

13L



ENERGY

[Stoich Turbocharged]

56100046

Rev: 3

General Engine Data ⁵											
Type	Inline 4-cycle				Flywheel housing		SAE No. 1				
Number of cylinders	6				Flywheel		SAE No. 14				
Aspiration	Charged Cooled Forced Induction				Dry Weight (Fan to Flywheel)		lb	kg	2313	1050	
Firing Order	1 - 5 - 3 - 6 - 2 - 4				Wet Weight (Fan to Flywheel)		lb	kg	2423	1100	
Rotation Viewed from Flywheel	Counter Clockwise				CG From Flywheel Housing Rear Face		in	mm	17.8	451	
Bore	in	mm	5.0	127.0	CG Above Crank Centerline		in	mm	6.4	162	
Stroke	in	mm	6.5	165.1	Max Bending Moment @ Rear of Block		lbf-ft	N-m	8238	11170	
Displacement	in ³	L	764.9	12.54	Moment of Inertia About Roll Axis		lb-ft ²	kg-m ²	1066	45	
Compression Ratio	9.75 : 1				Oil Specification		SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher				
Exhaust Manifold Type	Water Cooled										
Turbo Exhaust Outlet Pipe Size	in	mm	3.15 -3.37	80.0 - 85.6	Engine Oil Capacity ⁸	Min	qts	L	28.0	26.5	
Catalyst Inlet Size	in	mm	3.5	90		Max	qts	L	31.7	30.0	
Catalyst Dp	in-H ₂ O	kPa	29.9	7.45	ECU Low Oil Pressure Warning ⁶		psi	bar	30	2.1	
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	15	ECU Low Oil Pressure Shutdown ⁶		psi	bar	25	1.7	
Maximum Fuel System Pressure	psi	kPag	1.0	6.9	Oil Pressure Operating Range	Idle	psi	bar	19 - 36	1.3 - 2.5	
Maximum Operating pressure to EPR	in-H ₂ O	kPa	10.8	2.7		Rated	psi	bar	51 - 80	3.5 - 5.5	
Minimum Operating pressure to EPR	in-H ₂ O	kPa	6.8	1.7	Max Allowable Oil Temperature		°F	°C	221	205	
Minimum Gas Supply Pipe Size ⁵	1-1/4" NPT				Coolant Capacity (Engine only)		gal	L	5.8	22	
Maximum Pressure Drop Across CAC	psi	kPa	1.7	12.0	Coolant Capacity (Radiator only)		gal	L	14.3	54	
Maximum Allowable Intake Restriction	Clean Air Filter	in-H ₂ O	kPa	12.0	3.0	Radiator Weight (Dry)		lb	kg	705	320
	Dirty Air Filter	in-H ₂ O	kPa	24.9	6.2	Thermostat Operating		Cracking	°F	°C	169
Spark Plug Part Number	Bosch R66857				Temperature Range ⁹		Full Open	°F	°C	190	88
Standard Spark Plug Gap ¹⁰	in	mm	0.020	0.5	ECU Coolant Temp Warning		°F	°C	220	103	
Spark Plug Coil - Primary Resistance	Ohms		0.59Ω ± 10%		ECU Coolant Temp Shutdown		°F	°C	230	110	
Battery Voltage	Volts		24		Max External Coolant Friction Head		psi	kPa	7.3	50	
Starter Motor Power	HP	kW	7.4	5.5	CAC Rise Above Ambient Specified		°F	°C	37.8	21	
