ALPHA SERIES

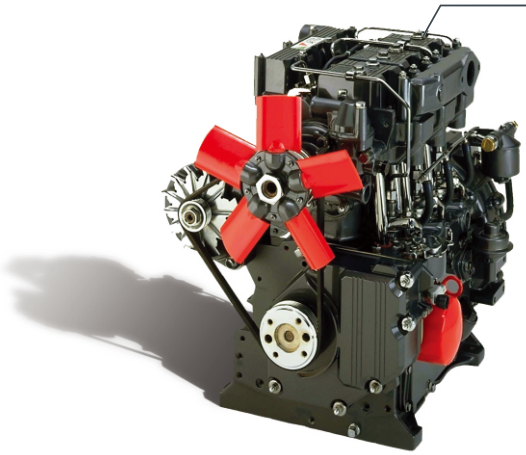
LPW Liquid Cooled Engines

LPW2 | LPW3 | LPW4 | LPWT4

fixed speed | full-load speed range
1500 - 3600 r/min
variable speed | full-load speed range
1500 - 3000 r/min

6.8 - 37.5 kW | 9.1 - 50.3 bhp [1]

LPW4 Engine



- direct fuel injection
- 2, 3 or 4 cylinders
- liquid cooled
- naturally aspirated or turbocharged (LPWT4)

OVERVIEW

The Alpha engine is specifically designed as an Industrial/Pump spec engine suitable for use in unregulated emissions territories. It is durable, reliable and easy to maintain with oil & filter changes up to 500 hours, dependant on operational conditions. It is designed for continuous operation in ambient temperatures up to 52°C (122°F) and a cold start capability down to -32°C (-25.6°F).

Note:
This engine does not comply with Harmonised International Regulated Emissions Limits.

BASIC ENGINE CHARACTERISTICS

- diesel fuelled and approved for operation on biodiesel, that conforms with ASTM D6751 and EN14214, concentrations of up to 20%

* Optional items

DESIGN FEATURES AND EQUIPMENT

- inlet and exhaust manifolds *
- heavy duty air cleaner *
- fuel lift pump
- mechanical governing
- self-vent fuel system with individual
- fuel injection pumps
- fuel filter/agglomerator
- thermostatically controlled cooling system with belt driven coolant pump
- radiator with fan and belt guard *
- gear driven positive displacement type
- lubricating oil pump
- spin on full flow lubricating oil filter
- flywheel with ring gear *
- SAE 5 flywheel housing *
- 12V starter motor *
- 12V battery charge alternator *
- oil pressure and coolant temperature switches *
- fuel control solenoid (energised to run) *
- skid base packing
- operators handbook (English) *

OPTIONAL ITEMS

- radiator options with choice of pusher or puller fan and full guarding
- increased oil sump capacity (deep sump)

VARIABLE SPEED | POWER OUTPUTS TO ISO3046

Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPW2	1500	Continuous	6.8	9.1	6.65	8.91
		Fuel stop	7.5	10.0	7.35	9.85
	1800	Continuous	8.5	11.4	8.27	11.09
		Fuel stop	9.4	12.6	9.17	12.29
	2000	Continuous	9.6	12.9	9.30	12.47
		Fuel stop	10.6	14.2	10.30	13.81
	2500	Continuous	11.8	15.8	11.20	15.01
		Fuel stop	13.0	17.4	12.40	16.62
	3000	Continuous	13.4	18.0	12.20	16.36
		Fuel stop	14.7	19.7	13.50	18.10
Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPW3	1500	Continuous	10.3	13.8	10.15	13.61
		Fuel stop	11.8	15.8	11.65	15.62
	1800	Continuous	12.8	17.2	12.57	16.85
		Fuel stop	14.1	18.9	13.87	18.59
	2000	Continuous	14.5	19.4	14.20	19.04
		Fuel stop	15.9	21.3	15.60	20.91
	2500	Continuous	17.7	23.7	17.10	22.93
		Fuel stop	19.5	26.1	18.90	25.34
	3000	Continuous	20.1	27.0	18.90	25.34
		Fuel stop	22.1	29.6	20.90	28.02
Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPW4	1500	Continuous	13.6	18.2	13.45	18.03
		Fuel stop	15.0	20.1	14.85	19.91
	1800	Continuous	17.0	22.7	16.77	22.48
		Fuel stop	18.7	25.1	18.47	24.76
	2000	Continuous	19.3	25.9	19.00	25.47
		Fuel stop	21.2	28.4	20.90	28.02
	2500	Continuous	23.6	31.6	23.00	30.84
		Fuel stop	26.0	34.8	25.40	34.06
	3000	Continuous	26.8	35.9	25.60	34.33
		Fuel stop	29.5	39.5	28.30	37.95
Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPWT4	1500	Continuous	18.9	25.3	18.75	25.14
		Fuel stop	20.9	28.1	20.75	27.82
	1800	Continuous	24.2	32.4	23.97	32.14
		Fuel stop	26.9	36.0	26.67	35.76
	2000	Continuous	26.3	35.2	26.00	34.86
		Fuel stop	29.2	39.1	28.90	38.75
	2500	Continuous	31.0	41.5	30.40	40.76
		Fuel stop	34.4	46.4	33.80	45.32
	3000	Continuous	33.7	45.2	32.50	43.58
		Fuel stop	37.5	50.3	36.30	48.68

