BPD180S3-P

180 KVA DIESEL GENERATOR

FEATURES & BENEFITS

- Maximum 200 kVA, 380V, 1500 RPM
- Constant voltage AVR (Automatic Voltage Regulator)
- 24V Electric Starter
- 320 Litre Fuel Tank, 10 Hours @ 75% load
- Silent Version (±72dBA)
- 6 Cylinder, in-line, Water cooled, Turbocharged & Aftercooled
- Three Phase Output
- DeepSea DSE6120 Digital Control Panel
- Low oil pressure system
- Low water cut out engine protection

Perkins DSE DEEP SEA ELECTRONICS LEROY-SOMER

GENERAL DATA	
Model:	BPD180S3-P
Prime Power (P.R.P):	180 kVA
Stand-by Power (L.T.P):	200 kVA
Amps:	303 A
Power Factor / COS:	0.8
Frequency:	50 Hz
Voltage:	380 V
Phases:	Three Phase
Engine Speed:	1500 RPM
Length:	3150 mm
Width:	1100 mm
Height:	1680 mm
Weight:	2103 kg's
Tank Capacity:	320 l

ADDITIONAL	
Running Time:	10 Hours @ 75% load
Structure Type:	Silent
Noise Level (7m):	72 dBA
Auto Voltage Regulator:	Constant voltage AVR
ISO9001 Certified:	Yes
CE Certified:	Yes
Fuel Cons. @ 100% Load:	41.4
Fuel Cons. @ 75% Load:	31.0
Fuel Cons. @ 50% Load:	20.7

ENGINE DATA	
Brand:	Perkins
Model:	1106A-70TAG3
Type:	6 Cylinder, in-line, Water cooled, Turbocharged & Aftercooled
Starting System:	24V Electric Starter
Auto-Decompression:	Yes
Cubic Capacity (l):	7.01
Compression Ratio:	18.2:1
Rated Power (kW/RPM):	180 / 1500
Fuel Type:	Diesel
Lube Oil:	15W40
Low Pressure Alert:	Yes
Low Fuel Cut Out:	Yes

CONTROL PANEL	
Model:	DeepSea DSE6120
Type:	Digital Control Panel
Analogue Inputs:	6
Mains Phase Voltage:	Yes
Mains Line Voltage:	Yes

ALTERNATOR	
Model:	Leroy Somer - TAL-A46-C
Pole Number:	4
Excitation Mode:	Self Excitation

Maputo, Moçambique

+258 85 176 3143 comercial@cobalt.co.mz **www.cobalt.co.mz**

1106A-70TAG3

180.2 kWm (Gross) @ 1500 rpm
197.7 kWm (Gross) @ 1800 rpm

ElectropaK

1100 Series

Basic technical data

Number of cylinders	6
Cylinder arrangement	Inline
Cycle	4 stroke
Induction system	Turbocharged and air charge cooled
Combustion system	Direct injection diesel
Compression ratio	16 5:1
Bore	105 mm
Stroke	135 mm
Cubic capacity	7..01 litres
Direction of rotation	Anticlockwise when viewed from flywheel
Firing order	1, 5, 3, 6, 2, 4
Estimated total weight (dry)	743 kg
Estimated total weight (wet)	777 kg

Overall dimensions, ElectropaK

Height	1092 mm
Length (air cleaner fitted)	1706 mm
Width	756 mm

Moments of inertia

Engine rotational components	0..27 kgm²
Flywheel	1..26 kgm² (SAE2)

Centre of gravity, ElectropaK

Forward from rear of block (wet)	476 mm
Above crankshaft centre line (wet)	176 mm
Offset to RHS of crankshaft centre line (wet)	-16 mm

Performance

Speed variation at constant load	± 0..75%
Cyclic irregularity at standby power	0 028
All ratings within	± 5%

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

Sound level

Average sound pressure level for prime power @ 1 m ..... TBA dB(A)

Test conditions

Air temperature	25°C
Barometric pressure	100 kPa
Relative humidity	31..5%
Air inlet restriction at maximum power	3 kPa (nominal)
Exhaust back pressure at maximum power	6 kPa (nominal)
Fuel temperature	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.. For full details, contact Perkins Technical Service Department..

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General installation

General Installation	Units	Prime	Standby	Prime	Standby
		50 Hz		60 Hz	
Gross engine power	kW	162..7	180..2	179..7	197..7
Gross BMEP	kPa	1856..0	2056..5	1709..0	1880..2
Mean piston speed	metres/s	6..8		8..1	
ElectropaK nett engine power	kW	157..7	175..2	171..7	189..7
Engine coolant flow (against 35 kPa restriction)	litres/min	142		170	
Combustion air flow (at STP)	m³/min	12..74	13..45	16..55	17..37
Exhaust gas flow (maximum)	m³/min	30..37	32..28	37..45	40..66
Exhaust gas temperature (maximum) in manifold (after turbocharger)	°C	487		486	
Nett engine thermal efficiency	%	40..0	40..4	37..3	36..8
Typical genset electrical output (0..8pf 25°C)	kWe	144	160	156..8	173..0
	kVA	180	200	196..9	216..5
Regenerative power (estimated)	kW	8..1		9	
Assumed alternator efficiency	%	91..3		91..3	

Rating definitions

Prime power

Unlimited hours usage, with an average load factor of 80% over each 24 hour 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

Designation	Units	Prime	Standby	Prime	Standby
		50 Hz		60 Hz	
Heat in fuel	kW	394..2	433..6	460..9	514..8
Power to cooling fan	kW	5..0		8..0	
Power to coolant and lubricating oil	kW	71..9	77..9	80..8	92..5
Power to exhaust	kW	119..1	129..6	144..7	162..4
Energy to charge coolers	kW	28..7	32..9	41..9	46..8
Power to radiation	kW	11..8	13..0	13..8	15..4

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Cooling system

Cooling pack

Overall weight (wet) ..... 45 kg
Overall face area ..... 469,200 mm²
Width ..... 684 mm
Height ..... 690 mm

Radiator

Face area ..... 303,600 mm²
Number of rows and materials ..... 4 rows, Aluminium
Matrix density and material ..... 11..3 fins per inch, Aluminium
Width of matrix ..... 440 mm
Height of matrix ..... 690 mm
Pressure cap setting (minimum) ..... 110 kPa

Charge cooler

Face area ..... 151,800 mm²
Number of rows and materials ..... 2 rows, Aluminium
Matrix density and material ..... 10 fins per inch, Aluminium
Width of matrix ..... 220 mm
Height of matrix ..... 690 mm

Fan

Diameter ..... 635 mm
Drive ratio 1 25:1
Number of blades 7
Material ..... Nylon
Type ..... Pusher
Air flow @ 1500 rpm ..... 222 m³/min
Power @ 1500 rpm ..... 4..5 kW
Air flow @ 1800 rpm ..... 282 m³/min
Power @ 1800 rpm ..... 8 kW

Coolant

Total system capacity ..... 20..5 litres
System drawdown capacity 10%
Engine capacity ..... 9..5 litres
Maximum top tank temperature ..... 110°C
Temperature rise across engine (maximum rating dependent) ..... 6°C - 12°C
Maximum permissible external system resistance ..... 35 kPa
Thermostat operation range ..... 82°C to 93°C
Shutdown switch setting ..... 118°C
Coolant pump method of drive ..... Gear
Recommended coolant immersion heater rating (minimum) ..... 0..75 kW
Recommended coolant ..... BS6580 - 1992, ASTM D3306 and ELC coolants to 1E1966

Duct allowance

Maximum additional restriction (duct allowance to cooling airflow and resultant minimum air flow) - Standby power

Description	rpm	kPa	m³/min
Duct allowance with inhibited coolant at 53°C			
Minimum air flow	1500	0..125	204
	1800	0..12	258
Duct allowance with inhibited coolant at 46°C			
Minimum air flow	1500	0..2	184
	1800	0..2	228

Electrical system

Alternator ..... SI
Alternator voltage ..... 12 volts
Alternator output ..... 65 amps
Starter ..... 38 MT
Starter motor voltage ..... 12 volts
Starter motor power ..... 5..0 kW
Number of teeth on the flywheel 134
Pull-in and hold-in current of starter motor solenoid @ 25°C maximum [1] ..... 12 volts 320 amps
Hold-in current of starter motor solenoid @ 25°C maximum [1] ..... 12 volts 25 amps
Engine stop method ..... Solenoid

[1] All leads to rated at 10 amps minimum

Cold start recommendations

Minimum required cranking speed over TDC ..... 60 rpm

	5 to -10°C	-10 to -20°C	-20 to -25°C
Oil	15W40	10W40	5W40
Starter	38 MT		
Battery	2 x 950 CCA		
Cranking current	850 A		
Aids	None	Glowplugs	
Minimum mean cranking speed	130 rpm	100 rpm	100 rpm

Note: Battery capacity is defined by the 20 hour rate..

Note: If a change to a low viscosity oil is made, the cranking torque necessary at low ambient temperatures is much reduced.. The starting equipment has been selected to take advantage of this.. It is important to change to the appropriate multigrade oil in anticipation of operating in low ambient temperatures..

