



# GILLETTE GENERATORS

LIQUID COOLED NAT. GAS ENGINE GENERATOR SET

60 HZ MODEL  
**SP-4000**

Model	STANDBY 120°C RISE		
	HZ	LPG	N.G.
<b>SP-4000-60 HERTZ</b>	60	300	400



All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.



**UL2200, UL1446, UL508, UL142, UL498**



**NFPA 110, 99, 70, 37**

All generator sets meet NFPA-110 Level 1, when equipped with the necessary accessories and installed per NFPA standards.



**NEC 700, 701, 702, 708**



**NEMA ICS10, MG1, ICS6, AB1**



**ANSI C62.41, 27, 59, 32, 480, 40Q, 81U, 360-05**

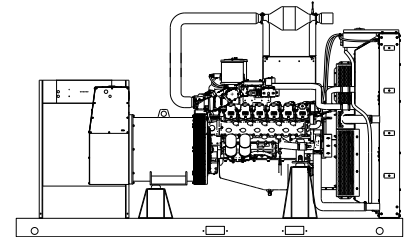


**ASCE 7-05 & 7-10**

All generator sets meet 180 MPH rating.

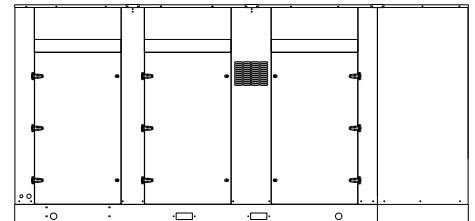


**EPA 40CFR Part 60, 1048, 1054, 1065, 1068**



“OPEN” GEN-SET

There is no enclosure, so gen-set must be placed within a weather protected area, un-inhabited by humans or animals, with proper ventilation. Silencer not supplied, as installation requirements are not known. However, this item is available as optional equipment.



“LEVEL 2” HOUSED GEN-SET

Full aluminum weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

## GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	LIQUID PROPANE GAS FUEL		NATURAL GAS FUEL	
	L-N	L-L			120°C RISE STANDBY RATING		120°C RISE STANDBY RATING	
					KW/KVA	AMP	KW/KVA	AMP
<b>SP-4000-3-2</b>	120	208	3	60	300/300	1250	400/500	1390
<b>SP-4000-3-3</b>	120	240	3	60	300/375	1042	400/500	1200
<b>SP-4000-3-4</b>	277	480	3	60	300/375	903	400/500	600
<b>SP-4000-3-5</b>	127	220	3	60	300/375	452	400/500	1314
<b>SP-4000-3-16</b>	346	600	3	60	300/375	985	400/500	481

RATINGS: All three phase gen-sets are 12 lead windings, rated at .8 power factor. 120°C “STANDBY RATINGS” are strictly for gen-sets that are used for back-up emergency power to a failed normal utility power source. This standby rating allows varying loads, with no overload capability, for the entire duration of utility power outage. All gen-set power ratings are based on temperature rise measured by resistance method as defined by MIL-STD 705C and IEEE STD 115, METHOD 6.4.4. All generators have class H (180°C) insulation system on both rotor and stator windings. All factory tests and KW/KVA charts shown above are based on 120°C (standby) R/R winding temperature, within a maximum 40°C ambient condition. Generators operated at standby power ratings must not exceed the temperature rise limitation for class H insulation system, as specified in NEMA MG1-22.40. Specifications & ratings are subject to change without prior notice.

