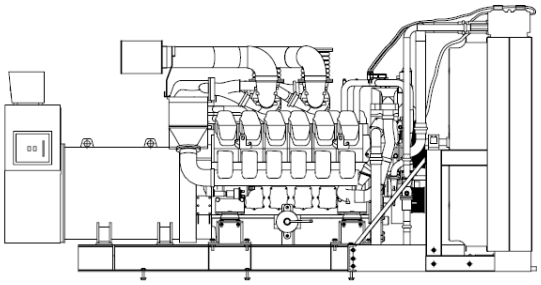
MAQUINARIA IGSA
POWER GENERATION SYSTEMS



MODEL: GSDD11500M
DIESEL ENGINE: DETROIT DIESEL
MODEL: 12V4000G81, TIER1
CAPACITY: 1500kW; 1800 RPM

RATINGS RANGE	
PRIME hp (kW)	STANDBY hp (kW)
1998 (1490)	2199 (1640)

Reference Conditions ISO 3046:	Standard	Power available up to
Intake air temperature	25°C (77°F)	40°C(104°F)
Side altitude above sea level	100 m (328.08ft)	400m(1312.3ft)
Charge air coolant temperature	55°C(131°F)	55°C(131°F)

STANDARD FEATURES

Complete system designed and built at ISO9001 certified facility

● Factory tested to design specifications at full load conditions.

● Fully engineered with a range of options and accessories.

1 IGSA Genset´s are composed of 12 cylinders in V, and four strokes diesel engine for industrial stationary applications. Those equipments are fully factory tested using a resistive load. (1) Hour ramp 100% load test.

2 The controls and accessories are selected to work together to achieve the maximum operational performance and security.

3 Exhaust gases silencer, and a section of flexible tube for connection purposes.

4 Engine **DETROIT DIESEL**, **12V4000G81 TIER 1**

5 Marathon Alternator

6 Radiator

7 Control MEC 310 (panel USC300)

8 Base of structural steel

GENERAL FEATURES

- IGSA GENSET of**, 1500 kW to 480V, 460V, 440V, 416V, 380 VAC**, 3 Phase, 4 Wire, 60 Hertz, is composed by an internal engine four strokes coupling with the alternator, controls and accessories totally assembled and tested in factory.
- The controls and accessories of the Genset are selected to provide the maximum in efficiency and Security
- The generator set its components are tested factory-built, and production-tested.
- The genset engine is certified by the Environmental Protection Agency (EPA) to conform to Tier 1 nonroad emissions regulations.
- Electronic engine controls manage the engine (isochronous)
- Integrated complete system control and monitoring (MDEC)

DETROIT DIESEL ENGINE
Weight 5650 Kg (12461.4 Lb)

General Data	
Model	12V4000G81
Combustion System	Direct Injection
Chargin method	Exhaust turbo charger and Water charge air cooling external
Bore x Stroke	165/190 mm
Displacement, total	48.7 Liter
Number of cylindres	12
Cylinder configuration	V - 90°
Compression Ratio	15.5 : 1
Direction of rotation	Left
Flywheel housing flange	SAE 00
Flywheel interface	21"
Starter ring-gear teeth no.	182
Injection system	Common Rail System with Electronically controlled high-pressure injection single injection pumps
Control/Monitoring	Electronic engine mana gement system MDEC
Number of turbo chargers	4
Number of intercooler	1
Power (ISO 3046)-- kW	1640
Mean Piston speed—In/s (m/s)	44.9 (11.4)
Mean effective pressure (bar)	22.5
Physical Data	
Weight, dry—Lb (kg)	12461.4 (5650)
Weight, wet-- Lb (kg)	13431.8 (6090)
Length--in.(mm)	96.9 (2460)
Height--in.(mm)	53.1 (1350)
width--in.(mm)	67.3 (1710)
Fuel Consumption (Standby)	
100 % Power-- g/kWh	202
75 % Power-- g/kWh	205
50 % Power-- g/kWh	215
Lube oil consumption (after run in)	0.5
Capacity	
Engine oil Cap, ininitial Filling (standard oil system)--Gl (Lt)	68.8 (260)
Oil pan capacity, dipdtick mark min.-- Gl (Lt)	42.3 (160)
Oil pan capacity, dipdtick mark max.-- Gl (Lt)	52.9 (200)
Engine coolant capacity (without equipment)-- Gl (Lt)	42.3 (160)
Intercooler coolant capacity-- Gl (Lt)	10.6 (40)
Heat dissipation	
Engine coolant dissipation 100% load-- kW	700
charge-air heat dissipation 100% load-- kW	400
Radiation and convection heat, engine-- kW	75
Noise emission	
(Free-field sound pressure level, 1m distance)	
Engine surface noise-- dB(A)	108
Exhaust noise, unsilenced-- dB(A)	118

Starter System	
Electrical Starter (make Delco)	
Starter, rated voltage-- V	24
Starter, rated power-- kW	2X9.0
Starter, power requirement max-- A	2600
Starter, power requirement at firing speed-- A	1000
Recommended battery capacity Lead-acid-- Ah/20h	450
NiCd--Ah/5h	240
Firing speed--1/min	80-120
Coolant pre-heating100-120	
Preheating temperature (min.)-- °F	89.6
Heater performance-- kW	9.0
Coolant system, Engine coolant circuit	
Coolant temperature (at engine outlet to cooling equipment)-- °F	203
Coolant temperature after engine, alarm-- °F	207
Coolant temperature after engine, shutdown-- °F	210
Coolant antifreeze content, max. Permissible-- %	50
Cooling equipment: coolant flow rate-- ft³/h	2471
Coolant pump: inlet pressure, min.-- bar	0.4
Coolant pump: inlet pressure, max.-- bar	1.5
Pressure loss in off-engine cooling system, max. Permissible-- bar	0.7
Cooling equipment: height above engine max. Permissible-- m	15.2
Cooling equipment: design pressure max. Permissible-- bar	2.5
Coolant system, Charge-air coolant circuit	
Coolant temperature before intercooler (engine inlet)-- °F	131
Coolant antifreeze content, max. Permissible-- %	50
Cooling equipment: coolant flow rate-- ft³/h	917.8
Pressure loss in off-engine cooling system max. Permissible-- bar	0.7
Cooling equipment: Height above engine max. Permissible-- m	15.2
Cooling equipment: design pressure max. Permissible	2.5
Combustion Air m³/s	**2.2**
Combustion air volume flow new filter-- mbar	30
Intake air depression limit value-- mbar	50
Fuel System	
Fuel supply flow, max.-- l/min	18.5
Fuel temperature max. °F	131
Fuel pressure at supply connection on engine, min. Admissible-- bar	1.5
Fuel pressure at supply connection on engine, max. Admissible-- bar	-0.1
Exhaust system	
Exhaust volume flow-- m³/s	5.2
Exhaust temperature after turbocharger-- °F	860
Exhaust backpressure limit value-- mbar	51
General operating data	
Recomended minimum continuous load-- %	20
Engine mass moment of inertia, with standard flywheel-- kgm²	16.38

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

MARATHON. ELECTRIC ALTERNATOR MODEL 742RSL4050
weight 3278.1 kg (7230Lb)

Kilowatt ratings at kW (kVA)	1800 RPM 3 Phase			60 Hertz 0.8 Power Factor			12 Leads standard 3 phase Dripproof or Open Enclosure		
Voltage	Class B	Class F					Class H		
	176°F 80° C (1) Continuous	194°F 90° C (1) Lloyds	203°F 95° C (1) ABS	105° C†(221°F) British Standard	221°F 105° C (1) Continuous	266°F 130° C (1) Standby	125° C†(257°F) British Standard	257°F 125° C (1) Continuous	302°F 150° C (1) Standby
480	1220 (1525)	1320(1650)	1220(1525)	1430(1788)	1430(1788)	1500(1875)	1430(1788)	1500(1875)	1520(1900)
460	1210 (1513)	1290(1613)	1200(1500)	1390(1738)	1390(1738)	1500(1875)	1430(1788)	1480(1850)	1530(1913)
440	1160 (1450)	1240(1550)	1150(1438)	1340(1675)	1340(1675)	1450(1813)	1420(1775)	1420(1775)	1500(1875)
416	1110 (1388)	1180(1475)	1100(1375)	1270(1588)	1270(1588)	1370(1713)	1340(1675)	1340(1675)	1410(1763)
380	1020 (1275)	1080(1350)	1020(1275)	1160(1450)	1160(1450)	1160(1450)	1160(1450)	1160(1450)	1160(1450)

(1) Rise by resistance method, Mil-Std-705, Method 680.1b.

† Rating per BS 5000.