Exhaust system

Maximum back pressure - 1500 rpm ..... 6..0 kPa
Exhaust outlet, internal diameter ..... 72 mm

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Fuel system

Injection components

Injector.....Mechanical
Fuel pump.....DP210G

Fuel priming

Priming pump type.....Manual
Maximum priming time.....90 seconds

Fuel feed

Maximum fuel flow.....3 litres/minute
Maximum suction head at engine fuel pump inlet.....50 kPa
Maximum static pressure head.....50 kPa
Fuel temperature at engine fuel pump inlet.....85°C
Tolerance on fuel consumption.....± 5%

Fuel specification

Fuel standard ..... Various (contact Perkins Technical Department)

Fuel consumption

Load	Type of operation and application			
	g/kWh		litres/hour	
	50 Hz	60 Hz	50 Hz	60 Hz
110% Prime power	203..1	216..7	43..7	51..7
Prime power	203..5	214..7	39..6	46..4
75% Prime power	209..3	221..5	30..7	35..7
50% Prime power	193..9	206..2	18..8	22..2
25% Prime power	217..5	224..7	10..5	12..1

Induction system

Maximum air intake restriction

Clean filter.....3 kPa
Dirty filter.....5 kPa
Air filter type .....Paper element

Lubrication system

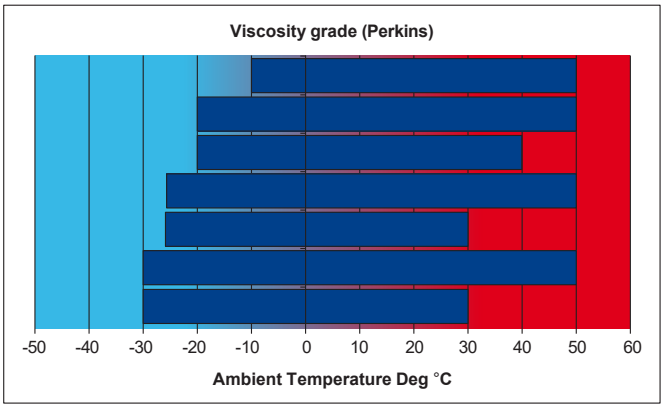
Maximum total system oil capacity ..... 18..0 litres
Minimum oil capacity in sump ..... 12..5 litres
Maximum oil capacity in sump ..... 16..1 litres
Maximum engine operating angles -
Front up, front down, right side, left side .....25°
Sump drain plug tapping size .....3/4 - 16 UNF
Shutdown switch setting (where fitted)

Lubricating oil

Relief valve opening pressure .....460 kPa
Pressure at maximum speed .....520 kPa
Maximum continuous oil temperature (in rail).....125°C
Oil consumption at full load (% of fuel) .. .. < 0 1

Recommended SAE viscosity

A multigrade oil must be used which conforms to API CH4 or CI4 ACEA E5 must be used, see illustration below:



Mountings

Maximum static bending moment at rear face of block .....1130 Nm
Maximum permissible overhung load
on the flywheel .....Calculated on request
Maximum bending moment at rear of flywheel housing.. ..... ± 3000 in Shock Nm

Load acceptance

The data 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)..

Description	Units	50 Hz	60 Hz
% of prime power	%	75	85
Load	kWe	109	150
Transient frequency deviation	%	<10	<10
Frequency recovery time	Seconds	1..6	2..3

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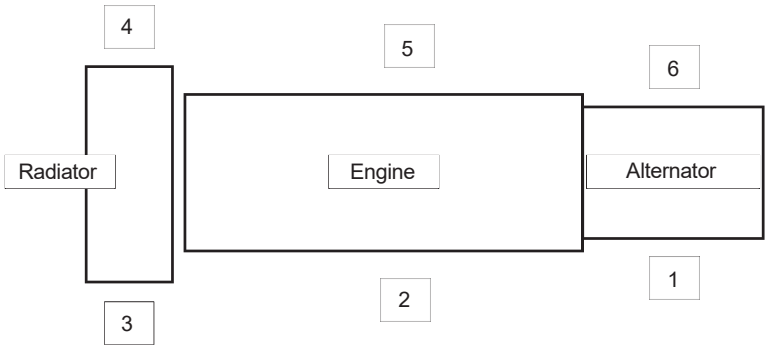
Noise data

Noise levels

Noise level [dB(A)]				
Position	Prime power		Standby	
	50 Hz	60 Hz	50 Hz	60 Hz
1	97..49	100..2	96..67	99..7
2	95..15	97..3	93..77	97..1
3	94..68	97..4	94..21	97
4	93..6	97..2	93..42	96..8
5	98..57	102..5	98..68	101..9
6	95..15	99..1	95..14	98..8

Noise reference level 65 dB(A)

