# GILLETTE GENERATORS

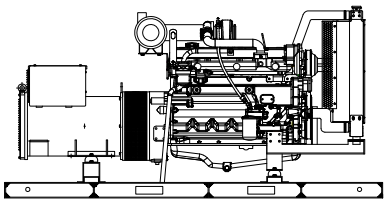
**LIQUID COOLED NAT. GAS ENGINE GENERATOR SET**

**PRIME MODEL**

# PR-1800

60 HERTZ

| Model | HZ | PRIME 105°C RISE NATURAL GAS |
|---|---|---|
| **PR-1800-60 HERTZ** | 60 | 180 |



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

**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**

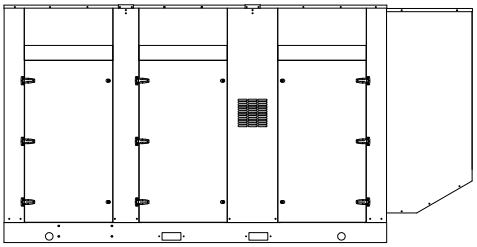
**NEMA ICS10, MG1, ICS6, AB1**

**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, 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 | NATURAL GAS FUEL 105°C RISE PRIME RATING | | POWER LEAD CONNECTIONS |
|---|---|---|---|---|---|---|---|
| | L-N | L-L | | | KW/KVA | AMP | |
| **PR-1800-1-1** | 120 | 240 | 1 | 60 | 180/180 | 750 | 4 LEAD DEDICATED 1 PH. |
| **PR-1800-3-2** | 120 | 208 | 3 | 60 | 180/225 | 625 | 12 LEAD LOW WYE |
| **PR-1800-3-3** | 120 | 240 | 3 | 60 | 180/225 | 542 | 12 LEAD HIGH DELTA |
| **PR-1800-3-4** | 277 | 480 | 3 | 60 | 180/225 | 271 | 12 LEAD HIGH WYE |
| **PR-1800-3-5** | 127 | 220 | 3 | 60 | 180/225 | 591 | 12 LEAD LOW WYE |
| **PR-1800-3-16** | 346 | 600 | 3 | 60 | 180/225 | 217 | 4 LEAD DEDICATED 3 PH. |

RATINGS: All single phase gen-sets are dedicated 4 lead windings, rated at unity (1.0) power factor. All three phase gen-sets are 12 lead windings, rated at (.8) power factor. 105°C "PRIME RATINGS" are strictly for gen-sets provide the prime source of electric power, where normal utility power is unavailable or unreliable. A 10% overload is allowed for a total of 1 hour, within every 12 hours of operation of PRIME RATED systems. 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 105°C (prime) R/R winding temperature, within a maximum 40°C ambient condition. Specifications & ratings are subject to change without prior notice.

# APPLICATION AND ENGINEERING DATA FOR MODEL PR-1800-60 HZ

## GENERATOR SPECIFICATIONS

Manufacturer.....Stamford Electric Generators
Model & Type..... S4L1DD-311, 4 Pole, 12 Lead, Single Phase
..... UCID274J-311, 4 Pole, 12 Lead, Three Phase
..... UCI274H-17, 4 Pole, 12 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 prime amps
Total Stator and Load Insulation.....Class H, 180°C
Temperature Rise .....105°C R/R, prime rating @ 40°C amb.
1 Ø Motor Starting @ 30% Voltage Dip (240V) .....490 kVA
3 Ø Motor Starting @ 30% Voltage Dip (208-240V).....510 kVA
3 Ø Motor Starting @ 30% Voltage Dip (480V) .....675 kVA
Bearing..... 1, Pre-lubed and sealed
Coupling.....Direct flexible disc
Total Harmonic Distortion..... Max 3½% (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.
- 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.
- Full amortisseur windings with UL-1446 certification.
- 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 11.1LTCAC, 4 cycle
Aspiration.....Turbocharged & Charge Air Cooled
Cylinder Arrangement.....6 Cylinders, Inline
Displacement Cu. In. (Liters).....674 (11.1)
Bore & Stroke In. (Cm.).....4.84 x 6.1 (12.3 x 15.5)
Compression Ratio..... 10.5:1
Main Bearings & Style.....7, Precision 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)…… 18310 (558)
Max Power, bhp (kwm) Prime/NG ..... .....272 (203)
Ltd. Warranty Period.....12 Months or 2000 hrs., first to occur

## FUEL SYSTEM

Type .....NAT. GAS, Vapor Withdrawal
Fuel Pressure (kpa), in. $H_2O$ .....(1.74), 7”
Secondary Fuel Regulator.....NG Vapor System
Auto Fuel Lock-Off Solenoid ..... Standard on all sets
Fuel Supply Inlet Line.....2” NPTF

## FUEL CONSUMPTION

| NAT. GAS: $FT^3/HR$ ($M^3/HR$) | PRIME |
|---|---|
| 100% LOAD | 1980 (56.1) |
| 75% LOAD | 1500 (42.5) |
| 50% LOAD | 1075 (30.4) |
| **NG = 1000 BTU X $FT^3$/HR = Total BTU/HR** | |

## OIL SYSTEM

Type ..... Full Pressure
Oil Pan Capacity qt. (L) .....26.4 (25.0)
Oil Pan Cap. W/ filter qt. (L) .....28.8 (27.0)
Oil Filter..... 1, 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# 27, Max. Dimensions: 12”lg x 6 3/4” wi x 9” hi, with standard round posts. Min output 700 CCA. Battery tray (max. dim. at 12”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 PR-1800-60 HZ

## COOLING SYSTEM

Type of System ..... Pressurized, closed recovery
Coolant Pump .....Pre-lubricated, self-sealing
Cooling Fan Type (no. of blades) ..... Pusher (12)
Fan Diameter inches (mm)..... 38" (965)
Ambient Capacity of Radiator °F (°C)..... 125 (51.6)
Engine Jacket Coolant Capacity Gal (L)..... 5.5 (21.0)
Radiator Coolant Capacity Gal. (L) ..... 30.6 (116)
Maximum Restriction of Cooling Air Intake
and discharge side of radiator in. $H_20$ (kpa)..... 0.5 (.125)
Water Pump Capacity gpm (L/min)..... ..... 75 (284)
Heat Reject Coolant: Btu/min (kw) ..... .....8100 (142)
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 ($m^3$/min) ..... .....448 (12.7)

Radiator Air Flow cfm ($m^3$/min)…… ...…18,000 (510)
Heat Rejected to Ambient:
Engine: kw (btu/min)..... .....60.3 (3430)
Alternator: kw (btu/min)..... ..... 16 (910)

## EXHAUST SYSTEM

Exhaust Outlet Size.....5"
Max. Back Pressure, in. hg (KPA).....3.0 (10.2)
Exhaust Flow, at rated kw: cfm ($m^3$/min) ..... .....1425 (40.3)
Exhaust Temp., at rated kw: °F (ºC) ……..….1382 (750)
Engines are EPA certified for Natural Gas.

## SOUND LEVELS MEASURED IN dB(A)

| | Open Set | Level 2 Encl. |
|---|---|---|
| Level 2, Critical Silencer | 90 | 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 85°F (29.4°C)

## DIMENSIONS AND WEIGHTS

| | Open Set | Level 2 Enclosure |
|---|---|---|
| Length in (cm) | 132 (335) | 204 (518) |
| Width in (cm) | 52 (132) | 72 (183) |
| Height in (cm) | 80 (203) | 94 (239) |
| 3 Ø Net Weight lbs (kg) | 6375 (2891) | 8975 (4071) |
| 3 Ø Ship Weight lbs (kg) | 6725 (3050) | 9325 (4230) |

# DEEP SEA 7420MKII DIGITAL MICROPROCESSOR CONTROLLER


**Deep Sea 7420MKII**

The "**7420MKII**" 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 PR-1800-60 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.

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:**

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