

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
- IP44 (soundproof sets), IP54 (control system)
- Water jacket preheater, oil heater and double air cleaner, etc. are available.



Output Ratings		
Generating Set Model	Prime	Standby
WCS110/S	100kVA/80kW	110kVA/88kW

Ratings at 0.8 power factor.

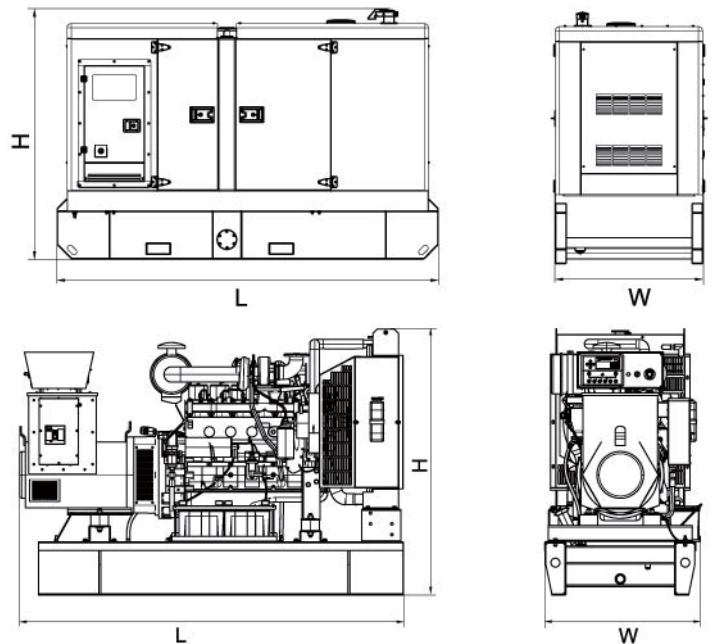
Ratings and Performance Data

Engine Make & Model:	QSB5-G5	
Alternator Model:	UCI274C	
Alternator Brand:	STAMFORD	
Control System:	PLC-920 / PLC-7420	
Noise Level@7m:	63.6-74.5	
Frequency & Phase:	50Hz & 3PH	
Engine Speed: RPM	1500	
Structure Type:	WCS110	A
	WCS110S	R
Fuel Tank Capacity: L	WCS110	305
	WCS110S	250
Fuel Consumption: l/h	at 100% load	23.8
	at 75% load	19

Dimensions and Weights

Generating Set Model	Length (L) mm (in)	Width (W) mm (in)	Height (H) mm (in)	Dry kg (lb)
WCS110	2060	850	1610	1280
WCS110S	3150	1150	1700	1960

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/EUCU: 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: QSB5-G5

GENERAL ENGINE DATA

Type	4-Cycle; In-line; 4-Cylinder Diesel
Aspiration	Turbocharged and Charge Air Cooled
Bore x Stroke	4.21 x 4.88 (107 x 124)
Displacement.....	272 (4.5)
Compression Ratio.....	17.3 : 1
Dry Weight (Approximate), Fan to Flywheel Engine.....	— lb (kg) 776 (352)
Wet Weight (Approximate), Fan to Flywheel Engine.....	— lb (kg) 818 (371)
Moment of Inertia of Rotating Components	
• with FW 9857 Flywheel	— lb _m • ft ² (kg • m ²) 16.9 (0.71)
• with FW 9878 Flywheel.....	— lb _m • ft ² (kg • m ²) 29 (1.22)
Center of Gravity from Rear Face of Block.....	— in (mm) 9.4 (239)
Center of Gravity Above Crankshaft Centerline.....	— in (mm) 6.4 (163)
Maximum Static Loading at Rear Main Bearing.....	— lb (kg) N.A. (N.A.)

ENGINE MOUNTING

Maximum Bending Moment at Rear Face of Block.....	— lb • ft (N • m) 1000 (1356)
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EXHAUST SYSTEM

Maximum Back Pressure.....	— in Hg (kPa) 3 (10)
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AIR INDUCTION SYSTEM

Maximum Intake Air Restriction	
• with Dirty Filter Element.....	— in H ₂ O (kPa) 25 (6.2)
• with Clean Filter Element.....	— in H ₂ O (kPa) 15 (3.7)

COOLING SYSTEM

Jacket Water Circuit Requirements

Coolant Capacity — Engine Only	— US gal (litre) 2.25 (8.5)
Maximum Static Head of Coolant Above Engine Crank Centerline	— ft (m) 60 (18.3)
Standard Thermostat (Modulating) Range	— °F (°C) 175-203 (79-95)
Minimum Pressure Cap.....	— psi (kPa) 15 (103)
Maximum Top Tank Temperature for Standby / Prime Power	— °F (°C) 233/225 (112/107)
Maximum Coolant Friction Head External to Engine	— psi (kPa) 5 (35)

Charge Air Cooler Requirements

Maximum Temp. Rise Between Engine Air Intake and Intake Manifold - 1500/1800 rpm	— °F (°C) 45 (25)
Maximum Air Pressure Drop from Turbo Air outlet to Intake Manifold - 1500/1800 rpm	— in Hg (kPa) 2.5/4 (8.5/13.5)
Maximum Intake Manifold Temperature @ 77 °F (25 °C) ambient - 1500/1800 rpm	— °F (°C) 122 (50)
Maximum Intake Manifold Temperature for engine protection (Shut Down Threshold)	— °F (°C) 210 (99)

LUBRICATION SYSTEM

Oil Pressure @ Idle Speed.....	— psi (kPa) 10 (69)
@ Governed Speed	— psi (kPa) 40-60 (276-414)
Maximum Oil Temperature.....	— °F (°C) 280 (138)
Oil Capacity with OP 9458 Oil Pan : Low - High.....	— US gal (litre) 2.4-2.9 (9-11)
Total System Capacity (Including Filter)	— US gal (litre) 3.2 (12.2)

Engine model: QSB5-G5

FUEL SYSTEM

Type Injection System	Bosch HPCR
Maximum Restriction at Lift Pump(clean/dirty filter)..... — in Hg (kPa)	5/10 (17/34)
Maximum Allowable Head on Injector Return Line (Consisting of Friction Head and Static Head) — in Hg (kPa)	6 (20)
Maximum Fuel Flow to Injector Pump	35 (133)
Maximum Return Fuel Flow	33 (125)
Maximum Fuel Inlet Temperature	160 (71)

ELECTRICAL SYSTEM

Cranking Motor (Heavy Duty, Positive Engagement)	— volt	12	24
Battery Charging System, Negative Ground	— ampere	100	70
Maximum Allowable Resistance of Cranking Circuit	— ohm	0.001	0.002
Minimum Recommended Battery Capacity			
• Cold Soak @ 0 °F to 32 °F (-18 °C to 0 °C)	— 0°F CCA	1000	(500)

COLD START CAPABILITY

Minimum Ambient Temperature for NFPA 110 Cold Start (90 degree F Coolant Temperature)	— °F (°C)	32	(0)
Minimum Ambient Temperature for Unaided Cold Start	— °F (°C)	10	(-12)

PERFORMANCE DATA

- All data is based on:
- Engine operating with fuel system, water pump, lubricating oil pump, air cleaner and exhaust silencer; not included are battery charging alternator, fan, and optional driven components.
 - Engine operating with fuel corresponding to grade No. 2-D per ASTM D975.
 - ISO 3046, Part 1, Standard Reference Conditions of:

Barometric Pressure	: 100 kPa (29.53 in Hg)	Air Temperature	: 25 °C (77 °F)
Altitude	: 110 m (361 ft)	Relative Humidity	: 30%

Steady State Stability Band at Any Constant Load	— %	+/- 0.25
Estimated Free Field Sound Pressure Level of a Typical Generator Set;		
Excludes Exhaust Noise; at Rated Load and 7.5 m (24.6 ft); @1800 rpm	— dBA	88
Exhaust Noise at 1 m Horizontal from Centerline of Exhaust Pipe Outlet Upwards at 45 °	— dBA	109

Governed Engine Speed	rpm
Engine Idle Speed	rpm
Gross Engine Power Output.....	hp (kW _m)
Brake Mean Effective Pressure.....	psi (kPa)
Piston Speed	ft/min (m/s)
Friction Horsepower	hp (kW _m)
Engine Water Flow at Stated Friction Head External to Engine:	
• 2.5 psi Friction Head.....	US gpm (litre/s)
• Maximum Friction Head	US gpm (litre/s)

