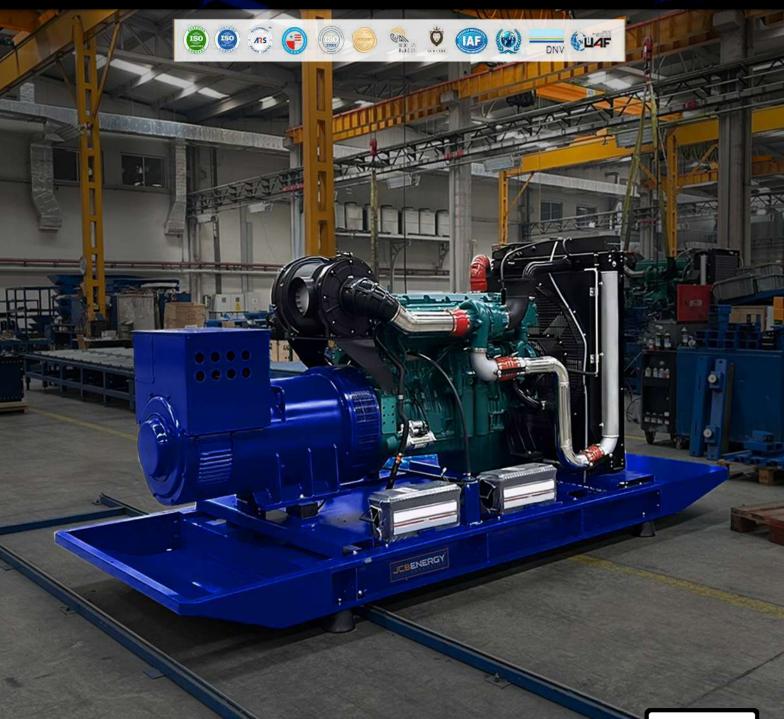


JCB ENERGY ELECTRIC POWER INDUSTRY

♀ MADRID / SPAIN







VMAN®















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





GENERATOR GENERAL INFORMATION

GENERATOR	FREQUENCY	VOLTAGE	POWER FACTOR	SPEED	DIESEL E	DIESEL ENGINE ALTERNATOR			TYPE OF	GENERATOR OUTPUT		JTPUT		
Model	Hz	V	Cos Q	Rpm	Brand	Model	Series	Brand	Model	Series	Operation	kVA	kW	Α
								_			Standby	66,0	52,8	95,4
JCD 66	50	231/400	0.8	1500	BF4M2012					225S2	Prime	60,0	48,0	86,7
						<u></u>	罗	ICD		Continuous	55,1	44,1	79,7	
						BF4IVIZU1Z	2 BF	Π	JCB	22552	Standby	77,0	61,6	111,3
JCD 77	60	277/480	0.8	1800				ENERGY			Prime	70,0	56,0	101,2
											Continuous	65,3	52,2	94,3

- 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.





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



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

- * Generators can work on Continuous Power at 70% of Prime power value if only all maintenances are done on time with original spare parts and high-quality oils that manufacturer advice.
- * Generators should not operate below 50% of Prime Power value. In such a case, the engine will burn excessive oil and eventually have irreparable damage.
- * If your need is 1000 kVA or above, you should prefer Synchronic Systems with 2-3 generators with failure back up and simultaneous aging.
- * These points will provide advantage for you with purchasing and operating the generator.

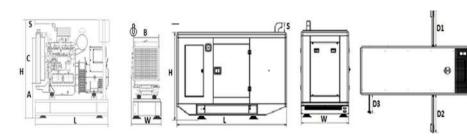
GENERATOR DIMENSIONS AND TECHNICAL DRAWINGS





VALUES		OPEN TYPE GENERATOR	CANOPY TYPE GENERATOR
WIDTH	mm	700	1042
LENGTH	mm	1900	2615
HEIGHT	mm	1562	1766
WEIGHT (NET)	Kg	1024	1200
FUEL TANK CAPACITY	L	161	205

SYMBOL	OPEN	CANOPY
L	1900	2615
W	700	1042
Н	1562	1594
S	95	172
Α	580	
В	530	
С	590	
D1		750
D2		750
D3		520
D4		
D5		



FUEL CONSUMPTION

PERCENT OF PRIME POWER	1500 rpm	1800 rpm	
1 ENGLIST OF FIRME FOODER	l/hr	I/hr	
110 %	15,07	17,58	
100 %	13,56	15,98	
75 %	10,08	11,88	
50 %	6,94	8,18	