1/3 octave analysis: TBC



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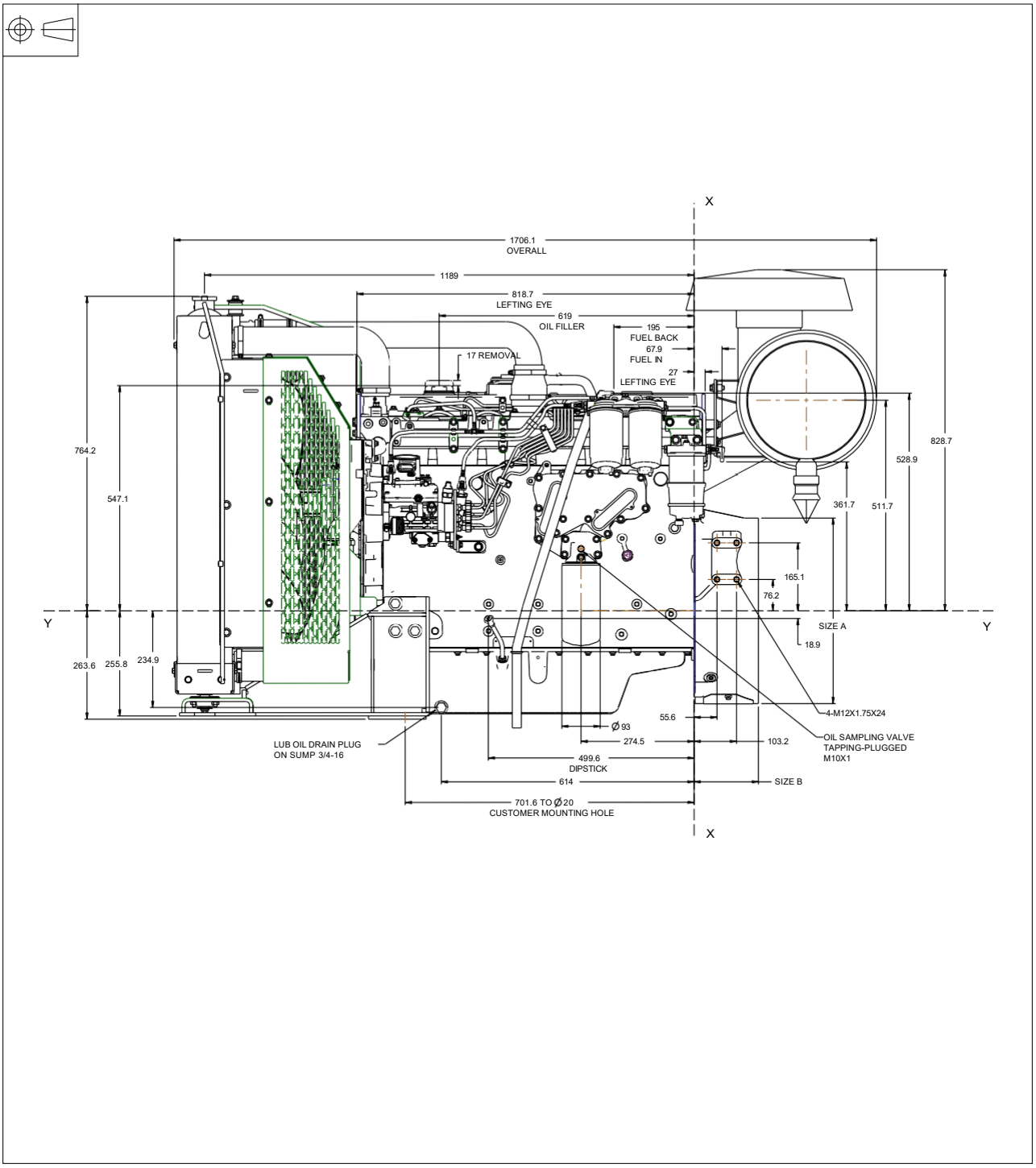
1106A-70TAG3 - Left side view



Flywheel and housing options

Option	Part	Size A	Size B	Description
1	C0001 & D0004	ø 450..9	153..37	The type is SAE 3 Use on TAG 2 & 4
2	C0074 & D0090	ø 489	134..6	The type is SAE 2 Use on TAG 3 & 4

