

Technical Data

2800 Series

2806C-E18TAG3

Diesel Engine - Electropak

Basic technical data

Number of cylinders	6
Cylinder arrangement	Vertical, in line
Cycle	4 stroke, compression ignition
Induction system	Turbocharged, air to air charge cooling
Compression ratio	14-5:1 Nominal
Bore	145 mm
Stroke	183 mm
Cubic capacity	18,13 litres
Direction of rotation	Anti-clockwise viewed on flywheel
Firing order	1, 5, 3, 6, 2, 4
Cylinder 1	furthest from flywheel

Total weight Electropak

-dry	2050 kg
-wet	2158 kg

Overall dimensions

-height	1807,5 mm
-length	2545,0 mm
-width	1536,0 mm

Moment of inertia (mk²)

-flywheel @ 1500 rev/min	4,74 kgm ²
-engine @ 1500 rev/min	2,31 kgm ²
-flywheel @ 1800 rev/min	4,74 kgm ²
-engine @ 1800 rev/min	2,70 kgm ²

Performance

Note: All data based on operation to ISO 3046/1, BS5514 and DIN 6271 standard reference conditions.

Cyclic irregularity

for engine/flywheel maximum:

-1500 rev/min	0,0192
-1800 rev/min	0,01163

Ratings

Steady state speed stability at constant load

Electrical ratings are based on average alternator efficiency and are for guidance only (0.8 power factor being used).

Operating point

Engine speed	1500 rev/min
Cooling water exit temp.	88 - 103 °C

Fuel data

To conform to

Noise

Estimated sound pressure levels:

-1500 rev/min	105,3 dB(A)
-1800 rev/min	108,0 dB(A)

Note: Noise level represents highest recorded at 1500 and 1800 rev/min respectively

Test conditions

Air temperature	25 °C
Barometric pressure	100 kPa
Relative humidity	30%
Air inlet restriction at maximum power (nominal)	2,5 kPa
Exhaust back pressure at maximum power (nominal)	6,0 kPa
Fuel temperature (inlet pump)	40 °C

Note: If the engine is to operate in ambient conditions other than those of the test conditions, suitable adjustments must be made for these changes

General installation

Designation	Units	Type of operation and application			
		Prime	Standby	Prime	Standby
		50 Hz 1500 rev/min		60 Hz 1800 rev/min	
Gross engine power	kWb	539,7	583,8	617,5	678,2
Fan power	kWm	9		15	
Restriction losses	kWm	9,1	9,8	10,3	11,2
Nett engine power	kWm	522	565	592	652
BMEP gross	kPa	2381	2576	2270	2493
Combustion air flow	m ³ /min	38	40	49	52
Exhaust gas temperature (after turbo)	°C	566	567	527	554
Exhaust gas flow	m ³ /min	106	114	130	141
Boost pressure ratio	-	3,00	3,18	3,28	3,50
Overall thermal efficiency (nett)	%	43,3	43,0	40,6	41,6
Friction power and pumping losses	kWm	20		34	
Mean piston speed	m/s	9		11	
Engine coolant flow	l/s	6,1		7,2	
Cooling fan airflow	m ³ /min	702		852	
Typical gen set electrical output 0.8 pf	kWe	480	520	545	600
	kVa	600	650	681	750
Assumed alternator efficiency	%	92		92	

Rating definitions

Prime power

Variable load. Unlimited hours usage with an average load factor of 80% of the published Prime Power rating over each 24 hour period. A 10% overload is available for 1 hour in every 12 hours 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.

Emissions statement

Certified against the requirements of Tier 2 legislation for non-road mobile machinery, powered by constant speed engines (EPA 40 CFR Part 89 Tier 2). These engines also comply with the 1/2 TA Luft (1986) NOx limits of 2000 mg/nm³.

Energy balance

Designation	Units	Type of operation and application			
		Prime	Standby	Prime	Standby
		1500 rev/min		1800 rev/min	
Energy in fuel	kWt	1270	1388	1497	1653
Energy in power (gross)	kWb	540	584	618	678
Energy to fan and restriction losses	kWm	18,1	18,8	25,3	26,2
Energy to coolant and lubricating oil	kWt	158	168	153	183
Energy to exhaust	kWt	435	489	538	586
Energy to charge cooler	kWt	95	111	144	156
Energy to radiation	kWt	43	37	45	50

Cooling system

Recommended coolant: 50% clean water with 50% Perkins ELC. Where there is no likelihood of ambient temperature below 10 °C, clean 'soft' water may be used, treated with 1% by volume of Perkins inhibitor in the cooling system. The inhibitor is available from Perkins.

Nominal jacket water pressure in crankcase. 280 kPa
 Maximum top tank temperature (standby) ... 103 °C
 Thermostat operating range... 88 - 98 °C
 Ambient cooling clearance maximum duct allowance and resultant minimum airflow (standby power). Based on air temperature at fan 10 °C above ambient

Duct Allowance kPa	Ambient Clearance °C	Min Airflow m³/min	Ambient Clearance °C	Min Airflow m³/min
	1500 rev/min		1800 rev/min	
0	49	702	54	852
0,13	46	660	52	804
0,19	42	630	52	792
0,25	37	606	51	762

Radiator

-face area... 1,75 m²
 -rows and material... 2 Aluminium
 -fins per inch... 15

Width and height of matrix

-height... 1260 mm
 -width... 1390 mm
 Total coolant capacity (radiator and engine)... .61 litres
 Pressure cap setting... .70 kPa

Charge cooler, integral with radiator

Face area... 1,623 m²
 Rows and material... 1 Aluminium
 Fins per inch... 14

Width and height of matrix

-height... 1390 mm
 -width... 1180 mm

Coolant pump

Speed... 1,08 x e rev/min
 Method of drive... Gear

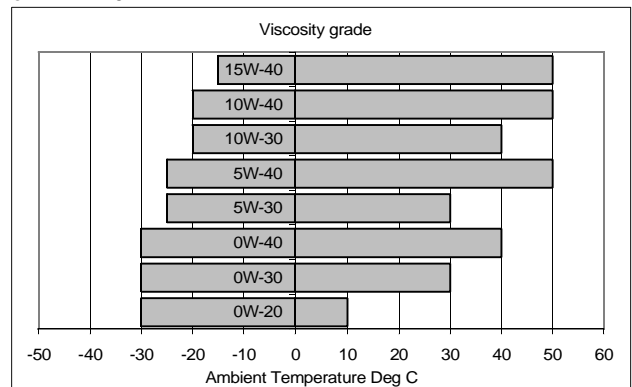
Fan

Type... Pusher
 Drive ratio... 0,8 : 1
 Diameter... 965 mm
 Number of blades... 9
 Material... Plastic

Lubrication system

Recommended SAE viscosity

A single or multigrade oil must be used which conforms to API CG4 or APEA E5.



Lubricating oil capacity

Total system... 62,0 litres
 Sump maximum... 53,0 litres
 Sump minimum... 45,0 litres

Lubricating oil temperature (sump)

Normal... 95 °C
 Maximum... 113 °C

Lubricating oil pressure

At rated speed... 420 kPa
 Minimum... 200 kPa
 Oil relief valve opens... 610k Pa
 Oil filter spacing... 30 µm
 Sump drain plug tapping size... 1 in NTPF
 Oil pump speed and method of drive... 1,16 x engine speed, gear
 Oil pump flow 1500/1800... 2,90 / 3,48 litres/sec
 Oil consumption as a percentage of full load fuel
 -less than... 0,1%

Normal operating angles

Front and rear... 7° maximum
 side tilt... 7° maximum

Electrical system

Type... Insulated return
 Alternator output... 24 volts / 70 amps
 Starter motor power... 9 kW
 Number of teeth on flywheel... 136
 Number of teeth on starter motor... 11
 Minimum cranking speed... 115 rev/min
 Pull-in current of starter motor solenoid... 49 amps
 Hold-in current of starter motor solenoid... 6 amps

Engine management system

Full electronic engine management system controlling:

- Speed governing
- Air / Fuel ratio
- Start sequence
- Engine Protection and diagnostics.

Starting requirements

Temperature range	
Down to -10 °C (14 °F)	Oil: 15W / 40 API CG4 Starter: 24 Volt Battery: 2 x 12V 128 Ah Max breakaway current: 1400 Amps Cranking Current: 700 Amps Aids: Not required
Down to -25 °C (-13 °F)	Oil: 0W / 30 API CG4 Starter: 24 volt Battery: 2 x 12V 128 Ah Max breakaway current: 1400 Amps Cranking Current :600 Amps Aids: Block heater to 45 °C

Notes:

- The battery capacity is defined by the 20 hour rate at 0 °C
- The oil specification should be for the minimum ambient temperature as the oil will not be warmed by the immersion heater
- The breakaway current is dependant on the battery capacity available. Cables should be capable of handling the transient current which may be up to double the steady cranking current.

Induction system

Air intake restriction: ... 3,7 kPa
 Maximum restriction (dirty filter) ... 6,35 kPa
 Air filter type:
 -1500 rev/min ... Paper element 457 mm Diameter

Exhaust system

Exhaust outlet size (internal). ... 202 mm
 Maximum exhaust back pressure for total system ... 6,9 kPa
 For recommended pipe sizes, see installation manual.

Fuel system

Type of injection system. ... MEUI
 Fuel injector pressure. ... 200 MPa

Fuel lift pump

Delivery per hour at 1500/1800 rev/min. ... 413 / 457 litres/hour
 Fuel delivery pump delivery pressure. ... 600 kPa
 Fuel delivery pump maximum suction head ... 3 m
 Fuel delivery pump maximum pressure head ... 4 m

Fuel filtration level

Primary ... 10 µm
 Secondary ... 2 µm

Typical fuel consumption

Fuel consumption calculated on engine nett rated powers				
Rating	g/kWh	litres/hr	g/kWh	litres/hr
	1500 rev/min		1800 rev/min	
	Standby	204	134	209
Prime + 10%	204	134	209	158
Prime	203	123	211	145
At 75% of Prime	211	96	217	112
At 50% of Prime	221	67	230	79

Note: Assumed fuel density 0,862 kg/l.

Engine mounting

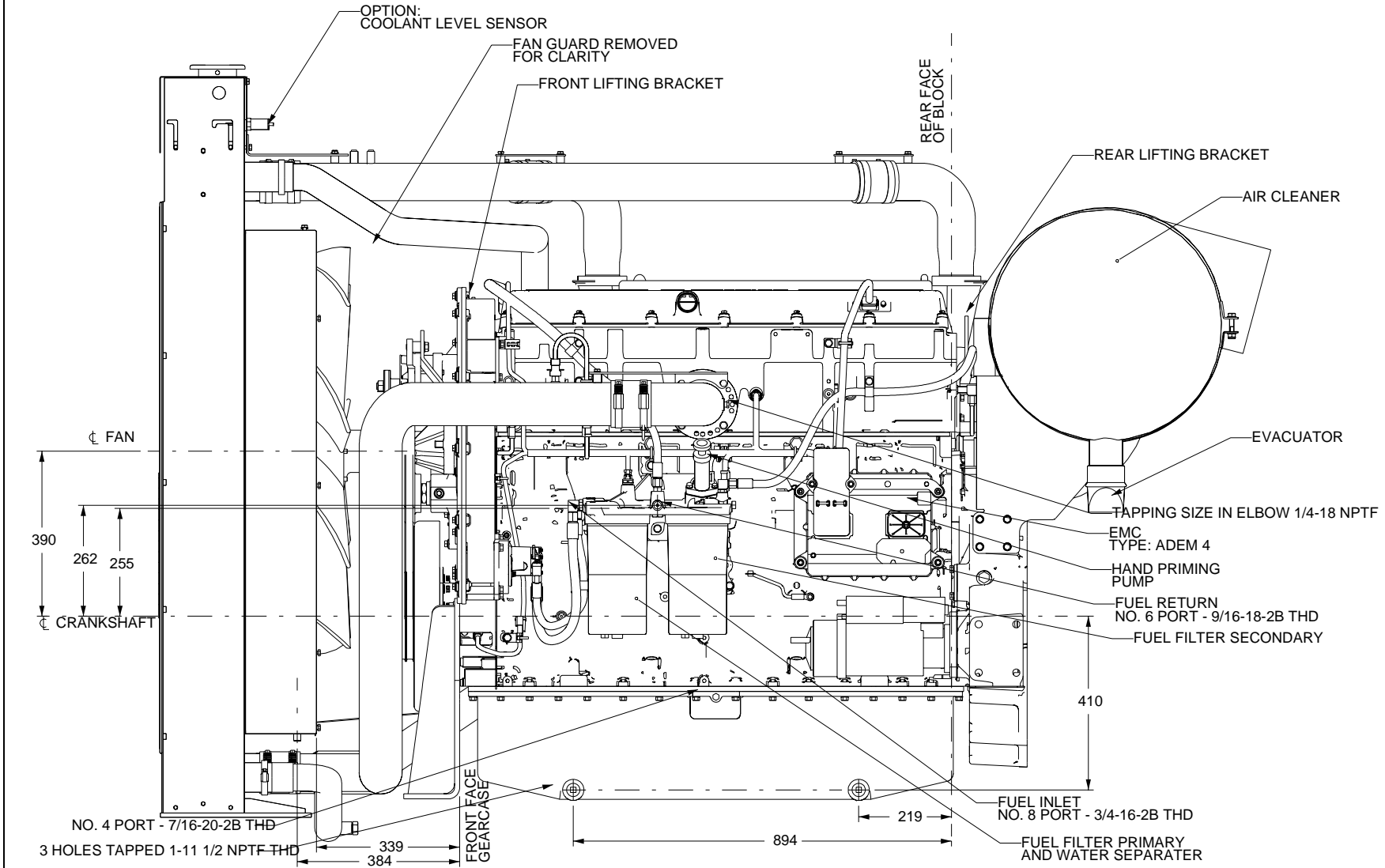
Maximum bending moment
 -at rear face of the engine crankcase. ... 1356 Nm

Position of centre of gravity (bare dry engine)

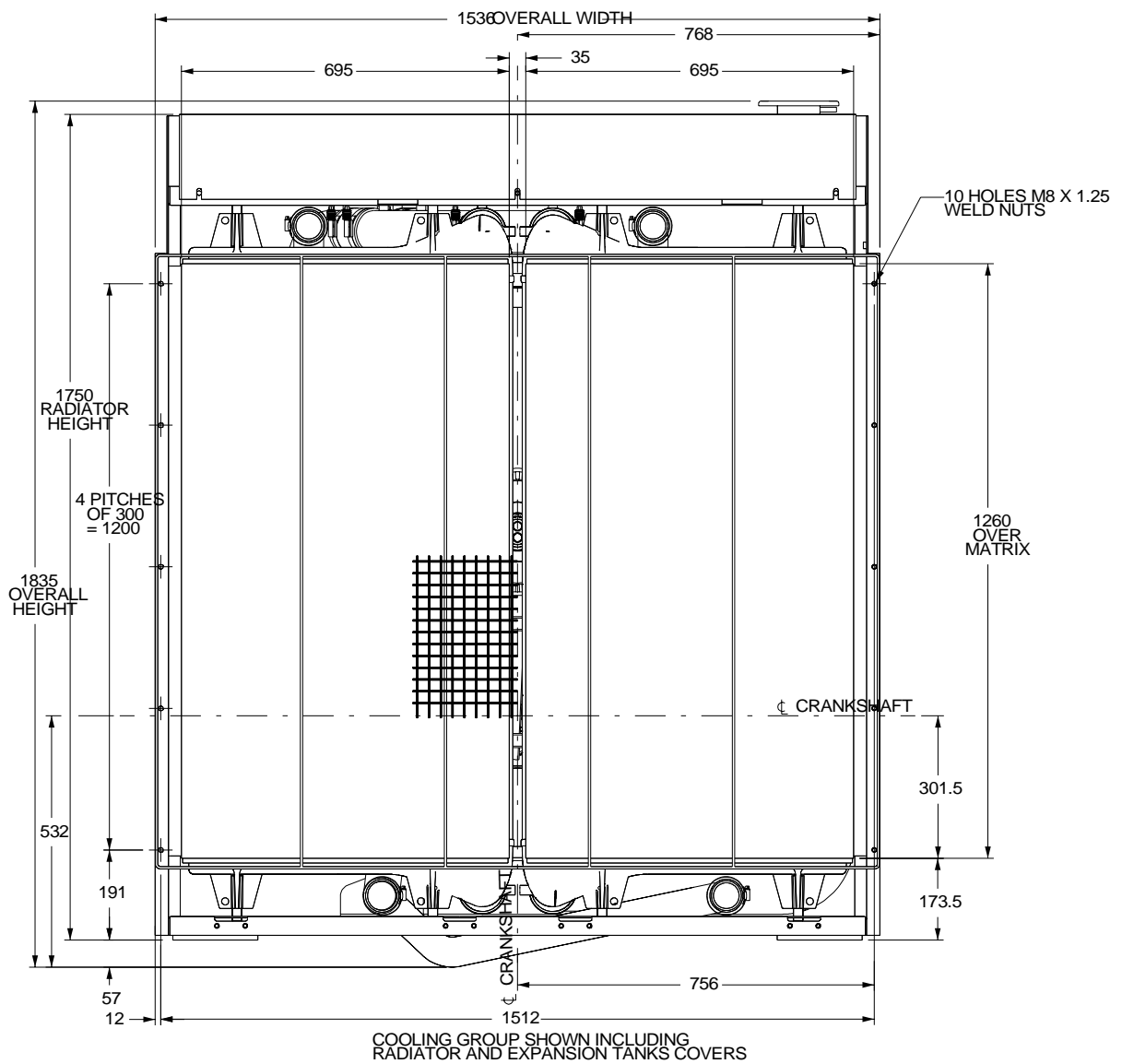
Forward of the rear face of the engine crankcase ... 550 mm
 Above crankshaft centre line ... 250 mm

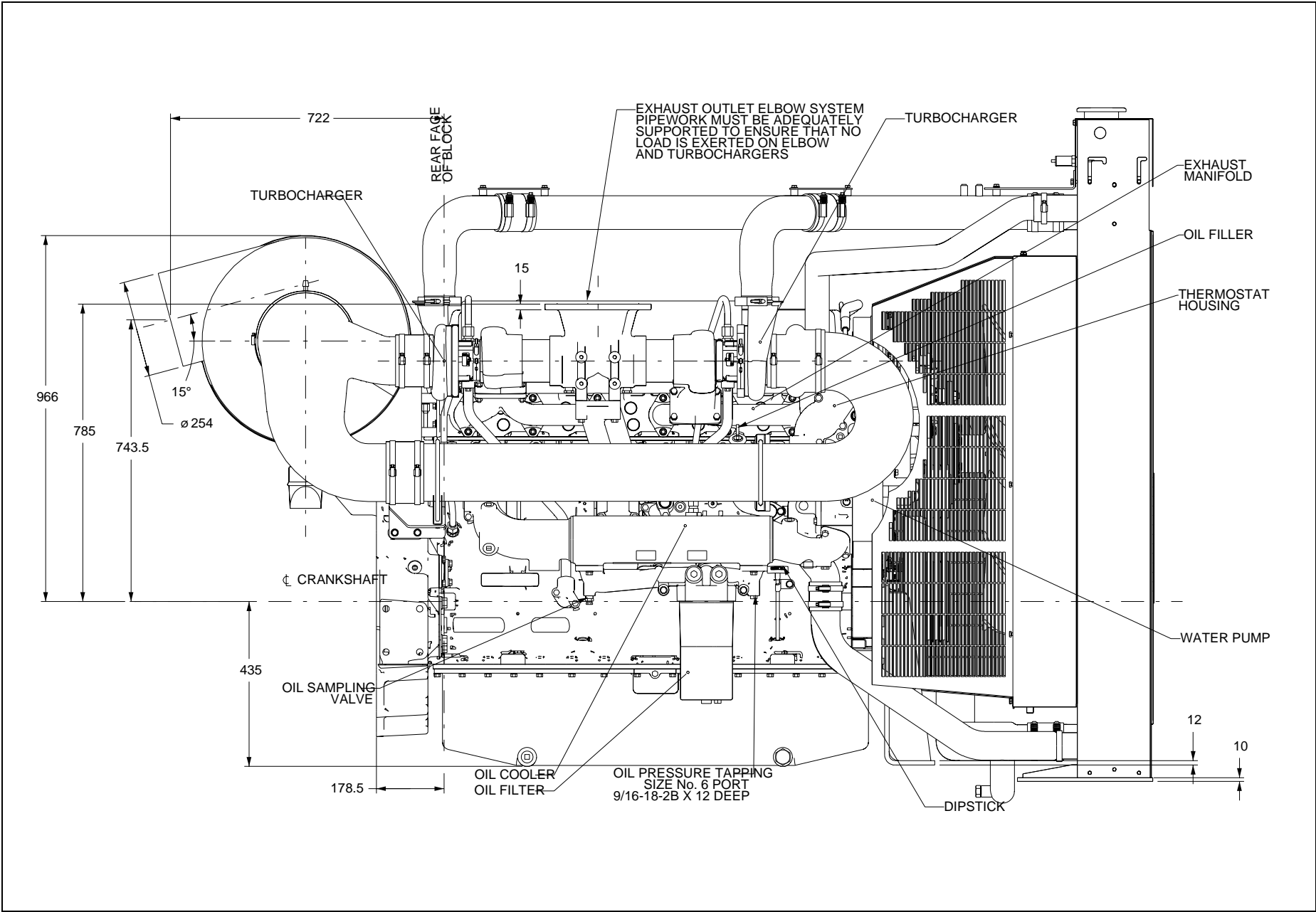
Weight of engine and cooling system

Engine (bare dry) ... 1832 kg
 Radiator (dry) ... 200 kg

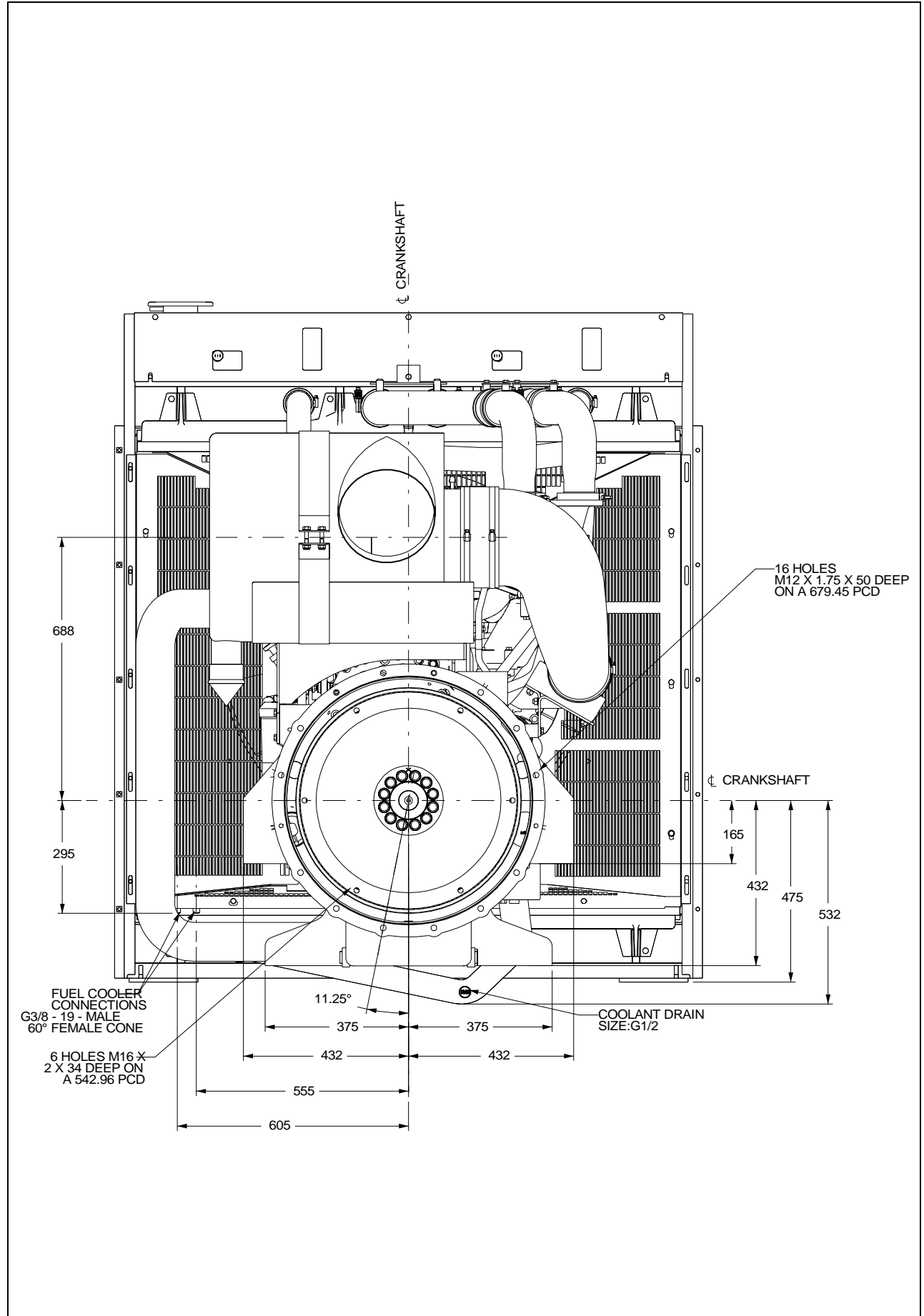


2806C-E18TAG3 - front view





2806C-E18TAG3 - rear view



Typical load acceptance

Prime %	1800 rev/min			
	Load on		Load off	
	Transient % speed change	Speed recovery time (sec)	Transient % speed change	Speed recovery time (sec)
20	1,6	0,9	1,2	1,2
40	2,8	1,6	2,4	1,4
60	7,0	2,3	3,7	1,7
70	9,5	2,7	4,3	1,8
80	15,1	3,1	5,0	1,9
100	25,4	3,8	6,2	2,1

The above figures were obtained under test conditions as follows:

Engine block temperature:45 °C
 Minimum ambient temperature15 °C
 Governing mode Isochronous
 Alternator inertia. 10,4 kgm²
 Under frequency roll off (UFRO) point set to 1 Hz below rated frequency
 UFRO rate set to 2 % voltage / 1% frequency
 LAM on / off off

All tests were conducted using an engine installed and serviced to Perkins Engines Company Limited recommendations.

Applied load is a percentage of generator electrical output using alternator efficiencies as published in the general installation section of this data sheet.

The information given on Technical Data Sheets is for standard ratings only. For ratings other than shown contact Perkins Engines Company Limited, Stafford.

The information given in this document is for guidance only.

Notes



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