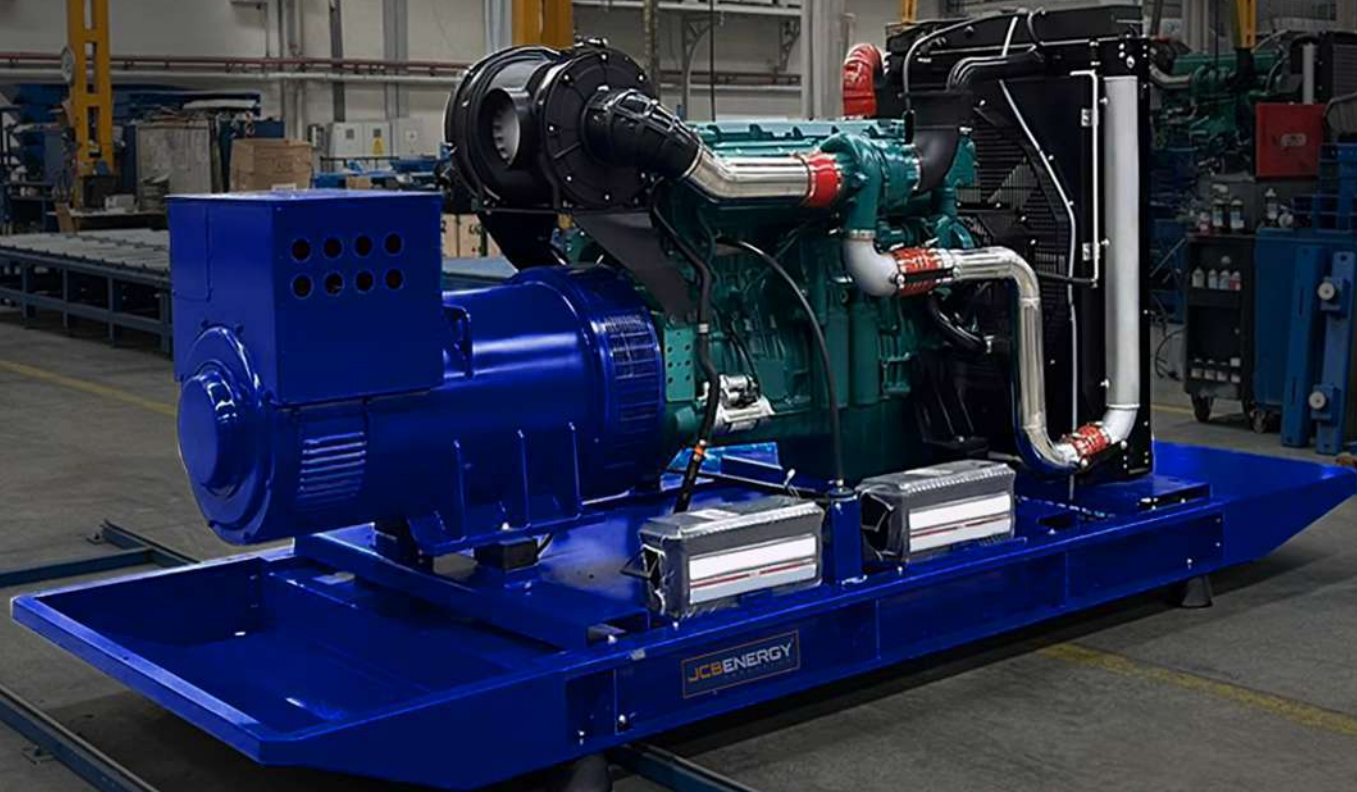




JCB ENERGY ELECTRIC POWER INDUSTRY

📍 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
JCD 410	50	231/400	0.8	1500		TCD12.1G2	TCD		JCB	315S	Standby	410,0	328,0	592,5
				Prime							373,0	298,4	539,0	
				Continuous							349,0	279,2	504,3	
JCD 440	60	277/480	0.8	1800							Standby	440,0	352,0	635,8
										315S	Prime	400,0	320,0	578,0
											Continuous	360,7	288,6	521,3

