4008 TAG1A

644 - 882 kWm (Gross) @ 1500 rpm

4008 TAG2A

715 - 985 kWm (Gross) @ 1500 rpm

ElectropaK

4000 Series

Basic technical data

Number of cylinders 8
Cylinder arrangement .. .. In line
Cycle ... ...4 stroke, compression ignition
Induction system.. ... ... Turbocharged
Compression ratio ... ...13.6:1 nominal
Bore . ... 160 mm
Stroke . ...190 mm
Cubic capacity . ...30.561 litres
Direction of rotation.. ... ... .Anti-clockwise viewed on flywheel
Firing order 1, 4, 7, 6, 8, 5, 2, 3
Cylinder 1. ... ... furthest from flywheel

Weight of ElectropaK

Temperate

Dry ... ...4270 kg
Wet .. ..4558 kg

Tropical

Dry ... ...4320 kg
Wet .. ..4618 kg

Overall dimensions of Electropak

Temperate

Length.. ... ... 3852 mm
Width ... ... 2046 mm
Height .. .. 2067 mm

Tropical

Length.. ... ... 3711 mm
Width ... ... 2046 mm

Moment of inertia

Engine.. ... ...9.60 kgm²
Flywheel... ... ...6.02 kgm²

Cyclic irregularity, engine/flywheel Prime power

4008TAG1A. 1.195
4008TAG2A. 1.180

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
For test conditions relevant to data on load acceptance, refer to Perkins Applications Department.

All information in this document is substantially correct at time of printing and may be altered subsequently.
Publication TSL4252E7 September 2012.
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General installation

4008TAG1A - Temperate

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	644	805	882
Fan power	kWm		27	
Net engine power	kWm	617	778	855
BMEP gross	bar	16.6	20.7	22.7
Combustion air flow	m³/min	58	69.4	74
Exhaust gas temperature, after turbo	°C	405	425	440
Exhaust gas flow maximum, after turbo	m³/min		183	
Boost pressure ratio	-	2.90	3.45	3.65
Mechanical efficiency	%	88	91	92
Overall thermal efficiency	%	41.5	41	40
Friction power and pumping losses	kWm		80	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	l/s		10	
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	733	923	1015
	kWe	586	739	812
Assumed alternator efficiency	%		95	

4008TAG1A - Tropical

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	644	805	882
Fan power	kWm		38	
Net engine power	kWm	606	767	844
BMEP gross	bar	16.6	20.7	22.7
Combustion air flow	m³/min	58	69.4	74
Exhaust gas temperature, after turbo	°C	405	425	440
Exhaust gas flow maximum, after turbo	m³/min		183	
Boost pressure ratio	-	2.90	3.45	3.65
Mechanical efficiency	%	88	91	92
Overall thermal efficiency	%	41.5	41	40
Friction power and pumping losses	kWm		80	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	l/s		10	
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	720	911	1002
	kWe	576	728	802
Assumed alternator efficiency	%		95	

4008TAG2A - Temperate

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	719	899	985
Fan power	kWm		27	
Net engine power	kWm	692	872	958
BMEP gross	bar	18.5	23.2	25.4
Combustion air flow	m³/min	64	75	80.5
Exhaust gas temperature, after turbo	°C	405	438	465
Exhaust gas flow maximum, after turbo	m³/min		200	
Boost pressure ratio	-	3.18	3.70	4,0
Mechanical efficiency	%	90	92	92
Overall thermal efficiency	%	41.5	41	40
Friction power and pumping losses	kWm		80	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	l/s		10,0	
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	821	1035	1138
	kWe	657	828	910
Assumed alternator efficiency	%		95	

4008TAG2A - Tropical

Designation	Units	Baseload power	Prime Power	Standby power
Gross engine power	kWb	719	899	985
Fan power	kWm		38	
Net engine power	kWm	681	861	947
BMEP gross	bar	18.5	23.2	25.4
Combustion air flow	m³/min	64	75	80.5
Exhaust gas temperature, after turbo	°C	405	438	465
Exhaust gas flow maximum, after turbo	m³/min		200	
Boost pressure ratio	-	3.18	3.70	4,0
Mechanical efficiency	%	90	92	92
Overall thermal efficiency	%	41.5	41	40
Friction power and pumping losses	kWm		80	
Mean piston speed	m/s		9.5	
Engine coolant flow (minimum)	l/s		10,0	
Typical Genset electrical output 0.8pf 25°C (100 kPa)	kVA	809	1022	1125
	kWe	647	818	900
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.

Energy balance

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

4008TAG1A - Tropical

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	1544	1957	2191
Energy in power output (gross)	kWb	644	805	882
Energy to cooling fan	kWm	38	38	38
Energy in power output (net)	kWm	606	767	844
Energy to exhaust	kWt	492	606	712
Energy to coolant and oil	kWt	245	300	313
Energy to radiation	kWt	30	70	91
Energy to charge coolers	kWt	133	176	193

4008TAG1A - Temperate

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	1544	1957	2191
Energy in power output (gross)	kWb	644	805	882
Energy to cooling fan	kWm	27	27	27
Energy in power output (net)	kWm	617	778	855
Energy to exhaust	kWt	492	606	712
Energy to coolant and oil	kWt	245	300	313
Energy to radiation	kWt	30	70	91
Energy to charge coolers	kWt	133	176	193

4008TAG2A - Tropical

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	1733	2209	2498
Energy in power output (gross)	kWb	719	899	985
Energy to cooling fan	kWm	38	38	38
Energy in power output (net)	kWm	681	861	947
Energy to exhaust	kWt	548	698	807
Energy to coolant and oil	kWt	273	332	349
Energy to radiation	kWt	40	80	100
Energy to charge coolers	kWt	153	200	257

4008TAG2A - Temperate

Designation	Units	Baseload power	Prime power	Standby power
Energy in fuel	kWt	1733	2209	2498
Energy in power output (gross)	kWb	719	899	985
Energy to cooling fan	kWm	27	27	27
Energy in power output (net)	kWm	692	872	958
Energy to exhaust	kWt	548	698	807
Energy to coolant and oil	kWt	273	332	349
Energy to radiation	kWt	40	80	100
Energy to charge coolers	kWt	153	200	257

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

The following is a guide based on ambient air conditions of 52°C on a Perkins supplied radiator.

Total coolant capacity:

Engine only.. ... ...48 litres
ElectropaK (engine/radiator):
Tropical ... ... 149 litres
Temperate ... ... 143 litres
Pressure cap setting ... ... 69 kPa
Fan .. ..Incorporated in radiator

Diameter

Tropical ... ... 1400 mm (pusher)
Temperate ... ... 1214 mm (pusher)
Ambient cooling clearance (open ElectropaK prime power) based on air temperature at fan 3°C above ambient.
Maximum additional restriction (duct allowance) to cooling airflow (Prime power applications) and resultant minimum airflow.

	Ambient clearance 50% glycol	Duct allowance mm H_20	Min airflow m^3/min
4008TAG1A - Tropical	50°C	20	1248
4008TAG1A - Temperate	41°C	24	1095
4008TAG2A - Tropical	50°C	18	1350
4008TAG2A - Temperate	35°C	25	1095

Coolant pump speed ... ... .1.4 x e rpm
Method of drive ... ... Gear driven
Maximum static pressure head on pump above engine crank centre line ... ... .7 m
Maximum external permissible restriction to coolant pump flow ... ... 20 kPa
Thermostat operating range ... ... 71-85°C
Shutdown switch setting.. ... ...101°C rising
Coolant immersion heater capacity . ... .4 kW x 1

Jacket cooling water data	Units	
Coolant flow 4008TAG1A/2A	l/s	10
Coolant exit temperature (max)	°C	98
Coolant entry temperature (min)	°C	70
Coolant entry temperature (max)	°C	86

Lubrication system

Recommended lubricating oil to conform with the specification of API CG4 15W/40

Lubricating oil capacity

Sump maximum ... ...153 litres
Sump minimum . ...127 litres
Lubricating oil temperature maximum to bearings ... ... 105°C

Lubricating oil pressure

At 80°C temperature to bearing gallery (minimum) .. ..0.34 MPa

Oil consumption Prime power

4008TAG1A

Oil consumption Prime power	Units	
After running-in[1]	g/kWhr	0.50
Oil flow rate from pump	l/s	3.70

1.Typical after 250 hours

4008TAG2A

Oil consumption Prime power	Units	
After running-in[1]	g/kWhr	0.52
Oil flow rate from pump	l/s	3.70

1.Typical after 250 hours

Sump drain plug tapping size G1
Oil pump speed and method of drive ... ... 1.4 x e rpm, gear driven
Shutdown switch setting ... ...1.93 bar falling

Normal operating angles

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

Fuel system

Recommended fuel to conform to:
.. .. BS2869 1998 Class A2 or BS EN590
Type of injection system ... ...Direct injection
Fuel injection pump... ... ...Combined unit injector
Fuel injector .. ..Combined unit injector
Fuel injector opening pressure .. .. 234 bar
Fuel lift pump ... ... Tuthill TCH 1-054
Delivery/hour at 1500 rpm. ... ...660 litres
Heat retained in fuel to tank.. ... ... 4.5 kW
Temperature of fuel at lift pump to be less than ... ... 58°C
Fuel lift pump pressure . ... 300 kPa
Fuel lift pump maximum suction head .. .. 2.5 m
Fuel lift pump maximum pressure head ... .see Installation Manual
Fuel filter spacing.. ... ... 10 microns
Governor type ... ...Electronic
Torque at the governor output shaft.. ... ... .0.917 kgm
Static injection timing ... ... See engine number plate
Tolerance on fuel consumption. ... ... .To ISO 8528-1 1993

Fuel consumption Gross

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.

4008TAG1A - Tropical

Designation	g/kWh	Litres/hr
At Standby Max power rating	210	218
At Prime Power rating	206	195
At Continuous Baseload rating	203	154
At 75% of Prime Power rating	201	143
At 50% of Prime Power rating	207	98
At 25% of Prime Power rating	217	52

4008TAG1A - Temperate

Designation	g/kWh	Litres/hr
At Standby Max power rating	210	218
At Prime Power rating	206	195
At Continuous Baseload rating	203	154
At 75% of Prime Power rating	201	143
At 50% of Prime Power rating	207	98
At 25% of Prime Power rating	217	52

4008TAG2A - Tropical

Designation	g/kWh	Litres/hr
At Standby Max power rating	214	248
At Prime Power rating	208	220
At Continuous Baseload rating	204	173
At 75% of Prime Power rating	202	160
At 50% of Prime Power rating	205	108
At 25% of Prime Power rating	216	57

4008TAG2A - Temperate

Designation	g/kWh	Litres/hr
At Standby Max power rating	214	248
At Prime Power rating	208	220
At Continuous Baseload rating	204	173
At 75% of Prime Power rating	202	160
At 50% of Prime Power rating	205	108
At 25% of Prime Power rating	216	57

Induction system

Maximum air intake restriction of engine

Clean filter ... 127 mm H_2O
Dirty filter ... 380 mm H_2O
Air filter type ... cylinder paper pleat

Exhaust system

Maximum back pressure for total system

4008TAG1A ... 947 mm H_20
4008TAG2A ... 816 mm H_20
Exhaust outlet flange size ... 2 x 152 mm
For recommended pipe sizes, refer to the Installation Manual.

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 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 ... 30 amps at 24 volts
Hold-in current of starter motor solenoid ... 9 amps at 24 volts
Engine stop solenoid ... 24 volts
Pull-in current of stop solenoid ... 60 amps at 24 volts
Hold-in current of stop solenoid ... 1.1 amps at 24 volts

Engine mounting

Position of centre of gravity (wet engine) forward from rear face of crankcase ... 900 mm
Engine vertical centre line above crankshaft centre line ... 140 mm
Maximum additional load applied to flywheel due to all rotating components ... 650 Kg

Starting requirements

Temperature range down to 0°C (32 °F)

Oil ... API CG4 15W/40
Starter ... 1 x 24V
Battery ... 2 x 12 volts x 178 Ah
Max breakaway current ... 1400 amps
Cranking current ... 750 amps
Aids ... Not necessary
Starter cable size ... 70 mm²
Maximum length ... 6 m

- 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)

4008TAG1A

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 kWm (kWe) Nett	Transient Frequency Deviation %	Frequency recovery time seconds	Prime Power %	Load kWm (kWe) Nett	Transient Frequency Deviation %	Frequency recovery time seconds
64	493 / 469	-10	5	36	274 / 259	-10	5

4008TAG2A

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 kWm (kWe) Nett	Transient Frequency Deviation %	Frequency recovery time seconds	Prime Power %	Load kWm (kWe) Nett	Transient Frequency Deviation %	Frequency recovery time seconds
57	490 / 466	-10	5	43	371 / 352	-10	5

The above complies with the requirements of Classification 3 & 4 of ISO 8528-12 and G2 operating limits stated in ISO 8528-5.
The above figures were obtained under test conditions as follows:
Engine block temperature ... ...

Noise data

Noise levels

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

Octave analysis

The following histograms show an octave band analysis at the position of the maximum noise level.

Total noise level

Sound pressure level re: -20 x 10^{-6} pa

Speed 1500 rpm ... ... Ambient noise level 79 dB(A) 4008TAG1A

Octave analysis performed at the position of maximum noise

4008TAG1A / 4008TAG2A

Position 1

Temperate	103 - dBA	4008TAG1A
	104 - dBA	4008TAG2A
Tropical	105 - dBA	4008TAG1A
	105 - dBA	4008TAG2A

Position 7

Temperate	108 - dBA	4008TAG1A
	109 - dBA	4008TAG2A
Tropical	110 - dBA	4008TAG1A
	110 - dBA	4008TAG2A

Position 6

Temperate	108 - dBA	4008TAG1A
	109 - dBA	4008TAG2A
Tropical	109 - dBA	4008TAG1A
	110 - dBA	4008TAG2A

Position 5

Temperate	107 - dBA	4008TAG1A
	108 - dBA	4008TAG2A
Tropical	107 - dBA	4008TAG1A
	109 - dBA	4008TAG2A

F

R

Position 2

Temperate	108 - dBA	4008TAG1A
	109 - dBA	4008TAG2A
Tropical	109 - dBA	4008TAG1A
	109 - dBA	4008TAG2A

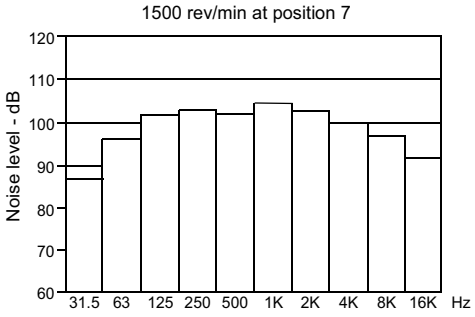
Position 3

Temperate	108 - dBA	4008TAG1A
	109 - dBA	4008TAG2A
Tropical	109 - dBA	4008TAG1A
	110 - dBA	4008TAG2A

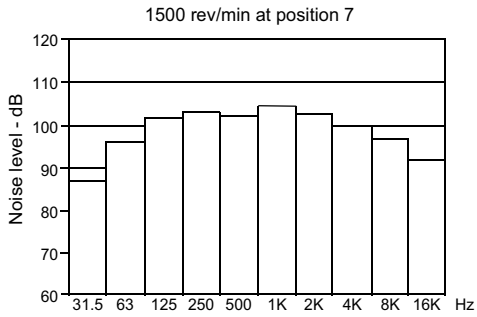
Position 4

Temperate	107 - dBA	4008TAG1A
	108 - dBA	4008TAG2A
Tropical	108 - dBA	4008TAG1A
	108 - dBA	4008TAG2A

4008TAG1A - Temperate



4008TAG2A - Temperate

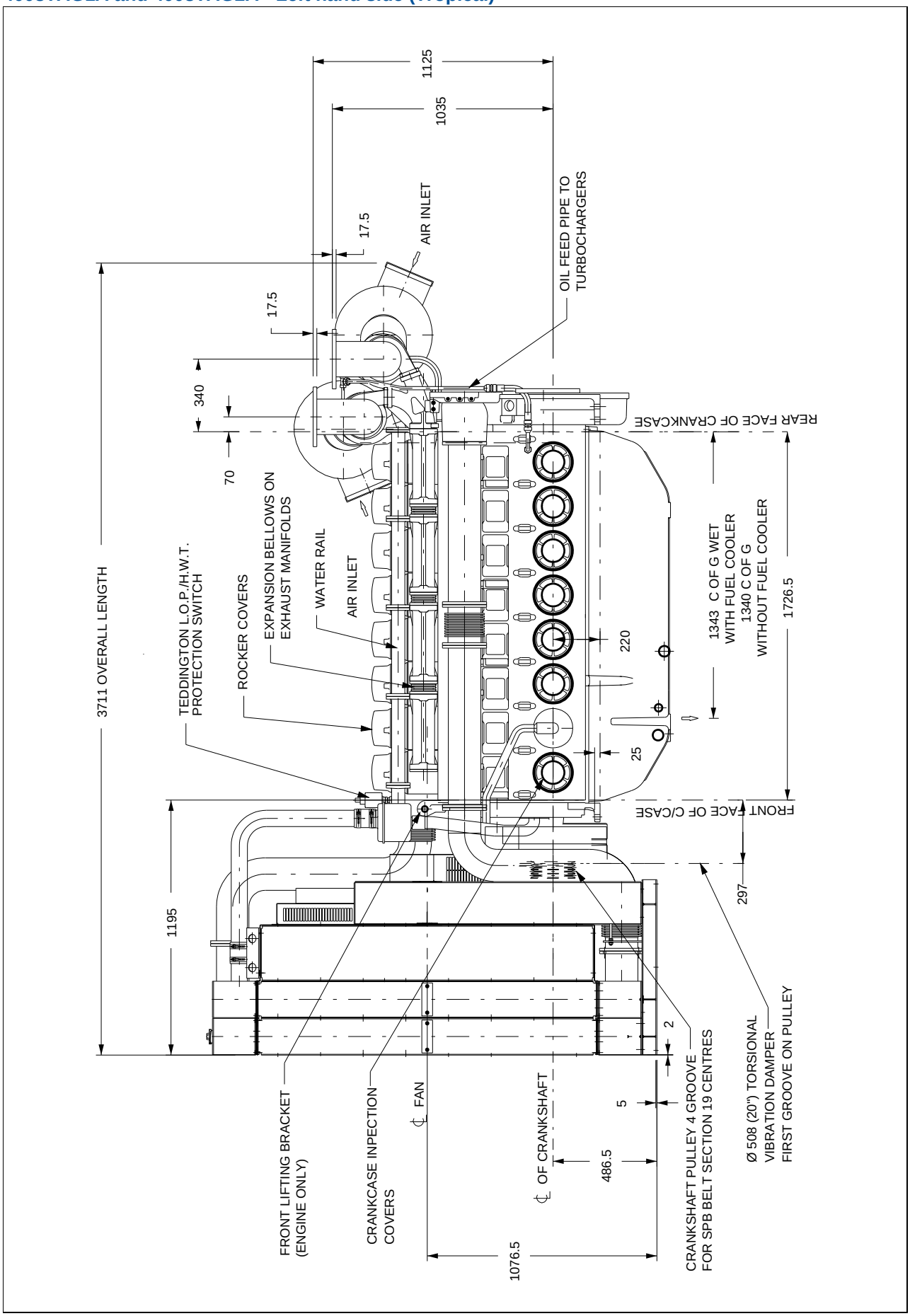


Isochronous governing

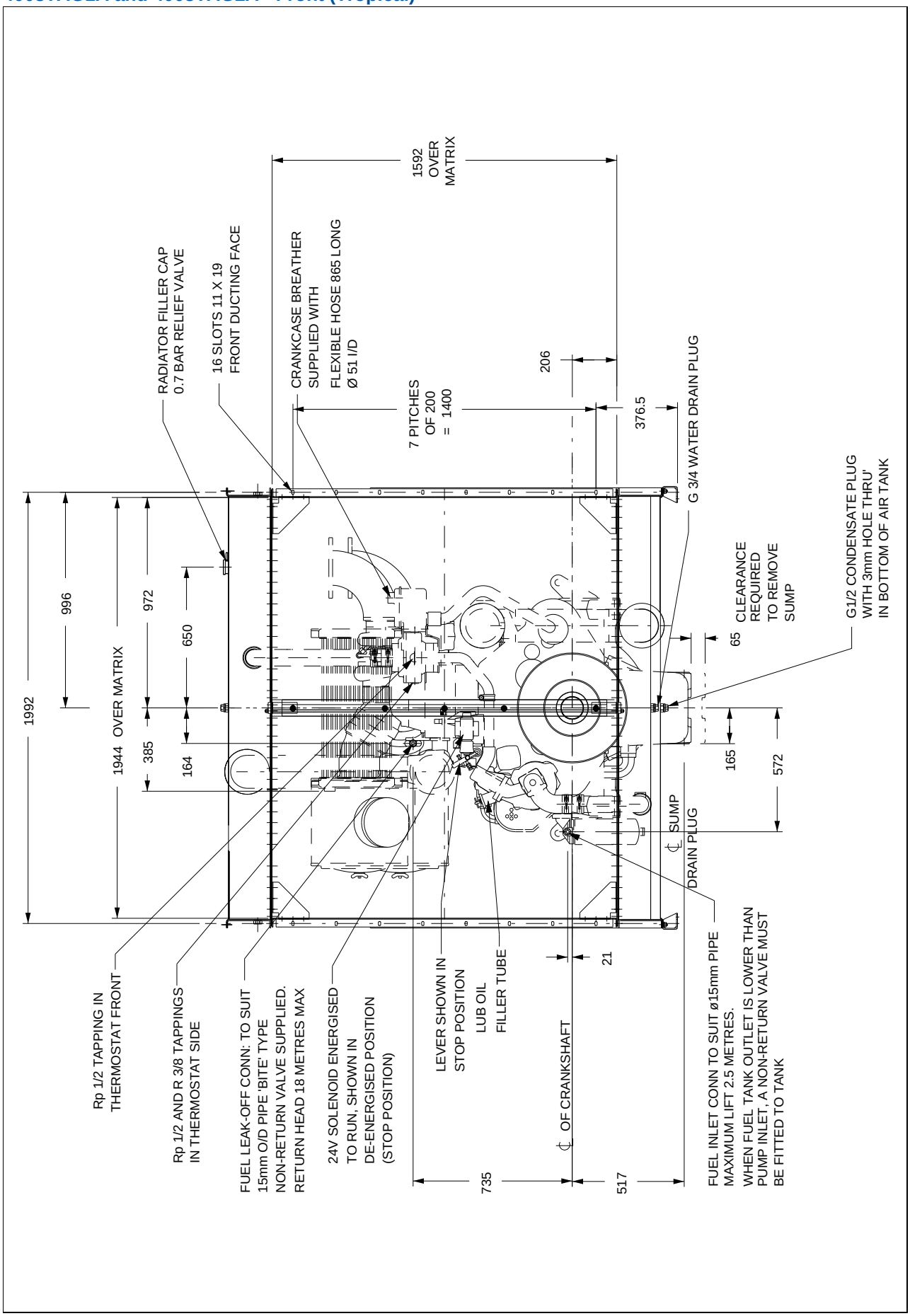
Under frequency roll off (UFRO) set to ... ...1 Hz below rated frequency

Typical alternator inertia . ...

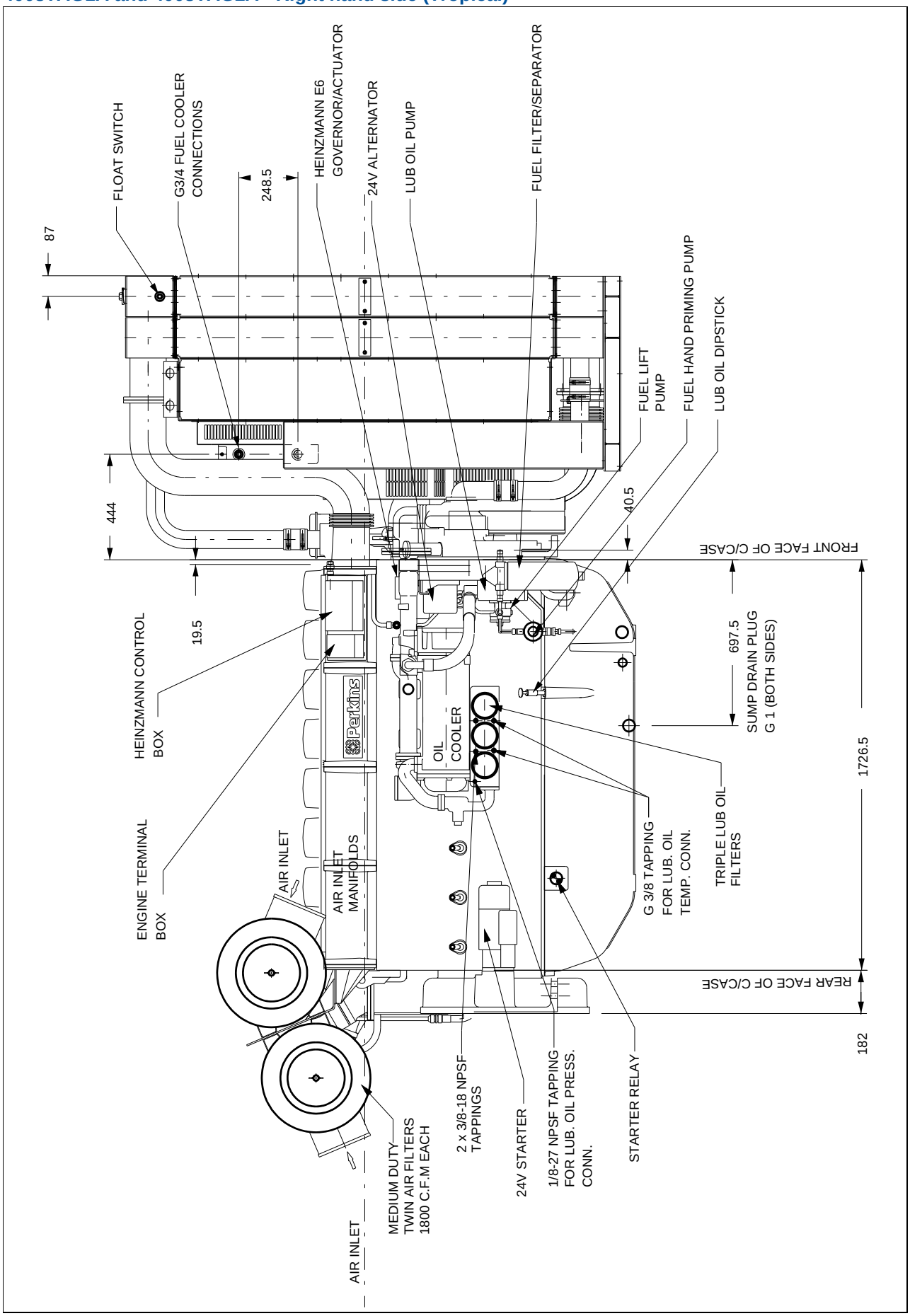
4008TAG1A and 4008TAG2A - Left hand side (Tropical)



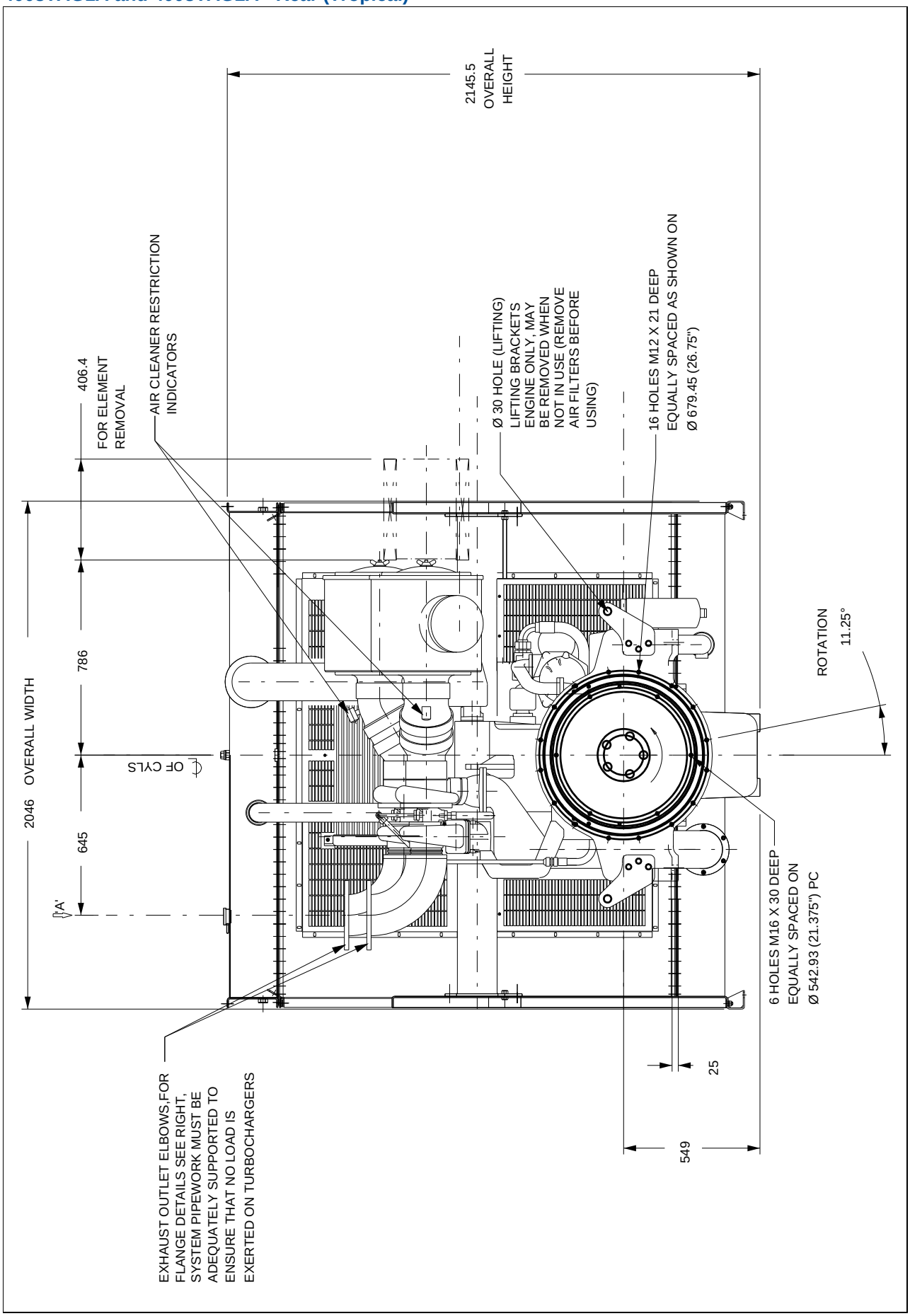
4008TAG1A and 4008TAG2A - Front (Tropical)



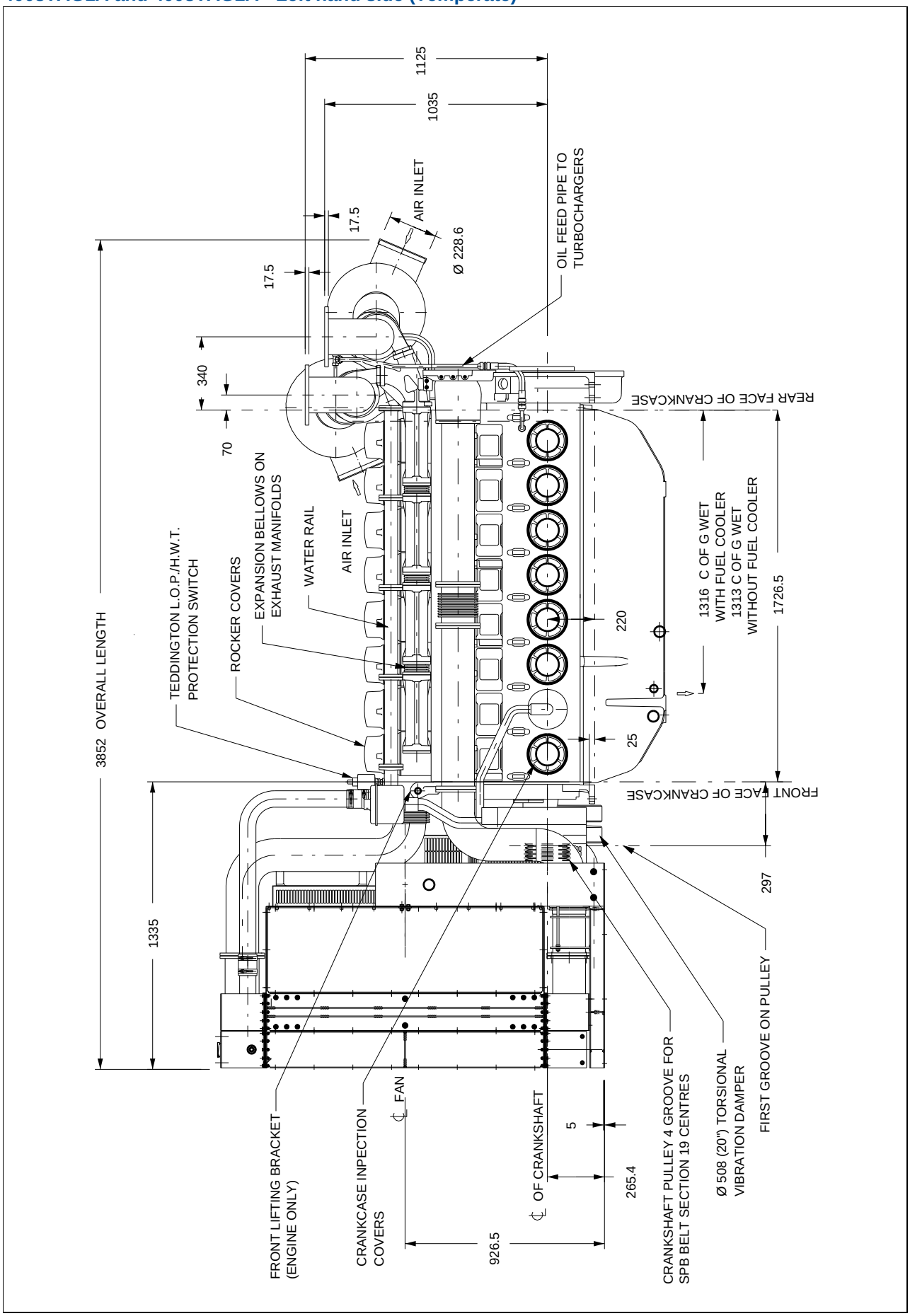
4008TAG1A and 4008TAG2A - Right hand side (Tropical)



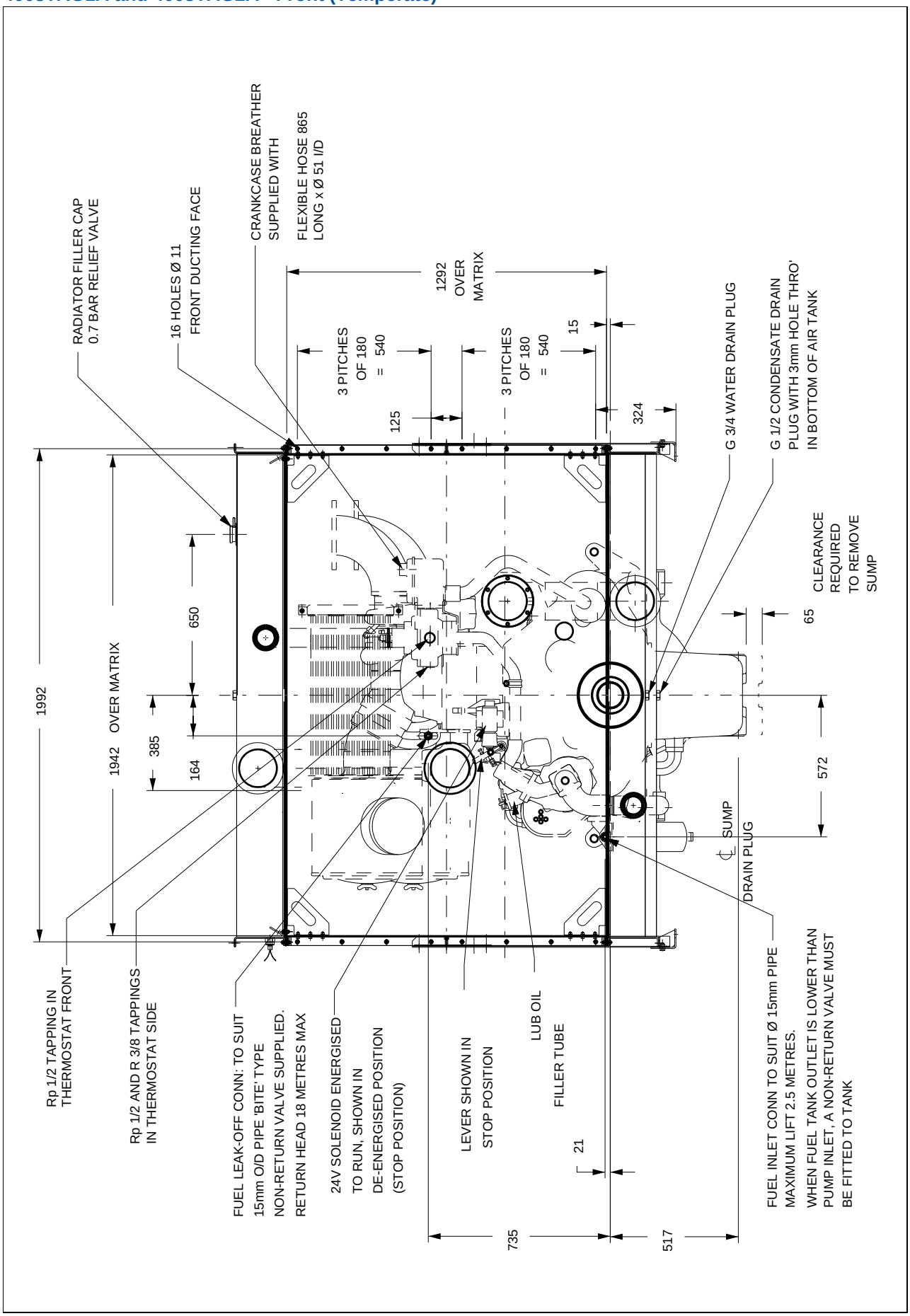
4008TAG1A and 4008TAG2A - Rear (Tropical)



4008TAG1A and 4008TAG2A - Left hand side (Temperate)



4008TAG1A and 4008TAG2A - Front (Temperate)



4008TAG1A and 4008TAG2A - Right hand side (Temperate)

