

# 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	RATOR O	UTPUT
Model	Hz	V	Cos Q	Rpm	Brand	Model	Series	Brand	Model	Series	Operation	kVA	kW	А
						JCN C556JCI	C556JCI CII		J <b>WENERGY</b>	315M 315S	Standby	450,0	360,0	650,3
JCN 450	50	231/400	0.8	1500							Prime	409,1	327,3	591,2
					ICN						Continuous	286,4	229,1	413,8
					JCIN						Standby	450,0	360,0	650,3
JCN 450	60	277/480	0.8	1800				ିଦ			Prime	409,1	327,3	591,2
											Continuous	286,4	229,1	413,8

- 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**



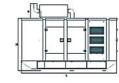


VALUES		OPEN TYPE GENERATOR	CANOPY TYPE GENERATOR
WIDTH	mm	1100	1140
LENGTH	mm	3254	4100
HEIGHT	mm	1782	1900
WEIGHT (NET)	Kg	2379	2970
FUEL TANK CAPACITY	L	475	678

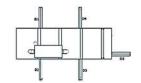
SYMBOL	OPEN	CANOPY
L	3254	4100
W	1100	1140
Н	1598	2000
S	184	600
Α	766	
В	810	
С	860	
D1		860
D2		860
D3		860
D4		860
D5		860











## **FUEL CONSUMPTION**

PERCENT OF PRIME POWER	1500 rpm	1800 rpm
TERCENT OF TRANSPORTER	I/hr	I/hr
110 %	88,84	88,84
100 %	80,84	80,84
75 %	60,95	60,95
50 %	42,11	42,11





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## **DIESEL ENGINE MAIN TECHNICAL PARAMETERS**

