Technical Data

1300 Series EDi 1306C-E87TAG4

ElectropaK

Basic technical data

Rating code TAG4 ... ...M914 (50Hz)
Rating code TAG4 ... ...M925 (60Hz)
Number of cylinders. 6
Cylinder arrangement .. ..Vertical, in-line
Cycle ... ... Four stroke
Induction system.. ... ... Air to air charged cooled, turbocharged
Compression ratio ... ... 16·9:1
Bore . ... 116,6 mm
Stroke .. .. 135,9 mm
Cubic capacity . ... .8,7 litres
Direction of rotation.. ... ...Clockwise, from the front
Firing order 1, 5, 3, 6, 2, 4

Engine weight is for full Electropak

-dry... ... ... 889 kg
-wet.. ... ... 939 kg

Overall dimensions (includes ElectropaK kit)

-height.. ... ... 1413 mm
-length.. ... ... 1866 mm
-width (including mounting brackets) ... ... 898 mm

Moments of rotational inertia (mk²)

-engine. ... ... 0,536 kgf m²
-flywheel SAE 2 (option GL08) ... ... 1,005 kgf m²

Centre of gravity

Position of centre (dry, base engine plus accessories)
-forward from rear of block... ... ... 449,6 mm
-above centre line of block... ... ... 182,9 mm
-offset to RHS of centre line. ... ... 10,2 mm

Performance

Data based on ISO/TR14396, SAE J1995 3.1, ISO3046/1, DIN6271
Engine speed control in
accordance with ... ... .BS5514 pt.4; ISO3046-4 and ISO8528-5
Cyclic irregularity
-TAG4 at 1500 rev/min 110% stand-by power.. 0,0286
-TAG4 at 1800 rev/min 110% stand-by power.. 0,0185

Test conditions

-air temperature ... ... 25 °C
-barometric pressure. ... ... 100 kPa
-relative humidity... ... ...30%

Sound level

Bare engine at 1 metre
-1500 rev/min ... ... see page 14
-1800 rev/min ... ... see page 15
-all ratings certified to within . ...+3 % to -5 %

If the engine is to operate in ambient conditions other than those of the test conditions (page 12), suitable adjustments must be made for these changes. For full details, contact Perkins Technical Service Department.
For details of load acceptance values see ‘Load acceptance” on page 12 contact the applications department at Perkins Engines Company Limited, Stafford.

Certified against the requirements of EU2007 legislation for non-road mobile machinery, powered by constant speed engines (EU97/68/EC Stage II).

General installation

Model: 1306C-E87TAG4 at 1500 rev/min

Designation	Units	Type of operation and application 50 Hz @ 1500 rev/min		
		Baseload	Prime	Standby
Gross engine power	kWb	189	209	228
Fan power	kWm	11		
ElectropaK nett engine power	kWm	178	198	217
Gross BMEP	kPa	1739	1919	2099
Combustion air flow	kg/s	0.25	0.27	0.29
Exhaust gas temperature after turbo (max)	°C	576		
Exhaust gas flow, wet	kg/s	0.27	0.28	0.30
Boost pressure ratio	-	2.60	2.73	2.86
Overall thermal efficiency (nett)	%	37.0	38.0	39.0
Mean piston speed	m/s	6.8		
Engine coolant flow	l/min	236		
Cooling fan air flow	m³/min	440		
Typical Gen Set electrical output (0.8pf)	kWe	164	182	200
	kVA	205	228	250
Assumed alternator efficiency	%	92		
Energy balance				
Energy in fuel	kWt	516	556	591
Energy in power output (at shaft)	kWb	182	201	220
Energy to coolant and oil	kWt	97	101	104
Energy to exhaust	kWt	169	180	189
Energy to ACC	kWt	41	46	50
Energy to cooling fan	kWm	20		
Energy to radiation (residual heat loss)	kWt	8	8	9

Caution: *The airflows shown in this table will provide acceptable cooling for an open power unit operating in ambient temperatures of up to 53 °C), 46 °C if a canopy is fitted. If the power unit is to be enclosed totally, a cooling test should be done to check that the engine cooling is acceptable. If there is insufficient cooling, contact Perkins Technical Service Department.*

Note: The above data is based on 42584 MJ/kg calorific value for diesel conforming to specification BS2869 Class A2.

Prime Power

Variable load. Unlimited hours usage with an average load factor of 70% of the published prime power rating.
A 10% overload is available for 1 hour in every 12 hour of operation.

