

## 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
<b>WPS45/S</b>	45kVA/36kW	49.5kVA/39.6kW

Ratings at 0.8 power factor.

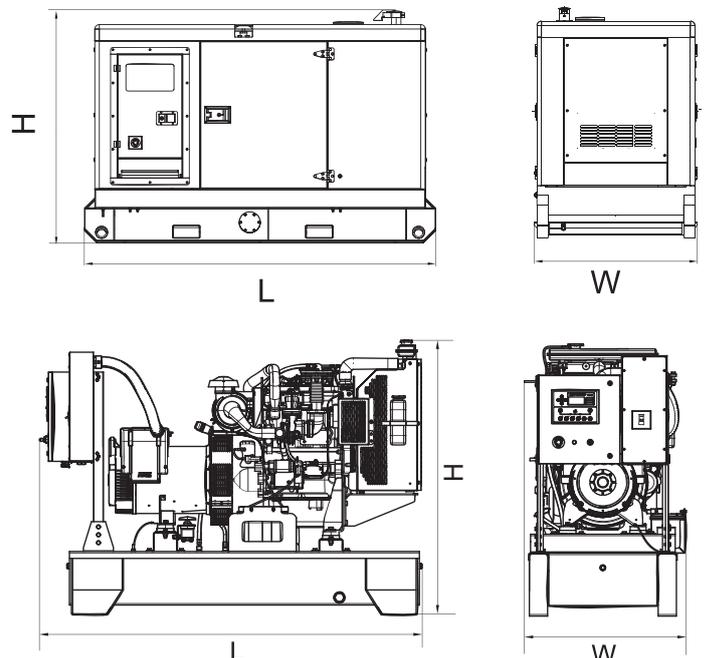
### Ratings and Performance Data

<b>Engine Make &amp; Model:</b>	1103A-33TG1	
<b>Alternator Model:</b>	ECO32-1L/4	
<b>Alternator Brand:</b>	MECC	
<b>Control System:</b>	PLC-920 / PLC-7420	
<b>Noise Level@7m:</b>	N/A	
<b>Circuit Breaker Type:</b>	/	
<b>Frequency &amp; Phase:</b>	50Hz & 3PH	
<b>Engine Speed: RPM</b>	1500	
<b>Structure Type:</b>	<b>WPS45</b>	B
	<b>WPS45S</b>	R
<b>Fuel Tank Capacity: L</b>	<b>WPS45</b>	220
	<b>WPS45S</b>	180
<b>Fuel Consumption: l/hr (100% Load)</b>	<b>Prime</b>	/
	<b>Standby</b>	/

### Dimensions and Weights

Generating Set Model	Length (L) mm (in)	Width (W) mm (in)	Height (H) mm (in)	Dry kg (lb)	Wet kg (lb)
<b>WPS45</b>	1911	802	1384	875	/
<b>WPS45S</b>	2338	1080	1561	1376	/

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: 1103A-33TG1**

**Cooling system**

**Radiator**

-face area... 0.276 m<sup>2</sup> (2.97 ft<sup>2</sup>)  
 -rows and materials... single row aluminium  
 -matrix density and material... Aluminium 12.5 fins/inch  
 -width of matrix... 526 mm (20.7 in)  
 -height of matrix... 524 mm (20.6 in)  
 -pressure cap setting... 107 kPa

**Fan**

-diameter... 457 mm (18 in)  
 -drive ratio... 0.85 : 1  
 -number of blades... 7  
 -material... Composite  
 -type... Pusher

**Coolant**

Total system capacity  
 -with radiator... 10.2 l (21.5 pt)  
 -without radiator... 4.4 l (9.2 pt)  
 Maximum top tank temperature... 110 °C (230 °F)  
 Thermostat operating range... 82 - 93 °C (180 - 199 °F)  
 Recommended coolant: 50 % ethylene glycol with a corrosion inhibitor (BS 658 : 1992 or MOD AL39) and 50% clean fresh water.