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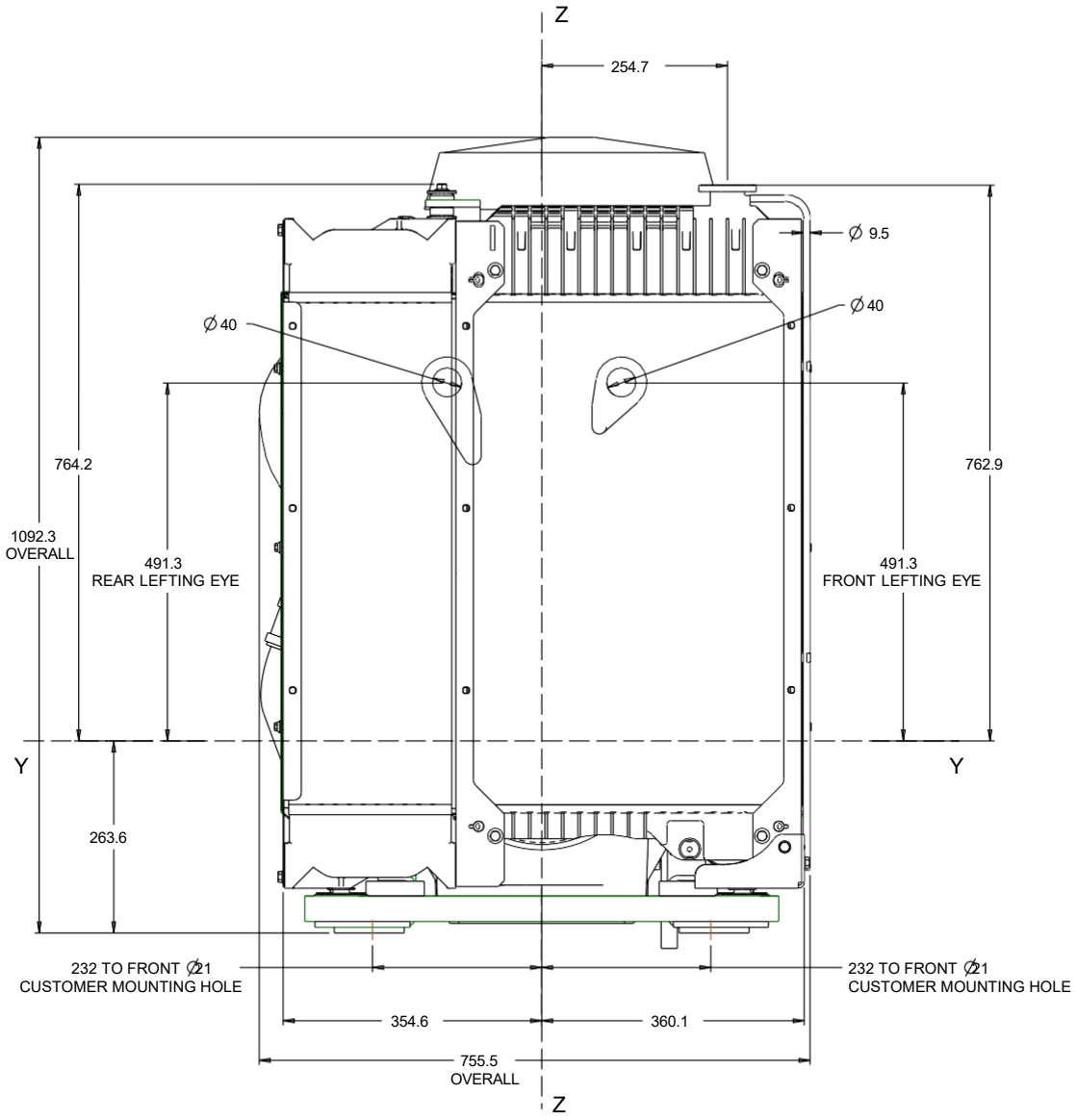
1106A-70TAG3 - Front view



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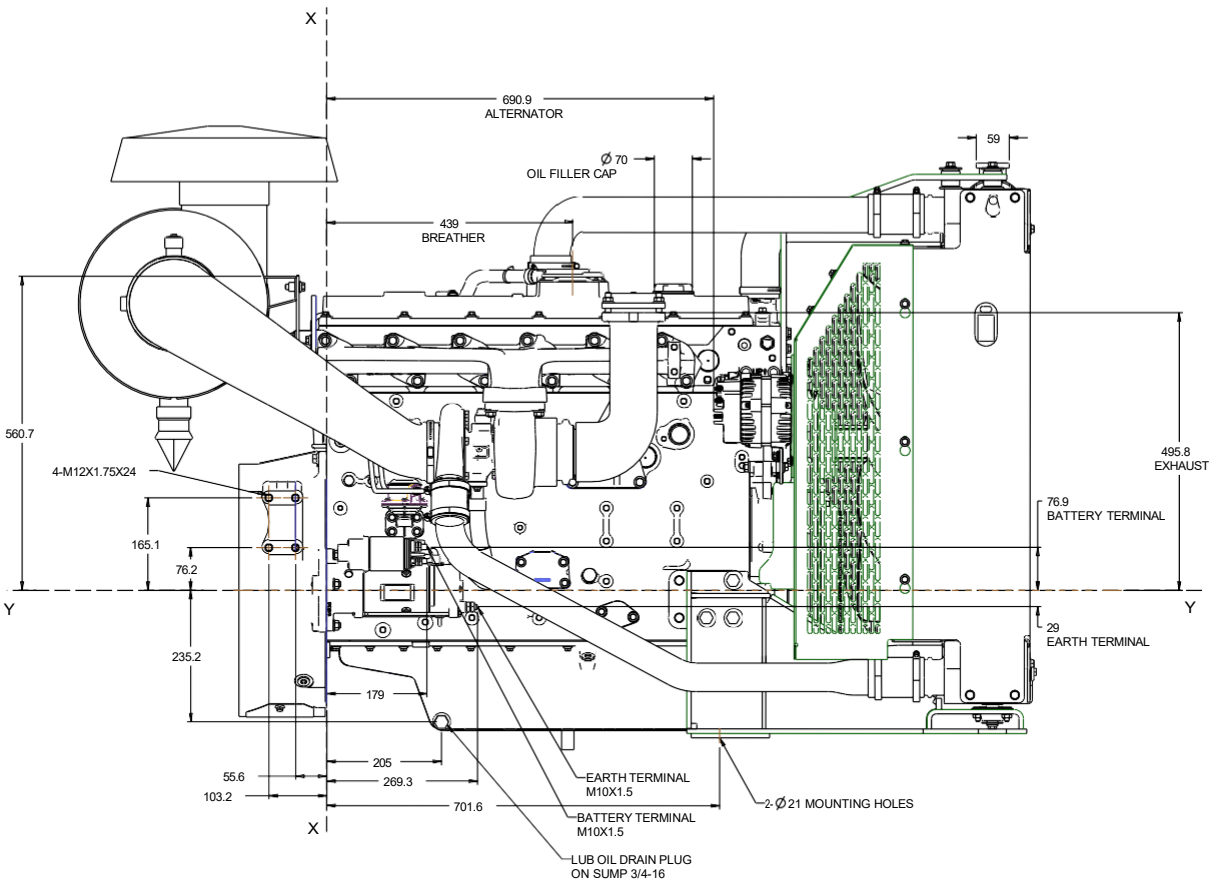
1106A-70TAG3 - Right side view



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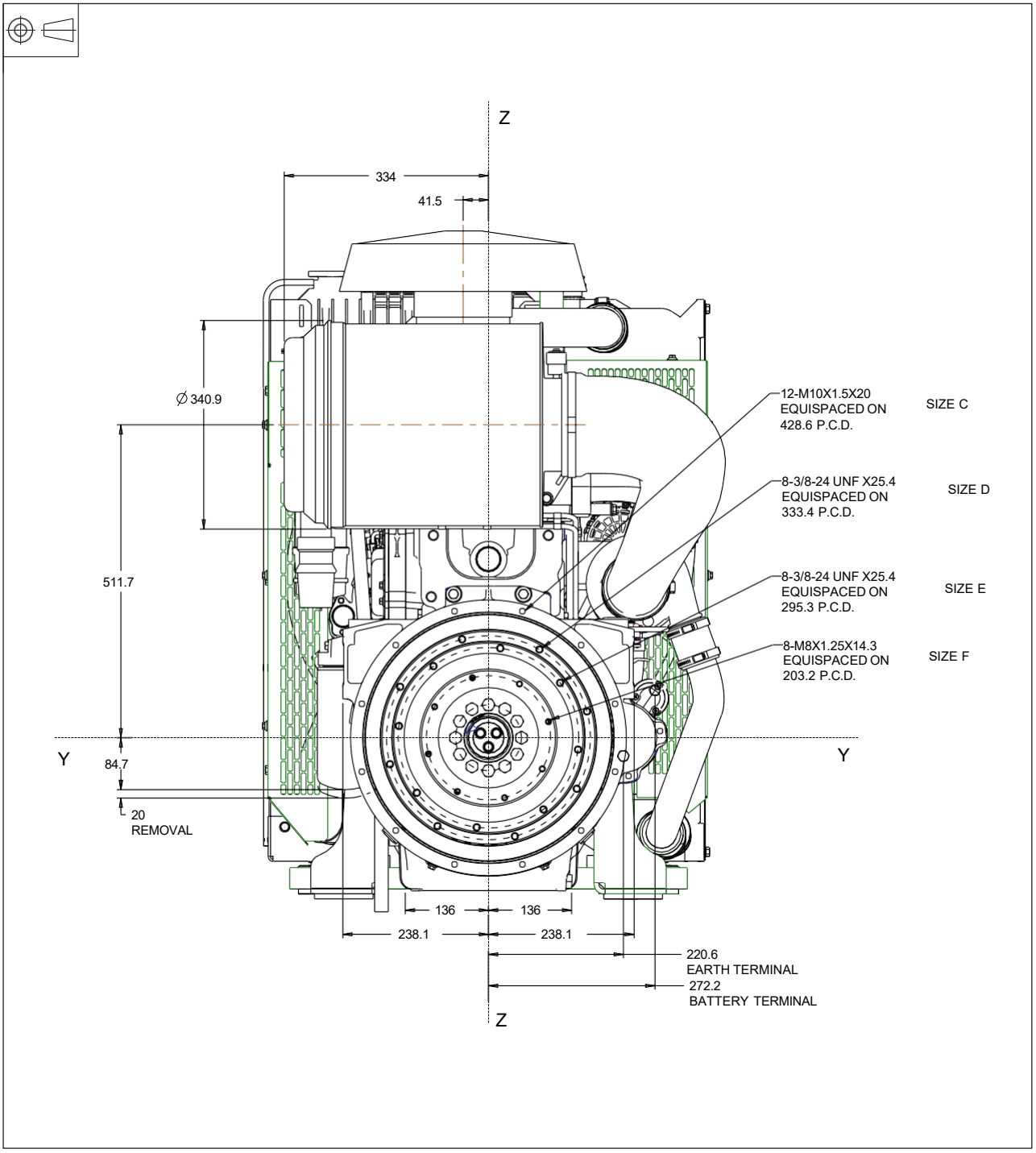
1106A-70TAG3 - Rear view



Option	Part	Size C	Size D	Size E	Size F
1	C0001 & D0004	12- M10 x 1..5 x 20 EQUISPACED ON 428..63 P..C..DIA	8- 3/8 - 24 UNF x 25..4 EQUISPACED ON 333..38 P..C..DIA	8- 3/8 - 24 UNF x 25..4 EQUISPACED ON 295..28 P..C..DIA	8- M8 x 1..25 x 14..3 EQUISPACED ON 203..2 P..C..DIA
2	C0074 & D0090	12- M10 x 1..5 x 20 EQUISPACED ON 466..725 P..C..DIA	8- M10 x 1..5 x 25..4 EQUISPACED ON 333..38 P..C..DIA		

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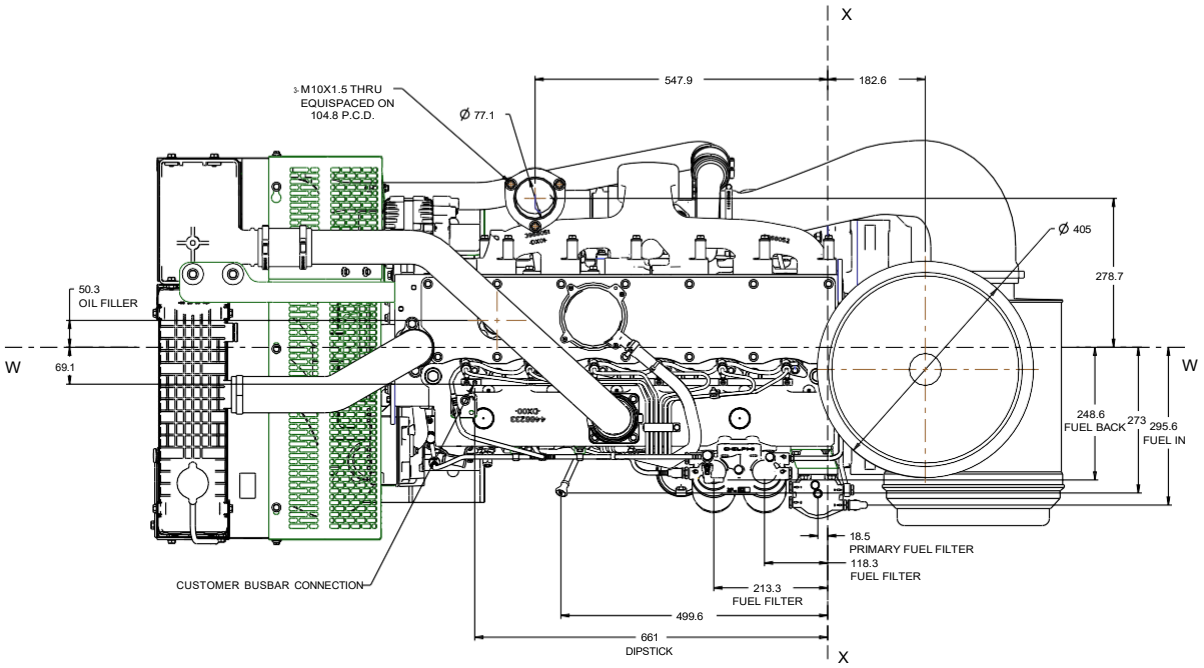
1106A-70TAG3 - Plan view



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DSEGenset®

DSE6110/20 MKII

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

DSE**6120 MKII**

DSE**6110 MKII**

KEY FEATURES

- Large back-lit text display
- Multiple display languages
- Heated display option available
- DSENet® expansion compatible
- Data logging facility
- Fully configurable via PC using USB communication
- Front panel configuration
- Efficient power save mode
- 3 phase generator sensing
- 3 phase mains (utility) sensing (DSE6120 MKII only)
- Generator/load power monitoring (kW, kV A, kV Ar, pf)
- Accumulated power monitoring (kW h, kVA h, kVAr h)
- Generator/load current monitoring and protection
- Generator overload protection (kW)
- Breaker control via fascia buttons
- Fuel and start outputs, configurable when using CAN
- 4 configurable DC outputs
- 4 configurable analogue/digital inputs
- Support for 0 to10 V & 4 to 20 mA oil pressure sensors
- 6 configurable digital inputs
- Configurable staged loading outputs
- CAN, MPU and alternator speed sensing in one variant
- 3 engine maintenance alarms
- Engine speed protection
- Engine hours counter
- Engine pre-heat
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel pump control
- Real time clock
- Battery voltage monitoring
- Start on low battery voltage
- Configurable remote start input
- 1 alternative configuration
- Comprehensive warning, electrical trip or shutdown protection upon fault condition
- LCD and LED alarm indication
- Customisable information screens
- Configurable event log (100)
- Tier 4 ECO engine support including exhaust fluids & filters
- J1939-75 instrumentation output, configurable CAN instrumentation and alarms
- Start on low battery
- Enhanced alarm functionality
- Low load alarm

