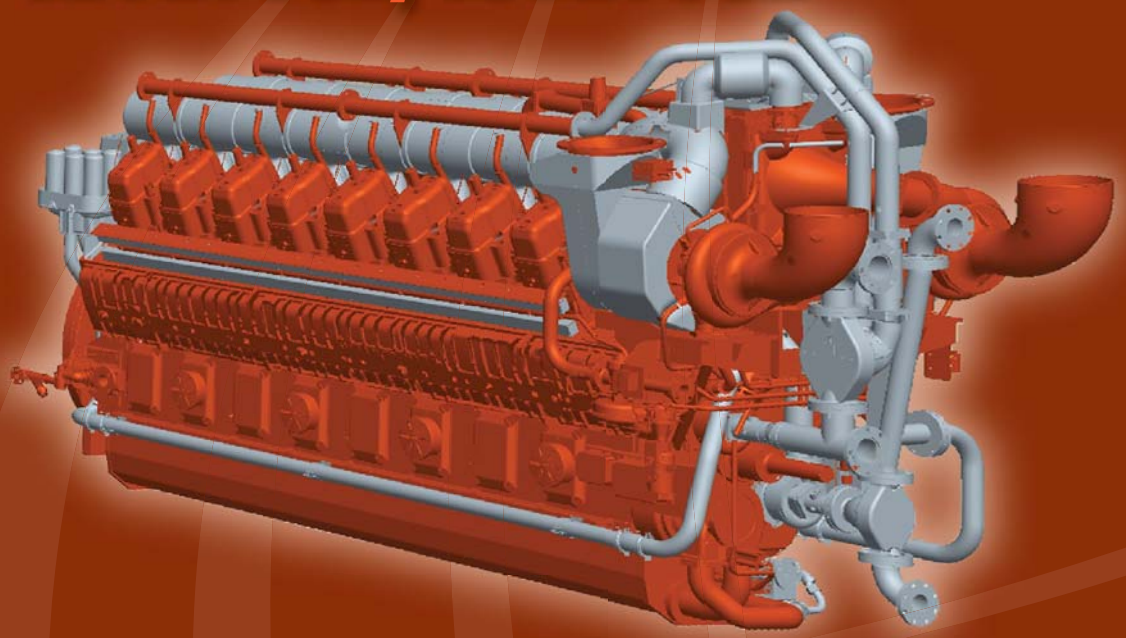
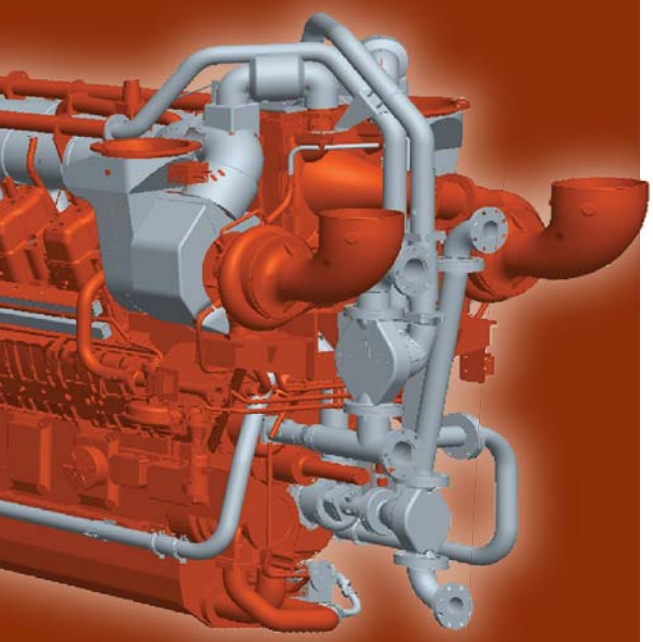
DRESSER Waukesha

The 275GL™ Series

Performance Enhancements & Packaging Improvements

12V275GL/16V275GL





INTRODUCTION

Dresser Waukesha is pleased to introduce its 275GL™ Series engines, the latest generation of high-horsepower engines for the gas compression market. The new 275GL Series combines the robust construction and reliable operation of Waukesha's ATGL® Series with an enhanced engine control system and a series of design and engineering updates that greatly simplify packaging and servicing. In addition, the new 12-cylinder model will deliver a power uprate of approximately 8%. The result is a new streamlined high-performance engine series with approximately a 2% fuel savings advantage over our closest competitor.