**Electrical system**

Type... Negative ground  
 Alternator voltage... 12 V  
 Alternator output... 65 amps  
 Starter motor voltage... 12 V  
 Starter motor power... 3 kW  
 Number of teeth on flywheel... 126  
 Pull in current of starter motor solenoid... 60 amps  
 Hold in current of starter motor solenoid... 15 amps  
 Engine stop solenoid... 12 V  
 Stop solenoid (minimum)  
 -pull in current... 10 amps  
 -hold in current... 10 amps

**Cold start recommendations**

Minimum cranking speed... 105 rev/min

**Starter specification**

Starter motor type	Minimum starting temperature	Lubricating oil viscosity SAE / battery type - values in CCA			
		15W/40	10W/40	5W/40	5W/30
12 volt 3.0 kW	°C (°F)				
	-10 (14)	1 x 660			
	-15 (5) *		1 x 660		
	-20 (-4) *			1 x 660	
	-25 (-13) *				2 x 570

\* - Glow plug start aid fitted.

**Note:** CCA - Cold Cracking Amps to SAEJ537.

**Exhaust system**

Maximum back pressure  
 -1500 rev/min... 10 kPa  
 -1800 rev/min... 15 kPa  
 Exhaust outlet size... 56 mm (2.2 in)

**Fuel System**

Type of injection... Direct  
 Fuel injection pump... Rotary  
 Fuel atomiser... Multi-hole  
 Nozzle opening pressure... 29,0 MPa (290 bar)

**Fuel lift pump**

Type... Electrical  
 -flow/hour... 120 - 150 l/h (211 - 264 pt/m)  
 -pressure... 30 - 75 kPa (4.4 - 10.9 psi)  
 Maximum suction head:  
 -1500 rev/min... 20 kPa

**Governor type**

Electronic governor (optional)... Woodward LCG2  
 Mechanical and electronic governor speed control to... ISO 8528, G2

**Fuel specification**

Fuel Specification	European RF75-T-96 / DIN EN590 / BS2869 class A2
Density (kg/l @ 15 °C)	0,835 - 0,845
Viscosity (mm <sup>2</sup> /s @ 40 °C)	2,5 - 3,5
Sulphur content (%)	0,1 - 0,2
Cetane number	45 - 50

**Fuel consumption litres/hour (UK gals/hr)**

Speed	Power rating				
	110%	100%	75%	50%	25%
1500	12,0 (2.6)	10,7 (2.3)	8,2 (1.8)	5,7 (1.2)	3,4 (0.7)
1800	14,3 (3.1)	12,9 (2.8)	9,9 (2.1)	7,1 (1.5)	4,3 (0.9)

**Induction system**

**Maximum air intake restriction**

-clean filter... 5 kPa  
 -dirty filter... 8 kPa  
 -air filter type... Dry

**Lubrication system**

**Lubricating oil capacity**

Total system... 8,3 l (17.5 pt)  
 Sump minimum... 6,2 l (13.1 pt)  
 Sump maximum... 7.8 l (16.4 pt)

**Maximum engine operating angles:**

-front up, front down, right side or left side... 25°

**Lubricating oil pressure**

-relief valve opens... 415 - 470 kPa  
 -at maximum no-load speed... 276 - 414 kPa  
 Max continuous oil temperature... 125 °C (257 °F)  
 Oil consumption at full load as a % of fuel consumption... 0.15%