KEY BENEFITS

- Automatically transfers between mains (utility) and generator (DSE6120 MKII only)
- Increased input and output expansion capability via DSENet®
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored simultaneously which are clearly displayed on a large back-lit text display via multiple languages
- The module can be configured to suit a wide range of applications
- Uses DSE Configuration Suite PC Software for simplified configuration
- Licence-free PC software
- IP65 rating (with optional gasket) offers increased resistance to water ingress

RELATED MATERIALS

TITLE	PART NO.
DSE6110/20 MKII Installation Instructions	053-173
DSE6110/20 MKII Operator Manual	057-226
DSE6110/20 MKII Configuration Suite PC Manual	057-224

SPECIFICATIONS

DC SUPPLY

CONTINUOUS VOLTAGE RATING
8 V to 35 V Continuous

CRANKING DROPOUTS
Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT
100 mA at 12 V, 105 mA at 24 V

MAXIMUM STANDBY CURRENT
60 mA at 12 V, 55 mA at 24 V

MAXIMUM SLEEP CURRENT
40 mA at 12 V, 35 mA at 24 V

GENERATOR & MAINS (UTILITY)

VOLTAGE RANGE
15 V to 415 V AC (Ph to N)
26 V to 719 V AC (Ph to Ph)

FREQUENCY RANGE
3.5 Hz to 75 Hz

INPUTS

DIGITAL INPUTS A to F
Negative switching

ANALOGUE INPUT A
Configurable as:
Negative switching digital input
0 V to 10 V
4 mA to 20 mA
0 Ω to 240 Ω

ANALOGUE INPUTS B TO D
Configurable as:
Negative switching digital input
0 Ω to 480 Ω

OUTPUTS

OUTPUT A (FUEL)
10 A short term, 5 A continuous, at supply voltage

OUTPUT B (START)
10 A short term, 5 A continuous, at supply voltage

AUXILIARY OUTPUTS C, D, E & F
2 A DC at supply voltage

DIMENSIONS

OVERALL
216 mm x 158 mm x 43 mm
8.5'' x 6.2" x 1.5"

PANEL CUT-OUT
184 mm x 137 mm
7.2'' x 5.3"

MAXIMUM PANEL THICKNESS
8 mm
0.3"

STORAGE TEMPERATURE RANGE
-40 °C to +85 °C
-40 °F to +185 °F

OPERATING TEMPERATURE RANGE

NON HEATED DISPLAY VARIANT
-30°C to +70°C
-22 °F to +158 °F

HEATED DISPLAY VARIANT
-40 °C to +70 °C
-40 °F to +158 °F

OPTIONAL PARTS

PART	PART NUMBER
IP65 Gasket	020-521

DEEP SEA ELECTRONICS PLC UK
Highfield House, Hunmanby Industrial Estate, Hunmanby YO14 0PH
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EMAIL sales@deepseausa.com **WEBSITE** www.deepseausa.com

DSEGenset®

DSE6110/20 MKII

AUTO START & AUTO MAINS FAILURE CONTROL MODULES

The DSE6110 MKII Auto Start Control Module and the DSE6120 MKII Auto Mains (Utility) Failure Control Module are suitable for a wide variety of single gen-set applications.

Monitoring engine speed, oil pressure, coolant temperature, frequency, voltage, current, power and fuel level, the modules give comprehensive engine and alternator protection. This is indicated on a large back-lit LCD text display via an array of warning, electrical trip and shutdown alarms in multiple languages.

Electronic J1939 (CAN) and non-electronic MPU and alternator sensing engine support for diesel, gas and petrol engines all in one variant. With a number of flexible inputs, outputs and protections, the modules can be easily adapted to suit a wide range of applications.

Through USB Communication both modules can be configured using the DSE Configuration Suite PC Software or through the module's front panel editor.

Using the DSE Configuration Suite PC Software the controller is easy to use and configure which allows alteration of operating parameters, sequences, timers and alarms.

AVAILABLE VARIANTS

6110-03	Auto Start with real time clock
6120-03	Auto Mains Failure with real time clock

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY
BS EN 61000-6-2
EMC Generic Immunity Standard for the Industrial Environment
BS EN 61000-6-4
EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY
BS EN 60950
Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE
BS EN 60068-2-1
Ab/Ae Cold Test -30 ºC
BS EN 60068-2-2
Bb/Be Dry Heat +70 ºC

VIBRATION
BS EN 60068-2-6
Ten sweeps in each of three major axes
5 Hz to 8 Hz at +/-7.5 mm,
8 Hz to 500 Hz at 2 GN

HUMIDITY
BS EN 60068-2-30
Db Damp Heat Cyclic 20/55 ºC at 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 ºC at 93% RH 48 Hours

SHOCK
BS EN 60068-2-27
Three shocks in each of three major axes
15 GN in 11 mS

DEGREES OF PROTECTION PROVIDED BY ENCLOSURES
BS EN 60529
IP65 - Front of module when installed into the control panel with the optional sealing gasket.

COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS