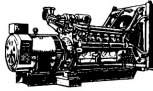


PROUDLY 100% AUSTRALIAN OWNED

**MACFARLANE
GENERATORS**



ESTABLISHED 1949

VICTORIA (HEAD OFFICE) REC: 691

136 Fairbank Road, Clayton South, VIC 3169 Ph: 03 9544 4222 Fax: 03 9543 7138

NEW SOUTH WALES BRANCH REC: 261624C

1 St. James Place, Seven Hills, NSW 2147 Ph: 02 9899 6699 Fax: 02 9899 8048

QUEENSLAND BRANCH REC: 72635

31 South Pine Road, Brendale, QLD 4500 Ph: 07 3205 6333 Fax: 07 3205 6344

PO Box 5176, Clayton, VIC 3168 www.macfarlanegenerators.com.au info@macgen.com

Macfarlane Generators PTY. LTD. ACN 006 849 074 ABN 74 006 849 074

GSW200P (ALT. M)



Main Features

Frequency	Hz	50
Voltage	V	400
Power factor	cos ϕ	0.8
Phase		3

Power Rating

Emergency Standby Power ESP	kVA	196.00
Emergency Standby Power ESP	kW	156.80
Prime power PRP	kVA	182.14
Prime power PRP	kW	145.71

Ratings definition (ISO-8528)

ESP - Emergency Standby Power:

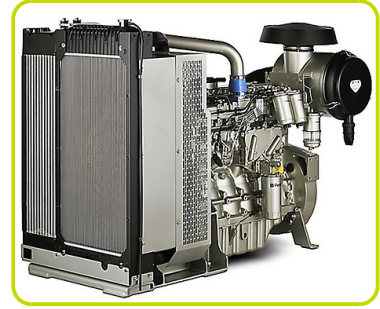
It is the maximum power available during a variable electrical power sequence, under the stated operating conditions, for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 h of operation per year with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. The permissible average power output over 24 h of operation shall not exceed 70 % of the ESP.

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.

Engine specifications

Engine Brand	Perkins	
Model	1106A-70TAG3	
[50Hz] Exhaust emission level	Non Emission Certified	
Engine cooling system	Water	
Nr. of cylinder and disposition	6 in line	
Displacement	cm ³	7000
Aspiration	Turbocharged	
Speed governor	Mechanical	
Prime gross power PRP	kW	162.7
Maximum gross power LTP ESP	kW	180.2
Oil capacity	l	14.9
Lube oil consumption PRP (max)	%	0.1
Coolant capacity	l	21
Fuel	Diesel	
Specific fuel consumption 75% PRP	g/kWh	211
Specific fuel consumption PRP	g/kWh	207
Starting system	Electric	
Starting engine capability	kW	4.2
Electric circuit	V	12



Engine equipment

Standards

The above ratings represent the engine performance capabilities to conditions specified in ISO 8528/5.

Lube oil system

Flat-bottomed isolated aluminium sump

Filter

- Fuel filter
- Air filter
- Oil filter

Cooling system

- Radiator (incorporating air-to-air charge cooler + fuel cooler)
- Water pump

Alternator Specifications

Alternator	Mecc Alte	
Model	ECO38-1S	
Voltage	V	400
Frequency	Hz	50
Power factor	cos ϕ	0.8
Type	Brushless	
Poles	4	
Voltage tolerance	%	1
Efficiency @ 75% load	%	92.6
Class	H	
IP protection	23	

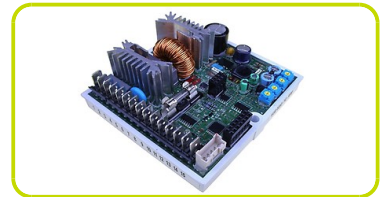


Mechanical structure

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

Voltage regulator

Voltage regulation with DSR. The digital DSR controls the range of voltage, avoiding any possible trouble that can be made by unskilled personnel. The voltage accuracy is $\pm 1\%$ in static condition with any power factor and with speed variation between 5% and +30% with reference to the rated speed.



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.

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.

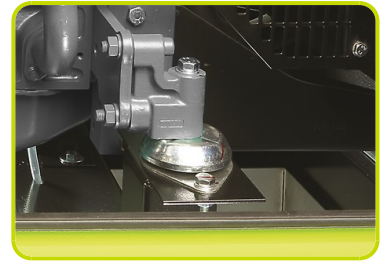
Reference standards

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

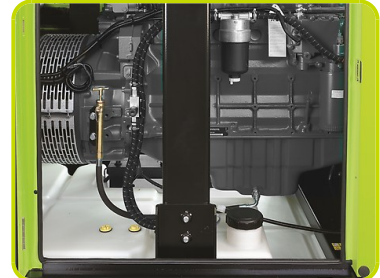
BASE FRAME MADE OF WELDED STEEL PROFILE, COMPLETE WITH:

- Anti-vibration mountings properly sized
- Welded or Screwed support legs. (according to canopy size)



PLASTIC FUEL TANK WITH THE FOLLOWING COMPONENT:

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



OIL DRAINING PIPE WITH CAP:

- Oil draining facilities



ENGINE COMPLETE WITH:

- Battery
- Liquids (no fuel)

CANOPY:

- Soundproof canopy made up of modular panels, realized with zinc plated 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; 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.
- Single detachable lifting eye placed on the roof.



