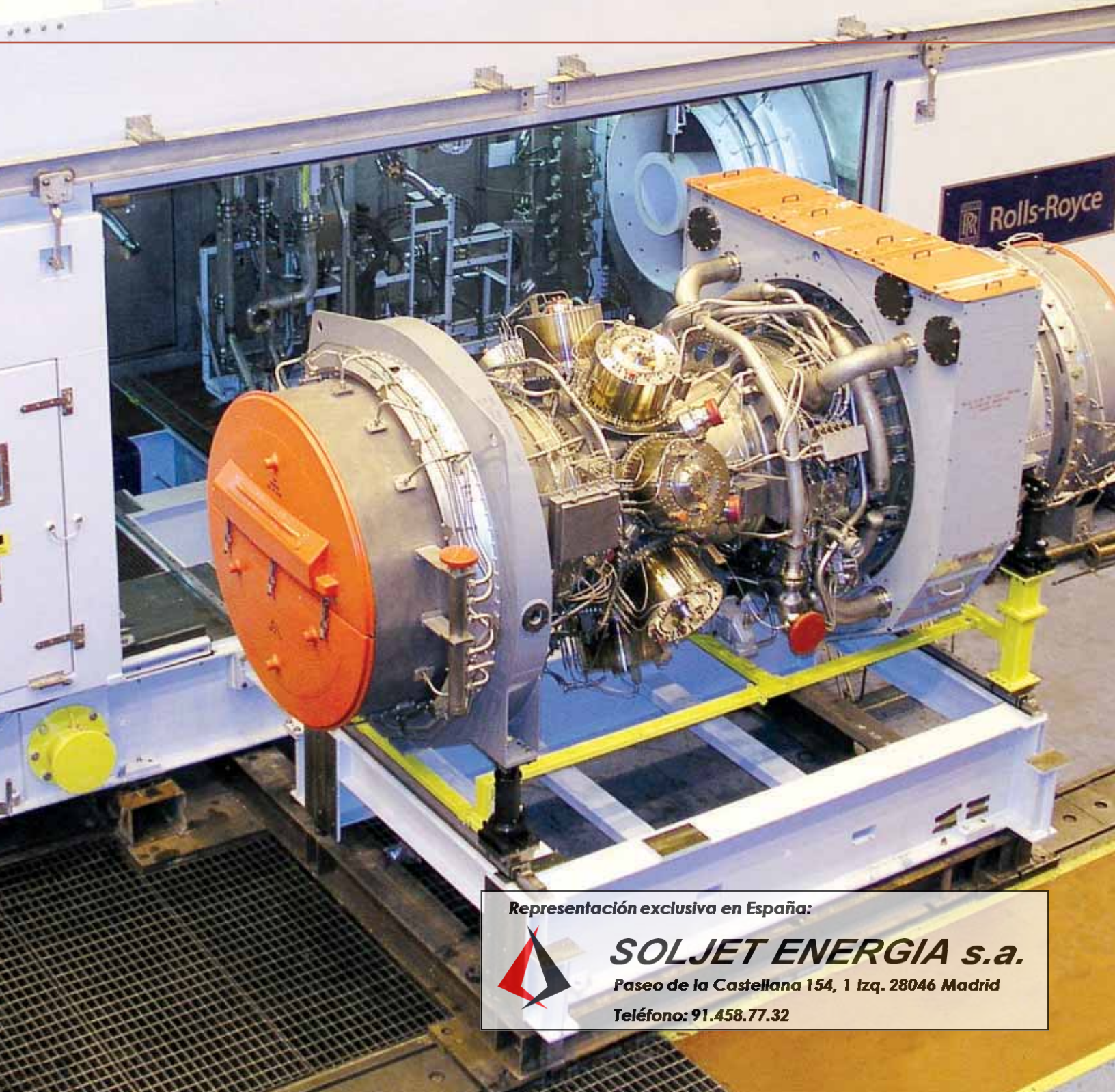




Rolls-Royce

The Trent 60 Gas Turbine

For power generation and mechanical drives



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Power generation

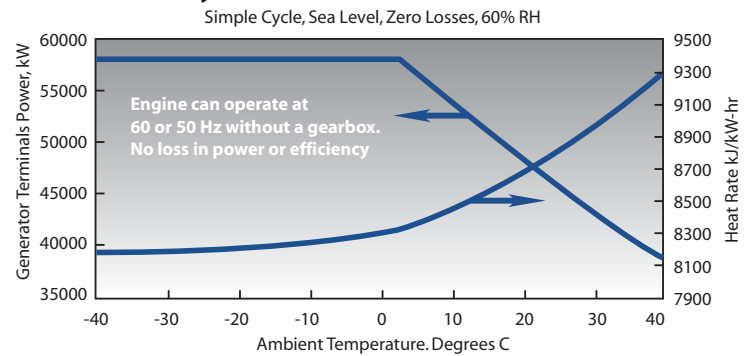
T R E N T

The Rolls-Royce Trent 60 is the most advanced aeroderivative gas turbine available today. Delivering up to 58MW of electric power in simple cycle service, at 42 per cent efficiency, the Trent 60 has established a new benchmark for fuel economy and cost savings. It also offers operators fast delivery and installation times and beneficial environmental performance.

Key features

- Highest power aero derivative gas turbine
- Highest simple cycle efficiency gas turbine
- Efficient package for installation and maintenance
- Power generation at 50 or 60 Hz without a gear
- DLE or WLE systems available for 25 ppm NOx
- Small footprint and low weight
- Proven history from aircraft engine lineage
- Full load train starting with only 250 kW motor
- High cyclic life meets daily peaking market
- Cold start to full power in under 10 minutes

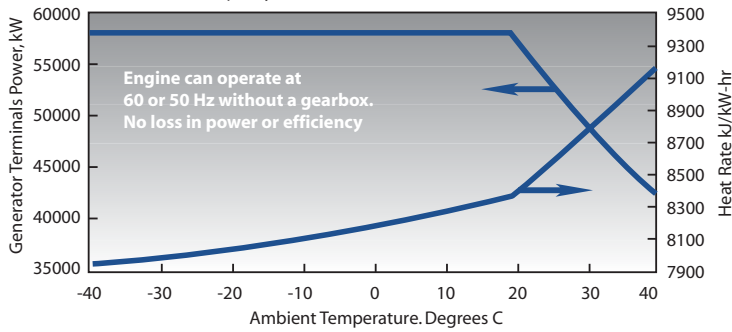
Trent 60 (Dry Low Emissions) Nominal Performance



The Trent 60 package

Trent 60 (Water Injected) Nominal Performance

Simple Cycle, Sea Level, Zero Losses, 60% RH



T R E N T



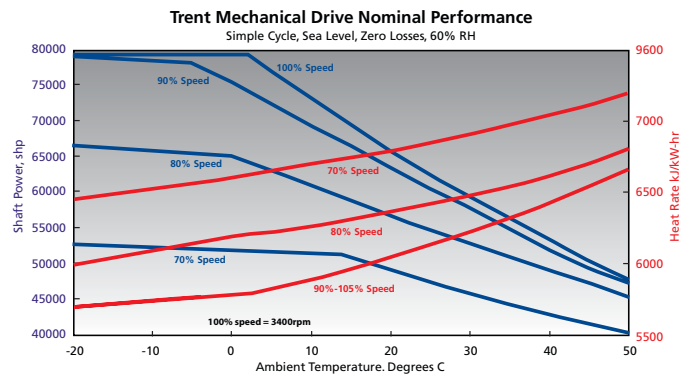
Trent 60 – Dry Low Emissions (DLE)

The Trent 60 DLE engine is designed to meet stringent environmental requirements. The use of an eight canular staged combustion system allows the successful operation of the engine in part load operation while still maintaining NOx and CO compliance. The engine is designed to produce 52MW of power at ISO conditions and is flat rated at 58MW power at temperatures below approximately 2°C.

Trent 60 – Wet Low Emissions (WLE)

The Trent 60 WLE uses the annular combustor system from the Trent aero engine with the introduction of water to reduce emissions and boost performance. Since the Trent 60 engine only uses water in the combustion chamber, water usage is kept to a minimum. At temperatures below 19°C. (varies due to site conditions) the engine is flat rated at 58MW. An online monitoring system allows for the reduction of water usage due to changes in power demand and ambient conditions while still maintaining compliant emission levels.

Mechanical drive



T R E N T

Onshore or offshore



The Trent 60 is ideally suited to meet the higher power, variable speed demands required by applications like natural gas

liquefaction, gas transportation and gas Injection for oil recovery. The design flexibility of the Trent allows the same engine that serves the power generation market to meet the needs of mechanical drive service with no design changes. The Trent, due to its three independent shaft design, is capable of meeting driven equipment power demand at reduced speeds with a minimal drop off in efficiency. The Trent design also allows the starting of large trains with the same standard, low power, starting system that is employed for power generation.

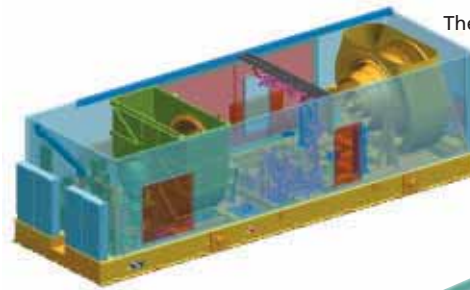
Key features

- The engine is designed for a 100% speed of 3400 RPM
- Can be direct connected to driven equipment or use a gear
- Engine control system can be modified to support a variety of driven equipment
- Speed range of 70-105%.
- Low starting power requirement for large trains
- Identical engine and package for power generation and mechanical drive.
- Multiple daily starts with no extended wait time between starts.

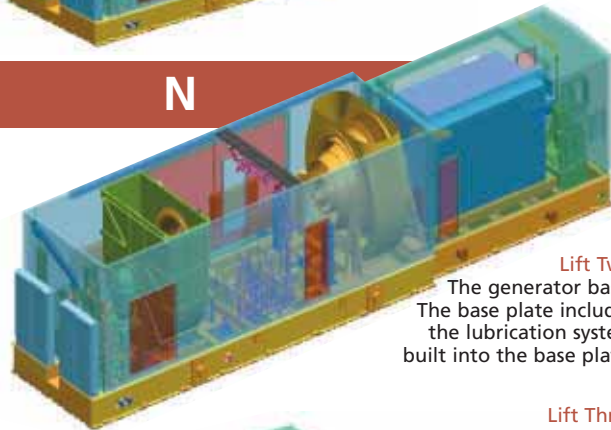


Trent 60 engine on test, driving a centrifugal compressor at full load.

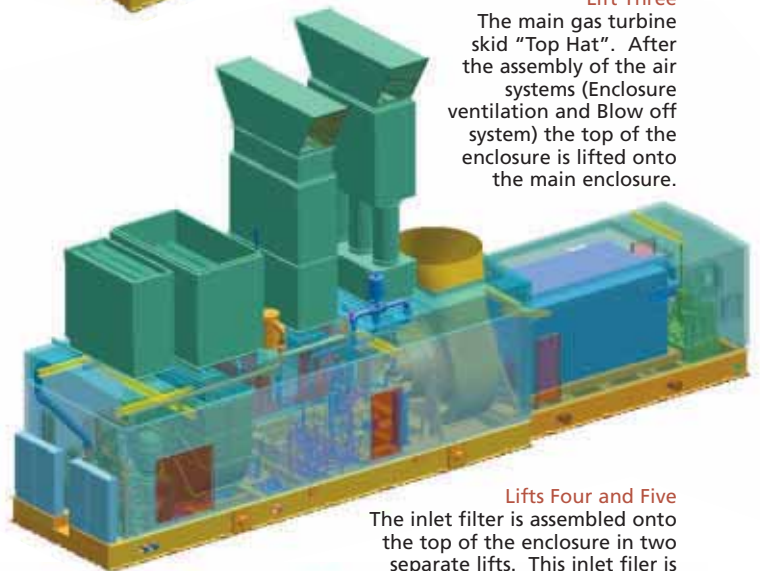
The Trent 60 package



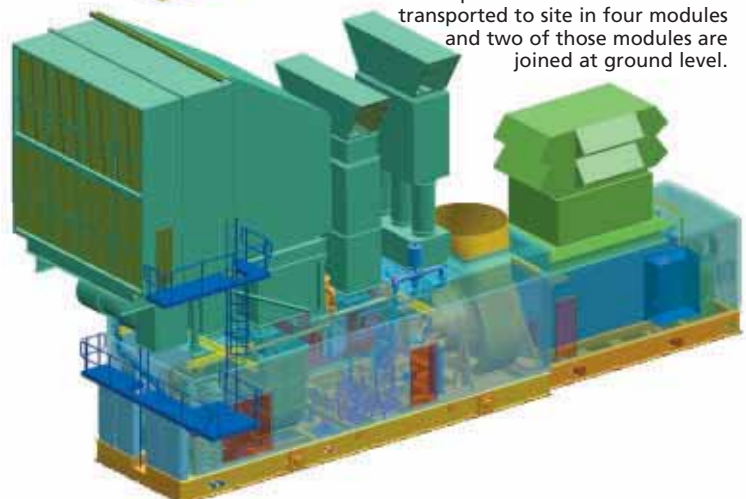
Lift One
The main gas turbine skid base plate. This base includes all required engine lubrication systems, fuel systems and the control panels.