The 16-cylinder (16V275GL) version is currently available and the 12-cylinder (12V275GL) version is being introduced in the second half of 2009.

The 275GL Series engines are equipped with an enhanced version of the successful Engine System Manager (ESM®) control system. ESM is currently installed on Dresser Waukesha's VHP® Series and the state-of-the art APG™ (Advanced Power Generation) Series. The ESM is a reliable total engine management system designed to optimize engine performance and maximize uptime by integrating:

- Spark timing control
- Turbocharger control
- Speed governing
- Knock detection
- Start-stop control
- Diagnostic tools
- Fault logging
- Engine safeties
- Air/Fuel Ratio (AFR) control

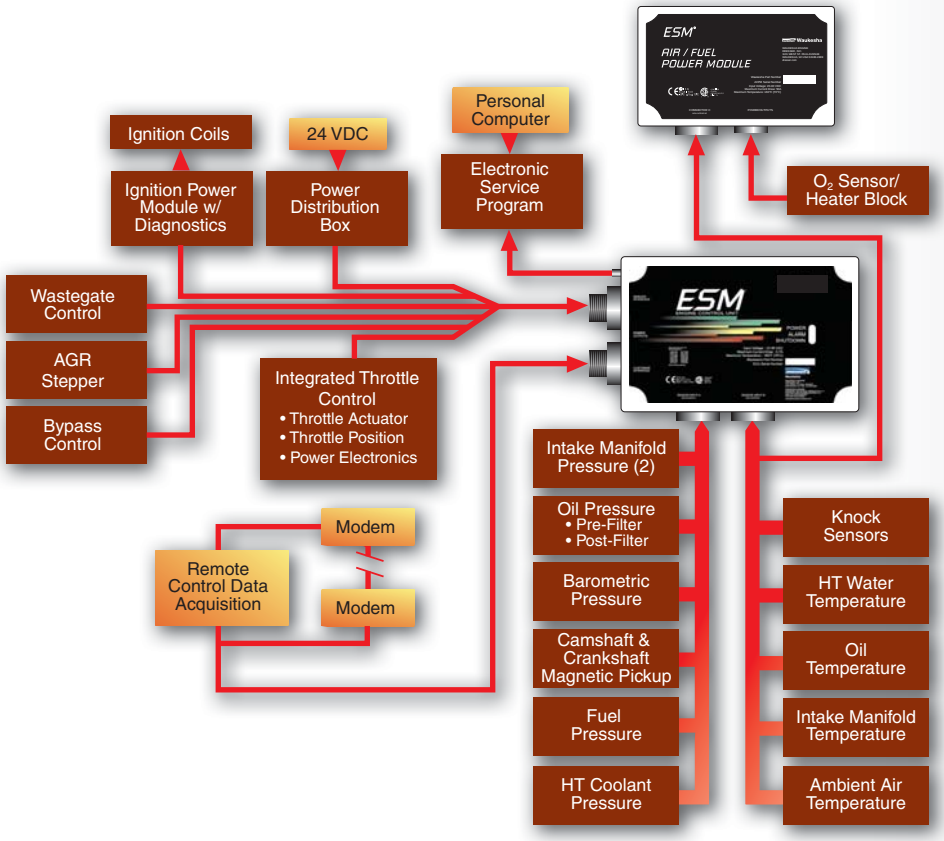
Key enhancements include factory-mounted lube oil and cooling systems, which streamline and optimize the 275GL Series design, creating a standard, consistent configuration that is easier and more cost effective to package and service.

The sections that follow provide more detailed information on the key features and benefits of these design changes.