RATING DEFINITIONS TO ISO 3046

ISO Standard Conditions

Barometric pressure 100 kPa
Relative humidity 30%
Ambient air temperature at the inlet manifold 25°C

Fixed Speed: Continuous Power (ICN)

The power in kW which the engine is capable of delivering continuously at the stated crankshaft speed, under ISO 3046 standard conditions, measured at the flywheel without power-absorbing accessories, provided that the engine is overhauled and maintained in good operating condition and that fuel to BS EN 590 Class A1 or A2, and lubricating oils to the correct performance specification and viscosity classification as recommended by Lister Petter Limited are used.

Fixed Speed (Fuel Stop): Overload Power (ICXN)

The maximum power in kW which the engine is capable of delivering intermittently at the stated crankshaft speed for a period not exceeding one hour in any period of twelve hours of continuous running, immediately after working at the continuous power, under ISO 3046 standard conditions and with the provisions specified for continuous power in item (1) above, but with the fuel limited so that the fuel stop power cannot be exceeded.

Variable Speed (Fuel Stop): Continuous Power (IFN)

The maximum power in kW which the engine is capable of delivering continuously at the stated crankshaft speed, under ISO 3046 standard conditions, and with the provisions specifi ed in item (1) above, but with the fuel limited so that the fuel stop power cannot be exceeded.

Variable Speed (Fuel Stop): Overload Power (IOFN)

The maximum power in kW which the engine is capable of delivering intermittently at the stated crankshaft speed for a period not exceeding one hour in any period of twelve hours of continuous running, immediately after working at the continuous power, under ISO 3046 standard conditions and with the provisions specified for continuous power in item (3) above, but with the fuel limited so that the fuel stop power cannot be exceeded.

Derating

For non-standard site conditions, reference should be made to relevant BS, ISO & DIN standards.

FIXED SPEED | POWER OUTPUTS TO ISO3046

Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPW2	1500	Continuous	7.5	10.1	7.16	9.60
		Fuel stop	8.2	11.0	7.86	10.54
	1800	Continuous	9.3	12.5	8.68	11.64
		Fuel stop	10.2	13.7	9.58	12.84
	3000	Continuous	13.4	18.0	12.20	16.36
		Fuel stop	14.7	19.7	13.50	18.10
	3600	Continuous	12.7	17.0	10.60	14.20
		Fuel stop	14.0	18.8	11.90	15.95
Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPW3	1500	Continuous	11.3	15.2	10.96	14.69
		Fuel stop	12.4	16.6	12.06	16.17
	1800	Continuous	13.9	18.6	13.58	18.21
		Fuel stop	15.3	20.5	14.68	19.68
	3000	Continuous	20.1	26.9	18.90	25.34
		Fuel stop	22.1	29.6	20.90	28.02
	3600	Continuous	19.1	25.6	17.00	22.80
		Fuel stop	21.0	28.1	18.90	25.34
Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPW4	1500	Continuous	15.0	20.1	14.66	19.66
		Fuel stop	16.5	22.1	16.16	21.67
	1800	Continuous	18.6	24.9	17.98	24.11
		Fuel stop	20.3	27.2	19.68	26.39
	3000	Continuous	26.8	35.9	25.60	34.33
		Fuel stop	29.5	39.5	28.30	37.95
	3600	Continuous	25.4	34.1	23.35	31.31
		Fuel stop	28.0	37.5	25.90	34.73
Model	Speed, r/min	Power	Gross		Net	
			kWm	bhp	kWm	bhp
LPWT4	1500	Continuous	18.9	25.3	18.56	24.89
		Fuel stop	20.9	28.1	20.56	27.57
	1800	Continuous	24.2	32.4	23.58	31.60
		Fuel stop	26.9	36.0	26.28	35.20
	3000	Continuous	33.7	45.2	32.50	44.00
		Fuel stop	37.5	50.3	36.30	48.60
	3600	Continuous	N/A	N/A	N/A	N/A
		Fuel stop	N/A	N/A	N/A	N/A