# APPLICATION AND ENGINEERING DATA FOR MODEL SP-4000-60 HZ

## GENERATOR SPECIFICATIONS

Manufacturer..... Stamford Electric Generators  
 Model & Type..... S4L1DG-311, 4 Pole, 12 Lead, Three Phase  
 ..... S4L1DF-311, 4 Pole, 12 Lead, 480V, Three Phase  
 ..... HCI434F-17, 4 Pole, 6 Lead, 600V, Three Phase  
 Exciter..... Brushless, shunt excited  
 Voltage Regulator..... Solid State, HZ/Volts  
 Voltage Regulation..... ½%, No load to full load  
 Frequency..... Field convertible, 60 HZ to 50 HZ  
 Frequency Regulation..... ½% (½ cycle, no load to full load)  
 Unbalanced Load Capability..... 100% of standby amps  
 Total Stator and Load Insulation..... Class H, 180°C  
 Temperature Rise..... 120°C R/R, standby rating @ 40°C amb.  
 3 Ø Motor Starting @ 30% Voltage Dip (208-240V) .... 480 kVA  
 3 Ø Motor Starting @ 30% Voltage Dip (480V)..... 1100 kVA  
 3 Ø Motor Starting @ 30% Voltage Dip (600V)..... 1280 kVA  
 Bearing..... 1, Pre-lubed and sealed  
 Coupling..... Direct flexible disc  
 Total Harmonic Distortion..... Max 3 | % (MIL-STD705B)  
 Telephone Interference Factor..... Max 50 (NEMA MG1-22)  
 Deviation Factor..... Max 5% (MIL-STD 405B)  
 Ltd. Warranty Period ..... 24 Months from date of start-up or  
 ..... 1000 hours use, first to occur.

## GENERATOR FEATURES

- World Renown Stamford Electric Generator having UL-1446 certification on full amortisseur windings.
- Full generator protection with **Deep Sea 7420** controller, having UL-508 certification.
- Automatic voltage regulator with over-excitation, under-frequency compensation, under-speed protection, and EMI filtering. Entire solid-state board is encapsulated for moisture protection.
- Generator power ratings are based on temperature rise, measured by resistance method, as defined in MIL-STD 705C and IEEE STD 115, Method 6.4.4.
- Power ratings will not exceed temperature rise limitation for class H insulation as per NEMA MG1-22.40.
- Insulation resistance to ground, exceeds 1.5 meg-ohm.
- Stator receives 2000 V. hi-potential test on main windings, and rotor windings receive a 1500 V. hi-potential test, as per MIL-STD 705B.
- Complete engine-generator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-generator sets, before shipping.
- Self ventilating and drip-proof & revolving field design

## ENGINE SPECIFICATIONS AND APPLICATIONS DATA

### ENGINE

Manufacturer..... Power Solutions Inc. (PSI)  
 Model and Type..... Heavy Duty, 21.9LTCAC, 4 cycle  
 Aspiration..... Turbocharged & Charge Air Cooled  
 Cylinder Arrangement ..... 12 Cylinders, Vee  
 Displacement Cu. In. (Liters)..... 1338 (21.9)  
 Bore & Stroke In. (mm.)..... 5.04 x 5.59 (128 x 142)  
 Compression Ratio..... 10.5:1  
 Main Bearings & Style..... 14, Percision Half-Shell  
 Cylinder Head..... Cast Iron  
 Pistons..... Cast Aluminum  
 Crankshaft..... Forged Steel  
 Exhaust Valve..... Inconel, A193  
 Governor..... Electronic  
 Frequency Reg. (no load-full load)..... Isochronous  
 Frequency Reg. (steady state)..... ± 1/4%  
 Air Cleaner..... Dry, Replaceable Cartridge  
 Engine Speed ..... 1800  
 Piston Speed, ft/min (m./min)..... 1830 (558)  
 Max Power, bhp (kwm) Standby/LPG..... 471 (351)  
 Max Power, bhp (kwm) Standby/NG ..... 612 (457)  
 Ltd. Warranty Period ..... 12 Months or 2000 hrs., first to occur

### FUEL SYSTEM

Type ..... LPG or NAT. GAS, Vapor Withdrawal  
 Fuel Pressure (kpa), in. H<sub>2</sub>O\* ..... (1.74-2.74), 7"-11"  
 Secondary Fuel Regulator..... NG or LPG Vapor System  
 Auto Fuel Lock-Off Solenoid..... Standard on all sets  
 Fuel Supply Inlet Line ..... (2) 2" NPTF

### FUEL CONSUMPTION

LP GAS: FT <sup>3</sup> /HR (M <sup>3</sup> /HR)	STANDBY
100% LOAD	1409 (39.9)
75% LOAD	1201 (34.0)
50% LOAD	809 (22.9)
<b>LPG = 2500 BTU X FT<sup>3</sup>/HR = Total BTU/HR</b> <b>LPG Conversion: 8.50 FT<sup>3</sup> = 1 LB. : 36.4 FT<sup>3</sup> = 1 GAL.</b>	

NAT. GAS: FT <sup>3</sup> /HR (M <sup>3</sup> /HR)	STANDBY
100% LOAD	4230 (120.0)
75% LOAD	3297 (93.3)
50% LOAD	2314 (65.5)
<b>NG = 1000 BTU X FT<sup>3</sup>/HR = Total BTU/HR</b>	

### OIL SYSTEM

Type ..... Full Pressure  
 Oil Pan Capacity qt. (L) ..... 42.3 (40.0)  
 Oil Pan Cap. W/ filter qt. (L) ..... 49.1 (47.1)  
 Oil Filter..... 2, Replaceable Spin-On

### ELECTRICAL SYSTEM

Ignition System ..... Electronic  
 Eng. Alternator/Starter: 24 VDC, negative ground, 45 amp/hr.  
 Recommended battery to -18°C (0° F): ... (2) 12 VDC, BCI# 31,  
 Max. Dimensions: 14"lg x 6 3/4" wi x 10" hi, with standard  
 round posts. Min output 1000 CCA. Battery tray (max. dim. at  
 15"lg x 7"wi). This model has (2) battery trays, (2) hold down  
 straps, (2) sets of battery cables, and (1) battery charger.  
 Installation of (2) 12VDC starting batteries connected in series  
 for 24VDC output is required, with possible higher AMP/HR  
 rating, as described above, if the normal environment  
 temperature averages -13° F (-25°C) or cooler.

# APPLICATION AND ENGINEERING DATA FOR MODEL SP-4000-60 HZ

## COOLING SYSTEM

Type of System ..... Pressurized, closed recovery  
 Coolant Pump ..... Pre-lubricated, self-sealing  
 Cooling Fan Type (no. of blades) ..... Pusher (8)  
 Fan Diameter inches (mm) ..... 52" (1321)  
 Ambient Capacity of Radiator °F (°C) ..... 125 (51.6)  
 Engine Jacket Coolant Capacity Gal (L) ..... 14 (53.0)  
 Radiator Coolant Capacity Gal. (L)..... 50 (189)  
 Maximum Restriction of Cooling Air Intake  
 and discharge side of radiator in. H<sub>2</sub>O (kpa) ..... 0.5 (.125)  
 Water Pump Capacity gpm (L/min) ..... 174 (660)  
 Heat Reject Coolant: Btu/min (kw) ..... 25,760 (453)  
 Low Radiator Coolant Level Shutdown.....Standard  
 Note: Coolant temp. shut-down switch setting at 230°F (110°C) with 50/50  
 (water/antifreeze) mix.

## AIR REQUIREMENTS

Combustion Air, cfm (m<sup>3</sup>/min) ..... 1027 (29.1)  
 Radiator Air Flow cfm (m<sup>3</sup>/min).....29,000 (821)  
 Heat Rejected to Ambient:  
     Engine: kw (btu/min)..... 66 (3765)  
     Alternator: kw (btu/min)..... 23 (1309)

## EXHAUST SYSTEM

Exhaust Outlet Size.....(2) 5"  
 Max. Back Pressure, in. hg (KPA). ..... 3.0 (10.2)  
 Exhaust Flow, at rated kw: cfm (m<sup>3</sup>/min).....2995 (84.8)  
 Exhaust Temp., at rated kw: °F (°C) .....1350 (732)  
 Engines are EPA certified for Natural Gas.

## SOUND LEVELS MEASURED IN dB(A)

	Open Set	Level 2 Encl.
Level 2, Critical Silencer .....	96	81
Level 3, Hospital Silencer.....		75

Note: Open sets (no enclosure) has (2) optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to hospital silencer. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise at normal operation.

