



MGT-30 GAS TURBINE

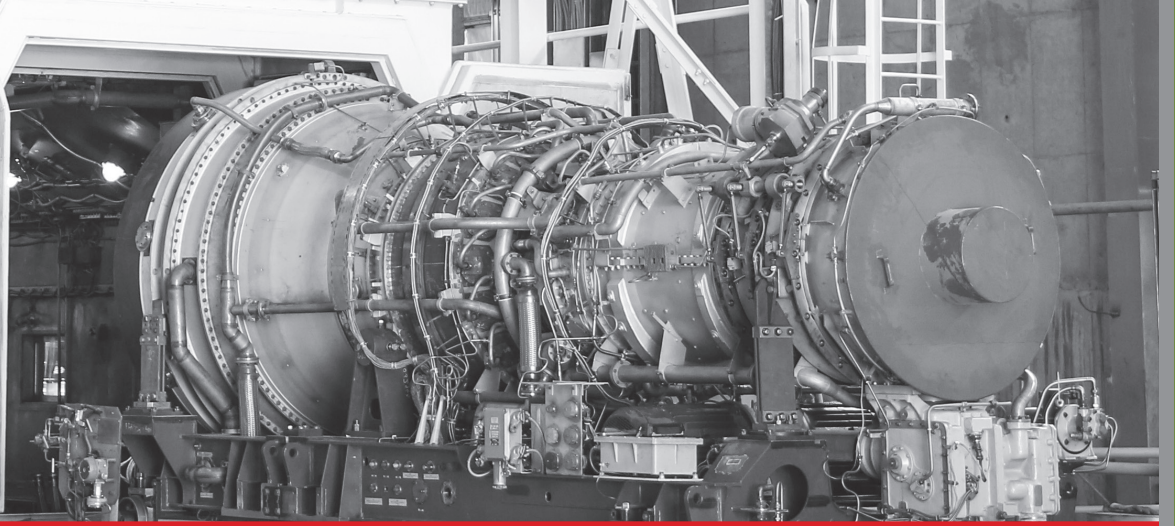
MAPNA TURBINE ENGINEERING & MANUFACTURING Co. (TUGA)

MGT-30 Gas Turbine

The MGT-30 Gas Turbine meets customer requirements for economic installation and operation and provides excellent flexibility for industrial processes and household electricity power generation. There are various types of applications that use gas turbines. However, the most prevalent are found in the oil and gas industry (refineries, petrochemical plants), mining utilities, cement industry, as well as those requiring independent and distributed power generation.

Product Specifications

No.	Parameters	Unit	Value
1	Gross Power Output*	MW	25
2	Gross Efficiency*	%	35.9
			36.1
3	Shaft Speed	rpm	3000
			3500-5000-5250
4	Exhaust Gas Temperature	°C	472
			478
5	Exhaust Mass Flow Rate	kg/s	89
			88
6	No. of Compressor Stages	EA	9 stages LPC 9 stages HPC
7	No. of Power turbine stages	EA	4
			2
8	Pressure Ratio	-	22
			21.5
9	Type of Combustors	-	Reverse Can-annular
10	NOx Emissions (DLE Type)	ppmvd@15%O ₂	25
11	CO Emissions (DLE Type)	ppmvd@15%O ₂	25
12	Frequency	Hz	50
			-
13	Weight (Core Engine)	tonnes	15.1
			14.2
14	Dimensions (Length×Width×Height)	m	6.3 x 2.4 x 2.5
			6.3 x 2.3 x 2.5
* Nominal Power at ISO Conditions.			Power Generation
			Mechanical Drive



Advantages

- High simple cycle efficiency
- Mechanical drive reliability specially for centrifugal compressors
- Mixed-duty applications

Other Features

The machine consists of two main sections, Gas Generator (GG) and Power Turbine (PT), which are thermodynamically coupled to each other. These special design considerations make our product unique:

Anti Stall and Surge Built-ins

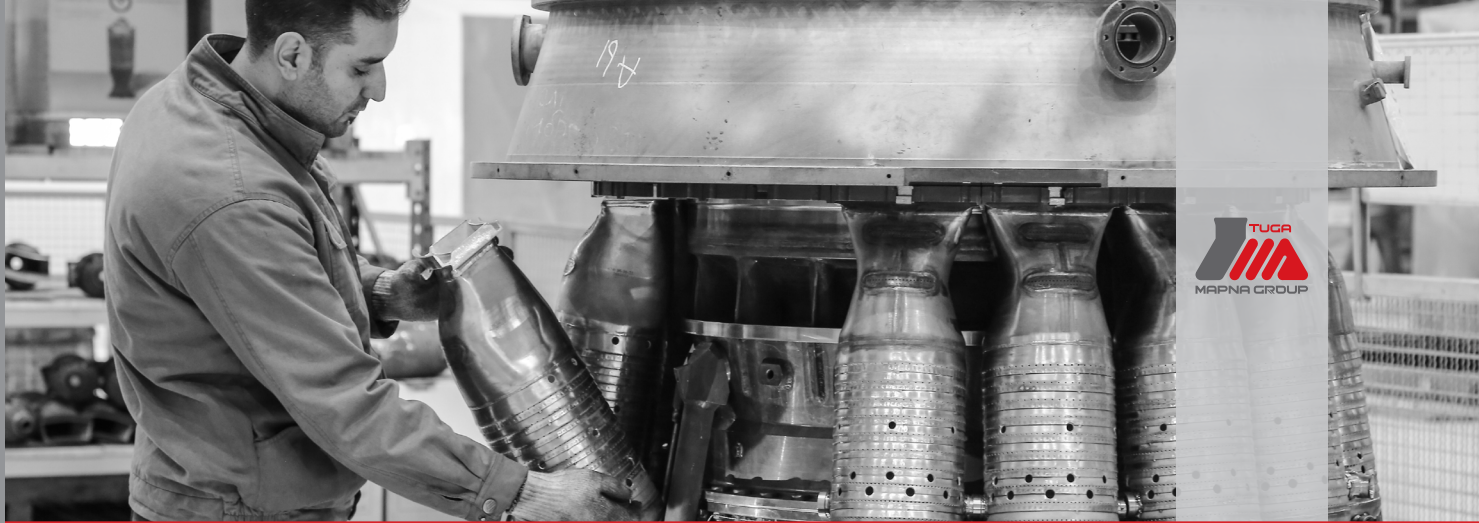
Twin-shaft configuration in the Gas Generator unit leads to maximum reliability reducing the risk of surge and stall phenomena occurring in the gas turbine. Additionally, integrated IGV and VGV rings designed to be put in the GG's structure improve the flow inside. Blow-offs along the flow path inside the GG contribute to maximum safety, as well.

Design Reliabilities

Using a centrifugal ratchet clutch leads to a smoother start-up. Nearly maintenance-free roller bearings are used in the whole machine design. Furthermore, fir grooves/trees are applied to the first three stages of the compressor to enhance fatigue strength on blades and disks. A by-pass anti-surge chamber in the vicinity of the first rotary stage contributes to stability and sustainability of transition regimes.

Combustion System

MGT-30(1) gas turbine is primarily designed based on diffusion type can-annular combustor with NOx emission level of around 200 ppm at the base load. Due to compliance with environmental standards the development of DLE combustion system was foreseen in the upgrading roadmap of this product. Unlike conventional diffusion combustors, DLE systems are developed in such a way that the combustion zone temperature, as the main factor affecting emission levels, would be controlled by providing lean air/fuel mixture. In this dry emission control method, fuel and air are premixed at a specific ratio before entering the combustion zone.



Simple Installation and Maintenance

The GT is available as a factory-assembled package. It is easily transported, installed and maintained on-site. The package includes the gas generator, the power turbine and all the wiring and piping mounted on a single base frame. For maintenance purposes, the gas generator part can be slid off completely from the whole package to make space for any ensuing operation. These characteristics have made MGT-30 gas turbine stand out from its competitors in terms of safety, maintenance, and reliability.

Key Features of MGT-30(1)

- LPC Blades: Assembly Modification
- HPC Rear Bearing Bush: Design Reliability Increase
- Diffusion Combustion Chamber: Liner Cooling modification and Using TBC Coating
- Nozzle Vane Casing: Machining and Insulation Modification
- Lubrication System: Test & Assembly Modification and Using Extra SOS
- Hot Gas Path Development: HPT Blade Design and its Coating Modification

Services Offered After Sales

After 25000 EOH, the gas turbine flow path is inspected on site. Depending on the machine condition and operating parameters, a decision is made either to extend further operation or carry out an overhaul. In the aggregate, total recommended service lifetime is 100,000 EOH, which is normally reached in approximately 12 years. Based on the machine inspection, the time between overhauls and total service time may be extended in case of good machine condition. The following services are available to the clients after sales.

Provision of spare parts for the turbine and auxiliaries

Our own manufacture, as well as reliable network of spare parts suppliers enables us to satisfy individual client demands, including capital spares, as per order.

Long-term supply and support agreements

We offer long-term contracts for various types of support and service.

Supervision with installation and commissioning

Installation and commissioning of turbines and auxiliaries are performed by skilled personnel under our direct supervision. Personnel can also be made readily available on and off the client site until the end of the guarantee period of the last unit in the plant.



Technical consultation services for end users

Our experienced and knowledgeable technical and engineering team is available for consultation at any time.

Training of end-user staff

We offer several training courses for new staff on site, such as general plant knowledge, operation, maintenance, and some special training, such as firefighting.

Performing inspections and overhauls

Our experienced maintenance personnel can perform turbine inspections and overhauls thoroughly.

Fabrication and repair of turbine special parts

Thanks to our state-of-the-art machineries and skilled manufacturing personnel, we can provide fabrication and repair of special parts for our MGT-30(1) machines.

The Gas Turbine Test Stand

Newly manufactured or overhauled gas turbines shall undergo mechanical and operational tests under the real operating conditions according to the respective standards. Our in-house test station is set up and equipped for complete testing and verification of MGT-30(1) machines. It consists of two parallel test stands, each including gas turbine installation platform with all the auxiliary equipment and control system, as well as a hydraulic dynamometer (water brake). The dynamometer puts load on the machine, simulating the real power consumer (generator, compressor, or pump), and allowing a full-range testing of the gas turbine for different applications.

A water circulation and cooling cycle dissipates the heat generated inside the dynamometers. The closed cycle of water consists of the main concrete buried reservoir of 1000 m³, a 35-meter water tower with a volume of 35 m³, as well as a 50 m³ concrete reservoir inside the test hall. For cooling and circulation of water in the closed cycle, the system is equipped with 4 cooling towers, 6 pumps, and 25 motorized valves in different sizes.

While the first stand is dedicated to testing the machines at the end of production, the second one is equipped with additional instrumentations for research and developments. The station is working with fuel gas, which is fed up to a pressure of 35 bar through a special pipeline and installation. The tests normally include recording data during the machines operation in specified working modes and up to the nominal power, in order to conduct performance and mechanical analyses and calculations for any required adjustments or formal reports to the customer.

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