

JCB ENERGY ELECTRIC POWER INDUSTRY

♥ MADRID / SPAIN

































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





GENERATOR GENERAL INFORMATION

GENERATOR	FREQUENCY	VOLTAGE	POWER FACTOR	SPEED	DIESEL	ENGINE		ALTERN	ATOR		TYPE OF	GENER	ATOR O	DUTPUT
Model	Hz	٧	Cos Q	Rpm	Brand	Model	Series	Brand	Model	Series	Operation	kVA	kW	Α
						16N 510F161	05161 511	JWENERGY	JCB		Standby	85,0	68,0	122,8
JCN 85	50	231/400	0.8	1500						225M1 CB 225M1	Prime	77,3	61,8	111,7
					JCN						Continuous	54,1	43,3	78,2
					JCN	E105JCI	EII				Standby	102,0	81,6	147,4
JCN 102	60	277/480	0.8	1800							Prime	92,7	74,2	134,0
											Continuous	64,9	51,9	93,8

- Diesel Engines with Advanced Technology and Quality
- Alternators with Advanced Technology and Quality
- Low Exhaust Emission
- Control Panel Suitable for Flexible Application
- Patented Compact Designed and Sound proof Canopy
- Low Operating Cost, Suitable for Heavy-Duty
- Durability, Low Noise Level

- Tropical 50 °C Radiator, First Class Product Support
- Fuel Filter with Water and Particle Separator
- Low Fuel Consumption, Low Oil Consumption
- Global Technical Service and Maintenance Support
- 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 per year.

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



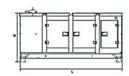


VALUES		OPEN TYPE GENERATOR	CANOPY TYPE GENERATOR
WIDTH	mm	700	1000
LENGTH	mm	1900	2700
HEIGHT	mm	1562	1190
WEIGHT (NET)	Kg	957	1080
FUEL TANK CAPACITY	L	161	100

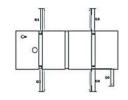
SYMBOL	OPEN	CANOPY
L	1700	2700
W	700	1000
Н	1212	1390
S	930	80
Α	870	
В	900	
С	515	
D1		100
D2		100
D3		400
D4		400
D5		483











FUEL CONSUMPTION

PERCENT OF PRIME POWER	1500 rpm	1800 rpm
TERCEIVI OF TRIME FOWER	I/hr	I/hr
110 %	18,98	22,77
100 %	17,32	20,71
75 %	13,31	15,91
50 %	9,51	11,37





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DIESEL ENGINE MAIN TECHNICAL PARAMETERS

GENERAL		
Number of Cylinders		4
Configuration		Vertical, In Line
Aspiration		Turbocharged & Intercooler
Combustion System		Direct Injection
		17.5:1
Compression Ratio		102
Bore	mm	
Stroke	mm	115
Displacement	L	3,76
Governing Type		Mechanic
Governing Class		G2
Rotation		Counterclockwise
Firing Order		1-3-4-2
Emission		Tier II
Moments of Rotation Inertia		
Engine	Kg - m²	0,16
Flywheel	Kg - m ²	1,2
Performance Rating	Ng III	1,2
-	0/	-22
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)	3
Flex Coupling Disc	Inch (")	11,5
TEST CONDITIONS		
Ambient Temperature	%	25
Atmospheric Pressure	KPa	100
Relative Humidity	Rh (%)	30
Max. Operating Intake Resistance	KPa	5
Exhaust Backpressure Limit	KPa	5
Fuel Temperature (Fuel Inlet Pump)	°C	38±2
OVERALL DIMENSIONS		3012
Length*	mm	1260
Width	mm	700
Height	mm	838
Dry Weight	kg	490
*From front end of radiator to near end of air filter		
FAN		450
Diameter Drive Ratio	mm	450 1,3:1
Number of Blades		8
		<u> </u>
Material		Plastic





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DIESEL ENGINE MAIN TECHNICAL PARAMETERS