## DERATE GENERATOR FOR ALTITUDE

3% per 1000 ft.(305m) above 3000 ft. (914m) from sea level

## DERATE GENERATOR FOR TEMPERATURE

2% per 10°F(5.6°C) above 104°F (40°C)

## DIMENSIONS AND WEIGHTS

	Open Set	Level 2 Enclosure
Length in (cm) .....	168 (427)	210 (534)
Width in (cm).....	82 (208)	82 (208)
Height in (cm).....	92 (234)	100 (254)
3 Ø Net Weight lbs (kg).....	9550 (4332)	12050 (5466)
3 Ø Ship Weight lbs (kg) .....	9950 (4513)	12450 (5647)

# DEEP SEA 7420 DIGITAL MICROPROCESSOR CONTROLLER



### Deep Sea 7420

The “7420” controller is an auto start mains (utility) failure module for single gen-set applications. This controller includes a backlit LCD display which continuously displays the status of the engine and generator at all times.

The “7420” controller will also monitor speed, frequency, voltage, current, oil pressure, coolant temp., and fuel levels. These modules have been designed to display warning and shut down status. It also includes: (11) configurable inputs • (8) configurable outputs • voltage monitoring • mains (utility) failure detection

- (250) event logs • configurable timers • automatic shutdown or warning during fault detection • remote start (on load) • engine preheat • advanced metering capability • hour meter • text LCD displays • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAR, kVAh, kVARh) This controller includes expansion features including RS232, RS484 (using MODBUS-RTU/TCP), direct USB connection with PC, expansion optioned using DSENet for remote annunciation and remote relay interfacing for a distance of up to 3300FT. The controller software is freely downloadable from the internet and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.

**LOW LOAD CONDITIONS:** Operation of PSI HD engines at low-load conditions should be limited to no more than one (1) hour per twenty-four (24) hour period. If the application requires extended time at light loads, it is recommended that the engine load be increased to at least 70% of mechanical rating for a minimum of two (2) hours per fifty (50) hours of low-load operation. Piston sealing rings rely on adequate cylinder firing pressure and temperature to seal the combustion chamber and prevent excessive engine oil from entering the power cylinder. Under low loads these rings will not seal properly, resulting in oil being burned in the combustion chamber and carbon deposits on pistons and valves. This mechanism is well-documented in reciprocating engines of all fuel types and is often referred to as “wet-stacking.”

# STANDARD FEATURES FOR MODEL SP-4000-60 HZ

## STANDARD FEATURES

### CONTROL PANEL:

- Deep Sea 7420 digital microprocessor with logic allows programming in the field. Controller has:
- STOP-MANUAL-AUTO modes and automatic engine shutdowns, signaled by full text LCD indicators:
  - Low oil pressure
  - High engine temp
  - Low Radiator Level
  - Three auxiliary alarms
  - Battery fail alarm
  - Engine fail to start
  - Engine over speed
  - Engine under speed
  - Over & under voltage
- Also included is tamper-proof engine hour meter

### ENGINE:

- Full flow oil filter • Air filter • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump
- Thermostat • Pusher fan and guard • Exhaust manifold
  - 24 VDC battery charging alternator • Flexible exhaust connector • "Isochronous" duty, electronic governor • Secondary dry fuel regulator • Dry fuel lock-off solenoid • Vibration isolators • Closed coolant recovery system with 50/50 water to anti-freeze mixture • flexible oil & radiator drain hose.

### AC GENERATOR SYSTEM:

- AC generator • Shunt excited • Brushless design • Circuit Breaker installed and wired to gen-set • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction • UL Certified

### VOLTAGE REGULATOR:

- ½% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

### DC ELECTRICAL SYSTEM:

- Battery tray • Battery cables • Battery hold down straps
- 2-stage battery float charger with maintaining & recharging automatic charge stages

### WEATHER/SOUND PROOF ALUMINUM HOUSING CORROSION RESISTANT PROTECTION CONSISTING OF:

- 9 Heated and Agitated Wash Stages
- Zinc Phosphate Etching-coating Stage
- Final Baked On Enamel Powder Coat
- 18/8 Stainless Steel Hardware

Design & specifications subject to change without prior notice. Dimensions shown are approximate. Contact Gillette for certified drawings. DO NOT USE DIMENSIONS FOR INSTALLATION PURPOSES.