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



DIESEL ENGINE MAIN TECHNICAL PARAMETERS

50 Hz – 1500 min ⁻¹			60 Hz – 1800 min ⁻¹		
Type		BF4M2012	Туре		BF4M2012
Speed	min ⁻¹	1500	Speed	min ⁻¹	1800
Net Frequency	Hz	50	Net Frequency	Hz	60
Power Standard		LTP	Power Standard		LTP
Power Level		-	Power Level		-
Exhaust Emission Standard		COM II	Exhaust Emission Standard		COM II
GENERAL			GENERAL		
Aspiration		Turbo	Aspiration		Turbo
Governing System		Electronic	Governing System		Electronic
Governor Brand		Heinzmann/DDE	Governor Brand		Heinzmann/DDE
No of Cylinders		4	No of Cylinders		4
Configuration		in-line	Configuration		in-line
Inication Contain		single injection	Iniantian Contains		single injection
Injection System		pumps	Injection System		pumps
Displacement	L	4,04	Displacement	L	4,04
Bore	mm	101	Bore	mm	101
Stroke	mm	126	Stroke	mm	126
Compression Ratio		19:1	Compression Ratio		19:1
Mean Effective Pressure	Bar	11,90	Mean Effective Pressure	Bar	11,60
Piston Speed	m/s	6,30	Piston Speed	m/s	7,56
Rotation (looking at flywheel)		ccw	Rotation (looking at flywheel)		ccw
No of Teeth on Flywheel Ring Gear		129	No of Teeth on Flywheel Ring Gear		129
GOVERNOR PERFORMANCE			GOVERNOR PERFORMANCE		
Speed droop (static) mech. gov.	%	4-5	Speed droop (static) mech. gov.	%	4-5
Speed droop (static) electr. gov.	%	0-3	Speed droop (static) electr. gov.	%	0-3
Governing standards		G3	Governing standards		G3
MOMENT OF INERTIA			MOMENT OF INERTIA		
Engine without flywheel	kg m²	0,16	Engine without flywheel	kg m²	0,16
Flywheel (standard genset spec.)	kg m²	1,20	Flywheel (standard genset spec.)	kg m²	1,20
Max. step load acceptance, 1st step	%	-	Max. step load acceptance, 1st step	%	-
Sound power at full load, incl. cooling system	dB(A)	105,3	Sound power at full load, incl. cooling	dB(A)	106,5
Sound wasse (1m overage full load) incl	- ()	,-	system	- ()	,-
Sound press. (1m average, full load), incl. cool. syst.	dB(A)	92	Sound press. (1m average, full load), incl. cool. syst.	dB(A)	93
ENGINE WEIGHT			ENGINE WEIGHT		
Engine Dry, w/o Cooling System	kg	405	Engine Dry, w/o Cooling System	Kg	405
Engine with cooling system	kg	457	Engine with cooling system	kg	457
LUBRICATION SYSTEM			LUBRICATION SYSTEM	6	
Oil specification		15W40/CI-4/SL	Oil specification		15W40/CI-4/SL
•	0/		Oil consumption (as % of fuel	0/	
Oil consumption (as % of fuel consumption)	%	0.15	consumption)	%	0,15
Oil capacity (sump)	I	8,50	Oil capacity (sump)	I	8,50
Min. oil pressure (warning)	Bar	1,80	Min. oil pressure (warning)	Bar	1,80
Min. oil pressure (shut down)	Bar	1.50	Min. oil pressure (shut down)	Bar	1,50
Max. permissible oil temperature (oil pan)	°C	125	Max. permissible oil temperature (oil pan)	°C	125
OUTPUT	.,		OUTPUT		
Gross Output(LTP or StandBy Power)	Kw	60	Gross Output(LTP or StandBy Power)	Kw	70
Fan Reduction	Kw	2,00	Fan Reduction	Kw	3,50
Net flywheel	Kw	58,0	Net flywheel	I/	66,5
Electrical Output (Stand By)	Kva	66	Electrical Output (Stand By)	Kva	77
Gross Output(PRP or Prime Power) Gross Output(Continous Power)	Kw kw	54 51	Gross Output(PRP or Prime Power) Gross Output(Continous Power)	Kw kw	63
Gross Output(Continuus Power)	I VV	21	Gross Output(Continious Power)	I VV	60





