POWER FACTOR

*Energy Solutions for a brighter future...*

# MTU - VGS2970 Diesel Generator

**3-Phase Rated – 480v, 60Hz, 0.8 pf**
**Prime Power**
**2,000 kWe / 2,500 kVA**

## GENERATOR SET PERFORMANCE

### Application

A factory designed generator set equipped with a standard AC/DC generator control panel. The generator set is ready to be connected to your fuel and power line to start up once the installation completed.

### Applicable Definitions

Prime: Applicable for supplying emergency power at varying load in the event of normal utility power interruption. 10% overload is allowed.

### Applicable Standard

Generator sets design, assembly and testing meet or exceed many international standards. The power rating is set in accordance with ISO 8528, ISO 3046-1 and SAEJ1995/J1349.

### Structure Outline

The generator set has selected materials and equipment of the highest quality performance, which are durable and vibration resistant. The assembly work meets the highest quality standards. This concept of the design and manufacturing is for easy operation and maintenance, to be compact, light weight and highly portable.
The single bearing alternator frame is coupled to the engine housing directly. With one end of the rotor supported by the main bearing, and the other connected to the engine flywheel with steel laminate plates, rugged durability is achieved.
All components and necessary equipment are mounted on a common skid base if heavy gauge steel.

### Rubber Isolator Mounting

The rubber isolators are mounted between the engine, alternator and its common skid base.

### Applicable Conditions

| | |
|---|---|
| Installation Place | : Indoor |
| Ambient Temperature | : 0-40°C |
| Air Intake Temperature | : ~40°C |
| Altitude | : Max 1,000 m |

### Painting Color

| | |
|---|---|
| Engine | : MTU Blue |
| Alternator | : Blue / Black |
| Generator Control Panel | : Black |
| Skid Base | : Black |

### Dimensions and Weight (PPU Generator Set)

| | |
|---|---|
| Overall Length | : 6,544 mm |
| Overall Width | : 2,220 mm |
| Overall Height | : 2,507 mm |
| Weight | : Approx. 14,700kg |

### Control System

| | |
|---|---|
| Panel Model | : V500-G |
| Controller Model | : IG-NT |
| Controller Brand | : ComAp |
| Mounted | : Set Mounted |

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

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# MTU - VGS2970 Diesel Generator

## 60Hz Generator Set - 480V 3-Phase Rated Voltage

## TECHNICAL DATA

| | | |
|---|---|---|
| **ENGINE BODY** | Maker and Model | MTU 16V4000G83 |
| | Rating Type | Prime |
| | Engine Output | 3,056HP |
| | Engine Load Acceptance | 2,280kWm<br>1,512kWe (70%) |
| | Aspiration | Turbocharged and Water Charge Air Cooling |
| | Cylinder Arrangement | 16 Vee |
| | Type | Water Cooled, 4 Cycles, Overhead Valve |
| | Bore x Stroke | 170mm x 210mm |
| | Piston Displacement | 76.3 Liters |
| | Starting Method | Electric Motor, 24V – 9.0kW x 2 |
| | Charging Alternator | DC 24V – 35A (Brushless) |
| | Cooling Fan and Diameter | 8 Blades Pusher Type, 1891mm |
| | Oil Cooler | Water Cooled, Multi-plate Type |
| | Air Cleaner | Dry Type, Cyclopac Two Stage Paper Element |
| | Stop Solenoid | Energized to Run Mode |
| | Flywheel Housing / Flywheel , | SAE #00 / SAE #21 (Metric Tread) |
| | Flywheel, Ring Gear Teeth | 182 |
| | Battery (Lead Acid Type) | DC 12V – 200Ah x 4 |
| | Frequency Regulation,Steady State | ≤±0.5% |
| | Frequency Regulation, Transient State | ≤±10% |
| | Frequency Stable Time | 2 sec |
| | Frequency Waving | ≤±0.25% |
| | Frequency Regulation Range | ±5.0% |
| **ENGINE LUBRICANT** | Oil Pan (High / Low Level) | 240 / 210 liters |
| | Oil Filter /By-pass Filter | 60 liters |
| | System Total | 300 liters |
| | Grade | SAE #15W-40<br>API, Class CH, CI |
| **ENGINE COOLANT** | Fan Motor & Radiator Intake Temp. | Corrugated Fin Type, 40 |
| | Cooling System | Forced Circulation by Centrifugal Water Pump |
| | Engine Capacity | 225 liters |
| | Radiator Capacity | 330 liters |
| | Heat Dissipation | 1,400kW |
| **ENGINE DATA** | Mean Effective Pressure (MEP) | 19.9 bar |
| | Mean Piston Speed | 12.6 m/s |
| | ɹnd Level (Average at 1m) Full Load | 106dBA |
| | Speed Regulation | Electronically controlled injection; Common Rail System |
| | Thermostat (Wax Type) | Cracking 79C, Fully Open 87C |
| | Water Coolant | |
| | Engine Shutdown Device | |
| | Coolant Temp (Sensor Type) Oil | 102 C plus 3% |
| | Pressure (Sensor Type) | 1.0 bar plus 3% (98kPa plus 3%) |
| **FUEL CONSUMPTION** | BSFC (at 100% Load) | 202 g/kWh |
| | Lubricating Oil (Nominal) | 0.3% |
| | Fuel Rate | 543 liter/hr |

