

# MITSUBISHI MGS SERIES

DIESEL GENERATOR SET

50Hz/1500 rpm/3.3kV



## MGS1500HV

50Hz/3.3kV

POWER RATING (0.8 P.F.)

STAND-BY 2000 kVA

PRIME 1810 kVA

MODEL CODE

53S-T82M

53P-T82M



MGS1500HV with typical options

### CONDITIONS & DEFINITIONS

#### Stand-by: Code: S

Applicable for supplying emergency power at varying load in the event of normal utility power interruption.

Fuel stop power in accordance with ISO15550, ISO3046/1, JISB8002-1, DIN6271 and BS5514.

#### Prime: Code: P

Applicable for supplying emergency power at varying load in the event of normal utility power interruption. + 10% overload in accordance with ISO3046/1. Overload power in accordance with ISO15550, ISO3046/1, JIS8002-1, DIN6271 and BS5514.

#### Conditions:

Engine ratings are based on SAE J1349 standard conditions and also apply at ISO3046/1, DIN6271 & BS5514 standard conditions.

Fuel rates: based on ASTM D975, BS2869 and on fuel oil of 35° API (16°C or 60° F) gravity having a LHV of 42,780 kJ/kg (18,390 Btu/lb.) when used at 29°C (85° F) and weighing 838.9 g/liter (7.001 lbs./U.S. gal.).

### DIMENSION (Reference Data)

|                    |            |    | STAND-BY<br>2000 kVA | PRIME<br>1810 kVA |
|--------------------|------------|----|----------------------|-------------------|
| Overall dimensions | L : Length | mm | 5675                 | 5675              |
|                    | W : Width  | mm | 2160                 | 2160              |
|                    | H : Height | mm | 2730                 | 2730              |
| Total Weight (Dry) |            | kg | 13415                | 13415             |
| Total Weight (Wet) |            | kg | 14015                | 14015             |

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## MGS SERIES DIESEL ENGINE: MITSUBISHI S16R-PTA-S

V-16, 4 stroke-cycle water-cooled, turbocharged and aftercooled

### ENGINE SPECIFICATIONS & TECHNICAL DATA

|   |                     |      |
|---|---------------------|------|
| Bore                                    | mm                  | 170  |
| Stroke                                  | mm                  | 180  |
| Displacement                            | L                   | 65.4 |
| Piston speed                            | m/sec.              | 9.0  |
| Compression ratio                       |                     | 14   |
| Lubricating oil capacity                | L                   | 230  |
| Coolant capacity without radiator       | L                   | 170  |
| Coolant pump external resistance        | m water             | 5.0  |
| Coolant pump flow rate                  | L/min               | 1650 |
| Cooling fan airflow rate                | m <sup>3</sup> /min | 2040 |
| Cooling fan air flow restriction        | kPa                 | 0.1  |
| Ambient air temperature                 | °C                  | 40   |
| Allowable exhaust back pressure         | kPa                 | 6.0  |
| Exhaust flange size (internal diameter) | mm                  | 350  |

### ENGINE OPERATING DATA

|  |                     | STAND-BY | PRIME    |
|--|---------------------|----------|----------|
|  |                     | 2000 kVA | 1810 kVA |
| Gross Engine Power*                                      | kWm                 | 1678     | 1523     |
| Brake mean effective pressure                            | MPa                 | 2.1      | 1.9      |
| Regenerative absorption                                  | kW                  | 140      | 140      |
| Noise Level at 1 m<br>(excluding: intake, exhaust & fan) | dB(A)               | 111      | 109      |
| Fuel consumption load 100%*                              | L/hr.               | 415      | 371      |
| Fuel consumption load 75%*                               | L/hr.               | 303      | 275      |
| Combustion air inlet flow rate                           | m <sup>3</sup> /min | 142      | 127      |
| Exhaust gas flow rate                                    | m <sup>3</sup> /min | 375      | 335      |
| Exhaust gas temperature                                  | °C                  | 530      | 520      |
| Heat rejection to coolant                                | kW                  | 1034     | 924      |
| Heat rejection to exhaust                                | kW                  | 1280     | 1124     |
| Heat rejection to atmosphere from engine                 | kW                  | 124      | 111      |
| Heat rejection to atmosphere from generator              | kW                  | 67       | 59       |

\* WITH FAN basis.

Deration for engine

Altitude: 2.5% per 300m (1000ft) above 1,500m

Temperature: 2% per 5°C (9° F) above 40°C

### ENGINE STANDARD EQUIPMENT

Aftercooler  
Turbocharger filter  
Structure steel base  
Crankcase breather  
Charging alternator  
Lubricating oil cooler  
Fuel filters, full flow paper element  
Fuel transfer pump, gear driven, plunger type  
Electronic type governor  
Jacket water pump, gear driven  
Lubricating oil filter, full flow paper element  
Lubricating oil pump, gear driven  
Exhaust dry manifold  
Radiator, blower fan, fan drive  
Manual shutoff  
24V DC electric starting motor

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## MGS SERIES 7310 GENERATOR CONTROL PANEL

### Type & Design

MGS standard 7310 programmable microprocessor control-automatic start/stop panel, generator breaker control, indicating the operational status and fault conditions; automatically shutting down the engine and indicating the engine failure by means of LCD display and LEDs on the front panel.

### Controls & Monitoring

- ◆ Mode selection & start engine button with interlock key switch system
- ◆ Menu navigation button
- ◆ LCD display for: AC amperage-each phase and earth current, AC voltage-each phase and neutral, Frequency Hz, Operation hours run, Lub. Oil pressure, Cooling water temperature, Generator Load kW/kVA/kVar, Generator Load kWh/kVAh/kVarh
- ◆ Operation status LED indicators
- ◆ CB control buttons
- ◆ Mute/Lamp test button
- ◆ Voltage adjuster
- ◆ Speed adjuster
- ◆ Emergency stop pushbutton
- ◆ Provided 5 outputs for status as standard equipment (Programmable 8 outputs available as option)

### Safety Shutdown Protection and LED Indicators

High engine temperature, Low oil pressure, Fail to start, Generator Over Speed/Frequency, Generator Under Speed/Frequency, Generator High Voltage, Generator Low Voltage, Oil pressure sender circuit, Loss of Speed signal, Emergency stop,

### Mounting

Fabricated cubicle mounted on individual bracket with anti-vibration isolator

### Electrical Design

In accordance with BS EN 60950 Low Voltage Directive, BS EN 61006-2 and 61006-4 EMC Directive. The optional interface can provide real time diagnostic facilities.

### Generator Control Panel Description

- 3 position operation mode control key switch (ACTIVE, PANEL LOCK, STOP/RESET)
- Manual button
- Auto button
- CB open button (Manual only)
- CB close button (Manual only)
- Start engine button (Manual only)
- LCD display accessed by scroll pushbutton
  - Generator volts L1-N, L2-N, L3-N
  - Generator volts L1-L2, L2-L3, L3-L1
  - Generator amps L1, L2, L3
  - Generator Earth Current
  - Generator Frequency Hz
  - Engine speed RPM
  - Engine oil pressure (PSI & Bar)
  - Engine cooling water temperature (°C & °F)
  - Battery volts
  - Engine hours run
  - Generator Load kW, kVA, kVar
  - Generator Load kWh, kVAh, kVarh
  - Power Factor
  - Generator Phase Sequence
- Visual indicators on LCD display
  - Shutdown alarm
  - Warning alarm
  - High coolant temperature
  - Low oil pressure
  - Charge fail
  - Over-speed
  - Under-speed
  - Electrical trip
  - Fail to stop
  - Generator high current
  - Over voltage (AC)
  - Under voltage (AC)
  - Over voltage (DC)
  - Under voltage (DC)
  - Auxiliary indication
  - Auxiliary alarm (warning or shutdown)
  - Common alarm
  - Over frequency
  - Under frequency
- Visual indication alarm and automatically shutdown
  - High engine temperature
  - Low oil pressure
  - Fail to start
  - Over-speed
  - High voltage
  - Low voltage
  - Over frequency
  - Under frequency
  - Oil pressure sender open circuit
  - Loss of speed signal
  - High Crankcase internal pressure (MGS-C Continuous only)
  - Emergency Stop
- Operation status indicated by LED
  - Remote start present
  - Generator ready
  - Lubrication oil filter clogged
  - Electrical trip
- Pre-Programmed Starting Unit
  - Automatic start/stop sequence timing and delay systems configured via MS-Windows based software.

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MGS1500HV



## MGS SERIES AC GENERATOR MODEL: MG-KT82M (STAND-BY) MG-KT82M (PRIME)

### Type & Design

MGS original design, single bearing, 4 pole, screen protected, selfexciting, self regulating and brushless with fully connected damper windings, salient pole rotors, A.C. exciter and rotating rectifier unit. Direct coupled to engine and regreaseable bearing, direct drive centrifugal blower.

With Space heater.

Enclosure: Drip-proof IP22

Terminal box: Totally enclosed IP44

### Winding System

Standard 6 wire winding is provided. All windings are formed wound and impregnated in vacuum pressure with a special epoxy resin.

Overspeed capability: 125% for 2 minutes

Insulation: Class 'H' of IEC

Temperature rise: 150°C (Stand-by)

Temperature rise: 125°C (Prime)

### Voltage Regulator

Fully sealed, 3 phase RMS sensing AVR with built-in protection against sustained over-excitation. This de-excites the generator after a minimum of 5 seconds.

Voltage regulation: Less than +/- 0.5% from no load to full load at any power factor between 0.8 lagging and 1.0 allowing for a 4% engine speed variation

Voltage adjustment: +/- 6%

Wave form: Less than 5% deviation

### Permanent Magnet Generator (PMG)

Electrically isolated from the main alternator stator windings powers AVR - sustaining approx. 250% of short circuit current at the AC generator output terminals for not more than 10 seconds by means of excitation voltage via AVR

### Sensors

Temperature sensors are provided as follows.

Stator winding, 2 per each phase, PT100

Bearing, PT100

### Electrical Design

In accordance with BS5000 Part 3, VDE0530, UTE51100, NEMA MG1-22, CEMA, IEC34-1, CSA22.2, AS1359 and JEC2100.

Telephone Influence Factor (TIF): Less than 50

Telephone Harmonic factor (THF): Less than 2.5%

Radio interference: Suppression is in line with the provision of VDE Class G and N

### Gen Set Option Features

- |  |   |
|--|---|
| <ul style="list-style-type: none"><li>■ ENGINE<ul style="list-style-type: none"><li>Air Cleaner, paper element dry type</li><li>Battery Kit</li><li>Battery Charger</li><li>Anchor Bolts</li></ul></li><li>■ FUEL<ul style="list-style-type: none"><li>Fuel Day Service Tank</li></ul></li><li>■ COOLING<ul style="list-style-type: none"><li>Heat Exchanger</li><li>Expansion Tank</li><li>Jacket Water Heater</li><li>Removal STD Radiator, Fan &amp; Fan Drive</li></ul></li><li>■ LUBRICATION<ul style="list-style-type: none"><li>Lub. Oil Priming Pump</li></ul></li><li>■ EXHAUST<ul style="list-style-type: none"><li>Exhaust Silencer</li><li>Exhaust Flexible Pipe</li></ul></li></ul> | <ul style="list-style-type: none"><li>■ GENERATOR<ul style="list-style-type: none"><li>Power Factor Regulator</li></ul></li><li>■ CONTROL PANEL<ul style="list-style-type: none"><li>Diesel Generator Integrated Communication Synthesizer (DGICS-MII)</li><li>Auxiliary Control Panel</li><li>Remote Monitor Interface</li><li>Temperature Meter for Winding &amp; Bearing</li></ul></li><li>■ SWITCHGEAR<ul style="list-style-type: none"><li>Circuit Breaker VCB</li><li>Reverse Power Relay</li></ul></li></ul> |
|--|---|



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The International System of units (SI) is used in this publication.

