


# 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    | Series | Brand   | Model | Series | Operation | kVA              | kW      | A       |
| JCN 2500  | 50        | 231/400 | 0.8          | 1500       | JCN           | Y3091JCI | YII    |  | JCB   | 450MX  | Standby   | 2.500,0          | 2.000,0 | 3.612,7 |
|           |           |         |              | Prime      |               |          |        |   |       |        | 2.272,7   | 1.818,2          | 2.284,3 |         |
|           |           |         |              | Continuous |               |          |        |   |       |        | 1.590,9   | 1.272,7          | 2.299,0 |         |
| JCN 2500  | 60        | 277/480 | 0.8          | 1800       |               |          |        |   |       |        | Standby   | 2.500,0          | 2.000,0 | 3.612,7 |
|           |           |         |              | Prime      |               |          |        |   |       |        | 2.272,7   | 1.818,2          | 2.284,3 |         |
|           |           |         |              | Continuous |               |          |        |   |       |        | 1.590,9   | 1.272,7          | 2.299,0 |         |

- 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

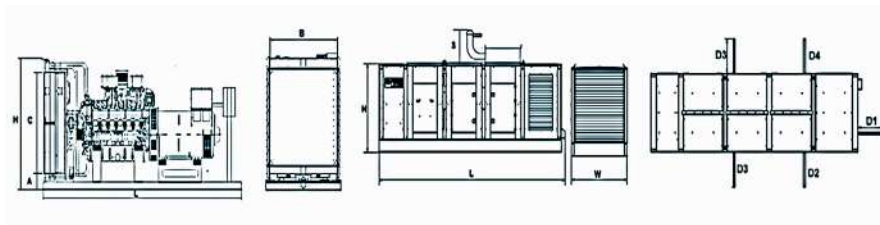
- \* Generators can work on Continuous Power at 70% of Prime power value if only all maintenances are done on time with original spare parts and high-quality oils that manufacturer advice.
- \* Generators should not operate below 50% of Prime Power value. In such a case, the engine will burn excessive 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 | 2600                | 2800                  |
| LENGTH             | mm | 5700                | 9000                  |
| HEIGHT             | mm | 2643                | 2900                  |
| WEIGHT (NET)       | Kg | 13870               | 18890                 |
| FUEL TANK CAPACITY | L  | 4000                | 4000                  |

| SYMBOL | OPEN | CANOPY |
|--------|------|--------|
| L      | 5700 | 9000   |
| W      | 2600 | 2800   |
| H      | 2643 | 2000   |
| S      |      | 900    |
| A      | 300  |        |
| B      | 2559 |        |
| C      | 2086 |        |
| D1     |      | 1044   |
| D2     |      | 1044   |
| D3     |      | 1044   |
| D4     |      | 1044   |
| D5     |      | 1044   |



## FUEL CONSUMPTION

| PERCENT OF PRIME POWER | 1500 rpm | 1800 rpm |
|------------------------|----------|----------|
|                        | l/hr     | l/hr     |
| 110 %                  | 497,30   | 497,30   |
| 100 %                  | 455,85   | 455,85   |
| 75 %                   | 343,60   | 343,60   |
| 50 %                   | 240,52   | 240,52   |

## DIESEL ENGINE MAIN TECHNICAL PARAMETERS

### GENERAL

|                             |                     |                                     |
|-----------------------------|---------------------|-------------------------------------|
| Number of Cylinders         |                     | 12                                  |
| Configuration               |                     | V-Type                              |
| Aspiration                  |                     | Turbocharged & Intercooled          |
| Combustion System           |                     | Direct Injection                    |
| Compression Ratio           |                     | 13.5:1                              |
| Bore                        | mm                  | 200                                 |
| Stroke                      | mm                  | 210                                 |
| Displacement                | L                   | 79,17                               |
| Governing Type              |                     | ECU                                 |
| Governing Class             |                     | G3                                  |
| Rotation                    |                     | Counterclockwise                    |
| Firing Order                |                     | L1-R6-L5-R2-L3-R4-L6-R1-L2-R5-L4-R3 |
| Emission                    |                     | Tier II                             |
| Moments of Rotation Inertia |                     |                                     |
| Engine                      | Kg - m <sup>2</sup> | 39,53                               |
| Flywheel                    | Kg - m <sup>2</sup> | 25,05                               |
| Performance Rating          |                     |                                     |
| Speed Droop                 | %                   | ≤0,5                                |
| 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) | 00 |
| Flex Coupling Disc | Inch (")   | 21 |

### TEST CONDITIONS

|                                    |        |      |
|------------------------------------|--------|------|
| Ambient Temperature                | %      | 25   |
| Atmospheric Pressure               | KPa    | 100  |
| Relative Humidity                  | Rh (%) | 30   |
| Max. Operating Intake Resistance   | KPa    | <5   |
| Exhaust Backpressure Limit         | KPa    | <10  |
| Fuel Temperature (Fuel Inlet Pump) | °C     | 38±2 |

### OVERALL DIMENSIONS

|            |    |      |
|------------|----|------|
| Length*    | mm | 3320 |
| Width      | mm | 2560 |
| Height     | mm | 2255 |
| Dry Weight | kg | 9707 |

\*From front end of radiator to near end of air filter

### FAN

|                  |    |         |
|------------------|----|---------|
| Diameter         | mm | 1700    |
| Drive Ratio      |    | 1,26    |
| Number of Blades |    | 8       |
| Material         |    | PAG     |
| Type             |    | Blowing |



## DIESEL ENGINE MAIN TECHNICAL PARAMETERS

### COOLING SYSTEM

|   |                    |          |
|---|--------------------|----------|
| Radiator Type                                     | 50°C               | Tropical |
| Total Coolant Capacity                            | L                  | 355      |
| 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                 | 75       |
| Thermostat Operation Temperature - Full Open      | °C                 | 85       |
| Delivery of Coolant Pump                          | m <sup>3</sup> / h | 16,67    |
| Min. Pressure Before Coolant Pump                 | bar                | 0,5      |
| Radiator Face Area                                | m <sup>2</sup>     | 5,35     |
| Rows  | Row                | 7        |
| Matrix Density                                    | Per / Inch         | 12       |
| Material  |                    | Aluminum |
| Width of Matrix                                   | mm                 | 2559     |
| Height of Matrix                                  | mm                 | 2086     |
| Pressure Cap Setting                              | kPa                | 50       |
| Estimated Cooling Air Flow Reserve                | kPa                | 0,125    |
| Engine Pre Heater-Tube (with Circulation Pump)    | W                  | 2x4500   |

### LUBRICATION SYSTEM

|  |     |      |
|--|-----|------|
| Total System                           | L   | 340  |
| Minimum Oil Level                      | L   | 280  |
| Nominal Motor Operating Temperature    | °C  | 40   |
| Lubricating Oil Pressure (Rated Speed) | bar | 7    |
| Relief Valve Opens                     | kPa | 200  |
| Oil / Fuel Consumption Ratio           | %   | ≤0,1 |
| Normal Oil Temperature                 | °C  | 110  |

### ELECTRICAL SYSTEM

|                           |    |       |
|---------------------------|----|-------|
| Voltage                   | V  | 24    |
| Starter                   | kW | 2X11  |
| Alternator Output Ampers  | A  | 60    |
| Alternator Output Voltage | V  | 28    |
| Batteries Capacity        | Ah | 4X200 |

## JCB ENERGY DIESEL ENGINE POWER RATINGS

| ENGINE MODEL |                   | Y3091JCI                       |         | ENGINE FAMILY | JC37    | ENGINE SERIES | YII     |
|--------------|-------------------|--------------------------------|---------|---------------|---------|---------------|---------|
| Speed (Rpm)  | Type of Operation | TYPICAL GENERATOR OUTPUT (NET) |         | ENGINE POWER  |         |               |         |
|              |                   |                                |         | Gross         |         | Net           |         |
|              |                   | kVA                            | kWe     | KWm           | Hp      | kWm           | Hp      |
| 1500         | Stand By(Maximum) | 2.502,0                        | 2.002,0 | 2.160,0       | 2.899,3 | 2.085,0       | 2.798,7 |
|              | Prime             | 2.274,0                        | 1.819,0 | 1.970,0       | 2.644,3 | 1.895,0       | 2.543,6 |
| 1800         | Stand By(Maximum) | 2.502,0                        | 2.002,0 | 2.160,0       | 2.899,3 | 2.085,0       | 2.798,7 |
|              | Prime             | 2.274,0                        | 1.819,0 | 1.970,0       | 2.644,3 | 1.895,0       | 2.543,6 |

## DIESEL ENGINE MATCHING PARAMETERS - 50 HZ

| 50 HZ @ 1500 R/MIN                         |                      | STAND BY | PRIME  |
|--|----------------------|----------|--------|
| Gross Engine Power                         | kW                   | 2160,0   | 1970,0 |
| Net Engine Power                           | kW                   | 2085,0   | 1895,0 |
| Fan Power Consumption (Belt Pulley Driven) | kW                   | 70,0     | 70,0   |
| Other Power Loss                           | kW                   | 5,0      | 5,0    |
| Mean Effective Pressure                    | MPa                  | 1,97     | 1,78   |
| Intake Air Flow                            | m <sup>3</sup> / min | 175,00   | 159,00 |
| Exhaust Temperature Limit                  | °C                   | 550      | 550    |
| Exhaust Flow                               | m <sup>3</sup> / min | 395,00   | 358,00 |
| Boost Pressure Ratio                       |                      | 3,15     | 2,88   |
| Mean Piston Speed                          | m / s                | 10,5     | 10,5   |
| Cooling Fan Air Flow                       | m <sup>3</sup> / min | 3000,0   | 3000,0 |
| Typical Generator Output Power             | kVA                  | 2502     | 2274   |
| HEAT REJECTION                             |                      | STAND BY | PRIME  |
| Energy in Fuel (Heat of Combustion)        | kW                   | 5093,0   | 4598,0 |
| Gross Heat to Power                        | kW                   | 2160,0   | 1970,0 |
| Energy to Coolant and Lubricating Oil      | kW                   | 690,0    | 621,0  |
| Heat Dissipation Capacity *                | kW                   | 820,0    | 738,0  |
| Energy to Exhaust                          | kW                   | 1205,0   | 1065,0 |
| Heat to Radiation                          | kW                   | 218,0    | 204,0  |

\*Intake Intercooled system

## DIESEL ENGINE MATCHING PARAMETERS - 60 HZ

| 60 HZ @ 1800 R/MIN                         |                      | STAND BY | PRIME  |
|--|----------------------|----------|--------|
| Gross Engine Power                         | kW                   | 2160,0   | 1970,0 |
| Net Engine Power                           | kW                   | 2085,0   | 1895,0 |
| Fan Power Consumption (Belt Pulley Driven) | kW                   | 70,0     | 70,0   |
| Other Power Loss                           | kW                   | 5,0      | 5,0    |
| Mean Effective Pressure                    | MPa                  | 1,97     | 1,78   |
| Intake Air Flow                            | m <sup>3</sup> / min | 175,00   | 159,00 |
| Exhaust Temperature Limit                  | °C                   | 550      | 550    |
| Exhaust Flow                               | m <sup>3</sup> / min | 395,00   | 358,00 |
| Boost Pressure Ratio                       |                      | 3,15     | 2,88   |
| Mean Piston Speed                          | m / s                | 10,5     | 10,5   |
| Cooling Fan Air Flow                       | m <sup>3</sup> / min | 3000,0   | 3000,0 |
| Typical Generator Output Power             | kVA                  | 2502     | 2274   |
| HEAT REJECTION                             |                      | STAND BY | PRIME  |
| Energy in Fuel (Heat of Combustion)        | kW                   | 5093,0   | 4598,0 |
| Gross Heat to Power                        | kW                   | 2160,0   | 1970,0 |
| Energy to Coolant and Lubricating Oil      | kW                   | 690,0    | 621,0  |
| Heat Dissipation Capacity *                | kW                   | 820,0    | 738,0  |
| Energy to Exhaust                          | kW                   | 1205,0   | 1065,0 |
| Heat to Radiation                          | kW                   | 218,0    | 204,0  |

\*Intake Intercooled system

## JCB ALTERNATOR TECHNICAL PARAMETERS AND SPECIFICATIONS



| ALTERNATOR TECHNICAL PARAMETERS |                      |                                 |                               |                  |
|---------------------------------|----------------------|---------------------------------|-------------------------------|------------------|
| Insulation Class                | H                    | Field Control System            | Self-Excited                  |                  |
| Winding Pitch                   | 2/3 - (N° 6)         | A.V.R. Model                    | Standard                      | MX321+PMG        |
| Wires                           | 6                    | Voltage Regulation              | %                             | ± 0.5            |
| 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                        | m <sup>3</sup> /sec. | 2,69                            | Wave Form: I.E.C. = THF - (*) | % < 1.5          |
| Bearing Drive                   | N/A                  | -                               | Bearing Non-Drive             | Bearing 6319-2RZ |
| Rotor Winding                   | 100%                 | Copper                          | Stator Winding                | 100% Copper      |



# JCN 2500 & 2500

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



## ALTERNATOR SPECIFICATIONS

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

STANDARD USING ALTERNATOR

OPTIONAL USING ALTERNATOR

BRAND/MODEL



JCB 450MX



LSA 52.3S7

STAMFORD

P7G

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

2300,0

2300,0

2346,0

-

2530,0

2530,0

2581,0

-

OUTPUT POWER

kW

1840,0

1840,0

1876,8

-

2024,0

2024,0

2064,8

-

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

STANDARD USING ALTERNATOR

OPTIONAL USING ALTERNATOR

BRAND/MODEL



JCB 450SX



LSA 52.3S5

STAMFORD

S7L1D-F4

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

2300,0

2300,0

2346,0

-

2530,0

2530,0

2581,0

-

OUTPUT POWER

kW

1840,0

1840,0

1876,8

-

2024,0

2024,0

2064,8

-



## 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

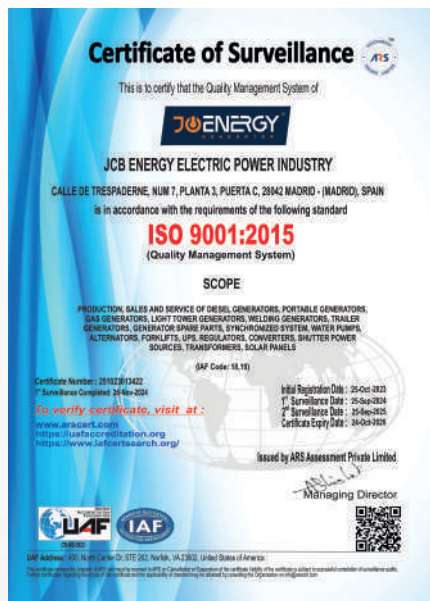


- Special, Registered JCB Energy Design and Colour
- A1 Quality DKP / HRU / Galvanized Steel
- Sensitive Twist on Automatic Press Brake
- Delicate Cut on Automatic Punch and Laser Bench
- Sensitive Welding on Robotic Welding Bench
- Chemical Cleaning Nano Technology Before Painting
- Robotic Painting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

Certificate no.: 2372384

Valid until: 14 August 2021

Valid from: 14 October 2020 - 13 October 2021

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: **Buenos Aires, 09 October 2021**

For the issuing office: **DNV Business Assurance** **DNV AS, 1300 L.B. Sørensen, Nærøysund**

Signature:

Signature:

Signature:

Signature:

Signature:

Signature:

# MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 2372385

Valid until: 13 January 2022

Valid from: 14 October 2020 - 13 October 2021

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).**

Place and date: **Buenos Aires, 09 October 2021**

For the issuing office: **DNV Business Assurance** **DNV AS, 1300 L.B. Sørensen, Nærøysund**

Signature:

Signature:

Signature:

Signature:

Signature:

Signature:

# CAMARA DE COMERCIO INDUSTRIA Y SERVICIOS

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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: **Buenos Aires, 09 October 2021**

For the issuing office: **DNV Business Assurance** **DNV AS, 1300 L.B. Sørensen, Nærøysund**

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# CAMARA DE COMERCIO INDUSTRIA Y SERVICIOS

CERTIFICATE NO. 2372384

Valid until: 14 August 2021

Valid from: 14 October 2020 - 13 October 2021

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# CE DECLARATION OF CONFORMITY

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**JCBENERGY**  
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-VERTA-106189

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