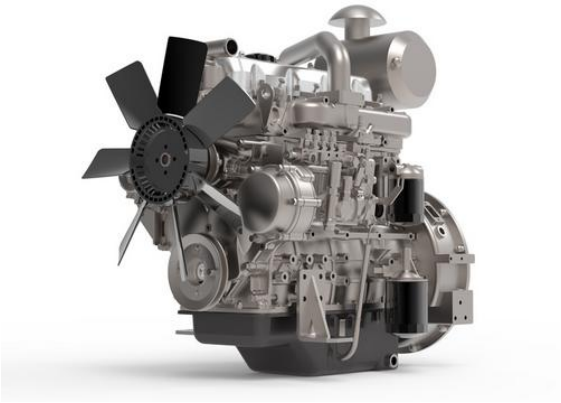
SDEC POWER

Z SERIES POWER GENERATION ENGINES



G-DRIVE
POWERPACK
Power Generation Specification

TECHNICAL DATA SHEET

Power Output Range
16kW – 23kW

STAGE II EMISSION COMPLIANT
FOR USE IN THE FOLLOWING TERRITORIES. ASIA, MIDDLE EAST AND AFRICA.

Z SERIES DIESEL ENGINE

MODELS	MAX ENGINE OUTPUT		RATED GENERATOR OUTPUT	
	Prime kW	Standby kW	Prime kVA	Standby kVA
4Z2.3-G21 (1500 rpm)	16	18	15	17
4Z2.3-G21 (1800 rpm)	21	23	20	21

Generator outputs calculated using nett engine power at 0.8 power factor, at an altitude below 1000 m.a.s.l. and 40-degree Celsius ambient temperature.
Refer to the outputs and ratings tables for exact site conditions.

Build specification for export markets
Manufactured in the People's Republic of China

TECHNICAL ENGINE SUMMARY

SPECIFICATIONS	4Z2.3 -G21	
Fuel Type	Diesel	
Method Of Cooling	Water Cooled – Set Mounted Radiator	
Number Of Cylinders	Four	
Engine Type	Inline 4 Stroke	
Bore x Stroke mm x mm	85 x 100	
Cylinder Liner Type	Wet Liner	
Total Displacement cc / L	2300 / 2.3	
Combustion Type	Direct Injection	
Aspiration - Naturally or Turbo	Naturally Aspirated	
Make of Turbo Charger	-	
Valves Per Cylinder	2 per cylinder	
Compression Ratio	18:1	
Firing Order	1:3:4:2	
Swept Volume in cm^3	2270 @ 1500rpm	
Mean Piston Speed in m/min	300 @ 1500rpm	360 @ 1800rpm
Cyclic Irregularity	0.060-0.075 δs	
Fuel System	BQ Series Inline Pump	
Steady State Speed Stability at Constant Load	G2 Class $\leq \pm$ 1.5	
Flywheel & Bellhousing SAE	SAE 4-7.5	
Number of Teeth on Flywheel	109	
Direction of Rotation (Viewed from Flywheel)	Counterclockwise	
Moment of Inertia (Engine and Alternator) kgm2	3.0-5.0 kgm2 depending on the alternator	
Moment of Inertia (Engine) kgm2	1.2-1.5 kgm2	
PROTECTIONS & SENSORS		
Method of Protection Against High Engine Temperature	KE00105(3/8-18NPT)	
Method of Protection Against Low Oil Pressure	KE21103(NPT1/8;0-10)	
Method of Protection Against Low Water Level	JKE00120 1/2"-G	
Method of Protection Against High Water Temperature	KE00105(3/8-18NPT)	
WEIGHTS & DIMENSIONS		
Weight (Dry) / Weight (Wet) (kg)	220 / 230	
Length x Width x Height (Engine Only) mm	919 × 565 × 760	
Length x Width x Height (Engine Only + Radiator) mm	1099 × 565 × 760	

RATINGS / OUTPUTS

kW (Gross kWm)	1500	1800
Max kw	18	23
kW (Nett kWm) Rated	**1500**	**1800**
Continuous kW	13	17
Prime kW	16	21
Standby kW	18	23
kWe (Nett kWe)	**1500**	**1800**
Continuous kWe	12	16
Prime kWe	15	120
Standby kWe	17	21
Based on an alternator efficiency of 95%		
kVA	**1500**	**1800**
Continuous kVA @ 0,8pf	12	15
Prime kVA @ 0,8pf	15	19
Standby kVA @ 0,8pf	16	21

These guidelines have been formulated to ensure proper application of generator drive engines in A.C. generator set installations.

STANDBY POWER RATING
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 Standby Power rating. This rating should be applied where reliable utility power is available. A Standby rated engine should be sized for a maximum of an 80% average load factor and 200 hours of operation per year. This includes less than 25 hours per year at the Standby Power rating. Standby 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
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:

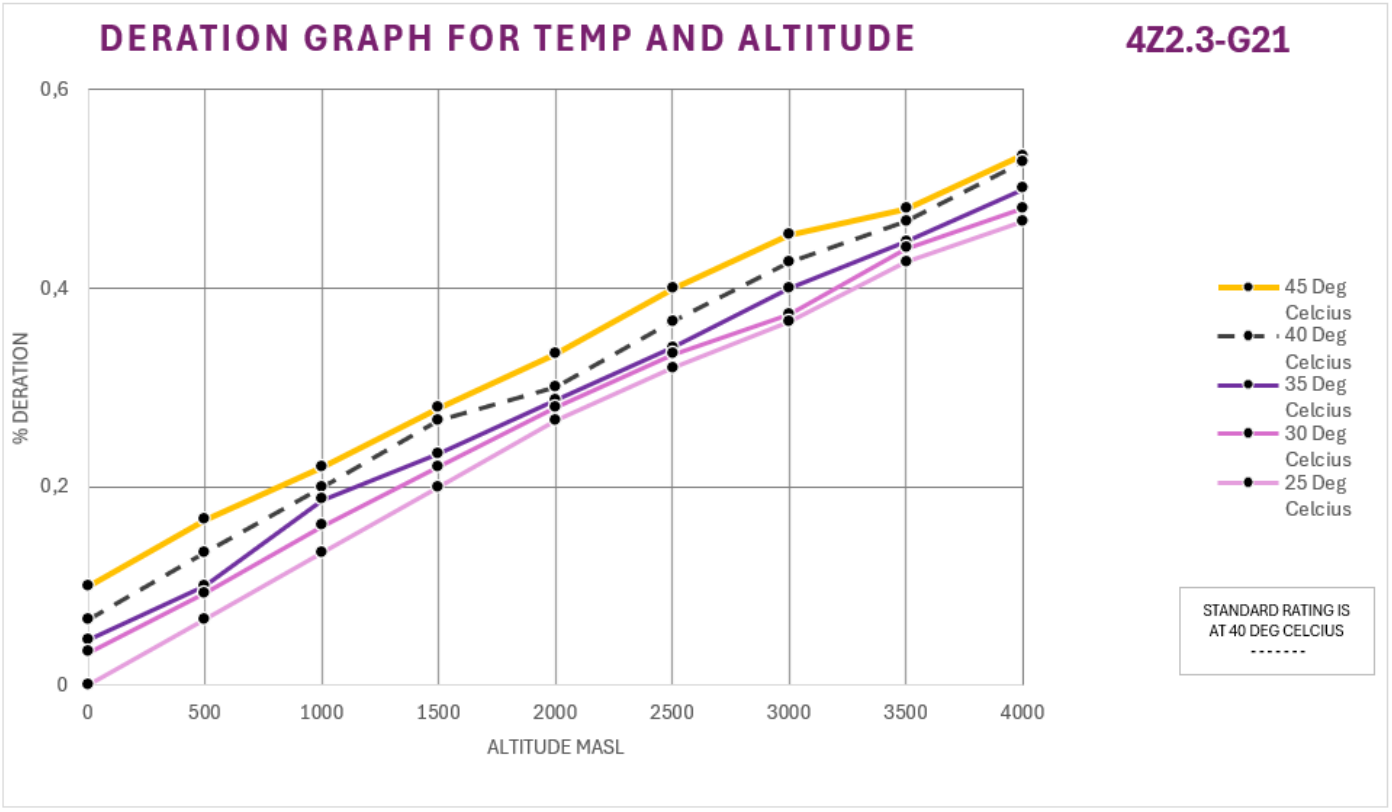
UNLIMITED TIME RUNNING PRIME POWER
Prime Power is available for an unlimited number of hours per year in a variable load application. Variable load should not exceed a 70% average of the Prime Power rating during any operating period of 250 hours. The total operating time at 100% Prime Power shall not 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
Limited Time Prime Power is available for a limited number of hours in a non-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 exceeding 750 hours per year at the Prime Power rating should use the Continuous Power rating.

CONTINUOUS POWER RATING
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.

NB: DC VARIABLE SPEED POWER RATING
Please consult with engineering for applications where variable speed engines are required for D.C. generator set applications.

RATINGS – DERATION CURVES



BASE kW RATING: PERCENTAGE (%) DERATING FOR SITE CONDITIONS

Alt. / Temp	0	500	1000	1500	2000	2500	3000	3500	4000
50 Deg C	-	-	-	-	-	-	-	-	-
45	10%	16%	22%	28%	33%	40%	45%	48%	53%
40	7%	13%	20%	27%	30%	37%	43%	47%	53%
35	5%	10%	19%	23%	29%	34%	40%	45%	50%
30	3%	9%	16%	22%	28%	33%	37%	44%	48%
25	0%	7%	13%	20%	27%	32%	37%	43%	47%

TEST CONDITIONS

Air temperature. . ... 27 °C
Barometric pressure... ... ... 100 kPa
Relative humidity 30%
Air inlet restriction at maximum power (nominal) ... ... 2,5 kPa
Intercooler Pressure at maximum power (nominal) ... ... 2,5 kPa
Exhaust back pressure at maximum pressure (nominal) ... 3,0 kPa
Fuel temperature (inlet pump) ... ... 55 °C maximum

Notes:
All data is based on the engine operating without, alternator, optional equipment and driven components. Data shown above represents gross engine performance capabilities obtained and corrected in accordance with
GB/T1147.1-2017 and Equivalent ISO 3046-1:2002

Standards for ratings (continuous, prime, standby) in accordance with GB/T2820 and Equivalent ISO 8528-1:2018

LOAD ACCEPTANCE AND GOVERNING CLASS

Initial load acceptance
When engine reaches rated speed

(Withing 15 seconds after engine starts to crank)

Step Load	Prime Power Load kWm	Load kWe nett	Expected frequency deviation %	Frequency recovery time seconds	Frequency stability
25% - 75%	4 – 12	5 – 15	5-8% dip	≤ 3-4	± 1.5%
0% - 100%	0 – 16	0 – 18	10-14% dip	≤ 5	± 1.5%
100 – 0% load drop	16 - 0	18 – 0	5-10% overshoot	≤ 5	± 1.5%

VALVES AND MECHANICS

VALVE MECHANISM		
Type	Overhead Valves	
Number of valves	1 Intake & 1 Exhaust per Cylinder	
Valve lashes when cold	Intake 0.35mm	
	Exhaust 0.45mm	
VALVE TIMING	**OPENING**	**CLOSE**
Intake Valve	12 ° BTDC	38 ° ABDC
Exhaust Valve	50 ° BBDC	14° ATDC

ELECTRICAL SYSTEM

CHARGING ALTERNATOR	
Charging Alternator Manufacturer	SDEC-4K41ZD-52300
Charging Alternator	35 A 14 V
Voltage Regulator	Built-In IC Regulator
STARTER MOTOR	
Starter Motor Manufacturer	SDEC-4K41ZD-51100
Number of Starter Motors	1
Starter Motor Power	3 Kw
Starter Motor Voltage	12 V
BATTERIES (NOT SUPPLIED / RECOMMENDED)	
Battery Capacity	110-120 Amp Hour
Number of Battery & Type	1 x 12V Lead Acid

FUEL CONSUMPTION

MODEL / LOAD	25%	50%	75%	100%	110%
1500 rpm g/kWh	95	137	194	247	273
1500 rpm l/h	2L	3L	4L	5L	5L
1800 rpm g/kWh	92	136	192	244	268
1800 rpm l/h	2L	3L	5L	6L	7L

FUEL SYSTEM

Injection System	
Type	Electronic
Injection Pump	Kang Da
Injection Nozzle	Multi Hole Type
Opening Pressure	24Mpa
Injection Timing	14 -17 °
Feed Pump	Mechanical
Governor	Electronic
Governing Class	G2
Speed Controller	Fortrust C2004
Fuel Filtration	
Fuel Filter	Spin On Type
Fuel Filters Type	Full Flow Cartridge
Fuel Filters	1 Primary
Water Separator	Optional
Fuel	
Fuel Type	Diesel
Suggested Grade / Class	50 ppm or better
Bio Diesel Compatible	Confirm the ratio with the factory before use

LUBRICATION SYSTEM

Oil Lubrication System	
Lubrication Method	Fully forced pressure feed type
Oil Pump Type	Gear type driven by crankshaft
Oil Pan Capacity	
High Level / Low Level (Litres)	6 / 5
Angularity Limit	
Front Down	25 °
Front Up	35 °
Side to Side	35 °
Oil Filtration	
Oil Filter	Spin On Type
Oil Filters Type	Full Flow Cartridge
Oil Filters	1 Primary
Oil	
Oil Type	Multigrade Oil
Suggested Grade / Class	CF 15W/40

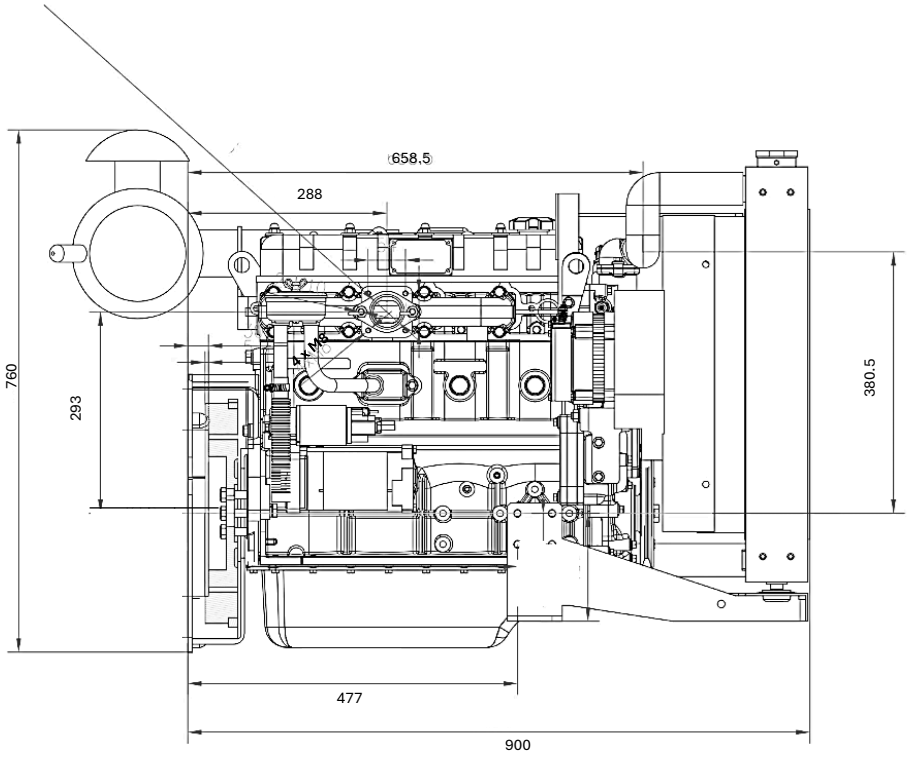
ENGINE COOLING DATA AND THERMODYNAMICS

Cooling System	
Cooling Method	Fresh Water Forced Circulation
Water Capacity (Engine Only)	4 litres
Water Lid Min. Pressure	70 kPa
Water Pump	Centrifugal Type
	Belt Driven
Water Pump Capacity 1500rpm	25 L/min
Water Pump Capacity 1800 rpm	28L/min
Thermostat	Wax–Pellet Type
	Opening Temp. 72°C
	Full Open Temp. 82°C
Cooling Fan Type	Blower Type
Drive Type	Mechanically Driven
Cooling Fan Construction	7 x Plastic Blades
Cooling Fan Size	400 mm Diameter
Cooling Fan Power Consumption	1.2kw
Cooling Air Flow	10.8 m^3/s
Radiator	
Type	Set Mounted
Manufacturer	JK
Construction	Copper Core
Treatment	Tropicalised
Temperature	50 Degree
Intercooled	No
Antifreeze	
Antifreeze Type	Premix (50/50)
Compliant Grade / Class	ASTM D-3306 ASTM D-6210 SAE J814
Main Ingredient	50% Glycol or More

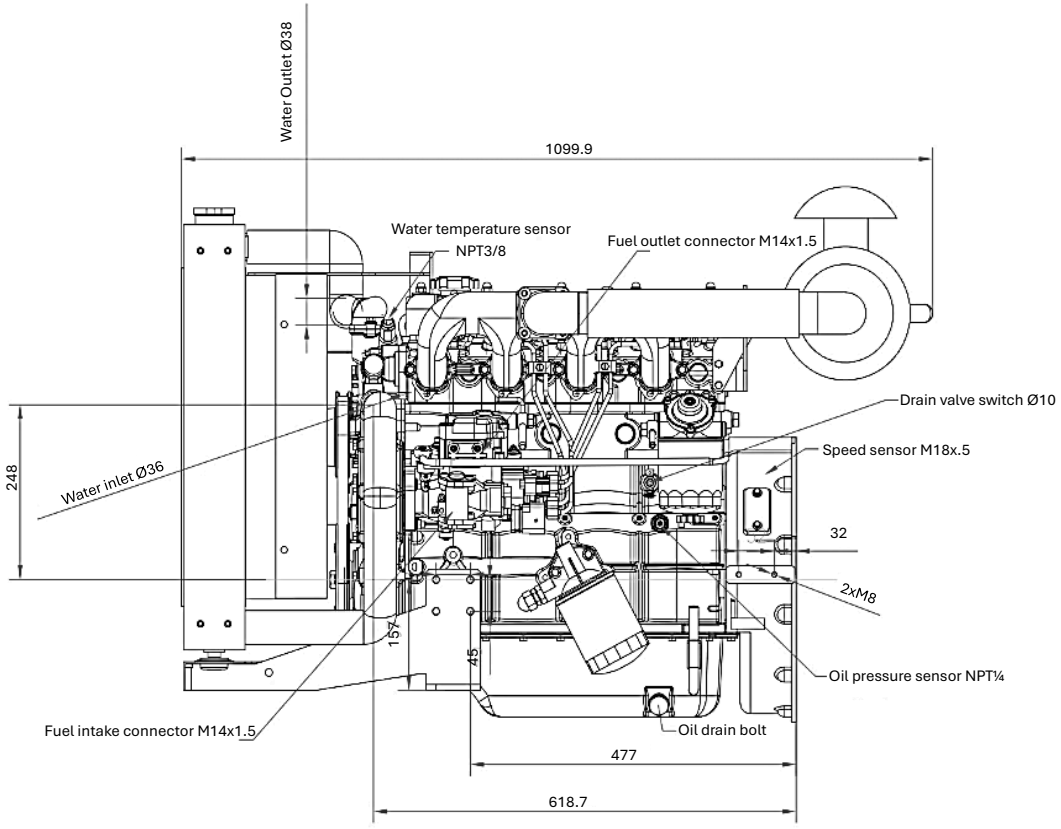
Heat Rejection	
Heat Rejection to Coolant	2kcal/sec (1500 rpm) 3kcal/sec (1800 rpm)
Heat Rejection to Intercooler	-
Max. Permissible Restrictions	3kPa
Permissible Restrictions: Intercooler	-
Intake System kPa	4
Max. Permissible Altitude m.a.s.l.	1000m (3280 ft)
Exhaust System	
Exhaust Gas flow	4m3/min (1500 rpm) 5m3/min (1800 rpm)
Exhaust Gas Temperature Max °C	480
Exhaust Outlet Size (Internal) mm	Ø46
Exhaust Outlet Flange Size mm	Ø54
Exhaust Flange & Bellow Supplied	No
Back Pressure for Total System at Standby Power	10 kPa Max
Exhaust Smoke (FSN)	≤2.5
Turbo Charger	
Manufacturer	-
Boost Pressure Ratio	-
Water Jacket Cooling Data (Optional	
Coolant Flow - litres/min	5l/min
Coolant Exit Temperature (max) °C	70–85 °C
Coolant Inlet Temperature (min) °C	-40 °C
Coolant Inlet Temperature (max) °C	+60 °C to +70 °C
Suggested Pump Rating kW	1 Kw
Colour of the engine	
RAL	RAL 9006 (White/Silver Aluminium)

DRAWINGS ENGINE

SIDE VIEW - RHS

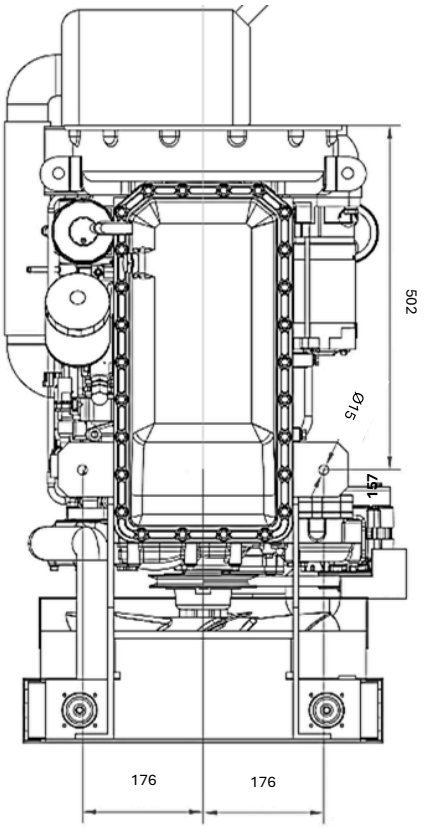


SIDE VIEW - LHS

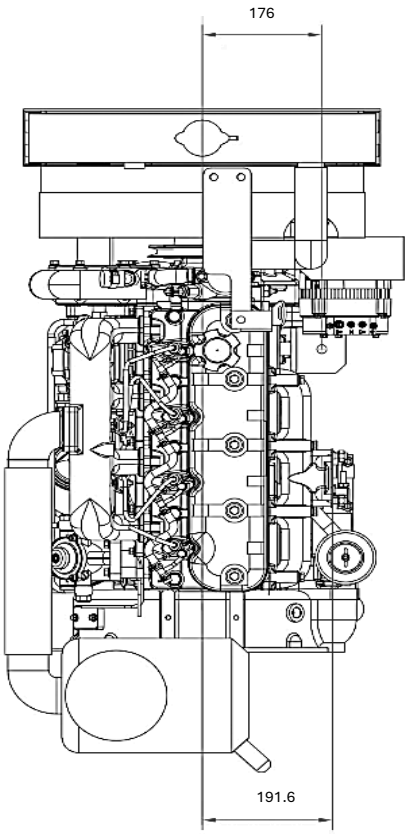


DRAWINGS ENGINE & RADIATOR

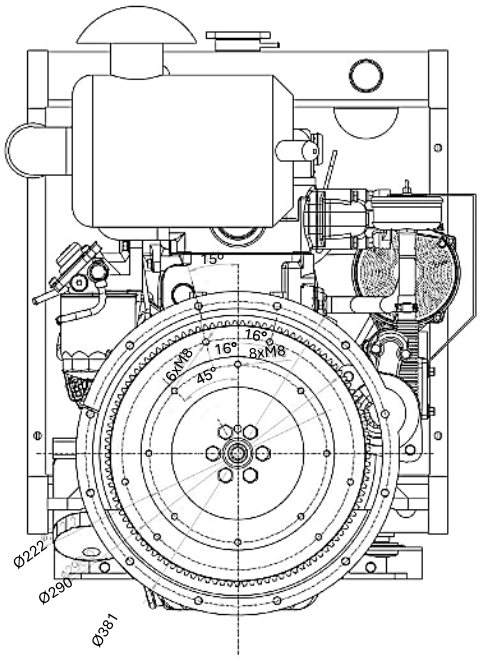
BOTTOM VIEW - LOW



TOP VIEW - AERIAL



REAR VIEW - FLYWHEEL



SERVICE AND CRITICAL PARTS

SERVICE HOURS		50	100	250 Monthly	1000 Annually
SERVICE PART	**PART NO.**				
Air Filter (Inner)	4050121	-	-	Yes	Yes
Air Filter (Outer)	-	-	-	-	-
Fuel Filter (Outer)	4050120	-	-	Yes	Yes
Fuel / Water Separator	-	-	-	-	-
Oil Filter	4050119	-	-	Yes	Yes
Fan Belt	490B-41001-3	Check for wear or damage	Check for wear or damage	Check for wear or damage	Yes
Timing Belt	-	-	-	-	-
Oil	CF 15W/40	Check Level	Check Level	Yes	Yes
Anti-Freeze	Premix (50/50)	Check Level	Check Level	Check Level	Check Level
CRITICAL PARTS					
SERVICE PART	**PART NO.**				
Charging Alternator	4K41ZD-52300				
Starter Motor	4K41ZD-51100				
Valve Cover Gasket	NC485B-11104				
Radiator	S1580				
Speed Controller / ECU	ESG2002A800C-W				
Turbocharger	-				
Lift Pump	Provide engine build no.				
Fuel Pump	C490BD-21100-1				
Oil Pump	A495BZL-31000				

NOTES

NOTES

MANUFACTURER DETAILS

HEADQUARTERS & FACTORY

SDEC POWER

Shanghai New Power Automotive Technology Company Limited.

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motor@sdecie.com	spare@sdecie.com	sc_fw@sdec.com.cn
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DEALER INFORMATION

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