

13L



ENERGY

[Stoich Turbocharged]

56100046

Rev: 3

General Engine Data<sup>3</sup>

Type	Inline 4-cycle			
Number of cylinders	6			
Aspiration	Charged Cooled Forced Induction			
Firing Order	1 - 5 - 3 - 6 - 2 - 4			
Rotation Viewed from Flywheel	Counter Clockwise			
Bore	in	mm	5.0	127.0
Stroke	in	mm	6.5	165.1
Displacement	in <sup>3</sup>	L	764.9	12.54
Compression Ratio	9.75 : 1			
Exhaust Manifold Type	Water Cooled			
Turbo Exhaust Outlet Pipe Size	in	mm	3.15 - 3.37	80.0 - 85.6
Catalyst Inlet Size	in	mm	3.5	90
Catalyst Dp	in-H <sub>2</sub> O	kPa	29.9	7.45
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	15
Maximum Fuel System Pressure	psi	kPag	1.0	6.9
Maximum Operating pressure to EPR	in-H <sub>2</sub> O	kPa	10.8	2.7
Minimum Operating pressure to EPR	in-H <sub>2</sub> O	kPa	6.8	1.7
Minimum Gas Supply Pipe Size <sup>5</sup>	1-1/4" NPT			
Maximum Pressure Drop Across CAC	psi	kPa	1.7	12.0
Maximum Allowable Intake Restriction	Clean Air Filter	in-H <sub>2</sub> O	kPa	12.0
	Dirty Air Filter	in-H <sub>2</sub> O	kPa	24.9
Spark Plug Part Number	Bosch R66857			
Standard Spark Plug Gap <sup>10</sup>	in	mm	0.020	0.5
Spark Plug Coil - Primary Resistance	Ohms 0.59Ω ± 10%			
Battery Voltage	Volts 24			
Starter Motor Power	HP	kW	7.4	5.5

Performance Data 60Hz<sup>3,5</sup>

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 <sup>11</sup>	HP	kW	39	29
Cooling Fan Speed	RPM		2200	
Cooling Fan Air Flow <sup>11</sup>	SCFM	m <sup>3</sup> /min	26697	756
Maximum Cooling Air Temp at Radiator	°F	°C	111	44

Flywheel housing		SAE No. 1			
Flywheel		SAE No. 14			
Dry Weight (Fan to Flywheel)	lb	kg	2313	1050	
Wet Weight (Fan to Flywheel)	lb	kg	2423	1100	
CG From Flywheel Housing Rear Face	in	mm	17.8	451	
CG Above Crank Centerline	in	mm	6.4	162	
Max Bending Moment @ Rear of Block	lbf-ft	N-m	8238	11170	
Moment of Inertia About Roll Axis	lbf-ft <sup>2</sup>	kg-m <sup>2</sup>	1066	45	
Oil Specification		SAE 15W-40 Low Ash Gas engine oil (.25-.5% by wt), API CD/CF or higher			
Engine Oil Capacity <sup>8</sup>	Min	qts	L	28.0	26.5
	Max	qts	L	31.7	30.0
ECU Low Oil Pressure Warning <sup>6</sup>	psi	bar	30	2.1	
ECU Low Oil Pressure Shutdown <sup>6</sup>	psi	bar	25	1.7	
Oil Pressure Operating Range	Idle	psi	bar	19 - 36	1.3 - 2.5
	Rated	psi	bar	51 - 80	3.5 - 5.5
Max Allowable Oil Temperature	°F	°C	221	205	
Coolant Capacity (Engine only)	gal	L	5.8	22	
Coolant Capacity (Radiator only)	gal	L	14.3	54	
Radiator Weight (Dry)	lb	kg	705	320	
Thermostat Operating Temperature Range <sup>9</sup>	Cracking	°F	°C	169	76
	Full Open	°F	°C	190	88
ECU Coolant Temp Warning	°F	°C	220	103	
ECU Coolant Temp Shutdown	°F	°C	230	110	
Max External Coolant Friction Head	psi	kPa	7.3	50	
CAC Rise Above Ambient Specified	°F	°C	37.8	21	

