

# JCB ENERGY ELECTRIC POWER INDUSTRY









VMAN<sup>®</sup>

















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





#### **GENERATOR GENERAL INFORMATION**

GENERATOR	FREQUENCY	VOLTAGE	POWER FACTOR	SPEED	DIESEL	ENGINE		ALTERN	ATOR		TYPE OF	GENE	RATOR (	ОUТРUТ
Model	Hz	V	Cos Q	Rpm	Brand	Model	Series	Brand	Model	Series	Operation	kVA	kW	А
								<u>_</u>	<u>_</u>		Standby	630,0	504,0	910,0
JCN 630	50	231/400	0.8	1500			3790JCI BII m R R R G Y		355S2	Prime	573,0	458,6	828,0	
					ICN	DZOOLCI			JCB	355S1	Continuous	401,0	321,5	579,0
					JCN	B/90JCI					Standby	730,0	584,0	1054,9
JCN 730	60	277/480	0.8	1800							Prime	663,6	530,9	959,0
									``.		Continuous	464,5	371,6	671,3

- 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.



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

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

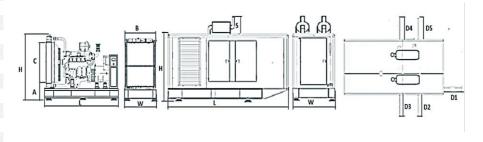
#### **GENERATOR DIMENSIONS AND TECHNICAL DRAWINGS**





VALUES		OPEN TYPE GENERATOR	CANOPY TYPE GENERATOR		
WIDTH mm		1400	1646		
LENGTH	mm	3311	4632		
HEIGHT	mm	1980	2641		
WEIGHT (NET)	Kg	3386	4240		
FUEL TANK CAPACITY	L	1066	400		

SYMBOL	OPEN	CANOPY
L	3311	4632
W	1400	1646
Н	1980	2000
S		641
Α	560	
В	1200	
С	1200	
D1		1002
D2		800
D3		800
D4		800
D5		800



#### **FUEL CONSUMPTION**

PERCENT OF PRIME POWER	1500 rpm	1800 rpm
TERCENT OF THINKE TOWER	I/hr	I/hr
110 %	129,65	138,46
100 %	119,02	127,10
75 %	89,72	95,81
50 %	60,42	64,52



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#### **DIESEL ENGINE MAIN TECHNICAL PARAMETERS**

GENERAL		
Number of Cylinders		8
Configuration		V-Type
Aspiration		Turbocharged & Intercooled
Combustion System		Direct Injection
Compression Ratio		15.5:1
Bore	mm	128
Stroke	mm	155
Displacement	L	15,948
	L	Electronic
Governing Type		
Governing Class		G3
Rotation		Counterclockwise
Firing Order		1-5-7-2-6-3-4-8
Emission		Tier II
Moments of Rotation Inertia		
Engine	Kg - m²	4,54
Flywheel	Kg - m²	2,1
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)	1
Flex Coupling Disc	Inch (")	14
TEST CONDITIONS	, ,	
Ambient Temperature	%	25
Atmospheric Pressure	КРа	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		JULE
Length*	mm	1745
Width	mm	1380
Height	mm	1440
Dry Weight *From front end of radiator to near end of air filter	kg	1400
*From tront and at radiator to hear and at air tilter		
FAN	mm	900
FAN Diameter	mm	900 1,15:1
FAN	mm	900 1,15:1 7
FAN Diameter Drive Ratio	mm	1,15:1



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#### **DIESEL ENGINE MAIN TECHNICAL PARAMETERS**

COOLING SYSTEM		
Radiator Type	50ºC	Tropical
otal Coolant Capacity	L	80
Max. Perm. Coolant Outlet Temperature	ōC	105
Max. Perm. Flow Resist. (Cool. System And Piping)	bar	0,5
Max. Temperature of Coolant Warning	ōC	95
Max. Temperature of Coolant Shutdown	ōC	98
hermostat Operation Temperature - Initial Open	ōС	68
hermostat Operation Temperature - Full Open	ōC	71
Delivery of Coolant Pump	m ³/ h	5,60
Ain. Pressure Before Coolant Pump	bar	0,5
adiator Face Area	m²	1,39
tows	Row	5
Matrix Density	Per / Inch	15,5
<i>A</i> aterial		Aluminum
Vidth of Matrix	mm	1162
leight of Matrix	mm	1196
Pressure Cap Setting	kPa	70
stimated Cooling Air Flow Reserve	kPa	0,15
ingine Pre Heater-Tube (with Circulation Pump)	W	3000
UBRICATION SYSTEM		
otal System	L	28
Ainimum Oil Level	L	19
Nominal Motor Operating Temperature	ōC	40
ubricating Oil Pressure (Rated Speed)	bar	5
Relief Valve Opens	kPa	200
Oil / Fuel Consumption Ratio	%	≤0,5
lormal Oil Temperature	ōС	110
ELECTRICAL SYSTEM		
/oltage	V	24
tarter	kW	7
Alternator Output Ampers	Α	45
Alternator Output Voltage	V	28
Batteries Capacity	Ah	2X135



