled to the laminations pack (alternator types AAN and AAP have on the stator two three-phase windings that are connected parallelly). The chosen technology and materials, high filling factor of the winding in the slots of the stator stack, and large surface of the stator stack fit to the alternator housing with the coolant ensure high electric characteristics, high efficiency, and quiet operation of the alternator.

Housing

Alternator housing is made of cast aluminium. Channels, through which the coolant flows and enables an efficient cooling of the alternator, are designed to additionally reduce the noise of the alternator. On the rear end bracket there are also connections for inlet and outlet of the coolant.

Rotor

Alternator types AAL and AAN have a single rotor, whereas alternator type AAP has a double one (two pairs of claw poles, excitation windings are connected parallelly). The excitation is carried out through the slip rings and brushes. Additionally installed permanent magnets between the claw poles of the rotor improve the electric characteristics in the entire range of operation, above all in operation with lower number of revolutions.

Rectifier and regulator

Alternator types AAL and AAN have the rectifier with the built-in zener press fit diodes that protect the consumers on the vehicle against over voltage. The rectifier is placed to the rear end bracket, ensuring efficient cooling of the rectifier by the help of the coolant. AAL and AAN alternators have built-in multifunction regulator with additional possibility of engine compartment temperature sensing.

The rectifier in alternators type AAP is designed by MOSFET transistors that together with the regulator make an autonomous unit and enable two autonomous alternator outputs. AAP alternators have built-in multifunction regulator with BSS interface that enable communication between regulator/alternator assembly and engine CPU. In this way, optimal alternator operation is ensured, regardless the conditions in which the alternator operates.

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