Performance Data 50Hz<sup>3,5</sup>

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 <sup>11</sup>	HP	kW	23	17
Cooling Fan Speed	RPM		1830	
Cooling Fan Air Flow <sup>11</sup>	SCFM	m <sup>3</sup> /min	22194	629
Maximum Cooling Air Temp at Radiator	°F	°C	118	48

Standby			NG 60Hz		NG 50Hz		LP 60Hz		LP 50Hz	
Power Rating <sup>1,2,3,4</sup> 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 <sup>3,4,7,12</sup>	lb/hr	kg/hr	153	69	122	56	109	49.4	84	38
	ft <sup>3</sup> /hr	m <sup>3</sup> /hr	3418	97	2734	77	-	-	-	-
	gal/hr	L/hr	-	-	-	-	26	97	20	75
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 <sup>3</sup> /min	1855	52.5	1492	42.3	1285	36.4	953	27.0

Air Induction System<sup>5</sup>

Combustion Air required (entire engine)	lb/hr	kg/hr	2551	1157	2094	950	1634	741	1257	570
	ACFM	m <sup>3</sup> /min	575	16.3	472	13.4	368	10.4	283	8.0
Compressor Outlet Temperature <sup>2</sup>	°F	°C	326	163	279	137	170	112	208	98

Thermal Balance<sup>5</sup>

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

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

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General Engine Data<sup>1</sup>

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 <sup>3</sup>	L	764.9	12.54	Moment of Inertia About Roll Axis		lbf-ft <sup>2</sup>	kg-m <sup>2</sup>	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 <sup>8</sup>		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 <sub>2</sub> O	kPa	29.9	7.45	ECU Low Oil Pressure Warning <sup>5</sup>		psi	bar	30	2.1	
Maximum Allowable Exhaust Back Pressure	in-Hg	kPa	3.8	15	ECU Low Oil Pressure Shutdown <sup>6</sup>		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 <sub>2</sub> O	kPa	10.8	2.7			Rated	psi	bar	51 - 80	3.5 - 5.5
Minimum Operating pressure to EPR	in-H <sub>2</sub> O	kPa	6.8	1.7	Max Allowable Oil Temperature		°F	°C	221	205	
Minimum Gas Supply Pipe Size <sup>5</sup>	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 <sub>2</sub> O	kPa	12.0	Radiator Weight (Dry)		lb	kg	705	320	
	Dirty Air Filter	in-H <sub>2</sub> O	kPa	24.9	Thermostat Operating		Cracking	°F	°C	169	76
Spark Plug Part Number	Bosch R66857				Temperature Range <sup>9</sup>		Full Open	°F	°C	190	88
Standard Spark Plug Gap <sup>10</sup>	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<sup>3,5</sup>

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 <sup>11</sup>	HP	kW	39	29
Cooling Fan Speed	RPM		2200	
Cooling Fan Air Flow <sup>11</sup>	SCFM	m <sup>3</sup> /min	26697	756
Maximum Cooling Air Temp at Radiator	°F	°C	111	44

Performance Data 50Hz<sup>3,5</sup>

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 <sup>11</sup>	HP	kW	23	17
Cooling Fan Speed	RPM		1830	
Cooling Fan Air Flow <sup>11</sup>	SCFM	m <sup>3</sup> /min	22194	629
Maximum Cooling Air Temp at Radiator	°F	°C	118	48

Prime			NG 60Hz		NG 50Hz		LP 60Hz		LP 50Hz	
Power Rating <sup>1,2,3,4</sup> 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 <sup>3,4,7,12</sup>	lb/hr	kg/hr	123	56	114	52	109	49.4	84	38
	ft <sup>3</sup> /hr	m <sup>3</sup> /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 <sup>3</sup> /min	1499	42	1388	39	1330	38	977	28

Air Induction System<sup>5</sup>

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

Thermal Balance<sup>5</sup>

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

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