



### Features:

- Excitation system: self-excited (AREP and PMG are optional)
- ATS (automatic transfer switch) receptacle
- Lockable battery isolator switch
- Stainless galvanized zinc plates with strong corrosion resistance
- Vibration isolators between the engine/alternator and base frame
- Integrated wiring design
- Base fuel tank for at least 8 hours running
- Equipped with an industrial muffler
- Engine oil pump
- 50 C radiator
- Top lifting and steel base frame with forklift holes
- Drainage for fuel tank
- Complete protection functions and safety labels
- IP54 (soundproof sets), IP56 (control system)
- Water jacket preheater, oil heater and double air cleaner, etc. are available.



### Output Ratings

Generating Set Model	Prime	Standby
WPS1500/S	1500kVA/1200kW	1650kVA/1320kW

Ratings at 0.8 power factor.

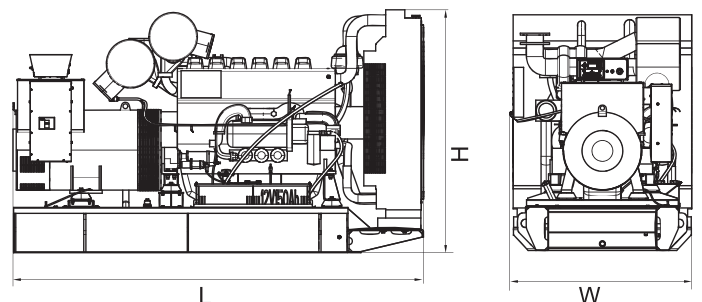
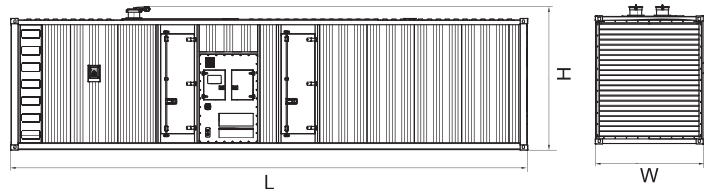
### Ratings and Performance Data

<b>Engine Make &amp; Model:</b>	4012-46TAG2A	
<b>Alternator Model:</b>	LSA50.2L8	
<b>Alternator Brand:</b>	Leroy Somer	
<b>Control System:</b>	PLC-8610 / PLC-7420	
<b>Noise Level@7m:</b>	/	
<b>Circuit Breaker Type:</b>	/	
<b>Frequency &amp; Phase:</b>	50Hz & 3PH	
<b>Engine Speed: RPM</b>	1500	
<b>Structure Type:</b>	WPS1500	A
	WPS1500S	C
<b>Fuel Tank Capacity: L</b>	WPS1500	/
	WPS1500S	2000
<b>Fuel Consumption: l/hr (100% Load)</b>	Prime	/
	Standby	/

### Dimensions and Weights

Generating Set Model	Length (L) mm (in)	Width (W) mm (in)	Height (H) mm (in)	Dry kg (lb)	Wet kg (lb)
WPS1500	5080	2192	2410	9895	/
WPS1500S	12192	2438	3150	20220	/

Dry = With Lube Oil      Wet = With Lube Oil and Coolant



Also available in the following voltages: 415/240V-380/220V-220/127V-200/115V;

ESP: Standby Power Standby duty, operation under variable load, without over load;

PRP: Prime Power-Continuous duty operation, under variable load 24/24h-10% over load permissible 1 hour/12 hours;

The data is only for your reference but not for use of sales.

M: Mechanical speed governor, E/ECCU: Electronic speed governor;

NA: Naturally aspirated, TC: Turbocharged, TCA: Turbocharged and air-air aftercooled. TCW: Water-cooled Turbocharged;

The weights are approximate and without fuel.



## Engine model: 4012-46TAG2A

### Cooling system

Recommended coolant: 50% inhibited ethylene glycol or 50% inhibited propylene glycol and 50% clean fresh water. For CHP systems and where there is no likelihood of ambient temperature below 10 °C, then clean 'soft' water may be used, treated with 1% by volume of Perkins inhibitor in the cooling system. The inhibitor is available in 1 litre bottles from all Perkins Distributors.

Maximum pressure in crankcase water jacket . . . . . 170 kPa  
Maximum top tank temperature (standby) . . . . . 98 °C  
Maximum static pressure on pump . . . . . 70 kPa  
Maximum pressure cap setting . . . . . 70 kPa

### Total coolant capacity

Electronit (engine only) . . . . . 73 litres  
ElectropaK  
-temperate (engine and radiator) . . . . . 196 litres  
-tropical (engine and radiator) . . . . . 201 litres  
Maximum permissible restriction to coolant pump flow . . . . . 20 kPa  
Thermostat operating range . . . . . 71 - 85 °C  
Temperature rise across the engine (standby power) with inhibited coolant . . . . . 8 °C  
Shutdown switch setting . . . . . 101 °C (rising)  
Coolant immersion heater capacity . . . . . 2 x 4 kW

### Water jacket cooling data

Coolant flow . . . . . 948 l/min  
Coolant exit temperature (max) . . . . . 98 °C  
Coolant inlet temperature (min) . . . . . 70 °C  
Coolant inlet temperature (max) . . . . . 85 °C

### Cooling clearance

4012-46TWG2A - Temperate			
Maximum additional restriction (duct allowance) to cooling airflow, and resultant min airflow			
Description	°C	Pa	m³/sec
Ambient clearance: Inhibited coolant	35	N/A	N/A
Duct allowance	35	250	N/A
Minimum airflow	35	250	22

### Fuel system

Injection system . . . . . direct injection  
Fuel injection pump/Injector type . . . . . Combined unit injector  
Injector pressure . . . . . 23,4 MPa  
Fuel lift pump type . . . . . Gerotor  
Delivery flow . . . . . 1020 litres/hr  
Heat retained in fuel to tank  
-4012-46TWG2A . . . . . 8,5 kW  
-4012-46TWG3A . . . . . 9,0 kW  
Fuel inlet temperature to be less than . . . . . 58 °C  
Delivery pressure . . . . . 300 kPa  
Maximum suction head at pump inlet . . . . . 24,5 kPa  
Maximum static pressure head . . . . . see installation manual for details  
Fuel filter spacing . . . . . 10 microns  
Governing type . . . . . electronic  
Governing . . . . . to ISO 8528-5 2005  
Torque at the governor output shaft . . . . . 1-631  
Tolerance on fuel consumption . . . . . to ISO 8528-1 1993

### Fuel specification

Recommended fuel to conform to: . . . . . -BS2869 1998 class A2 or BS EN590

### Coolant pump

-speed . . . . . 1.4 x engine rev/min  
-method of drive . . . . . engine (gear) driven

### Radiator

Face area  
-temperate . . . . . 2630400 mm²  
-tropical . . . . . 2967420 mm²  
Number of rows and material . . . . . 226  
Fins per inch and material . . . . . 7  
Width of matrix  
-temperate . . . . . 1600 mm  
-tropical . . . . . 1805 mm  
Height of matrix . . . . . 1644 mm  
Weight (dry)  
-temperate . . . . . 780 kg  
-tropical . . . . . 843 kg  
Total coolant capacity  
-temperate . . . . . 123 litres  
-tropical . . . . . 128 litres  
Pressure cap setting (min) . . . . . 69 kPa

### Fan

Type . . . . . engine driven  
Diameter  
-temperate . . . . . 1400 mm  
-tropical . . . . . 1530 mm  
Number of blades . . . . . 12  
Material . . . . . Aluminium  
Drive ratio  
-temperate . . . . . 1:1  
-tropical . . . . . 1:0,9

4012-46TWG2A - Tropical			
Maximum additional restriction (duct allowance) to cooling airflow, and resultant min airflow			
Description	°C	Pa	m³/sec
Ambient clearance: Inhibited coolant	50	N/A	N/A
Duct allowance	50	125	N/A
Minimum airflow	50	125	28



## Engine model: 4012-46TAG2A

### Fuel consumption

Note: All fuel consumption figures are based on assumed fuel density of 0.862.

4012-46TWG2A - Temperate		
Designation	Fuel consumption calculated on nett rated powers	
	1500 rev/min	
	g/kWh	litres/hr
Standby	212	287
Prime power	211	258
Baseload power	213	206
At 75% of Prime power	214	196
At 50% of Prime power	230	141

4012-46TWG2A - Tropical		
Designation	Fuel consumption calculated on nett rated powers	
	1500 rev/min	
	g/kWh	litres/hr
Standby	213	288
Prime power	212	259
Baseload power	214	207
At 75% of Prime power	216	196
At 50% of Prime power	233	143

### Electrical system

Alternator

-type ... insulated return  
 -voltage ... 24 volts  
 -output ... 40 amps

Starter

-type ... (axial) electric  
 -motor voltage ... 24 volts  
 -motor power ... 16,4 kW

Number of teeth on

-flywheel ... 156  
 -starter motor ... 12  
 Minimum cranking speed ... 120 rev/min

Starter solenoid (24V)

-pull in current @ -25 °C max. ... 30 amps  
 -hold in current @ -25 °C max ... 9 amps  
 Engine stop solenoid current ... 1,1 amps

### Engine mounting

Maximum static bending moment at rear face of block ... 1356 Nm  
 Maximum additional load applied to flywheel due to rotating components ... 850 kg

### Centre of gravity

Bare engine (wet) 4012-46TWG2A / 4012-46TWG3A

-forward of rear face of cylinder block ... 658 mm  
 -above crankshaft centre line ... 32 mm

ElectropaK (wet) - Temperate

-forward of rear face of cylinder block ... 960 mm  
 -above crankshaft centre line ... 32 mm

ElectropaK (wet) - Tropical

-forward of rear face of cylinder block ... 1286 mm  
 -above crankshaft centre line ... 32 mm

### Cold start recommendations

Temperature range	
Down to 0 °C (32 °F)	Oil: ... API CH4 15W40 Starter: ... 2 x 24 volts Battery: ... 4 x 12V 286 Ah Max breakaway current: ... 1600 amps Cranking current: ... 810 amps Aids: ... block heaters Min mean cranking speed: ... 120 rev/min

#### Notes:

- The battery capacity is defined by the 20 hour rate
- The oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater
- Breakaway current is dependant on battery capacity available. Cables should be capable of handling the transient current which may be up to double the steady cranking current.

### Lubrication system

Recommended multigrade oil viscosity (15W40) which adequately meets the specifications of API CH4. For further details refer to the engine OMM.

#### Lubricating oil capacity

Total system ... 177 litres  
 Sump maximum ... 157,5 litres  
 Sump minimum ... 115 litres  
 Oil temperature at normal operating conditions ... 95 °C  
 Oil temperature (in rail) - maximum continuous operation .. 105 °C

#### Lubricating oil pressure

minimum ... 340 kPa  
 At rated speed ... 400 kPa  
 Oil relief opens ... 400 kPa  
 Oil filter screen spacing ... 20 microns  
 Sump drain plug tapping size ... G1  
 Lubricating oil pump speed ... 1.4 x engine rev/min  
 Lubricating oil pump drive method ... engine driven  
 Shutdown switch - pressure setting (where fitted) 193 kPa (falling)

#### Normal operating angles

-front and rear ... 5°  
 -side tilt ... 10°

Oil consumption (prime power)		4012-46TWG2A	4012-46TWG3A
After running-in (typically after 250 hours)	g/kWhr	0,52	0,52
Oil flow rate from oil pump	l/s	6,0	6,0



### Alternator model: LSA50.2L8

#### SPECIALLY ADAPTED FOR APPLICATIONS

The LSA 50.2 alternator is designed to be suitable for typical generator set applications, such as: backup, base production, cogeneration, marine applications, rental, telecommunications, etc.

#### COMPLIANT WITH INTERNATIONAL STANDARDS

The LSA 50.2 alternator conforms to the main international standards and regulations:  
IEC 60034, NEMA MG 1.22, ISO 8528, CSA/UL on request, marine regulations, etc.  
It can be integrated into a CE marked generator.  
The LSA 50.2 is designed, manufactured and marketed in an ISO 9001 environment.

#### TOP OF THE RANGE ELECTRICAL PERFORMANCE

- Class H insulation.
- Standard 6-wire re-connectable winding, 2/3 pitch, type no. 6S.
- Voltage range 50 Hz : 380V - 400V - 415V - 440 V and 220V - 230V - 240V ,
- Voltage range 60 Hz : 380V - 416V - 440V - 480V and 220 V - 240 V.
- High efficiency and motor starting capacity.
- Other voltages are possible with optional adapted windings :
  - 50 Hz : 440 V (no. 7S), 500 V (no. 9S), 600 V (no. 22S or 23S), 690 V (no. 10S or 52S)
  - 60 Hz : 380 V and 416 V (no. 8S), 600 V (no. 9S).
- THD Total harmonic distortion < 3.5% (full load)..
- R 791 interference suppression conforming to standard EN 55011 group 1 class B standard for European zone (CE marking).

#### EXCITATION AND REGULATION SYSTEM SUITED TO THE APPLICATION

The LSA 50.2 can be supplied with AREP or PMG excitation system, according to the alternator specification.

Excitation system			Regulation options				
Volage regulator	AREP	PMG	T.I. Current transformer for paralleling	R 726 Mains paralleling	R 731 3 Phase sensing	R 734 3 Phase sensing for mains paralleling unbalanced	P Remote voltage potentiometer
R 450	Std	Option	√	√	√	√	√
D 510	Option	Option	√	included	included	contact factory	√

Voltage regulator accuracy +/- 0.5%. √ : possible mounting

#### PROTECTION SYSTEM SUITED TO THE ENVIRONMENT

- The LSA 50.2 is IP 23.
- Standard winding protection for clean environments with relative humidity ≤ 95 %, including indoor marine environments.
- Options: - Filters on air inlet : derating 5%.
  - Filters on air inlet and air outlet (IP 44) : derating 10%.
  - Winding protections for harsh environments and relative humidity greater than 95%.
  - Space heaters.
  - Thermal protection for winding.

#### REINFORCED MECHANICAL STRUCTURE USING FINITE ELEMENT MODELLING

- Compact and rigid assembly to better withstand generator vibrations.
- Steel frame.
- Cast iron flanges and shields.
- Twin-bearing and single-bearing versions designed to be suitable for engines on the market.
- Half-key balancing.
- Sealed for life ball bearings, regreasable bearings (optional).
- Standard direction of rotation : clockwise when looking at the drive end view (for anti-clockwise, derate the machine by 5%).

#### ACCESSIBLE TERMINAL BOX PROPORTIONED FOR OPTIONAL EQUIPMENT

- Easy access to the voltagage regulator and to the connections.
- Possible inclusion of accessories for paralleling, protection and measurement.
- Connection bars for winding reconnection.



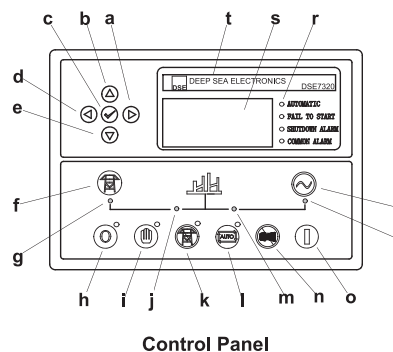
**WPS1500 / WPS1500S**

# Control System PLC-7420

PLC-7420 is an advanced control module based on micro-processor, containing all necessary functions for protection of the genset and the breaker control. It can monitor the mains supply, breaker control, and automatically start the engine when the mains is abnormal. Accurately measure various operational parameters and display all values and alarms information on the LCD. In addition, the control module can automatically shut down the engine and indicate the engine failure.

**FEATURES**

- Microprocessor control, with high stability and credibility
  - Monitoring and measuring operational parameters of the mains supply and genset
  - Indicating operation status, fault conditions, all parameters and alarms
  - Multiple protections; multiple parameters display, like pressure, temp. etc.
  - Manual, automatic and remote work mode selectable
  - Real time clock for time and date display, overall runtime display, 250 log entries
  - Overall power output display
  - Integral speed/frequency detecting, telling status of start, rated operation, overspeed etc.
  - Communication with PC via RS485 OR RS232 interface, using MODBUS protocol
- a Button (next page)
  - b Button (increase value / previous item)
  - c Button (accept)
  - d Button (previous page)
  - e Button (decrease value / next item)
  - f Button (transfer the load to the mains supply, when in Manual mode only)
  - g Mains supply available LED
  - h Stop / Reset button
  - i Manual button (Manual control mode)
  - j Mains supply on load LED
  - k Test button (Test mode) | l Auto button (Auto mode)
  - m Genset on load LED | n Mute/Lamp test button
  - o Start button (Manual) | p Genset available LED
  - q Button (transfer the load to the genset, when in Manual mode only)
  - r Alarm LED (4 alarm items)
  - s LCD display
  - t Control module name



**Control System function list**

	MODEL	PLC-8610	PLC-7420			
General accessory	AVR	●	●			
	Electronic Governing	●	×			
	Glow plug control	●	●			
	Cycle Cranking	●	●			
	(MODBUS) Networking	●	●			
	Fault History	●	●			
Operator interface	manual start/stop	●	●			
	Auto/remote start	●	●			
	Regular Test	●	●			
	Auto operation LED	●	●			
	Manual operation LED	●	●			
	Common Shutdown LED	●	●			
	Common warning LED	●	●			
	Fail to start LED	●	●			
	Emergency stop(local)	●	●			
	Alphanumeric screen	●	●			
Measurement and instrumentation	Engine	Oil pressure	●	●		
		Water Temperature	●	●		
		Engine Speed	●	●		
		Hours Run	●	●		
		Number of Starts	●	●		
		Battery Voltage	●	●		
	Alternator	Coolant Temperature	●	●		
		3Phase-L Voltage&Frequency	●	●		
		3phase Current	●	●		
		Frequency	●	●		
		kWh	●	●		
		Apparent Power	●	●		
		Active Power and Reactive Power	●	●		
		Power Factor	●	●		
Mains Expression	Per Phase kW, kVAr	●	●			
	Per Phase kVA	●	●			
	Phase Voltage	●	●			
	Output Power	●	●			
	Grid Line Voltage	●	●			
	Grid Phase Voltage	●	●			
Shutdown Protection and Indication	Engine	Low Fuel Level	●	●		
		High Fuel Level	○	○		
		Low Oil Pressure	●	●		
		High Water Temperature	●	●		
		Failure to Stop	●	●		
		Failure to Start	●	●		
	Alternator	Controllable start circles/times	●	●		
		Overspeed	●	●		
		Under&Over Voltage	●	●		
		Under&Over Frequency	●	●		
Threshold Warning Indication	Overcurrent	●	●			
	Earth Leakage	○	○			
	Reverse Power	●	×			
	Reverse kW/r	●	×			
	Low Oil Pressure	●	●			
	Low Water Temperature	○	○			
Paralleling Capability	Power Transfer Function	High Water Temperature	●	●		
		Low Water Level	●	●		
		Low/High Battery Voltage	●	●		
		Failure to Charge	●	●		
		Overcurrent	●	●		
		Overload	●	●		
	Environment	Genset Under/Over Voltage	●	●		
		Genset Under/Over Frequency	●	●		
		under/over Speed	●	●		
		High Engine Temperature	●	●		
Monitoring Function	Paralleling Capability	Earth Leakage	●	●		
		Synchroscope(Independent Bus)	●	×		
		Active and Reactive Power Control	●	×		
		Synchroscope(Shared Bus)	●	×		
		Synchronization Detector	●	×		
		Peak Lopping	○	×		
		Monitoring Function	Automatic Transfer	●	●	
			Hard Closed Transition	●	●	
			Soft Closed Transition	●	×	
			Gen/Mains Breaker	×	●	
Gen/Mains Breaker Status Protection	×		●			
Speed/Voltage Control	●		×			
Power Indication	●		●			
Fuel&Solenoid Valve Control	●		●			
Stator Control	●		●			
Preheating	○		○			
Monitoring Function	Paralleling Capability	Mains Transfer Switch (Standard)	●	●		
		Mains Transfer Switch (Emergency)	●	●		
		Operating Temperature (-40 °C -70 °C)	●	●		
		Ambient Temperature (-25 °C -45 °C)	●	●		
		Humidity ≤ 80%	●	●		
		Monitoring Function	Paralleling Capability	Grid Over/Under Voltage Control	●	●
				Grid Over/Under Frequency Control	●	●
				Remote Start Output(Load/No-load)	●	●
				Optional Relay Output	●	●
				Remote Telecom Control with All Functions	●	●
Engine Instrument Monitoring	●			●		
Alternator Output Instrument Monitoring	●			●		
Connection Point with All-around Setting For 6 Users	●			●		
3 Users Input Connection Point	●			●		
LCD Light Control of Low Light Operation Environment	●			●		
Monitoring Function	Paralleling Capability	Safe PIN Code	●	●		
		RS232/485 Interface	●	●		
		Language Selection	●	●		
		Multi-Language Function	●	●		
		● Standard ○ Optional × Impossible				



## Control System

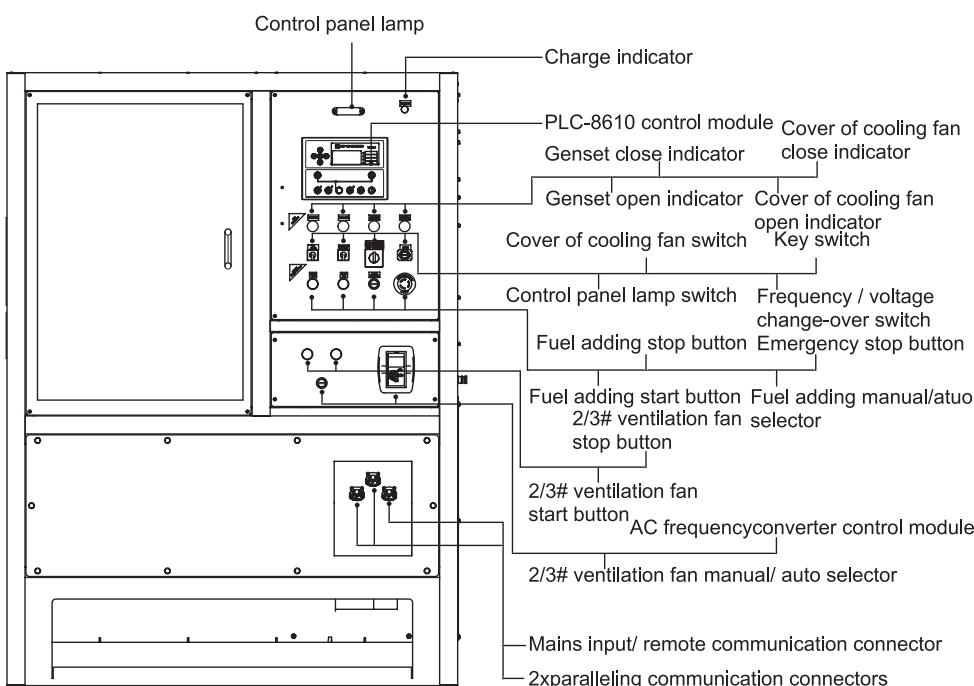
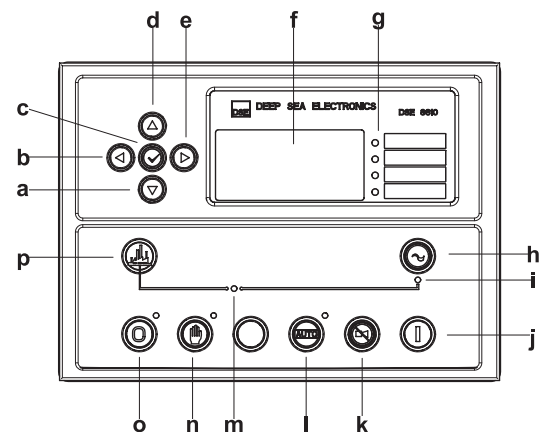
Digital, intelligent control system allows easier operation.

## PLC-8610 (Optional)

PLC-8610 is a microprocessor based control unit containing all necessary functions for protection of the genset and the breaker control. Furthermore, it contains all necessary three-phase measuring circuits and presents all values and alarms on the LCD display. The module has the function of load sharing which enables the module to share the active load (kW) equally when operating in parallel with other gensets. The load sharing is performed so each genset takes a portion of the load that is calculated in percent according to the nominal power.

### FEATURES

- ◆ Microprocessor control, with high stability and credibility
- ◆ Monitoring and measuring operational parameters of the genset
- ◆ Indicating operation status, fault conditions, all parameters and alarms
- ◆ Multiple protections; multiple parameters display, like pressure, temp. etc.
- ◆ Manual, automatic and remote work mode selectable
- ◆ RS232 & RS485 can be used at the same time
- ◆ Real time clock for time and date display, overall runtime display, 250 log entries



- a Decrease value next item
- b Previous page
- c Accept
- d Increase value previous item
- e Next page
- f LCD display
- g Four alarm LEDs
- h Close genset
- i Genset available LED
- j Manual start
- k Mute alarm / lamp test
- l Auto mode (with LED)
- m Genset breaker on LED
- n Manual mode (with LED)
- o Stop / reset (with LED)
- p Open genset



### Optional

Engine	Alternator	Generator Set	Fuel System	Canopy
<ul style="list-style-type: none"><li>• Water Jacket Preheater</li><li>• Oil Preheater</li></ul>	<ul style="list-style-type: none"><li>• Winding Temperature Measuring Instrument</li><li>• Alternator Preheater</li><li>• PMG</li><li>• Anti-damp and anti-corrosion treatment</li><li>• Anti-condensation heater</li></ul>	<ul style="list-style-type: none"><li>• Tools with the machine</li></ul>	<ul style="list-style-type: none"><li>• Low fuel level alarm</li><li>• Automatic fuel feeding system</li><li>• Fuel T-valves</li></ul>	
Lubricating System	Exhaust System	Cooling System	Control Panel	Voltages
<ul style="list-style-type: none"><li>• Oil with the machine</li></ul>	<ul style="list-style-type: none"><li>• Protection board from hotness</li></ul>	<ul style="list-style-type: none"><li>• Front heat protection</li><li>• Coolant (-30°C)</li></ul>	<ul style="list-style-type: none"><li>• Remote control panel</li><li>• PLC-8610</li><li>• PLC-7420</li><li>• ATS</li></ul>	<ul style="list-style-type: none"><li>• 415/240V</li><li>• 400/230V</li><li>• 380/220V</li><li>• 220/127V</li><li>• 200-115V</li></ul>