Performance Data 60Hz ^{3,5}					Performance Data 50Hz ^{3,5}						
Nominal Engine Speed	RPM		1800		Nominal Engine Speed	RPM		1500			
Mean Piston Speed	ft/min	m/s	1949	9.9	Mean Piston Speed	ft/min	m/s	1624	8		
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1778 - 1823		RPM Range (Min-Max) ISO 8528-5 G1	RPM		1477 - 1519			
Charging Alternator Voltage	Volts		28		Charging Alternator Voltage	Volts		28			
Charging Alternator Current	Amps		70		Charging Alternator Current	Amps		70			
Total Engine Coolant Flow	gal/min	L/min	159	600	Total Engine Coolant Flow	gal/min	L/min	90	340		
Cooling Fan Power ¹¹	HP	kW	39	29	Cooling Fan Power ¹¹	HP	kW	23	17		
Cooling Fan Speed	RPM		2200		Cooling Fan Speed	RPM		1830			
Cooling Fan Air Flow ¹¹	SCFM	m ³ /min	26697	756	Cooling Fan Air Flow ¹¹	SCFM	m ³ /min	22194	629		
Maximum Cooling Air Temp at Radiator	°F	°C	111	44	Maximum Cooling Air Temp at Radiator	°F	°C	118	48		
Standby				NG 60Hz		NG 50Hz		LP 60Hz		LP 50Hz	
Power Rating ^{1,2,3,4} Per ISO 3046	HP	kWm	402	300	335	250	243	181	202	151	
MEP (@ rated Load on NG)	psi	bar	231	16.0	231	16.0	140	9.6	140	9.6	
Fuel Consumption ^{3,4,7,12}	lb/hr	kg/hr	153	69	122	56	109	49.4	84	38	
	ft ³ /hr	m ³ /hr	3418	97	2734	77	-	-	-	-	
	gal/hr	L/hr	-	-	-	-	26	97	20	75	
	lb/(hp-hr)	g/(kW-hr)	0.380	231	0.364	222	0.448	273	0.413	252	
BSFC	lb/(hp-hr)	g/(kW-hr)	0.380	231	0.364	222	0.448	273	0.413	252	
Turbine Outlet Temperature	°F	°C	1204	651	1177	636	1260	682	1191	644	
Exhaust Flow at Turbine Outlet Conditions (entire engine)	lb/hr	kg/hr	2701	1226	2200	1000	1815	825	1395	634	
	ACFM	m ³ /min	1855	52.5	1492	42.3	1285	36.4	953	27.0	
Air Induction System ⁵											
Combustion Air required (entire engine)	lb/hr	kg/hr	2551	1157	2094	950	1634	741	1257	570	
	ACFM	m ³ /min	575	16.3	472	13.4	368	10.4	283	8.0	
Compressor Outlet Temperature ²	°F	°C	326	163	279	137	170	112	208	98	
Thermal Balance ⁵											
Total Fuel	BTU/min	kW	52570	924	41629	732					
Mechanical Power	BTU/min	kW	17072	300	14217	250					
Heat Rejected to Cooling Water at Rated Load	BTU/min	kW	16299	287	13023	229					
Heat Rejection CAC at Rated Power	BTU/min	kW	2144	38	1934	34					
Heat Rejection to Exhaust (LHV to 150C)	BTU/min	kW	14593	257	11374	200					
Engine Radiated Heat	BTU/min	kW	2462	43	1081	19					

