BPD60S3-P

60 KVA DIESEL GENERATOR

FEATURES & BENEFITS

- Maximum 66 kVA, 380V, 1500 RPM
- Constant voltage AVR (Automatic Voltage Regulator)
- 12 Volt Electric Starter
- 100 Litre Fuel Tank, 9 Hours @ 75% load
- Silent Version (±72dBA)
- Three cylinder, Turbocharged, Water cooled Diesel Engine
- 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:	BPD60S3-P
Prime Power (P.R.P):	60 kVA
Stand-by Power (L.T.P):	66 kVA
Amps:	100 A
Power Factor / COS:	0.8
Frequency:	50 Hz
Voltage:	380 V
Phases:	Three Phase
Engine Speed:	1500 RPM
Length:	2200 mm
Width:	900 mm
Height:	1150 mm
Weight:	968 kg's
Tank Capacity:	100 l

ADDITIONAL	
Running Time:	9 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:	14.6
Fuel Cons. @ 75% Load:	10.8
Fuel Cons. @ 50% Load:	7.6

ENGINE DATA	
Brand:	Perkins
Model:	1103A-33TG2
Type:	Three cylinder, Turbocharged, Water cooled Diesel Engine
Starting System:	12 Volt Electric Starter
Auto-Decompression:	Yes
Cubic Capacity (l):	3.3
Compression Ratio:	17.25:1
Rated Power (kW/RPM):	60.5 / 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-A42-H
Pole Number:	4
Excitation Mode:	Self Excitation

Johannesburg 011 397 7373

Pietermaritzburg 033 007 0812

Nelspruit 013 007 1753

Bloemfontein 051 001 1429

www.BunduPower.co.za

@Perkins®

Technical Data

1100 Series

1103A-33TG2

Gen Set

59.3 kWm @ 1500 rev/min
67,4 kWm @ 1800 rev/min

Basic technical data

Number of cylinders 3
Cylinder arrangement ... ... Vertical in-line
Cycle. ... ... Four stroke
Induction system ... ... Turbocharged
Compression ratio. ... ... 17.25 : 1
Bore .. .. 105 mm (4.13 in)
Stroke .. .. 127 mm (4.99 in)
Cubic capacity .. .. 3.3 litres
Direction of rotation ... ... .Clockwise view from front
Firing order 1,2,3
Total weight (engine only)
-dry ... ...420 kg
-wet ... ...438 kg

Overall dimensions

-height ... ... 951 mm (37.44 in)
-length ... ... 1049 mm (41.29 in)
-width (including mounting brackets) ... ... 634 mm (24.96 in)

Moment of inertia (mk²)

Engine:
- longitudinal. ... ... 25 kgm²
- horizontal ... ... 42 kgm²
- axial ... ... 25 kgm²

Flywheel (polar) ... ... 1.14 kgm²

Centre of gravity (wet)

- forward from rear of block ... ... 215 mm (8.46 in)
- above centre line of block ... ... 120 mm (4.72 in)
- offset of RHS of centre line. ... ... 25 mm (0.98 in)

Performance

Steady state speed stability at constant load:
- G2 ... ... ± 0.75%

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

Test conditions

Air temperature. . ... 25 °C
Barometric pressure ... ... 100 kPa
Relative humidity 30%

Sound level

Overall sound pressure level (cooling pack and air cleaner fitted):
- at 1500 rev/min ... ... 89,4 dBA
- at 1800 rev/min ... ... 92,8 dBA

Sound pressure level from the mean of 4 microphones at the front, left, right and above the engine. Exhaust was piped away out of the test cell.

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.

General installation

Designation	Units	Type of Operation and Application			
		Prime	Stand-by	Prime	Stand-by
		50 Hz	50 Hz	60 Hz	60 Hz
Gross engine power	kWm	55,0	60,5	63,3	69,6
Brake mean effective pressure	kPa (lbf/in²)	1333 (193.3)	1467 (212.7)	1279 (185.5)	1406 (203.9)
Mean piston speed	m/s (ft/s)	6,35 (20.8)	6,35 (20.8)	7,62 (25)	7,62 (25)
ElectropaK net engine power	kWm	53,8	59,3	61,2	67,5
Engine coolant flow 35 kPa restriction	l/min (UK gal/min)	125,5 (27.6)	125,5 (27.6)	151,0 (33.2)	151,0 (33.2)
Combustion air flow	m³/min (ft³/min)	3,8 (134.1)	3,9 (137.7)	4,7 (1659)	4,9 (173.0)
Exhaust gas flow (max)	m³/min (ft³/min)	10,1 (356.6)	10,4 (367.2)	11,8 (416.7)	12,5 (441.4)
Exhaust gas temperature (max) in manifold	°C (°F)	557 (1034.6)	571 (1059.8)	534 (993.2)	564 (1047.2)
Cooling fan air flow	m³/min (ft³/min)	89,0 (3143.0)	89,0 (3143.0)	111,0 (3919.9)	111,0 (3919.9)
Overall thermal efficiency	%	39,2	39,0	37,9	38,7
Typical genset electrical unit (0.8 pf 25° C	kWe	48,0	52,8	54,5	60,1
	kVA	60,0	66,0	68,1	75,1
Assumed alternator effiency	%	89%			
Energy balance					
Power in fuel (Fuel heat of combustion)	kW (Btu/min)	140,0 (7968.7)	155,0 (8822.5)	167,0 (9509.5)	177 (10074.7)
Power output (gross)	kW (Btu/min)	55,0 (3130.5)	60,5 (3443.6)	63,3 (3603.0)	68,5 (3898.9)
Power to cooling fan	kW (Btu/min)	1,2 (68.3)	1,2 (68.3)	2,1 (119.5)	2,1 (119.5)
Power output (net)	kW (Btu/min)	53,8 (3062.2)	59,3 (3375.3)	61,2 (3483.4)	66,4 (3779.4)
Power to coolant and lubricating oil	kW (Btu/min)	35,0 (1992.1)	38,0 (2162.9)	41,0 (2333.7)	43,0 (2447.5)
Power to exhaust	kW (Btu/min)	41,0 (2333.7)	46,0 (2618.3)	52,0 (2959.8)	54,0 (3073.6)
Power to radiation	kW (Btu/min)	10,0 (569.1)	11,0 (626.1)	11,0 (626.1)	11,0 (626.1)

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 (127 °F) or 46 °C (114.8 °F) 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.*

Cooling system

Radiator

- face area ... 0.276 m² (2.97 ft²)
- rows and materials ... single row aluminium
- matrix density and material ... Aluminium 12,5 fins/inch
- width of matrix ... 526 mm (20.7 in)
- height of matrix ... 524 mm (20.6 in)
- pressure cap setting ... 107 kPa

Fan

- diameter ... 457mm (18 in)
- drive ratio ... 1.25 : 1
- number of blades ... 7
- material ... Composite
- type ... Pusher

Coolant

Total system capacity
- with radiator ... 10.2 l (21.5 pt)
- without radiator ... 4.4 l (9.2 pt)

Maximum top tank temperature ... 110 °C (230 °F)
Thermostat operating range ... 82 - 93 °C (180 - 199 °F)
Recommended coolant: 50 % ethylene glycol with a corrosion inhibitor (BS 658 : 1992 or MOD AL39) and 50% clean fresh water.

Electrical system

Type ... Negative ground
Alternator voltage ... 12 V
Alternator output ... 65 amps
Starter motor voltage ... 12 V
Starter motor power ... 3 kW
Number of teeth on flywheel ... 126
Pull in current of starter motor solenoid ... 60 amps
Hold in current of starter motor solenoid ... 15 amps
Engine stop solenoid ... 12 V
Stop solenoid (minimum)
- pull in current ... 10 amps
- hold in current ... 10 amps

Cold start recommendations

Minimum cranking speed ... 105 rev/min

Starter specification

Starter motor type	Minimum starting temperature	Lubricating oil viscosity SAE / battery type - values in CCA			
	°C (°F)	15W/40	10W/40	5W/40	5W/30
12 volt 3.0 kW	-10 (14)	1 x 660			
	-15 (5) *		1 x 660		
	-20 (-4) *			1 x 660	
	-25 (-13) *				2 x 570

* - Glow plug start aid fitted.

