JCB ENERGY ELECTRIC POWER INDUSTRY

JOENERGY

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MADRID / SPAIN





JCN 18 & 22

231 / 400 V – 50 Hz & 277 / 480 V – 60 Hz





GENERATOR GENERAL INFORMATION

GENERATOR	FREQUENCY	VOLTAGE	POWER FACTOR	SPEED	DIESEL	DIESEL ENGINE		ALTERNATOR		TYPE OF G	GENEI	GENERATOR OUTPUT		
Model	Hz	V	Cos Q	Rpm	Brand	Model	Series	Brand	Model	Series	Operation	kVA	kW	A
JCN 18	50	231/400	0.8	1500				U U U			Standby Prime Continuous	18,0 16,4	14,4 13,1	26,0 23,6
JCN 22	60	277/480	0.8	1800	JCN	JCN E22C	E22C EII	ENERGY	JCB	160L	Standby Prime	11,5 22,0 20,0	9,2 17,6 16,0	16,6 31,8 28,9
								×.			Continuous	14,0	11,2	20,2
 Diesel Engines with Advanced Technology and Quality Alternators with Advanced Technology and Quality Low Exhaust Emission Control Panel Suitable for Flexible Application 						• Fue • Lov	el Filter w v Fuel Co	vith Wate	er and Pai on, Low C	ticle Sep Dil Consu]

Patented Compact Designed and Sound proof Canopy
Low Operating Cost, Suitable for Heavy-Duty
Durability, Low Noise Level
Wide Range of Affordable Spare Parts
High Quality and Reliable Technology
Half Century Experience in Generator Manufacturing

STAND BY POWER RATING – (ESP):

ESP is applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. Under no condition is an engine allowed to operate in parallel with the public utility at the Stand by Power rating. This rating should be applied where reliable utility power is available. A Stand By rated engine should be sized for a maximum of an 70% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Stand by Power rating. Stand By ratings should never be applied except in true emergency power outages. Negotiated power outages contracted with a utility company are not considered an emergency. PRIME POWER RATING – (PRP):

Applicable for supplying electric power in lieu of commercially purchased power. Prime Power applications must be in the form of one of the following two categories:

UNLIMITED TIME RUNNING PRIME POWER (ULTP):

PRP (Prime Power) is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not exceed 500 hours per year. A 10% overload capability is available for a period of 1 hour within a 12-hour period of operation. Total operating time at the 10% overload power shall not exceed 25 hours.

LIMITED TIME RUNNING PRIME POWER (LTP):

LTP (Limited Time Prime Power) is available for a limited number of hours in a no variable load application. It is intended for use in situations where power outages are contracted, such as in utility power curtailment. Engines may be operated in parallel to the public utility up to 750 hours per year at power levels never to exceed the Prime Power rating. The customer should be aware, however, that the life of any engine will be reduced by this constant high load operation. Any operation

CONTINUOUS POWER RATING (COP):

COP is the power that the engine can continue to use under the prescribed speed and the specified environment condition in the normal maintenance period stipulated in the manufacturing plant. And Continuous Power is applicable for supplying utility power at a constant 100% load for an unlimited number of hours per year. No overload capability is available for this rating.



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PAY ATTENTION TO THE POINTS BELOW IN PICKING AND USING THE GENERATOR

* Generators can work on Continuous Power at 70% of Prime power value if only all maintenances are done on time with original spare parts and high-quality oils that manufacturer advice.

* Generators should not operate below 50% of Prime Power value. In such a case, the engine will burn excessive oil and eventually have irreparable damage.

* If your need is 1000 kVA or above, you should prefer Synchronic Systems with 2-3 generators with failure back up and simultaneous aging.

* These points will provide advantage for you with purchasing and operating the generator.

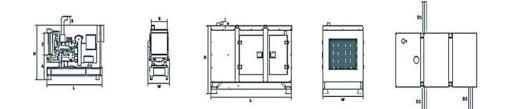
GENERATOR DIMENSIONS AND TECHNICAL DRAWINGS





VALUES		OPEN TYPE GENERATOR	CANOPY TYPE GENERATOR
WIDTH	mm	597	1000
LENGTH	mm	1400	2000
HEIGHT	mm	1309	1190
WEIGHT (NET)	Kg	531	670
FUEL TANK CAPACITY	L	58	100

SYMBOL	OPEN	CANOPY
L	1400	1916
W	597	942
н	871	1272
S	438	172
Α	438	
В	438	
С	480	
D1		630
D2		630
D3		360
D4		
D5		



FUEL CONSUMPTION

PERCENT OF PRIME POWER	1500 rpm	1800 rpm
	l/hr	l/hr
110 %	4,39	5,27
100 %	3,99	4,79
75 %	3,06	3,68
50 %	2,63	2,63







DIESEL ENGINE MAIN TECHNICAL PARAMETERS

GENERAL		
Number of Cylinders		4
Configuration		Vertical, In Line
Aspiration		Naturally
Combustion System		Direct Injection
Compression Ratio		19.1:1
Bore	mm	85
Stroke	mm	100
Displacement	L	2,27
Governing Type		Mechanic
Governing Class		G2
Rotation		Counter clockwise
Firing Order		1-3-4-2
Emission		Tier II
Moments of Rotation Inertia		
Engine	Kg - m²	0,44
Flywheel	Kg - m²	2,55
Performance Rating		
Speed Droop	%	≤3
Steady State Speed Band	%	≤0,5
FILTERS		
Air Filter		Dry Type, Replaceable
Fuel Filter		With Water Separator
Oil Filter		Element Type, Particulate Trap
FLYWHEEL HOUSING AND FLEX COUPLING		
Flywheel Housing	SAE (J620)	4
Flex Coupling Disc	Inch (")	7,5
TEST CONDITIONS		
Ambient Temperature	%	25
Atmospheric Pressure	КРа	100
Relative Humidity	Rh (%)	30
Max. Operating Intake Resistance	КРа	5
Exhaust Backpressure Limit	КРа	5
Fuel Temperature (Fuel Inlet Pump)	°C	38±2
OVERALL DIMENSIONS	C C	JU±2
Length*	mm	1087
Width	mm	597
Height	mm	749
Dry Weight *From front end of radiator to near end of air filter	kg	275
"From tront end of radiator to hear end of air filter		
FAN	mm	410
FAN Diameter Drive Ratio	mm	410 1,61:1
FAN Diameter Drive Ratio	mm	410 1,61:1 7
FAN Diameter	mm	1,61:1



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DIESEL ENGINE MAIN TECHNICAL PARAMETERS

Radiator Type50°CTropicalTotal Coolant CapacityL13Max. Perm. Coolant Outlet Temperature°C103Max. Perm. Flow Resist. (Cool. System And Piping)bar0,5Max. Temperature of Coolant Warning°C95Max. Temperature of Coolant Shutdown°C98Thermostat Operation Temperature - Initial Open°C68Thermostat Operation Temperature - Full Open°C72Delivery of Coolant Pumpm³/h1,60Min. Pressure Before Coolant Pumpbar0,15	
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Thermostat Operation Temperature - Initial Open°C68Thermostat Operation Temperature - Full Open°C72Delivery of Coolant Pumpm³/h1,60	
Thermostat Operation Temperature - Full Open ^o C 72 m ³ /h 1,60	
Delivery of Coolant Pumpm ³/ h1,60	
Min. Pressure Before Coolant Pumpbar0,15	
Radiator Face Aream²0,21	
Rows Row 2	
Matrix DensityPer / Inch15,5	
Material Aluminum	
Width of Matrixmm438	
Height of Matrix mm 480	
Pressure Cap SettingkPa90	
Estimated Cooling Air Flow ReservekPa0,125	
Engine Pre Heater-Tube (with Circulation Pump)W1500	
LUBRICATION SYSTEM	
Total System L 8	
Minimum Oil Level L 7	
Nominal Motor Operating Temperature ${}^{Q}C$ 40	
Lubricating Oil Pressure (Rated Speed)bar5	
Relief Valve OpenskPa352	
Oil / Fuel Consumption Ratio%< 0,3	
Normal Oil Temperature °C 110	
ELECTRICAL SYSTEM	
Voltage V 12	
Starter kW 3,2	
Alternator Output Ampers A 25	
Alternator Output Voltage V 14	