¹ Standby and overload ratings based on ISO 3046 gross flywheel power.² Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psia(100kPa) and 30% relative humidity.³ Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.⁴ All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for NG of 48.17 MJ/kg.⁵ All values in the following section are provided for informational purpose only and are non-binding.⁶ >1400RPM.⁷ See PSI Energy Technical Spec. 56100019 - Fuel Standard.⁸ Standard Sump Capacity.⁹ ± 2 degrees Celsius.¹⁰ ± 0.002" or 0.05mm.¹¹ At 0.5 in-H₂O of Package Restriction at 50C Ambient Air Temperature.¹² Volume calculated using density of 0.717 kg/m3 for NG, 0.51 kg/L for LPG

13LT Fuel Consumption Data Standby

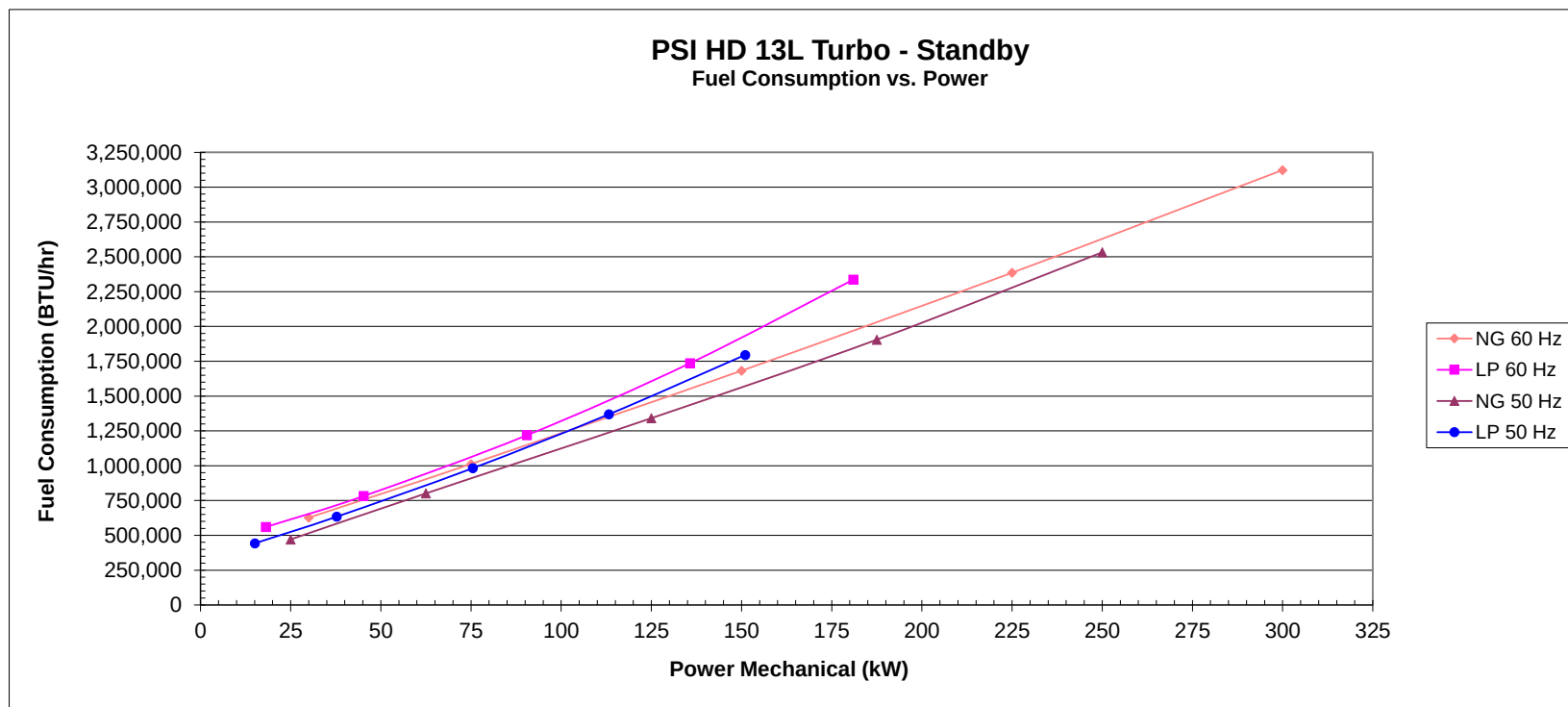
NG 60 Hz				
Power at Flywheel (kw)	kg/hr	m3/hr	ft3/hr	BTU/hr
300	68	95.4	3,369	3,122,889
225	52	72.9	2,574	2,385,843
150	37	51.4	1,815	1,682,392
75	22	30.9	1,092	1,012,538
30	13.7	19.2	676	626,751

NG 50 Hz				
Power at Flywheel (kw)	kg/hr	m3/hr	ft3/hr	BTU/hr
250	55	77.4	2,732	2,532,223
188	42	58.2	2,055	1,904,790
125	29	41.0	1,447	1,341,503
63	18	24.5	864	801,244
25	10	14.4	508	471,037

Gas Properties		
	Density	Heat content
LP	0.51 kg/L	91330 BTU/gal
NG	0.717 kg/m3	927 BTU/ft3

LP 60 Hz				
Power at Flywheel (kw)	kg/hr	L/hr	gal/hr	BTU/hr
181	49	96.9	25.6	2,336,094
136	37	72.0	19.0	1,736,612
91	26	50.5	13.3	1,218,713
45	17	32.4	8.6	782,397
18	12	23.2	6.1	559,768

LP 50 Hz				
Power at Flywheel (kw)	kg/hr	L/hr	gal/hr	BTU/hr
151	38	74.5	19.7	1,795,450
113	29	56.8	15.0	1,369,707
76	21	40.7	10.8	982,515
38	13	26.3	6.9	633,872
15	9.4	18.4	4.9	443,191



Technical data based on ISO 3046-1 standards of 77°F (25°C), barometric pressure of 14.5Psia (100kPa) and 30% relative humidity. Production tolerances in engines and installed components can account for power variations of ± 5%.

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Aspiration	Charged Cooled Forced Induction				Dry Weight (Fan to Flywheel)		lb	kg	2313	1050	
Firing Order	1 - 5 - 3 - 6 - 2 - 4				Wet Weight (Fan to Flywheel)		lb	kg	2423	1100	
Rotation Viewed from Flywheel	Counter Clockwise				CG From Flywheel Housing Rear Face		in	mm	17.8	451	
Bore	in	mm	5.0	127.0	CG Above Crank Centerline		in	mm	6.4	162	
Stroke	in	mm	6.5	165.1	Max Bending Moment @ Rear of Block		lbf-ft	N-m	8238	11170	
Displacement	in³	L	764.9	12.54	Moment of Inertia About Roll Axis		lbf-ft²	kg-m²	1066	45	
Compression Ratio	9.75 : 1				Oil Specification		SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher				
Exhaust Manifold Type	Water Cooled										
Turbo Exhaust Outlet Pipe Size	in	mm	3.15 - 3.37	80.0 - 85.6	Engine Oil Capacity ⁸	Min	qts	L	28.0	26.5	
Catalyst Inlet Size	in	mm	3.5	90		Max	qts	L	31.7	30.0	
Catalyst Dp	in-H ₂ O	kPa	29.9	7.45	ECU Low Oil Pressure Warning ⁶		psi	bar	30	2.1	
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	15	ECU Low Oil Pressure Shutdown ⁶		psi	bar	25	1.7	
Maximum Fuel System Pressure	psi	kPag	1.0	6.9	Oil Pressure Operating Range	Idle	psi	bar	19 - 36	1.3 - 2.5	
Maximum Operating pressure to EPR	in-H ₂ O	kPa	10.8	2.7		Rated	psi	bar	51 - 80	3.5 - 5.5	
Minimum Operating pressure to EPR	in-H ₂ O	kPa	6.8	1.7	Max Allowable Oil Temperature		°F	°C	221	205	
Minimum Gas Supply Pipe Size ⁵	1-1/4" NPT				Coolant Capacity (Engine only)		gal	L	5.8	22	
Maximum Pressure Drop Across CAC	psi	kPa	1.7	12.0	Coolant Capacity (Radiator only)		gal	L	14.3	54	
Maximum Allowable Intake Restriction	Clean Air Filter	in-H ₂ O	kPa	12.0	3.0	Radiator Weight (Dry)		lb	kg	705	320
	Dirty Air Filter	in-H ₂ O	kPa	24.9	6.2	Thermostat Operating Temperature Range ⁹		Cracking	°F	°C	169
Spark Plug Part Number	Bosch R66857				Full Open		°F	°C	190	88	
Standard Spark Plug Gap ¹⁰	in	mm	0.020	0.5	ECU Coolant Temp Warning		°F	°C	220	103	
Spark Plug Coil - Primary Resistance	Ohms		0.59Ω ± 10%		ECU Coolant Temp Shutdown		°F	°C	230	110	
Battery Voltage	Volts		24		Max External Coolant Friction Head		psi	kPa	7.3	50	
Starter Motor Power	HP	kW	7.4	5.5	CAC Rise Above Ambient Specified		°F	°C	37.8	21	

Performance Data 60Hz^{3,5}

Nominal Engine Speed	RPM		1800	
Mean Piston Speed	ft/min	m/s	1949	9.9
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1778 - 1823	
Charging Alternator Voltage	Volts		28	
Charging Alternator Current	Amps		70	
Total Engine Coolant Flow	gal/min	L/min	159	600
Cooling Fan Power ¹¹	HP	kW	39	29
Cooling Fan Speed	RPM		2200	
Cooling Fan Air Flow ¹¹	SCFM	m ³ /min	26697	756
Maximum Cooling Air Temp at Radiator	°F	°C	111	44

