Guascor Energy

Guascor Energy MODs&UPs: Double-stage intercooler for V engines

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Background

A single-stage intercooler, which is cooled solely by an auxiliary cooling water circuit, is not hydraulically connected to the high-temperature circuit.

This prevents the extraction of thermal power that could otherwise be utilized by facilities or industrial processes where the engines are installed.

Considering the significant number of V engines operating under this configuration, Guascor Energy has developed an upgrade kit. This kit enables the implementation of a modern double-stage intercooler, allowing the engine to supply additional thermal power to consumers.

Product Overview

In gas engines, the intercooler is employed to cool the air-fuel mixture before injecting it into the combustion chamber.

From a mechanical standpoint, the double-stage intercooler is designed to be partially cooled by the high-temperature circuit and the remaining part by the engine's auxiliary cooling circuit, as illustrated in Figure 1.

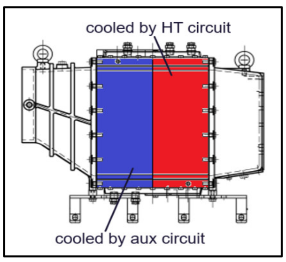

Figure 1 Double-stage intercooler

In this type of intercooler, the heat generated during one of the stages is transferred to the high-temperature circuit of the engine, thereby augmenting the available heat.

Application

The kit is compatible with all V engines in the G-FL, G-SL, and series equipped with a single-stage intercooler.

The following diagrams (Figures 2 and 3) illustrate the process of transforming an engine from a single-stage to a double-stage intercooler configuration

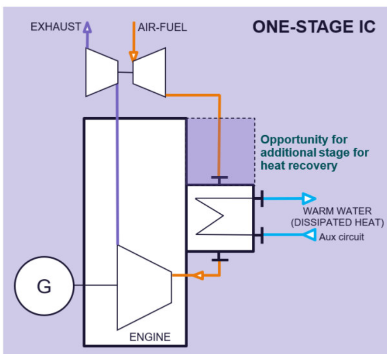

Figure 2 Scheme before the implementation

Prior to installation, a thorough inspection of the existing setup must be conducted to ensure there are no mechanical interferences preventing the implementation of the kit in the engine. Additionally, it is crucial to confirm that the facilities' thermal process can handle the additional power.

After the modification, this is how the engine cooling scheme would be like:

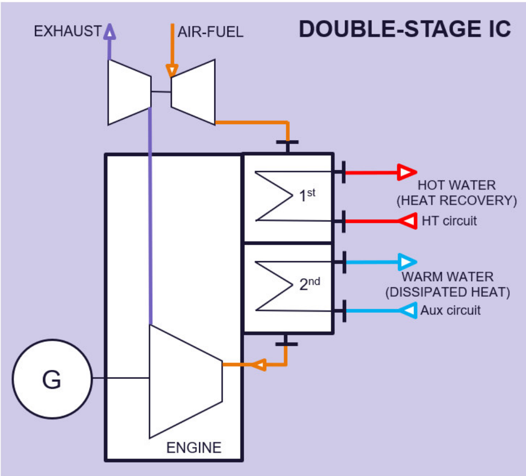

Figure 3 Scheme after the implementation

Guascor Energy gas engines		
G-48SL @ 1500rpm Natural Gas	1 stage I/C 100% load	2 stages I/C 100% load
Heat in HT circuit [kW]	**529**	**604**
Heat in intercooler 1st stage [kW]	-	75
Heat increase [%]	-	**14%**
Heat in auxiliary circuit [kW]	210	135
Heat in intercooler 2nd stage [kW]	122	47
Heat in oil cooler [kW]	88	88
Total heat [kW]	**739**	**739**

Figure 4 Heat balance for a G-48SL

Benefits

The primary advantage of this solution is the augmented thermal power available in the high-temperature circuit, beneficial for the thermal processes where the engines are utilized, such as steam production for industrial applications, wastewater treatment plants, district heating, etc.

This increase in thermal power can reach up to 15%, contingent on the engine type.

In the following example, after the kit implementation, a portion of the thermal power from the 2nd stage (cooled by the auxiliary circuit) is transferred to the 1st stage and subsequently to the high-temperature circuit.

An additional 75 kW are added to the existing 529 kW in the high-temperature circuit, resulting in a total of 604 kW.

This accounts for a 14% increase in thermal power at nominal load.

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