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

ENGINE MODEL	в790ЈСІ		ENGINE FAMILY	FAMILY JC25		BII	
		TYPICAL GENERATOR OUTPUT (NET)		ENGINE POWER	₹		
Speed (Rpm)	Type of Operation			Gr	oss	Net	
		kVA	kWe	KWm	Нр	kWm	Нр
1500	Stand By(Maximum)	630,0	504,0	558,0	748,0	536,0	719,0
	Prime	573,0	458,0	507,0	680,0	487,0	654,0
	Stand By(Maximum)	693,0	554,4	613,8	822,8	589,6	790,0
1800	Prime	630,3	503,8	557,7	748,0	535,7	719,4

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

50 HZ @ 1500 R/MIN		STAND BY	PRIME
Gross Engine Power	kW	574,7	522,2
Net Engine Power	kW	552,1	501,6
Fan Power Consumption (Belt Pulley Driven)	kW	22,0	22,0
Other Power Loss	kW	2,0	1,5
Mean Effective Pressure	MPa	3,80	3,46
Intake Air Flow	m³/min	41,65	39,66
Exhaust Temperature Limit	ōС	690	690
Exhaust Flow	m ³/ min	76,39	72,75
Boost Pressure Ratio		3,50	3,30
Mean Piston Speed	m/s	8,5	8,5
Cooling Fan Air Flow	m ³/ min	809,6	809,6
Typical Generator Output Power	kVA	630	573
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	1493,6	1357,5
Gross Heat to Power	kW	597,4	542,8
Energy to Coolant and Lubricating Oil	kW	298,7	271,9
Heat Dissipation Capacity *	kW	105,1	94,8
Energy to Exhaust	kW	433,6	393,5
Heat to Radiation	kW	59,7	54,6

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



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

60 HZ @ 1800 R/MIN		STAND BY	PRIME
Gross Engine Power	kW	613,8	557,7
Net Engine Power	kW	589,6	535,7
Fan Power Consumption (Belt Pulley Driven)	kW	22,0	22,0
Other Power Loss	kW	2,0	1,5
Mean Effective Pressure	MPa	3,80	3,46
Intake Air Flow	m³/min	41,65	39,66
Exhaust Temperature Limit	ōС	690	690
Exhaust Flow	m³/min	76,39	72,75
Boost Pressure Ratio		3,50	3,30
Mean Piston Speed	m / s	8,5	8,5
Cooling Fan Air Flow	m³/min	809,6	809,6
Typical Generator Output Power	kVA	693	630
HEAT REJECTION		STAND BY	PRIME
Energy in Fuel (Heat of Combustion)	kW	1495,6	1332,8
Gross Heat to Power	kW	597,4	516,0
Energy to Coolant and Lubricating Oil	kW	298,7	271,9
Heat Dissipation Capacity *	kW	104,0	94,8
Energy to Exhaust	kW	433,6	393,5
Heat to Radiation	kW	62,8	56,7
*			

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

#### **JCB ALTERNATOR TECHNICAL PARAMETERS AND SPECIFICATIONS**



ALTERNATOR TECHNI	CAL PARAMETERS				
Insulation Class		Н	Field Control System		Self-Excited
Winding Pitch		2/3 - (N° 6)	A.V.R. Model	Standard	SX440
Wires		12	Voltage Regulation	%	± 1
Protection		IP 23	Sustained Short-Circuit Current	10 sec	300% (3 IN)
Altitude	m	1000	Total Harmonic (*) TGH / THC	%	< 4
Overspeed	rpm	2250	Wave Form: NEMA = TIF - (*)		< 50
Air Flow	m³/sec.	1,035	Wave Form: I.E.C. = THF - (*)	%	< 2
<b>Bearing Drive</b>	N/A	-	Bearing Non-Drive	Bearing	6314-2RZ
<b>Rotor Winding</b>	100%	Copper	Stator Winding	100%	Copper



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#### **ALTERNATOR SPECIFICATIONS**

50 HZ / 231-400V COSQ 0,8 / 1500 RPM												
STANDARD USING ALTERNATOR				OPTIONAL USING ALTERNATOR								
BRAND/MODEL	JCBENERGY	JCB 355S2		LEROY-S	OMER <sup>™</sup>	TAL047E	STAMFORD	НС5Е				
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	573,0	573,0	594,0	-	630,0	630,0	653,0	-			
OUTPUT POWER	kW	458,0	458,0	475,0	-	504,0	504,0	522,4	-			

60 HZ / 277-480V COSQ 0	,8 / 1800 RPM								
STANDARD USING ALTERNATOR					JSING ALTER	RNATOR			
BRAND/MODEL	JCBENERGY	JCB 355S1		LEROY-S	OMER TA	AL047E	STAMFO	ORD	HC5E
DUTY				Continuous				Stand By	
AMBIENT	C°			40°C				27°C	
CLASS / TEMP. RISE	C°			H / 125° K				Н / 163° К	
SERIES STAR	V	416/240	440/254	480/277	1 Phase	416/240	440/254	480/277	1 Phase
PARALLEL STAR	V	208/120	220/127	240/138	-	208/120	220/127	240/138	-
SERIES DELTA	V	240	254	277	240	240	254	277	240
OUTPUT POWER	kVA	661,0	696,0	733,0	-	727,0	766,0	806,0	-
OUTPUT POWER	kW	528,8	556,8	586,4	-	581,6	612,8	644,8	-



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#### **CONTROL MODULE ALERTS**

Emergency Stop Malfunction
High Generator Frequency
Low Generator frequency, Low Load
Over Current, Unbalanced Current
Low Generator Voltage
High generator Frequency
Phase sequence error
Overload, Heat Sensor Broken
Low Water Level (Optional)
Low Oil Pressure, Reverse Power

Start Error, Stop Error
Magnetic Pickup Error
Charge Alternator Error
Unbalanced Load
Maintenance Time Alarm
Low Speed, High Speed
Broken Oil Sensor Cable
High Oil Temperature (Optional)
Low Fuel Level (Optional), High Battery Voltage
Low Battery Voltage, High Water Temperature
Electronic Can bus Errors (ECU)

#### **CONTROL PANEL SPECIFICATIONS**



**Low Water Temperature** 



- Powder Painted Steel Panel with Lockable Door
- ATS (Automatic Transfer Panel) Optional
- Control Module
- 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	JCBENERGY <sup>*</sup>	Brand	Trans-MIDIAMF.232.GP	
Dimensions	120mmx94mm.	Protection Class	IP65 From the Front	
Weight	260 gr.	<b>Environmental Conditions</b>	2000 meters above sea level	
Ambient Humidity	Max. %90.	Ambient Temperature	nbient 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	



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#### **CONTROL MODULE FUNCTION**

Mains Voltage Level Control	Generator Voltage Level Control	3 Phase Generator Protections	3 Phase AMF Function	Alarm Horn
Network Frequency Level Control	Generator Frequency level Control	- High / Low Voltage	- High / Low Frequency	Heater Tube Thermostat Control
Engine Operating Option Control	Generator Current Level Control	- High / Low Frequency	- High / Low Voltage	Modbus and SNMP
Engine Stop Option Control	Generator Powder Level Control	- Current / Voltage Asymmetry	- High / Low Water Temperature	Working Hour
Engine Speed (RPM) Level Control	Generator work Schedule and Timing Control	- Overcurrent / Overload	- High / Low Load	Ground Leakage
Battery Voltage Options Times	Oil Pressure Controllers Control	Overheat Control	Mains., Generator ATS Control	Analog Modem
Check Engine Maintenance Times	Configurable Analog Inputs and Outputs	1 Phase or 3 Phase, Phase Selection	Network, Voltage, Frequency Display	Ethernet, USB, RS232, RS485
Communication Interfaces GPRS, GSM	Keeping Error Records of Past Events	Parameter Setting via Control Module	Parameter Setting via Computer	Selectable Protection Alarm / Shutdown
Engine Speed, Voltage, Earning	Configurable Programmable Digital Inputs and Outputs	Water Temperature Current and Frequency	Hours of Operation Phase sequence	Battery Voltage Oil Pressure

#### SOUND PROOF CANOPY AND BASE FRAME (CHASIS) SPECIFICATIONS



- Special, Registered JCB Energy Design and Colour
- A1 Quality DKP / HRU / Galvanized Steel
- Sensitive Twist on Automatic Press Brake
- Delicate Cut on Automatic Punch and Laser Bench
- Sensitive Welding on Robotic Welding Bench
- Chemical Cleaning Nano Technology Before Painting
- o Robotic Painting with Electrostatic Powder Paint
- o Drying and stabilizing on 200 ºC Ovens
- 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
- I permeability Test for Fuel Tank
- Vacuumed Rubber Mounted
- High Quality weatherstrips
- High Quality Shock Absorbers
- Fuel Filling Cap (with ventilation)
- Lifting and Carrying Equipment
- Internal Exhaust Mufflers (Silencers)
- External Exhaust Mufflers (Silencers)
- Radiator water Filling Cap
- Daily Fuel Tank, External Fuel Tank

# Our Quality Certificates

