Power Generation

Model: ZMC360

Powered by CUMMINS

Generator Specification

Service	PRP(1)	ESP(2)
Power (kVA)	360	400
Power (kW)	288	320
Rated speed (r.p.m)	1500	
Standard voltage (V)	400/230V	
Rated at power factor(cos phi)	0.8	

Power gensets are compliant with ISO 9001 and CE standard, which include the following directives:

- 2006/42/EC Machinery safety.
- 2006/95/EC Low voltage
- EN 60204-1: 2006+A1: 2009, EN ISO 12100: 2010, EN ISO 13849-1: 2008, EN 12601 : 2010

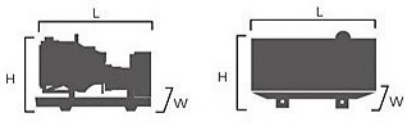
(1) PRP (Prime Power):
According to ISO8528-1, prime power is the maximum power available during a variable power sequence, which may be run for an unlimited number of hours per year, between stated maintenance intervals. The permissible average power output during at 24 hours period shall not exceed 80% of the prime power. 10% overload available for governing purposes only.

(2) ESP (Standby Power):
According to ISO 8528-1, It is defined as the maximum power available, under the agreed operating conditions, for which the generating set is capable of delivering for up to 500 hours of operation per year (of which no more than 300 hours for continuative use) with the maintenance intervals and procedures being carried out as prescribed by the manufacturers. No overload capability is available.

Powers	ESP		PRP		Standby
Voltage (V)	KVA	KW	KVA	KW	Amps
415/240	400	320	360	288	556.5
400/230	400	320	360	288	577.4
380/220	400	320	360	288	607.8

Performance Data		
Model		ZMC360
Engine brand		Cummins
Engine model		QSG12G1
Speed control type		Electronic
Phase		3
Control system		Digital
Starter motor voltage		24V
Frequency		50HZ
Engine speed (RPM)		1500
Fuel Consumption (L/H)	100% standby power	82
	100% prime power	72
	75% prime power	54
	50% prime power	37

Standard reference Conditions
Note: Standard reference condition 25℃ (77℉) air inlet temp, 100m(328ft) A.S.L 30% relative humidity. Fuel consumption dat with diesel fuel with specific gravity of 0.85 and conforming to BS 2869: 1998 , Class A2



Dimension and Weight		
Dimension	Open	Silent
Length (L)	3150mm	4365mm
Width (W)	1130mm	1400mm
Height (H)	1940mm	2240mm
Net Weight	3965KG	4350KG
Fuel Tank (L)	-	-

Power Generation

Engine Specification: QSG12G1

Basic technical data	
No. of cylinders	6
Cylinder arrangement	In-line
Cycle	4 stroke
Aspiration	Turbocharged and Charge Air Cooled
Compression ratio	17.0:1
Bore	132mm
Stroke	144mm
Displacement	11.8L
Dry Weight(Approximate)	785 kg
Wet Weight(Approximate)	N/A

Cooling system	
Coolant capacity-engine	14L
Maximum coolant friction head external to engine:	
-2.5 psi friction head(1500rpm)	261 L/m
-Maximum friction head (1500rpm)	231 L/m
Maximum static head of coolant above engine crank centerline	14m
Standard Thermostat (Modulating) Range	NA - NA℃
Minimum Pressure Cap	48.3 kPa
Maximum Top Tank Temperature for Standby / Prime Power	104 / 104℃

Fuel system	
Max return fuel flow	100 L/h
Max supply fuel flow	182 L/h
Max fuel inlet temperature	71℃
Max allowable head on injector return line(consisting of friction head and static head)	50 kPa

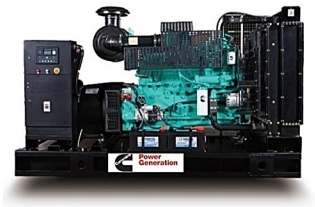
Air intake system	
Maximum intake air restriction with heavy duty air cleaner:	
-Dirty element	6.2kpa
-Clean element	3.7kpa

Lubrication system	
Oil pressure at minimum idle speed	48.3kPa
Oil pressure at governed speed	246-253.9kPa
Max oil temperature	129 ℃
Oil capacity with op 2179:Low-High	26.5-34.1L

Electrical system	
Cranking motor (Heavy duty, positive engagement	24V
Battery charging system, negative ground	900 ampere
Maximum allowable resistance of cranking circuit	0.002 ohm
Minimum recommended battery capacity- cold soak	900 CCA

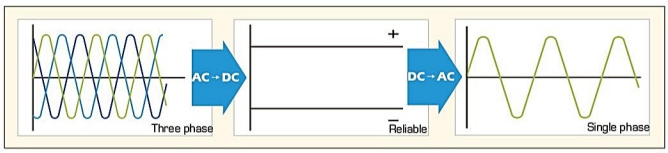
General installation	Prime power
Gross engine power output	332kWm
Engine idle speed	700-900 rpm
Friction power	36 kWm
Brake mean effective pressure	2248kPa
Intake air flow	362 l/sec
Exhaust gas flow	824 l/sec
Exhaust gas temperature	457 ℃
Radiated heat to ambient	27kWm
Heat to JW Radiator	116kWm
Charge air flow	25kg/min