CE - VERTA-106188 - VERTA-106189





JCB ENERGY DIESEL ENGINE POWER RATINGS

ENGINE MODEL	E22C		ENGINE FAMILY	JC11	ENGINE SERIES	EII	
		TYPICAL GENERATOR OUTPUT (NET)		ENGINE POWER	3		
Speed (Rpm)	Type of Operation			Gr	oss	Net	
		kVA	kWe	KWm	Нр	kWm	Нр
1500	Stand By(Maximum)	17,5	14,0	18,5	24,8	16,5	22,1
	Prime	16,3	13,0	16,8	22,6	15,3	20,5
1800	Stand By(Maximum)	21,1	16,9	22,2	29,8	19,9	26,7
	Prime	19,5	15,6	20,2	27,1	18,4	24,7

DIESEL ENGINE MATCHING PARAMETERS - 50 HZ

50 HZ @ 1500 R/MIN		STAND BY	PRIME
Gross Engine Power	kW	18,5	16,8
Net Engine Power	kW	16,5	15,3
Fan Power Consumption (Belt Pulley Driven)	kW	1,5	1,5
Other Power Loss	kW	0,5	0,0
Mean Effective Pressure	MPa	0,65	0,59
Intake Air Flow	m ³ / min	1,25	1,25
Exhaust Temperature Limit	°C	300	300
Exhaust Flow	m ³/ min	1,30	1,15
Boost Pressure Ratio		3,20	2,90
Mean Piston Speed	m / s	5,0	5,0
Cooling Fan Air Flow	m ³/ min	46,6	46,6
Typical Generator Output Power	kVA	18	16
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	57,1	48,1
Gross Heat to Power	kW	18,5	16,8
Energy to Coolant and Lubricating Oil	kW	18,6	15,4
Heat Dissipation Capacity *	kW	-	-
Energy to Exhaust	kW	15,8	12,7
Heat to Radiation	kW	4,2	3,2
*Intaka Intercooled system			

*Intake Intercooled system







DIESEL ENGINE MATCHING PARAMETERS - 60 HZ

60 HZ @ 1800 R/MIN		STAND BY	PRIME
	1.147		
Gross Engine Power	kW	22,2	20,2
Net Engine Power	kW	19,9	18,4
Fan Power Consumption (Belt Pulley Driven)	kW	1,8	1,8
Other Power Loss	kW	0,5	0,0
Mean Effective Pressure	MPa	0,65	0,59
Intake Air Flow	m ³ / min	1,50	1,50
Exhaust Temperature Limit	°C	360	360
Exhaust Flow	m ³ / min	1,57	1,38
Boost Pressure Ratio		3,80	3,50
Mean Piston Speed	m / s	6,0	6,0
Cooling Fan Air Flow	m ³ / min	55,9	55,9
Typical Generator Output Power	kVA	21	20
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	67,3	55,6
Gross Heat to Power	kW	22,2	18,4
Energy to Coolant and Lubricating Oil	kW	22,3	18,5
Heat Dissipation Capacity *	kW	-	-
Energy to Exhaust	kW	18,9	15,3
	1.3.47	2.0	2 5
Heat to Radiation	kW	3,8	3,5

JCB ALTERNATOR TECHNICAL PARAMETERS AND SPECIFICATIONS



ALTERNATOR TECH	NICAL PARAMETERS				
Insulation Class		Н	Field Control System		Self-Excited
Winding Pitch		2/3 - (N° 6)	A.V.R. Model	Standard	SX460
Wires		12	Voltage Regulation	%	± 1
Protection		IP 23	Sustained Short-Circuit Current	10 sec	300% (3 IN)
Altitude	m	1000	Total Harmonic (*) TGH / THC	%	< 5
Overspeed	rpm	2250	Wave Form: NEMA = TIF - (*)		< 50
Air Flow	m³/sec.	0.071	Wave Form: I.E.C. = THF - (*)	%	< 2
Bearing Drive	N/A	-	Bearing Non-Drive	Bearing	6306-2RZ
Rotor Winding	100%	Copper	Stator Winding	100%	Copper







ALTERNATOR SPECIFICATIONS

50 HZ / 231-400V COSQ 0,8 / 1500 RPM

STANDARD USING ALTERNATOR				OPTIONAL USING ALTERNATOR					
BRAND/MODEL		JCB 160L		LEROY-S	OMER	TAL040E	STAMFORD	SOL2F	
DUTY				Continuous				Stand By	
AMBIENT	C°			40°C				27°C	
CLASS / TEMP. RISE	C°			H/ 125° K				H/ 163° K	
SERIES STAR	V	380/220	400/231	415/240	1 Phase	380/220	400/231	415/240	1 Phase
PARALLEL STAR	V	190/110	200/115	208/120	220	190/110	200/115	208/120	220
SERIES DELTA	V	220	230	240	230	220	230	240	230
OUTPUT POWER	kVA	16,0	16,0	17,0	10,0	17,5	17,5	18,5	12,0
OUTPUT POWER	kW	12,8	12,8	13,6	8,0	14,0	14,0	14,8	9,6

60 HZ / 277-480V COSQ 0,8 / 1800 RPM

STANDARD USING ALTERNATOR				OPTIONAL USING ALTERNATOR						
BRAND/MODEL		JCB 160L		LEROY-SOMER		TAL040E	STAMF	ORD	PIO44H-SOL2-F	
DUTY				Continuous			Stand By			
AMBIENT	C°	40°C					27°C			
CLASS / TEMP. RISE	C°	H / 125° K				Н / 163° К				
SERIES STAR	V	416/240	440/254	480/277	1 Phase	416/240	440/254	480/27	7 1 Phase	
PARALLEL STAR	V	208/120	220/127	240/138	-	208/120	220/127	240/13	8 -	
SERIES DELTA	V	240	254	277	240	240	254	277	240	
OUTPUT POWER	kVA	19,0	20,0	20,0	13,3	21,0	22,0	22,0	14,6	
OUTPUT POWER	kW	15,2	16,0	16,0	10,6	16,8	17,6	17,6	11,7	







CONTROL MODULE ALERTS

Emergency Stop Malfunction High Generator Frequency Low Generator frequency, Low Load Over Current, Unbalanced Current Low Generator Voltage High generator Frequency Phase sequence error Overload, Heat Sensor Broken Low Water Level (Optional) Low Oil Pressure, Reverse Power Low Water Temperature

Start Error, Stop Error Magnetic Pickup Error Charge Alternator Error Unbalanced Load Maintenance Time Alarm Low Speed, High Speed Broken Oil Sensor Cable High Oil Temperature (Optional) Low Fuel Level (Optional), High Battery Voltage Low Battery Voltage, High Water Temperature Electronic Can bus Errors (ECU)

CONTROL PANEL SPECIFICATIONS







- Powder Painted Steel Panel wit Lockable Door
- ATS (Automatic Transfer Panel)-Optional
- Control Module
- Battery Charger
- Emergency Stop Button

- Terminal Blocks
- Load Output Terminal
- System Protection MSBs
- Circuit Breaker-Optional
- o LCD Screen
- Control Relay
- Backlit, 128x64 Pixels

CONTROL MODULE TECHNICAL PARAMETERS

Brand		Brand	Trans-MIDIAMF.232.GP	
Dimensions	120mmx94mm.	Protection Class	IP65 From the Front	
Weight	260 gr.	Environmental Conditions	2000 meters above sea level	
Ambient Humidity	Max. %90.	Ambient Temperature -20°C to +70°C		
DC Battery Supply Voltage	8 - 32 V	Battery Voltage Measurement	8 – 32 V	
Network Frequency	5 - 99,9 Hz	Mains Voltage Measurement	3 - 300 V phase -Neutral, 5 - 99,9 Hz	
Generator Voltage Measurement	3 - 300 V	Generator Frequency	5 - 99,9 Hz	
Current Transformer Secondary	5A	Working Period	Continuous	
Charge Alternator Voltage Measurement	8 - 32 V	Charge Alternator Excitation	210mA &12V, 105mA &24V Nominal 2.5W	
Communication Interface	RS-232	Analog Sender Measurement	0 - 1300ohm	
Generator Contactor Relay Output	5A & 250V	Mains Contactor Relay Output	5A & 250V	
Solenoid Transistor Outputs	1A with DC Supply	Start Transistor Outputs	1A with DC Supply	
Configurable-3 Transistor Outputs	1A with DC Supply	Configurable-4 Transistor Outputs	1A with DC Supply	



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CONTROL MODULE FUNCTION

Mains Voltage Level Control	Generator Voltage Level Control	3 Phase Generator Protections	3 Phase AMF Function	Alarm Horn
Network Frequency Level Control	Generator Frequency level Control	- High / Low Voltage	- High / Low Frequency	Heater Tube Thermostat Control
Engine Operating Option Control	Generator Current Level Control	- High / Low Frequency	- High / Low Voltage	Modbus and SNMP
Engine Stop Option Control	Generator Powder Level Control	 Current / Voltage Asymmetry 	- High / Low Water Temperature	Working Hour
Engine Speed (RPM) Level Control	Generator work Schedule and Timing Control	- Overcurrent / Overload	- High / Low Load	Ground Leakage
Battery Voltage Options Times	Oil Pressure Controllers Control	Overheat Control	Mains., Generator ATS Control	Analog Modem
Check Engine Maintenance Times	Configurable Analog Inputs and Outputs	1 Phase or 3 Phase, Phase Selection	Network, Voltage, Frequency Display	Ethernet, USB, RS232, RS485
Communication Interfaces GPRS, GSM	Keeping Error Records of Past Events	Parameter Setting via Control Module	Parameter Setting via Computer	Selectable Protection Alarm / Shutdown
Engine Speed, Voltage, Earning	Configurable Programmable Digital Inputs and Outputs	Water Temperature Current and Frequency	Hours of Operation Phase sequence	Battery Voltage Oil Pressure

SOUND PROOF CANOPY AND BASE FRAME (CHASIS) SPECIFICATIONS

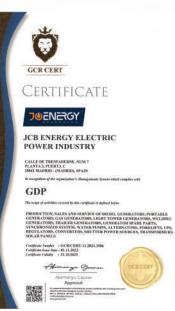


- Special, Registered JCB Energy Design and Colour
- A1 Quality DKP / HRU / Galvanized Steel
- Sensitive Twist on Automatic Press Brake
- Delicate Cut on Automatic Punch and Laser Bench
- Sensitive Welding on Robotic Welding Bench
- Chemical Cleaning Nano Technology Before Painting
- Robotic Painting with Electrostatic Powder Paint
- Drying and stabilizing on 200 °C Ovens
- 1500 Hour Salt Test
- Glass wool Isolation, A1 Class Material -50/+500 ºC
- Special Covering Over Glass Wool
- Best Sound Level (in Dba)
- Temperature Tests
- Rustproof Accessories

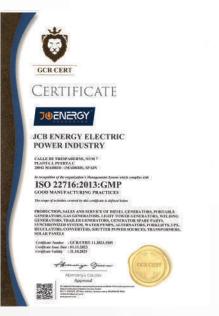
- Cable Exit Connectors and Glands
- Emergency Stop Button
- Fuel Level Gauge
- Fuel Drain Cap
- Fuel Inlet and Return Records
- Impermeability Test for Fuel Tank
- Vacuumed Rubber Mounted
- High Quality weatherstrips
- High Quality Shock Absorbers
- Fuel Filling Cap (with ventilation)
- Lifting and Carrying Equipment
- Internal Exhaust Mufflers (Silencers)
- External Exhaust Mufflers (Silencers)
- Radiator water Filling Cap
- o Daily Fuel Tank, External Fuel Tank

OUR CERTIFICATES











CERTIFICATE HEALTHY & SAFE WORKPLACE CERTIFICATE

JUENERGY JCB ENERGY ELECTRIC POWER INDUSTRY

CALLE, DE TRENPADERNE, NUM 7 PLANTA 2, PURITA C 20942 MADRID - (MADRID), NPAIN ETREMON CONTROL TO DRAME & ManBY, and Tafe Worksham

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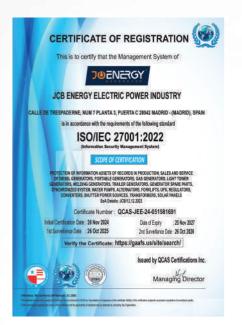
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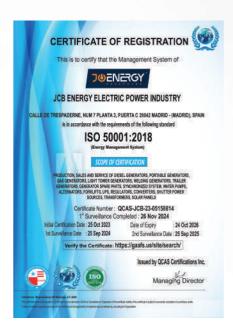
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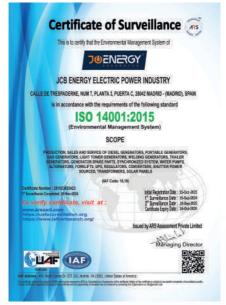


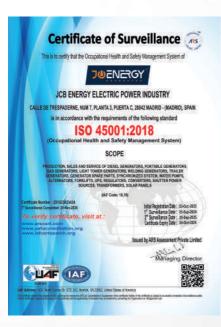
CE -VERTA-106188 -VERTA-106189











DNV

MANAGEMENT SYSTEM CERTIFICATE

Certificate no: Initial certification date: D012084 14 August 2007

The is to cardy that the management system of HD Hyundai Infracore Co., Ltd. Head Office & Incheon Plant 40 (highes). Drops, indexe, 2520, Republic of Korea and the sites as mentioned in the appendix accompanying this cartificate has been toyoid to conform to the Environmental Management System standard. Iso 14001/2015

Valid: 14 October 2023 - 13 October 2026

The certificate is walls for the following scope: Design, Development, Manufacture, Servicing of Internal Combustion Engine for use in Marine Industry, General Industry and Automotive Industry, and Earth Moving Equipment[Excavator, Wheel Loader, Dezer], Testing of Earth Moving Equipment[Excavator and Wheel Loader].





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RENE SANCHEZ ROMAN, MANAGER CH'THE DERIMETATION OF LIGAL ADVISORY SERVICES AND THE DATAMASE OF THE OFFICIAL OMAXBER OF COMMERCE, MOUERRE AND SERVICES OF MARINE, WITH INDUSTRIED OFFICE AT PLAZA DE LA INDERDIDICA 1, MARINE, DAVIN

CERTIFY. That, according to the background data on moord at this Chambar and others produced by the Company

CB-BERGY RECEISE FOMBLINGOTINE SL, a Company with Tax ID. Namine H1997554, and to registress office a strengt impactements in 2000 Masking is registred on MMp 2004, and the heading of the 3D Service comparise, of the Economic Activities Tax Tarihi function 540 spectrum the future gradient of the Service comparison.

· Menufacture of electrical material for use and equipment

In whites whereast, for the appropriate purpose, i have issued and signed this Certificate, to which Latts the stamp of this Chamilee, in Madrial on 28 July 2004.





Libratus de Manare Maista Maria Nº de Register 155 / 85 660 Fecha: 3607/355 1357/35

BENE SANCHEZ ROMAN, DIRECTORA DEL DEIWOTMENTO DE ASESORIA IMPORTA Y CINSO DE LA CIMARIA OFICIAL DE COMERCIO, INDUSTINA Y SURVICIS DE MARIRO, CON OCIACIONI SOCIAL EN LA TILAZA DE LA INDEPENDENCIA Y IL IMPORTO-ENTRATA CERTIFICA Que de los antecedentes que obrin en ente Cuipenación y de coso entididos por la recordad, manta

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