SOUNDPROOF:

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



Dimensional data

Length	(L) mm	3400
Width	(W) mm	1250
Height	(H) mm	1770
Dry weight	kg	2043
Fuel tank capacity	l	350
Fuel tank material		Plastic



Autonomy

Fuel consumption @ 75% PRP	l/h	30.90
Fuel consumption @ 100% PRP	l/h	40.09
Running time 75% PRP	h	11.33
Running time 100% PRP	h	8.73

Noise level

Guaranteed noise level (LWA)	dB(A)	97
Noise pressure level @ 7 m	dB(A)	68



Installation data

Exhaust gas flow	m ³ /min	31.55
Exhaust gas temperature	°C	491

Electrical Data

Battery capacity	Ah	140
Max current	A	282.91
Circuit breaker	A	320

Control panel availability

MANUAL CONTROL PANEL	MCP
MANUAL CONTROL PANEL FULL OPTION	MPF
AUTOMATIC CONTROL PANEL	ACP
MODULAR PARALLEL PANEL	MPP

MCP - Manual control panel

Mounted on the genset and complete of: analogue instrumentation, control, protection of the generating set, protected through door with lockable handle.

INSTRUMENTATION (ANALOGUE)

- Voltmeter (1 phase)
- Ammeter (1 phase)
- Hours-counter

COMMANDS

- Start/stop selector switch with key
- Emergency stop button

PROTECTION WITH ALARM

- Low fuel level
- Battery charger failure
- low oil pressure
- high engine temperature
- Earth Fault.

PROTECTIONS WITH SHUTDOWN

- Low fuel level
- Battery charger failure
- low oil pressure
- high engine temperature.
- Circuit breaker protection: III poles
- Emergency stop button

OTHERS PROTECTIONS

- Panel protected through door with lockable handle.



OUT PUT PANEL MCP

Power cables connection to Circuit Breaker.	
External Terminal Board (ETB)	Optional
Socket kit	Optional
3P+N+T 400V 63A	n
3P+N+T CEE 400V 32A	n

MPF - Manual control panel full option

Mounted on the genset and complete of: analogue instrumentation, control, protection of the generating set, protected through door with lockable handle

INSTRUMENTATION (ANALOGUE)

- Voltmeter with selector switch (3 phases)
- Frequency meter
- Ammeter with selector switch (3 phases)
- Hours-counter
- Fuel level indicator
- Oil pressure indicator
- Engine temperature indicator

COMMANDS

- Start/stop selector switch with key
- Emergency stop button

PROTECTION WITH ALARM

- Low fuel level
- Battery charger failure
- low oil pressure
- high engine temperature
- Earth Fault

PROTECTIONS WITH SHUTDOWN

- Low fuel level
- Battery charger failure
- low oil pressure
- high engine temperature
- Circuit breaker protection: III poles
- Emergency stop button

OTHERS PROTECTIONS

- Panel protected through door with lockable handle

OUT PUT PANEL MPF

ETB- External Terminal Board		ETB
Socket kit		Standard
Individual CB and Earth Fault protection		√
3P+N+T 400V 63A IP67	n	1
3P+N+T CEE 400V 16A IP67	n	1
230V/16A 2P+T CEE IP67	n	1
230V 16A SCHUKO IP68	n	1



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 ϕ
- 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

Power cables connection to Circuit Breaker.	
Predisposed for remote control optional:	RCG
External Terminal Board (ETB)	Optional
Socket kit	Optional

MPP - Modular parallel panel

Mounted on the genset, complete with digital control unit IG-NTC 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 (through IG-NTC control unit)

- 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).
- Generating set Power factor Cos f.
- Generating set kWh and kVAh.
- Battery voltage.
- Hours-counter.
- Engine speed r.p.m.
- Fuel level (%).
- Engine temperature (depending on model).
- Oil pressure (depending on model).

COMMAND AND OTHERS

- Graphical display 128x64 pixels.
- 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.
- Settable PASSWORD for protection level.

PROTECTION WITH ALARM AND SHUTDOWN

- 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

OTHERS PROTECTION:

- Circuit breaker protection: IV poles Motorized.
- Emergency stop button.
- Panel protected through door with lochetable handle

OUT PUT PANEL MPP

Multi-pin connectors (in and out) for parallel with other generators	n	2
Connecting cable with 2 connectors multipin (length 10m)	n	1
External terminal board		ETB



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