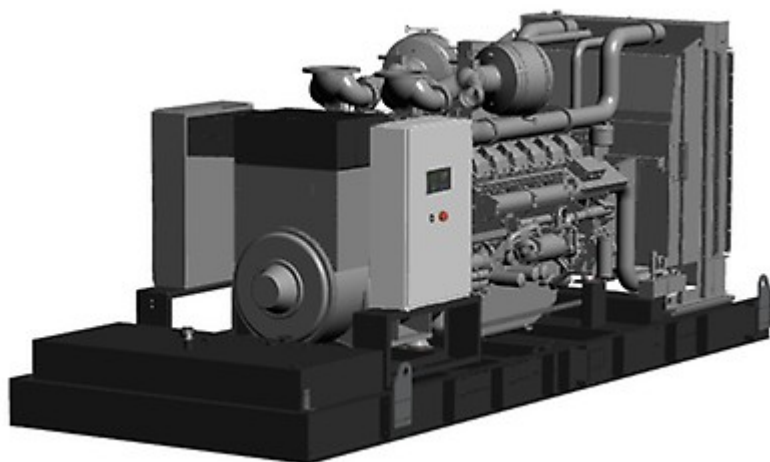




# ENERGY GENERATION

## GSW1770M



### Main Features

Frequency	Hz	50
Voltage	V	400
Power factor	cos $\phi$	0.8
Phase and connection		3

### Power Rating

Standby power LTP	kVA	1780.00
Standby power LTP	kW	1424.00
Prime power PRP	kVA	1661.17
Prime power PRP	kW	1328.94

### 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.

## Engine specifications

Engine manufacturer	MTU	
Model	12V4000G23	
Version	50 Hz	
[50Hz] Exhaust emission level	Unregulated	
Engine cooling system	Water	
Nr. of cylinder and disposition	12 V	
Displacement	cm <sup>3</sup>	57199
Aspiration	Turbocharged aftercooled	
Speed governor	Electronic	
Operating Speed-Nominal	rpm	1500
Prime gross power PRP	kW	1420
Maximum gross power LTP	kW	1562
Oil capacity	l	260
Lube oil consumption @ PRP (max)	%	1
Coolant capacity	l	335
Fuel	Diesel	
Specific fuel consumption @ 75% PRP	g/kWh	195
Specific fuel consumption @ PRP	g/kWh	189
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:

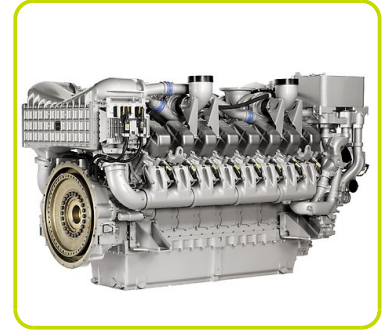
- Forced-feed lubrication system with piston cooling
- Lube oil circulation pump with safety valve
- Lube oil multi-stage filter
- Lube oil heat exchanger
- Oil filler neck and oil dipstick for measurement on non-running engine
- Closed crankcase venting system

### 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
- Electric radiator for jacket water and charge air cooling circuit with integrated expansion tank
- Coolant level sensor



## Alternator Specifications

Brand	Mecc Alte	
Model	ECO46-1.5S/4	
Voltage	V	400
Frequency	Hz	50
Power factor	cos $\phi$	0.8
Voltage regulation system	Electronic	
Poles	4	
Type	Brushless	
Standard AVR	DER1	
Voltage tolerance	%	1
Efficiency @ 75% load	%	96.5
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:  $\pm 1\%$  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:  $\pm 0,5\%$  in stabilized conditions (load, temperature).

Transient voltage drop and overvoltage within  $\pm 15\%$

Voltage recovery time within  $\pm 3\%$  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.



## 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 Draining pump

### PROTECTIONS:

- Moving and rotating parts protection against accidental contacts

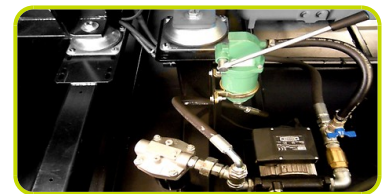
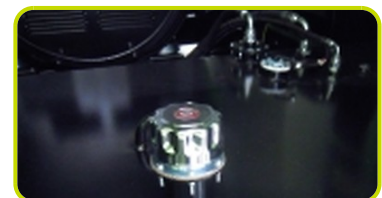
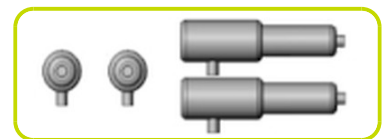
### LIFTING:

- Lifting points frame structure.



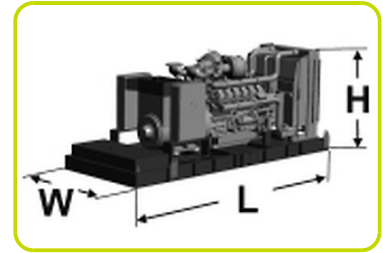
### Genset Equipment - Basic Configurations Available:

BAT – LEAD-ACID STARTING BATTERIES KIT			:
Battery	n		4
Battery Capacity	Ah		220
MBS - Manual Battery Switch			•
EXHAUST SILENCER - VERSIONS AVAILABLE			:
IES - Industrial silencer	dB(A)		-15
RES - Residential silencer	dB(A)		-35/38
FEC - Flexible Exhaust Compensator Bellow and flanges			•
Hot parts protection			•
INTEGRATED FUEL TANK - VERSIONS AVAILABLE			:
IFT1 - Integrated Fuel Tank (steel)	l		500
IFT2 - Integrated Fuel Tank (steel)	l		1000
FBD - Fully bundled 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			.



### Dimensional data

Length	(L) mm	6000
Width	(W) mm	2150
Height	(H) mm	2722
Dry weight	Kg	12150



### Consumption

Fuel consumption @ 75% PRP	l/h	249.06
Fuel consumption @ 100% PRP	l/h	319.50

### Installation data

Total air flow	m <sup>3</sup> /min	2381.00
Exhaust gas flow @ PRP	m <sup>3</sup> /min	240
Exhaust gas temperature @ LTP	°C	440

### Data Current

Battery capacity	Ah	220
MAX current	A	2569.28
Circuit breaker	A	2500

### Control panel availability

AUTOMATIC CONTROL PANEL	ACP
MODULAR PARALLEL PANEL	MPP

## ACP - Automatic control panel

Mounted on the genset, complete with digital control unit AC03 for monitoring, control and protection of the generating set

### 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  $\phi$
- 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



## 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		.





**MPP - Modular parallel panel**

Mounted on the genset, complete with digital control unit Intelvision5 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.
- Generating 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 - Multiple 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 governer 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 measurement 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.



**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	.



## 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).

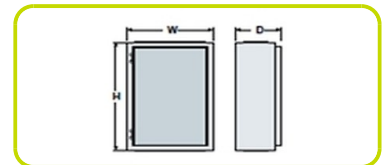
According to the changeover control signal, the power supply is transferred from one source to the other by means of two motorized IV-poles change-over switches. A mechanical and electrical interlocking prevents both power sources to be connected at the same time, avoiding any damage for the load or 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



Printed on 11/03/2016 (ID 359)

©2012 | PR INDUSTRIAL s.r.l. | All rights reserved | Image shown may not reflect actual package. Specifications subject to change without notice | ENERGY GENERATION is registered trademarks of PR INDUSTRIAL s.r.l. Other company, product or service names may be trademarks or service marks of others. RevA (06/2012).