ENGINE SYSTEM MANAGER (ESM®)

DESCRIPTION

Dresser Waukesha's ESM is factory mounted, calibrated and tested to minimize on-site set-up requirements. The system includes the Engine Control Unit (ECU), sensors for critical engine pressures and temperatures, combustion monitoring, and air/fuel ratio control. In addition, turbocharger controls and detonation settings also are factory-calibrated. On-site ESM setup is limited to simply entering site parameters such as fuel quality, load inertia, and air/fuel ratio settings using the Electronic Service Program (ESP). ESP can also be used for troubleshooting, as it can access the ESM fault screen as well as the ESM help program (E-HELP). A free ESP CD is provided with every engine or it can be downloaded for free from the Waukesha web site (with no limitations on the number of allowable downloads and no annual maintenance fee). Connections to remote control panels are quick and easy with Waukesha-supplied wiring harnesses. Customer connections are centralized and simplified. ECU parameters are available through MODBUS for engine monitoring.



FEATURES

How the ESM Interfaces with the Engine

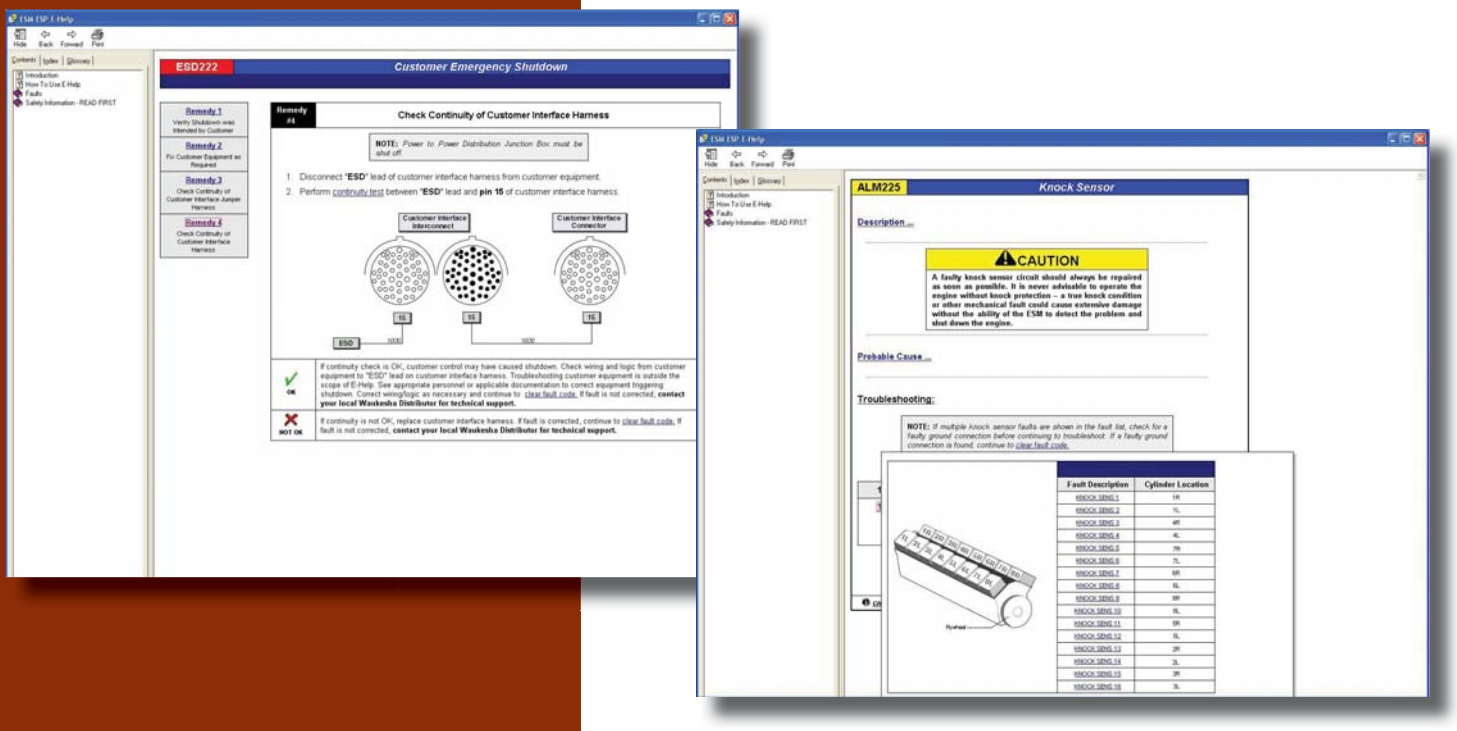
- The ESM includes all on-engine wire harnesses, a power distribution box and interface wire harnesses for connection from the ESM to the local control panel.
- During normal engine startup and shutdown, the ESM controls all sequencing for pre-lube/post-lube, engine cranking, purge time, fuel valves, and cool down functions.
- Engine shut-down protection is provided for critical pressures, temperatures, overload, overspeed and detonation.
- Remote monitoring of critical temperatures, pressures and other key parameters is facilitated through a standard MODBUS connection. Remote control can be provided through a customer-supplied local control panel.