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# MTU - VGS2970 Diesel Generator

## 60Hz Generator Set - 480V 3-Phase Rated Voltage

## TECHNICAL DATA

| | | |
|---|---|---|
| **ALTERNATOR** | Model | PI734F1 |
| | Construction | Single Bearing, Self Ventilated |
| | Control System | MX321 with PMG Excited |
| | Insulation / Temperature Rise | Class H |
| | Protection | IP23 |
| | Rated Power Factor | 0.8 |
| | Efficiency (Cont. 100%) | 95.9 |
| | 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,Steady State | ≤±0.5 |
| | Voltage Regulation, Transient State | +20 ~ -15v |
| | Voltage Stable Time | ≤0.5% |
| | Voltage Waving | ≤±0.5% |
| | Voltage Regulation(at No Load) | 95 ~ 105% |
| | Voltage Waveform Distortion No Load | < 1.5% |
| | Non-Distorted Balanced Linear Load | < 5.0% |
| | Maximum Overspeed | 2250 rpm |
| | Telephone Interference | THF<2 / TIF<50 |
| | Voltage Dip. at 15% | 2750kVA |
| | Voltage Dip. at 20% | 3850kVA |
| **AIR VENTILATION** | Combustion Air Flow | 186.0 $m^3$/min |
| | Cooling Fan Air Flow | 1,920 $m^3$/min |
| | Alternator Air Flow | 207.0 $m^3$/min |
| | Total | 2,313.0 $m^3$/min |
| **EXHAUST GAS** | Gas Flow (at Full Load) | 456 $m^3$/min |
| | Temperature (at T/C Outlet) | 465 C |
| | Allowable Back Pressure | 85 mbar |
| | Bellow Size (Inner Diameter) | 250 x 2mm |
| **RECOMMEND** | Diesel Fuel (Grade) | ASTM D975, 1-D or 2-D |
| | Pipe Size of Fuel Line Supply / Return (Minimum) | 1.5 / 1.0 In. |
| **GENERATOR CONTROL PANEL** | Gen Set Controller | ComAp IG-NT |
| | Analog Measurement | Coolant Temperature<br>Engine Oil Pressure<br>Engine Speed<br>Battery Voltage<br>Hour Run<br>Fuel Level (Optional) Gen U1 – U3 |
| | AC Measurement | Gen I1 – I3<br>Gen Frequency<br>Gen Active Power<br>Gen Reactive Power<br>Gen Power Consumption<br>Mains U1 – U3<br>Mains Frequency<br>Mains Voltage (L1-L2, L2-L3, L3-L1) |

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# MTU - VGS2970 Diesel Generator