Submittal Data: 480 Volts, 1500 kw, 1875 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase

Mil-Std-705C Method	Description	Value
301.1b	Insulation Resistance	> 1.5 Meg
302.1a	High Potential Test	
	Main Stator	2000 Volts
	Main Rotor	1500 Volts
	Exciter Stator	1500 Volts
	Exciter Rotor	1500 Volts
	PMG Stator	1500 Volts
401.1a	Stator Resistance, Line to Line	
	High Wye Connection	0.0023
Ohms		
	Rotor Resistance	0.889 Ohms
	Exciter Stator	22 Ohms
	Exciter Rotor	0.043 Ohms
	PMG Stator	2.1 Ohms
410.1a	No Load Exciter Field Amps	
	at 240/480 Volts Line to Line	0.62 A DC
420.1a	Short Circuit Ratio	0.484
421.1a	Xd Synchronous Reactance	2.67 pu
422.1a	X2 Negative Sequence	0.226 pu
423.1a	X0 Zero Sequence Reactance	0.067 pu
425.1a	X'd Transient Reactance	0.16 pu
426.1a	X"d Subtransient Reactance	0.121 pu
--	Xq Quadrature Synch. React.	1.1 pu
427.1a	T'd Transient Short Circuit	
	Time Constant	0.162 sec.
428.1a	T"d Subtransient Short Circuit	
	Time Constant	0.011 sec.
430.1a	T'do Transient Open Circuit	
	Time Constant	2.88 sec.
432.1a	Ta Short Circuit Time	
	Constant of Armature Winding	0.028 sec.

Mil-Std-705C Method	Description	Value
505.3b	Overspeed	2250 RPM
507.1c	Phase Sequence CCW-ODE	ABC
508.1c	Voltage Balance L-L OR L-N	0.20%
601.4a	L-L Harmonic Maximum - Total	5.0%
	(Distortion Factor)	
601.4a	L-L Harmonic Maximum - Single	3.0%
601.1c	Deviation Factor	5.0%
--	TIF (1960 Weightings)	<50
--	THF (IEC, BS & NEMA Weightins)	<2%
652.1a	Shaft Current	<0.1 ma
--	Main Stator Capacitance to ground	0.06 mdf
	Additional Prototype Mil-Std Methods are Available on Request.	
--	Generator Frame	742
--	Type	
MAGNAMAXDVR		
--	Insulation	Class H
--	Coupling - Single Bearing	Flexible
--	Amortisseur Windings	Full
--	Excitation	Ext. Voltage Regulated, Brushless
--	Voltage Regulator	DVR2000
--	Voltage Regulation	0.25%
--	Cooling Air Volume	3329 CFM
--	Heat rejection rate	4468 Btu's/min
--	Full load current	2255 amps
--	Minimum Input hp required	2116.0
	Efficiency at rated load:	95 %
--	Full koad torque	6172 Lb-ft

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. Standby Ratings: Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS5514, AS2789, and DIN 6271. Prime Power Ratings: Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for a 12 hour period. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. GENERAL GUIDELINES FOR DERATION: Altitude: Derate 0.1% per 100 m (328 ft.) elevation above 400 m (1312 ft.). Temperature: Derate 2.0% per 5°C (9°fF) temperature above 40°C (104°F).

CONTROLLER FOR GENSET: CONTROL MEC 310 PANEL USC300

The Generator Controller MEC 310 is a microprocessor-based control unit containing all necessary functions for protection and control of a power generator. Besides the control and protection of the diesel engine it contains a full 3-phase AC voltage and current measuring circuit. The unit is equipped with an LCD display presenting all values and alarms.

- USC 300C Unit Mount Control Panel, Black Nema 1 enclosure c/w rubber mounts
- MEC 310 Microprocessor Based Engine Generator Controller
- Graphic Display 128 X 64 pixels (STN) Super Twisted Nematic
- Digital AC Metering:
  - 3-Phase Volts (Phase to Phase and Phase to Neutral),
  - 3-Phase Amps
  - Frequency
  - kW, kVAR, KVA, pF, kWHr
  - AC Protective Relaying:
  - 27/59 Under/Over Voltage
  - 32 Reverse Power
  - 51 Time Overcurrent
  - 81 O/U Under/Over Frequency
  - Digital gauge display:
  - Oil Pressure (sender required by others)
  - Coolant Temperature (sender required by others)
  - Fuel Level (sender required by others)
  - Hourmeter
  - Tachometer
- 5 digital inputs for alarms / shutdowns
- Dedicated Output Contacts - Engine Crank; Run (30 VDC / 6 Amps)
- Three Programmable Output Contacts (30 VDC / 1 Amps)
- Event Logging (30 events)
- Pushbuttons:
- Emergency Stop
- Manual Start and Stop
- Manual/Auto/Test
- Lamp Test
- Horn Silence
- Indicating Lights:
- Common Alarm
- Generator Ready (Voltage and Frequency Normal)

FEATURES

Electrical Rating: - Single or three phase, 600VAC maximum, 50/60HZ, 4 wire
- 12 or 24Vdc (nominal) supply, negative ground.
- Dedicated Output Contacts - Engine Crank; Run (30 VDC / 6 Amps)
- Three Programmable Output Contacts (30 VDC / 1 Amps)

Enclosure: - Black Nema 1 enclosure c/w rubber mounts

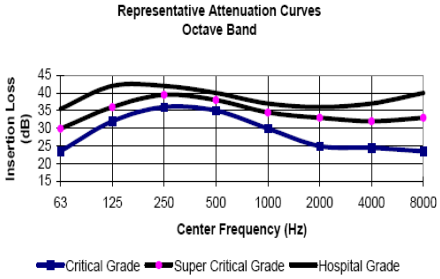
Engine Senders: - Oil pressure (1/8" NPT), Temperature (1/4"NPT) (Supplied loose for engine mounting).

Requirements: - Exceeds requirements of CSA 282 and NFPA 110 Level

OPTIONAL SILENCER ACCORDING TO THE APPLICATION

Silencer with different levels from attenuation

- Critical Grade
- Super Critical Grade
- Hospital Grade



Levels from attenuation

DOCUMENTATION AND OTHERS

- Manual of operation and maintenance
- Spare parts
- Maintenance
- Consulting

MISCELLANEOUS EQUIPMENT

- Batteries of 12 VDC with cables for battery connection with the Engine.

GENSET OPTIONS

Control Panel
USC 300C Control Panel is standard on all units see page 4 of spec sheet for standard features.
Another Type_____

Cooling System

Radiator

- ☐ Vertical Direct
- ☐ Vertical Remote
- ☐ Horizontal Remote
- ☐ Radiator Duct Flange
- ☐ Antifreeze drain Extension

Fuel system

- ☐ Fuel Water Separator
- ☐ Day tank
- ☐ Auxiliary fuel pump
- ☐ Sub Base mounted Fuel Tank
  - ☐ Single Wall
  - ☐ Double Wall
  - ☐ UL listed
- ☐ Diesel Fuel Tank
  - ☐ 1000 L (264.1 gal)
  - ☐ 5000 L (1320.8 gal)
  - ☐ 15000L (3962.5 gal)

Exhaust System

- ☐ Critical Grade
- ☐ Super Critical Grade
- ☐ Hospital Grade

Engine Electrical system

Battery

- ☐ Lead-Acid
- ☐ NiCad
- ☐ Battery Rack
- ☐ Battery Charger Automatic

Generator

- ☐ Breaker in the alternator
- ☐ PMG excitation &DVR 2000 Regulator

OPTIONAL ACCESSORIES AVAILABLE FOR THE EQUIPMENT

Vibration isolation

- ☐ Rigid Spring Mounting
- ☐ Resilient Mounting

Filters

- ☐ Air Filter for Medium Dust Environments
- ☐ Air Filter of Heavy Dust Environments

Drain

- ☐ Oil drain Extension

Enclosures

- ☐ Sound Attenuated
- ☐ Weather Proof
- ☐ Stainless steel cover
- ☐ Trailer Mounting
- ☐ Interior lights Ac or DC

Heaters

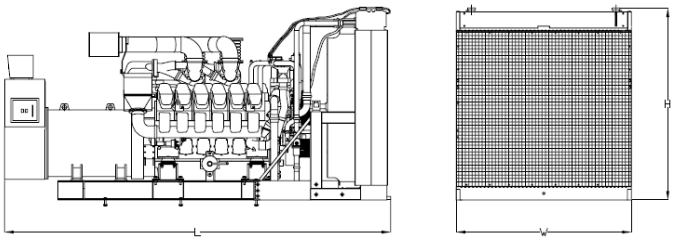
- ☐ Jacket Water Heater
- ☐ Crankcase Oil Heater

Insulation Blankets

- ☐ Features:
  (Temperature to 1260°C (2300°F), Non-Combustible, Highly Resistant to Vibration, Oil, Fuel, Grease, and Moisture Resistant Exterior, Personal Protection

Notes_____

DIMENSIONS



LENGTH	WIDTH	HEIGHT
mm (in)	mm (in)	mm (in)
4968(195.58)	2225 (87.58)	2831 (111.47)

NOTES: - General configuration not to be used for installation. See general dimension drawing for detail.
- The dimensions of GENSET can change due to the radiator option

SERVICES

- Development of the project.
- Development of engineering.
- Equipment's Installation
- Engineering for special applications.
- Synchronies with utility network or more Gensets.
- Attention and technical support

INSTALLATION OPTIONS OF THE GENSET

- On-Site ☐
- Acoustic Enclosure ☐
- ISO Container ☐
- Trailer ☐