COOLING SYSTEM		
Radiator Type	50ºC	Tropical
Total Coolant Capacity	L	18
Max. Perm. Coolant Outlet Temperature	ōC	103
Max. Perm. Flow Resist. (Cool. System And Piping)	bar	0,5
Max. Temperature of Coolant Warning	ōC	95
Max. Temperature of Coolant Shutdown	ōC	98
Thermostat Operation Temperature - Initial Open	ōC	72
Thermostat Operation Temperature - Full Open	ōC	75
Delivery of Coolant Pump	m^3/h	1,60
Min. Pressure Before Coolant Pump	bar	0,15
Radiator Face Area	m²	0,24
Rows	Row	2
Matrix Density	Per / Inch	15,5
Material		Aluminum
Width of Matrix	mm	538
Height of Matrix	mm	480
Pressure Cap Setting	kPa	90
Estimated Cooling Air Flow Reserve	kPa	0,125
Engine Pre Heater-Tube (with Circulation Pump)	W	1500
LUBRICATION SYSTEM		
Total System	L	12
Minimum Oil Level	L	11
Nominal Motor Operating Temperature	ōC	40
Lubricating Oil Pressure (Rated Speed)	bar	5
Relief Valve Opens	kPa	352
Oil / Fuel Consumption Ratio	%	≤0,3
Normal Oil Temperature	ōС	110
ELECTRICAL SYSTEM		
Voltage	V	12
Starter	kW	3,8
Alternator Output Ampers	А	25
Alternator Output Voltage	V	14
Batteries Capacity	Ah	55





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JCB ENERGY DIESEL ENGINE POWER RATINGS

ENGINE MODEL	E105JCI		ENGINE FAMILY JC71		ENGINE SERIES	EII	
		TYPICAL GENERATOR OUTPUT (NET)		ENGINE POWER			
Speed (Rpm)	Type of Operation			Gro	oss	Net	
		kVA	kWe	KWm	Нр	kWm	Нр
1500	Stand By(Maximum)	84,3	67,5	80,0	107,4	76,0	102,0
	Prime	76,8	61,4	73,0	98,0	69,0	92,6
	Stand By(Maximum)	101,5	81,2	96,0	128,9	91,2	122,4
1800	Prime	92,0	73,6	87,3	117,2	82,7	111,0

DIESEL ENGINE MATCHING PARAMETERS - 50 HZ

50 HZ @ 1500 R/MIN		STAND BY	PRIME
Gross Engine Power	kW	80,0	73,0
Net Engine Power	kW	76,0	69,0
Fan Power Consumption (Belt Pulley Driven)	kW	3,0	3,0
Other Power Loss	kW	1,2	1,0
Mean Effective Pressure	MPa	1,70	1,55
Intake Air Flow	m³/min	4,33	4,33
Exhaust Temperature Limit	ōС	480	450
Exhaust Flow	m³/ min	5,25	4,77
Boost Pressure Ratio		10,30	9,40
Mean Piston Speed	m / s	5,8	5,8
Cooling Fan Air Flow	m ³/ min	73,3	73,3
Typical Generator Output Power	kVA	84	77
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	186,0	168,0
Gross Heat to Power	kW	80,0	73,0
Energy to Coolant and Lubricating Oil	kW	43,5	39,2
Heat Dissipation Capacity *	kW	13,0	12,5
Energy to Exhaust	kW	50,9	45,8
Heat to Radiation	kW	11,6	10,4

^{*}Intake Intercooled system





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DIESEL ENGINE MATCHING PARAMETERS - 60 HZ

60 HZ @ 1800 R/MIN		STAND BY	PRIME
	LAAZ		
Gross Engine Power	kW	96,0	87,3
Net Engine Power	kW	91,2	82,7
Fan Power Consumption (Belt Pulley Driven)	kW	3,6	3,6
Other Power Loss	kW	1,2	1,0
Mean Effective Pressure	MPa	1,70	1,55
Intake Air Flow	m ³ / min	5,20	5,20
Exhaust Temperature Limit	ōС	576	576
Exhaust Flow	m ³ / min	6,30	5,70
Boost Pressure Ratio		12,40	11,30
Mean Piston Speed	m / s	6,9	6,9
Cooling Fan Air Flow	m ³ /min	88,0	88,0
Typical Generator Output Power	kVA	102	92
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	223,2	196,8
Gross Heat to Power	kW	96,0	82,7
Energy to Coolant and Lubricating Oil	kW	52,2	46,8
Heat Dissipation Capacity *	kW	14,0	13,5
Energy to Exhaust	kW	61,1	54,8
Heat to Radiation	kW	13,9	12,5
*Intake Intercooled system			