**Alternator model: EC032-1L/4**

Electrical Characteristics										
Frequency	Hz		50				60			
Voltage (series star)	V		380	400	415	440	415	440	460	480
Rated power class H	kVA		50	50	50	40	58	60	60	60
	kW		40	40	40	32,0	46,4	48	48	48
Rated power class F	kVA		48	48	48	38	56	58	58	58
	kW		38,4	38,4	38,4	30,4	44,8	46,4	46,4	46,4
Regulation with	DSR		±1 % with any power factor and speed variations between -5% +30%							
Insulation class			H							
Execution			Brushless							
Stator winding			12 ends							
Rotor			with damping cage							
Efficiencies class H	4/4	%	89	89,1	88,8	88,6	91,1	91,6	91,7	91,8
(see graph. for details)	3/4	%	89,2	89,5	89,4	89,1	91,5	91,7	91,9	92,1
	2/4	%	87,5	87,6	87,6	87,4	88,8	88,9	89	89,1
	1/4	%	85,5	85,3	85,1	84,6	85,4	85	85,5	85,4
Reactances (f. l.cl. F)	Xd		271,5	245	227,6	162,0	316,8	291,6	266,8	245
	Xd'		14,96	13,5	12,54	8,93	17,46	16,07	14,70	13,5
	Xd''		8,20	7,4	6,87	4,89	9,57	8,81	8,06	7,4
	Xq		113,0	102	94,8	67,4	131,9	121,4	111,1	102
	Xq'		113,0	102	94,8	67,4	131,9	121,4	111,1	102
	Xq''		34,9	31,5	29,3	20,8	40,7	37,5	34,3	31,5
	$\sigma$		23,27	21	19,51	13,88	27,16	24,99	22,87	21
	X <sub>0</sub>		3,21	2,9	2,69	1,92	3,75	3,45	3,16	2,9
Short Circuit Ratio	Kcc		0,62	0,71	0,73	1,30	0,40	0,48	0,62	0,71
Time Constants	Td'		0,059							
	Td''		0,013							
	Tdo'		1,40							
	$\alpha$		0,035							
Short Circuit Current Capacity	%		>300				>350			
Excitation at no load	Amp.		0,6	0,7	0,8	1,2	0,3	0,4	0,5	0,6
Excitation at full load	Amp.		2,2	2,4	2,3	2,7	2,1	1,9	2,1	2,3
Overload (long-term)	%		1 hour in a 6 hours period 110% rated load							
Overload per 20 sec.	%		300							
Stator Winding Resistance (20°C)	Ω		0,061							
Rotor Winding Resistance (20°C)	Ω		2,473							
Exciter Resistance (20 °C)	Ω		Rotor : 0,442				Stator : 11,35			
Heat dissipation at f.l.cl.H	W		4944	4893	5045	4117	4533	4402	4345	4288
Telephone Interference			THF < 2%				TIF < 45			
Radio interference			EN61000-6-3, EN61000-6-1. For others standards apply to factory							
Waveform Distors.(THD) at f. load	LL/LN %		3,8 / 3,6							
Waveform Distors.(THD) at no load	LL/LN %		3,3 / 3,2							

Mechanical characteristics										
Protection	IP 21 (other protection on request)									
DE bearing	6312-2RS									
NDE bearing	6309-2RS									
Weight of wound stator assembly	kg	78								
Weight of wound rotor assembly	kg	53								
Weight of complete generator	kg	248								
Maximun overspeed	rpm	2250								
Unbalanced magnetic pull at f.l.cl.F	kN/mm	4,1								

WPS45/ WPS45S

# Control System PLC-920 (Optional)

PowerLink PLC-920 generator controllers integrating digital, intelligent and network techniques are used as the automatic control systems for diesel generators. It can carry out functions including pre-alarm, warning & electrical trip, fail monitoring and controls etc.

## FEATURES

- Parameter configuration via RS-232 serial communication;
- Log last 50 events & alarm information with measured values;
- Statistics records;
- Remote start/stop;
- Speed sensing from alternator voltage or magnetic pickup;
- Configurable 3 inputs and 6 outputs;
- ECU powers, ECU stop, STOP or fuel solenoid selection;
- Automatic transfer switching control and engine control;
- Adjustable start, load and stop timers.



## SPECIFICATION

- Dimensions: 111mm\*81mm\*61mm
- Protection: IP65 at front panel
- Operating temperature: -20 °C to 70 °C
- Max. Operating current is 360mA
- Sender measurement: 0 to 1300 ohm
- Panel cut-out: 81mm\*70mm
- Weight: approximately 0.3kg
- DC battery supply voltage: 8 to 32Vdc
- CT secondary: 5A
- Accuracy: 1%FS, resolution: 1 ohm

## FUNCTION

- Pre-Alarm
- Engine temperature
- Oil pressure
- Over/under voltage
- Over/under frequency
- Over/under speed
- Warning & Electrical trip
- Over current
- Short circuit
- Error
- Over/under speed
- Speed loss
- Battery low
- Battery high
- Maintenance
- Over current
- Short circuit
- Engine stop
- Can bus
- Charge alternator
- Fail monitoring
- Emergency stop
- Multiple engage fail
- Failed to start
- Low oil pressure
- High temperature
- Speed failure
- Voltage
- Charging fail
- Shutdown
- Warning
- Controls
- Fuel and stop solenoid
- ECU power and stop
- Starter motor
- Automatic generator start
- Preheat
- External alarm horn
- Engine cooling
- Idle mode