Notes:

1. Power ratings measured at the flywheel and fuel consumptions apply to a fully run-in, non derated engine without a radiator and fan fitted, and without power absorbing accessories or transmission equipment.
2. The overload capability applies to a fully run-in engine. This is normally attained after a running period of about 50 hours.
3. Excluding radiator.

Note:

Engines operating at 3600rpm are offered for standby duty only. For further information and approval please contact Applications Department.

VARIABLE SPEED | TORQUE

Model	Power		1500	1800	2000	2500	3000
LPW2	Intermittent Fuel Stop	Nm	47.7	49.4	50.6	49.7	46.8
		lbf ft	35.2	36.4	37.3	36.7	34.5
LPW3		Nm	71.9	74.9	75.9	74.5	70.4
		lbf ft	53.0	55.2	56.0	54.9	51.9
LPW4		Nm	95.5	99.2	101.9	99.3	93.9
		lbf ft	70.4	73.2	75.1	73.2	69.3
LPWT4		Nm	142.0	151.2	148.0	140.2	128.0
		lbf ft	104.7	111.5	109.1	103.4	94.4

TECHNICAL DATA

Model		LPW2	LPW3	LPW4	LPWT4
Type of fuel injection		Direct	Direct	Direct	Direct
Number of cylinders		2	3	4	4
Aspiration		Natural	Natural	Natural	Turbo-charged
Direction of rotation (flywheel end)		Anti clockwise	Anti clockwise	Anti clockwise	Anti clockwise
Nominal cylinder bore	mm	86.0	86.0	86.0	86.0
	in	3.39	3.39	3.39	3.39
Stroke	mm	80.0	80.0	80.0	80.0
	in	3.15	3.15	3.15	3.15
Total cylinder capacity	litre	0.930	1.395	1.860	1.860
	in^3	56.75	85.13	113.5	113.5
Compression ratio		18.5:1	18.5:1	18.5:1	16.2:1
Firing order (number 1 cylinder is at the gear end)		1 - 2	1 - 2 - 3	1 - 3 - 4 - 2	1 - 3 - 4 - 2
Minimum idling speed		Dependent on build			
Minimum full load speed	r/min	1500	1500	1500	1500
Number of flywheel ring gear teeth		96	96	96	96
Gear end power take-off (subject to Lister Petter Power Systems approval) - maximum inline	kw	12	12	12	12
	bhp	16	16	16	16
- maximum side load using a drive belt	kw	8.0	8.0	8.0	8.0
	bhp	10.7	10.7	10.7	10.7
Maximum continuous crankshaft end thrust	kgf	180	180	180	180
	lbf	400	400	400	400
Maximum permissible intake restriction at full rated speed and load	mbar	25	25	25	25
	in H_2O	10	10	10	10
Maximum permissible exhaust back pressure	mbar	75	75	75	50
	in H_2O	30	30	30	20
Lubricating oil pressure at 3000r/min and with the oil at 110°C (230°F)	bar	2.0	2.0	2.0	2.0
	lbf/in^2	29	29	29	29
Lubricating oil pressure at idle	bar	1.0	1.0	1.0	1.0
	lbf/in^2	14.5	14.5	14.5	14.5