JCB ALTERNATOR TECHNICAL PARAMETERS AND SPECIFICATIONS



ALTERNATOR TECHNI	CAL 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.	0.216	Wave Form: I.E.C. = THF - (*)	%	< 2
Bearing Drive	N/A	-	Bearing Non-Drive	Bearing	6309-2RZ
Rotor Winding	100%	Copper	Stator Winding	100%	Copper





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ALTERNATOR SPECIFICATIONS

50 HZ / 231-400V COSQ 0,8 / 1500 RPM											
STANDARD USING ALTERNATOR					OPTIONAL USING ALTERNATOR						
BRAND/MODEL	J@ENERGY*	JCB 225M1		LEROY-SO	OMER"	TAL044B	STAMFORD	UC224	4G		
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	77,0	77,0	80,0	-	85,0	85,0	88,0	-		
OUTPUT POWER	kW	61,6	61,6	64,0	-	68,0	68,0	70,4	-		

60 HZ / 277-480V COSQ 0,8 / 1800 RPM											
STANDARD USING ALTERNATOR				OPTIONAL USING ALTERNATOR							
BRAND/MODEL	J ⊕ ĒŅĒŖĢŶ	JCB 225M1		LEROY	SOMER	TAL044A	STAMF	ORD UC22	4F		
DUTY				Continuous				Stand By			
AMBIENT	C°			40°C				27°C			
CLASS / TEMP. RISE	C°			H / 125° K				H / 163° K			
SERIES STAR	V	416/240	440/254	480/277	1 Phase	416/240	440/254	480/277	1 Phase		
PARALLEL STAR	V	208/120	220/127	240/138	-	208/120	220/127	240/138	-		
SERIES DELTA	V	240	254	277	240	240	254	277	240		
OUTPUT POWER	kVA	83,0	87,0	92,0	-	91,0	96,0	101,0	-		
OUTPUT POWER	kW	66,4	69,6	73,6	-	72,8	76,8	80,8	-		





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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

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



Low Water Temperature



- Powder Painted Steel Panel with Lockable Door
- ATS (Automatic Transfer Panel)-Optional
- Control Module
- o Battery Charger
- Emergency Stop Button
- Terminal Blocks
- Load Output Terminal
- System Protection MSBs
- Circuit Breaker-Optional
- o LCD Screen
- Control Relays
- Backlit, 128x64 Pixels

CONTROL MODULE TECHNICAL PARAMETERS

Brand	JOENERGY.	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 Nomi		
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

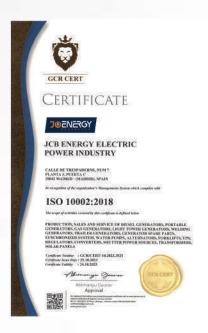


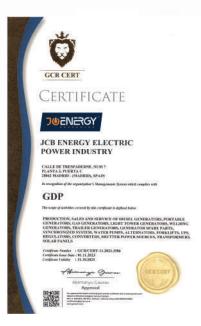
- Special, Registered JCB Energy Design and Colour
- A1 Quality DKP / HRU / Galvanized Steel
- Sensitive Twist on Automatic Press Brake
- O Delicate Cut on Automatic Punch and Laser Bench
- Sensitive Welding on Robotic Welding Bench
- Chemical Cleaning Nano Technology Before Painting
- Robotic Painting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

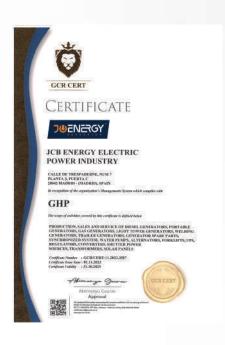
- Cable Exit Connectors and Glands
- Emergency Stop Button
- Fuel Level Gauge
- Fuel Drain Cap
- Fuel Inlet and Return Records
- o Impermeability Test for Fuel Tank
- Vacuumed Rubber Mounted
- High Quality weatherstrips
- High Quality Shock Absorbers
- Fuel Filling Cap (with ventilation)
- Lifting and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

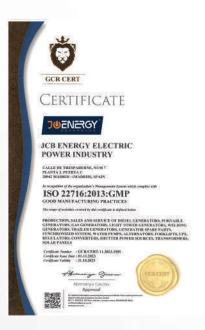


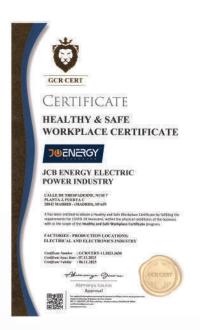
OUR CERTIFICATES

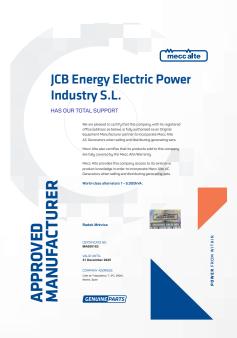




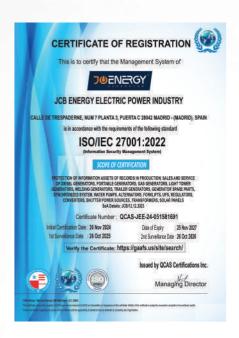






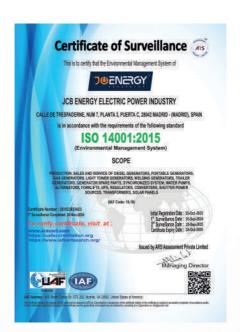
















MANAGEMENT SYSTEM CERTIFICATE

Valid: 14 October 2023 – 13 October 2026

This is to certify that the management system of HD Hyundai Infracore Co., Ltd. Head Office &

Incheon Plant
489, Injung-ro, Dong-gu, Incheon, 22502, Republic of Korea
and the sites as mentioned in the appendix accompanying th

has been found to conform to the Environmental Management System standard: ISO 14001:2015

This certificate is valid for the following scope:
Design, Development, Manufacture, Servicing of Internal Combustion Engine for use in
Marine industry, aneral Industry and Automotive Industry, and Earth Moving
Testing of Earth Moving Equipment(Excavator and Wheel Loader).

Place and date: Barendrecht, 99 October 2023

For the issuing office: DMY - Business Assurance Zwolesoweg 1, 2964 LB Barendracht, Hetherlands







MANAGEMENT SYSTEM CERTIFICATE

Initial certification class: 03 January 2006 Spissed on OHSAS 18001)

HD Hyundai Infracore Co., Ltd. Head Office & Incheon Plant

480 Inlung-ro, Dong-gu, Incheon, 22502, Republic of Korea

has been found to conform to the Occupational Health and Safety Management Syst ISO 45001:2018

Place and date: Barendrecht, 99 October 2023













IRBHE SANKHEZ ROMMA MANAGER DE THE DEFARTMENT OF LEGAL ADVISONY SERVICES AND THE DATAINSE OF THE OFFICIAL CHARMER OF COMMERCE, HIGHERRY AND SERVICES OF MADRID, WITH REGISTERED OFFICE AT PLAZA DE LA MODERNORIOCA F, MADRID, TAYAN

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

CB ENERGY ELECTRIC POWER INSUSTRY St., a Company with Tax LD. Nation B1975554, and its registress of those at street frequency may 7, 2000. Making is registered on 6 May 2004, under the heating of the 145 Section, companies, of the Economic Activities Tax Traffic Number 545 to preterm the National Activities of Company (Company).

Menufacture of electrical material for use and equipment.







REGISTRO GENERAL SALIDA

CÉASIO DE LA CÁMARA ORICIAL DE COMERCIO, INICIUSTRIA Y SERVICIOS DE MADRID, CON DOMICIUO SOCIAL EN LA PLAZA DE LA INDEPENDENCIA Nº 1, MADRID — ESPAÑA

CERTIFICA. Que de los antecedentes que obran en esta Corporación y da otros estábidos por la sociedad, musita:







