

LIQUID COOLED NAT. GAS ENGINE GENERATOR SET

60 HZ MODEL **SP-4000**

Model		STANDBY 120°C RISE		
	HZ	LPG	N.G.	
SP-4000-60 HERTZ	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

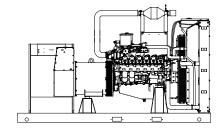


ASCE ASCE 7-05 & 7-10

All generator sets meet 180 MPH rating.

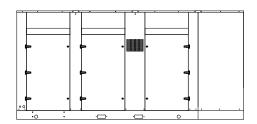


EPA 40CFR Part 60, 1048, 1054, 1065, 1068



"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.

GENER	ATOR	RATING	<u> </u>		LIQUID PROPAN	IE GAS FUEL	NATURAL	GAS FUEL
GENERATOR MODEL	VOL	ΓAGE	PH	HZ	120°C RISE STANDBY RATING		120°C RISE STA	ANDBY RATING
SENERATOR MODEL	L-N	L-L	• • •		KW/KVA	AMP	KW/KVA	AMP
SP-4000-3-2	120	208	3	60	300/300	1042	400/500	1390
SP-4000-3-3	120	240	3	60	300/375	903	400/500	1200
SP-4000-3-4	277	480	3	60	300/375	452	400/500	600
SP-4000-3-5	127	220	3	60	300/375	985	400/500	1314
SP-4000-3-16	346	600	3	60	300/375	361	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

ManufacturerStamford Electric Generators
Model & Type S4L1DG-311, 4 Pole, 12 Lead, Three Phase
HCI434F-17, 4 Pole, 6 Lead, 600V, Three Phase
Exciter Brushless, shunt excited
Voltage RegulatorSolid State, HZ/Volts
Voltage Regulation ¹ / ₂ %, No load to full load
FrequencyField convertible, 60 HZ to 50 HZ
Frequency Regulation
Unbalanced Load Capability100% of standby amps
Total Stator and Load Insulation
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
CouplingDirect flexible disc
Total Harmonic Distortion
Telephone Interference Factor Max 50 (NEMA MG1-22)
Deviation Factor
Ltd. Warranty Period24 Months from date of start-up or

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, underfrequency 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

ManufacturerModel and TypeHeav AspirationTurboc	y Duty, 21.9LTCAC, 4 cycle
Cylinder Arrangement	
Displacement Cu. In. (Liters)	
Bore & Stroke In. (mm.)	
Compression Ratio	` `
Main Bearings & Style	
Cylinder Head	
Pistons	Cast Aluminum
Crankshaft	
Exhaust Valve	Inconel, A193
Governor	
Frequency Reg. (no load-full load)	
Frequency Reg. (steady state)	± 1/4%
Air Cleaner	Dry, Replaceable Cartridge
Engine Speed	1800
Piston Speed, ft/min (m./min)	
Max Power, bhp (kwm) Standby/LP	G471 (351)
Max Power, bhp (kwm) Standby/NO	
Ltd. Warranty Period12 Mont	hs or 2000 hrs., first to occur

FUEL SYSTEM

TypeLPG	or NAT. GAS, Vapor Withdrawal
Fuel Pressure (kpa), in. H ₂ 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
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FUEL CONSUMPTION

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

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

OIL SYSTEM

Type	Full Pressure
Oil Pan Capacity qt. (L)	
Oil Pan Cap. W/ filter qt. (L)	
Oil Filter	` '

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 Pressuriz	ed, closed recovery
Cooling For Type (no. of blades)	
Cooling Fan Type (no. of blades) Fan Diameter inches (mm)	, ,
Ambient Capacity of Radiator °F (°C)	, ,
Engine Jacket Coolant Capacity Gal (L)	
Radiator Coolant Capacity Gal. (L)	50 (189)
Maximum Restriction of Cooling Air Intake	
and discharge side of radiator in. H ₂ 0 (kpa)	` /
Water Pump Capacity gpm (L/min)	
Heat Reject Coolant: Btu/min (kw)	
Low Radiator Coolant Level Shutdown	
Note: Coolant temp. shut-down switch setting at 230°F (I (water/antifreeze) mix.	10°C) with 50/50

AIR REQUIREMENTS

Combustion Air, cfm (m³/min)	1027 (29.1)
Radiator Air Flow cfm (m³/min)	29,000 (821)
Heat Rejected to Ambient:	
Engine: kw (btu/min)	66 (3765)
Alternator: kw (btu/min)	

EXHAUST SYSTEM

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

SOUND LEVELS MEASURED IN dB(A)

	Open	Level 2	
	Set	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)	216 (548)
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
- Engine fail to start
- High engine temp
- Engine over speed
- Low Radiator Level
- Engine under speed
- Three auxiliary alarms
- Over & under voltage
- Battery fail alarm

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.

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

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:

1/2% 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