GENERAL		
Number of Cylinders		6
Configuration		Vertical, In Line
Aspiration		Turbocharged & Intercooled
Combustion System		Direct Injection
Compression Ratio		17:1
Bore	mm	126
Stroke	mm	130
Displacement	L	9,726
Governing Type		Electronic
Governing Class		G3
Rotation		Counterclockwise
Firing Order		1-5-3-6-2-4
Emission		Tier II
Moments of Rotation Inertia		
Engine	Kg - m²	3,02
Flywheel	Kg - m²	2,35
Performance Rating	9	,
Speed Droop	%	≤0,5
Steady State Speed Band	%	≤0,5
FILTERS	70	20,3
Air Filter		Dry Type, Replaceable
Fuel Filter		With Water Separator
Oil Filter		Element Type, Particulate Trap
On thick		Element Type, Tarticulate Trup
FLYWHEEL HOUSING AND FLEX COUPLING		
	SAF (1620)	1
Flywheel Housing	SAE (J620)	1
Flywheel Housing Flex Coupling Disc	SAE (J620) Inch (")	1 14
Flywheel Housing Flex Coupling Disc TEST CONDITIONS	Inch (")	14
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature	Inch (") %	14 25
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure	Inch (") % KPa	14 25 100
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity	Inch (") % KPa Rh (%)	14 25 100 30
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance	Inch (")  %  KPa  Rh (%)  KPa	14 25 100 30 5
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance Exhaust Backpressure Limit	Inch (")  %  KPa  Rh (%)  KPa  KPa	25 100 30 5 10
Flywheel Housing Flex Coupling Disc  TEST CONDITIONS  Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance Exhaust Backpressure Limit Fuel Temperature (Fuel Inlet Pump)	Inch (")  %  KPa  Rh (%)  KPa	14 25 100 30 5
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance Exhaust Backpressure Limit Fuel Temperature (Fuel Inlet Pump) OVERALL DIMENSIONS	Inch (")	25 100 30 5 10 38±2
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance Exhaust Backpressure Limit Fuel Temperature (Fuel Inlet Pump) OVERALL DIMENSIONS Length*	Inch (")	14  25  100  30  5  10  38±2
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance Exhaust Backpressure Limit Fuel Temperature (Fuel Inlet Pump) OVERALL DIMENSIONS Length* Width	Inch (")  %  KPa  Rh (%)  KPa  KPa  C  mm  mm	14  25  100  30  5  10  38±2  1854  887
Flywheel Housing Flex Coupling Disc TEST CONDITIONS Ambient Temperature Atmospheric Pressure Relative Humidity Max. Operating Intake Resistance Exhaust Backpressure Limit Fuel Temperature (Fuel Inlet Pump) OVERALL DIMENSIONS Length* Width Height	Inch (")  %  KPa  Rh (%)  KPa  KPa  C  mm  mm  mm	14  25  100  30  5  10  38±2
Flywheel Housing Flex Coupling Disc  TEST CONDITIONS  Ambient Temperature  Atmospheric Pressure  Relative Humidity  Max. Operating Intake Resistance  Exhaust Backpressure Limit  Fuel Temperature (Fuel Inlet Pump)  OVERALL DIMENSIONS  Length*  Width  Height  Dry Weight	Inch (")  %  KPa  Rh (%)  KPa  KPa  C  mm  mm	14  25  100  30  5  10  38±2  1854  887  1209
Flywheel Housing Flex Coupling Disc  TEST CONDITIONS  Ambient Temperature  Atmospheric Pressure  Relative Humidity  Max. Operating Intake Resistance  Exhaust Backpressure Limit  Fuel Temperature (Fuel Inlet Pump)  OVERALL DIMENSIONS  Length*  Width  Height  Dry Weight  *From front end of radiator to near end of air filter  FAN	Inch (")  %  KPa  Rh (%)  KPa  KPa  C  mm  mm  mm	25 100 30 5 10 38±2 1854 887 1209 980
Flywheel Housing Flex Coupling Disc  TEST CONDITIONS  Ambient Temperature  Atmospheric Pressure  Relative Humidity  Max. Operating Intake Resistance  Exhaust Backpressure Limit  Fuel Temperature (Fuel Inlet Pump)  OVERALL DIMENSIONS  Length*  Width  Height  Dry Weight  *From front end of radiator to near end of air filter  FAN  Diameter	Inch (")  %  KPa  Rh (%)  KPa  KPa  C  mm  mm  mm	25 100 30 5 10 38±2 1854 887 1209 980
Flywheel Housing Flex Coupling Disc  TEST CONDITIONS  Ambient Temperature  Atmospheric Pressure  Relative Humidity  Max. Operating Intake Resistance  Exhaust Backpressure Limit  Fuel Temperature (Fuel Inlet Pump)  OVERALL DIMENSIONS  Length*  Width  Height  Dry Weight  *From front end of radiator to near end of air filter  FAN  Diameter  Drive Ratio	Inch (")  %  KPa  Rh (%)  KPa  KPa  °C  mm  mm  mm  kg	25 100 30 5 10 38±2 1854 887 1209 980
Flywheel Housing Flex Coupling Disc  TEST CONDITIONS  Ambient Temperature  Atmospheric Pressure  Relative Humidity  Max. Operating Intake Resistance  Exhaust Backpressure Limit  Fuel Temperature (Fuel Inlet Pump)  OVERALL DIMENSIONS  Length*  Width  Height  Dry Weight  *From front end of radiator to near end of air filter  FAN  Diameter  Drive Ratio  Number of Blades	Inch (")  %  KPa  Rh (%)  KPa  KPa  °C  mm  mm  mm  kg	25 100 30 5 10 38±2 1854 887 1209 980
Fuel Temperature (Fuel Inlet Pump)  OVERALL DIMENSIONS  Length*  Width  Height  Dry Weight	Inch (")  %  KPa  Rh (%)  KPa  KPa  °C  mm  mm  mm  kg	25 100 30 5 10 38±2 1854 887 1209 980





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# **DIESEL ENGINE MAIN TECHNICAL PARAMETERS**

COOLING SYSTEM		
Radiator Type	50ºC	Tropical
Total Coolant Capacity	L	46
Max. Perm. Coolant Outlet Temperature	ōС	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	68
Thermostat Operation Temperature - Full Open	ōC	71
Delivery of Coolant Pump	$m^3/h$	5,60
Min. Pressure Before Coolant Pump	bar	0,5
Radiator Face Area	m²	0,72
Rows	Row	5
Matrix Density	Per / Inch	15,5
Material		Aluminum
Width of Matrix	mm	830
Height of Matrix	mm	870
Pressure Cap Setting	kPa	90
Estimated Cooling Air Flow Reserve	kPa	0,125
Engine Pre Heater-Tube (with Circulation Pump)	W	3000
LUBRICATION SYSTEM		
Total System	L	26
Minimum Oil Level	L	24
Nominal Motor Operating Temperature	ōC	40
Lubricating Oil Pressure (Rated Speed)	bar	5
Relief Valve Opens	kPa	300-400
Oil / Fuel Consumption Ratio	%	≤0,36
Normal Oil Temperature	ōС	105
ELECTRICAL SYSTEM		
Voltage	V	24
Starter	kW	8,5
Alternator Output Ampers	Α	55
Alternator Output Voltage	V	28
Batteries Capacity	Ah	2X135





