

NATURAL GAS GENSET

PPU2028NG

MTU 16V4000L64FNER

For Continuous Application
400V 50Hz 1500 RPM(NOX500)

General Description

- ❖ MTU gas genset of electrical power 2028kWe, 400V, 50Hz , Pf=1, powered by MTU engine 16V4000L64FNER
- ❖ ISO 40' High Cube Container
- ❖ Re-cooling system for engine and mixture cooling circuit (without heat recovery)
- ❖ Generator output field including customer 's connection
- ❖ MMC (MTU Module Control) for system control, regulating ,diagnosis and protection

Features of Container

- ❖ Full transportability of the system (Rail, Road, Sea)
- ❖ Lloyd's CSC-certified (Convention Safety Container) for trouble-free conventional transport (Rail, Road, Sea) and stackable storage of the modules
- ❖ Plug & Play solution for the ease of "On site" installation and operation
- ❖ Versatile use of the gensets (different operating conditions)
- ❖ Weather-proof
- ❖ Minimum external dimensions, ISO 40'HQ container
- ❖ Proven tested design (Extensive testing before launch as standard products)
- ❖ Combinable optional packages to suit various demands
- ❖ Environment friendly provision (e.g. low noise level, container floor sealed against leaking oil and water, optional catalytic converter and CHP unit)

Acoustic

Sound pressure level	95dB(A)
Tolerance	+2dB(A)
Distance from genset	1m
Reference height above ground	1.5m

powered by



Design Conditions

Ambient Temperature	0°C ~ 35°C
Ambient Humidity	60%
Altitude	100m

Applicable Standard

Low voltage Directive 2006/95/EG
EMV Directive 2004/108/EG
Lloyds CSC Certified
Corners of container (ISO1161)
Protective coating (CSN EN12944)
Safety instruction according to international standard (ISO3864 / ANSI Z535)
Conformite Europeenne (2006/42/EC,2014/35/EU · 97/23/EC)

Color Scheme

Engine, generator	RAL9006
Frame	RAL5002
Control cabinet	RAL7035
External surface of container(if option is selected, customer shall advise the color code)	RAL9003

* Materials and specifications are subjected to change without prior notice.

Technical Specification

Engine

Engine Model	16V4000L64FNER
Version	93800052518-V03-en-GB
Number of cylinders / configuration	16V
Engine speed	1500 r/min
Bore	170 mm
Stroke	210 mm
Displacement	76.3 L
Lube oil Capacity	330 L
Exhaust gas emissions	
NOx, stated as NO2 (dry, 5% O2)	< 500 mg/m ³ i.N
CO (dry, 5 % O2)	< 800 mg/m ³ i.N

Internal Consumption

Internal consumption for the radiator	14.24kWe
Internal consumption for HT< Pump	20.7kWe
Internal consumption of ventilation fans	5.6kWe
Battery charger	1.2kWe
Coolant heater	9kWe
Anti-condensation heater	1.2kWe

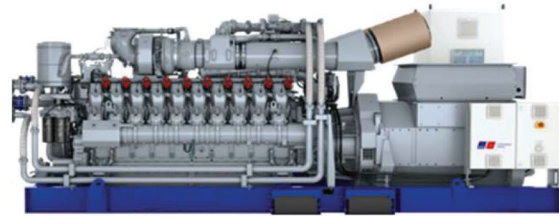
Gas System (Standard)

Gas control and regulating unit installed inside the container

Container gas connection Flange DN100 in container wall

Gravity-operated lube oil system (Top Up System) Optional

- Extra lube oil tank(80L)
- Automatic refilling system
- Controlled via MMC
- High/Low level monitor
- Minimum volume monitor for lube oil tank
- Lubricating oil pump for draining the oil sump (including two solenoid valves)

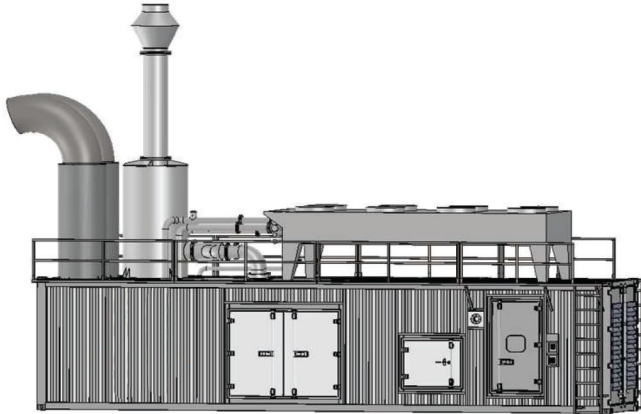


Alternator

Model*	LVSI 804 T2 Wdg12
Construction	ISO6232C3/ISO6324C3
Control System	SERIES 3 SEPARATELY EXCITED BY P.M.G.
Insulation	Class H
Protection	IP23
Rated Power Factor	0.8
Efficiency (Cont. 100%)	97.1%
No of Pole and Phase	4 Poles 3 Phase 4 Wire
Stator Winding	Double Layer lab
Winding Pitch	2/3
Winding Leads	6
Voltage Regulation, Stead State	≤±0.25%
Voltage Regulation, Transient State	+20 ~ - 15%
Voltage Stable Time	≤0.5s
Voltage Waving	≤±0.5%
Voltage Regulation (at No Load)	95 ~ 105%
Voltage Waveform Distortion	
No Load	< 1.5%
Non-Distorted	< 3%
Balanced Linear Load	
Maximum Overspeed	2250rpm
Telephone Interference	THF<2%
Voltage Dip at 15%	~2100kVA
Voltage Dip at 20%	~2900kVA

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Technical Specification



Cooling System

Rated radiator temperature	35 °C
Antifreeze cooling medium	35 %

Standard features :

- Radiator for engine cooling water circuit and gas mixture cooling circuit
- Radiator exhaust air via roof
- Stainless Steel piping
- Temperature control via mixing valve in gas mixture cooling and engine cooling water circuits
- Integrated control, safety and shut-off devices in the cooling water circuits
- Closed cooling system
- Intake and exhaust air with protective grid
- Intake and exhaust air with sound attenuated louvers
- Exhaust air at the front part of container
- Intake and exhaust air with weatherproof grid
- Conveyance of the required air volume by means of axial fans (Atex GII-approved)

Optional Items:

- Air intake with sand filter and protective grid
- Air intake with filter mats
- Engine cooling water heat recovery

Protective Equipment (Standard Features)

- Fire alarm system (horn + light)
- Gas alarm system (horn + light)
- Leakage monitor for "oil sump"
- Optical alarm for "bus bar under voltage"
- Safety instructions according to international standard (ISO3864 / ANSI Z535)
- Fire extinguishers(hand held type) at the access doors
- EMERGENCY-STOP button at the access doors (outside)
- Complete generator output field installed on the container wall
- Access from outside at one side of the container through lockable access doors.

Generator Output Field (Standard Features)

- Isolating switch for power supply of auxiliary drives
- 3P Isolating switch for generator voltage
- 3P isolating switch for bus bar voltage
- Connection of customer power cable

Lighting

Standard features :

- Complete lighting consisting of 230 V 50 Hz
- Emergency lights
- Lighting for emergency exit in accordance with EU 89/654/EWG

Optional Item :

- Option DC 24V lighting

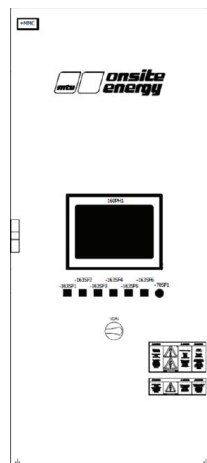
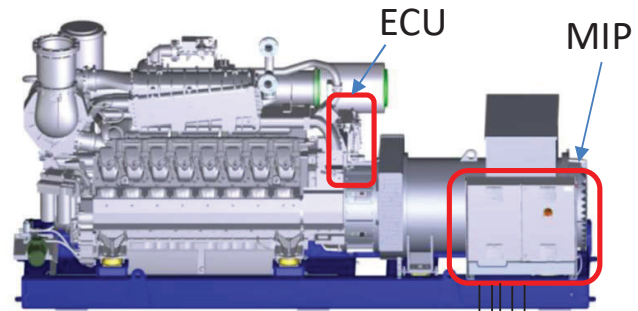
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MIP & MMC GAS GENSET CONTROL SYSTEM

MIP (MTU Interface Panel)

Mounted directly on the base frame of all MTU systems, the MTU Interface Panel (MIP) manages engine and generator operation. It also controls paralleling and synchronizing with other sources of electricity, such as the utility or other generator sets, and provides remote access and software interfacing capabilities.

- Genset Control PLC
- Interface to Engine Control Unit ECU
- Interface to Alternator
- Bus interface to external (Modbus)
- On-base components cabled to MIP



MMC (MTU Module Control)

MTU's highly customizable solution—the MTU Module Control (MMC)—seamlessly links with the MIP engine and generator set controls by cable, making all vital data and functions accessible to the operator from one convenient location.

- Operator interface
- DC power supply
- Data Logging capability
- Remote connection to MTU available
- Control of off base components

The MIP/MMC consolidates the following controls and functions:

Generator Set Controls

- Starter Battery Charger
- Gas train control
- Engine oil system (refilling)
- I/O's (Inputs/Outputs), auxiliary drives
- Parallel/Island operation
- Load sharing
- PLC (Programmable Logic Controller)
- AVR (Automatic Voltage Regulator)
- Energy-Measure-Module – controls

Engine Control Unit (ECU)

- Gas supply (mixture/lambda)
- Throttle / speed control
- Ignition control
- Turbo bypass
- Knocking detection / control
- Engine sensors / monitoring
- Emission sensor (NOx)
- Start / stop procedure

Accessory Controls

- Alarm system
- Data logging
- Visualization (webserver)
- MMC/MCS interfaces (Ethernet)
- Customer interfaces (ex. Modbus)
- HMI touchscreen
- Remote monitoring and diagnostic

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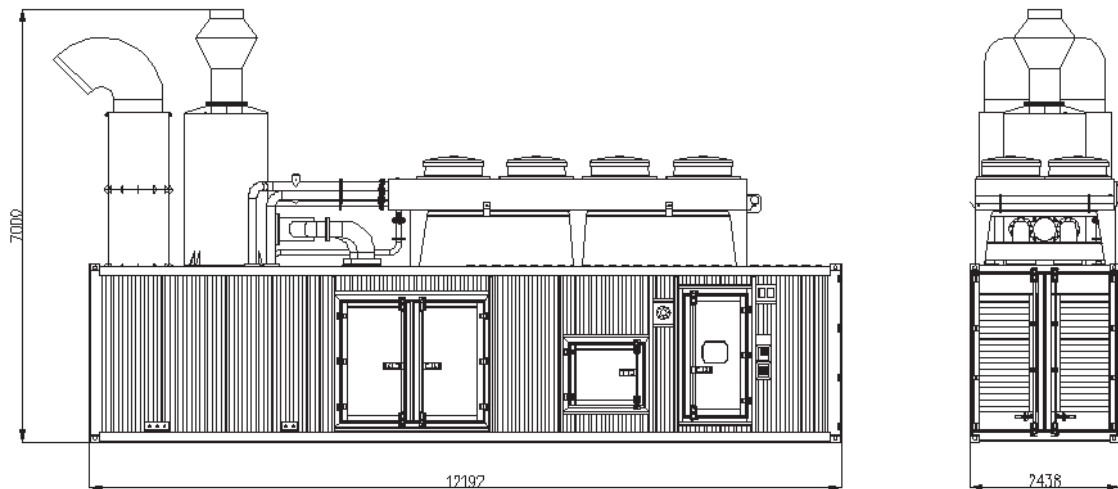
Rated Power

Energy balance	%	100	75	50
Electrical Power 2) 3)	kW	2028	1521	1014
Energy input 4) 5)	kW	4622	3522	2445
Thermal output total 6)	kW	1173	870	602
Thermal output engine (block, lube oil) 6)	kW	1173	870	602
Thermal output mixture cooler 2nd stage 6)	kW	93	53	24
Exhaust heat (120 °C) 6)	kW	974	806	606
Engine power ISO 3046-1 2)	kW	2080	1560	1045
Generator efficiency at power factor = 1	%	97.5	97.5	97.0
Electrical efficiency 4)	%	43.9	43.2	41.5
Total efficiency	%	90.3	90.8	90.9

Remarks:

- 1) Genset can operate at max. 1000m altitude and max. 40 °C intake air temperature; else power derating
- 2) Prime power operation will be designed specific to the project
- 3) Generator gross power at nominal voltage, power factor = 1 and nominal frequency
- 4) According to ISO 3046 (+5% tolerance), using reference fuel used at nominal voltage, power factor =1 and nominal frequency
- 5) Emission values during grid parallel operation
- 6) Thermal output at layout temperature; tolerance +/- 8%

Dimensions and Weight



Genset Model	Dry Weight (kg)	Dimensions (LxWxH) mm
PPU2028NG	Approximately 36,000	12192 x 3682 x 7000

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