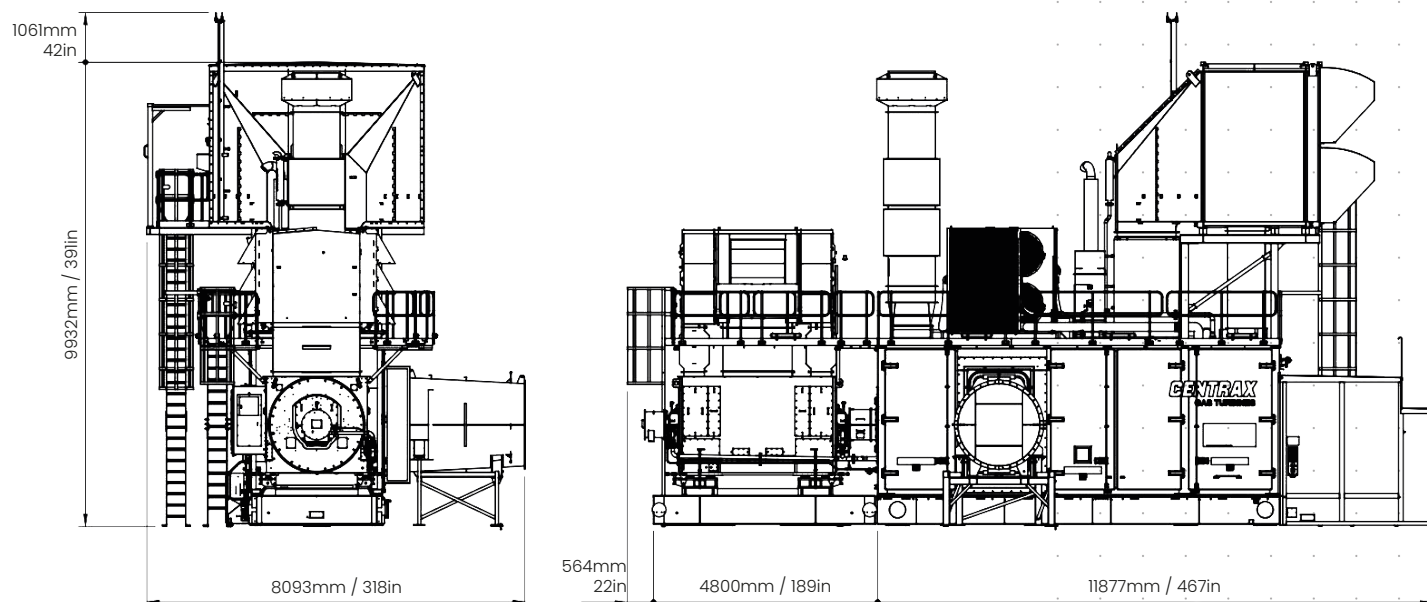


# CX400 12.9MW

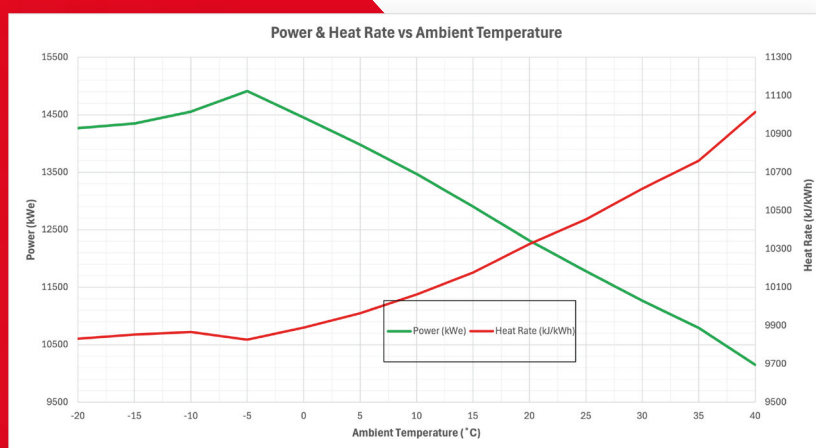
## Gas Turbine Generator Set

**CENTRAX**  
GAS TURBINES



Approx total weight = 117000 KG / 257941 lbs

Power Output	12904 kW <sub>e</sub>
Heat Rate	10176 kJ/kWh 9645 BTU/kWh
Exhaust Flow	39.2 kg/s 86.4 lb/s
Exhaust Temperature	549°C 1020.2°F
Exhaust Thermal Energy	36475 kW <sub>th</sub>
Electrical efficiency at generator terminals	35%



ISO rating is based on the following characteristics:

Ambient Temperature 15°C (59°F), Altitude (Sea level) 0m (0ft), Ambient Pressure 1013 mbar (29.91 inHg), Relative Humidity 60%, Natural Gas fuel (LHV) 47889 kJ/kg (20589 BTU/lb)

\* Inlet losses, exhaust losses & package auxiliary losses are excluded

Capable of a high number of starts per year, easily accepts instantaneous increases/decreases in power output, fast start capabilities, cold and hot start.

### Centrax Gas Turbines Ltd

Shaldon Road, Newton Abbot, Devon, TQ12 4SQ, England

Registered in England No. 00592720. VAT No. GB 141 5342 02.

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# General specifications – Siemens SGT-400 12.9MWe

## Gas Turbine

- Industrial twin shaft design
- 11 Stage axial compressor with variable guide vanes on stages 1 to 5
- Pressure ratio 16.7:1, blow-off valves to prevent compressor surge
- Combustion module
  - 6 reverse flow combustion chambers (cans)
  - Standard ignition system, high-energy ignition unit and 6 ignitors
  - Gas and Liquid fuel Dry Low Emissions (DLE) \*
- 2 stage compressor turbine, 2 stage power turbine
- Power take-off through exhaust end (hot end drive)
- Tilting pad journal & thrust bearings

## Gearbox

- Epicyclic speed reduction gearbox
- Reduce power turbine speed down to 1500rpm (50Hz) or 1800rpm (60Hz)

## Generator

- 4 poles, 3 phase synchronous
- Wide range of voltages available for both 50Hz and 60Hz machines
- Open ventilation (IEC 60034-6:1991 classification IC0A1)
- CACA (Closed Air, Cooling Air) \*
- CACW (Closed Air, Cooling Water)\*
- Inlet and outlet air temperature monitoring
- Bearing temperature and vibration monitoring
- Stator winding temperature monitoring

## Baseplate

- Two baseplates for driver (turbine & gearbox) and driven (generator) equipment
- Carbon steel structural sections and plate to BS EN 10025 S275
- Designed to support the machinery drive train, acoustic enclosure, and all auxiliary systems
- Designed to give low vibration level and turning moment, reduced foundation loads and cost
- Transmits all package loads to the foundation via anchor bolts
- 5500ltr integral oil tank is incorporated within the turbine baseplate
- Each baseplate designed for single point lift

## Acoustic enclosure

- Indoor/Outdoor acoustic enclosure covering turbine and gearbox
- Integral engine and auxiliary maintenance beams
- Interior lighting
- Gas detection system, fire protection and CO2 suppression system in accordance with EN54 and EN12094

## Integrated lube oil system

- Gearbox driven main lube oil pump
- AC driven auxiliary pump
- DC driven emergency pump
- Integrated DC battery system to provide emergency oil supply on loss of AC power
- Oil module regulates pressure and temperature
- Duplex oil filter
- External oil to air heat exchanger with safe area axial fans
- Water to oil cooler heat exchanger\*
- Lube oil tank heaters
- Oil tank ventilation system with oil mist coalescer to reduce emissions
- Stainless steel piping
- First fill of oil included

## Fuel system

- Natural gas
- Liquid fuel \*
- Dual fuel (Natural gas / liquid) \*
- Low BTU gas \*
- Natural gas / Hydrogen mix \*

## Start system

- Electro-hydraulic start system, 110kW 3 phase AC motor

## Turbine wash system

- Motoring (cold) wash, mobile wash tank

## Turbine intake system

- Heated Vane Separator (HVS) anti-icing system
- 2 stage filtration system, 1st Stage M5. (ISO 16890 ePM10 60%), 2nd Stage E11 (ISO 29461-1 T12)
- 3 stage filtration system \*
- Inlet chiller coils \*
- Intake attenuation
- Support steelwork to EN1090-1&2 \*

## Acoustic enclosure ventilation system

- Heated vane separator (HVS) anti-icing system, single stage filtration system M5 (ISO 16890 ePM10 60%)
- Air outlet extractor fan
- Air inlet and outlet shut-off damper for CO2 retention
- Intake and outlet attenuation
- Support steelwork to EN1090-1&2 \*

## Turbine exhaust system

- Radial exhaust exit (Left/Right/Vertical)
- Thermal expansion compensator
- Thermal / Acoustic shroud
- Primary exhaust attenuator \*

## Package control

- On-skid control suite
- Control panel shelter \*

## Turbine control

- Rockwell Allen Bradley "Guardlogix" PLC, Rockwell Point I/O, Safety Point I/O and Flex I/O modules
- Dual Redundant ethernet ring (DLR) communication
- Hardwired interlocks to balance of plant (HRSG, gas compressor etc)
- Safety systems: Rockwell Allen Bradley "GuardLogix" Safety Integrity Level (SIL) PLC, hardwired emergency stop safety chain to SIL 2. Independent SIL overspeed protection module
- 19" touch screen human machine interface, system graphics, alarm display and historical logging
- Data communication link available for remote control & monitoring
- Vibration monitoring using Rockwell Dynamix 1444 series

## Generator control and protection

- Electronic Automatic Voltage Regulator (AVR) with protection functions,
  - ANSI 58 – Rotating diode failure,
  - ANSI 60 – Voltage imbalance
- Digital integrated protection relay comprising: ANSI 21 – Under impedance,
  - ANSI 24 – Over excitation
  - ANSI 27 – Three-phase undervoltage,
  - ANSI 32R – Reverse power,
  - ANSI 40 – Loss of excitation,
  - ANSI 46 – Negative phase sequence,
  - ANSI 50/51 – Overcurrent,
  - ANSI 50BF – Breaker failure, \*
  - ANSI 51N – Stator earth (ground) fault,
  - ANSI 59 – Three-phase overvoltage,
  - ANSI 59N – Neutral voltage displacement
  - ANSI 67N – Directional earth (ground) fault, \*
  - ANSI 78 – Pole Slip
  - ANSI 81O – Over frequency,
  - ANSI 81U – Underfrequency,
  - ANSI 87G/T – Differential fault
- Additional generator protection by PLC, ANSI 38 – Generator bearing thermal protection, ANSI 49S – Stator thermal protection

## Synchronising equipment

- ANSI 15 – automatic synchroniser
- ANSI 25 – check synchroniser
- Automatic or manual forward and back synchronising, MV circuit breaker control

## Motor control centre

- Skid mounted 400V, 50Hz or 480/575V, 60Hz, 3ph MCC, allowing a single point of connection for the customer

## Documentation

- Drawings
- Quality manual
- Test reports

## Testing

- Factory testing of turbine
- Full fired package test

\* Optional equipment

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