

ZPP NA 416 Gamma

4 Cylinder Inline | Naturally-Aspirated |
1.6L - Gasoline, Natural Gas, Propane |

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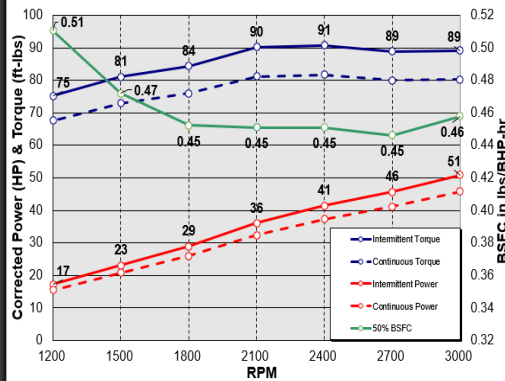
Specifications

# of Cylinders	4 Inline
Operation	4-stroke
Ignition	Spark-Ignited
# of Valves	4/cylinder
Firing Order	1-3-4-2
Bore x Stroke	77 X 85.4 mm 3.032" x 3.362"
Displacement	1591 cc / 97.1 ci
Compression Ratio	11.0 : 1
Piston Speed @ 2400 rpm	1,345 fpm
Piston Speed @ 1800 rpm	1,009 fpm
Oil Capacity	3.3L / 3.49qts
Electrical System	12 Volt

Features

☆	US EPA & CARB Certified
☆	CAN bus controlled—J1939
☆	Full Built-in Engine Protection
☆	Stoichiometric Combustion
☆	90A Alternator

Gasoline Power, Torque, & BSFC Curves

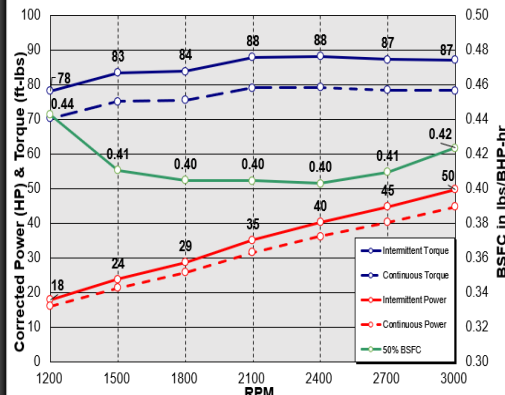


Industrial Rating (BHP)

Rating	2400 rpm	1800 rpm
Intermittent	41.5	28.9
Continuous	37.3	26.0

**All data is corrected per SAE J1349
*Performance is NET including losses from engine auxiliaries (alternator, fan, water pump, air cleaner, catalyst)
*NG is pipeline grade gas
*LPG is commercial grade
*Gasoline is pump gasoline
*Continuous is a 10% de-rate
Electrical kW calculated with 92%

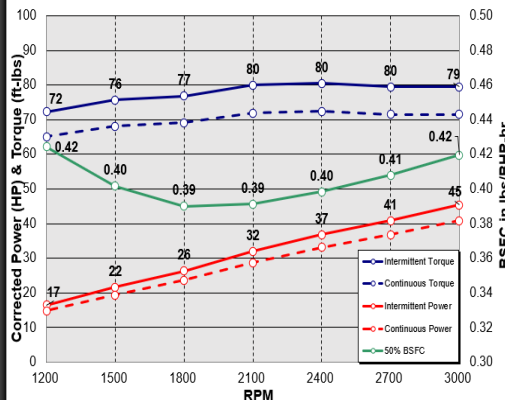
LPG Power, Torque, & BSFC Curves



Industrial Rating (BHP)

Rating	2400 rpm	1800 rpm
Intermittent	40.2	28.7
Continuous	36.2	25.9

NG Power, Torque, & BSFC Curves

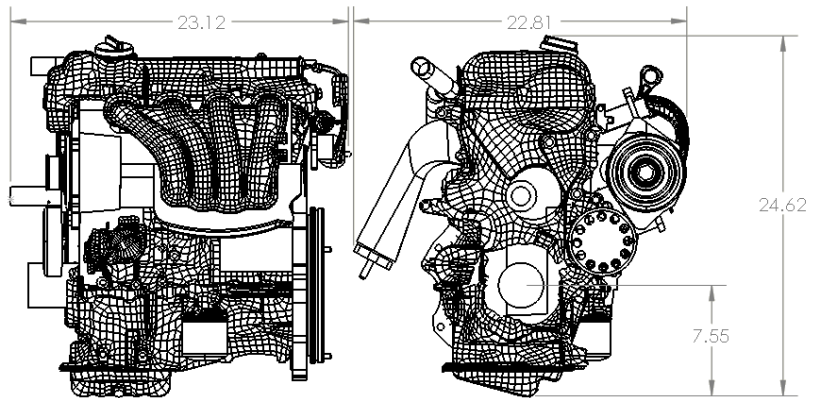


Industrial Rating (BHP)