	STANDBY POWER		PRIME POWER	
	60 hz	50 hz	60 hz	50 hz
Governed Engine Speed	1800	1500	1800	1500
Engine Idle Speed	700 - 900	700 - 900	700 - 900	700 - 900
Gross Engine Power Output.....	176 (131)	151 (113)	152 (113)	130 (97)
Brake Mean Effective Pressure.....	285 (1964)	293 (2022)	246 (1696)	252 (1740)
Piston Speed	1464 (7.4)	1220 (6.2)	1464 (7.4)	1220 (6.2)
Friction Horsepower	17 (13)	12 (9)	17 (13)	12 (9)
Engine Water Flow at Stated Friction Head External to Engine:				
• 2.5 psi Friction Head.....	43 (2.8)	34 (2.2)	43 (2.8)	34 (2.2)
• Maximum Friction Head	39 (2.5)	30 (1.9)	39 (2.5)	30 (1.9)
Intake Air Flow	361 (171)	304 (144)	354 (167)	289 (137)
Exhaust Gas Temperature	913 (490)	890 (477)	808 (431)	834 (446)
Exhaust Gas Flow	878 (415)	727 (344)	790 (373)	661 (312)
Air to Fuel Ratio	24.3 : 1	24.1 : 1	27.6 : 1	26.3 : 1
Radiated Heat to Ambient	773 (14)	657 (12)	666 (12)	572 (11)
Heat Rejection to Jacket Coolant.....	3003 (53)	2786 (49)	2674 (47)	2586 (46)
Heat Rejection to Exhaust	6335 (112)	5064 (89)	5217 (92)	4315 (76)
Heat Rejected to Fuel*	20 (1)	18 (1)	18 (1)	15 (1)
Heat Rejected to Aftercooler.....	1702 (30)	1452 (26)	1626 (29)	1293 (23)
Charge Air Flow	26 (12)	22 (10)	25 (12)	21 (10)
Turbocharger Compressor Outlet Pressure	32 (223)	32 (218)	31 (211)	29 (198)
Turbocharger Compressor Outlet Temperature.....	398 (204)	398 (204)	381 (194)	374 (190)

Engine Data

Intake Air Flow	cfm (litre/s)
Exhaust Gas Temperature	°F (°C)
Exhaust Gas Flow	cfm (litre/s)
Air to Fuel Ratio	air : fuel
Radiated Heat to Ambient	BTU/min (kW)
Heat Rejection to Jacket Coolant.....	BTU/min (kW)
Heat Rejection to Exhaust	BTU/min (kW)
Heat Rejected to Fuel*	BTU/min (kW)
Heat Rejected to Aftercooler.....	BTU/min (kW)
Charge Air Flow	lb/min (kg/min)
Turbocharger Compressor Outlet Pressure	psi (kPa)
Turbocharger Compressor Outlet Temperature.....	°F (°C)

* This is the maximum heat rejection to fuel.

N.A. - Not Available
 N/A - Not Applicable to this Engine
 TBD - To Be Determined

Alternator model: UC1274C

CONTROL SYSTEM	SEPARATELY EXCITED BY P.M.G.							
A.V.R.	MX321	MX341						
VOLTAGE REGULATION	± 0.5 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT	REFER TO SHORT CIRCUIT DECREMENT CURVES (page 7)							
CONTROL SYSTEM	SELF EXCITED							
A.V.R.	SX460	AS440						
VOLTAGE REGULATION	± 1.0 %	± 1.0 %	With 4% ENGINE GOVERNING					
SUSTAINED SHORT CIRCUIT	SERIES 4 CONTROL DOES NOT SUSTAIN A SHORT CIRCUIT CURRENT							
INSULATION SYSTEM	CLASS H							
PROTECTION	IP23							
RATED POWER FACTOR	0.8							
STATOR WINDING	DOUBLE LAYER CONCENTRIC							
WINDING PITCH	TWO THIRDS							
WINDING LEADS	12							
STATOR WDG. RESISTANCE	0.059 Ohms PER PHASE AT 22°C SERIES STAR CONNECTED							
ROTOR WDG. RESISTANCE	1.12 Ohms at 22°C							
EXCITER STATOR RESISTANCE	20 Ohms at 22°C							
EXCITER ROTOR RESISTANCE	0.091 Ohms PER PHASE AT 22°C							
R.F.I. SUPPRESSION	BS EN 61000-6-2 & BS EN 61000-6-4, VDE 0875G, VDE 0875N. refer to factory for others							
WAVEFORM DISTORTION	NO LOAD < 1.5% NON-DISTORTING BALANCED LINEAR LOAD < 5.0%							
MAXIMUM OVERSPEED	2250 Rev/Min							
BEARING DRIVE END	BALL. 6315-2RS (ISO)							
BEARING NON-DRIVE END	BALL. 6310-2RS (ISO)							
	1 BEARING				2 BEARING			
WEIGHT COMP. GENERATOR	406 kg				420 kg			
WEIGHT WOUND STATOR	131 kg				131 kg			
WEIGHT WOUND ROTOR	133.78 kg				122.82 kg			
WR ² INERTIA	1.0288 kgm ²				0.9781 kgm ²			
SHIPPING WEIGHTS in a crate	439 kg				452 kg			
PACKING CRATE SIZE	105 x 67 x 103(cm)				105 x 67 x 103(cm)			
	50 Hz				60 Hz			
TELEPHONE INTERFERENCE	THF<2%				TIF<50			
COOLING AIR	0.514 m ³ /sec 1090 cfm				0.617 m ³ /sec 1308 cfm			
VOLTAGE SERIES STAR	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
VOLTAGE PARALLEL STAR	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
VOLTAGE SERIES DELTA	220/110	230/115	240/120	254/127	240/120	254/127	266/133	277/138
KVA BASE RATING FOR REACTANCE VALUES	100	100	100	N/A	112.5	117.5	117.5	125
X _d DIR. AXIS SYNCHRONOUS	2.45	2.21	2.05	-	2.76	2.58	2.36	2.30
X' _d DIR. AXIS TRANSIENT	0.20	0.18	0.17	-	0.24	0.22	0.21	0.20
X'' _d DIR. AXIS SUBTRANSIENT	0.14	0.13	0.12	-	0.16	0.15	0.14	0.13
X _q QUAD. AXIS REACTANCE	1.59	1.43	1.33	-	1.58	1.48	1.35	1.32
X'' _q QUAD. AXIS SUBTRANSIENT	0.18	0.16	0.15	-	0.23	0.21	0.20	0.19
X _L LEAKAGE REACTANCE	0.07	0.06	0.06	-	0.08	0.07	0.07	0.07
X ₂ NEGATIVE SEQUENCE	0.16	0.14	0.13	-	0.19	0.18	0.16	0.16
X ₀ ZERO SEQUENCE	0.10	0.09	0.08	-	0.12	0.11	0.10	0.10