ENGINE EXHAUST SYSTEM DETAIL

Parameter	Engine Model			
	LPW2	LPW3	LPW4	LPWT4
Maximum allowed back pressure (kPa)	7.5			
Bosch smoke level at rated output	5.5			
Exhaust gas temperature, continuous (°C)	520	520	520	480
Exhaust gas temperature, overload (°C)	550	550	550	520
Exhaust pipe diameter - recommended O/D	48			

ENGINE NOISE LEVELS

Parameter	Engine Model			
	LPW2	LPW3	LPW4	LPWT4
Sound pressure level at 1m	≤ 92.9	≤ 92.3	≤ 95.2	≤ 88.0

ENGINE LUBRICATING OIL SYSTEM DETAIL

Parameter	Engine Model			
	LPW2	LPW3	LPW4	LPWT4
Lubrication method	Pressure			
Sump capacity (L)	3.0	3.8	5.5	
Total capacity (L)	3.5	4.8	6.5	
Oil filter type	Full flow paper element			
Oil consumption (g/kW h)	≤ 0.25			
Lubrication oil temperature (°C)	110 (max. 125)			
Lubrication oil pressure at running conditions (kPa)	100-450			
Oil pump type	Gear type			
Oil cooler type (where fitted)	Oil to water			
Maximum operation angle (degrees)	Front/rear - 30; Fuel pump up/down - 30			

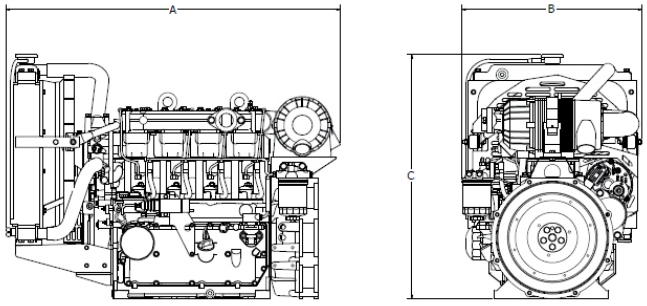
ENGINE COOLANT DETAIL

Parameter	Engine Model			
	LPW2	LPW3	LPW4	LPWT4
Cooling method	Liquid cooled circulation by belt driven water pump			
Cooling package operating temperatures (°C)	88			
Total system coolant capacity (L)	5.6	7.0	7.5	
Thermostat type	Wax capsule			
Thermostat opens at... (°C)	86			
Thermostat fully open at…(°C)	99			
Minimum temperature to engine (°C)	74			
Maximum static pressure head at pump (metres at 1500rpm)	4			

VARIABLE SPEED | APPROXIMATE FUEL CONSUMPTION | 100% LOAD

Speed, r/min	LPW2		LPW3		LPW4		LPWT4	
	g/kWh	l/h	g/kWh	l/h	g/kWh	l/h	g/kWh	l/h
1500	224.0	2.0	261.0	3.2	253.2	4.1	208.9	3.7
1800	247.1	2.5	242.8	3.7	237.2	4.8	211.7	6.1
2000	218.8	2.5	220.1	3.8	217.6	5.0	226.8	7.1
2500	227.8	3.2	223.1	4.7	224.2	6.3	238.5	8.8
3000	244.5	3.9	246.6	5.9	244.5	7.8	264.2	10.6

APPROXIMATE DIMENSIONS AND WEIGHT



		LPW2	LPW3	LPW4	LPWT4
Dry weight	kg	112	150	180	186
	lb	247	330	396	409
Length (A)	mm	699	809	909	999
	in	27.5	31.9	35.8	39.3
Width (B)	mm	512	512	512	512
	in	20.2	20.2	20.2	20.2
Height (C)	mm	647	685	685	685
	in	25.5	27.0	27.0	27.0

TYPICAL PACKING CASE DIMENSIONS

	Packing case dimensions				Container quantities	
Engine	Length (mm)	Width (mm)	Height (mm)	Gross weight (kg)	20ft	40ft
LPW2	770	550	850	175	56	120
LPW3	880			205	48	104
LPW4	1020			240	40	88
LPWT4	1020	670		255	30	66

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