Rating	2400 rpm	1800 rpm
Intermittent	36.8	33.1
Continuous	26.3	23.7

Fuel System Features

- ☆ Multi-Fuel (Natural Gas or LPG) or Gasoline
- ☆ Air-valve Mixer based fueling
- ☆ Direct Electronic Pressure Regulator
- ☆ Electronic, closed-loop control
- ☆ EPA certified to pipeline quality fuels
- ☆ Electronic Throttle body
- ☆ Inline catalyst provided with engine



**All data is corrected per SAE J1349*

Gasoline

RPM	Intermittent		Continuous Duty		BMEP (psi)	Fuel Flow (lb/hr)	Air Flow (lb/hr)	BSFC (lb/hp/hr)	Exhaust Outlet (F)
	Torque ft-lbs (Nm)	Power BHP (kW)	Torque ft-lbs (Nm)	Power BHP (kW)					
3000	89.1 (120.9)	50.9 (38.0)	80.2 (108.8)	45.8 (34.2)	131	19.1	268	0.379	1397
2700	88.9 (120.6)	45.7 (34.1)	80.0 (108.5)	41.1 (30.7)	131	17.6	244	0.384	1389
2400	90.8 (123.2)	41.5 (30.9)	81.7 (110.8)	37.3 (27.9)	134	15.8	221	0.383	1382
2200	90.2 (122.3)	36.0 (26.9)	81.1 (110.1)	32.4 (24.2)	133	13.7	191	0.381	1344
1800	84.4 (114.5)	28.9 (21.6)	76.0 (103.0)	26.0 (19.4)	124	11.1	158	0.393	1263
1500	81.0 (109.9)	23.1 (17.3)	72.9 (98.9)	20.8 (15.5)	119	9.4	131	0.407	1235
1200	75.2 (102.0)	17.2 (12.8)	67.7 (91.8)	15.5 (11.5)	111	7.3	101	0.423	1186

Commercial LPG

RPM	Intermittent		Continuous Duty		BMEP (psi)	Fuel Flow (lb/hr)	Air Flow (lb/hr)	BSFC (lb/hp/hr)	Exhaust Outlet (F)
	Torque ft-lbs (Nm)	Power BHP (kW)	Torque ft-lbs (Nm)	Power BHP (kW)					
3000	87.0 (118.1)	49.7 (37.1)	78.3 (106.3)	44.7(33.4)	128	17.3	270	0.364	1314
2700	87.2 (118.4)	44.8 (33.5)	78.5 (106.5)	40.4(30.1)	129	15.2	237	0.354	1281
2400	88.1 (119.5)	40.2 (30.0)	79.3 (107.5)	36.2(27.0)	130	13.6	212	0.353	1257
2100	87.9 (119.2)	35.1 (26.2)	79.1 (107.3)	31.6(23.6)	129	11.7	183	0.349	1229
1800	83.9 (113.8)	28.7 (21.4)	75.5 (102.4)	25.9(19.3)	124	9.7	151	0.352	1161
1500	83.5 (113.2)	23.8 (17.8)	75.1 (101.9)	21.5(16.0)	123	8.1	126	0.354	1106
1200	78.1 (106.0)	17.8 (13.3)	70.3 (95.4)	16.1(12.0)	115	6.1	95	0.357	1043

Pipeline NG

RPM	Intermittent		Continuous Duty		BMEP (psi)	Fuel Flow (lb/hr)	Air Flow (lb/hr)	BSFC (lb/hp/hr)	Exhaust Outlet (F)
	Torque ft-lbs (Nm)	Power BHP (kW)	Torque ft-lbs (Nm)	Power BHP (kW)					
3000	79.4 (107.7)	45.4 (33.8)	71.5 (97.0)	40.8 (30.5)	114	14.8	254	0.351	1273
2700	79.5 (107.9)	40.9 (30.5)	71.6 (97.1)	36.8 (27.4)	114	13.2	226	0.347	1240
2400	80.5 (109.2)	36.8 (27.4)	72.4 (98.3)	33.1 (24.7)	116	11.8	202	0.344	1219
2100	79.9 (108.5)	32.0 (23.8)	71.9 (97.6)	28.8 (21.5)	115	10.2	175	0.343	1172
1800	76.8 (104.2)	26.3 (19.6)	69.1 (93.8)	23.7 (17.7)	110	8.5	145	0.345	1102
1500	75.6 (102.6)	21.6 (16.1)	68.1 (92.4)	19.4 (14.5)	109	6.9	118	0.342	1047
1200	72.3 (98.1)	16.5 (12.3)	65.1 (88.3)	14.9 (11.1)	104	5.3	91	0.345	980