FDK ENERGY
SHENZHEN FUDIANKANG ENERGY CO., LTD
GUANGZHOU SANQ DIESEL GENERATOR SET CO., LTD
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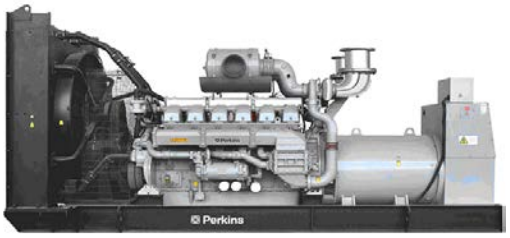
DATA SHEET

DIESEL GENERATOR 18KW
MODEL#FDK-P18/H1
50HZ/1500RPM
PERKINS MODEL: 404D-22G



General Features:

- All qualified generator sets are subjected to a comprehensive performance test which includes 50% load, 70% load, 100% load, 110% load and to check, verify that all control systems, alarm and shut-down protection.
- Equipped with battery charger and 24V high performance maintenance-free lead-acid starting batteries and connecting cables.
- Stainless galvanized zinc plates with strong corrosion-proof.
- Vibration isolators between the engine/alternator and base frame.
- Equipped with industrial silencer and flexible exhaust hose.
- Designed to comply with ISO8528/GB2820.
- Powered by Perkins engine and coupled with Stamford alternator.
- Water jacket preheater, oil heater and double air cleaner, etc. are available.

FDK Diesel Generator Set Data

Genset Model	FDK-P18/H1	Engine Make	Perkins CHINA
Prime Power	16KW/20KVA	Engine Model	404D-22G
Standby Power	18KW/23KVA	Alternator model	Stamford PI042G
Output Frequency / Rated speed	50Hz/1500rpm	Control System	DSE7320
Rated Voltage	230V/400V	Phase	Three

(1) **Prime power**: The rating is available for an unlimited of annual operating hours in variable load applications, in accordance with ISO8528-1.A 10% overload is available for a period of 1 hour within 12-hour period of operation, in accordance with ISO 3046-1.

(2) **Standby power**: The rating is applicable for supplying emergency power in variable load applications for up to 200 hours per year in accordance with ISO8528-1. Overload is not allowed.

(3) **Rated voltage**: available with customer requirement.

Engine Specifications (DETAILED in APPENDIX)

Engine Model	404D-22G	Bore x Stroke (mm x mm)	84×100
Engine Manufacturer	Perkins CHINA	Displacement	2.216L
Cylinder quantity	4	Compression Ratio	23.3:1
Cylinder Arrangement	In-line	Prime power / Speed (KW/RPM)	18.7kw/1500
Cycle	4	Standby power/ Speed (KW/RPM)	20.6kw/1500
Aspiration	Naturally	Governor type	Mechanical

CE ISO9001:2008 FDK reserves the right to change the specifications and designs without noice.

Piston Speed	5m/s	Fuel Consumption at 100% load (L/HOUR)	5.3 L
Typical genset electrical output (0,8 pf 25°C)	16kw	Starter motor	12V
Total Lubrication System Capacity (L)	10.6	Alternator	12V
Coolant Capacity (L)	3.6	Minimum cranking speed.	150rpm

Alternator Specifications

Alternator model	PI042G	Number of phase	3
Alternator manufacturer	STAMFORD	Rated voltage	400V (Available with custom requirements)
Exciter type	Single bearing, Brushless, Self-excited	Power factor	0.8
Rated output prime power	20KVA	Voltage regulation NL-FL	≤±1%
Rated speed	1500 rpm	Insulation grade	H
Rated frequency	50Hz	Protection grade	IP23

Alternator option: Leroy Somer, MECC, Marathon, Engga, Faraday

Control System DSE7320 (DETAILED in INSTRUCTION)

DSE7320 is an advanced control module based on micro-processor, containing all necessary functions for protection of the genset and the breaker control. It can monitor the mains supply, breaker control and automatically start the engine when the mains are abnormal. Accurately measure various operational parameters and display all values and alarms information on the LCD. In addition, the control module can automatically shut down the engine and indicate the engine failure.

FEATURES

- Microprocessor control, with high stability and credibility.
- Monitoring and measuring operational parameters of the mains supply and genset.
- Indicating operation status, fault conditions, all parameters and alarms.
- Multiple protections; multiple parameters display, like pressure, temp. etc.
- Manual, automatic and remote work mode selectable.
- Real time clock for time and date display, overall runtime display, 250 log entries.
- Overall power output display.
- Integral speed/frequency detecting, telling status of start, rated operation, overspeed etc.
- Communication with PC via RS485 OR RS232 interface, using MODBUS protocol.

Soundproof Enclosure Specification

FDK silent generator is designed by professional acoustic engineers based on years of experience. Now we can make the noise of the generator less than 80-85dB(A) at 1m, or 70-75dB(A) at 7m, 60-65dB(A) at 15m.

FEATURES

- Multi-way air intake and exhaust guarantee the power performance of the generator.
- Large-scale impedance combined type silencer effectively reduce noise of the generator.
- Internal high performance rubber damper and flexible materials reduce vibration.
- Base mounted fuel tank supports the generator running for 8 hours.

CE ISO9001:2008

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Optional

Generator set	Alternator	Low environment Temp	ATS
☐ Open generator set	☐ Stamford	☐ Water heater	☐ CHINT
☐ Silent generator set	☐ Marathon	☐ Oil heater	☐ SCHNEIDER
☐ Trailer generator set	☐ Mecc Alte	☐ Battery heater	☐ ABB
☐ ABB MCCB circuit breaker	☐ Leroy Somer		
	☐ Farady		
	☐ Engga		
Fuel system	**Control system**	**Voltage**	**Synchronized system**
☐ 12hrs base tank	☐ AMF function	☐ 415/240V	☐ CHINT Cabinet
☐ 24hrs base tank	☐ ATS control cabinet	☐ 400/230V	☐ SCHNEIDER Cabinet
☐ Dual wall base fuel tank	☐ DSE7320	☐ 380/220V	☐ DSE8610 Module
☐ Outside fuel tank	☐ DSE7510	☐ 220/127V	☐ COMAQ Module
	☐ GU620A	☐ 200/115V	☐ DEIF Module

Dimension & Weight

Open

Overall Size: L×W×H (mm)	1500×1000×730
Weight (kg)	630

Soundproof Version

Overall Size: L×W×H (mm)	2500×1300×1400
Weight (kg)	760

Sales Promises

- FDK provides a full line of brand new and high quality products. Each and every unit is strictly factory tested before shipment.
- Quality warranty is according to our standard conditions: 12 months from BL date or 1000 running hours, whichever comes first.
- Service and parts are available from FDK or distributors in your location.
- FDK guarantee use **BRAND NEW & GENUINE MACHINE.**

Technical Data

400 Series 404D-22G

ElectropaK

Basic technical data

Number of cylinders 4
Cylinder arrangement . . . . . Vertical in-line
Cycle . . . . . four stroke
Induction system . . . . . Naturally aspirated
Compression ratio 23,3:1
Bore . . . . . 84 mm
Stroke . . . . . 100 mm
Cubic capacity . . . . . 2·216 litres
Direction of rotation . . . . anti-clockwise when viewed from flywheel
Firing order 1, 3, 4, 2
Estimated total weight (dry) . . . . . 242 kg

Overall dimensions

-height . . . . . 840 mm
-length . . . . . 915 mm
-width . . . . . 477 mm

Moments of inertia (mk²)

-engine rotational components . . . . . 0,44 kg m²
-flywheel . . . . . 2,55 kg m²

Centre of gravity

-forward from rear of block . . . . . tba mm
-above centre line of block . . . . . tba mm
-offset to RHS of centre line . . . . . tba mm

Performance

Note: All data based on operation to ISO 3046-1:2002 standard reference conditions

Steady state speed stability at constant load
G2 . . . . . ± 0,75%
Cyclic irregularity
-at 110% stand-by power . . . . . tba

Test conditions

-air temperature . . . . . 25°C
-barometric pressure . . . . . 100 kPa
-relative humidity 31.5%
-air inlet restriction at maximum power (nominal) . . . . . 3 kPa
-exhaust back pressure at maximum power (nominal) . . . 10,2 kPa
-fuel temperature (inlet pump) . . . . . 40°C

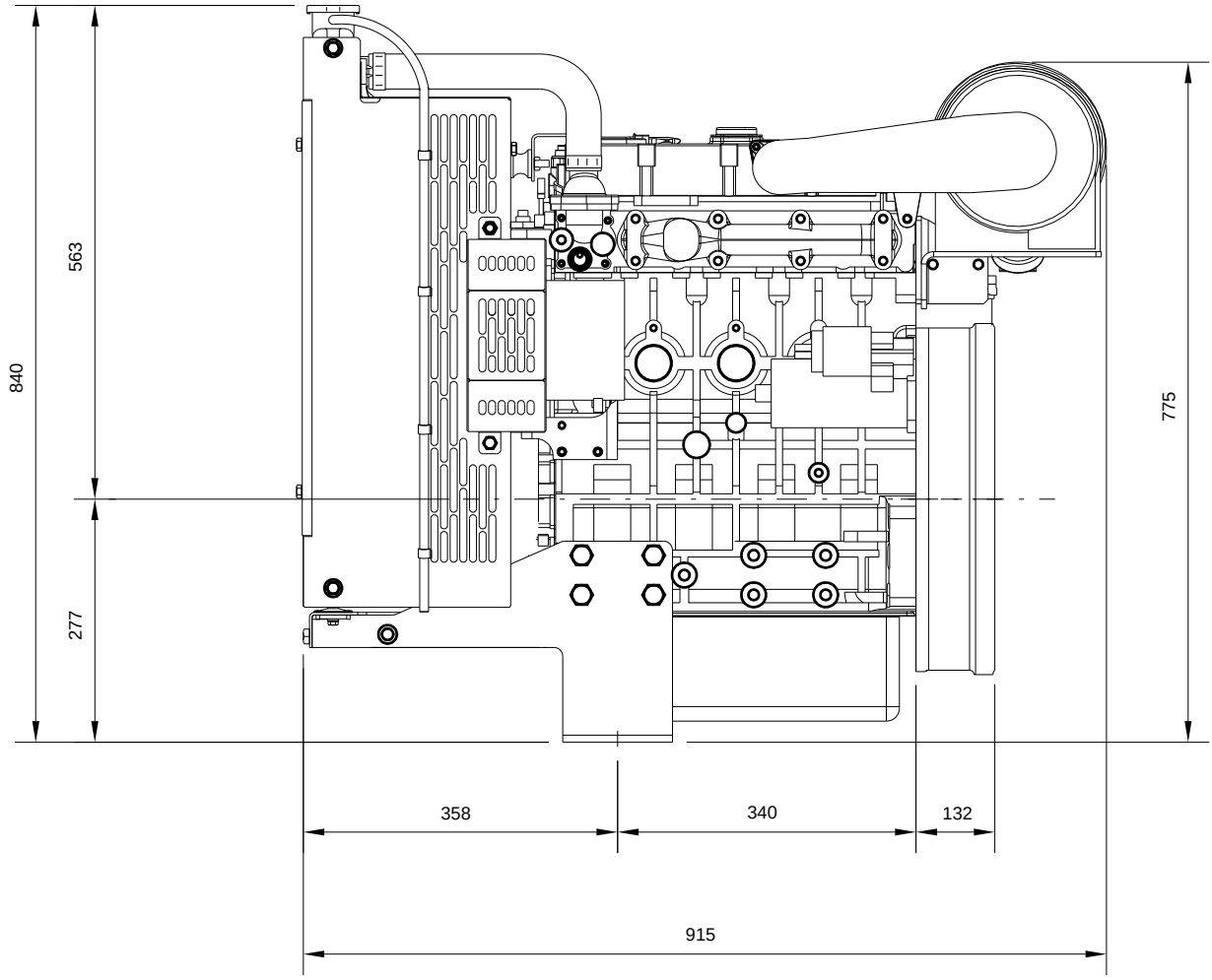
Sound level

Average sound pressure level for bare engine (without inlet and exhaust) at 1 metre . . . . . 76,4 dB(A)
-all ratings certified to within . . . . . ± 5%
If the engine is to operate in ambient conditions other than those of the test conditions, suitable adjustments must be made for these changes. For full details, contact Perkins Technical Service Department.
Emissions Statement: Certified against the requirements of EU2007 (EU97/68/EC Stage II) and EPA Interim Tier 4 (EPA 40 CFR Part 1039 Interim Tier 4) legislation for non-road mobile machinery, powered by constant speed engines.

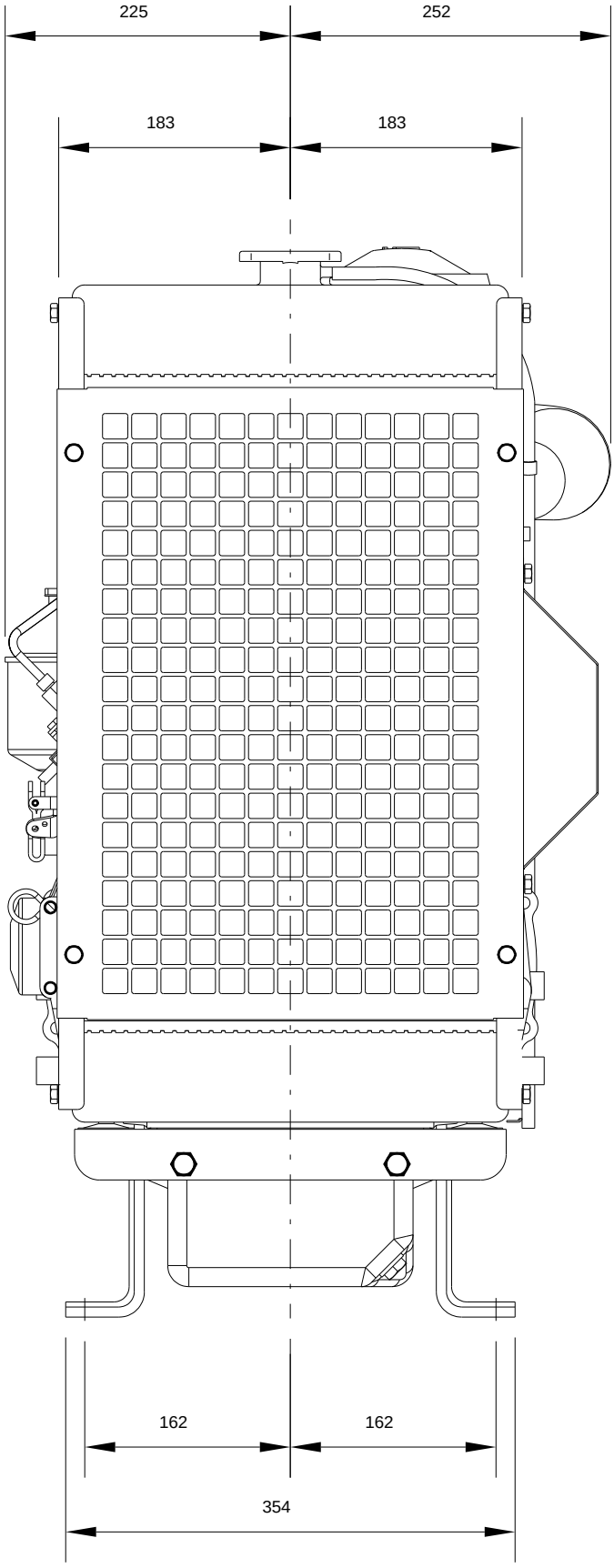
General installation - 404D-22G @ 1500 rev/min

Designation	Units	Type of operation and application	
		Prime	Stand-by
		50Hz	50Hz
Gross engine power	kWb	18,7	20,6
Brake mean effective pressure	kPa	669	650
Mean piston speed	m/s	5	
Engine coolant flow (coolant pump ratio 1·25:1)	l/min	40,3	
Combustion air flow	m³/min	1,45	
Exhaust gas flow (max)	m³/min	3,64	3,94
Exhaust gas temperature (max)	°C	445	505
Overall thermal efficiency (nett)	%	35	33
Typical genset electrical output (0,8 pf 25°C)	kWe	16,0	17,7
	kVA	20,0	22,1
Assumed alternator efficiency	%	87	
Energy balance			
Energy in fuel (heat of combustion)	kWt	53,0	61,2
Energy in power output (gross)	kWb	18,7	20,6
Energy to cooling fan	kWt	0,3	
Energy in power output (nett)	kWm	18,4	20,3
Energy to coolant and lubricating oil	kWt	17,0	19,6
Energy to exhaust	kWt	14,0	16,6
Energy to radiation	kWt	3,3	4,4

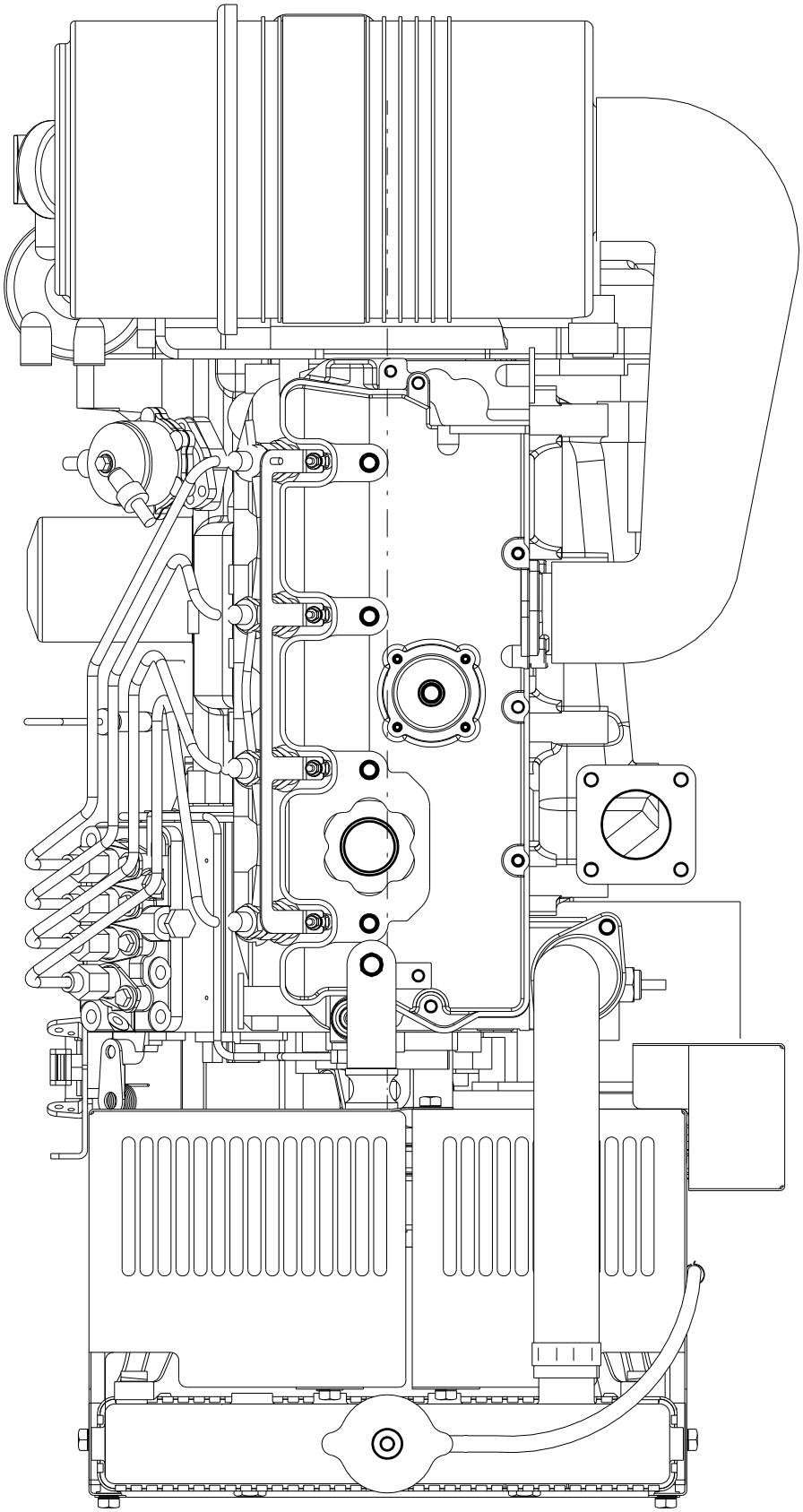
404D-22G ElectropaK, left side view



404D-22G ElectropaK, front view



404D-22G ElectropaK, plan view



Cooling system

Radiator

-face area ... 0,167 m²
-rows and materials ... 2 rows, Aluminium
-matrix density and material ... 14,5 fins per inch, Aluminium
-width of matrix ... 334,2 mm
-height of matrix ... 500,0 mm
-pressure cap setting ... 90 kPa
Estimated cooling air flow reserve ... 0,125 kPa

Fan

-diameter ... 320 mm
-drive ratio ... 1,25:1
-number of blades ... 7
-material ... Plastic
-type ... Pusher

Coolant

Total system capacity
-with radiator ... 7,0 litres
-without radiator ... 3,6 litres
Maximum top tank temperature ... 112°C
Temperature rise across engine ... 7,5°C
Max.permissible external system resistance ... tba kPa
Thermostat operation range ... 82 - 95°C
Recommended coolant:
Recommended coolant: 50% anti freeze / 50% water. For complete details of recommended coolant specifications, refer to the Operation and Maintenance Manual for this engine model.

Duct allowance

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow		
Ambient clearance 50% Glycol	**Duct allowance Pa**	**m³/sec**
53°C	0	0,67
46°C	125	0,49

Electrical system

-alternator ... 65 amps, 12 V
-starter motor ... Bosch 2 kW, 12 V

Cold start recommendations

Minimum cranking speed ... 150 rev/min

Minimum starting temperature	Grade of engine lubricating oil	Battery specifications			
°C		BS3911 Cold start amps	SAEJ537 Cold cranking amps	Number of batteries needed	Commercial ref number
0	20W	540	740	1	647
-15	10W	540	740	1	647
-20	5W	600	780	1	655

Note: Additional information for battery and cable limits can be found in Chapter 6 (Electrics) of 400D Engine Sales Manual.

Exhaust system

Maximum back pressure ... 10,2 kPa
Exhaust outlet size ... 42 mm

Fuel system

Type of injection ... Indirect injection
Fuel injection pump ... Cassette type
Fuel injector ... Pintle nozzle
Nozzle opening pressure ... 14,7 MPa
Max. particle size ... 25 microns

Fuel lift pump

-type ... mechanical (camshaft driven)
-flow/hour ... 63 litres/hr
-pressure ... 10 kPa
Maximum suction head ... 0,8 m
Maximum static pressure head ... 3,0 m
Governor type ... Mechanical

Fuel specification

USA Fed Off Highway - EPA2D 89.330-96
Europe Off Highway - CEC RF-06-99
Note: For further information on fuel specifications and restrictions, refer to the OMM Fuels section for this engine model.

Fuel consumption

Power rating%			
g/kWh (litres/hr)			
110	**100**	**75**	**50**
244 (6.1)	237 (5.3)	238 (4.0)	258 (2.9)

Induction system

Maximum air intake restriction

-clean filter . ... 3,0 kPa
-dirty filter ... ... 6,4 kPa
-air filter type .. .. Dry element type

Lubrication system

Lubricating oil capacity

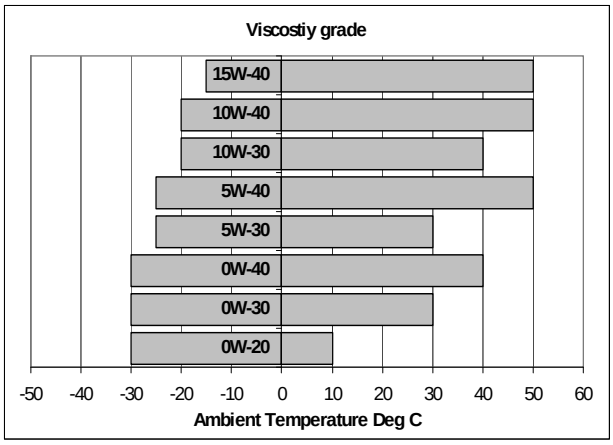
Max. sump capacity ... ... .10,6 litres
Min. sump capacity ... ...8,9 litres
Maximum engine operating angles
-front up, front down, right side or left side. ... ... 35° continuous

Lubricating oil pressure

-relief valve opens.. ... ...352 - 448kPa
Min. oil pressure. ... ...120 kPa
-at maximum no-load speed .. .. tba
Oil flow at rated speed ... ...109 litres/min
Normal oil temperature .. .. 125°C

Recommended SAE viscosity

A single or multigrade oil must be used which conforms API-CH-4 or ACEA E5.



Maximum static bending moment

at rear face of block .. ..1400 Nm

Load acceptance

The below complies with the requirements of classification 3 and 4 of ISO 8528-12 and G2 operating limits stated in ISO 8528-5

Initial load application: When engine reaches rated speed (15 seconds maximum after engine starts to crank)		
Descriptor	**Units**	**50 Hz**
% of prime power	%	tba
Transient frequency deviation	%	tba
Frequency recovery	Seconds	tba

The above figures were obtained under the following test conditions:
-minimum engine block temperature ... ... tba °C
-ambient temperature .. ..25°C
-governing mode 5%
-alternator inertia . ... tba kgm²
-under frequency roll off (UFRO) point set to2% Volt / 1% frequency
-UFRO rate set to ... ... 1 Hz below rated speed
LAM on/off ... ...off
All tests were conducted using an engine which was installed and serviced to Perkins Engines Company Limited recommendations.

Derate Curves

Derate curves for altitude and humidity can be found in section six (Ratings) of the 400D Engine Sales Manual

The general arrangement drawings shown in this data sheet are for guidance only. For installation purposes, latest versions should be requested from the Applications Dept., Perkins Engines Stafford, ST16 3UB United Kingdom.

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