

4012-46TAG1A

973 - 1327 kWm (Gross) @ 1500 rpm

4012-46TAG2A

1069 - 1459 kWm (Gross) @ 1500 rpm

Electropak

4000

Series

Basic technical data

Number of cylinders12
Cylinder arrangement..... 60° Vee
Cycle4 stroke, compression ignition
Induction system..... Turbocharged
Compression ratio 13:1 nominal
Bore 160 mm
Stroke 190 mm
Cubic capacity 45.842 litres
Direction of rotation..... Anti-clockwise viewed on flywheel
Firing order 1^A, 6^B, 5^A, 2^B, 3^A, 4^B, 6^A, 1^B, 2^A, 5^B, 4^A, 3^B
Cylinder 1. furthest from flywheel

Note: Cylinders designated 'A' are on the right hand side of the engine when viewed from the flywheel end

Weight of Electropak

Temperate

Dry 4400 kg
Wet + fuel cooler..... 5949 kg
Wet - fuel cooler..... 5933 kg

Tropical

Dry 4400 kg
Wet + fuel cooler..... 6086 kg
Wet - fuel cooler..... 6070 kg

Overall dimensions of Electropak

Temperate

Length..... 3916 mm
Width 1775 mm
Height 2255 mm

Tropical

Length..... 3915 mm
Width 2198 mm
Height 2258 mm

Moment of inertia

Engine..... 9.73 kgm²
Flywheel..... 9.57 kgm²

Cyclic irregularity, engine/flywheel Prime power

4012-46TAG1A 1.714
4012-46TAG2A 1.669

Ratings

Steady state speed stability at constant load ± 0.25%
Electrical rating are based on average alternator efficiency and are for guidance only (0.8 power factor being used).

Operating point

Engine speed 1500 rpm
Static injection timing See engine number plate
Cooling water exit temperature < 98°C

Fuel data

To conform to BS2869 class A2 or BS EN590.

Performance

Sound pressure level 1500 rpm 108 / 109 dB(A)

Note: All data based on operation to ISO 3046 / 1, BS 5514 and DIN 6271 standard reference conditions.

For engines operating in ambient conditions other than the standard reference conditions stated below a suitable de-rate must be applied. De-rate tables for increased ambient temperature and/or altitude are available, please contact Perkins Applications Department.

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 (nominal) 3.0 kPa
Fuel temperature (inlet pump)..... .58°C maximum

General installation

4012-46TAG1A - Temperate

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	973	1212	1327
Fan power	kWm		42	
Net engine power	kWm	931	1170	1285
BMEP gross	bar	1694	2110	2309
Combustion air flow	m ³ /min	92	112	120
Exhaust gas temperature, after turbo	°C	425	425	425
Exhaust gas flow (max) at atmospheric pressure	m ³ /min		280	
Boost pressure ratio	-	2.6	2.93	3.2
Mechanical efficiency	%	89	91	92
Overall thermal efficiency	%	41.0	41.5	41
Friction power and pumping losses	kWm		120	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	l/s		17	
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	1106	1389	1526
	kWe	884	1112	1221
Assumed alternator efficiency	%		95	

4012-46TAG1A - Tropical

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	973	1212	1327
Fan power	kWm		64	
Net engine power	kWm	909	1148	1263
BMEP gross	bar	1694	2110	2309
Combustion air flow	m ³ /min	92	112	120
Exhaust gas temperature, after turbo	°C	425	425	425
Exhaust gas flow (max) at atmospheric pressure	m ³ /min		280	
Boost pressure ratio	-	2.6	2.93	3.20
Mechanical efficiency	%	89	91	92
Overall thermal efficiency	%	41.0	41.5	41.0
Friction power and pumping losses	kWm		120	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	l/s		17	
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	1080	1364	1500
	kWe	864	1091	1200
Assumed alternator efficiency	%		95	

4012-46TAG2A - Temperate

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	1069	1331	1459
Fan power	kWm	42		
Net engine power	kWm	1027	1289	1417
BMEP gross	bar	18.61	23.17	25.38
Combustion air flow	m ³ /min	100	120	128
Exhaust gas temperature, after turbo	°C	455	455	455
Exhaust gas flow (max) at atmospheric pressure	m ³ /min	320		
Boost pressure ratio	-	2.8	3.1	3.4
Mechanical efficiency	%	89	91	92
Overall thermal efficiency	%	41.0	41.5	41.0
Friction power and pumping losses	kWm	120		
Mean piston speed	m/s	9.5		
Engine coolant flow (minimum)	l/s	17		
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	1220	1531	1683
	kWe	976	1225	1346
Assumed alternator efficiency	%	95		

4012-46TAG2A - Tropical

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	1069	1331	1459
Fan power	kWm	64		
Net engine power	kWm	1005	1267	1395
BMEP gross	bar	18.61	23.17	25.38
Combustion air flow	m ³ /min	100	120	128
Exhaust gas temperature, after turbo	°C	455	455	455
Exhaust gas flow (max) at atmospheric pressure	m ³ /min	320		
Boost pressure ratio	-	2.8	3.1	3.4
Mechanical efficiency	%	89	91	92
Overall thermal efficiency	%	41.0	41.5	41.0
Friction power and pumping losses	kWm	120		
Mean piston speed	m/s	9.5		
Engine coolant flow (minimum)	l/s	17		
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	1194	1505	1656
	kWe	955	1204	1325
Assumed alternator efficiency	%	95		

Note: Not to be used for CHP design purposes. (Indicative figures only). Consult Perkins Engines Company Limited. Assumes complete combustion.

Rating definitions

Baseload power

Unlimited hours usage with an average load factor of 100% of the published Baseload Power. No overload is permitted on Baseload Power.

Prime power

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

Standby power

Limited to 500 hours annual usage with an average load factor of 80% of the published Standby Power rating over each 24 hour period. Up to 300 hours of annual usage may be run continuously. No overload is permitted on Standby Power.

Emissions capability

All 4012-46TAG ratings are optimised to the 'best fuel consumption' and do not comply to Harmonised International Regulation Emission Limits. More information on these statements can be obtained by contacting the Applications Department at Perkins Engines Company Limited.

Energy balance

Note: Not to be used for CHP design purposes. (Indicative figures only). Consult Perkins Engines Company Limited. Assumes complete combustion.

4012-46TAG1A - Temperate

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kW	2217	2817	3137
Energy in power output (gross)	kW	973	1212	1327
Energy to cooling fan	kW		42	
Energy in power output (nett)	kW	931	1170	1285
Energy to exhaust	kW	750	900	1010
Energy to coolant and oil	kW	252	370	406
Energy to radiation	kW	67	85	94
Energy to charge coolers	kW	175	250	300

4012-46TAG1A - Tropical

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kW	2217	2817	3137
Energy in power output (gross)	kW	973	1212	1327
Energy to cooling fan	kW		64	
Energy in power output (nett)	kW	909	1148	1263
Energy to exhaust	kW	750	900	1010
Energy to coolant and oil	kW	252	370	406
Energy to radiation	kW	67	85	94
Energy to charge coolers	kW	175	250	300

4012-46TAG2A - Temperate

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kW	2450	3200	3750
Energy in power output (gross)	kW	1069	1331	1459
Energy to cooling fan	kW		42	
Energy in power output (nett)	kW	1027	1289	1417
Energy to exhaust	kW	805	1015	1080
Energy to coolant and oil	kW	288	457	501
Energy to radiation	kW	74	96	107
Energy to charge coolers	kW	214	301	423

4012-46TAG2A - Tropical

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kW	2450	3200	3750
Energy in power output (gross)	kW	1069	1331	1459
Energy to cooling fan	kW		64	
Energy in power output (nett)	kW	1005	1267	1395
Energy to exhaust	kW	805	1015	1080
Energy to coolant and oil	kW	288	457	501
Energy to radiation	kW	74	96	107
Energy to charge coolers	kW	214	301	423

Note: Not to be used for combined heat and power (CHP) purposes (indicative figures only). If necessary, please consult the Applications Department, Perkins Engines Company Limited, Stafford.

Cooling system

For details of recommended coolant specifications, refer to the Operation and Maintenance Manual for this engine model.

Nominal jacket water pressure in crankcase ... 170 kPa
 Maximum top tank temperature (standby) ... 98 °C
 Maximum static pressure head on pump. ... 7 m

Total coolant capacity:

Engine only ... 73 litres
 ElectropaK (engine/radiator):
 Temperate ... 207 litres
 Tropical ... 210 litres
 Maximum permissible restriction to coolant pump flow ... 20 kPa
 Thermostat operating range ... 71 - 85 °C
 Ambient cooling clearance (standby power) based on air temperature at fan 6 °C above ambient.
 Temperature rise across the engines (standby power) with inhibited coolant. ... 8 °C
 Coolant temperature shutdown switch setting. ... 101 °C rising
 Coolant immersion heater capacity (2 off) ... 4 kWe each

Radiator temperate

Radiator face area ... 2.57 m²
 Material and number of rows:
 -charge air and water jacket ... Copper, 4 rows
 Fins per inch and material:
 -charge air and water jacket ... Brass, 12 rows
 Width of matrix. ... 1.608 m
 Height of matrix ... 1.601 m
 Weight of radiator ... 1117 kg
 Pressure cap setting (min) ... 70 kPa

Radiator tropical

Radiator face area ... 3.46 m²
 Material and number of rows:
 -charge air and water jacket ... Copper, 4 rows
 Fins per inch and material:
 -charge air and water jacket ... Brass, 12 rows
 Width of matrix. ... 2.10 m
 Height of matrix ... 1.65 m
 Weight of radiator ... 1620 kg
 Pressure cap setting (min) ... 70 kPa

Water jacket cooling data

Temperate and Tropical

Coolant exit temperature (max) ... 98 °C
 Coolant inlet temperature (min) ... Thermostatic control
 Coolant inlet temperature (max) ... 90 °C

Coolant pump

Speed ... 1.4 x e rev/min
 Method of drive ... Gear

Fan

Type. ... Axial flow
 Diameter
 Temperate ... 1530 mm
 Tropical ... 1600 mm
 Number of blades ... 12
 Material ... Aluminium
 Drive ratio ... 0.93:1
 Maximum additional restriction (duct allowance) to cooling airflow (Stand-by power applications) and resultant minimum airflow.

	Ambient clearance 50% glycol	Duct allowance (Pa)	Min airflow m ³ /sec
4012-46TAG1A - Temperate	35°C	250	20.2
4012-46TAG1A - Tropical	50°C	200	32.4
4012-46TAG2A - Temperate	35°C	250	20.2
4012-46TAG2A - Tropical	50°C	200	32.4

Lubrication system

Recommended SAE viscosity: A multigrade oil conforming to the following must be used: API CH4 15W/40.

Note: For additional notes on lubricating oil specifications, please refer to the Operation and Maintenance Manual (OMM).

Lubricating oil capacity

Total system capacity ... 177 litres
 Sump maximum ... 157.5 litres
 Sump minimum ... 115 litres
 Oil temperature at normal operating conditions to bearings 105 °C

Lubricating oil pressure

At rated speed ... 400 kPa
 Minimum at 80 °C ... 340 kPa
 Oil relief valves open ... 400 kPa
 Oil filter spacing ... 20 microns
 Sump drain plug tapping size ... G1
 Oil pump speed ... 2100 rpm
 Method of drive ... Gear
 Shutdown switch pressure setting (where fitted) ... 193 kPa falling
 Oil pump flow ... 6,0 litres/sec

Normal operating angles

Front and rear ... 5°
 Side tilt ... 10°

Oil consumption

Prime power	Units	
After running in (typically after 250 hours)	g/kWhr	0,52
Oil flow rate from pump	litres/sec	6

Induction system

Maximum air intake restriction of engine

Maximum air intake restriction of engine:

-clean filter ... 2 kPa
 -dirty filter ... 4 kPa
 -air filter type ... Medium duty axial flow

Exhaust system

Maximum back pressure for total system

Exhaust outlet size (internal). ... 2 x 254 mm Table D flanges
 Exhaust outlet flange size. ... 2 x 254 mm Table D flanges
 Back pressure for total system at standby power ... 5 kPa
 For recommended pipe sizes, please refer to the Installation Manual.

Fuel system

Recommended fuel to conform to:

..... BS2869 1998 Class A2 or BS EN590
 Injection system..... direct
 Fuel injection pump and injector type..... combined unit injector
 Injector pressure..... 140 MPa
 Lift pump type..... Tuthill TCH 1-089

Delivery

4012-46TAG1A/-4012-46TAG2A 1020 litres/hour
 Heat retained in fuel to tank. 8 kW
 Fuel inlet temperature to be less than 58 °C
 Delivery pressure. 300 kPa
 Maximum suction head at pump inlet..... 2.5 m
 Maximum static pressure head ..see installation manual for details
 Fuel filter spacing 10 microns
 Governor type..... electronic
 Governing to ISO 8528-12 CLASS 3 and 4; ISO 8528-5 CLASS G2
 Tolerance on fuel consumption 5%

Note: All figures in the tables below are based on gross mechanical output, for fuel consumption based on electrical output of the generating set contact your OEM.

Fuel consumption

Ratings	g/kW/hr	litres/hr
4012-46TAG1A, Temperate & Tropical		
Standby	199	308
Prime	196	281
Baseload	196	224
75% Prime	195	212
50% Prime	204	154
4012-46TAG2A, Temperate & Tropical		
Standby	202	335
Prime	200	301
Baseload	200	242
75% Prime	201	237
50% Prime	203	162

Electrical system

Type..... Insulated return
 Alternator.....24 volts with integral regulator
 Alternator output 55 amps, 28 volts at 20°C ambient
 Starter motor 24 volts
 Starter motor typeAxial
 Starter motor power 8.2 kW
 Number of teeth on flywheel 190
 Number of teeth on starter motor..... 12
 Minimum cranking speed (0°C) 120 rpm
 Pull in current of starter motor solenoid @ -25 °C max ⁽¹⁾. 30 amps
 Hold in current of starter motor solenoid @ -25 °C max ⁽¹⁾ ..9 amps
 Engine stop solenoid. 24 volts
 Hold-in current of stop solenoid1.1 amps
 (1) All leads rated to 10 amps minimum.

Engine mounting

Maximum static bending moment at rear face of block. ... 1356 Nm
 Maximum additional load applied to flywheel
 due to all rotating components..... 850 kg

Centre of gravity

Bare engine, dry

Forward of the rear face of the cylinder block..... 771 mm
 Above the crankshaft centre line..... 32 mm

ElectropaK, dry

Forward of the rear face of the cylinder block..... 1176 mm
 Above the crankshaft centre line..... 32 mm

Cold start recommendations

Temperature range down to -10°C (14°F)

Oil..... 15W/40 CH4
 Starter 2 x 24V
 Battery..... 4 x 12 volts x 286 Ah
 Max breakaway current. 1600 amps
 Cranking current810 amps
 Aids..... Block heaters
 Min mean cranking speed. 120 rpm

- 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
- Breakaway current is dependant on battery capacity available. Cables should be capable of handling transient current which may be up to double the steady cranking current.

Typical load acceptance (cold)

Engine type	Initial load acceptance when engine reaches rated speed (15 seconds maximum after engine starts to crank)				2nd load application immediately after engine has recovered to rated speed (5 seconds after initial load application)			
	Prime power%	Load kWe nett	Transient frequency deviation %	Frequency recovery time seconds	Prime power%	Load kWe nett	Transient frequency deviation %	Frequency recovery time seconds
4012-46TAG1A	73	800	≤ 10	5	27	291	≤ 10	5
4012-46TAG2A	71	860	≤ 10	5	29	344	≤ 10	5

The above figures were obtained under test conditions as follows:

Engine block temperature 40 °C

Ambient temperature 25 °C

Governing mode Isochronous

Alternator inertia 50 kgm²

Under frequency roll off (UFRO) point set to 49,5

UFRO rate set to 16 v/hz

LAM on / off on

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

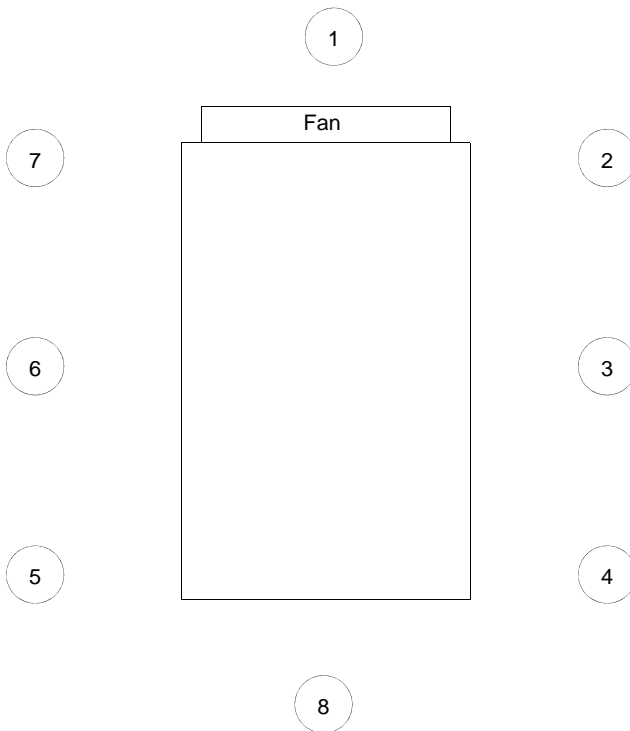
Applied load is a percentage of generator electrical output efficiency as published in the general installation section of this data sheet.

The information given on this Technical Data Sheet is for standard engines, and for guidance only.

For ratings other than those shown contact Perkins Engines Company Limited, Stafford.

Noise data

Octave analysis performed at the position of maximum noise



Noise Levels

The figures for total noise levels are typical for an engine running at Standby Power rating in a semi-reverberant environment and measured at a distance of one metre from the periphery of the engine.

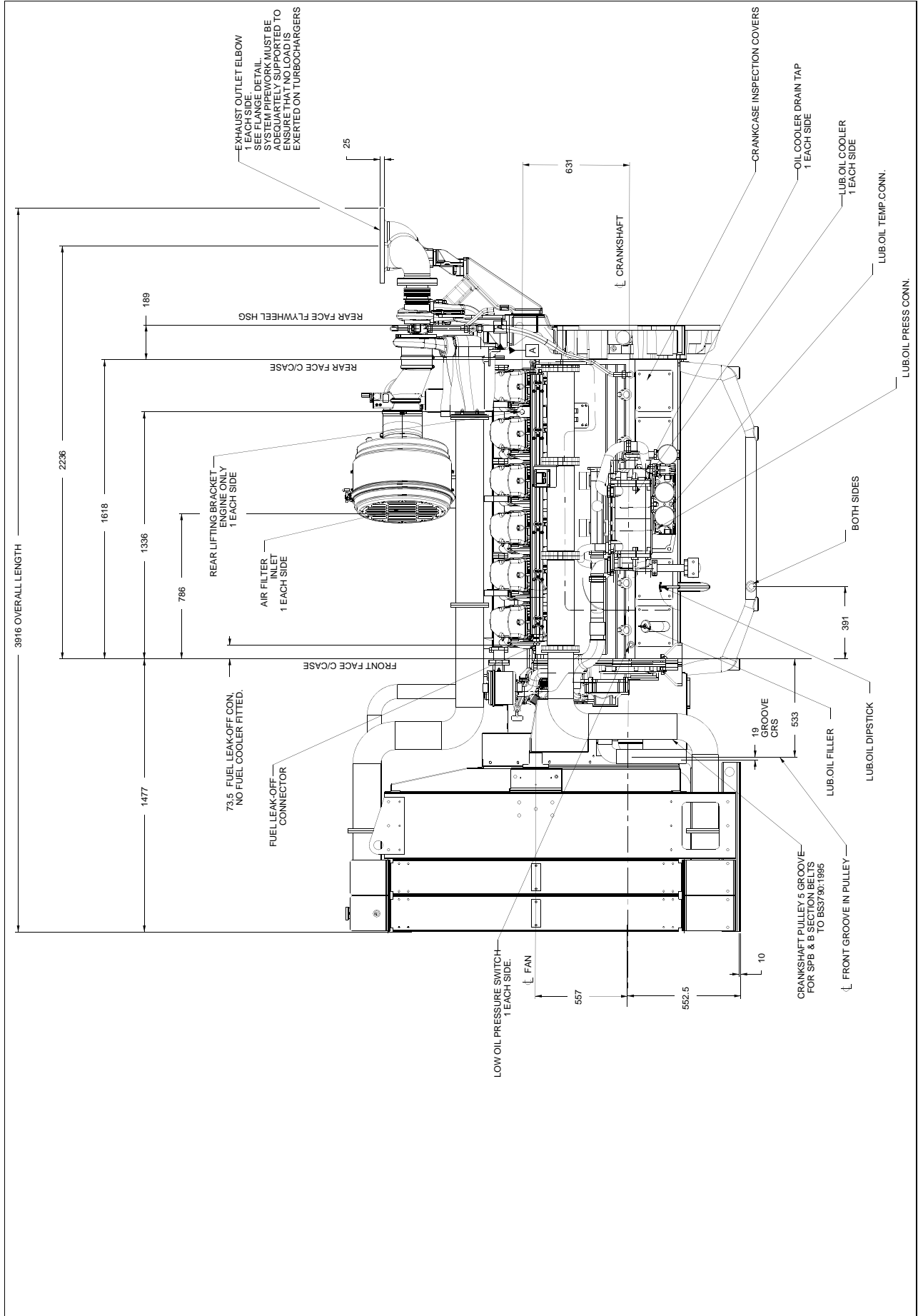
Total Noise Level

Sound pressure level re: 20×10^{-6} Pa
Ambient noise level 79 dBA

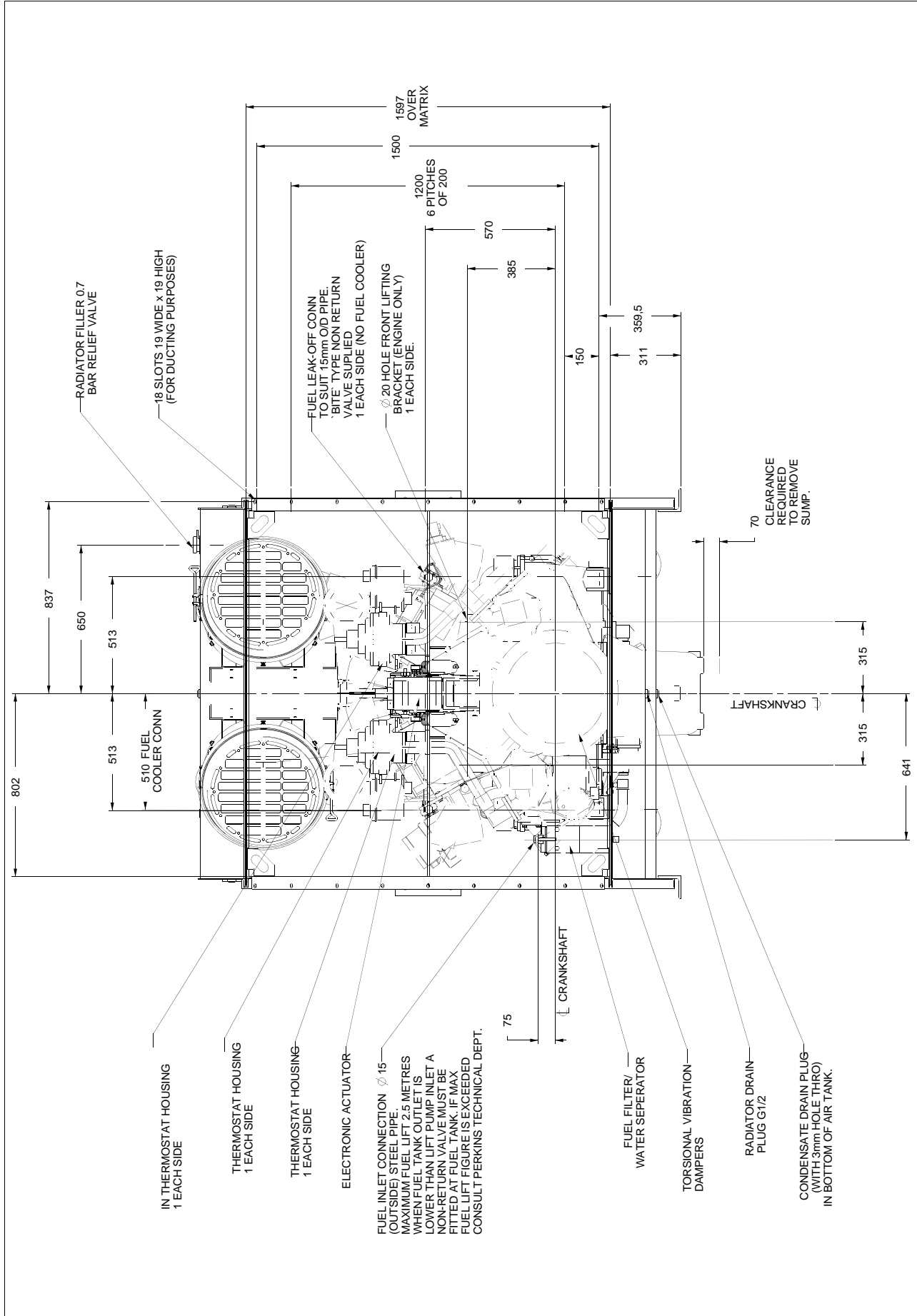
Octave analysis performed at the position of maximum noise.

		1500 RPM	POWER
1/3 (1/1 bandwidth) octave analysis			
SITE			
POSN.	DBA	HZ	DB AT POSN ..6...
1	114	31.5	90.2
2	113	63	101
3	111	125	104
4	110	250	112
5	110.5	500	109
6	111	1k	107
7	110.5	2k	104
8	107	4k	101
		8k	100
		16k	98
POSN.	DBA	HZ	DB AT POSN ..6...
1	114	31.5	90.9
2	113	63	101
3	111	125	104
4	110	250	110
5	110	500	109
6	111	1k	106
7	110	2k	103
8	107	4k	100
		8k	99
		16k	98
POSN.	DBA	HZ	DB AT POSN ..6...
1	114	31.5	91
2	113	63	101
3	111	125	104
4	110	250	110
5	110	500	109
6	111	1k	106
7	110	2k	103
8	107	4k	100
		8k	99
		16k	98
AMBIENT NOISE..79.....DBA			

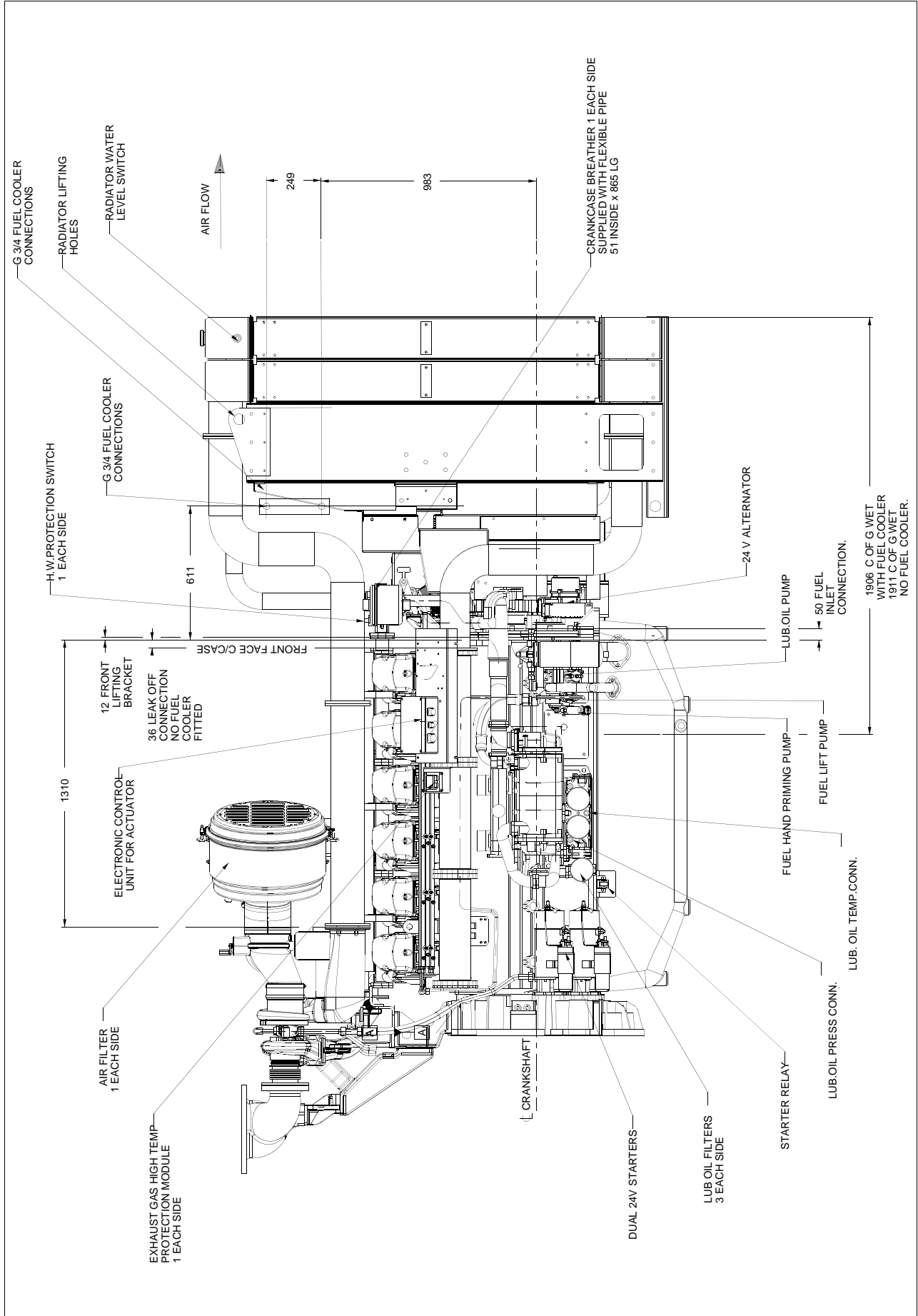
4012-46TAG1A / 4012-46TAG2A Temperate - Left hand side view



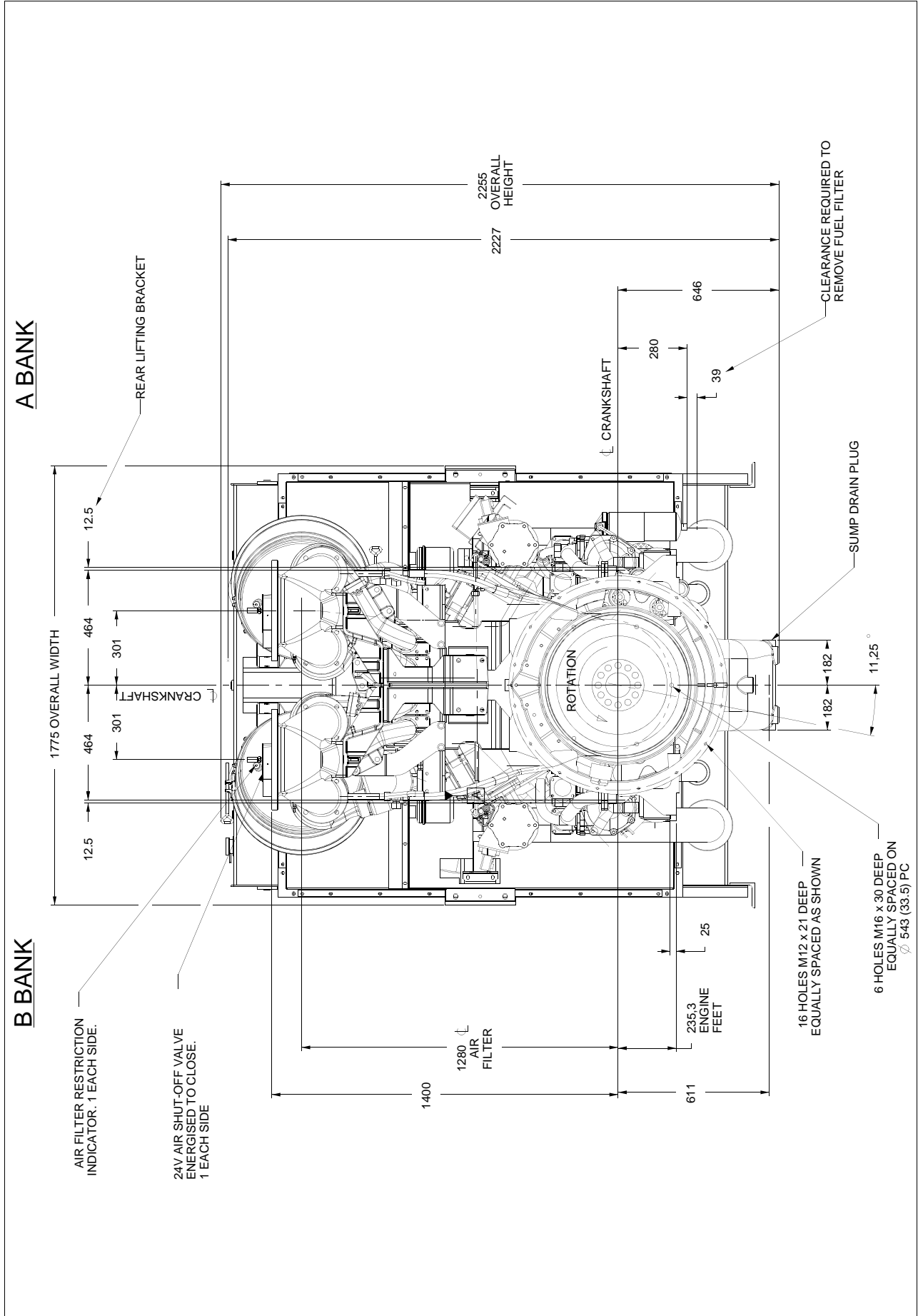
4012-46TAG1A / 4012-46TAG2A Temperate - Front view



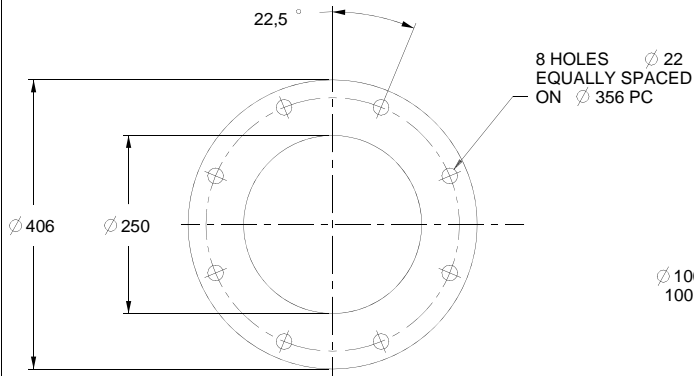
4012-46TAG1A / 4012-46TAG2A Temperate - Right hand side view



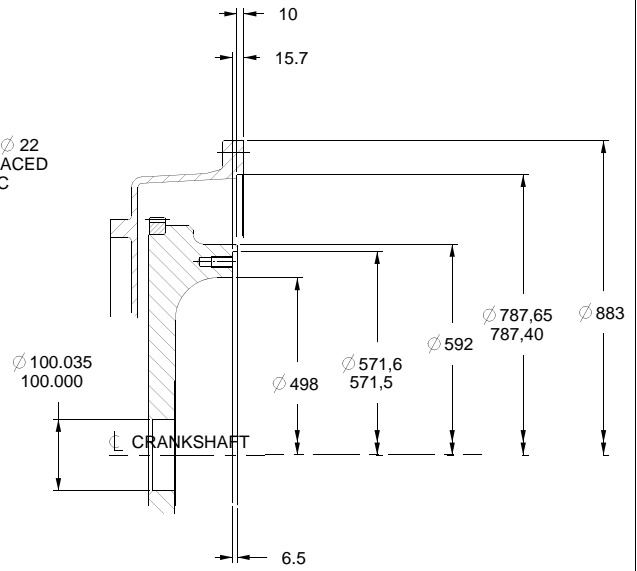
4012-46TAG1A / 4012-46TAG2A Temperate - Rear view



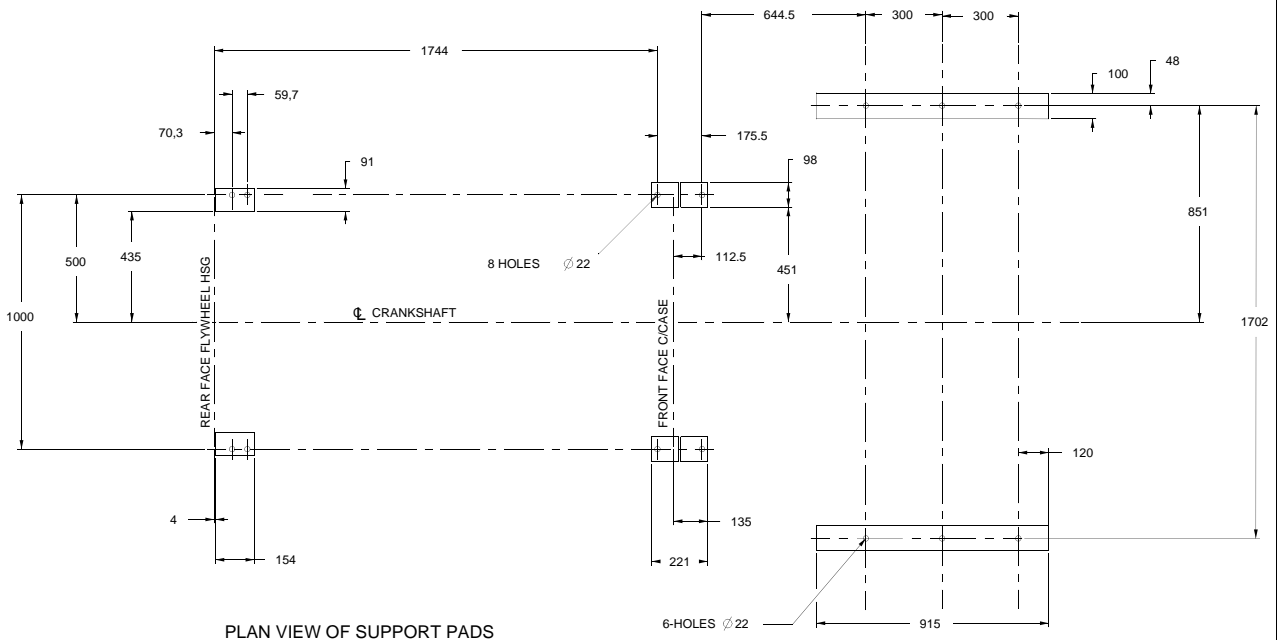
4012-46TAG1A / 4012-46TAG2A Temperate - Plan view of support pads, exhaust outlet flange and flywheel



DETAIL OF EXHAUST OUTLET FLANGE
(B.S.10 TABLE D)
SCALE 1:5

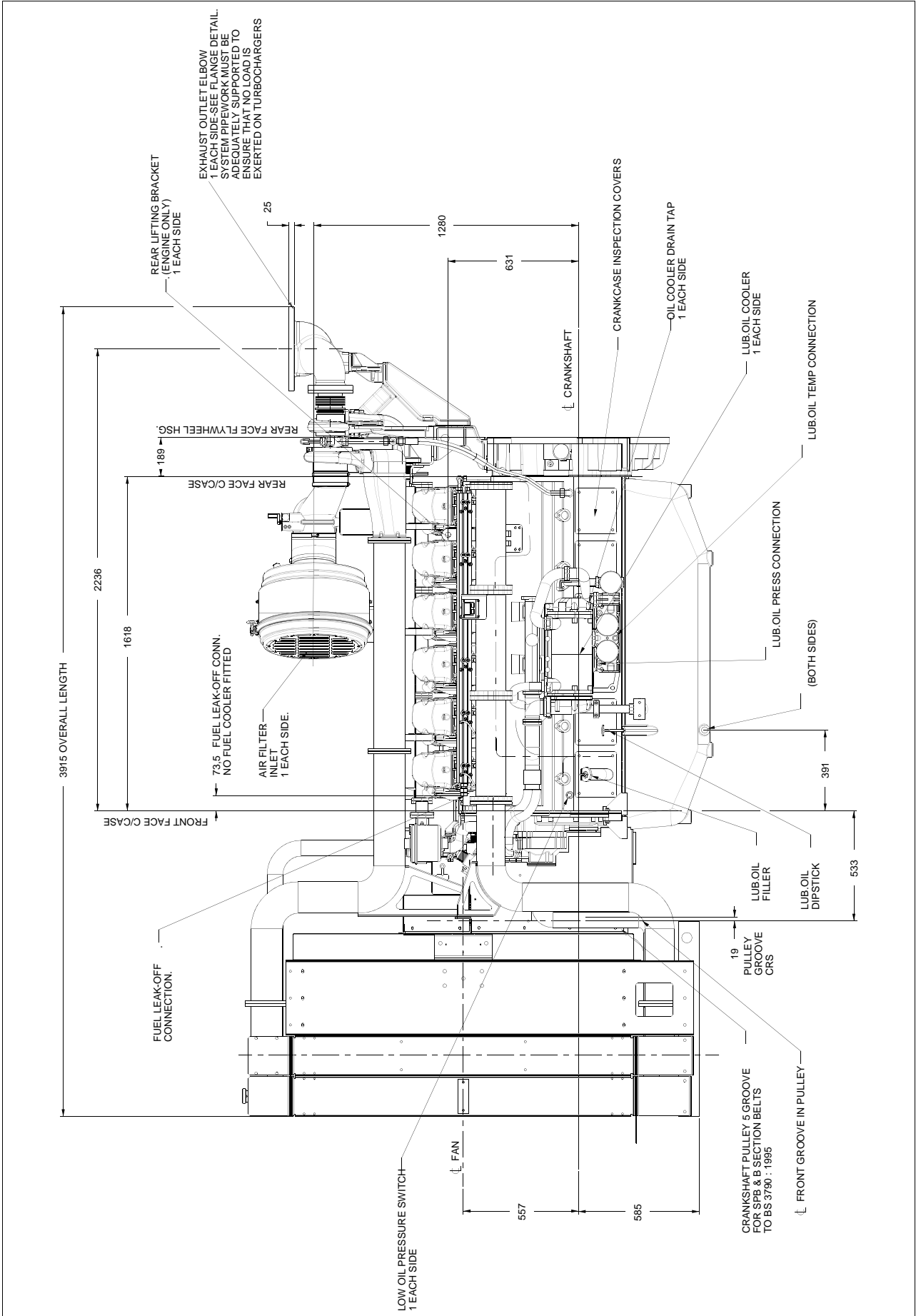


DETAIL OF SAE 518 FLYWHEEL
AND SAE 00 FLYWHEEL HOUSING
(METRIC TAPPINGS)
SCALE 1:5

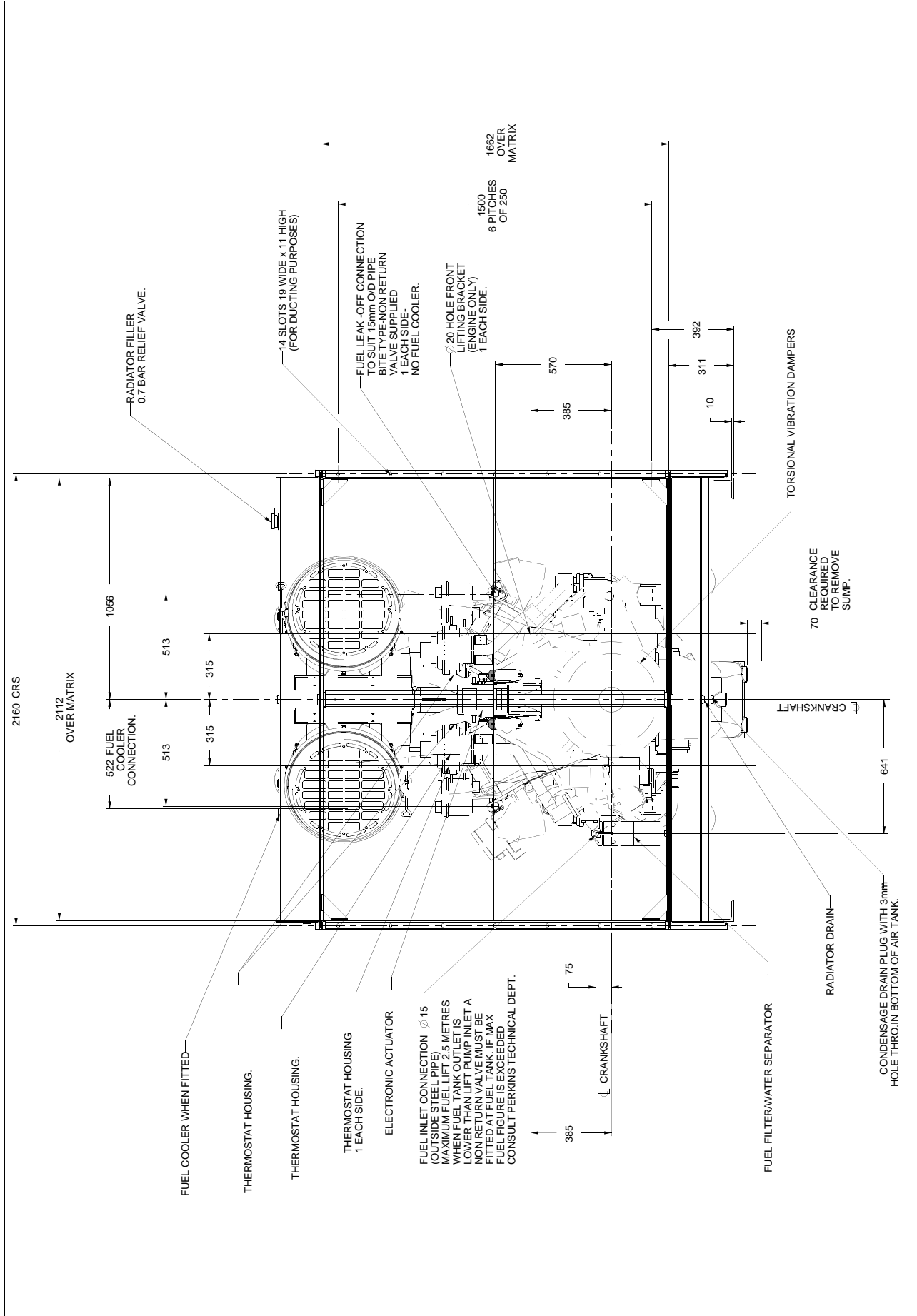


PLAN VIEW OF SUPPORT PADS

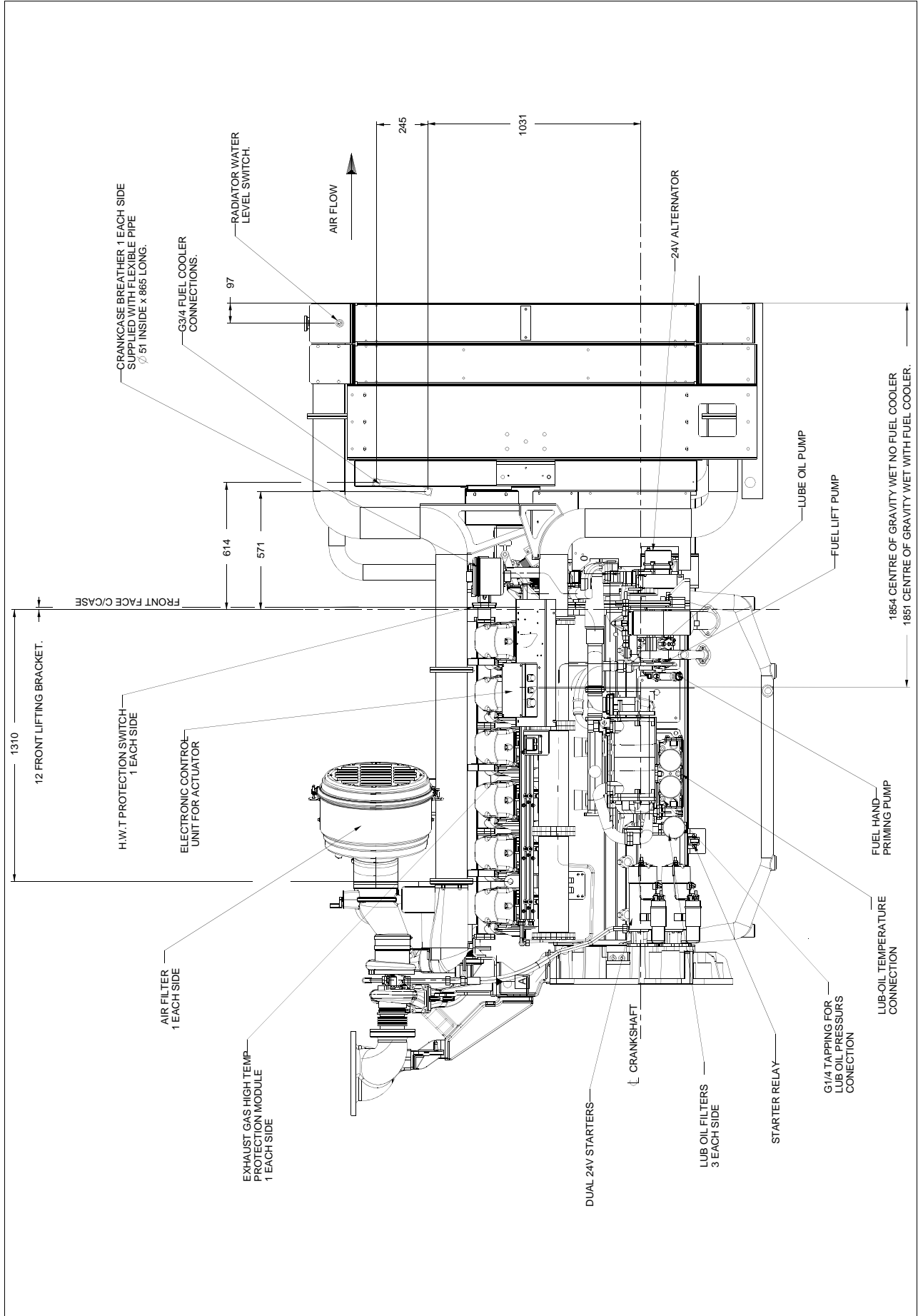
4012-46TAG1A / 4012-46TAG2A Tropical - Left hand side view



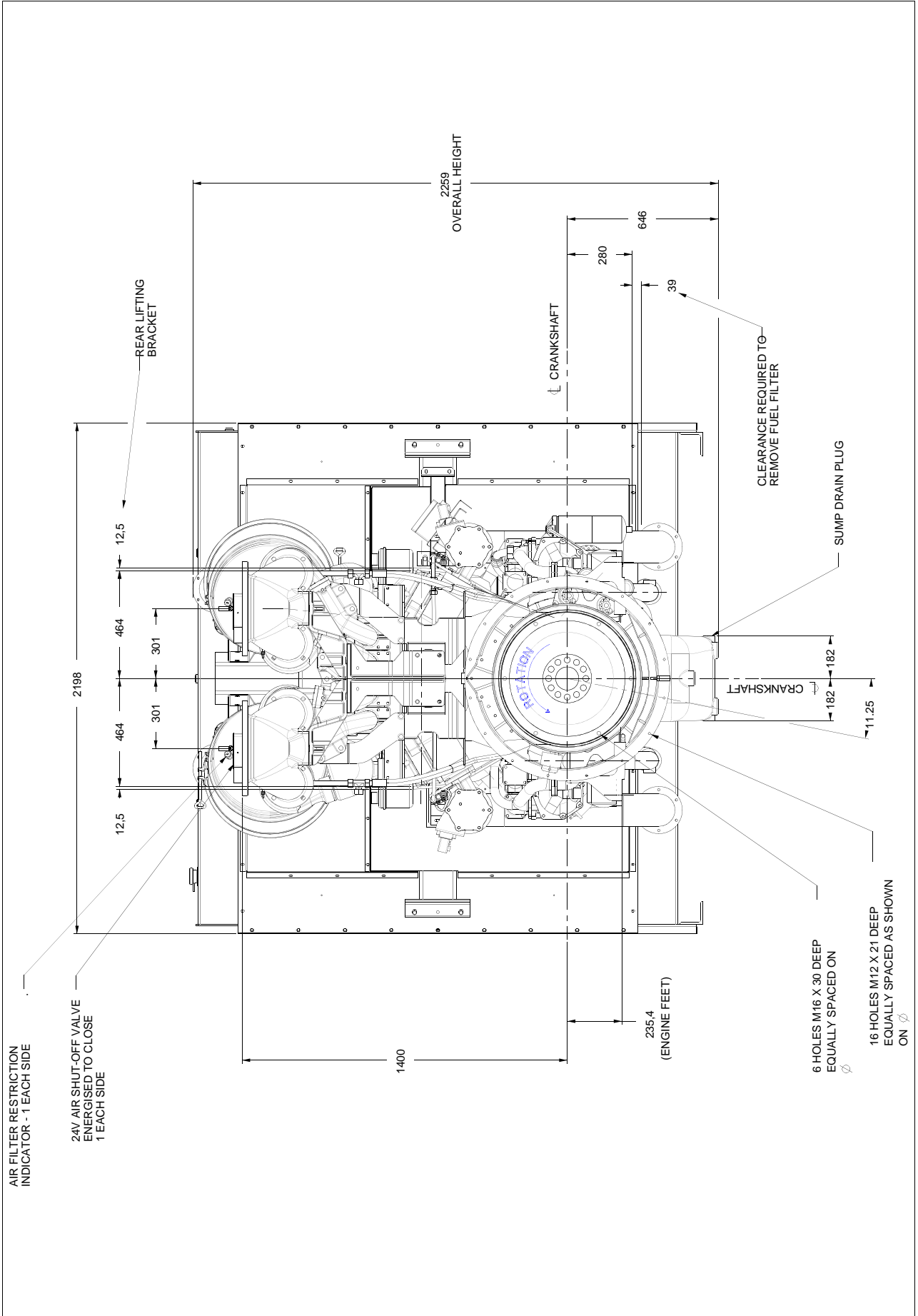
4012-46TAG1A / 4012-46TAG2A Tropical - Front view



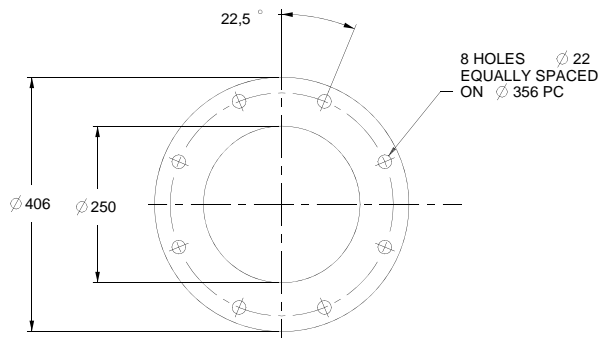
4012-46TAG1A / 4012-46TAG2A Tropical - Right hand side view



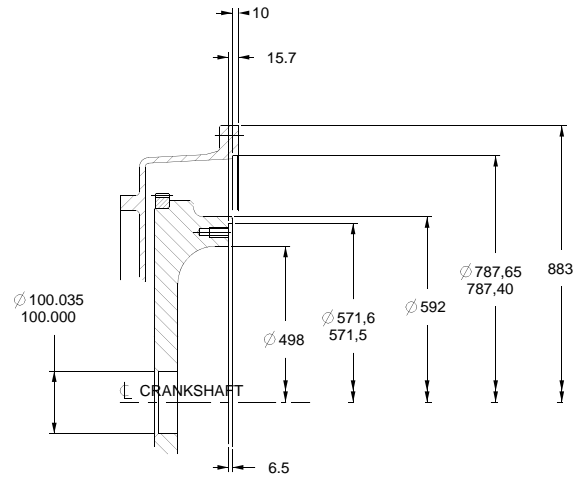
4012-46TAG1A / 4012-46TAG2A Tropical - Rear view



4012-46TAG1A / 4012-46TAG2A Tropical - Plan view of support pads, exhaust outlet flange and flywheel



DETAIL OF EXHAUST OUTLET FLANGE
(B.S.10 TABLE D)
SCALE 1:5



DETAIL OF SAE 518 FLYWHEEL
AND SAE 00 FLYWHEEL HOUSING
(METRIC TAPPINGS)
SCALE 1:5