Lift Two
The generator base. The base plate includes the lubrication system built into the base plate.



Lift Three
The main gas turbine skid "Top Hat". After the assembly of the air systems (Enclosure ventilation and Blow off system) the top of the enclosure is lifted onto the main enclosure.



Lifts Four and Five
The inlet filter is assembled onto the top of the enclosure in two separate lifts. This inlet filter is transported to site in four modules and two of those modules are joined at ground level.

T R E N

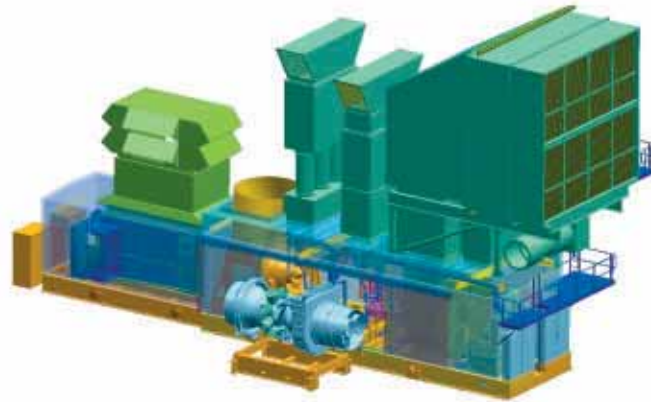
Modular concept

The Trent 60 package is designed with a modular concept to not only allow for quick installation but also for ease of maintenance in the field.

Each of the modules is fully assembled and tested before shipment to the field. Both the gas turbine and the generator base plates hold the required oil systems thus allowing installation, testing and flushing in a shop environment. This greatly reduces site installation time.

Not only are the mechanical systems located on the base plate but the control systems are located there as well. The control systems required for the operation of the Trent engine whether in mechanical drive or power generation service are pre-assembled and tested on the base plate before the unit ships to the field. All train control systems are then accessed by a Human Machine Interface (HMI) which can be located in the main control room.

Trent maintenance



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Flexible design

Due to the Trent's aircraft engine lineage, maintenance of the engine can be accomplished quickly and easily. The Trent package is designed to facilitate engine change out in under 24 hours of working time.

Complete engine servicing can take place in a Rolls-Royce facility.

The Trent engine is also capable of being split into three interchangeable modules:

1. Low pressure compressor
2. Intermediate and high pressure compressors and turbines
3. Low pressure turbine

It is possible to swap these engine modules at the site in under 72 working hours. This reduces overall transport and costs associated with inventory of a spare engine. Rolls-Royce can also offer access to a lease engine or module program.

This program reduces the need for a spare engine and allows significant flexibility in maintenance.



The engine is installed and removed from the side of the package. The use of sliding doors allows full access to the engine and is designed for a complete engine change out in 24 working hours.

Customer service business

Long Term Service Agreements
 Engineered products
 Refurbished power systems
 Repair and overhaul
 Control system upgrades
 Service exchange and lease engines
 Spare parts
 Technical support
 Field service
 Customer training
 Complete installation and commissioning service

T R E N T

Experience holds the key to success

In today's evolving and demanding energy market, Trent gas turbine based packages offer distinct advantages to the power generation and oil and gas industries. This competitive advantage is complemented by an innovative and diverse suite of service solutions tailored to customers' specific needs.

Our ability to keep you operational where others might fail is a direct result of our policy to develop integrated solutions. Our Long Term Service Agreements (LTSAs) create partnerships designed to control operators' maintenance budget while increasing the availability of the equipment.

The equipment upgrades we provide as part of our suite of engineered products rely on the

comprehensive system history and key performance indicators established in our technical support networks.

By diligently monitoring the performance of your installed plant we can plan when major components will need to be removed for repair or overhaul.

We are continually increasing the range and scope of our customer service solutions. Our own online community at www.enegymanager-online.com provides Rolls-Royce users with quick, up to date, easy to access information.



LP Turbine

HP/IP
Core

LP
Compressor

Engine Handling

Due to the Trent's aircraft lineage it is possible for the engine to be split into three modules at the site. This reduces transportation costs and saves on inventory requirements.



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