Performance Data 50Hz^{3,5}

Nominal Engine Speed	RPM		1500	
Mean Piston Speed	ft/min	m/s	1624	8
RPM Range (Min-Max) ISO 8528-5 G1	RPM		1477 - 1519	
Charging Alternator Voltage	Volts		28	
Charging Alternator Current	Amps		70	
Total Engine Coolant Flow	gal/min	L/min	90	340
Cooling Fan Power ¹¹	HP	kW	23	17
Cooling Fan Speed	RPM		1830	
Cooling Fan Air Flow ¹¹	SCFM	m ³ /min	22194	629
Maximum Cooling Air Temp at Radiator	°F	°C	118	48

Prime			NG 60Hz		NG 50Hz		LP 60Hz		LP 50Hz	
Power Rating ^{1,2,3,4} Per ISO 3046	HP	kWm	329	245	314	234	243	181	202	151
MEP (@ rated Load on NG)	psi	bar	189	13.0	217	14.9	140	9.6	140	9.6
Fuel Consumption ^{3,4,7,12}	lb/hr	kg/hr	123	56	114	52	109	49.4	84	38
	ft ³ /hr	m ³ /hr	2758	78	2561	73	-	-	-	-
	gal/hr	L/hr	-	-	-	-	26	97	20	75
BSFC	lb/(hp-hr)	g/(kW-hr)	0.375	229	0.365	222	0.448	273	0.413	252
Turbine Outlet Temperature	°F	°C	1184	640	1166	630	1260	682	1191	644
Exhaust Flow at Turbine Outlet Conditions (entire engine)	lb/hr	kg/hr	2152	978	2013	915	1815	825	1395	634
	ACFM	m ³ /min	1499	42	1388	39	1330	38	977	28

Air Induction System⁵

Combustion Air required (entire engine)	lb/hr	kg/hr	2028	922	1903	863	1630	741	1254	570
	ACFM	m ³ /min	458	13.0	429	12.1	368	10.4	283	8.0
Compressor Outlet Temperature ²	°F	°C	283	140	258	126	234	112	208	98

Thermal Balance⁵

Total Fuel	BTU/min	kW	43300	748	36409	640
Mechanical Power	BTU/min	kW	13643	240	11943	210
Heat Rejected to Cooling Water at Rated Load	BTU/min	kW	13706	241	11374	200
Heat Rejection CAC at Rated Power	BTU/min	kW	1405	25	1582	28
Heat Rejection to Exhaust (LHV to 150C)	BTU/min	kW	11539	203	10293	181
Engine Radiated Heat	BTU/min	kW	2269	40	1217	21

¹ Standby and overload ratings based on ISO 3046 gross flywheel power.² Technical data based on ISO 3046-1 standards of 77°F(25°C), absolute pressure 14.5Psia(100kPa) and 30% relative humidity.³ Production tolerances in engines and installed components can account for power variations of ± 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.⁴ All fuel and thermal calculations unless otherwise noted are done at ISO 3046 rated load using LHV for NG of 48.17 MJ/kg.⁵ All values in the following section are provided for informational purpose only and are non-binding.⁶ >1400RPM.⁷ See PSI Energy Technical Spec. 56100019 - Fuel Standard.⁸ Standard Sump Capacity.⁹ ± 2 degrees Celsius.¹⁰ ± 0.002" or 0.05mm.¹¹ At 0.5 in-H₂O of Package Restriction at 50C Ambient Air Temperature.¹² Volume calculated using density of 0.717 kg/m3 for NG, 0.51 kg/L for LPG

