PRAMAC

ENERGY GENERATION

GSW1500M

Main Features		
Frequency	Hz	50
Voltage	V	400
Power factor	cos ϕ	0.8
Phase and connection		3

Power Rating		
Standby power LTP	kVA	1520.00
Standby power LTP	kW	1216.00
Prime power PRP	kVA	1400.91
Prime power PRP	kW	1120.73

Ratings definition (According to standard ISO8528 1:2005)

PRP - Prime Power:
It is defined as being the maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out as prescribed by the manufacturer. The permissible average power output over 24 h of operation shall not exceed 70 % of the prime power.

LTP - Limited-Time running Power:
It is defined as the maximum power available, under the agreed operating conditions, for which the generating set is capable of delivering for up to 500 h of operation per year (whose no more than 300 for continuative use) with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. No overload capability is available.

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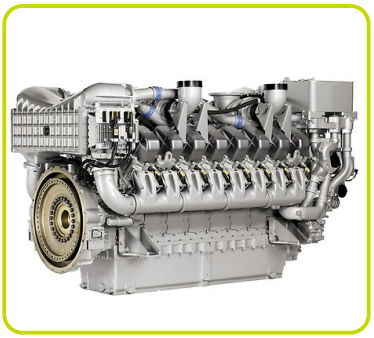
Engine specifications		
Engine manufacturer		MTU
Model		12V4000G23R
Version		50 Hz
[50Hz] Exhaust emission level		Unregulated
Engine cooling system		Water
Nr. of cylinder and disposition		12 V
Displacement	cm^3	57199
Aspiration		Turbocharged aftercooled
Speed governor		Electronic
Operating Speed-Nominal	rpm	1500
Prime gross power PRP	kW	1205
Maximum gross power LTP	kW	1325
Oil capacity	l	260
Lube oil consumption @ PRP (max)	%	1
Coolant capacity	l	335
Fuel		Diesel
Specific fuel consumption @ 75% PRP	g/kWh	197
Specific fuel consumption @ PRP	g/kWh	192
Starting system		Electric
Starting engine capability	kW	2 x 7.5
Electric circuit	V	24



Fuel system:
• Electronically controlled high-pressure injection with single unit injection pumps (EUP)
• Fuel delivery pump
• Fuel main filter
• Fuel priming pump for initial system filling and venting
• Closed fuel system

Lube oil system:
• Forced-feed lubrication system with piston cooling
• Lube oil circulation pump with safety valve
• Lube oil multi-stage filte
• Lube oil heat exchanger
• Oil filler neck and oil dipstick for measurement on non-running engine
• Closed crankcase venting system

Combustion air system:
• Exhaust turbochargers
• Set of dry-type air filters with contamination indicator

Cooling system :
• Coolant circulation pump and coolant thermostat for jacket water cooling systems
• Engine-mounted fan drive
• Front-type radiator for jacket water and charge air cooling circuit with integrated expansion tank
• Coolant level sensor

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Alternator Specifications		
Brand		Mecc Alte
Model		ECO43-VLN/4
Voltage	V	400
Frequency	Hz	50
Power factor	cos ϕ	0.8
Voltage regulation system		Electronic
Poles		4
Type		Brushless
Standard AVR		DER1
Voltage tolerance	%	1
Efficiency @ 75% load	%	96.4
Class		H
IP protection		21
Phases		3

Mechanical structure
Robust mechanical structure which permits easy access to the connections and components during routine maintenance check-ups.

Voltage regulator
Voltage regulation with DER 1. The digital DER 1 is a Digital controlled regulator, based on DSP (Digital Signal Processor) that combines function as Voltage Regulation and Alternator Protections and Diagnostic into a very small single board.

Voltage supply: 40Vac÷270Vac
Maximum continuous output current: 4Adc
Frequency range: 12Hz÷72Hz
Single phase sensing automatic recognition
Average value of voltage regulation
Voltage regulation range (sensing) from 75Vac to 300Vac
Precision of voltage regulation: ± 1% from no-load to nominal load in static condition, with any power factor and for frequency variations ranging from -5% to +20% of the nominal value.
Precision of voltage regulation: ± 0,5% in stabilized conditions (load, temperature).
Transient voltage drop and overvoltage within ± 15%
Voltage recovery time within ± 3% of the value set, in less than 300 msec.
Underspeed protection with adjustable threshold and slope
Overvoltage and undervoltage alarms
Excitation overcurrent protection with delayed intervention
Allarm conditions storage (type of alarm, number of events, duration of the last event, total time)
Memorization of the regulator operation time

Windings / Excitation system
Generator stator is wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th …) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches. MAUX (Standard): The MAUX MeccAlte Auxiliary Winding is a separate winding within the main stators that feeds the regulator. This winding enables to take an overload of 300% forced current (short circuit maintenance) for 20 seconds. This is ideal for motor starting requirements. PMAUX (optional): Alternator can be equipped with the optional PMAUX (Permanent Magnet Generator) which matches the performance and is capable of supporting both linear and distorted loads.

Insulation / Impregnation
Insulation is of class H standard. Impregnation is made with premium tropicalised epoxy resins by dipping and dripping. High voltage parts are impregnated by vacuum, so the insulation level is always very good. In the high-power models, the stator windings undergo a second insulation process. Grey protection is applied on the main and exciter stator to give enhanced protection.

Reference standards
Alternator manufactured according to , and complies with , the most common specification such as CEI 2-3, IEC 34-1, EN 60034-1, VDE 0530, BS 4999-5000, CAN/CSA-C22.2 No14-95-No100-95.

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Genset equipment

BASE FRAME:
Base frame made of welded steel profiles, complete with anti-vibration mountings properly sized.
The baseframe has a grounding point to connect all metal parts of the generating set and it provides a high structural strength.

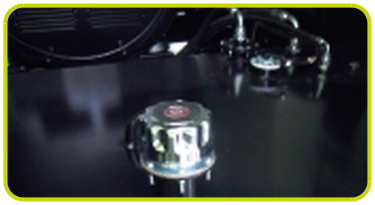
ENGINE COMPLETE WITH:
• Liquids (no fuel)

MANUAL OIL DRAININ PUMP:
• Oil draining facilities

CANOPY:
• Soundproof canopy made up of monolithic structure, built to achieve a high degree of stability and a protection against any kind of movement or infiltration. This kind of canopies are designed to meet a high standard of toughness and good noise attenuation as well as resistance to atmospheric agents, providing an integral solution ready for its installation both indoor and outdoor.
• Easy access to the genset for maintenance purposes thanks to: Wide lateral access doors fixed by stainless steel hinges and provided with lockable.
• Control panel protection door provided with suitable window and lockable handle.
• Lateral air inlet opening properly protected and soundproofed. Exhaust air outlet from the roof, trough wet section protected by proper grid.
• Lifting points located on the roof to facilitate the transport.

SOUNDPROOF:
• Noise attenuation thanks to soundproofing material
• Efficient residential silencer placed inside the canopy

Genset Equipment - Basic Configurations Available:		
BAT – LEAD-ACID STARTING BATTERIES KIT		:
Battery	n	4
Battery Capacity	Ah	220
MBS - Manual Battery Switch		●
INTEGRATED FUEL TANK - VERSIONS AVAILABLE		:
IFT1 - Integrated Fuel Tank (steel)	l	500
IFT2 - Integrated Fuel Tank (steel)	l	1000
FBD - Fully bunded base frame		●
LDS - Leakage detection sensor (only with FBD)		●
FCV - Fuel Cut Off Valve		●
AFP - Automatic Fuel Pump		●
DFP - Double Automatic Fuel Pump		●
PHS - Coolant Pre-Heating System - available for models:		●
ALS - Automatic Lube Oil Top Up System with lube oil tank 100L		●
● : Supplement available		.
Other Configurations and-or special versions available on requests		.



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Dimensional data		
Length	(L) mm	7800
Width	(W) mm	2424
Height	(H) mm	2997
Dry weight	Kg	17000

Consumption		
Fuel consumption @ 75% PRP	l/h	213.87
Fuel consumption @ 100% PRP	l/h	275.43

Installation data		
Total air flow	m³/min	2324.00
Exhaust gas flow @ PRP	m³/min	204
Exhaust gas temperature @ LTP	°C	440

Data Current		
Battery capacity	Ah	220
MAX current	A	2194.00
Circuit breaker	A	2500

Control panel availability	
AUTOMATIC CONTROL PANEL	ACP
MODULAR PARALLEL PANEL	MPP

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ACP - Automatic control panel

Mounted on the genset, complete with digital control unit AC03 for monitoring, control and protection of the generating set, protected through door with lockable handle

DIGITAL INSTRUMENTATION (through AC-03)
- Generating set voltage (3 phases)
- Mains voltage
- Generating set frequency
- Generating set current (3 phases)
- Battery voltage
- Power (kVA - kW - kVAr)
- Power factor Cos φ
- Hours-counter
- Engine speed r.p.m.
- Fuel level (%)
- Engine temperature

COMMANDS AND OTHERS
- Four operation modes: OFF - Manual starting - Automatic starting - Automatic test
- Pushbutton for forcing Mains contactor or Genset contactor
- Push-buttons: start/stop, fault reset, up/down/page/enter selection
- Remote starting availability
- DC system disconnection switch
- Acoustic alarm
- Automatic battery charger
- RS232 Communication port
- Settable PASSWORD for protection level

PROTECTIONS WITH ALARM
- Engine protections: low fuel level, low oil pressure, high engine temperature
- Genset protections: under/over voltage, overload, under/over frequency, starting failure, under/over battery voltage

PROTECTIONS WITH SHUTDOWN
- Engine protections: low fuel level, low oil pressure, high engine temperature
- Genset protection: under/over voltage, overload, under/over battery voltage, battery charger failure
- Earth Fault included in the control unit

OTHERS PROTECTIONS
- Emergency stop button
- Panel protected through door with lockable handle

ACP - Basic Configurations Available:

POWER PANEL - BREAKERS AVAILABLE:		:
GCB1 - Genset Circuit Breaker 3-pole	A	2500
GCB2 - Genset Circuit Breaker 4-pole	A	2500
ETB - External Terminal Board (with GCB)		Standard
RCG - Various Supplement fof Remote Control		●
IRB - Various supplements for remote signals		●
CPA - Control Panel Anti-Condensation Heater (ACP)		●
● : Supplement available		.
Other Configurations and-or special versions available on requests		.

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MPP - Modular parallel panel

Mounted on the genset, complete with digital control unit Intelivision5 for monitoring, control, protection and load sharing for both single and multiple gen-sets operating in standby or parallel modes (up to 32 gen-sets in island).

DIGITAL INSTRUMENTATION (Graphical display 320x240 pixels)
- Mains: voltage, Intensity, Frequency.
- Mains kW - kVAr -Power factor Cos f.
- Genereting set voltage (3 phases).
- Generating set frequency.
- Generating set current (3 phases).
- Generating set Power (kVA - kW - kVAr - Cos f).
- Generating set kWh and kVAh.
- Battery voltage.
- Hours-counter.
- Engine speed r.p.m.
- Fuel level (%).
- Engine temperature - Oil pressure.

COMMAND AND OTHERS
- Operation modes: OFF - AMF function - Single Parallel to mains Island application - Single Parallel to Mains AMF application - Mulitple parallel genset Island application.
- Pushbutton for forcing Mains Breaker/contactor or Genset Breaker/contactor.
- Push-buttons: start/stop, fault reset, up/down/page/enter selection.
- Multiple parallel and Power Management operation with digital load AVR sharing.
- Automatic synchronizing and power control (via speed goveroner or ECU)
- Baseload Import/Export and Peak shaving
- Voltage and PF control (AVR).
- Configurable digital I/O (12/12) and analogue inputs (3).
- Integrate PLC programmable functions.
- Event-based history (up to 500records).
- Selectable measurment range 120/277V and 0-1/0-5A.
- Remote starting and Blocking signal availability.
- DC system disconnection switch.
- Acoustic alarm.
- Automatic battery charger.
- 2xRS232/RS485/USB Comuncation ports.
- Multi-pin connettor (in and out) for parallel with other generators

PROTECTION
- Engine protections: low fuel level, low oil pressure, high engine temperature.
- Genset protections: under/over voltage, overload, under/over frequency, starting failure, under/over battery voltage
- Others: overcurrent, shortcircuit, reverse power, Earth fault
- Emergency stop button.
- Panel protected through door with lochetable handle

MPP - Basic Configurations Available:

POWER PANEL - BREAKERS AVAILABLE:		:
GMB1 - Genset Circuit Breaker 3-pole motorized	A	2500
GMB2 - Genset Circuit Breaker 4-pole motorized	A	2500
ETB - External Terminal Board (with GMB)		Standard
RCG - Various Supplement fof Remote Control		●
IRB - Various supplements for remote signals		●
CPA - Control Panel Anti-Condensation Heater (MPP)		●
● : Supplement available		.
Other Configurations and-or special versions available on requests		.

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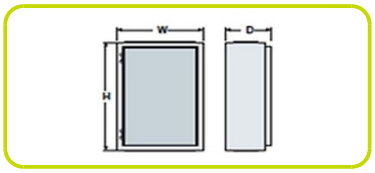
Accessories

Items available as accessory equipment

LTS - LOAD TRANSFER SWITCH - Accessories ACP

The Load Transfer Switch (LTS) panel operates the power supply changeover between the generator and the Mains in backup applications, guarantying the feeding to the load within a short period of time.
It consists of a standalone cabinet which can be installed separate from the generating set. The logic control of the power supply changeover is operated by means of the Automatic Control panel mounted on the generating set, so therefore none logic device is required on the LTS panel.
Main features
The enclosure is made of metal sheet folded and painted with high-resistance epoxy powder, guarantying external IP40 and internal IP20. Standard color is RAL7035. The lower side of the panel presents a removable plate for power cables connection.
The front door presents an emergency push-button to stop of the generator. Inside the enclosure it is provided a lever which allows a manual selection of the power supply between the generator and the Mains (I-0-II).
According to the changeover control signal, the power supply is transferred from one source to the other by means of two motorized IV-poles change-over switches. A mechanical and electrical interlocking prevents both power sources to be connected at the same time, avoiding any damage for the load or the alternator.

NOMINAL CURRENT & DIMENSIONS PANEL LTS (standard*)



Nominal Current	A	2500
Width	(W) mm	1000
Height	(H) mm	800
Depth	(D) mm	450
Weight	Kg	350

* = Available electrical power more

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