CAA - Cold Cracking Amps to SAEJ537.

Notes:

- Battery capacity is defined by the 20 hour rate
- If a change to a low viscosity oil is made, the cranking torque necessary at lower ambient temperatures is much reduced. The starting equipment has been selected to take advantage of this. It is important to change the appropriate multigrade oil in anticipation of operating in low ambient temperatures.
- Breakaway current is dependent on battery capacity available. Cables should be capable of handling the transient current which may be up to double the steady cranking current.

Exhaust system

Maximum back pressure
- 1500 rev/min ... 10 kPa
- 1800 rev/min ... 15 kPa

Exhaust outlet size ... 56 mm (2.2 in)

Fuel System

Type of injection ... Direct
Fuel injection pump ... Rotary
Fuel atomiser ... Multi-hole
Nozzel opening pressure ... 29,0 MPa (290 bar)

Fuel lift pump

Type ... Electrical
-flow/hour ... 120 - 150 l/h (211 - 264 pt/m)
-pressure ... 30 - 75 kPa (4.4 - 10.9 psi)
Maximum suction head:
- 1500 rev/min ... 20 kPa

Governor type

Electronic governor ... Woodward LCS2
Mechnical and electronic governor speed control to .. ISO 8528, G2

Fuel specification

Fuel Specification	European RF75-T-96 / DIN EN590 / BS2869 class A2
Density (kg/l @ 15 °C	0,835 - 0,845
Viscosity (mm²/s @ 40 °C	2,5 - 3,5
Sulphur content (%)	0,1 - 0,2
Cetane number	45 - 50

Fuel consumption litres/hour (UK gals/hr)

	Power rating				
Speed	**110%**	**100%**	**75%**	**50%**	**25%**
1500	15,4 (3.3)	13,9 (3.0)	10,4 (2.2)	7,2 (1.5)	4,1 (0.9)
1800	18,2 (4.0)	16,6 (3.6)	12,5 (2.7)	8,8 (1.9)	5,1 (1.1)