- 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

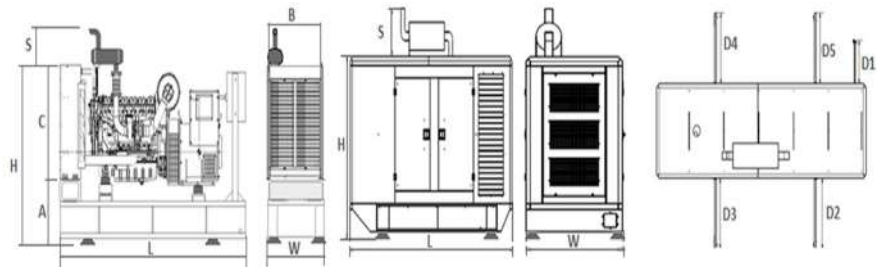
- * Generators can work on Continuous Power at 70% of Prime power value if only all maintenances are done on time with original spare parts and high-quality oils that manufacturer advice.
- * Generators should not operate below 50% of Prime Power value. In such a case, the engine will burn excessive 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	1100	1179
LENGTH	mm	3254	3921
HEIGHT	mm	1782	2498
WEIGHT (NET)	Kg	2379	2970
FUEL TANK CAPACITY	L	475	673

SYMBOL	OPEN	CANOPY
L	3254	3921
W	1100	1179
H	1598	1955
S	184	543
A	766	
B	810	
C	860	
D1		520
D2		850
D3		850
D4		850
D5		850



FUEL CONSUMPTION

PERCENT OF PRIME POWER	1500 rpm	1800 rpm
	l/hr	l/hr
110 %	82,47	88,19
100 %	75,98	80,58
75 %	57,27	60,74
50 %	39,72	42,12

DIESEL ENGINE MAIN TECHNICAL PARAMETERS

50 Hz – 1500 min ⁻¹			60 Hz – 1800 min ⁻¹		
Type		TCD12.1	Type		TCD12.1
Speed	min ⁻¹	1500	Speed	min ⁻¹	1800
Net Frequency	Hz	50	Net Frequency	Hz	60
Power Standard		LTP	Power Standard		LTP
Power Level		G2	Power Level		G2
Exhaust Emission Standard		Fuel Optimized	Exhaust Emission Standard		Fuel Optimized
GENERAL			GENERAL		
Aspiration		Turbo,CAC	Aspiration		Turbo,CAC
Governing System		Electronic	Governing System		Electronic
Governor Brand		Bosch	Governor Brand		Bosch
No of Cylinders		6	No of Cylinders		6
Configuration		in-line	Configuration		in-line
Injection System		Common Rail	Injection System		Common Rail
Displacement	L	12,10	Displacement	L	12,10
Bore	mm	131	Bore	mm	131
Stroke	mm	150	Stroke	mm	150
Compression Ratio		17:1	Compression Ratio		17:1
Mean Effective Pressure	Bar	28	Mean Effective Pressure	Bar	25,5
Piston Speed	m/s	8	Piston Speed	m/s	9,6
Rotation (looking at flywheel)		ccw	Rotation (looking at flywheel)		ccw
No of Teeth on Flywheel Ring Gear		143	No of Teeth on Flywheel Ring Gear		143
GOVERNOR PERFORMANCE			GOVERNOR PERFORMANCE		
Speed droop (static) electr. gov.	%	0	Speed droop (static) electr. gov.	%	0
Governing standards		G3	Governing standards		G3
MOMENT OF INERTIA			MOMENT OF INERTIA		
Flywheel (standard genset spec.)	kg m ²	2,16	Flywheel (standard genset spec.)	kg m ²	2,16
Max. step load acceptance, 1st step	%	-	Max. step load acceptance, 1st step	%	-
Sound power at full load, incl. cooling system	dB(A)	111,10	Sound power at full load, incl. cooling system	dB(A)	114,10
Sound press. (1m average, full load), incl. cool. syst.	dB(A)	96,60	Sound press. (1m average, full load), incl. cool. syst.	dB(A)	96,60
ENGINE WEIGHT			ENGINE WEIGHT		
Engine Dry, w/o Cooling System	kg	1154	Engine Dry, w/o Cooling System	Kg	1154
Engine with cooling system	kg	1249	Engine with cooling system	kg	1249
LUBRICATION SYSTEM			LUBRICATION SYSTEM		
Oil specification		15W40/CI-4/SL	Oil specification		15W40/CI-4/SL
Oil consumption (as % of fuel consumption)	%	0,10	Oil consumption (as % of fuel consumption)	%	0,10
Oil capacity (sump)	l	30	Oil capacity (sump)	l	30
Min. oil pressure (warning)	Bar	0,80	Min. oil pressure (warning)	Bar	0,80
Min. oil pressure (shut down)	Bar	0,60	Min. oil pressure (shut down)	Bar	0,60
Max. permissible oil temperature (oil pan)	°C	130	Max. permissible oil temperature (oil pan)	°C	130
OUTPUT			OUTPUT		
Gross Output(LTP or StandBy Power)	Kw	360	Gross Output(LTP or StandBy Power)	Kw	385
Fan Reduction	Kw	13	Fan Reduction	Kw	17,50
Net flywheel	Kw	347	Net flywheel		367,50
Electrical Output (Stand By)	Kva	410	Electrical Output (Stand By)	Kva	440
Gross Output(PRP or Prime Power)	Kw	330	Gross Output(PRP or Prime Power)	Kw	353
Gross Output(Continuous Power)	kw	310	Gross Output(Continuous Power)	kw	320

DIESEL ENGINE MAIN TECHNICAL PARAMETERS

50 Hz – 1500 min ⁻¹			60 Hz – 1800 min ⁻¹		
COOLING SYSTEM, GENERAL ENGINE COOLING DATA			COOLING SYSTEM, GENERAL ENGINE COOLING DATA		
Max. perm. Coolant Outlet Temperature	°C	99	Max. perm. Coolant Outlet Temperature	°C	99
Max. perm. Flow Resistance (cool. syst. and piping)	Bar	0,30	Max. perm. Flow Resistance (cool. syst. and piping)	Bar	0,30
Max. Temperature of Coolant (warning)	°C	105	Max. Temperature of Coolant (warning)	°C	105
Max. Temperature of Coolant (shutdown)	°C	108	Max. Temperature of Coolant (shutdown)	°C	108
Temperature at Which Thermostat Starts to open	°C	80	Temperature at Which Thermostat Starts to open	°C	80
Temperature at Which Thermostat is Fully Open	°C	90	Temperature at Which Thermostat is Fully Open	°C	90
Delivery of Coolant Pump	m ³ /h	28,80	Delivery of Coolant Pump	m ³ /h	34,6
Min. Pressure Before Coolant Pump	Bar	0,80	Min. Pressure Before Coolant Pump	Bar	0,80
Temperature at CAC outlet at standard conditions	°C	50	Temperature at CAC outlet at standard conditions	°C	50
ENGINE COOLING SYSTEM			ENGINE COOLING SYSTEM		
Coolant Capacity (engine)	l	20	Coolant Capacity (engine)	l	20
Coolant Capacity (incl. cooling unit)	l	35	Coolant Capacity (incl. cooling unit)	l	35
Air to Boil (max. permissible cool. air temp. at fan)	°C	55	Air to Boil (max. permissible cool. air temp. at fan)	°C	55
Fan Power Consumption	kW	13	Fan Power Consumption	kW	17,5
Cooling air Flow	m ³ /h	38486	Cooling air Flow	m ³ /h	43298
Air Pressure Loss, external	mbar	1,64	Air Pressure Loss, external	mbar	1,64
HEAT BALANCE			HEAT BALANCE		
Heat Dissipation (engine radiator)	kW	129	Heat Dissipation (engine radiator)	kW	131
Heat Dissipation (CAC)	kW	75	Heat Dissipation (CAC)	kW	70
INLET / EXHAUST DATA			INLET / EXHAUST DATA		
Max. intake Depression (Switch setting)	mbar	50	Max. intake Depression (Switch setting)	mbar	50
Combustion Air Volume	m ³ /h	1305	Combustion Air Volume	m ³ /h	1594
Max. Exhaust Back Pressure	mbar	50	Max. Exhaust Back Pressure	mbar	50
Max. Exhaust Gas Temperature	°C	523	Max. Exhaust Gas Temperature	°C	517
Exhaust Gas Flow (at above temp)	m ³ /h	3590	Exhaust Gas Flow (at above temp)	m ³ /h	4363
Exhaust Flange / pipe diameter	mm	120	Exhaust Flange / pipe diameter	mm	120
ELECTRICAL SYSTEM			ELECTRICAL SYSTEM		
Voltage	V	24	Voltage	V	24
Starter	KW	8,80	Starter	KW	8,80
Alternator Output	A	80	Alternator Output	A	80
Batteries (minimum capacity, cold start limit -5°C)	Ah	2*120	Batteries (minimum capacity, cold start limit -5°C)	Ah	2*120

ALTERNATOR TECHNICAL PARAMETERS






ALTERNATOR TECHNICAL PARAMETERS

Insulation Class	H	Field Control System	Self-Excited
Winding Pitch	2/3 - (N° 6)	A.V.R. Model	Standard
Wires	12	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%

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

STANDARD USING ALTERNATOR




OPTIONAL USING ALTERNATOR

BRAND/MODEL		JCB 315S			TAL046H			S4L1D E/HC4E	
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	373,0	373,0	387,0	-	410,0	410,0	426,0	-
OUTPUT POWER	kW	298,4	298,4	309,6	-	328,0	328,0	340,8	-

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

STANDARD USING ALTERNATOR

OPTIONAL USING ALTERNATOR

BRAND/MODEL		JCB 315S				TAL046G				HC4E	
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	421,0	443,0	466,0	-	463,0	487,00	513,0	-		
OUTPUT POWER	kW	336,8	354,4	372,8	-	370,4	389,6	410,4	-		

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		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

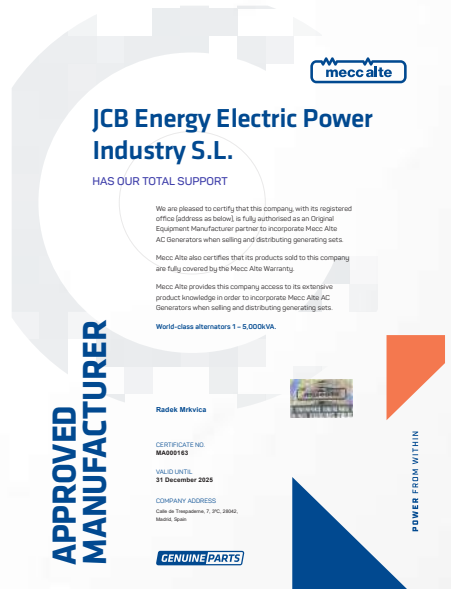
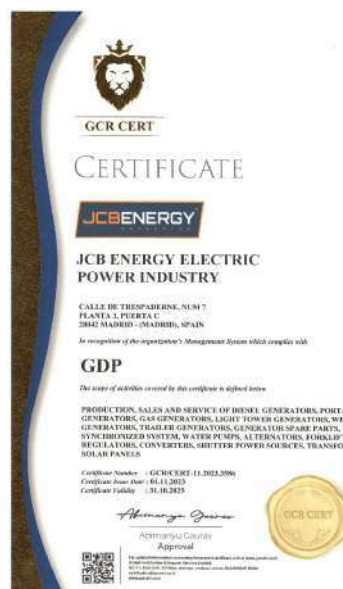
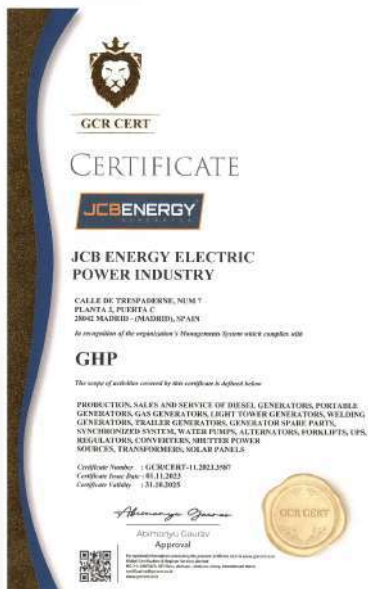
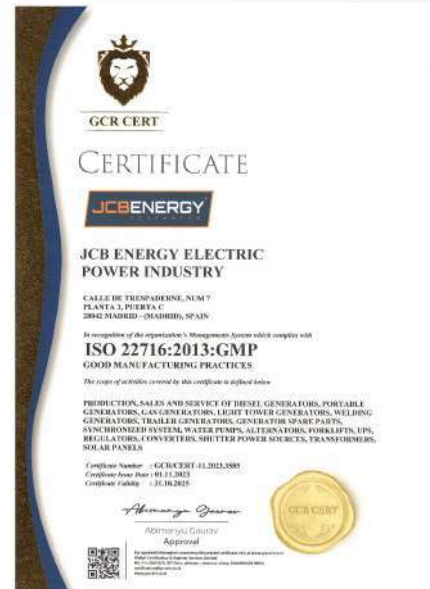
Mains Voltage Level Control	Generator Voltage Level Control	3 Phase Generator Protections	3 Phase AMF Function	Alarm Horn
Network Frequency Level Control	Generator Frequency level Control	- High / Low Voltage	- High / Low Frequency	Heater Tube Thermostat Control
Engine Operating Option Control	Generator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

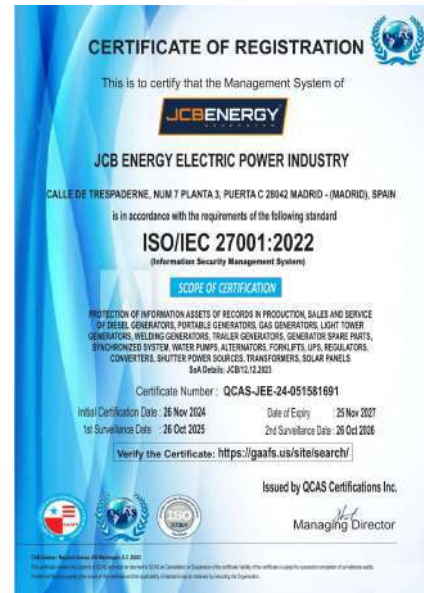
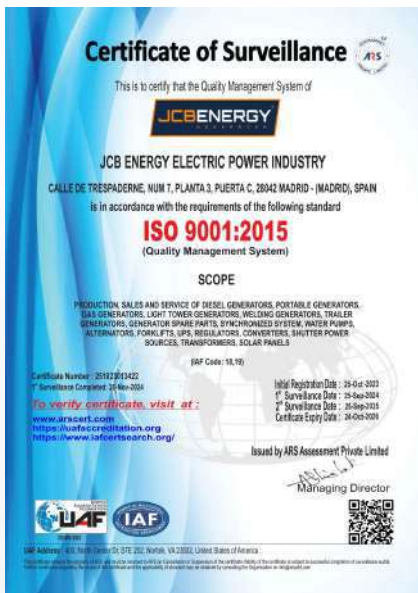
SOUND PROOF CANOPY AND BASE FRAME (CHASIS) SPECIFICATIONS



- 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

Initial certification date: 14 August 2021

Valid: 14 October 2021 – 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 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 2021

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

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

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

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

MANAGEMENT SYSTEM CERTIFICATE

Certificate no.: 2372385

Initial certification date: 13 January 2021

Valid: 14 October 2021 – 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 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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Certificate no.: 2372386

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Valid: 14 October 2021 – 13 October 2026

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CE DECLARATION OF CONFORMITY

Certificate no.: 2372388

Initial certification date: 13 January 2021

Valid: 14 October 2021 – 13 October 2026

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CE DECLARATION OF CONFORMITY

Certificate no.: 2372389

Initial certification date: 13 January 2021

Valid: 14 October 2021 – 13 October 2026

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