Performance Features

- Turbocharger controls are factory-calibrated for a wide range of site operating conditions, eliminating the need for on-site calibration.
- Dual ignition voltage level and condition monitoring maximize spark plug life.
- Advanced detonation control and monitoring provides protection and stability for the engine while operating with varying fuel qualities and site conditions. Because these features are pre-set, there is no need for on-site calibration.
- Predictive engine horsepower signal or display allows the compressor to be set for peak performance.

Serviceability Improvements

- The ESM provides current engine status and a permanent fault history for alarms and shutdowns.
- Ignition diagnostics provide spark plug condition information.
- The ESM includes Dresser Waukesha's Electronic Service Program (ESP) with E-Help (electronic help) which provides step-by-step troubleshooting of alarm or shutdown codes.
- Quick-connect harnesses allow speedy removal of any component (e.g. sensors, actuators, etc.) for service or replacement.



PACKAGING IMPROVEMENTS

DESCRIPTION

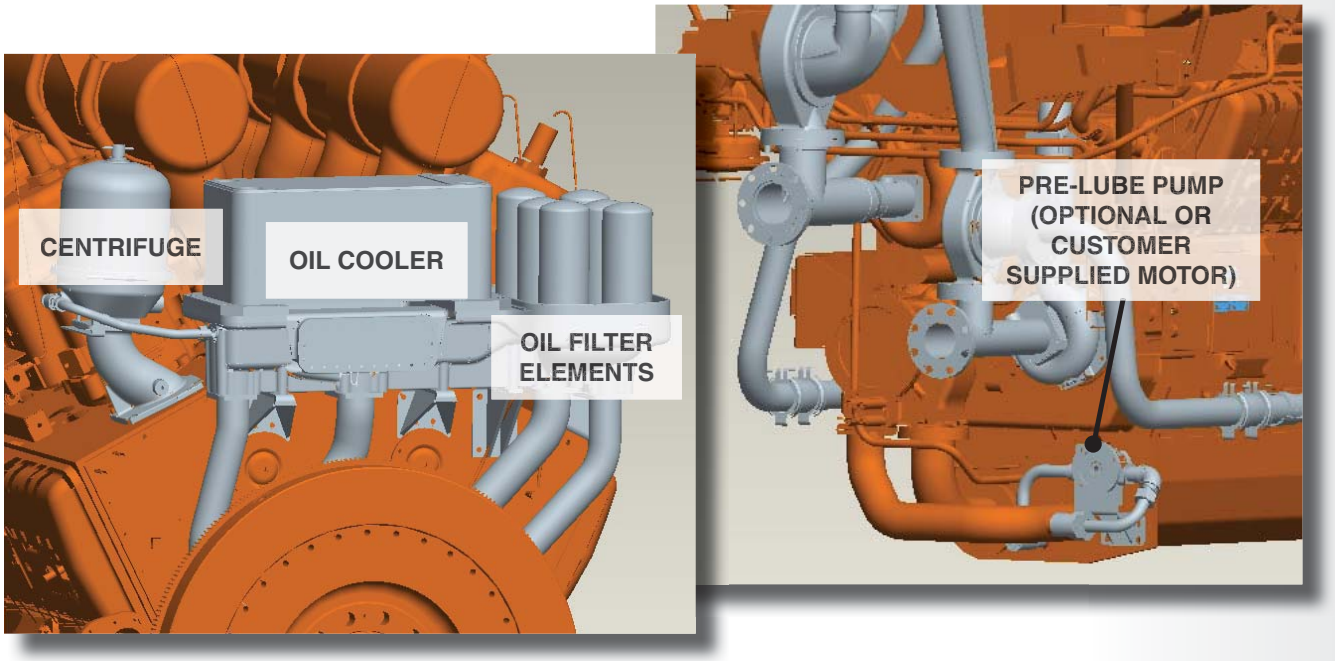
The 275GL Series includes numerous improvements that reduce packaging effort and enhance service access, such as the factory-mounting of the lube oil system and the cooling system thermostats on the engine. In addition, the pre-lube pump is now fully integrated and engine-mounted, and enhancements have been made to the wiring system. Placement of the turbochargers at the front end of the engine reduces piping requirements, simplifies servicing, and eliminates interference during top-end maintenance by keeping exhaust piping away from the top of the engine.