## 60Hz Generator Set - 480V 3-Phase Rated Voltage

## TECHNICAL DATA

**GENERATOR CONTROL PANEL**

| | |
|---|---|
| Default Protection Settings<br>Low Oil Pressure<br>High Coolant Temp<br>Over Speed<br>Fail to Start<br>Low / Hi Battery Voltage<br>Charge Fail<br>Under / Over Voltage<br>Under / Over Freq.<br>Over Current | <br>< 1.5 bar<br>> 100 C<br>> 10% of Rated Speed<br>> 39 Sec (failed to start after 3 attempts)<br>18 / 30 v<br>< 18 v<br>70 / 110% of Rated Voltage<br>85 / 110% of Rated Freq.<br>>120% (IDMTL) |
| Push Buttons<br>MODE ><br><br>MODE <<br><br>HORN RESET<br>FAULT RESET<br>START<br>STOP<br>MCB ON / OFF<br>GCB ON / OFF<br>PAGE<br><br>^<br><br>v<br>Enter | <br>Cycle Forward<br>(OFF > MAN > AUT > TEST)<br>Cycle Backward<br>(TEST > AUT > MAN > OFF)<br>Deactivates “HORN”<br>Acknowledges Fault / Alarm<br>Start Genset<br>Stop Genset<br>Manual Open / Close Main Breaker<br>Manual Open / Close Gen Breaker<br>Cycles Display Mode<br>(MEASUREMENT < > ADJUSTMENT)<br>Select Set Point / Increase Value<br><br>Select Set Point / Decrease Value<br>Confirm Set Point Value |
| LED’s (from left to right) | MAINS FAILURE: RED LED starts flashing when the mains failure occurs and Genset does not run; steady light when Genset starts; off when Mains restores.<br>MAINS PRESENT: GREEN LED is on, if mains is present and within limits.<br>MCB ON: GREEN LED is on, if MCB is closed. Driven by feedback signal.<br>GCB ON: GREEN LED is on, if GCB is closed. Driven by feedback signal.<br>GEN VOLTAGE PRESENT: GREEN LED is on, if Gen voltage is present and within limits.<br>GENSET FAILURE: RED LED starts flashing when genset failure occurs. After FAULT RESET button is pressed, it should become steady light (if an alarm is still active) or is off (if no alarm is active). |
| Emergency Stop Button<br>Key Switch<br>LED<br>Buzzer | Stop Genset in case of emergency<br>ON/OFF Power to the control panel<br>Common Engine Fault LED<br>Audible alarm |

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# Diesel Power 60Hz
# Open Type Generator Set

****Genset Output Data Display and Protection**

****Genset Status Display and Protection**

****Genset Remote Start-up and Auto Start-up**

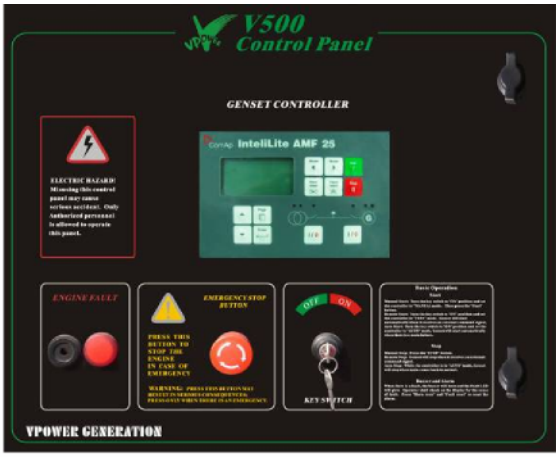
****Power Monitoring System**

****Fault LED Indicators**

****Modular design & expandable**

## V500 Genset Control System Features:

InteliLite® Genset Controller features with multiple functions for Genset control, operation and protection. It provides logical control and Graphical LCD display for local or remote applications. These features include:




(1) Auto/Manual Start-Stop

(2) Phase sequence detects and protection

(3) 128*64 LCD display

(4) Genset overspeed protection

(5) Oil pressure display and protection

(6) Water Temperature display and protection

(7) DC Volt measurement and Over/Under Volt protect

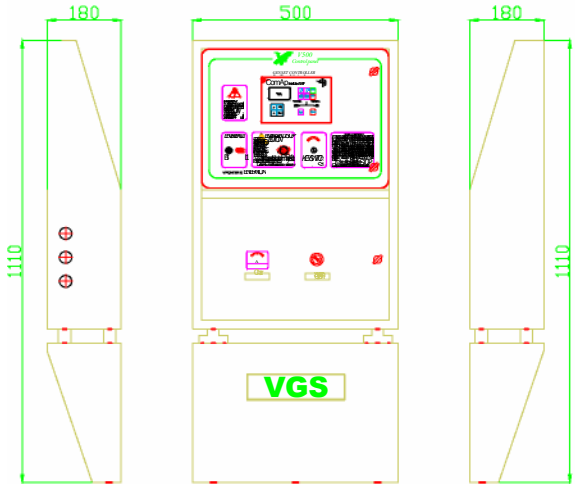
(8) Fuel Level detect and alarm

(9) Engine idle support

(10) Lube Oil Timer

(11) Electrical Measurement

- a. Active Power
- b. Reactive Power
- c. Voltage(L-L/L-N)
- d. Frequency
- e. Line Currents
- f. kWh
- g. kVAh




(12) Protections:

- a. Over/Under Voltage
- b. Over/Under Frequency
- c. IDMT Over-current

(13) LED Indicator for Normal/Breaker Close/Breaker Open/Alarm

(14) Programmable I/O s

(15) Hour-run meter

(16) 100 Event Log

(17) Support RS232 / Modbus Protocol

(18) Front Panel IP65 Protection

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# GENERATOR SET DRAWING