Induction system

Maximum air intake restriction

-clean filter ... 5 kPa
- dirty filter ... 8 kPa
- air filter type ... Dry

Lubrication system

Lubricating oil capacity

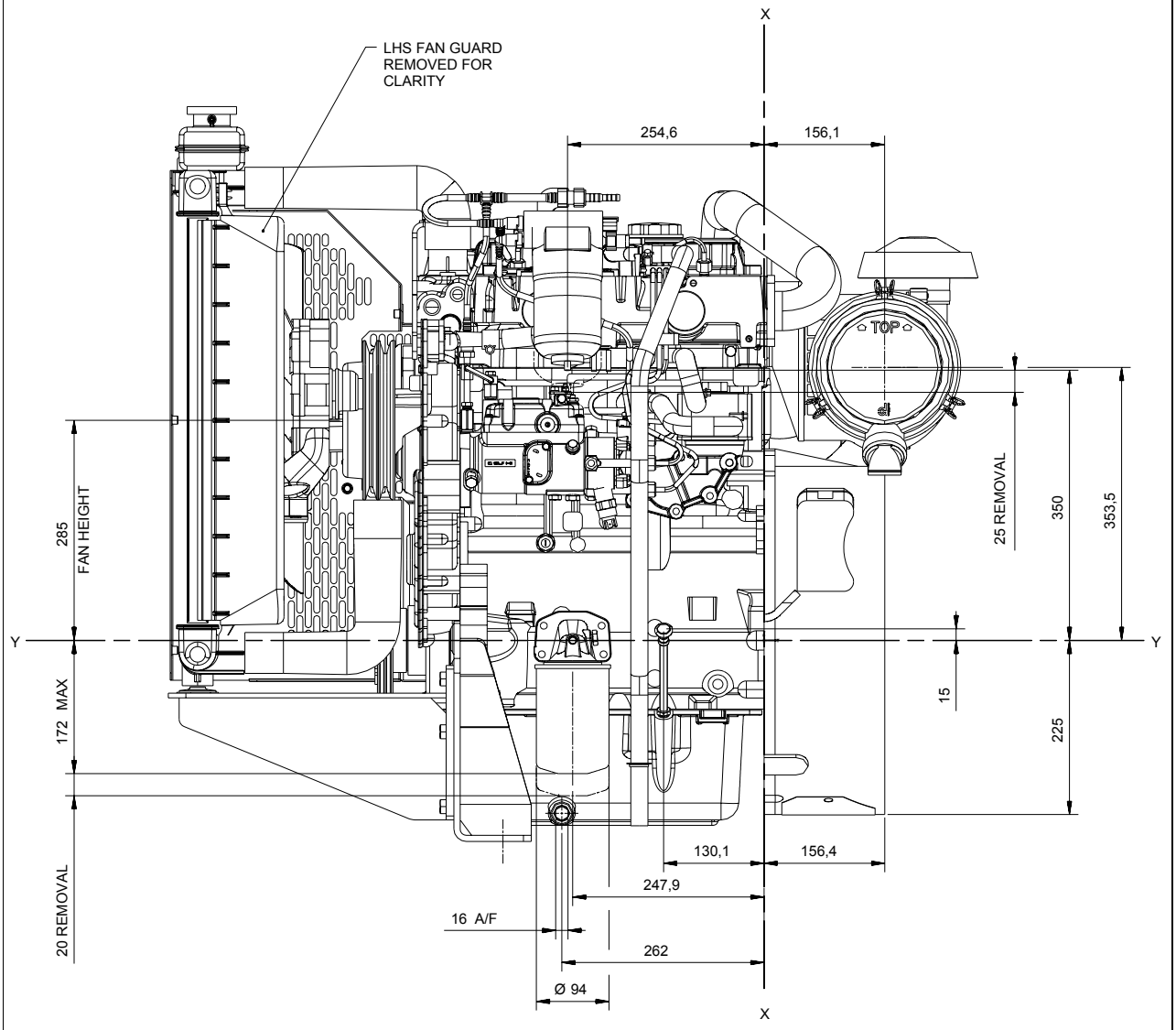
Total system ... 8,3 l (17.5 pt)
Sump minimum ... 6,2 l (13.1 pt)
Sump maximum ... 7.8 l (16.4 pt)
Maximum engein operating angles:
- front up, front down, right side or left side ... 25°

Lubricating oil pressure

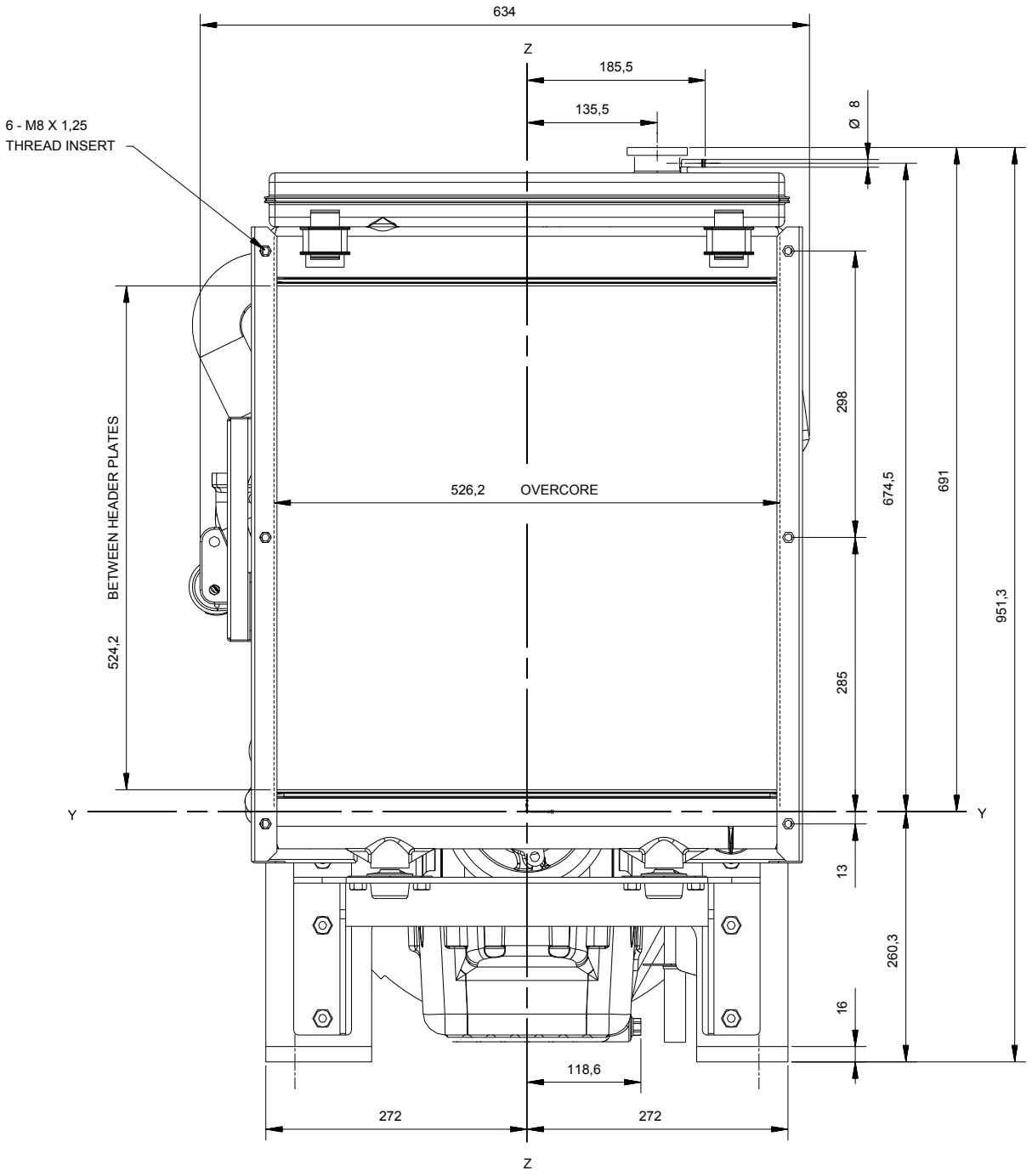
- relief valve opens ... 415 - 470 kPa
- at maximum no-load speed ... 276 - 414 kPa

Max continuous oil temperature (in rail) ... 125 °C (257 °F)
Oil consumption at full load as a % of fuel consumption ... 0.15%

