



231 / 400 V - 50 Hz





#### **GENERATOR GENERAL INFORMATION**

GENERATOR	FREQUENCY	VOLTAGE	POWER FACTOR	SPEED	SPEED DIESEL ENGINE ALTERNATOR				TYPE OF	GENER				
Model	Hz	V	Cos Q	Rpm	Brand	Model	Series	Brand	Model	Series	Operation	kVA	kW	Α
		231/400	231/400 0.8 15		O Cummins	QSG12G2	12G2 QSG	QSG I	JCB		Standby	450,0	360,0	650,3
JCC 450	50			1500						315M	Prime	409,1	327,3	591,2
								ğ			Continuous	286,4	229,1	413,8

- 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
- \* 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.

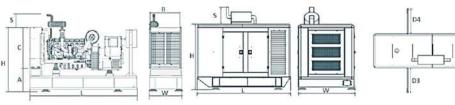
#### **GENERATOR DIMENSIONS AND TECHNICAL DRAWINGS**

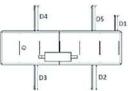




VALUES		OPEN TYPE GENERATOR	CANOPY TYPE GENERATOR
WIDTH	mm	1100	1179
LENGTH	mm	3254	3921
HEIGHT	mm	1782	2498
WEIGHT (NET)	Kg	2353	2790
FUEL TANK CAPACITY	L	475	673

SYMBOL	OPEN	CANOPY
L	3254	3921
W	1100	1179
Н	1598	1955
S	184	543
Α	766	
В	810	
С	860	
D1		520
D2		850
D3		850
D4		850
D5		850







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

GENERAL		
Number of Cylinders		6
Configuration		Vertical, in line
Aspiration		Turbo Charged & Aftercooled
Combustion System		Direct injection
Compression Ratio		17:1
Bore	mm	137
Stroke	mm	169
Displacement	L	15
Governing Type		Electronic
Governing Class		G3
Rotation		Counterclockwise
Firing Order		1-5-3-6-2-4
Emission		Tier 2
FILTERS		TICL Z
Air Filter		Dry Type, Replaceable
Fuel Filter		With Water Separator
Oil Filter		Element Type, Particulate Trap
LUBRICATION SYSTEM		Liement Type, Farticulate Trap
	L	91
Total System		
Minimum Oil Level	ōC F	85 50
Nominal Motor Operating Temperature		
Lubricating Oil Pressure (Rated Speed)	bar	4,8
Relief Valve Opens	kPa	200-300
Oil / Fuel Consumption Ratio	%	<0,1
Normal Oil Temperature	ōC	120
FUEL CONSUMPTION Standby - Load 110%	L/h	96,07
Prime - Load 100%	L/h	86,91
Prime - Load 100%  Prime - Load 75%	L/h	64,86
Prime - Load %50	L/h	45,17
COOLING SYSTEM	L/II	45,17
	50ºC	Transcal
Radiator Type		Tropical
Total Coolant Capacity	L	66
Max. Perm. Coolant Outlet Temperature	<u>o</u> C	110
Max. Perm. Flow Resist. (Cool. System And Piping)	bar	0,5
Max. Temperature of Coolant Warning	ēC	95
Max. Temperature of Coolant Shutdown	ōC	98
Thermostat Operation Temperature - Initial Open	ōС	84
Thermostat Operation Temperature - Full Open	ōC	95
Delivery of Coolant Pump	m³/ h	3,00
Min. Pressure Before Coolant Pump	bar	0,25
Radiator Face Area	m²	0,66
Rows	Row	3
Matrix Density	Per / Inch	12
Material		Aluminum
Width of Matrix	mm	600
Height of Matrix	mm	1100
Pressure Cap Setting	kPa	90
Estimated Cooling Air Flow Reserve		0.405
Engine Pre Heater-Tube (with Circulation Pump)	kPa W	0,125 3000



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

ELECTRICAL SYSTEM			
Voltage	V	24	
Starter	kW	7,5	
Alternator Output Ampere	Α	35	
Alternator Output Voltage	V	28	
Batteries Capacity	Ah	2X135	
FAN			
Diameter	mm	890	
Drive Ratio		1.2:1	
Number of Blades		9	
Material		Metal	
Туре		Blowing	

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

50 HZ @ 1500 R/MIN		STAND BY	PRIME	
Gross Engine Power	kW	407,0	370,0	
Net Engine Power	kW	385,0	350,0	
Fan Power Consumption (Belt Pulley Driven)	kW	16,0	16,0	
Other Power Loss	kW	6,0	6,0	
Mean Effective Pressure	MPa	2170,00	2170,00	
Intake Air Flow	m³/min	27,20	27,20	
Exhaust Temperature Limit	ōС	528	528	
Exhaust Flow	m ³/ min	68,20	68,20	
Boost Pressure Ratio		38,00	38,00	
Mean Piston Speed	m / s	8,5	8,5	
Cooling Fan Air Flow	m ³/ min	637,0	637,0	
Typical Generator Output Power	kVA	452	411	
Alternator Efficiency	%	94,0	94,0	
HEAT REJECTION		STAND BY	PRIME	
Energy in Fuel (Heat of Combustion)	kW	888,0	888,0	
Gross Heat to Power	kW	407,0	407,0	
Energy to Coolant and Lubricating Oil	kW	141,0	141,0	
Energy to Exhaust	kW	302,0	302,0	
Heat to Radiation	kW	38,00	38,00	



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#### **ALTERNATOR SPECIFICATIONS**



ALTERNATOR TECHNICA	L 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	<b>Sustained Short-Circuit Current</b>	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.	0.8	Wave Form: I.E.C. = THF - (*)	%	< 2
Bearing Drive	N/A	-	Bearing Non-Drive	Bearing	6314-2RZ
<b>Rotor Winding</b>	100%	Copper	Stator Winding	100%	Copper

50 HZ / 231-400V COSQ 0,8 / 1500 RPM									
STANDARD USING ALTERNATOR				OPTIONAL USING ALTERNATOR					
BRAND/MODEL	JCBENERGY	JCB 315M		LEROY-S	OMER"	TAL047A	STAMFORD	S4L1DF	
DUTY				Continuous			:	Stand By	
AMBIENT	C°			40°C				27°C	
CLASS / TEMP. RISE	C°			H/ 125° K			ı	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	409,0	409,0	424,0	-	450,0	450,0	467,0	-
OUTPUT POWER	kW	327,2	327,2	339,2	=	360,0	360,0	373,6	_



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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) Ontional
- Control Module
- Battery Charger
- Emergency Stop Button

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

#### **CONTROL MODULE TECHNICAL PARAMETERS**

Brand	JCBENERGY	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	-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
- 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