FEATURES

Lube Oil System

The new 275GL Series is equipped with an easy-access, upgraded oil filtration system that is completely factory-mounted and piped. The system features a plate-type oil cooler and spin-on disposable lube oil filter elements. Centrifugal oil filtration and a pre-lube pump are mounted and piped as standard equipment.

These upgraded components provide superior oil filtration through modern filter media and high-speed centrifugal particle removal. Access to the oil filters is very easy and a containment pan on the filter platform prevents oil from running down the side or back of the engine during filter changes.



The engine-mounted pre-lube pump reduces the effort associated with package procurement, assembly, and replacement pump sourcing.

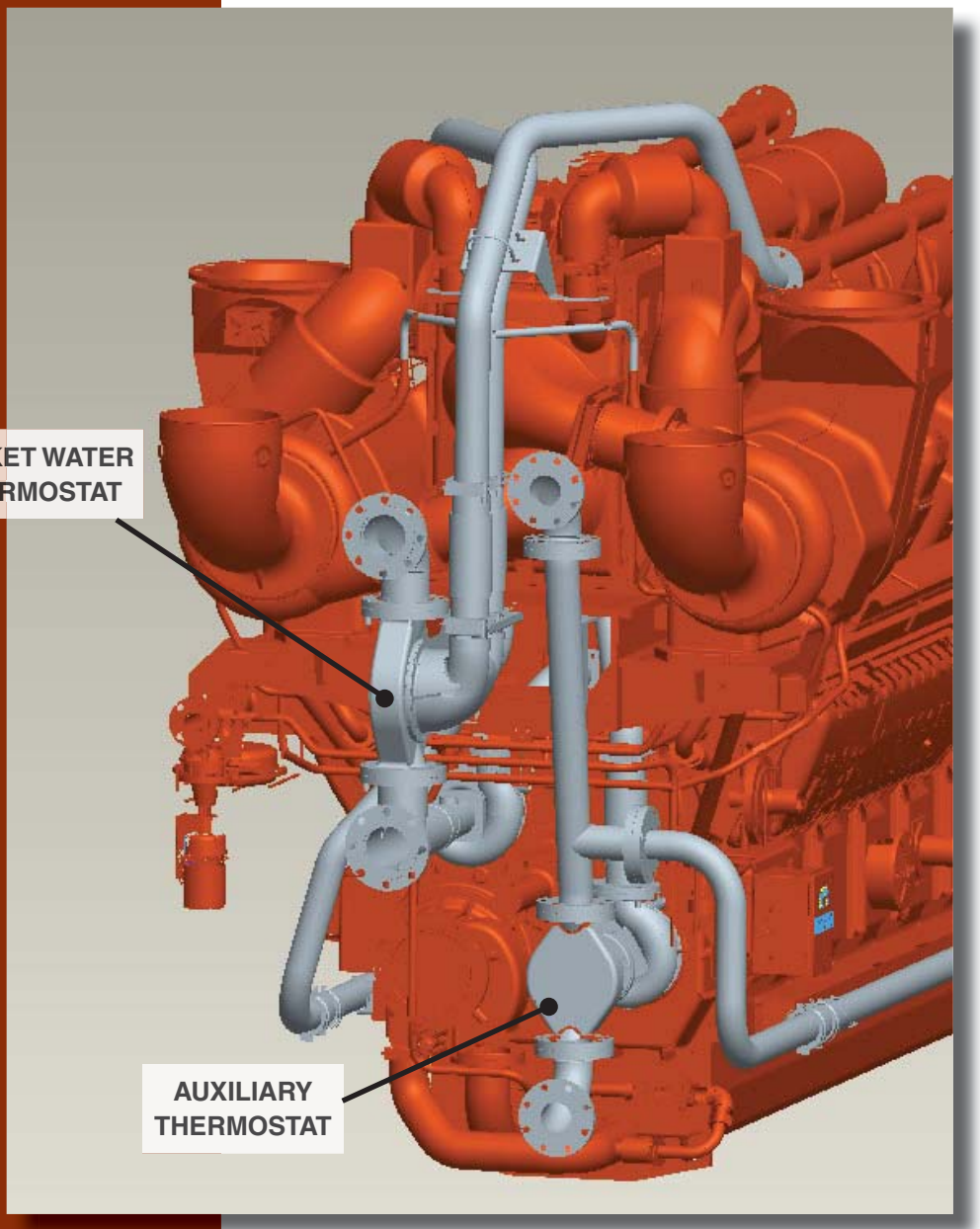
The engine-mounted oil system also provides:

- A standardized lube oil system that is designed expressly for the 275GL engines and provides consistent piping and component location.
- Lower packaging cost for the engine and compressor. Lube oil piping is now completed at the factory to avoid the cost of on-site piping.

Cooling System

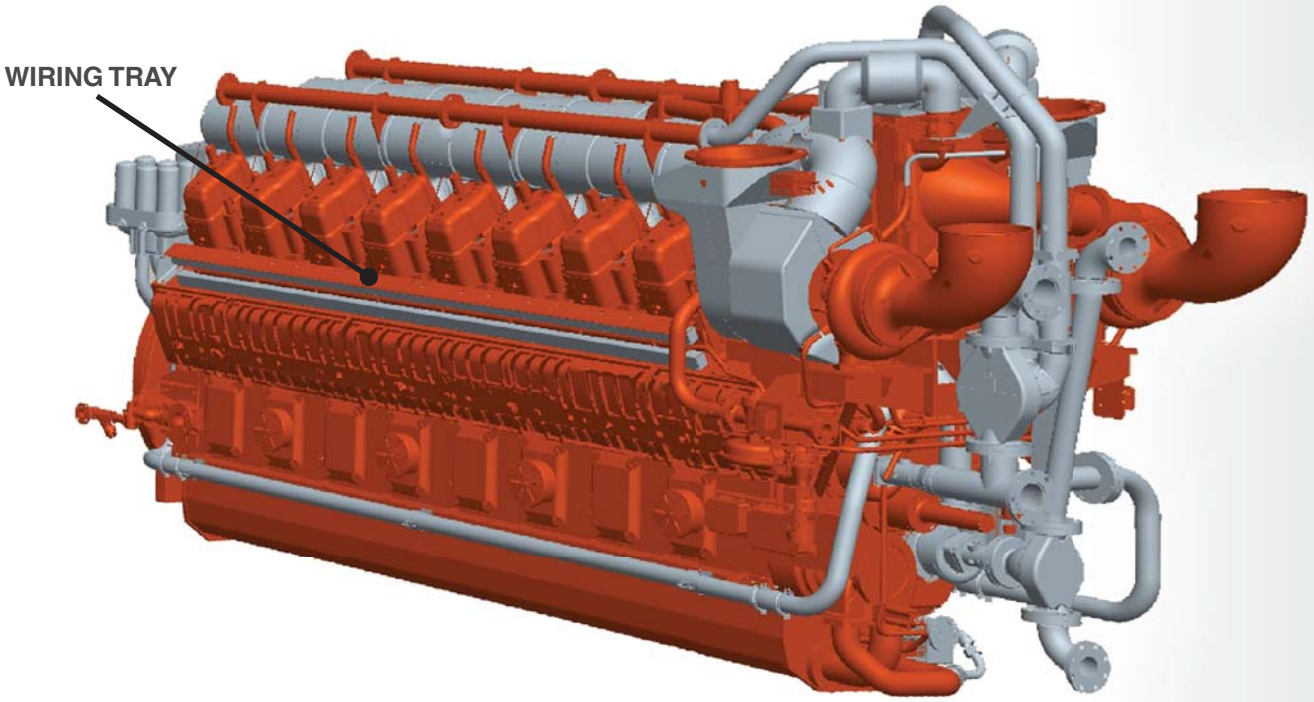
The cooling system enhancements provide a standardized and consistent design that reduces the engine packaging cost. Thermostats and bypass piping for the jacket water and auxiliary water are now mounted on the engine.

