CHP Technical Data Sheet for

T30 LB Biogas Indoor Canopy

Micro Series

Power Therm

The Micro series benefits from having Tedom's own built in-house high performance gas engines. Available to run on a variety of gas fuels. Multiple units can be run in synch, and high-end digital controllers make synchronising with the mains simple.

Standard Features

- High performance electrical efficiency
- Fully modulating output
- Compact footprint indoor canopy
- Sophisticated web remote monitoring
- Digital engine management
- Long service intervals
- 27 month warranty
- Standby power options
- Low noise options

ELECTRICITY OUTPUT	THERMAL OUTPUT	ELECTRIC EFFICIENCY	THERMAL EFFICIENCY	TOTAL EFFICIENCY
25 kWe	47.5 kWt	31.6 %	60.0 %	91.6 %

shenton**group** has the exclusive distributorship for Tedom products in the UK, Ireland and Channel Islands.

We provide dedicated services for CHP projects, ranging from design assistance, through project management, to commissioning and long-life support.

Tedom is a global CHP manufacturer with 600 employees. There are over 2,000 Tedom CHP units in service in over 35 countries worldwide.

t. +44 (0)844 888 444 5 e. info@shentongroup.co.uk www.shentongroup.co.uk
Shenton House, Walworth Road, Walworth Business Park, Andover, SP10 5LH

Micro Series Features

The TEDOM Micro series of CHP units are machines for the combined production heat and power in terms of gas combustion. Basic features of the Micro series of units are: high efficiency, compact design, long life-time of oil filling and service interval. Due to all characteristics mentioned, these products are used as modern power sources for heating small buildings of many types.

According to statement of notified body certificate certifying conformity of Micro series products with requests of directive 2009/142/EC (government regulation no. 22/2003 Col.) was edited. TEDOM is also the holder of QMS and EMS Certificates.

TEDOM CHP Unit Merits:

- Automatic air-fuel ratio control - this method of reducing emissions is in the standard supply of CHP unit.
- CHP units are equipped with digital engine-management which optimises engine operation.
- CHP units form easily connect-able compact complex.
- By use of acoustic enclosure, CHP units are characterized by low noise output.
- Ability to adapt to different temperature gradients of heating systems.
- Due to modular arrangement of control system, the number of binary and analogue inputs for monitoring and controlling following devices can be extended easily.
- Basic signals for CHP unit control (external emergency stop, external start, etc) can be connected to the customer's terminal box.
- Units are functionally tested for operation in production plant.
- TEDOM CHP units are continuously innovated from the knowledge of previous projects.

Design	Sound Enclosure
Operation	SP - synchronous, parallel with mains
Fuel	Biogas

Basic Technical Data

Nominal electric output	25 kW
Maximum heat output	47.5 kW
Fuel input	79.1 kW
Electrical efficiency	31.6 %
Heat efficiency	60.0 %
Total efficiency (fuel use)	91.6 %
Gas consumption at 100% of output	12.3 m^3/h
Gas consumption at 75% of output	9.9 m^3/h
Gas consumption at 50% of output	7.5 m^3/h

Basic technical data above is valid for standard conditions according to the 'Technical Instructions' document. Gas quality must also correspond with 'Fuel & Gas Inlet' section on page 4.

The minimum permanent electric output is 50% of nominal output.

Gas consumption is expressed for biogas with 65% methane content, under standard conditions (0°C, 101,325 kPa).

Technical data is specified for temperatures 65/85°C.

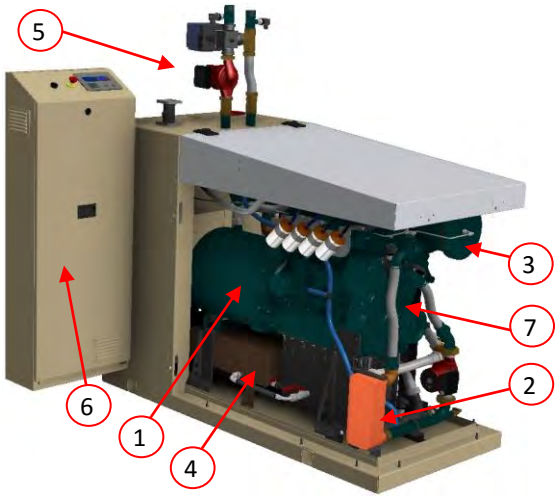
Emissions

Emissions	CO	NO_x
At 5% of O_2 in exhaust gas	1000 mg/Nm^3	500 mg/Nm^3

Orientation Description of CHP Unit

The unit consists of engine-generator set, complete heat equipment, including electro switchboard enabling parallel operation with mains 400V/50Hz. All parts are built in noise silencing enclosure. Warm-water circuits are designed for temperature gradient 70/90°C as standard.

1. Generator
2. Plate heat exchanger
3. Exhaust gas exchanger
4. Oil tank
5. Connecting points (see last page)
6. Electric switchboard
7. Combustion engine



Engine

Model	V3800
Manufacturer	Tedom
Number of cylinders	4
Arrangement of cylinders	In Line
Bore × stroke	100 × 120 mm
Displacement	3769 cm^3
Compression ratio	13 : 1
Speed	1500 rpm
Oil consumption normal / maximum	0.3 / 0.6 g/kWh
Coefficient of air excess	Λ=1.51
Maximum output of engine	28 kW

Illustrative picture

Generator

Type	Asynchronous
Model	AS 225
Manufacturer	Zanardi
Generator output	32 kW
Cos φ	0.78
Efficiency in working point	89.4 %
Winding connection	Switch Y/D
Voltage	400 V
Frequency	50 Hz

Thermal System

Heating system of CHP unit is formed in view of heat output transfer (heat gained by cooling of engine and exhaust gas) by hydraulic circuit, from which heat from unit is transferred to heating system of user. Unit enables operation by different temperatures. Heating system of the unit is equipped with circuit pump.

Parameters of Hydraulic Circuit:

Heating output of circuit	47.5 kW
Nominal flow rate	34.2 l/min
Maximum working pressure	600 kPa
Water volume in CHP unit circuit	25 litres
Pressure loss at nominal flow rate(1)	30 kPa
Pressure reserve at nominal flow rate(2)	50 kPa
Maximum temperature of return water	70 °C
Minimum allowed temperature of return water	40 °C
Nominal temperature drop	20 °C

(1) If the circuit pump is not used.

(2) If the circuit pump is used.

If it is not possible to use heat produced by the unit, this output or its part can be removed by cooling unit for emergency cooling, which can be also supplied.

Fuel & Gas Inlet

Fuel type	Biogas
Heat value (65% methane content)	23.4 MJ/Nm^3
Minimum content of methane	< 50 %
Chlorine[(1)]	< 2.5 mg/MJ
Fluorine[(1)]	< 1.25 mg/MJ
Chlorine & Fluorine[(1)]	< 2.0 mg/MJ
Sulphur overall[(1)]	< 20 mg/MJ
Solids (maximum size)	< 10 (< 10µm) mg/Nm^3
Oil[(1)]	< 6.0 mg/Nm^3
Silicium[(1)]	< 0.15 mg/MJ
Ammoniac[(1)]	< 0.83 mg/MJ
Relative humidity[(2)]	< 80 %
Relative humidity[(3)]	< 50 %
Gas pressure	1 - 10 kPa
Maximum pressure change under varying consumption	10 %

(1) The *Concentration of pollutant substances is related to unit of calorific value of incoming fuel. Data about allowed concentration for m^3 can be obtained by multiplying of particular value of actual calorific value 1m^3 in unit of measure 1m^3 in MJ.*

(2) *At temperature of inlet gas 5-25 ℃, basically a humidity can not occur in liquid form.*

(3) *At temperature of inlet gas 25-35 ℃, basically a humidity can not occur in liquid form.*

Gas line of the unit is constructed in conformity to TPG 811 01 and contains gas filter and combined gas armature, which fulfil following functions:

- Double quick-closing electromagnetic valve for gas Inlet closing at unit stop.
- Gas pressure regulation suitable for mixing.
- Elastic connection by metal hose with mixer of engine.

For correct operation of CHP unit, gas connection of suitable size and with adequate accumulation volume is required as a protection against gas pressure drop in system after abrupt changes in consumption. Gas connection must be equipped with hand valve and manometer.

Combustion Air & Exhaust Gas Outlet

Combustion air is sucked from surroundings through cold space of the unit. The exhaust gases are removed from unit by the exhaust piping (duct system) connected on the CHP unit flange. Exhaust piping from unit flange to chimney uptake has to be tight. The piping must be down-grade in the direction from the CHP unit. Eventually, the condensate, which could arise at CHP unit operation is evaporated and blow-off together with exhaust gases. Material of exhaust piping and heat insulation of duct system in plant room must be resistant to temperatures up to 200°C at least. Maximum pressure loss of whole duct system must not exceed 10 mbar. Machine construction does not require any forced air ventilation.

Quantity of combustion air	103 Nm^3/h
Requested temperature of combustion air	10 - 35 °C
Exhaust gas temperature nominal / max	150 / 180 °C
Maximum back-pressure of exhaust gas behind flange	10 mbar
Quantity of exhaust gas	115 Nm^3/h

Lubricants

Quantity of lubricating oil in engine	30 litres
Volume of oil tank	20 litres
Quantity of cooling liquid in primary circuit	9 litres

Heating water in hydraulic circuit must be modified, its composition must be according to the 'Technical Instructions' document.

Noise Parameters

Noise parameters specify the acoustic pressure level measured in free field conditions. Determination of measuring point and method of evaluation comply with ČSN 09 0862. The noise contains the tone element with a frequency of 50 Hz.

CHP unit 1m from sound enclosure	60 dB(A)
Exhaust gas outlet 1m from flange	57 dB(A)

Colour Design

Engine, generator, internal parts of unit, frame and oil tank	RAL 5001 (Blue)
Sound enclosure	RAL 1001, 1013 (Beige)

Dimensions & Weight Information

Dimensions vary depending on optional extras included. Please see GA drawing for full details.

Length (standard design)	1662 mm
Width (total with switchboard)	1492 mm
Height	1771 mm
Transport weight	1100 Kg

Additional Documents

- Dimension drawing: Micro T30 Biogas GA Drawing_R1475.
- P&ID: Micro T30 Biogas P&ID_S0744.
- Generally binding source materials according to the 'Technical Instructions' document.

Scope of Delivery

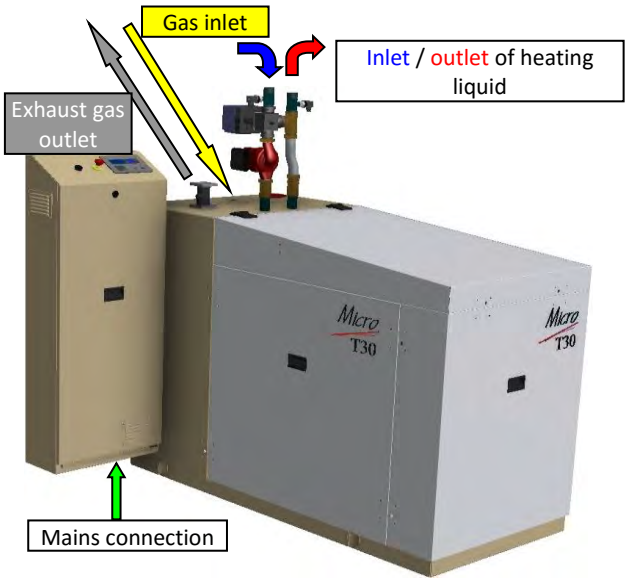
Standard Scope:

- Complete module of CHP unit.

Out of Standard Scope:

- Cooling unit for emergency cooling.
- Additional exhaust silencer.

Connecting Points



Amendments

Due to our policy of continual improvement, we reserve the privilege to change this document and consequential documents without notice.