Power Generation

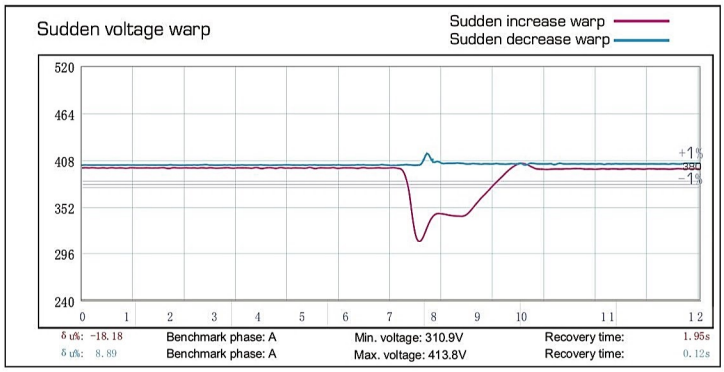


Alternator Specification

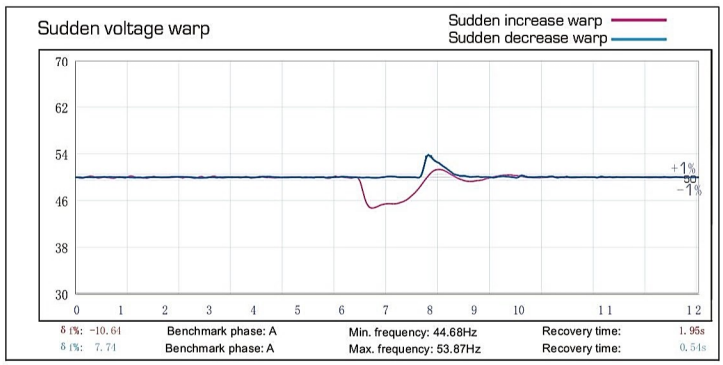
Alternator	
Number of phase	3
Power factor (Cos Phi)	0.8
Poles	4
Winding Connections (standard)	Star-serie
Terminals	12
Insulation type	H class
Winding Pitch	2/3
IP rating	IP23
Excitation system	Self-excited
Bearing	Single bearing
Coating	Vacuum impregnation
Voltage regulator	A.V.R
Couping	Flexible disc



Emergency voltage curve



Emergency frequency curve



Options

Engine	Alternator	Generator Sets	Fuel System
• Water Jacket Pre-heater • Fuel heater	• Winding Temp measuring Instrument • Alternator Pre-heater • PMG • Anti-damp and anti-corrosion treatment • Anti-condensation heater • Winding and bearing RTD	• Tools with the machine • Extended range fuel tank • Bunded fuel tank	• Low fuel level alarm • Automatic fuel feeding system • Fuel T-valves
Canopy	**Lub oil system**	**Cooling System**	**Control Panel**
• Rental type Canopy • Trailer	• Oil Pre-heater • Oil temp sensor	• Front heat protection	• Remote control panel • ATS • Synchronizing controller • Adjustable earth leakage relay

Power Generation

Control Panel

Configuration

- Emergency stop button
- Protection MCB
- Battery charger
- Integrated aviation plug
- ATS connection
- Digital control module

Features

- 3 phase generator set monitoring
- Support of engines equipped with electronic control unit
- Comprehensive diagnostic message
- Automatic or manual start/stop of the gensets
- Push buttons for simple control, lamp test
- Graphic back-lit LCD display
- Parameters adjustable via keyboard or PC
- Mains measurements (50HZ/60HZ)
- Generator measurements (50HZ/60HZ)
- Comprehensive shutdown or warning on fault condition
- 3 phase Generator protections
  - Over-/under voltage
  - Over-/under frequency
  - Current/voltage asymmetry
  - Over current/overload
- 3 phase AMF function
  - Over-/under frequency
  - Over-/under voltage
  - Voltage asymmetry
- Configurable analog inputs
- Battery voltage, engine speed (pick-up) measurement
- Configurable programmable binary inputs and outputs
- Warm-up and cooling functions
- Generator C.B. and Mains C.B. control with feedback and return timer
- RS232 interface
- Modem communication support
- Hours counter
- Sealed to Ip65
- Event log

Benefits

- Less wiring and components
- Integrated solution
- Less engineering and programming
- User friendly set-up and button layout
- Module can be configured to suit individual applications
- PC software for simplified configuration
- Wide range of communication capabilities

Operation conditions

- Operation temp: -20 ℃ to + 70 ℃
- Storage temp: -30 ℃ to + 80 ℃
- Operating humidity: 95% w/o condensation
- Vibration : 5-25Hz, ±1.6 mm
  5-100Hz, a=4g
- Shocks: a= 500m/s²

Options

- Ethernet interface (Remote monitoring and control)
- GSM modem/wireless internet (Remote monitoring and control)
- RS232-RS485 Dual port interface
- Synchronizing control panel
- Distribution board with sockets kit and power busbar
- Battery trickle charge ammeter
- Earth leakage protection
- Earth fault protection
- Low fuel level alarm
- Low fuel level shutdown
- High fuel level alarm
- Fuel transfer system control
- Low coolant level shutdown
- High lube oil temp shutdown
- Overload via alarm switch on breaker
- Engine coolant heater controls
- Control panel heater
- Speed adjust switch
- Oil temp displayed on LCD screen
- Additional 8 inputs and outputs