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## **JCB ENERGY DIESEL ENGINE POWER RATINGS**

ENGINE MODEL	C556JCI		ENGINE FAMILY	JC13	ENGINE SERIES	CII	
		TVDICAL CENED	ATOR OUTDUT (NET)	ENGINE POWE	R		
Speed (Rpm)	Type of Operation	TYPICAL GENERATOR OUTPUT (NET)		Gr	oss	Net	
		kVA	kWe	KWm	Нр	kWm	Нр
1500	Stand By(Maximum)	451 ,0	361,0	400,0	536,9	384,0	515,4
	Prime	409,0	328,0	364,0	488,6	349,0	468,5
	Stand By(Maximum)	451,0	361,0	400,0	536,9	384,0	515,4
1800	Prime	409,0	328,0	364,0	488,6	349,0	468,5

## **DIESEL ENGINE MATCHING PARAMETERS - 50 HZ**

50 HZ @ 1500 R/MIN		STAND BY	PRIME	
Gross Engine Power	kW	400,0	364,0	
Net Engine Power	kW	384,0	349,0	
Fan Power Consumption (Belt Pulley Driven)	kW	14,0	14,0	
Other Power Loss	kW	2,0	1,5	
Mean Effective Pressure	MPa	3,29	3,00	
Intake Air Flow	m³/min	21,72	20,68	
Exhaust Temperature Limit	ōC	650	650	
Exhaust Flow	m ³/ min	42,73	40,70	
Boost Pressure Ratio		3,26	3,09	
Mean Piston Speed	m / s	6,5	6,5	
Cooling Fan Air Flow	m ³/ min	612,0	612,0	
Typical Generator Output Power	kVA	451	409	
HEAT REJECTION		STAND BY	PRIME	
Energy in Fuel (Heat of Combustion)	kW	1000,0	910,0	
Gross Heat to Power	kW	400,0	364,0	
Energy to Coolant and Lubricating Oil	kW	200,0	182,0	
Heat Dissipation Capacity *	kW	70,0	64,0	
Energy to Exhaust	kW	290,0	264,0	
Heat to Radiation	kW	40,0	36,0	

<sup>\*</sup>Intake Intercooled system





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## **DIESEL ENGINE MATCHING PARAMETERS - 60 HZ**

60 HZ @ 1800 R/MIN		STAND BY	PRIME
Gross Engine Power	kW	400,0	364,0
Net Engine Power	kW	381,2	345,7
Fan Power Consumption (Belt Pulley Driven)	kW	16,8	16,8
Other Power Loss	kW	2,0	1,5
Mean Effective Pressure	MPa	2,74	2,50
Intake Air Flow	m³/min	21,72	20,68
Exhaust Temperature Limit	ōС	650	650
Exhaust Flow	m³/min	42,73	40,70
Boost Pressure Ratio		3,20	3,10
Mean Piston Speed	m / s	7,8	7,8
Cooling Fan Air Flow	m³/min	612,0	612,0
Typical Generator Output Power	kVA	447	406
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	1002,0	895,0
Gross Heat to Power	kW	400,0	347,0
Energy to Coolant and Lubricating Oil	kW	200,0	182,0
Heat Dissipation Capacity *	kW	70,0	63,0
Energy to Exhaust	kW	290,0	264,0
Heat to Radiation	kW	42,0	38,0
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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	SX440
Wires		12	Voltage Regulation	%	± 1
Protection		IP 23	Sustained Short-Circuit Current	10 sec	300% (3 IN)
Altitude	m	1000	Total Harmonic (*) TGH / THC	%	< 4
Overspeed	rpm	2250	Wave Form: NEMA = TIF - (*)		< 50
Air Flow	m³/sec.	0.8	Wave Form: I.E.C. = THF - (*)	%	< 2
<b>Bearing Drive</b>	N/A	-	Bearing Non-Drive	Bearing	6314-2RZ
<b>Rotor Winding</b>	100%	Copper	Stator Winding	100%	Copper





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# **ALTERNATOR SPECIFICATIONS**

50 HZ / 231-400V	COSQ 0,8 / 1500 RPI	М							
STANDARD USING ALTERNATOR				OPTIONAL USING ALTERNATOR					
BRAND/MODEL	JOENERGY.	JCB 315M		LEROY-SO	OMER"	TAL047A	STAMFORD	S4L1	DF
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	409,0	409,0	424,0	-	450,0	450,0	467,0	-
OUTPUT POWER	kW	327,2	327,2	339,2	-	360,0	360,0	373,6	-

60 HZ / 277-480V COSC	Q 0,8 / 1800 RPM								
STANDARD USING ALTE	RNATOR		OPTIONAL I	JSING ALTER	RNATOR				
BRAND/MODEL	<b>J@</b> ENERGY	JCB 315S		LEROY-	SOMER"	TAL046G	STAMFO	ORD HC4E	
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	480/277	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	421,0	443,0	466,0	-	463,0	487,0	513,0	-
OUTPUT POWER	kW	336,8	354,4	372,8	-	370,4	389,6	410,4	-





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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	J@≝ŇŒĞŸ.	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	
<b>Current Transformer Secondary</b>	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

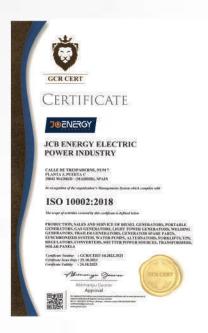


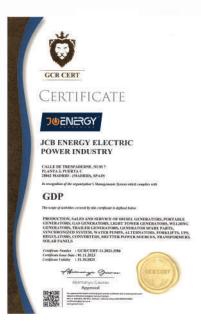
- Special, Registered JCB Energy Design and Colour
- A1 Quality DKP / HRU / Galvanized Steel
- Sensitive Twist on Automatic Press Brake
- Delicate Cut on Automatic Punch and Laser Bench
- Sensitive Welding on Robotic Welding Bench
- Chemical Cleaning Nano Technology Before Painting
- Robotic Painting 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

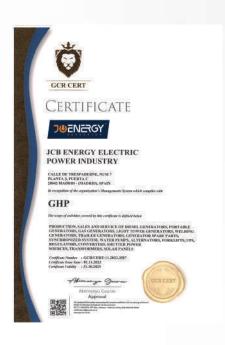
- Cable Exit Connectors and Glands
- Emergency Stop Button
- Fuel Level Gauge
- Fuel Drain Cap
- Fuel Inlet and Return Records
- o Impermeability Test for Fuel Tank
- Vacuumed Rubber Mounted
- High Quality weatherstrips
- High Quality Shock Absorbers
- Fuel Filling Cap (with ventilation)
- Lifting and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

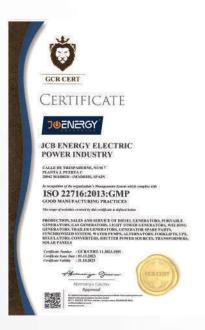


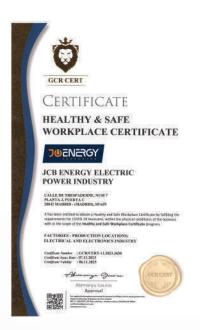
# **OUR CERTIFICATES**

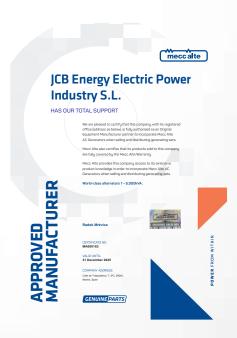




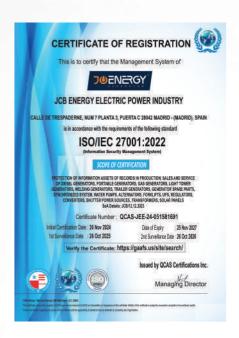






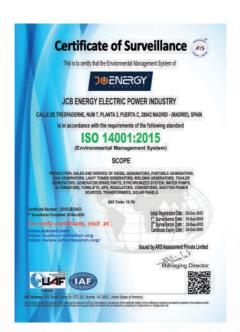
















#### MANAGEMENT SYSTEM CERTIFICATE

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 Barrendrecht, 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:







