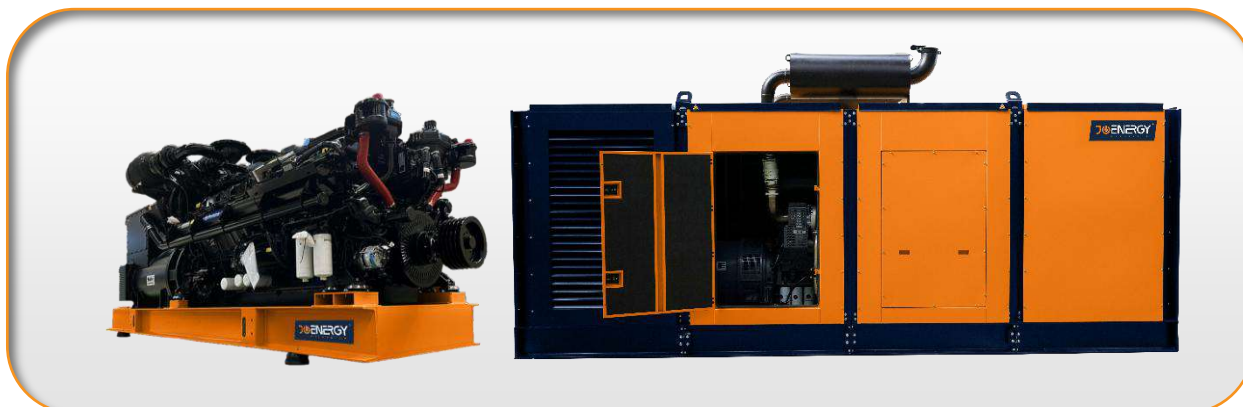


JCB ENERGY ELECTRIC POWER INDUSTRY

📍 MADRID / SPAIN





GENERATOR GENERAL INFORMATION

GENERATOR	FREQUENCY	VOLTAGE	POWER FACTOR	SPEED	DIESEL ENGINE	ALTERNATOR				TYPE OF	GENERATOR OUTPUT		
Model	Hz	V	Cos Q	Rpm	Brand	Model	Brand	Model	Series	Operation	kVA	kW	A
JCP 2000	50	231/400	0.8	1500	PERKINS	4016-61TRG1	JO ENERGY	JCB	450SX	Standby	2.000,0	1.600,0	2.890,2
										Prime	1.818,2	1.454,5	2.627,4
										Continuous	1.272,7	1.018,2	1.839,2

- 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.

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

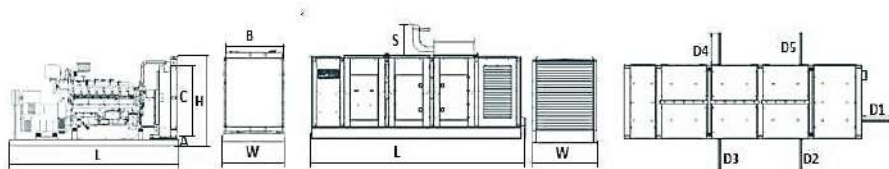
- * Generators can work on Continuous Power at 70% of Prime power value if only all maintenances are done on time with original spare parts and high-quality oils that manufacturer advice.
- * Generators should not operate below 50% of Prime Power value. In such a case, the engine will burn excessive 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	2190	2430
LENGTH	mm	6200	12000
HEIGHT	mm	3100	3200
WEIGHT (NET)	Kg	12720	19840
FUEL TANK CAPACITY	L	3000	3000

SYMBOL	OPEN	CANOPY
L	6200	12000
W	2190	2430
H	3100	3200
S		1000
A	225	
B	2080	
C	2750	
D1		1000
D2		1000
D3		1000
D4		1000
D5		1000



PERCENT OF PRIME POWER	FUEL CONSUMPTION
	l/hr
110 %	414,62
100 %	385,17
75 %	300,38
50 %	198,33

DIESEL ENGINE MAIN TECHNICAL PARAMETERS

GENERAL

Number of Cylinders		16
Configuration		Vee 60°
Aspiration		Turbo Charged & WAC-Intercooled
Combustion System		Direct injection
Compression Ratio		13:1
Bore	mm	160
Stroke	mm	190
Displacement	L	61,123
Governing Type		Electronic
Governing Class		G3
Rotation		Counterclockwise
Firing Order		1A, 1B, 3A, 3B, 7A, 7B, 5A, 5B, 8A, 8B, 6A, 6B, 2A, 2B, 4A, 4B
Emission		Fuel Optimised

FILTERS

Air Filter		Dry Type, Replaceable
Fuel Filter		Element Type, Replaceable
Oil Filter		Element Type, Particulate Trap

ELECTRICAL SYSTEM

Voltage	V	24
Starter	kW	2X8,2
Alternator Output Amperes	A	40
Alternator Output Voltage	V	28
Batteries Capacity	Ah	4X200

FAN

Diameter	mm	1905
Drive Ratio		0.93:1
Number of Blades		12
Material		Aluminum
Type		Blowing

COOLING SYSTEM

Radiator Type	50°C	Tropical
Total Coolant Capacity	L	315
Max. Perm. Coolant Outlet Temperature	°C	105
Max. Perm. Flow Resist. (Cool. System And Piping)	bar	0,5
Max. Temperature of Coolant Warning	°C	95
Max. Temperature of Coolant Shutdown	°C	98
Thermostat Operation Temperature - Initial Open	°C	71
Thermostat Operation Temperature - Full Open	°C	85
Delivery of Coolant Pump	m ³ /h	21,00
Min. Pressure Before Coolant Pump	bar	0,5
Radiator Face Area	m ²	5,72
Rows	Row	4
Matrix Density	Per / Inch	10
Material		Aluminum
Width of Matrix	mm	2080
Height of Matrix	mm	2750
Pressure Cap Setting	kPa	70
Estimated Cooling Air Flow Reserve	kPa	0,125
Engine Pre Heater-Tube (with Circulation Pump)	W	2X7500

DIESEL ENGINE MAIN TECHNICAL PARAMETERS

LUBRICATION SYSTEM		
Total System	L	213
Minimum Oil Level	L	157
Nominal Motor Operating Temperature	°C	40
Lubricating Oil Pressure (Rated Speed)	bar	4
Relief Valve Opens	kPa	340
Oil / Fuel Consumption Ratio	%	0,52
Normal Oil Temperature	°C	105

DIESEL ENGINE MATCHING PARAMETERS - 50 HZ

50 HZ @ 1500 R/MIN		STAND BY
Gross Engine Power	kW	1774,0
Net Engine Power	kW	1684,0
Fan Power Consumption (Belt Pulley Driven)	kW	90,0
Other Power Loss	kW	-
Mean Effective Pressure	MPa	2322,00
Intake Air Flow	m ³ / min	165,00
Exhaust Temperature Limit	°C	420
Exhaust Flow	m ³ / min	400,00
Boost Pressure Ratio		131,00
Mean Piston Speed	m / s	9,5
Cooling Fan Air Flow	m ³ / min	2081,0
Typical Generator Output Power	kVA	2000
HEAT REJECTION		STAND BY
Energy in Fuel (Heat of Combustion)	kW	4415,0
Gross Heat to Power	kW	1774,0
Energy to Coolant and Lubricating Oil	kW	666,0
Energy to Exhaust	kW	1225,0
Heat to Radiation	kW	131,0

ALTERNATOR SPECIFICATIONS



ALTERNATOR TECHNICAL PARAMETERS

Insulation Class	H	Field Control System	Self-Excited
Winding Pitch	2/3 - (N° 6)	A.V.R. Model	Standard
Wires	6	Voltage Regulation	%
Protection	IP 23	Sustained Short-Circuit Current	10 sec
Altitude	m	Total Harmonic (*) TGH / THC	%
Overspeed	rpm	Wave Form: NEMA = TIF - (*)	< 50
Air Flow	m³/sec.	Wave Form: I.E.C. = THF - (*)	%
Bearing Drive	N/A	Bearing non-drive	Bearing
Rotor Winding	100%	Stator Winding	100%

ALTERNATOR SPECIFICATIONS

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

STANDARD USING ALTERNATOR

OPTIONAL USING ALTERNATOR

BRAND/MODEL



JCB 450SX



LSA 52.3S5

STAMFORD

P7 E

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

1818,0

1818,0

1886,0

-

2000,0

2000,0

2075,0

-

OUTPUT POWER

kW

1454,0

1454,0

1509,0

-

1600,0

1600,0

1660,0

-

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 with 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
- LCD Screen
- Control Relays
- Backlit, 128x64 Pixels

CONTROL MODULE TECHNICAL PARAMETERS

Brand	JO ENERGY [®]	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

CONTROL MODULE FUNCTION

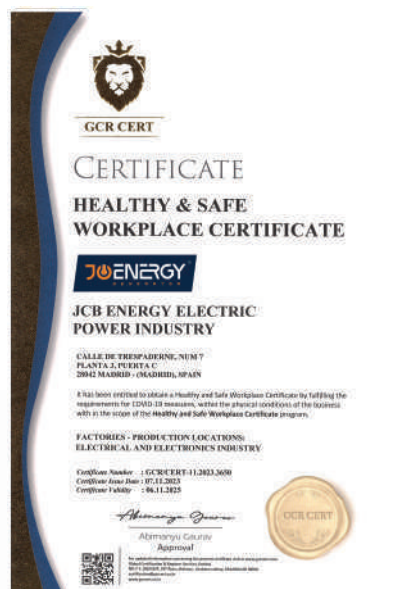
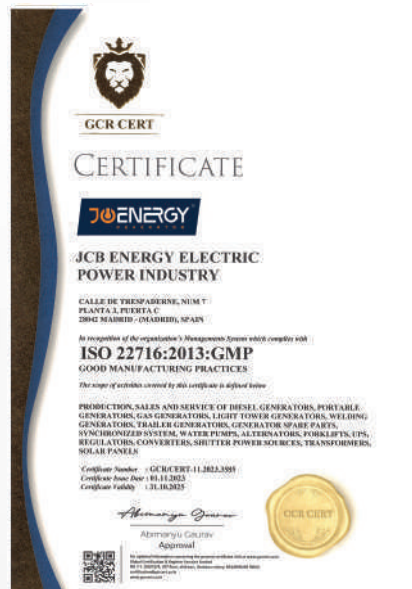
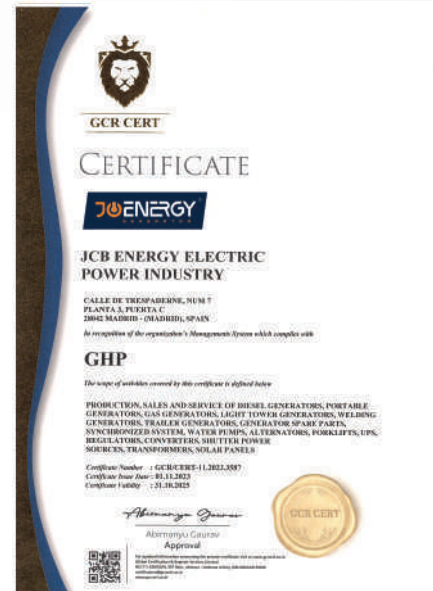
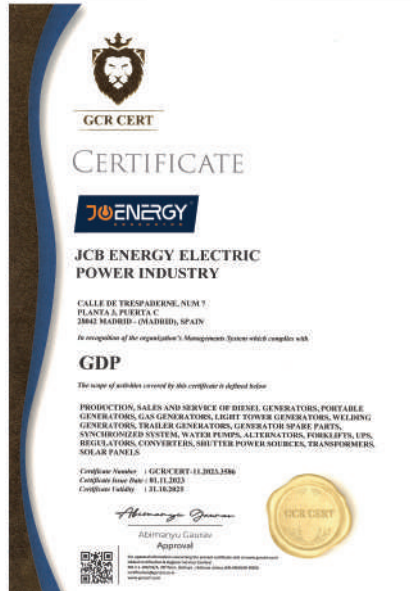
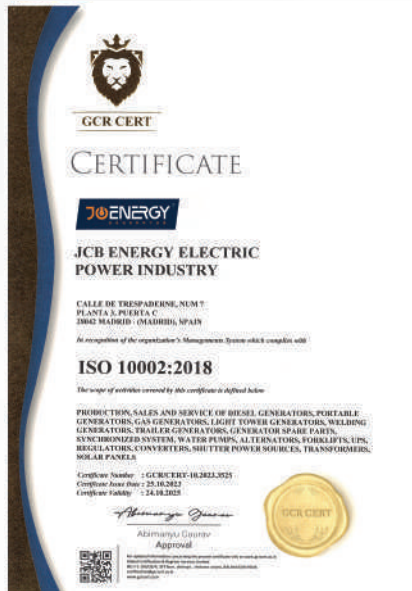
Mains Voltage Level Control	Generator Voltage Level Control	3 Phase Generator Protections	3 Phase AMF Function	Alarm Horn
Network Frequency Level Control	Generator Frequency level Control	- High / Low Voltage	- High / Low Frequency	Heater Tube Thermostat Control
Engine Operating Option Control	Generator 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

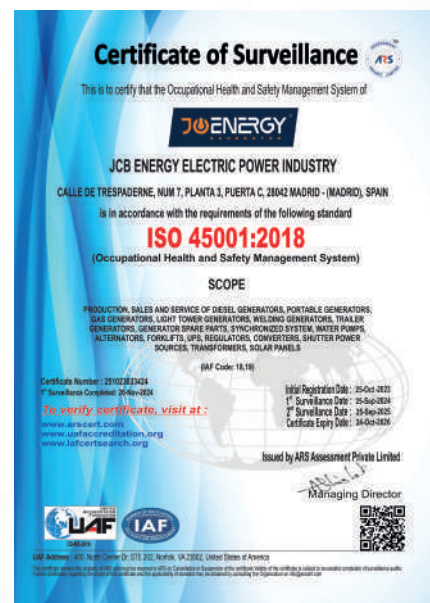
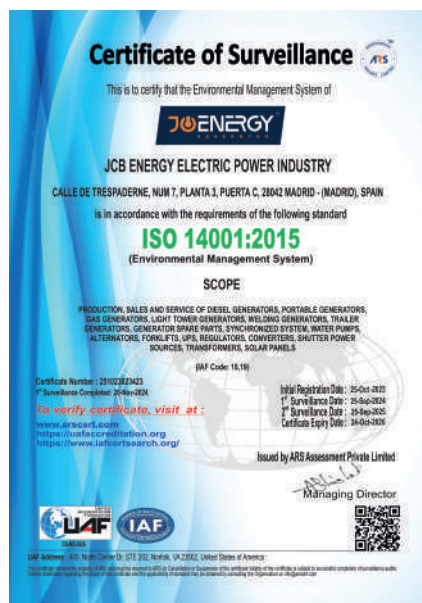
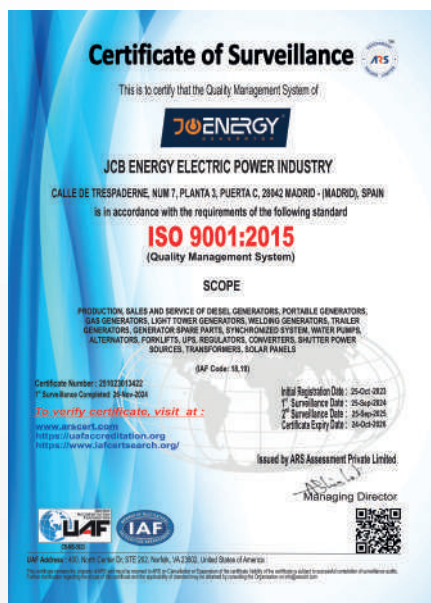
SOUND PROOF CANOPY AND BASE FRAME (CHASIS) SPECIFICATIONS



- 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 °C
- 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
- I permeability 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

Certificate no.: 2372384

Valid until: 14 August 2023

Initial certification date: 14 August 2021

Valid: 14 October 2021 – 13 October 2023

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 this certificate

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, General Industry and Automotive Industry, and Earth Moving Equipment (Excavator, Wheel Loader, Dozer), Testing of Earth Moving Equipment (Excavator and Wheel Loader).**

Place and date: Barcelona, 09 October 2023

For the issuing office: DNV Business Assurance, Barcelona, Spain

Site Name: Management Representative

Let us affirm that conditions as set out in the Certificate Agreement may render this Certificate invalid.

ACCREDITED UNIT: DNV Business Assurance S.L. - Certification - 2384-ES-BARCELONA, Barcelona, Spain - +34 93 555 0200 - www.dnv.com

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 2372385

Valid until: 13 January 2024

Initial certification date: 13 January 2024

Valid: 14 October 2021 – 13 October 2023

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 this certificate

has been found to conform to the Occupational Health and Safety Management System standard: **ISO 45001:2018**

This certificate is valid 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, Dozer), Testing of Earth Moving Equipment (Excavator and Wheel Loader).**

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CLAYTON DE WHITNEY
REGISTRO GENERAL
SALIDA
Nº de Registro: 945 / RG-045
Fecha: 29/07/2024 12:00:00

IRENE SANCHEZ ROMAN, MANAGER OF THE DEPARTMENT OF LEGAL ADVISORY SERVICES AND THE DATABASE OF THE OFFICIAL CHAMBER OF COMMERCE, INDUSTRY AND SERVICES OF MADRID, WITH REGISTERED OFFICE AT PLAZA DE LA INDEPENDENCIA 1, MADRID, SPAIN

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

JCB ENERGY ELECTRIC POWER INDUSTRY SL, a company with Tax ID: Number B13975954, and its registered office at street Tropezadero nº 7, 28042 Madrid is registered on 8 May 2024, under the heading of the 34 Section, companies, of the Economic Activities Tax Tariff Number 342 to perform the following activity:

- Manufacture of electrical material for use and equipment

In witness whereof, for the appropriate purpose, I have issued and signed this Certificate, to which I affix the stamp of this Chamber, in Madrid on 26 July 2024.

CLAYTON DE WHITNEY
REGISTRO GENERAL
SALIDA
Nº de Registro: 950 / RG-050
Fecha: 29/07/2024 12:00:00

IRENE SANCHEZ ROMAN, DIRECTORA DEL DEPARTAMENTO DE ASSESORIA JURIDICA Y CENSO DE LA CAMARA OFICIAL DE COMERCIO, INDUSTRIA Y SERVICIOS DE MADRID, CON DOMICILIO SOCIAL EN LA PLAZA DE LA INDEPENDENCIA Nº 1, MADRID - ESPAÑA

CERTIFICA: Que de los antecedentes que obran en esta Corporación y de otros exhibidos por la sociedad, resulta:

PRIMERO.- Que la compañía JCB ENERGY ELECTRIC POWER INDUSTRY SL, es una sociedad mercantil de nacionalidad española, constituida mediante escritura pública de fecha 23 de junio de 2023, anotada por don José María Vázquez, Notario del Registro de Madrid con el número 1.275 de acuerdo de su protocolo, e inscrita en el Registro Mercantil al Tomo 45.424, Folio 40, Hoja M-799.075, Inscripción 1ª.

SEGUNDO.- Que según se desprende de la mercantilización de constitución, en el artículo 3 de los Estatutos de la compañía JCB ENERGY ELECTRIC POWER INDUSTRY SL, resulta que tiene por objeto social:

"Actividad principal 27.11. Fabricación de motores, generadores y transformadores eléctricos".

TERCERO.- Que según consta en la escritura de constitución, el capital social de la compañía JCB ENERGY ELECTRIC POWER INDUSTRY SL, es de la cantidad de 19.000,00 € (DIECINUEVE MIL NOVECIENTOS VEINTE EUROS), dividido en 19.000 participaciones sociales, de 1,00 € (UN EURO) de valor nominal cada una, distribuido proporcionalmente del 1 al 19.000, ambos inclusive, que son íntegramente asumidos y desembolsados por el socio fundador.

CUARTO.- Que según consta en la escritura de constitución citada en párrafos anteriores, la compañía JCB ENERGY ELECTRIC POWER INDUSTRY SL, opta por el sistema de Administración Única y nombra por tiempo indefinido a don Mohamed A.M. Eladiri, con Número de Identidad Extranjera Y42M83279, para que actúe en nombre y representación de la sociedad, con facultades facultades legal y estatutariamente correspondientes a dicho cargo, prestando el administrador nombrado a la aceptación del mismo.

QUINTO.- Que la compañía JCB ENERGY ELECTRIC POWER INDUSTRY SL, con domicilio en calle Tropezadero número 7, 28042 Madrid y presunta de Número de Identificación fiscal B13975954, consta dada de alta en el grupo empresarial 342 de la Sección 1ª empresarial de las Tarifas del Impuesto sobre Actividades Económicas, que le habilita para ejercer la actividad "Fabricación de material eléctrico de utilización y equipamiento".

CE

CE DECLARATION OF CONFORMITY

JCB ENERGY ELECTRIC POWER INDUSTRY SL
C/ ALFREDO MARQUESE, 10, PUERTA A, PLANTA 1 BARCELONA MADRID

Description Of The Product: GENERATORS AND PUMPS

Product Brand/Model/Type: (DIESEL GENERATORS, GAS GENERATORS, PORTABLE GENERATORS, LIGHT TOWERS, WATERS PUMPS, FORKlift, UPS, REGULATORS, CONVERTERS, ALTERNATORS, WELDING GENERATORS, TAILGATE GENERATORS, BATTERY POWER SOURCES)

Applicable harmonized standards: EN ISO 15000:2010, EN ISO 15001:2010, EN ISO 15002:2010, EN ISO 15003:2010, EN ISO 15004:2010, EN ISO 15005:2010, EN ISO 15006:2010, EN ISO 15007:2010, EN ISO 15008:2010, EN ISO 15009:2010, EN ISO 15010:2010, EN ISO 15011:2010, EN ISO 15012:2010, EN ISO 15013:2010, EN ISO 15014:2010, EN ISO 15015:2010, EN ISO 15016:2010, EN ISO 15017:2010, EN ISO 15018:2010, EN ISO 15019:2010, EN ISO 15020:2010, EN ISO 15021:2010, EN ISO 15022:2010, EN ISO 15023:2010, EN ISO 15024:2010, EN ISO 15025:2010, EN ISO 15026:2010, EN ISO 15027:2010, EN ISO 15028:2010, EN ISO 15029:2010, EN ISO 15030:2010, EN ISO 15031:2010, EN ISO 15032:2010, EN ISO 15033:2010, EN ISO 15034:2010, EN ISO 15035:2010, EN ISO 15036:2010, EN ISO 15037:2010, EN ISO 15038:2010, EN ISO 15039:2010, EN ISO 15040:2010, EN ISO 15041:2010, EN ISO 15042:2010, EN ISO 15043:2010, EN ISO 15044:2010, EN ISO 15045:2010, EN ISO 15046:2010, EN ISO 15047:2010, EN ISO 15048:2010, EN ISO 15049:2010, EN ISO 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