Standby power

Variable load. Limited to 500 hours annual usage up to 300 hours of which may be continuous running. No overload is permitted

Model: 1306C-E87TAG4 at 1800 rev/min

Designation	Units	Type of operation and application 60 Hz @ 1800 rev/min		
		Baseload	Prime	Standby
Gross engine power	kWb	211	233	255
Fan power	kWm	20		
ElectropaK nett engine power	kWm	191	213	235
Gross BMEP	kPa	1618	1784	1951
Combustion air flow	kg/s	0.32	0.33	0.34
Exhaust gas temperature after turbo (max)	^{o}C	527		
Exhaust gas flow, wet	kg/s	0.33	0.34	0.35
Boost pressure ratio	-	2.75	2.95	3.15
Overall thermal efficiency (nett)	%	35.2	36.8	38.4
Mean piston speed	m/s	8.2		
Engine coolant flow	l/min	285		
Cooling fan air flow	m^3/min	495		
Typical Gen Set electrical output (0.8pf)	kWe	176	196	216
	kVA	220	245	270
Assumed alternator efficiency	%	92		
Energy balance				
Energy in fuel	kWt	541	579	618
Energy in power output (at shaft)	kWb	193	213	235
Energy to coolant and oil	kWt	99	103	106
Energy to exhaust	kWt	176	186	195
Energy to ACC	kWt	44	48	53
Energy to cooling fan	kWm	20		
Energy to radiation (residual heat loss)	kWt	8	9	10