WCS110 / WCS110S

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.

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 voltage
- Battery high voltage
- Maintenance
- Over current
- Short circuit
- Engine stop
- CAN bus
- Charge alternator

Controls

- Fuel and stop solenoid
- ECU power and stop
- Starter motor
- Automatic generator start
- Preheat
- External alarm horn
- Engine cooling
- Idle mode

Fail monitoring

- Emergency stop
- Multiple engage fail
- Failed to start
- Low oil pressure
- High temperature
- Speed failure
- Voltage
- Charging fail
- Shutdown
- Warning



FEATURES

- Largest back-lit icon display in its class
- Extremely efficient power save mode
- 3 configurable analogue/digital inputs
- Configurable staged loading outputs
- 15 events log
- LCD alarm indication
- Configurable remote start input
- Power factor measurement for 3 phases
- 3 phase Load current measurement
- 3 phase alternator voltage measurement
- Configurable 4 inputs and 8 outputs
- Engine run-time scheduler
- Engine hours counter
- Automatic start control
- CAN and alternator speed sensing in one variant
- Active, Reactive, Apparent power measurement
- Fully configuration via the fascia or PC using USB communication
- Motoring Engine Speed, Coolant Temperature, Oil Pressure and Fuel Level

SPCIFICATION

- Dimensions: 140mm*113mm*43mm
- Panel cut-out: 118mm*92mm
- Protection: IP65 at front panel
- Weight: approximately 0.16kg
- Operating temperature: -30 °C to 70 °C
- DC battery supply voltage: 8 to 35V
- Max. operating current: 85mA at 12V
96mA at 24V
- CT secondary: 5A
- Flexible sensor measurement:
Full scale: 480ohm;
Accuracy: ±2%FS; Resolution: 1%

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

Control System

Digital, intelligent control system allows easier operation.

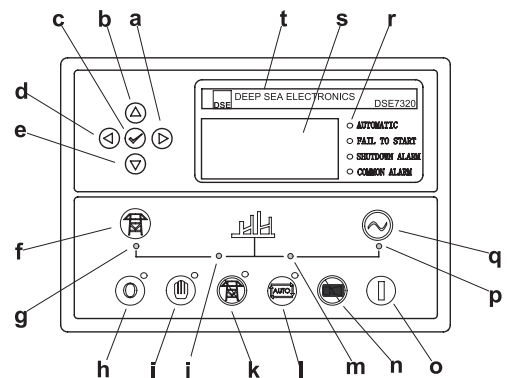
PLC-7420

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"> • Water Jacket Preheater • Oil Preheater 	<ul style="list-style-type: none"> • Winding Temperature Measuring Instrument • Alternator Preheater • PMG • Anti-damp and anti-corrosion treatment • Anti-condensation heater 	<ul style="list-style-type: none"> • Tools with the machine 	<ul style="list-style-type: none"> • Low fuel level alarm • Automatic fuel feeding system • Fuel T-valves 	<ul style="list-style-type: none"> • Trailer
Lubricating System	Exhaust System	Cooling System	Control Panel	Voltages
<ul style="list-style-type: none"> • Oil with the machine 	<ul style="list-style-type: none"> • Protection board from hotness 	<ul style="list-style-type: none"> • Front heat protection • Coolant (-30°C) 	<ul style="list-style-type: none"> • Remote control panel • PLC-920 • PLC-7420 • ATS 	<ul style="list-style-type: none"> • 415/240V • 400/230V • 380/220V • 220/127V • 200-115V

