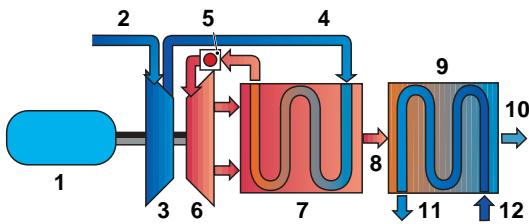
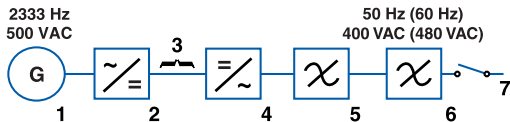


# T100 microturbine CHP system



- |                       |                        |
|-----------------------|------------------------|
| 1. Generator          | 7. Recuperator         |
| 2. Air inlet          | 8. Exhaust gases       |
| 3. Compressor         | 9. Heat exchanger      |
| 4. Air to recuperator | 10. Exhaust gas outlet |
| 5. Combustion chamber | 11. Hot water outlet   |
| 6. Turbine            | 12. Water inlet        |



- |                              |                         |
|------------------------------|-------------------------|
| 1. Generator                 | 5. Line filter          |
| 2. Rectifier/Start converter | 6. EMC filter           |
| 3. DC bus                    | 7. Main circuit breaker |
| 4. Converter                 |                         |

Turbec T100 microturbine is a CHP (Combined Heat and Power) unit. The unit produces electricity and heat fuelled by natural gas. The microturbine is designed for indoor installation and takes air from an outside intake. The CHP unit is divided into the following main parts:

- Gas turbine engine and recuperator
- Electrical generator
- Electrical system
- Exhaust gas heat exchanger
- Supervision and control system

The T100 is a single-shaft high-speed microturbine with a two-pole permanent magnet mounted on the same shaft as the compressor/turbine and rotates at the same speed.

## Electrical generator

The rotor is suspended by two bearings on each side of the permanent magnet. By full effective output the generator produces a high frequency triphase AC.

## Recuperator

The combustion air is heated in the recuperator by extracting some of the excess heat in the exhaust gases. The recuperator increases the efficiency of the microturbine.

## Electrical system

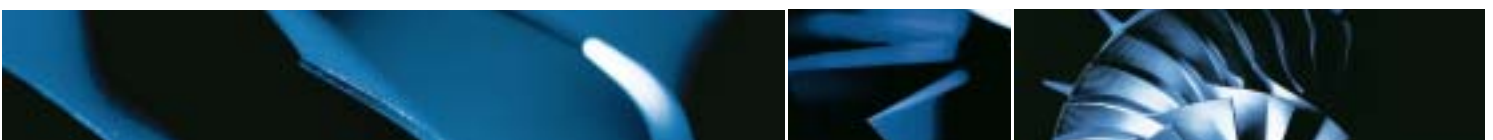
The high-speed generator produces high frequency electricity which is converted to the main frequency and voltage in the power converter. The electrical system is entirely controlled and automatically operated by the Power Module Controller (PMC). The electrical system is used in reverse when it works as the electric starter to the gas turbine.

## Exhaust gas heat exchanger

The heat exchanger is of gas-water counter-current flow type. The thermal energy from the exhaust gases is transferred to the hot-water system by the heat exchanger. The exhaust gases leave the heat exchanger through an exhaust pipe and the subsequent chimney.

## Supervision and control system

The Turbec T100 is controlled and supervised with an automatic control system. The CHP unit needs no attendance of personnel in normal use. In case of critical distortion the system automatically shuts down and records the fault code to the PMC. The PMC is used to start, stop and supervise the CHP unit. The T100 can be remotely accessed and operated.



# T100 microturbine CHP system



D 10239 Technical data sheet, Version 5.0

## General identification

Usage:	Indoors
Dimensions of CHP unit:	Width 870 mm (33.9")
	Height 1 900 mm (74.8")
	Length 2 920 mm (115")
Weight:	2 000 kg (4470 lb)
<b>Gas turbine</b>	
Compressor type:	Centrifugal
Turbine type:	Radial
Type of combustor:	Lean pre-mix, low emission
Number of combustors:	1
Pressure in combustor:	4.5 bar (a) (65 psia)
Number of shaft:	1
Nominal speed:	70 000 rpm
Consumption of lubrication Oil:	<9 litre/6 000 h operation (<304.9 fl oz /6 000 h op.)

## Electrical data

Voltage output:	400 VAC alt. 480 VAC, 3 phases
Frequency output:	50 Hz alt. 60 Hz

## Fuel requirements

Pressure min/max*:	6/8.5 bar (g) 87/123 psia
Temperature min/max*:	0°C/60°C (32°F/140°F)
Lower heating value:	38-50 MJ/kg

\* without fuel gas compressor

## Fuel gas compressor

Gas suction pressure:	0.02 - 1.0 bar (g) (0.3 - 14.5 psi)
Compressor type:	Scroll compressor
AC Power supply:	345 - 525 VAC, (50/60 Hz)
Noise level	75 dBA at 1 m (3.3 ft)
Dimensions:	Width 610 mm (24")
	Height 1 070 mm (42")
	Length 1 370 mm (54")

## Performance data

Net electrical output*:	105 kW (± 3)
Net electrical efficiency*:	30% (± 1)
Net total efficiency*:	78% (± 1)
Fuel consumption:	350 kW (1 194 000 Btu/h)
Net thermal output (hot water):	167 kW (± 5)(570 000 Btu/h)
Exhaust gas flow:	0.80 kg/s (6350 lb/h)
Exhaust gas temperature:	85°C (185°F)
Water inlet temperature:	50°C (122°F)
Water outlet temperature:	70°C (158°F)
Noise level:	70 dBA at 1 meter (3.3 ft)
<b>Volumetric exhaust gas emissions at 15% O<sub>2</sub> :</b>	
NO <sub>x</sub> :	< 15 ppm/v = 32 mg/MJ fuel
CO:	< 15 ppm/v = 18 mg/MJ fuel

*All performance data at ISO conditions and at 100% rated load.  
(\*Fuel gas compressor power consumption excluded)*

## Maintenance

The simple and rugged design of the T100 power module provides for a durable operation during many years. Expected life time of main components are listed below:

Gas turbine engine:	> 60 000 hrs
Recuperator:	> 60 000 hrs
Combustor:	> 30 000 hrs (some parts < 30 000 hrs)

The preventive (scheduled) maintenance is divided into two different categories:

	Interval (h)	Outage (h)
Inspection	6 000	24
Overhaul	30 000	48



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