

# GSW2045M



## Main Features

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

## Power Rating

Standby power LTP	kVA	2049.13
Standby power LTP	kW	1639.30
Prime power PRP	kVA	1837.81
Prime power PRP	kW	1470.25
PRP Rating available only with engine supplement:		DPA

### Ratings definition (According to standard ISO8528 1:2005)

#### PRP - Prime Power:

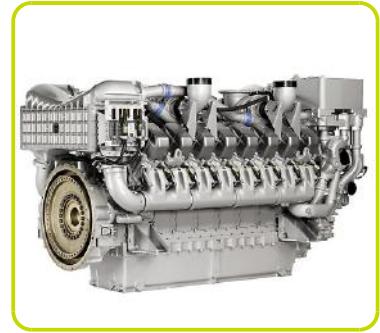
It is defined as being the maximum power which a generating set is capable of delivering continuously whilst supplying a variable electrical load when operated for an unlimited number of hours per year under the agreed operating conditions with the maintenance intervals and procedures being carried out 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	12V4000G84F 3D	
Version	50 Hz	
PRP Rating only with supplement:	DPA	
[50Hz] Exhaust emission level	Unregulated	
Engine cooling system	Water	
Nr. of cylinder and disposition	12 V	
Displacement	cm <sup>3</sup>	57200
Aspiration	Turbocharged aftercooled	
Speed governor	Electronic	
Operating Speed-Nominal	rpm	1500
Prime gross power PRP	kW	1575
Maximum gross power LTP	kW	1750
Oil capacity	l	260
Lube oil consumption @ PRP (max)	%	1
Coolant capacity	l	335
Fuel	Diesel	
Specific fuel consumption @ 75% PRP	g/kWh	193
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 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

Alternator	Mecc Alte	
Model	ECO46-1LN/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	%	96.8
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: 4A<sub>dc</sub>

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

Alarm 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 triple (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 DRAININ PUMP:

- Oil draining facilities

### CONTAINER 40':

Soundproof Container made by monoblock structure and designed to satisfy the most disparate needs of the Customer.

Main feature are:

- Structure similar to shipping containers (upper and lower corner castings, monolithic structure, walls and roof made of corrugated steel sheet), making them particularly strong and suitable .
- High resistance to the atmospheric agents
- Polyester powder painting and automatic blasting SA 2.5
- Air inlet and exhaust openings air outlet for genset cooling
- It is foreseen space for housing the electrical panel, if necessary the control panel can be separated from alternator, in a dedicated room.
- The floor is made of textured sheeting reinforced with profiles at steady pace bent.
- Doors single or double swing , these are fixed by sturdy steel hinges and equipped with various systems of locks, such as lever bolt locks, panic bars etc.

### SOUNDPROOF:

The walls, divisors and roof are self supporting and with high acoustic absorption.

They are produced in galvanized steel-sheet and subsequently painted with a galvanic deposition of polyester powder. Inside they are composed by a sheet of rock wool .

Exhaust silencers placed inside or outside the container depending on genset model.

Residual noise level of 70±3dB(A) at 7 m



### 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			.



### Dimensional data

Length	(L) mm	12190
Width	(W) mm	2438
Height	(H) mm	2896
Dry weight	Kg	20430



### Consumption

Fuel consumption @ 75% PRP	l/h	273.91
Fuel consumption @ 100% PRP	l/h	360.00

### Noise level

Noise pressure level @ 7 m	dB(A)	77 +/-3
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### Installation data

Total air flow	m <sup>3</sup> /min	2393.00
Exhaust gas flow @ PRP	m <sup>3</sup> /min	270
Exhaust gas temperature @ LTP	°C	450

### Electrical Data

Battery capacity	Ah	220
MAX current	A	2957.74
Circuit breaker	A	3200

### Control panel availability

AUTOMATIC CONTROL PANEL	ACP
MODULAR PARALLEL PANEL	MPP

## ACP - Automatic control panel

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

### DIGITAL INSTRUMENTATION

- 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

### 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	3200
GCB2 - Genset Circuit Breaker 4-pole	A	3200
ETB - External Terminal Board (with GCB)		Standard
RCG - Various Supplement for Remote Control		•
TLP - Various supplements for remote signals		•
CAH - 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 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 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 Communication 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	3200
GMB2 - Genset Circuit Breaker 4-pole motorized	A	3200
ETB - External Terminal Board (with GMB)		Standard
RCG - Various Supplement fof Remote Control		•
TLP - Various supplements for remote signals		•
CAH - Control Panel Anti-Condensation Heater (MPP)		•
• = Supplement available		.
Other Configurations and-or special versions available on requests		.



## Accessories

Items available as accessory equipment

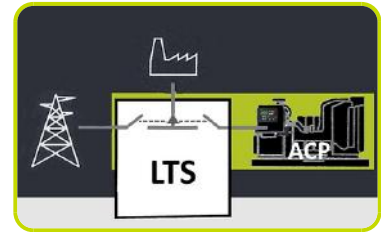
### LTS - Load Transfer Switch [Accessories for ACP Automatic Control Panel]

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 (ACP) mounted on the generating set, so therefore none logic device is required on the LTS panel.

#### LTS Type ATyS\_D:

- Box type: steel enclosures
- Installation mode: Standing
- Door: Hinged door closed with double barb locking.
- Ingress Protection: IP43
- Gland Plates: Removable on the top & bottom side
- Connections: Bottom/Bottom
- Motor unit
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- Connections: Bottom/Bottom
- Motor unit
- Switch position indicator
- Auto/Manual cover selector
- Housing for manual handle
- Padlocking mechanism
- Two side by side mounted load break switches
- Poles 4
- Double coils self-powered
- Voltage (coils): 208/277VAC (Tolerance +/-20% 166/333VAC)
- Frequency 50 & 60HZ
- Interface ATyS D10, fixed on the door for the status indication: Two lights to indicate the voltage presence of the grid and the diesel generator; Two lights for the switch position; Functionality mode (auto/manual) and cover protection IP65.
- Compliant with IEC 60947-3, EN 61439-6-1 and GB 14048-11



#### LTS SUPPLEMENTS AVAILABLE ON REQUEST:

- **ESB** - Emergency Stop Button (installed on the panel front)
- **APP** - Additional IPXXB Protection (internal plexiglass)

The information is aligned with the Data file at the time of download. Printed on 19/01/2020 (ID 419)

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