

THM1304

Generator Drive

The THM 1304 heavy-duty gas turbine family offers a long life with a high level of reliability and availability. The modular design facilitates easy installation and maintenance features to realize an optimized cost-to-benefit ratio over the entire lifecycle. Onshore and offshore requirements for power generation applications are perfectly met.

Benefits at a glance

- Modular design for easy and fast installation
- High reliability and availability
- Low emissions
- Fuel flexibility

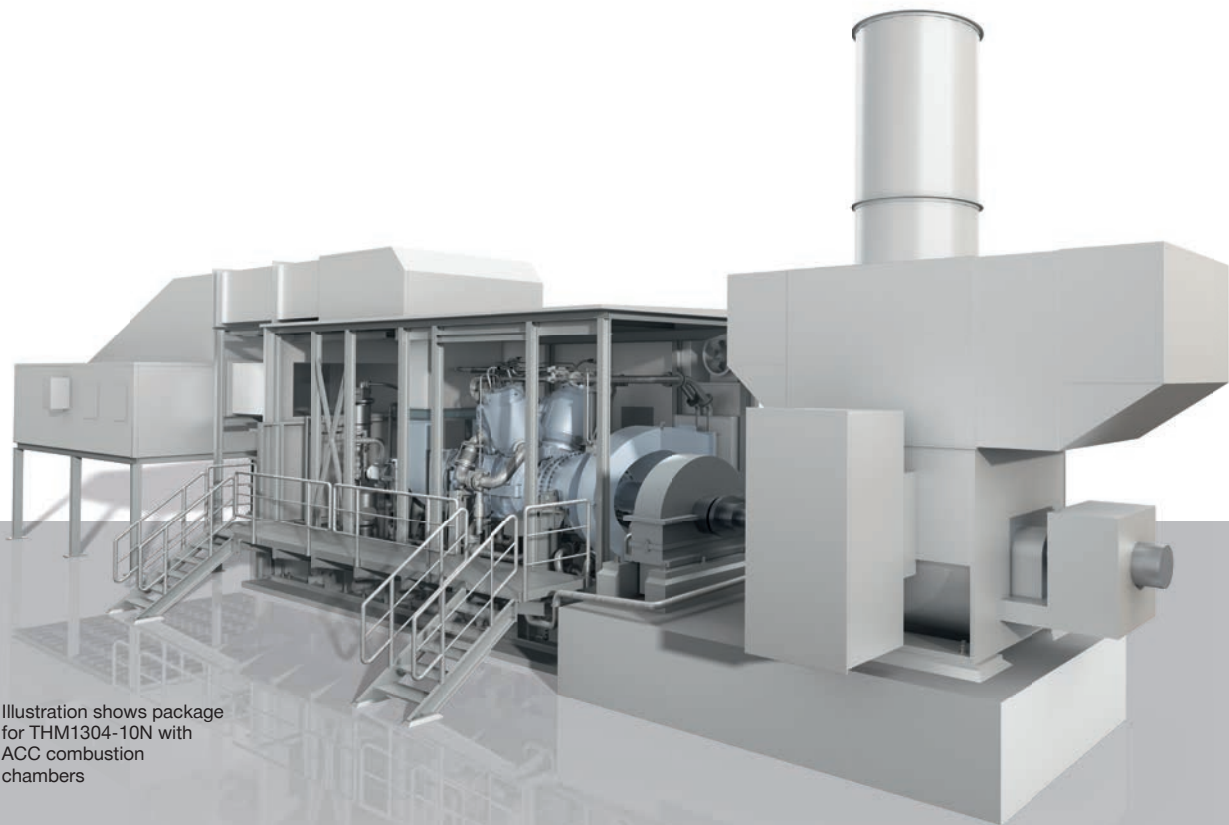


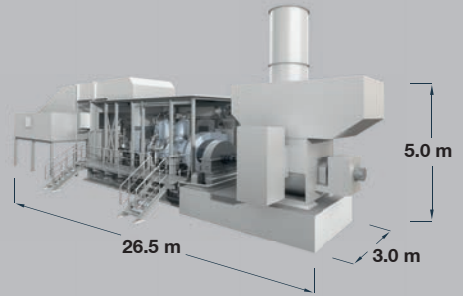
Illustration shows package for THM1304-10N with ACC combustion chambers

THM1304 Generator Drive

Technical data

Performance at ISO conditions*

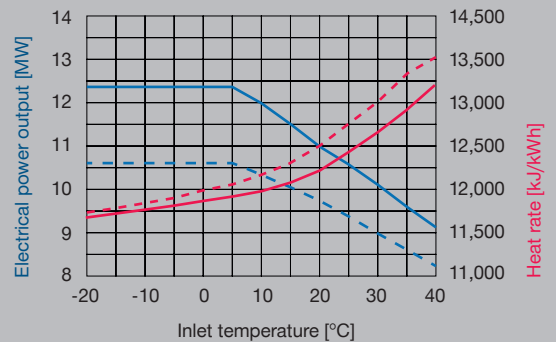
		1304-10N**	1304-12N***
Power output	kW _{el}	10,080	11,520
Heat rate	kJ/kWh _{el}	12,330	12,090
Efficiency	% _{el}	29.2	29.8
Exhaust gas flow	kg/s	46.5	48.1
Exhaust gas temperature	°C	490	525
Generator speed (50 Hz/60 Hz)	rpm	1,500/1,800	1,500/1,800
NO _x emissions (ref. to 15% O ₂ , dry)	mg/Nm ³ ppm	50 25	50 25
CO emissions (ref. to 15% O ₂ , dry)	mg/Nm ³ ppm	20 16	10 8



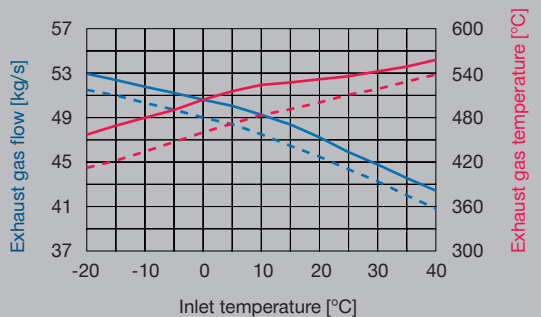
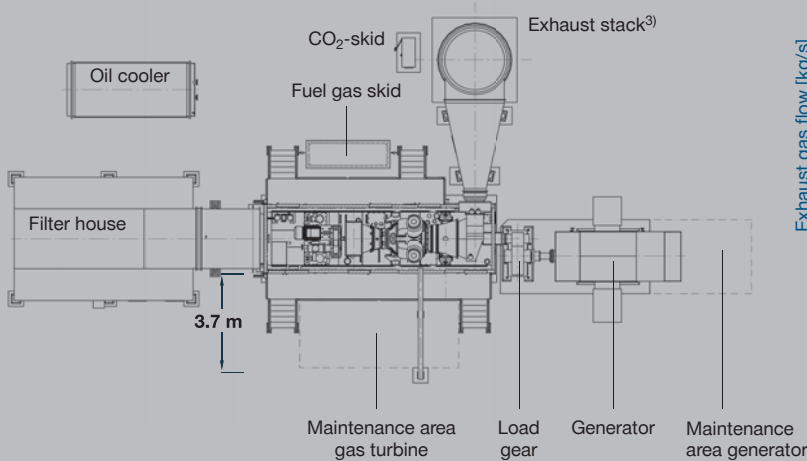
*all data valid for sea level, 15 °C, no inlet and exhaust pressure losses, 60 % rel. humidity, natural gas. Power output will decrease with increase of site altitude (1.1 % per 100 m), inlet pressure loss (1.9 % per 1 kPa) and exhaust pressure loss (0.9 % per 1 kPa)

** ACC combustor

*** DLN combustor



Layout based on THM1304-10N with ACC combustion system



--- THM1304-10N
— THM1304-12N

Typical applications

Gas turbine generator units are operated for e.g. emergency and black start applications, on off-shore platforms (with adapted package design) mainly in simple cycle mode.

For CHP¹⁾ applications (most common) gas turbine generator units are operated in combination with a heat recovery unit for different heat processes, resulting in e.g.

- Power, Steam Generation
- Power, Hot Water Generation
- Power, Steam & Chilled Water
- Power, Steam & Hot Water

CHP applications are beneficial for various industries such as food processing, pulp & paper, breweries, automotive, etc. having demand for heat and power. CHP processes provide increased efficiencies and reduced CO₂ emissions compared to conventional power & heat generation. Overall CHP efficiencies reach 90% and higher depending on the heat process.

Gas turbine

- Heavy duty, twin shaft
- 11 stage air compressor
- 2 combustion chambers in V arrangement
- 2 stage high pressure turbine
- 2 stage power turbine

Combustion systems

- Low Emission combustion system
 - ACC² combustors (THM1304-10N)
 - DLN combustors (THM1304-12N)
- Diffusion combustion system
 - Standard combustor
 - High fuel flexibility
 - Dual fuel compatible

Integrated auxiliary gear

- Parallel shaft gear type
- Drive for main lube oil pump
- Torque transmission of electric starter motor for gas turbine start-up

Load gear

- Speed reduction to 1,500 rpm (for 50 Hz) or 1,800 rpm (for 60 Hz)³
- Free standing (on foundation)

Generator

- 4 pole, 3 phase, synchronous generator with built-in exciter, rotating rectifier and permanent magnetic pilot generator (PMG)
- Air cooled
- Water cooled³
- Insulation Class F / temperature rise class B
- Free standing (on foundation)

Gas turbine package

- Package for outdoor installation
- Noise emission
 - All equipment is designed for $L_{pA} = 85$ dB(A) measured in 1 m distance and 1.5 m height
 - $L_{pA} = 80^{3), 75^{3), 70^{3)}$ dB(A)
- Base frame
 - With integrated lube oil and fuel system
- Starting system
 - Variable frequency drive for gas turbine starter motor
- Integrated lube oil system
 - Main lube oil pump driven via auxiliary gear
 - Stand-by lube oil pump (AC-motor driven)
 - Emergency lube oil pump (DC motor driven)
 - Air to oil cooler (free standing)
 - Water cooler³⁾
 - Integrated lube oil tank
 - Lube oil tank heater
 - Lube oil filter
 - Control valves
 - Oil mist separator
- Fuel system
 - Fuel gas system
 - Double block and bleed valves
 - Control valves
 - Liquid³⁾ & dual fuel system³⁾ (standard combustor)
- Air inlet system
 - Table type filter house with depth loading cartridges
 - Filtration class:
 - Pre-filter: G4,
 - Fine-filter: F9 (E11³⁾)
 - Static filter³⁾ with anti-icing³⁾
 - Pulse type filter in table or down flow arrangement³⁾
- Exhaust system
 - Transition duct up to interface at enclosure for connection to optional downstream exhaust system
 - Free standing stack³⁾
- Enclosure
 - Gas turbine enclosure for outdoor installation
 - Fire detection and CO₂ fire-fighting system
 - Water-mist fire-fighting system³⁾
 - Gas leakage detection
 - Maintenance cranes
- Turbine compressor cleaning system
 - Offline and online washing
 - Mobile wash trolley³⁾

Controls

- For installation in air conditioned control room (to be provided by others)
- Gas turbine control system
 - Gas turbine control & protection
 - Unit sequencing
 - Human machine interface (HMI)
 - Alarm management
- Generator control & protection system
 - Automatic synchronizaton
 - Automatic voltage regulator (AVR)
 - Generator protection relay
- Low voltage distribution system
 - AC power supply for all electrical consumers
- Turbine starting system
 - Variable frequency drive (VFD)
- Uninterrupted power supply system
 - Buffered with batteries
 - DC supply for emergency lube oil pump
 - AC supply for all electrical panels
- Data storage system
 - Long term data archive
 - Event logger
- Plant control system interface
 - Modbus TCP interface
 - Others optional

Documentation

- Engineering documents
- Installation manual
- Operating instructions
- Quality documentation

Factory acceptance test of turbine

- Core engine full-speed, full-load

Complete unit test³⁾

- Full-speed, full-load
- Full-speed, no-load

¹⁾ CHP = Combined Heat and Power

²⁾ ACC = Advanced Can Combustor (Dry Low Emission (DLE) Technology)

³⁾ can be offered as option

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