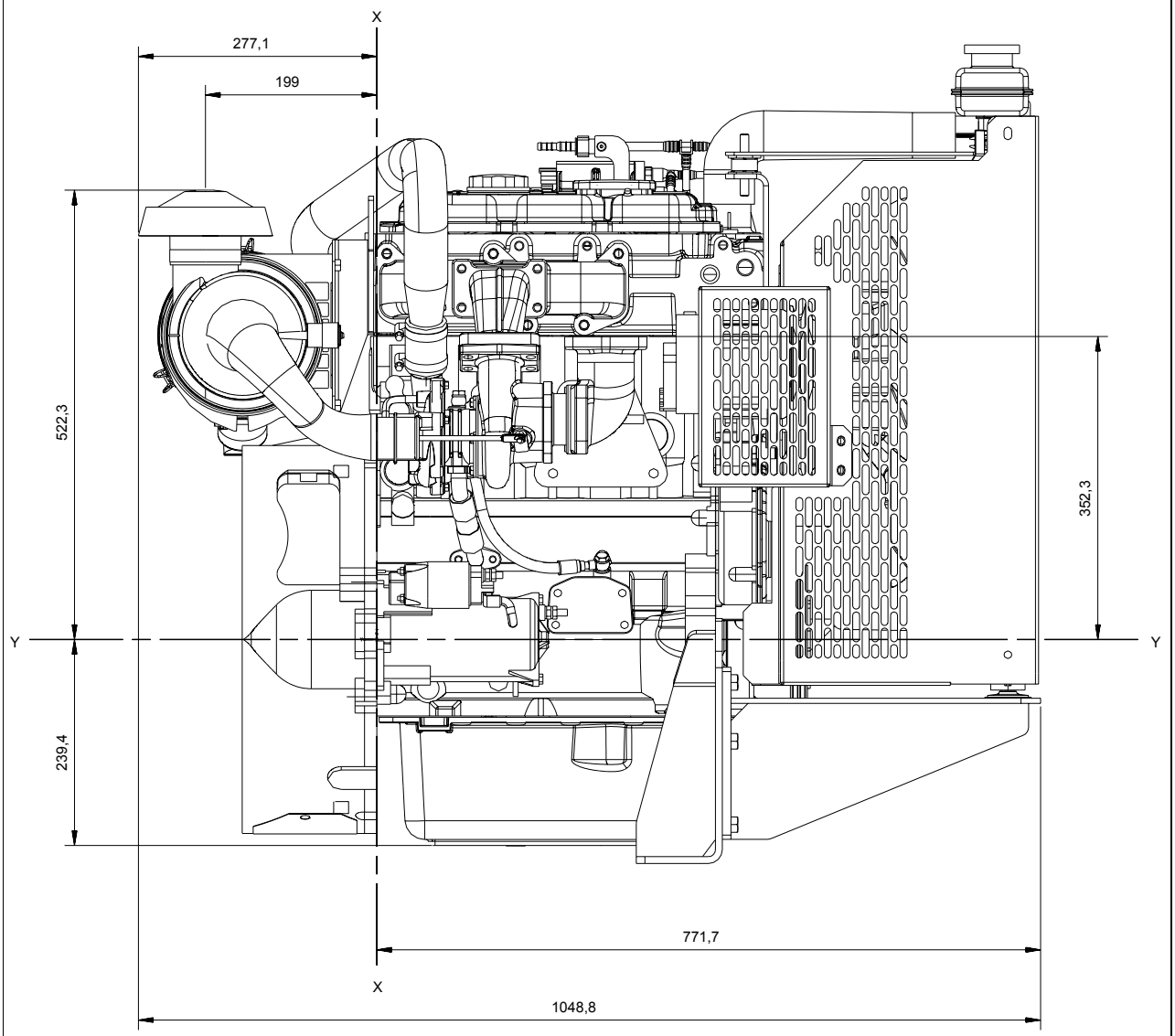
1103A-33TG2 ElectropaK - left view



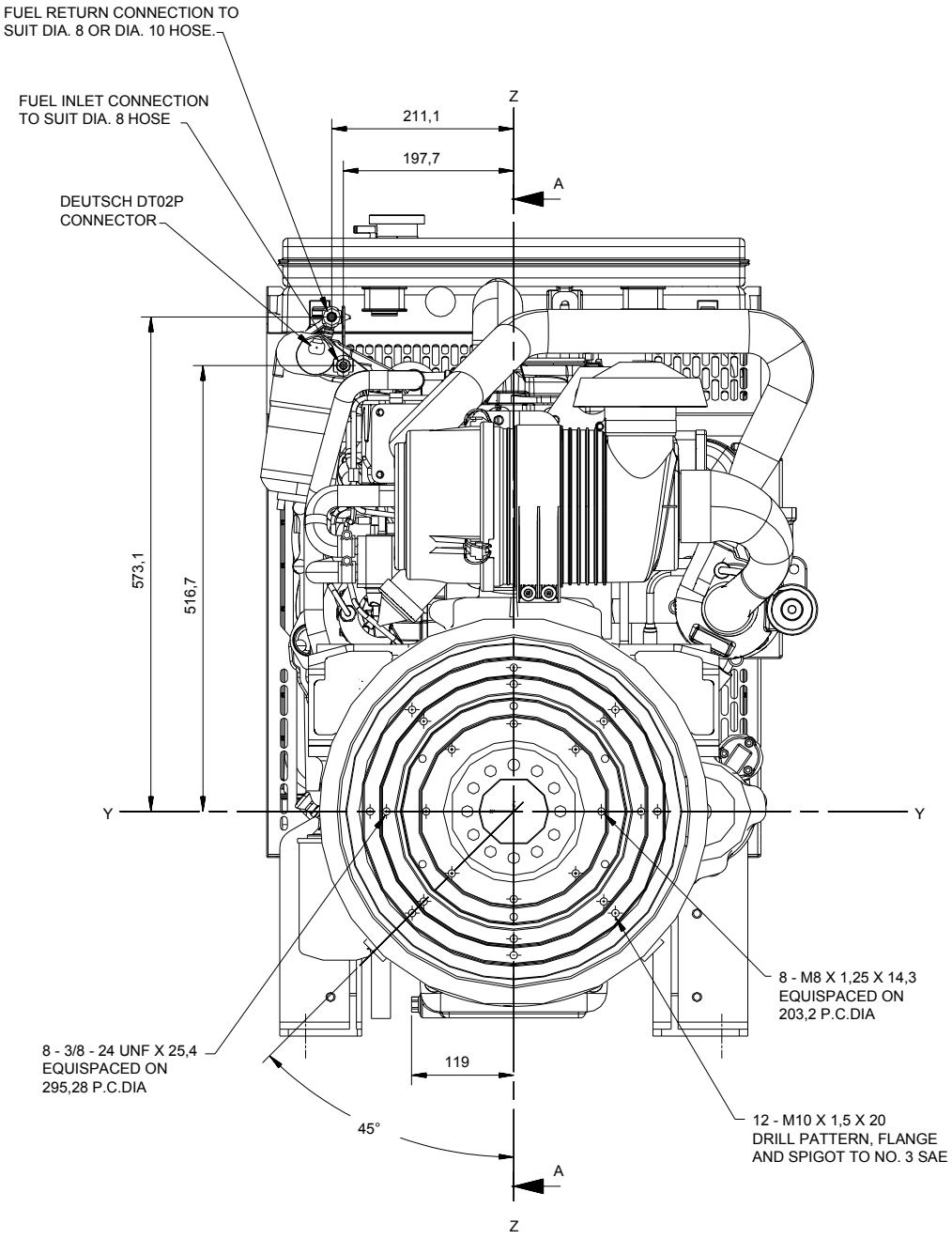
1103A-33TG2 ElectropaK - front view



1103A-33TG2 ElectropaK - right view

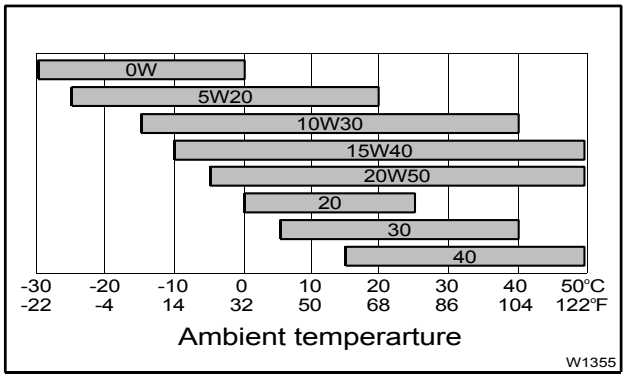


1103A-33TG2 ElectropaK - rear view



Recommended SAE viscosity

A single or multigrade oil must be used which conforms to APi-CG4 / CH4, see illustration below:



Mountings

Maximum static bending moment
at rear face of block ... ... 791 Nm (583 lb/ft)

Load Acceptance

Intital load appliaction when engine reaches rated speed (15 seconds max after engine starts to crank)			
	Units	**1500 rev/ min**	**1800 rev/ min**
Prime Power	%	85	95
Load	kWm (kWe)	46,8 (40.7)	60,1 (51.7)
Transient frequency deviation	%	<-10	<-10
Frequency recovery	seconds	<1	<1

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

Engine block temperature .. .. 15 °C
Alternator efficiency 89%
Minimum ambient temperature .. .. 15 °C
Isochronous governing:
- typical alternator inertia ... ... 0.496 kgm²

All tests were conducted using an engine installed and services to Perkins Engines Company Limitied recommendations

The information given in this document is for guidance only.

Publication No. TPD1490E, issue 1. Printed in England. ©Perkins Engines Company Limited.

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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
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055-191/04/17 (3)

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 °C
BS EN 60068-2-2
Bb/Be Dry Heat +70 °C

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 °C at 95% RH 48 Hours
BS EN 60068-2-78
Cab Damp Heat Static 40 °C 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