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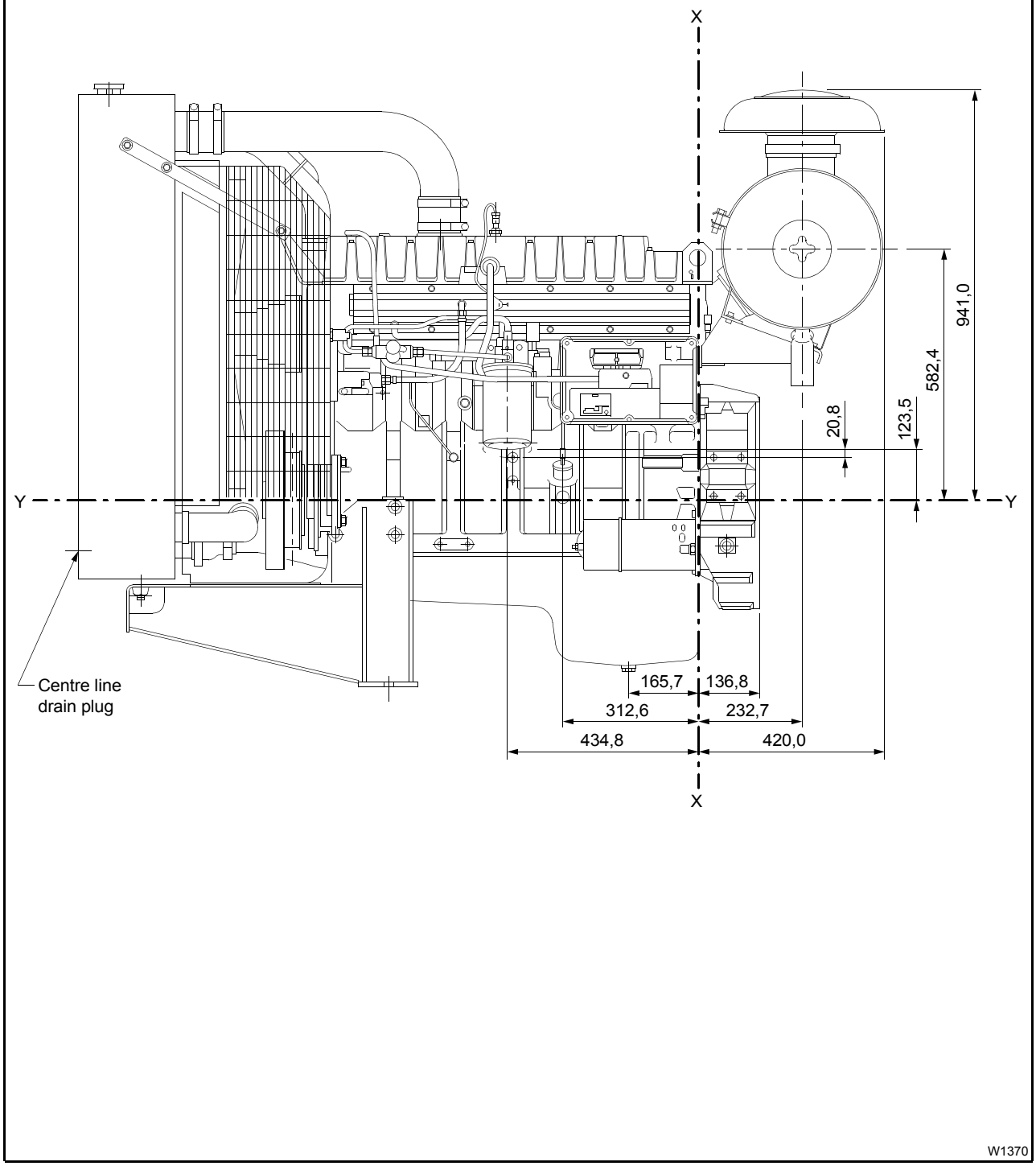
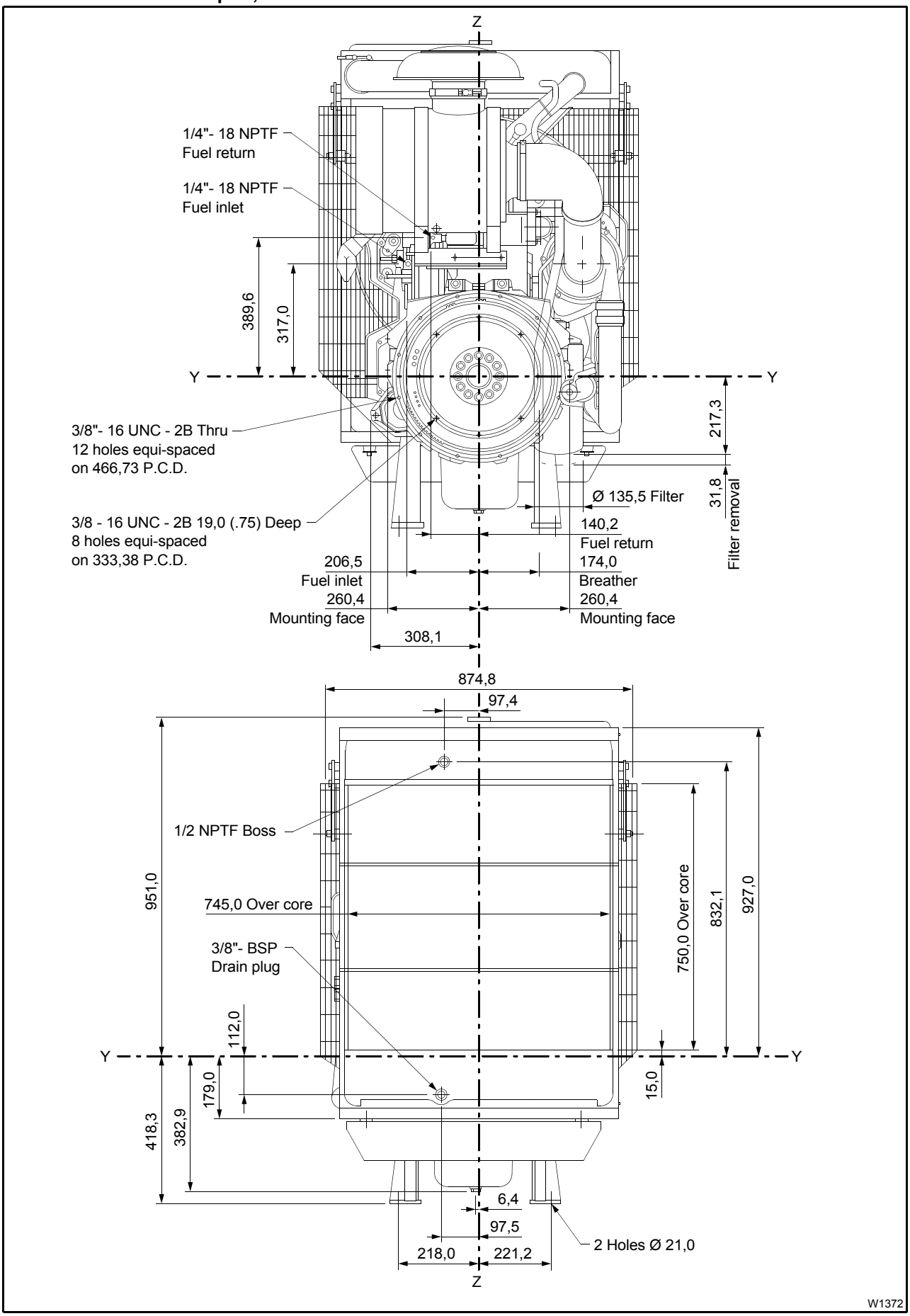
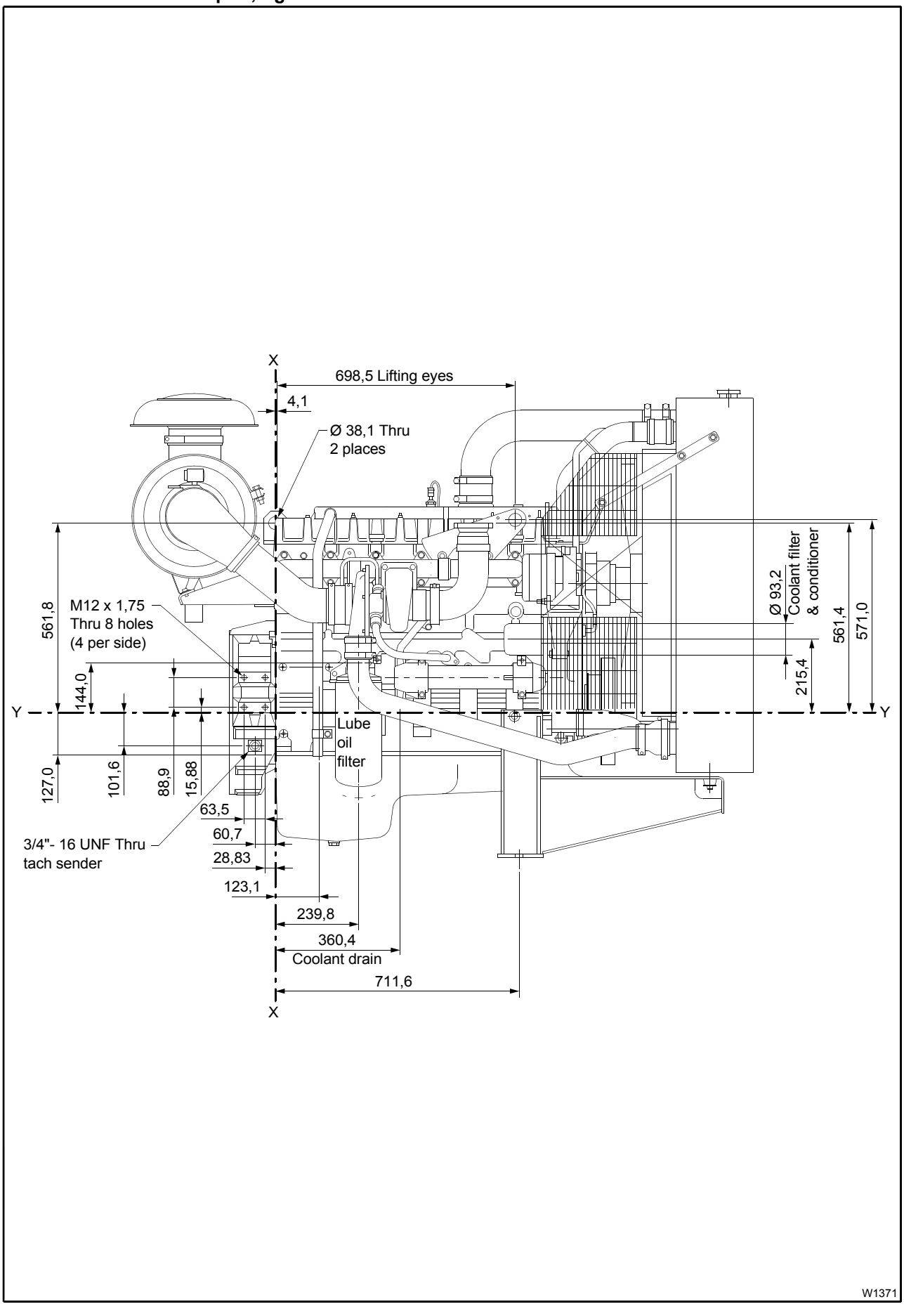
1306C-E87TAG4 ElectropaK, left side view



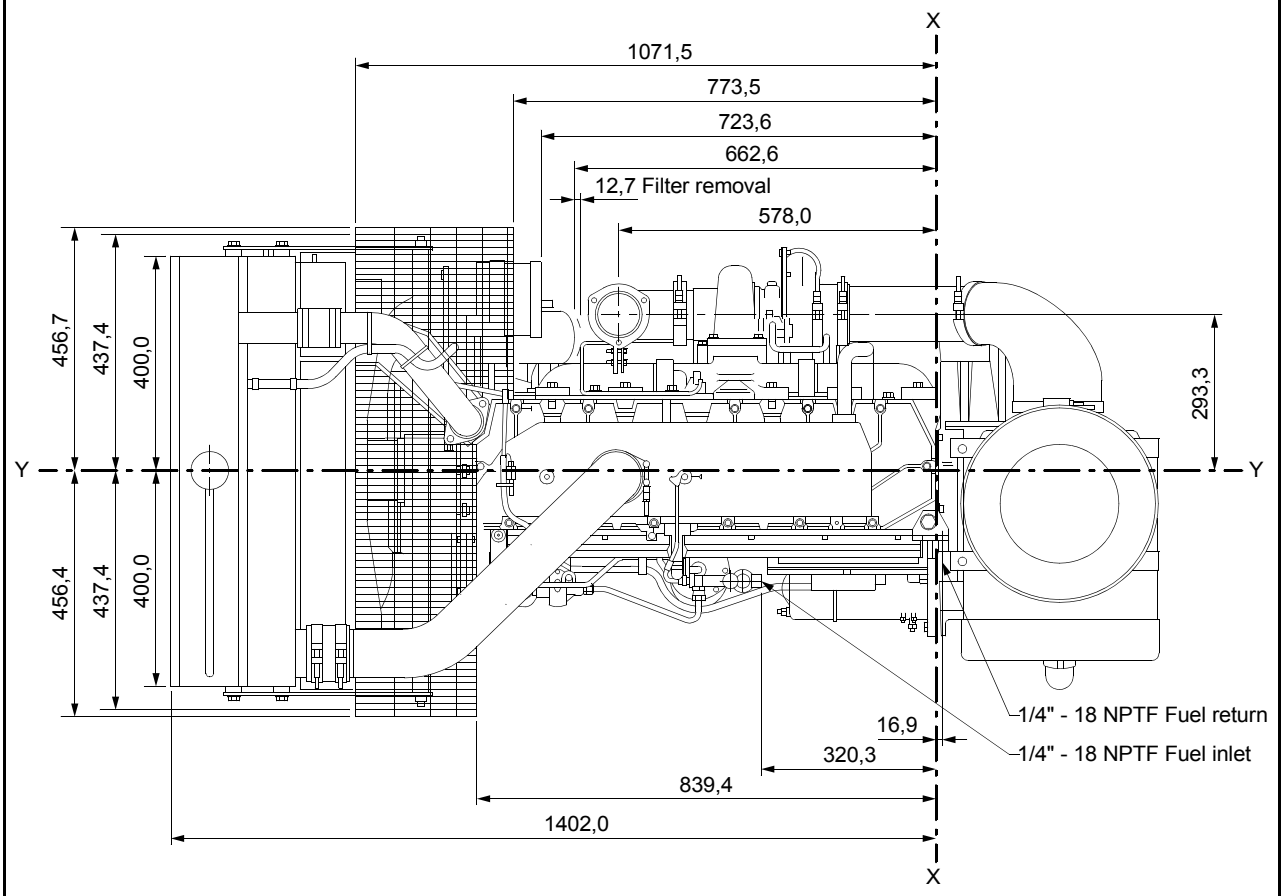
1306C-E87TAG4 ElectropaK, front and rear views



1306C-E87TAG4 ElectropaK, right side view



1306C-E87TAG4 ElectropaK, plan view



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Cooling system

Radiator

Radiator face area .. .. 0.39 m²
Number of rows and material . ... 5, aluminium
Fins per inch and material 10
Pressure cap setting (min) . ...110 kPa

Charge Cooler

Face area ... ... 0.26 m²
Number of rows and material . ... 2, aluminium
Fins per inch and material 10

Width and Height of Matrix

Height . ... 890.0 mm
Width .. .. 625.4 mm
Weight of cooling pack (dry)... ... ... 60.7 kg

Coolant pump

Speed
-at 1500 rev/min 2730
-at 1800 rev/min 3276
Method of drive .. ..Belt driven

Fan type/details

Diameter . ... .28 in (711.2 mm)
Drive ratio 1.3
Material .. .. Plastic
Number of blades 7
Pusher/Puller .. .. .Pusher
Cooling fan air flow
-at 1500 rev/min . ...440 m³/min
-at 1800 rev/min . ...495 m³/min

Coolant system

Recommended coolant: 50% inhibited ethylene glycol or 50% inhibited propylene glycol and 50% clean fresh water. Where there is no likelihood of ambient temperature below 10 °C, then clean soft water may be used, treated with 1% by volume of Perkins inhibitor.
Coolant capacity . ... 24.2 litres
Maximum pressure in engine cooling circuit .. ..110 kPa
Maximum top tank temperature ... ... 107 °C
Maximum static pressure head on pump ... ...127 kPa
Maximum permissible restriction to coolant pump flow . ... . .35 kPa
Thermostat operating range .. ..87 °C - 96 °C
Coolant flow against 30 kPa restriction,
-at 1500 rev/min ... ... 236 l/min
-at 1800 rev/min ... ... 285 l/min
Maximum temperature rise across the engine .. ..10 °C

Induction system

Maximum air intake restriction

-clean filter .. .. 2.5 kPa
-dirty filter ... ...6.22 kPa
-air filter type .. ..dry paper element

Exhaust system

Maximum back pressure ... ...10,7 kPa
Exhaust outlet size (internal) .. ... see GA drawings for dimensions

Cold start recommendations

Minimum starting temperature		Grade of engine lubricating oil	Battery specifications			
			BS3911 Cold start amps	SAEJ537 Cold cranking amps	Number of batteries needed	Perkins type
°C	°F					
-15	5	10W	440	660	2	A
-20	4	5W	440	660	2	A

Notes:

- Battery capacity is defined by the 20 hour rate
- The oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater
- Breakaway current is dependent on the battery capacity available. Cables should be capable of handling transient current twice that of cranking current

-15 °C

Oil (SAE grade) 10W
Battery 2
Max breakaway current ... ...amps
Cranking current .. ..amps
Aids (automatically controlled by the engine ECM) . ... type
Minimum mean cranking speed... ... ... 130 rev/min

-20 °C

Oil (SAE grade) 5W
Battery 2
Max breakaway current ... ...amps
Cranking current .. ..amps
Aids (automatically controlled by the engine ECM) . ... type
Minimum mean cranking speed... ... ... 130 rev/min

Maximum additional restriction (duct allowance) to cooling airflow and resultant minimum airflow

Ambient clearance: air temp to filters
52ºC at 0 kPa restriction resultant Min. airflow = 440 m³/min
40ºC at 0.125 kPa restriction resultant Min. airflow = 424 m³/min

Electrical system

Type (grounding) . ... Negative ground
Alternator type . ... Delco Remy 13SI 24V
Alternator voltage 24V
Alternator output .. .. .50 amps
Starter type .. ..Delco Remy 38MT 24V
Starter motor voltage 24V
Starter motor power . ...6 kW
Number of teeth on flywheel ... ... .138
Number of teeth on starter pinion 12
Minimum cranking speed . ... 130 rev/min
Starter solenoid maximum pull-in current at -25 °C ... ...200 amps
Starter solenoid maximum hold-in current at -25 °C ... . 15 amps

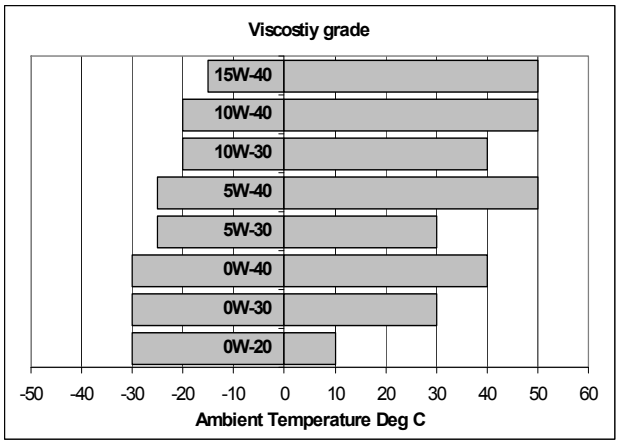
Lubrication system

Lubricating oil capacity

Total lubrication system capacity ... ... .26.5 litres
Maximum sump capacity (with filter canister) ... ... .28.3 litres
Minimum sump capacity (without filter canister) ... ... .22.7 litres
Oil temperature (in sump) - Maximum ... ... 132 °C
Oil temperature (in sump) - Normal continuous operation . . 121 °C
Shutdown switch setting (where fitted) .. .. kPa falling
Lubricating oil pressure at bearings:
-at 1500 rev/min . ... 350 kPa
-at 1800 rev/min . ... 370 kPa
-minimum ... ... 276 kPa
Oil relief opens at ... ... 552 kPa
Oil filter screen spacing.. ... ... 10 microns
Lubricating oil flow
-at 1500 rev/min . ... .79 litres/min
-at 1800 rev/min . ... .94 litres/min
Oil consumption . ... <0.1% of fuel
Oil pump speed (gear driven)
- at 1500 rev/min ... ... 1500 rev/min
- at 1800 rev/min ... ... 1800 rev/min

Recommended SAE viscosity

A single or multigrade oil must be used which conforms to API CI-4 or DHD-1 (a higher specification of lubricating oil is acceptable) see illustration below:



Fuel system

Injection system... ... ...Direct
Injector type. ... ... HEUI
Governor type.. ... .Electronic (isochronous or droop capability)
Governing conforms to
... ...BS 2869 CLASS A2 / ASTM D975 66T NUMBER 2D
Lift pump type.. ... ... R.Bosch 24P320
Lift pump fuel delivery at rated speed . ... 180 litres/hour
Lift pump delivery pressure . ...180 kPa
Maximum suction head at pump inlet.. ... ... .1 m
Maximum static pressure head ... ... .3 m
Maximum fuel inlet temperature .. ..58 °C
Fuel filter spacing (primary). ... ... 5 microns
Fuel filter spacing (secondary) ... ...
Fuel pre screen filter spacing .. .. 250 microns
Tolerance on fuel consumption 5%
Heat retained in fuel to tank ... ...1.5 kWt

Fuel specification

Fuel specification	USA Fed Off Highway EPA 2D 89.330-96
Density (kg/l at 15 °C)	0,845 - 0,85
Viscosity (mm²/s at 40 °C)	2,0 - 3,2
Sulphur content	0,03 - 0,05%
Cetane number	40 - 48

Fuel consumption

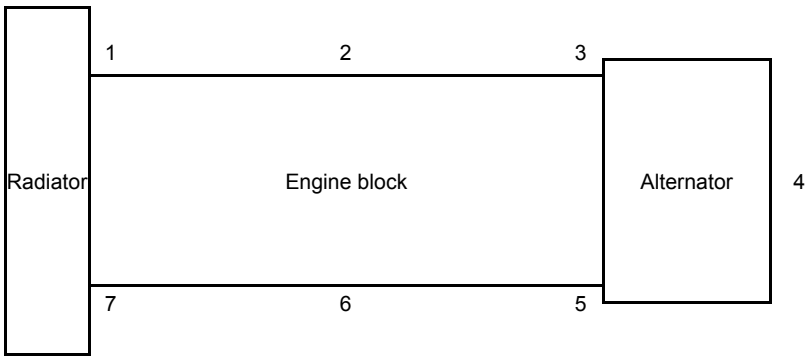
1306C-E87TAG4 at 1500 rev/min

Rating	g/kWh	l/hr
Standby	204	54
Prime	206	50
75% Prime	213	39
50% Prime	227	29

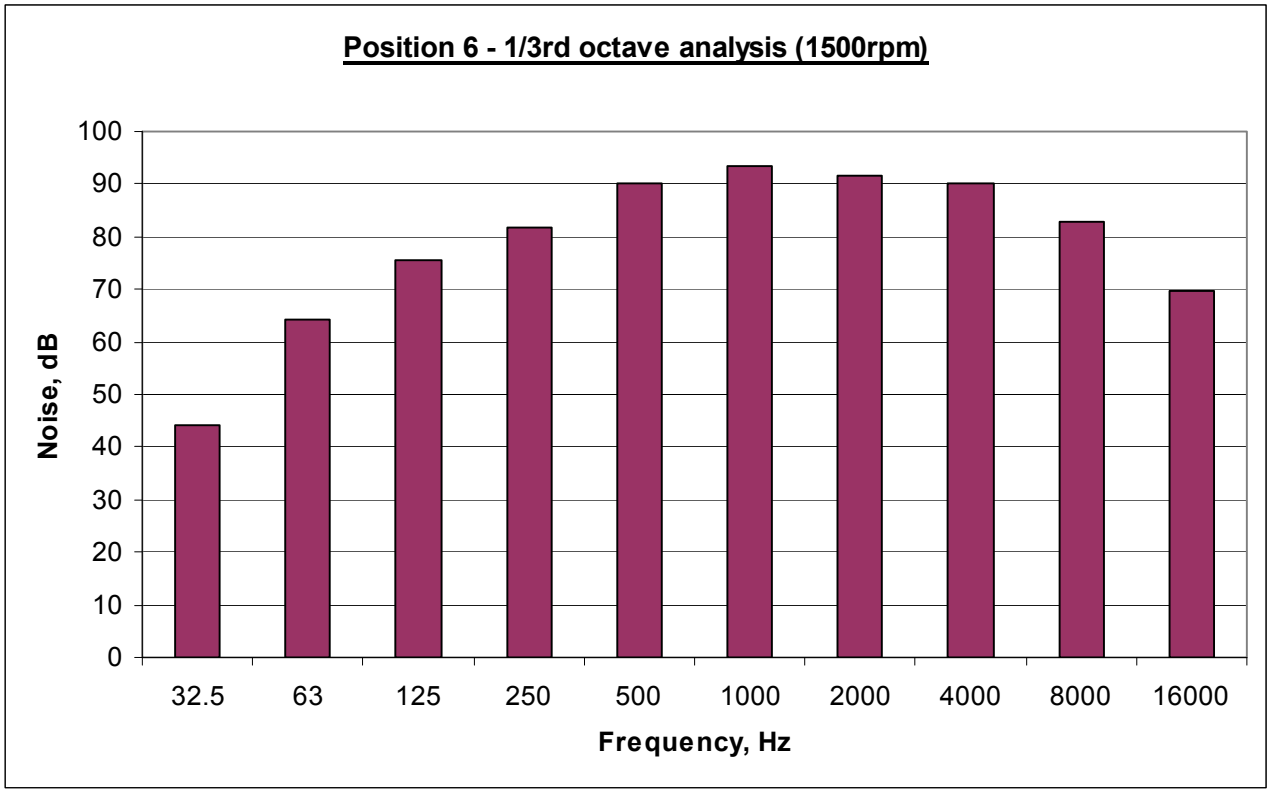
1306C-E87TAG4 at 1800 rev/min

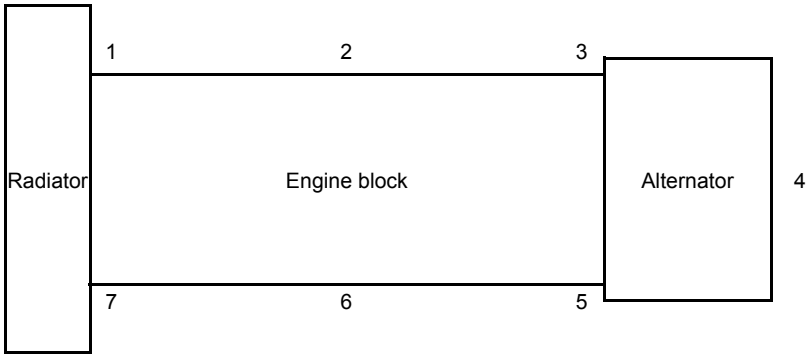
Rating	g/kWh	l/hr
Standby	207	59
Prime	214	56
75% Prime	231	46
50% Prime	247	34

Note: All figures based on Gross power.

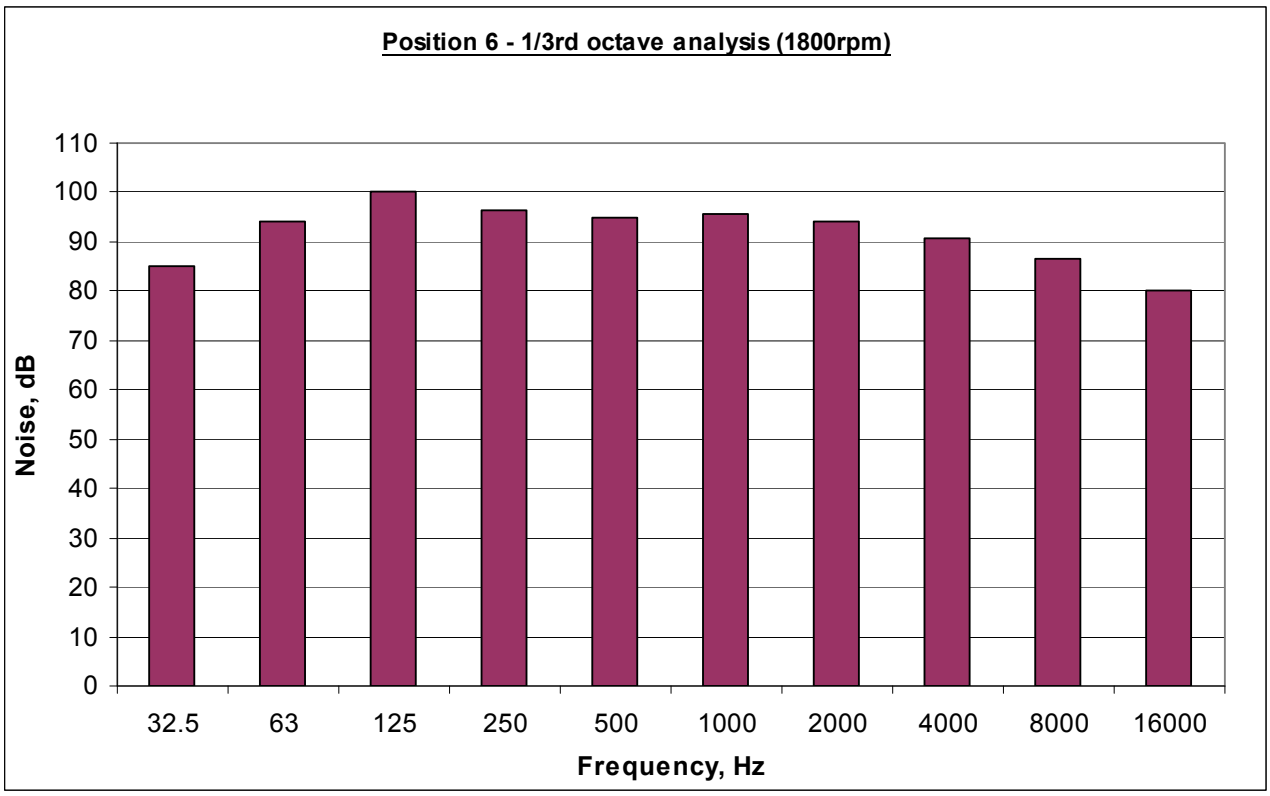


Position	Noise, dBA
1	101.8
2	102.8
3	100.7
4	97.5
5	102.3
6	102.5
7	101.8





Position	Noise, dBA
1	105.4
2	104.0
3	100.4
4	100.6
5	105.9
6	106.1
7	105.2



1300 Series EDi
1306C-E87TAG4

Load acceptance

Rating	% Prime	kWe	Transient dev, %	Freq rec, s
TAG 4 at 1500 rev/min	55	100	9.4	1.6
TAG4 at 1800 rev/min	59	116	8.2	1

Note: Fuelling can be attributed to the cases where load acceptance was better with no starting aid from cold.

The figure shown in the tables on page 10 and page 11 were obtained under the following test conditions:

Ambient noise
50 Hz with 220 kWe load ... 73.2 d(B)A
60 Hz with 216 kWe load ... 75.1 d(B)A
minimum engine block temperature
-at 1500 rev/min ... 10 °C
-at 1800 rev/min ... 5 °C
Alternator efficiency ... 92%
Ambient temperature.. ... 15 °C
Governing mode. ... isochronous
Alternator inertia. ... 2.393 kgm²
Under frequency roll off (UFRO) point set to.. ... 48 Hz
UFRO rate set to ... 15V/Hz
LAM on /off. ... N/A
Alternator manufacturer ... Newage
Alternator Model. ... UCD274K

Note: All tests were conducted using an engine installed and serviced to Perkins Engine Company limited recommendations.

Normal operating angles

Front and rear ... 30°
Side tilt ... 30°

Mountings

Maximum static bending moment at rear face of cylinder block ... 2644 Nm²
Maximum permissible overhung load on the flywheel ... 885 kg

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