Cooling pump outputs also have been resized to eliminate the need for setting the pump flow rates by pressure or temperature differential. The pumps are now sized to provide 15 psi (103 kPa) of external pressure head for customer piping and coolers. If a customer's components have very low restriction, coolant flow will still be within Waukesha requirements, eliminating the need for orifices or partially closed valves in the cooling circuits.



Wiring

The addition of easily removable wiring trays to each side of the engine improve it's serviceability. There are also quick disconnects on the ignition coils and thermocouples for easy replacement.



OTHER IMPROVEMENTS

In order to create a more standardized platform, the following key design features have been applied to the 12V275GL:

- Transition from a single-diaphragm air valve carburetor/mixer to a venturi mixer offers multiple benefits:
  - Overall increased reliability and durability.
  - Improved mixing of the fuel and air due to the elimination of moving parts.
  - Increased power output of the engine due to reduced restriction.
- Transition from water-cooled exhaust manifolds to insulated dry manifolds increases the engine's thermal efficiency by recovering more exhaust energy in the turbochargers and decreases heat load to the jacket water circuit allowing a reduced size jacket water cooler.

The combination of improvements to the fuel and exhaust systems coupled with the addition of ESM will result in an 8% power uprate, increasing output to 3375 bhp.

SUMMARY OF KEY CHANGES

FEATURES	ATGL®	275GL™	BENEFIT
Control System	• CEC	• ESM®	• Enhanced total engine management system
Oil Cooler	• Tube type • Shipped loose	• Plate type • Integrated with oil cooler housing	• Reduced packager assembly time / cost
Oil Filter	• Fiberglass elements • Shipped loose	• Spin on disposable filter elements • Oil containment pan • Integrated with oil cooler housing	• Ease of access • More efficient filter media • Contains oil during filter changes
Centrifugal Oil Filtration	• Option (shipped loose)	• Factory mounted & connected	• High speed particle removal
Pre-Lube Pump	• Customer supplied	• Factory mounted & connected	• Reduced initial package procurement and assembly cost
Thermostats & Bypass Jacket Water Piping	• Shipped loose	• Mounted	• Reduced packager assembly time/cost
Thermostats & Bypass Auxiliary Water Piping	• Shipped loose	• Mounted	• Reduced packager assembly time/cost
Resized Cooling Pump Outputs	• Customer supplied restrictions required	• No customer supplied restrictions required • Mounted	• Eliminates need to set flow rates by pressure or temperature differential
Wiring Trays	• Not Available	• Mounted	• Clean, streamlined appearance • Quick removal for servicing • Quick disconnect of coils/ thermocouples

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