

DOLE510**Main Features**

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

Power Rating

Emergency Standby Power ESP	kVA	511.48
Emergency Standby Power ESP	kW	409.18
Prime power PRP	kVA	463.05
Prime power PRP	kW	370.44

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	Doosan	
Model	DP158LC	
[50Hz] Exhaust emission level	Non Emission Certified	
Engine cooling system	Water	
Nr. of cylinder and disposition	8 V	
Displacement	cm ³	14618
Aspiration	Turbocharged intercooled	
Speed governor	Electronic	
Prime gross power PRP	kW	408
Maximum gross power LTP ESP	kW	449
Fuel	Diesel	
Specific fuel consumption 75% PRP	g/kWh	208
Specific fuel consumption PRP	g/kWh	213
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

Alternator	Leroy Somer	
Model	LSA47.2 M7	
Voltage	V	400
Frequency	Hz	50
Power factor	$\cos \phi$	0.8
Poles		4
Voltage tolerance	%	0.5
Efficiency @ 75% load	%	94.9
Class		H
IP protection		23



SPECIALLY ADAPTED TO APPLICATIONS

The LSA 47.2 alternator is designed to be suitable for typical generator applications, such as: backup, marine applications, rental, telecommunications, etc.

TOP OF THE RANGE ELECTRICAL PERFORMANCE

- Class H insulation.
- Standard 12 wire re-connectable winding, 2/3 pitch, type no. 6.
- High efficiency and motor starting capacity.
- R 791 interference suppression conforming to standard EN 55011 group 1 class B standard for European zone (CE marking).

EXCITATION AND REGULATION SYSTEM

- Excitation system: AREP

REINFORCED MECHANICAL STRUCTURE

- Compact rigid assembly to better withstand generator vibrations.
- Steel frame
- Cast iron flanges and shields.
- single-bearing designed to be suitable for heat engines.
- Half-key balancing bearing.
- Sealed for life ball bearing.

PROTECTION SYSTEM SUITED TO THE ENVIRONMENT

- The LSA is IP 23.
- Winding Protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments.

COMPLIANT WITH INTERNATIONAL STANDARDS

The LSA alternator conforms to the main international standards and regulations:

- IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA / UL 1146 (UL 1004 on request), marine regulations, etc.

It can be integrated into a CE marked generator.

The LSA is designed, manufactured and marketed in an ISO 9001 environment and ISO 14001.

Genset equipment

BASE FRAME MADE OF WELDED STEEL PROFILE, COMPLETE WITH:

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



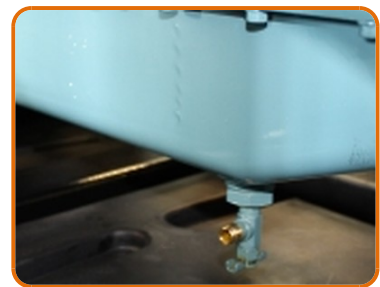
PLASTIC FUEL TANK WITH THE FOLLOWING COMPONENT:

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



MANUAL OIL DRAININ:

- Oil draining facilities



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
- Efficient residential silencer placed inside the canopy



Dimensional data

Length	(L) mm	4400
Width	(W) mm	1500
Height	(H) mm	2270
Dry weight	kg	4470
Fuel tank capacity	l	636
Fuel tank material		Plastic

Autonomy

Fuel consumption @ 75% PRP	l/h	76.46
Fuel consumption @ 100% PRP	l/h	103.46
Running time 75% PRP	h	8.32
Running time 100% PRP	h	6.15

Noise level

Guaranteed noise level (LWA)	dB(A)	98
Noise pressure level @ 7 m	dB(A)	68

Installation data

Total air flow	m ³ /min	782.10
Exhaust gas flow	m ³ /min	81
Exhaust gas temperature	°C	528

Electrical Data

Battery capacity	Ah	180
Max current	A	738.27
Circuit breaker	A	800

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, 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

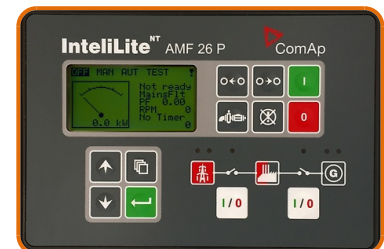
- Engine protections: low fuel level, low oil pressure, high engine temperature
- Genset protections: under/over voltage, overload, under/over frequency, starting failure, under/over battery voltage

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

Predisposed for remote control optional:	RCG
External Terminal Board (ETB)	Standard
Socket kit	Optional



MPP - Modular parallel panel

Mounted on the genset, complete with digital control unit IntelliVision5 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

- 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 320x240 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



Supplements:

To be ordered with equipment (when necessary) :

CONTROL PANEL SUPPLEMENT

RCG - Various supplements for remote controls - available for models:	ACP MPP
TLP - Various supplements for remote signals - available for models:	ACP MPP
ADI - Adjustable Differential Intensity - available only for models:	ACP
TIF - IV Poles Circuit Breaker instead of III - available for models:	ACP



Socket kit

Kit SKB or Kit SKC (for total n. 4 socket) - available for model:	ACP
Individual CB and Earth Fault protection	
3P+N+T 400V 63A	n 1
3P+N+T CEE 400V 32A	n 1
230V/16A SCHUKO	n 1
With version SKB:	
3P+N+T CEE 400V 16A	n 1
With version SKC:	
400V/125A 3P+N+T CEE	n 1

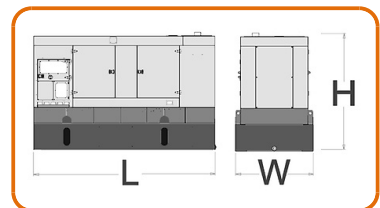


GENSET EQUIPMENT

LPT - Leak Proof Tray	●
AFP - Automatic Fuel Pump	●
KRT- Kit Rental for HEI gensets which includes: 3-way fuel valve, battery switch	●

Extended Fuel Tank

Fuel tank capacity	l	4180
Length (Genset)	(L) mm	4426
Width (Genset)	(W) mm	1726
Height (Genset)	(H) mm	2786



ENGINE SUPPLEMENTS

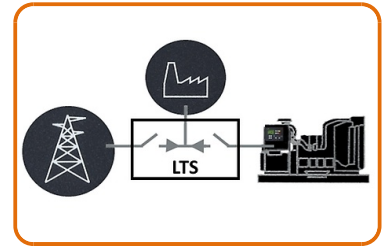
PHS - Coolant Pre-Heating System	ACP MPP
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Accessories

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.



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