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



DIESEL ENGINE MAIN TECHNICAL PARAMETERS

Max. perm. Flow Resistance (cool. syst. and piping) Max. perm. Flow Resistance (cool. syst. and piping) Max. Temperature of Coolant (warning) C 108 Max. Temperature of Coolant (shutdown) C 110 Max. Temperature of Coolant (shutdown) C 110 Max. Temperature of Coolant (shutdown) C 110 Max. Temperature of Coolant (shutdown) C 111 Cemperature at Which Thermostat Starts to open C 98 Temperature at Which Thermostat is Fully Open C 98 Temperature at Which Thermostat is Fully Open Min. Pressure Before Coolant Pump Bar O.3 Min. Pressure Before Coolant Pump Bar O.6 Temperature at CAC outlet at standard conditions C - Temperature at CAC outlet at standard conditions T - Temperature at CAC outlet at standard conditions T - Temperature at CAC outlet at standard conditions T - Tempera	50 Hz – 1500 min ⁻¹			60 Hz – 1800 min ⁻¹		
Max. perm. Flow Resistance (cool. syst. and piping) Max. perm. Flow Resistance (cool. syst. and piping) Max. Temperature of Coolant (warning) C 108 Max. Temperature of Coolant (shutdown) C 110 Max. Temperature of Coolant (shutdown) C 111 Max. Temperature of Coolant (shutdown) C 112 Max. Temperature of Coolant (shutdown) C 113 Max. Temperature of Coolant (shutdown) C 114 Temperature at Which Thermostat Starts to open C 98 Temperature at Which Thermostat is Fully Open C 98 Temperature at Which Thermostat is Fully Open Min. Pressure Before Coolant Pump Bar O. Temperature at CAC outlet at standard conditions C Temperature at CAC out	COOLING SYSTEM, GENERAL ENGINE COOLING DATA	\		COOLING SYSTEM, GENERAL ENGINE COOLING DATA	A	
	Max. perm. Coolant Outlet Temperature	°C	105	Max. perm. Coolant Outlet Temperature	°C	105
Max. Temperature of Coolant (shutdown) "C 110 Max. Temperature of Coolant (shutdown) "C 111 Temperature at Which Thermostat Starts to open "C 83 Temperature at Which Thermostat Starts to open "C 98 Temperature at Which Thermostat is Fully Open "C 98 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at CAC outlet at Standard Conditions "C - Temperature at CAC outlet at Standard Conditions "C - Temperature at CAC outlet at Standard Conditions "C - Temperature at CAC outlet at Standard Conditions "C C Coolant Capacity (engine) I 6,00 Coolant Capacity (incl. cooling unit) I 15,90 Coolant Capacity (incl. cooling unit) I 15,90 Coolant Capacity (incl. cooling unit) I 15,90 Cooling air Flow Mar to Boil (max. permissible cool. air temp. at fan) "C 55 Fan Power Consumption kW 2,00 Fan Power Consumption kW 2,00 Fan Power Consumption kW 3,5 Cooling air Flow Mar Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 45,4 Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (convection) kW 45,4 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 NLET / EXHAUST DATA Max. Intake Depression (Switch setting) mbar 25 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 527 Exhaust Flange / pipe diameter mm - Exhaust Flange	Max. perm. Flow Resistance (cool. syst. and piping)	Bar	0.22		Bar	0,22
Temperature at Which Thermostat Starts to open "C 83 Temperature at Which Thermostat is Fully Open "C 98 Temperature at Which Thermostat is Fully Open "C 98 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at Which Thermostat is Fully Open "C 99 Temperature at CAC outlet at Standard conditions "C - San Fower Consumption "A - Temperature at CAC outlet at Standard conditions "C - Te	Max. Temperature of Coolant (warning)	°C	108	Max. Temperature of Coolant (warning)	°C	108
Temperature at Which Thermostat is Fully Open "C 98 Temperature at Which Thermostat is Fully Open "C 99 Delivery of Coolant Pump m³/h 7,20 Delivery of Coolant Pump m³/h 8,6 Min. Pressure Before Coolant Pump m³/h 8,6 Min. Pressure Before Coolant Pump Bar 0.3 Min. Pressure Before Coolant Pump Bar 0.5 Temperature at CAC outlet at standard conditions "C 100 Delivery of Coolant Capacity (engine) 1 6,0 Coolant Capacity (engine) 1 1 5,90 Coolant Capacity (engine) 1 1 5,90 Coolant Capacity (incl. cooling unit) 1 15,90 Coolant Capacity (incl. cooling unit) 1 15,90 Air to Boil (max. permissible cool. air temp. at fan) "C 55 Air to Boil (max. permissible cool. air temp. at fan) "C 55 Air to Boil (max. permissible cool. air temp. at fan) "C 55 Air to Boil (max. permissible cool. air temp. at fan) "C 50 Cooling air Flow m³/h 4700 Cooling air Flow m³/h 580 Air Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 2, HEAT BALANCE Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 45,4 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 MINET / EXHAUST DATA Max. Intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Gas Temperature "C 60 Combustion Air Volume m³/h 282 Exhaust Gas Flow (at above temp) m³/h 282 Exhaust Gas Flow (at above temp) m³/h 376 Exhaust Gas Flow (at ab	Max. Temperature of Coolant (shutdown)	°C	110	Max. Temperature of Coolant (shutdown)	°C	110
