



# ENERGY GENERATION

## GSW410DO



### Main Features

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

### Power Rating

Standby power LTP	kVA	404.39
Standby power LTP	kW	323.51
Prime power PRP	kVA	363.48
Prime power PRP	kW	290.78

### 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	Doosan	
Model	P158LE-1	
[50Hz] Exhaust emission level	Non Emission Certified	
Engine cooling system	Water	
Nr. of cylinder and disposition	8 V	
Displacement	cm <sup>3</sup>	14618
Aspiration	Turbocharged intercooled	
Speed governor	Electronic	
Prime gross power PRP	kW	327
Maximum gross power LTP	kW	362
Oil capacity	l	28
Lube oil consumption @ PRP (max)	%	0.3
Coolant capacity	l	20
Fuel	Diesel	
Specific fuel consumption @ 75% PRP	g/kWh	200
Specific fuel consumption @ PRP	g/kWh	202.2
Starting system	Electric	
Starting engine capability	kW	7
Electric circuit	V	24



## ENGINE EQUIPMENT

### Standards

The engine performance corresponds to ISO 3046. Ratings are based on ISO 8528.

### Fuel System

- In-line pump with integrated electromagnetic actuator
- Fuel Filter full flow, cartridge type with water drain valve

### Lubrication System

- Fully forced pressure feed type
- Oil pump Gear type driven by crank- shaft gear
- Oil filter Full flow, cartridge type

### Cooling System

- Water circulation by centrifugal pump on engine
- Cooling method Fresh water forced circulation
- Cooling fan Blower type

## Alternator Specifications

Brand	Mecc Alte	
Model	ECO40-1S/4	
Voltage	V	400
Frequency	Hz	50
Power factor	$\cos \phi$	0.8
Poles	4	
Type	Brushless	
Voltage regulation system	Electronic	
Standard AVR	DER1-A	
Voltage tolerance	%	1
Efficiency @ 75% load	%	93.8
Class	H	
IP protection	21	

### 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

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 MADE OF WELDED STEEL PROFILE, COMPLETE WITH:

- Anti-vibration mountings properly sized
- Screwed support legs.

### METAL FUEL TANK WITH THE FOLLOWING COMPONENT:

- Filler neck
- Air breather (ventilation pipe)
- Minimum fuel level sensor

### ENGINE COMPLETE WITH:

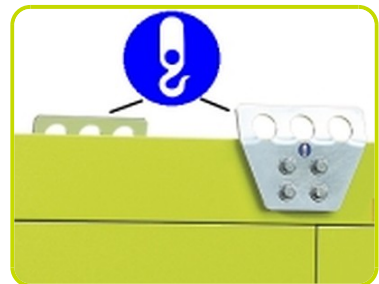
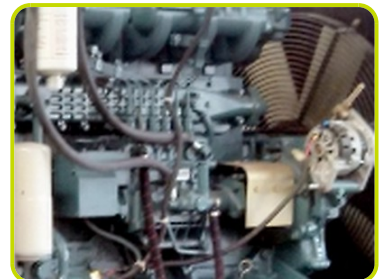
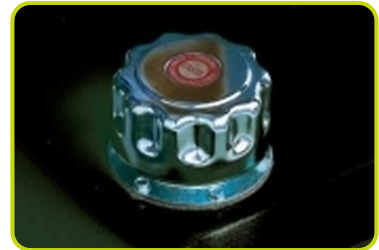
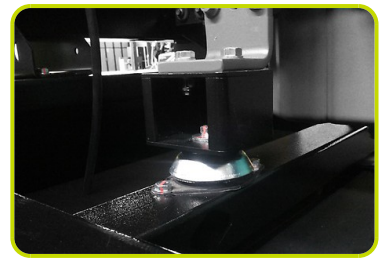
- Battery
- Liquids (no fuel)

### CANOPY:

- Soundproof canopy made up of modular panels, realized with zinc steel as treatment against corrosion and aggressive conditions, properly fixed and sealed allowing a full weatherproof enclosure.
- Easy access to the genset for maintenance purposes thanks to: Wide lateral access doors fixed by stainless steel hinges and provided with plastic lockable handles and internal perforated galvanized steel-sheet; Detachable panels, with screws holes protected by rubber tap.
- 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.
- Double lifting points frame structure.

### SOUNDPROOF:

- Noise attenuation thanks to soundproofing material (polyurethane)
- Efficient residential silencer placed inside the canopy



### Dimensional data

Length	(L) mm	4500
Width	(W) mm	1800
Height	(H) mm	2334
Dry weight	Kg	3787
Fuel tank capacity	l	720



### Autonomy

Fuel consumption @ 75% PRP	l/h	59.17
Fuel consumption @ 100% PRP	l/h	78.71
Running time @ 75% PRP	h	12.17
Running time @ 100% PRP	h	9.15

### Noise level

Guaranteed noise level (LWA)	dB(A)	106
Noise pressure level @ 7 mt	dB(A)	68



### Installation data

Exhaust gas flow @ PRP	m <sup>3</sup> /min	59.5
Exhaust gas temperature @ LTP	°C	520

### Data Current

Battery capacity	Ah	200
MAX current	A	583.70
Circuit breaker	A	600

### Control panel availability

AUTOMATIC CONTROL PANEL	ACP
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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  $\varphi$
- Hours-counter
- Engine speed r.p.m.
- Fuel level (%)
- Engine temperature (depending on model)

### 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
- Circuit breaker protection: III poles
- Earth Fault included in the control unit

### OTHERS PROTECTIONS

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



### OUT PUT PANEL ACP

Plinth row for connection from ACP to LTS panel.

Predisposed for remote control optional:

RCG

External Terminal Board (ETB)

Standard

**Supplements:**

Only Available when order

:

**ENGINE SUPPLEMENTS**

PHS - Coolant Pre-Heating System - available for models:

ACP

## Accessories

Items available as accessory equipment

### LTS - LOAD TRANSFER SWITCH - Accessories ACP

Load Transfer Switch panel complete with:

- Two layers motorized change-over switch 4pole made by means of two switch disconnectors mechanically interlocked.
- Emergency stop button

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.

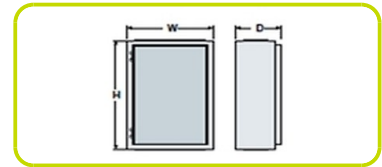
The logic control of the power supply changeover is operated by means of the Automatic Control panel mounted on the generating set, so therefore none logic device is required on the LTS panel.



### NOMINAL CURRENT & DIMENSIONS PANEL LTS (standard\*)

Nominal Current	A	630
Width	(W) mm	900
Height	(H) mm	700
Depth	(D) mm	450
Weight	Kg	60

\* = Available electrical power more



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