13LT Fuel Consumption Data Prime

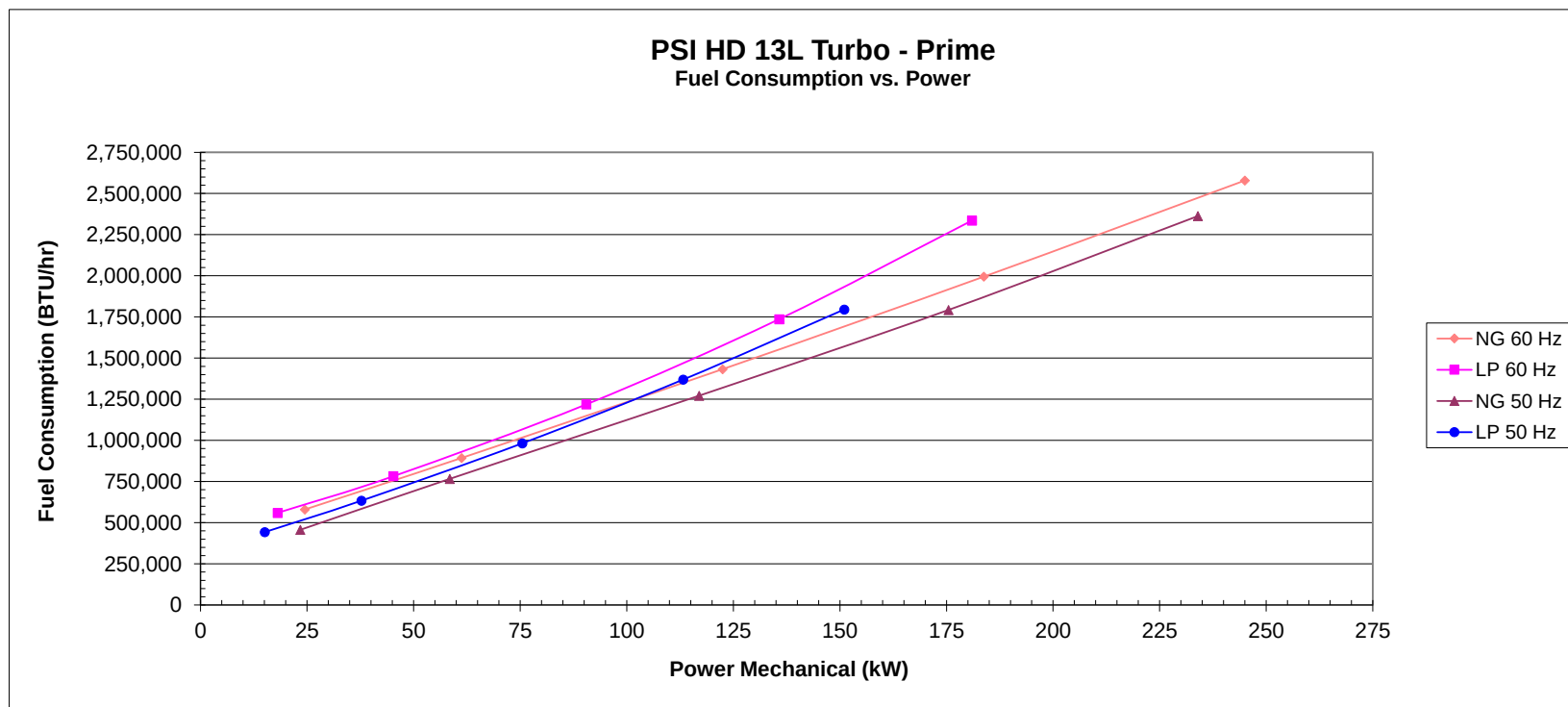
NG 60 Hz				
Power at Flywheel (kw)	kg/hr	m3/hr	ft3/hr	BTU/hr
245	57	78.8	2,782	2,579,103
184	44	61.0	2,152	1,994,788
123	31	43.8	1,546	1,432,878
61	20	27.3	964	893,375
25	12.7	17.7	626	580,428

NG 50 Hz				
Power at Flywheel (kw)	kg/hr	m3/hr	ft3/hr	BTU/hr
234	52	72.2	2,549	2,363,215
176	39	54.8	1,934	1,792,930
117	28	38.9	1,372	1,271,928
59	17	23.4	827	766,489
23	10	14.0	493	456,669

Gas Properties		
	Density	Heat content
LP	0.51 kg/L	91330 BTU/gal
NG	0.717 kg/m3	927 BTU/ft3

LP 60 Hz				
Power at Flywheel (kw)	kg/hr	L/hr	gal/hr	BTU/hr
181	49	96.9	25.6	2,336,094
136	37	72.0	19.0	1,736,612
91	26	50.5	13.3	1,218,713
45	17	32.4	8.6	782,397
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LP 50 Hz				
Power at Flywheel (kw)	kg/hr	L/hr	gal/hr	BTU/hr
151	38	74.5	19.7	1,795,450
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76	21	40.7	10.8	982,515
38	13	26.3	6.9	633,872
15	9.4	18.4	4.9	443,191



Technical data based on ISO 3046-1 standards of 77°F (25°C), barometric pressure of 14.5Psia (100kPa) and 30% relative humidity. Production tolerances in engines and installed components can account for power variations of ± 5%.