Delivery of Coolant Pump m³/h 7,20 Delivery of Coolant Pump m³/h 8,6 Min. Pressure Before Coolant Pump Bar 0.3 Min. Pressure Before Coolant Pump Bar 0.5 Min. Pressure Before Coolant Pump Bar 0.6 Min. Pressure Before Coolant Pump Bar 0.6 Min. Pressure Before Coolant Pump Bar 0.6 Min. Pressure Before Coolant Capacity (and to State at standard conditions cooling SYSTEM ENGINE COOLING SYSTEM COOLING SYSTEM COOLING SYSTEM ENGINE COOLING SYSTEM COOLING	Temperature at Which Thermostat Starts to open	°C	83	Temperature at Which Thermostat Starts to open	°C	83
Min. Pressure Before Coolant Pump Bar 0.3 Min. Pressure Before Coolant Pump Bar 0.5 Temperature at CAC outlet at standard conditions "C "C "Temperature at CAC outlet at standard conditions "C "C "Finding COOLING SYSTEM" Coolant Capacity (engine) 1 6,00 Coolant Capacity (incl. cooling unit) 1 15,90 Coolant Capacity (incl. cooling unit) 1 15,90 Air to Boil (max. permissible cool. air temp. at "an "C "S 55 Air to Boil (max. permissible cool. air temp. at "an "C "S 55 Air to Boil (max. permissible cool. air temp. at "A 10 Air to Boil (max. permissible cool. air temp. at "C "S 55 Air to Boil (max. permissible cool. air temp. at "C "S 56 Air to Boil (max. permissible cool. air temp. at "C "S 56 Air to Boil (max. permissible cool. air temp. at "C "S 56 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 57 Air to Boil (max. permissible cool. air temp. at "C "S 58 Air to Boil (max. permissible cool. air temp. at "C "S 58 Air to Boil (max. permissible cool. air temp. at "C "S 58 Air to Boil (max. permissible cool. air temp. at "C "C "S 58 Air to Boil (max. permissible cool. air temp. at "C "C "S 58 Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. permissible cool. air temp. at "C "C "Air to Boil (max. per	Temperature at Which Thermostat is Fully Open	°C	98	Temperature at Which Thermostat is Fully Open	°C	98
Temperature at CAC outlet at standard conditions C Temperature C Temperature at CAC outlet at standard conditions C Temperature C Temperature at CAC outlet at standard conditions C Temperature C Temperature at CAC outlet at standard conditions C Temperature C Temperature C Temperature C Temperature C Temperature at CAC outlet at standard conditions C Temperature C Temperature at CAC outlet at standard conditions C Temperature at CAC outlet at standard conditions C Temperature C Temperature at CAC outlet at standard conditions C Temperature at CAC outlet at standard conditions C Temperature at CAC outlet at standard Condition C Temperature at CAC outlet at standard Condition C Temperature at CAC outlet at standard Condition in 15,90 Condition Consumption (CAC) and a standard Condition C Temperature at CAC outlet at standard Condition in 15,90 Condition C Condition C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C Temperature at CAC outlet at Standard Condition C C C Temperature at CAC outlet at Standard Condition C C C Temperature at CAC outlet at Standard C C Temperature at CAC outlet at Standard C C	Delivery of Coolant Pump	m³/h	7,20	Delivery of Coolant Pump	m³/h	8,60
ENGINE COCING SYSTEM Coclant Capacity (engine) 1 6,00 Coclant Capacity (engine) 1 15,90 Coclant Capacity (incl. cocling unit) 1 15,90 Coclant Capacity (incl. cocling unit) 1 15,90 Coclant Capacity (incl. cocling unit) 1 15,90 Air to Boil (max. permissible cocl. air temp. at fan) Fan Power Consumption 1 15,90 Fan Power Consumption 1 2,00 Fan Power Consumption 2 5 Air to Boil (max. permissible cocl. air temp. at fan) Fan Power Consumption 3 6 Cocling air Flow 3 7 Air O Cocling air Flow 3 7 Air Pressure Loss, external 4 7 Cocling air Flow 4 7 Cocling air Flow 4 7 Cocling air Flow 4 Air Pressure Loss, external 4 7 Air Pressure Loss, external 4 7 Air Pressure Loss, external 4 8 Air Dissipation (engine radiator) 4 8 Air Pressure Loss, external 4 8 Air Dissipation (engine radiator) 4 8 Air Pressure Loss, external 4 8 Air Pressure Loss, external 4 8 Air Pressure Loss, external 4 8 Air Dissipation (engine radiator) 4 8 Air Pressure Loss, external 4 8 Air Dissipation (engine radiator) 4 8 Air Pressure Loss, external 4 8 Air Dissipation (engine radiator) 5 8 Air Pressure Loss, external 6 8 Air Pressure Loss, external 7 8 Air Pressure Loss, external 8 8 Air Dissipation (engine radiator) 8 8 Air Pressure Loss, external 8 8 Air Dissipation (engine radiator) 8 8 Air Pressure Loss, external 8 8 Air Dissipation (engine radiator) 8 8 Air Dissipation (convection) 8 8 Air Pressure Loss, external 8 8 Air Dissipation (engine radiator) 8 Air Dissipation (engine radiator) 8 Air Dissipation (engine radiator) 8 A	Min. Pressure Before Coolant Pump	Bar	0.3	Min. Pressure Before Coolant Pump	Bar	0.3
Coolant Capacity (engine) I 6,00 Coolant Capacity (engine) I 6,00 Coolant Capacity (incl. cooling unit) I 15,90 Coolant Capacity (incl. cooling unit) I 15,90 Coolant Capacity (incl. cooling unit) I 15,90 Air to Boil (max. permissible cool. air temp. at fan) Fan Power Consumption kW 2,00 Fan Power Consumption kW 3,5 Fan Power Consumption kW 4,5 Fan Power Consumption kW 4,5 Fan Power Consumption kW 4,5 Fan Power Consumption (engine radiator) kW 4,5 Fan Power Consumption (CAC) kW 4	Temperature at CAC outlet at standard conditions	°C	-	•	°C	-
Coolant Capacity (incl. cooling unit) I 15,90 Coolant Capacity (incl. cooling unit) I 15,90 Air to Boil (max. permissible cool. air temp. at fan) Air to Boil (max. permissible cool. air temp. at fan) Fan Power Consumption kW 2,00 Fan Power Consumption kW 3,5 Cooling air Flow m³/h 4700 Cooling air Flow m³/h 4700 Cooling air Flow m³/h 580 Air Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 2, HEAT BALANCE HEAT BALANCE Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 45,4 Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW - Heat Dissipation (CAC) Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 25 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Gas Temperature c 610 Max. Exhaust Gas Temperature c 610 Max. Exhaust Gas Temperature mbar 62 Exhaust Flange / pipe diameter mm - Exh			6.00		-	6.0
Air to Boil (max. permissible cool. air temp. at fan) *C 55 **Air to Boil (max. permissible cool. air temp. at fan) **C 55 **Air to Boil (max. permissible cool. air temp. at fan) **C 55 **Air to Boil (max. permissible cool. air temp. at fan) **C 55 **Air to Boil (max. permissible cool. air temp. at fan) **C 55 **Air to Boil (max. permissible cool. air temp. at fan) **C 55 **Air Power Consumption **W 3,5 **C Cooling air Flow **m³/h 4700 **Cooling air Flow **m³/h 4700 **Cooling air Flow **m³/h 4700 **C **Cooling air Flow **m³/h 4700 **Air Pressure Loss, external **mbar **mbar **C **Air Power Consumption **m³/h 4700 **Cooling air Flow **max. Exhausce **HEAT BALANCE **			,		•	,
Fan Power Consumption kW 2,00 Fan Power Consumption kW 3,5 Cooling air Flow m³/h 4700 Cooling air Flow m³/h 580 Air Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 2, HEAT BALANCE Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 45,4 Heat Dissipation (CAC) kW - Heat Dissipation (convection) kW 7,0 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 INLET / EXHAUST DATA INLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM V 12 Voltage V 12 Voltage V 11 Alternator Output A 3 35 Alternator Output A 3 34 Alternator Output A 3 35 Alternator Output A 3 35		ı	15,90		ļ	15,90
Cooling air Flow m³/h 4700 Cooling air Flow m³/h 580 Air Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 2, HEAT BALANCE Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 45,4 Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW 7,0 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 NLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 1 Starter KW 6 Starter KW Alternator Output A 3 35 Alternator Output A 3 3	fan)	°C	55		°C	57
Air Pressure Loss, external mbar 1,50 Air Pressure Loss, external mbar 2, HEAT BALANCE Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 45,4 Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW 7,0 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 INLET / EXHAUST DATA INLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 12 Voltage V 12 Voltage V 12 Voltage V 3 Alternator Output A 33 Alternator Output A 33 Alternator Output A 33	Fan Power Consumption	kW	2,00	Fan Power Consumption	kW	3,50
HEAT BALANCE Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 45,4 Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW 7,0 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) NLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 26 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Gas Temperature c C 610 Max. Exhaust Gas Temperature c C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 1 Starter KW 6 Starter KW 6 Starter KW 6 Starter KW 1 Alternator Output A 3	Cooling air Flow	m³/h	4700	Cooling air Flow	m³/h	5800
Heat Dissipation (engine radiator) kW 41,10 Heat Dissipation (engine radiator) kW 5,4 Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW 6,00 Heat Dissipation (convection) kW 7,0 NLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 26 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 12 Voltage V 12 Voltage V 14 Alternator Output A 35 Alternator Output A 3 36	Air Pressure Loss, external	mbar	1,50	Air Pressure Loss, external	mbar	2,0
Heat Dissipation (CAC) kW - Heat Dissipation (CAC) kW 7,0 Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 INLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 1 A 35 Alternator Output A 3 Alternator Output A 3	HEAT BALANCE			HEAT BALANCE		
Heat Dissipation (convection) kW 6,00 Heat Dissipation (convection) kW 7,0 INLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 11 A 3 A 3 Alternator Output A 3 A 3	Heat Dissipation (engine radiator)	kW	41,10	Heat Dissipation (engine radiator)	kW	45,40
INLET / EXHAUST DATA Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 26 Max. intake Depression (Switch setting) mbar 27 Max. intake Depression (Switch setting) mbar 28 Max. Exhaust Back Pressure mbar 30 Max. Exhaust Gas Temperature c C 60 Max. Exhaust Gas Temperature c C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 13 Alternator Output A 3 Alternator Output A 3 Alternator Output	Heat Dissipation (CAC)	kW	-	Heat Dissipation (CAC)	kW	-
Max. intake Depression (Switch setting) mbar 25 Max. intake Depression (Switch setting) mbar 2 Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature c C 60 Max. Exhaust Gas Temperature c C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 13 Alternator Output A 3 Alternator Output A 3 Alternator Output	Heat Dissipation (convection)	kW	6,00	Heat Dissipation (convection)	kW	7,00
Combustion Air Volume m³/h 219,6 Combustion Air Volume m³/h 282, Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 1 Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 3	INLET / EXHAUST DATA			INLET / EXHAUST DATA		
Max. Exhaust Back Pressure mbar 30 Max. Exhaust Back Pressure mbar 3 Max. Exhaust Gas Temperature °C 60 Max. Exhaust Gas Temperature °C 60 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 11 Starter KW Alternator Output A 35 Alternator Output A 3	Max. intake Depression (Switch setting)	mbar	25	Max. intake Depression (Switch setting)	mbar	25
Max. Exhaust Gas Temperature °C 610 Max. Exhaust Gas Temperature °C 600 Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 12 Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 36	Combustion Air Volume	m³/h	219,6	Combustion Air Volume	m³/h	282,6
Exhaust Gas Flow (at above temp) m³/h 526 Exhaust Gas Flow (at above temp) m³/h 87 Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 1 Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 3	Max. Exhaust Back Pressure	mbar	30	Max. Exhaust Back Pressure	mbar	30
Exhaust Flange / pipe diameter mm - Exhaust Flange / pipe diameter mm ELECTRICAL SYSTEM Voltage V 12 Voltage V 1 Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 3	Max. Exhaust Gas Temperature	°C	610	Max. Exhaust Gas Temperature	°C	600
FLECTRICAL SYSTEM Voltage V 12 Voltage V 1 Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 3 36 Alternator Output A 3 37 Alternator Output A 3 38 Alternator Output A 4 3 3 38 Alternator Output A 5 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 3 3 3	Exhaust Gas Flow (at above temp)	m³/h	526	Exhaust Gas Flow (at above temp)	m³/h	871
Voltage V 12 Voltage V 1 Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 3	Exhaust Flange / pipe diameter	mm	-	Exhaust Flange / pipe diameter	mm	-
Starter KW 6 Starter KW Alternator Output A 35 Alternator Output A 3	ELECTRICAL SYSTEM			ELECTRICAL SYSTEM		
Alternator Output A 35 Alternator Output A 3	Voltage	V	12	Voltage	V	12
	Starter	KW	6	Starter	KW	6
	Alternator Output	Α	35	Alternator Output	Α	35
Batteries (minimum capacity, cold start limit -5°C) Ah 1*85 Batteries (minimum capacity, cold start limit -5°C) Ah 1*8	Batteries (minimum capacity, cold start limit -5°C)	Ah	1*85	Batteries (minimum capacity, cold start limit -5°C)	Ah	1*85





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



ALTERNATOR TECHNICAL PARAMETERS



ALTERNATOR TECHNIC									
Insulation Class			Н	Field Control S	System			S	elf-Excited
Winding Pitch			2/3 - (N° 6)	A.V.R. Model			Standard		SX460
Wires			12	Voltage Regula	ation		%		± 1
Protection			IP 23	Sustained Sho	rt-Circuit Cu	rrent	10 sec	3	00% (3 IN)
Altitude	m		1000	Total Harmoni	ic (*) TGH / T	нс	%		< 5
Overspeed	rpm		2250	Wave Form: N	EMA = TIF -	(*)			< 50
Air Flow	m³/sec.		0.095	Wave Form: I	.E.C. = THF -	(*)	%		< 2
Bearing Drive	N/A		-	Bearing Non-D	Prive		Bearing		6309-2RZ
Rotor Winding	100%		Copper	Stator Winding	g		100%		Copper
50 HZ / 231-400V COSC	Q 0,8 / 1500 RPM								
50 HZ / 231-400V COSO STANDARD USING ALTE				OPTIONAL U	SING ALTERN	IATOR			
		JCB 225S2		OPTIONAL U	n n	IATOR TAL042H	STAMFORD	S1L2-Y1	/UC224E
STANDARD USING ALTE	ERNATOR	JCB 225S2			n n			S1L2-Y1 Stand By	/UC224E
STANDARD USING ALTE	ERNATOR	JCB 225S2		LEROY-SO	n n				/UC224E
STANDARD USING ALTE BRAND/MODEL DUTY	ERNATOR	JCB 225S2		LEROY-50 Continuous	n n		S	Stand By	/UC224E
STANDARD USING ALTE BRAND/MODEL DUTY AMBIENT	ERNATOR JCBENERGY C°	JCB 225S2 380/220	400/231	LEROY-50 Continuous 40°C	n n		S	Stand By 27°C	/UC224E 1 Phase
STANDARD USING ALTE BRAND/MODEL DUTY AMBIENT CLASS / TEMP. RISE	C° C°		400/231 200/115	LEROY-50 Continuous 40°C H/ 125° K	OMER"	TAL042H	\$ F	Stand By 27°C H/ 163° K	
STANDARD USING ALTE BRAND/MODEL DUTY AMBIENT CLASS / TEMP. RISE SERIES STAR	C° C°	380/220	,	LEROY-50 Continuous 40°C H/ 125° K 415/240	1 Phase	TAL042H 380/220	5 + 400/231	Stand By 27°C H/ 163° K 415/240	1 Phase

60 HZ / 277-480V COSQ 0,8 / 1800 RPM										
STANDARD USING ALTE	RNATOR		(OPTIONAL USING ALTERNATOR						
BRAND/MODEL	JCBENERGY	JCB 225S2		LEROY-SOM	IER" T.	AL042H	STAMF	ORD S1	L2-Y	
DUTY	212241141			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	77,0	81,0	85,0	-	85,0	89,0	93,0	-	
OUTPUT POWER	kW	61,6	64,8	68,0	-	68,0	71,2	74,4	-	

53,6

56,8

56,8

59,2

52,0



OUTPUT POWER



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



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

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
- Battery Charger
- Emergency Stop Button
- Terminal Blocks

Start Error, Stop Error

- Load Output Terminal
- System Protection MSBs
- Circuit Breaker-Optional
- o LCD Screen
- Control Relays
- Backlit, 128x64 Pixels

CONTROL MODULE TECHNICAL PARAMETERS

Brand	JCBENERGY	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





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



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

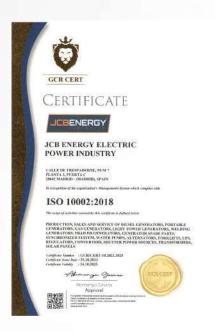


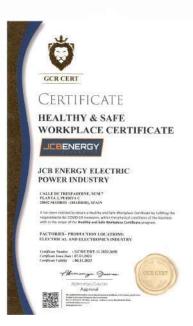
- Special, Registered JCB Energy Design and Colour
- A1 Quality DKP / HRU / Galvanized Steel
- Sensitive Twist on Automatic Press Brake
- Delicate Cut on Automatic Punch and Laser Bench
- Sensitive Welding on Robotic Welding Bench
- Chemical Cleaning Nano Technology Before Painting
- Robotic Painting with Electrostatic Powder Paint
- Drying and stabilizing on 200 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

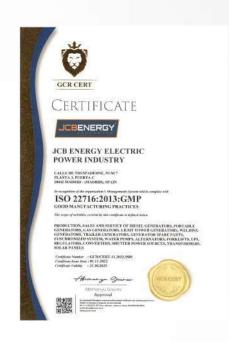
- Cable Exit Connectors and Glands
- Emergency Stop Button
- Fuel Level Gauge
- Fuel Drain Cap
- Fuel Inlet and Return Records
- Impermeability Test for Fuel Tank
- Vacuumed Rubber Mounted
- High Quality weatherstrips
- High Quality Shock Absorbers
- Fuel Filling Cap (with ventilation)
- Lifting and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



OUR CERTIFICATES

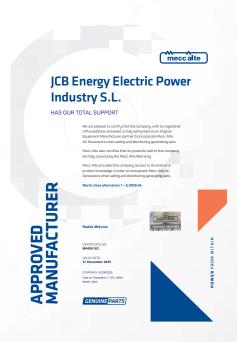












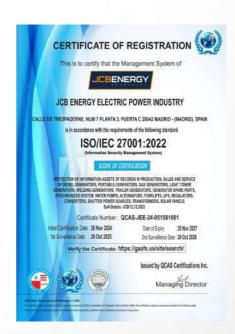














MANAGEMENT SYSTEM CERTIFICATE

Valle: 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 Manager 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 effice: DMY - Business Assurance Zwolesoweg 1, 2004 LB Barendracht, Hetherlands







MANAGEMENT SYSTEM CERTIFICATE

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

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

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

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

Place and date: Barendrecht, 99 October 2023

For the issuing office: DNY - Business Assurance Zwolsoweg 1, 2004 LB Barendrecht, Nethorlands











IRBNE SANKHEZ ROMANA MANNAGER DE THE DEFINENTIMENT OF LEGAL ADVISONY SERVICES AND THE DATAINSE OF THE OFFICIAL CHARMER OF COMMERCE, HICKLETRY AND SERVICES OF MADRID, WITH REGISTERED OFFICE AT PLAZA DE LA NOPER-DENICA I, MADRID, SPAIN

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

CB ENERGY ELECTRIC POWER INCOSTRY St., a Company with Tax LD. Nation B19975554, and its registrend office at street frequency my 7, 2000-2 Making is registered on 6 May 2004, under the hearing of the 145 Section, companies, of the Economic Activities Tax Transfer Lamber 545 to preterm the following scholar:







CÉNSO DE LA CAMARA ORICIAL DE COMERCIO, INDUSTRIA Y SERVICIOS DE MADRID, CON DOMICIUO SOCIAL EN LA PLAZA DE LA INDEPENDENCIA N° 1, MADRID — ESPAÑA

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