## Control System function list

	MODEL	PLC-920	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	Remote start input active LED	×	●	
	Alarm reset	●	●	
	Engine	Oil pressure	●	●
		Water Temperature	●	●
		Engine Speed	●	●
		Hours Run	●	●
		Number of Starts	●	●
	Alternator	Battery Voltage	●	●
		Coolant Temperature	●	●
		3Phase-L Voltage&Frequency	●	●
		3phase Current	●	●
		Frequency	●	●
		kWh	●	●
		Apparent Power	●	●
		Active Power and Reactive Power	●	●
Power Factor		●	●	
Per PhasekW, kVar		●	●	
Per Phase kVA	●	●		
Mains Expression	Phase Voltage	●	●	
	Output Power	×	●	
	Grid Line Voltage	×	●	
	Grid Phase Voltage	×	●	
Shutdown Protection and Indication	Grid Frequency	×	●	
	Engine	Low Fuel Level	●	●
		High Fuel Level	×	○
		Low Oil Pressure	●	●
		High Water Temperature	●	●
		Failure to Stop	●	●
	Alternator	Failure to Start	●	●
		Controlable start circles/times	×	●
		Overspeed	●	●
		Under&Over Voltage	●	●
Under&Over Frequency		●	●	
Threshold Warning/Indication	Overcurrent	●	●	
	Earth Leakage	○	○	
	Reverse Power	×	×	
	Reverse kW	×	×	
	Low Oil Pressure	●	●	
	Low Water Temperature	○	○	
	High Water Temperature	●	●	
	Low Water Level	●	●	
	Low/High Battery Voltage	●	●	
	Failure to Charge	●	●	
Paralleling Capability	Overcurrent	●	●	
	Overload	●	●	
	Genset Under/Over Voltage	●	●	
	Genset Under/Over Frequency	●	●	
	under/over Speed	●	●	
	High Engine Temperature	●	●	
	Earth Leakage	○	○	
	Synchroscope(Independent Bus)	×	×	
	Active and Reactive Power Control	×	×	
	Synchroscope(Shared Bus)	×	×	
Power Transfer Function	Synchronization Detector	×	×	
	Peak Lopping	×	×	
	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	●	●	
Environment	Starter Control	●	●	
	Preheating	○	○	
	Mains Transfer Switch (Standard)	×	●	
	Mains Transfer Switch (Emergency)	×	●	
	Operating Temperature (-40 °C-70 °C)	●	●	
	Ambient Temperature (-25 °C-45 °C)	●	●	
	Humidity ≤80%	●	●	
	Monitoring Function	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 4 Users		●	●	
3 Users Input Connection Point		●	●	
LCD Light Control of Low Light Operation Environment		●	●	
Monitoring Function	Safe PIN Code	●	●	
	RS232/485 Interface	×	●	
	Language Selection	●	●	
	Multi-Language Function	●	●	

# Control System

**Digital, intelligent control system allows easier operation.**

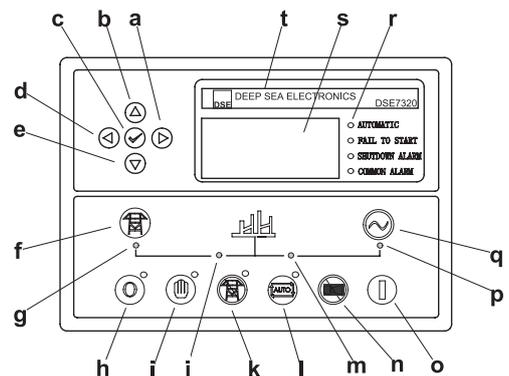
## PLC-7420

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



**Control Panel**

- 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

## 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>	<ul style="list-style-type: none"> <li>• Trailer</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-920</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>

The following lists are optional by the needs of customers.

### Engine Model: 1103A-33TG1

Minor Repair / 1000 hrs optional				
No.	Part Name	Part No.	Qty	Remark
1	Fuel Filter	26560163	6	
2	Oil Filter	2654403	6	
3	Air Filter	26510337	5	
4	BELT	2614B655	1	
5	SEAL - ROCKER BOX COVER	3681A057	1	
6	GASKET - CYLINDER HEAD	3681E049	1	
7	THERMOSTAT	4133L507	1	
8	FRONT OIL SEAL	2418F437	1	
9	SEAL - REAR END OIL	2418F704	1	

