# SENTRY-PRO POWER SYSTEMS

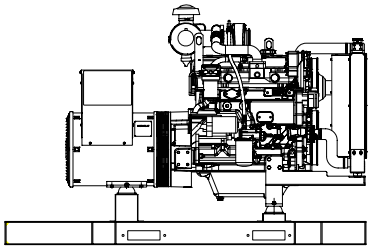
## By Gillette Generators, Inc.

**MODEL**
**SPJD-1000**
**60 HERTZ**

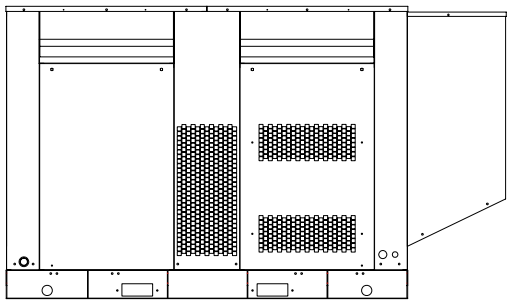
## LIQUID COOLED DIESEL ENGINE GENERATOR SET

### KW POWER RATINGS RANGE FOR 60 HZ

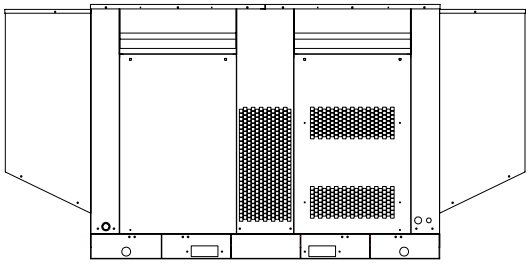
| Model | HZ | STANDBY 130ºC RISE | PRIME 105ºC RISE |
|---|---|---|---|
| **SPJD-1000-60 HERTZ** | 60 | 100 | 90 |



"OPEN" GEN-SET



"STANDARD" HOUSED GEN- SET



"SUPER-SILENT" HOUSED GEN-SET

### STANDARD FEATURES

- All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.
- All generator sets will accept 100% rated load in one step, per NFPA-110.
- All generators are UL-1446 certified and UL 2200 certified.
- Solid state, frequency compensated voltage regulation is standard on all gen-sets.
- Electronic engine governor for precise isochronous frequency regulation .
- SENTINEL "SCOUT" digital controller allows programming to basic engine functions in the field. Controller has stop-manual-auto mode and (8) basic protectors and the functions monitored by LED indicators, plus LCD hour meter.
- All generator set control systems components and accessories provide a 1-year limited warranty at time of initial start-up. Generators and engines are governed by separate warranties.
- "OPEN" Generator Sets: There is no enclosure, so gen-set must be placed within a weather protected area, un-inhabited by humans or animals, with proper ventilation. Muffler and flexible exhaust hose are not supplied, as installation requirements are not known. However, these two items are available as optional equipment.
- "STANDARD" Housing: Full weather protection and above average sound attenuation for normal applications. Residential grade muffler is standard.
- "SUPER-SILENT" Housing: Full weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

### GENERATOR RATINGS

| GENERATOR MODEL | VOLTAGE | | PH | HZ | 130°C RISE STANDBY RATING | | 105°C RISE PRIME RATING | | POWER LEAD CONNECTIONS |
|---|---|---|---|---|---|---|---|---|---|
| | L-N | L-L | | | KW/KVA | AMP | KW/KVA | AMP | |
| **SPJD-1000-1-1** | 120 | 240 | 1 | 60 | 100/100 | 416 | 90/90 | 375 | 4 LEAD DEDICATED 1 PH |
| **SPJD-1000-3-2** | 120 | 208 | 3 | 60 | 100/125 | 347 | 90/112.5 | 313 | 12 LEAD LOW WYE |
| **SPJD-1000-3-3** | 120 | 240 | 3 | 60 | 100/125 | 301 | 90/112.5 | 271 | 12 LEAD HIGH DELTA |
| **SPJD-1000-3-4** | 277 | 480 | 3 | 60 | 100/125 | 151 | 90/112.5 | 135 | 12 LEAD HIGH WYE |
| **SPJD-1000-3-5** | 127 | 220 | 3 | 60 | 100/125 | 328 | 90/112.5 | 295 | 12 LEAD LOW WYE |

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. 130° 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. 105° C "PRIME RATINGS" are strictly for gen-sets that 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, on every 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 130°C (standby), and 105°C (prime) R/R winding temperature, within a maximum 30°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 SPJD-1000-60 HZ

## GENERATOR SPECIFICATIONS

Type ..... 4 Pole, revolving field design
Exciter .....Brushless, internal 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% (1/2 cycle, no load to full load)
Unbalanced Load Capability..... 50% of nameplate rating
One Step Load Acceptance ..... 100% of nameplate rating
Motor Starting .....35% Dip on specific voltages
Total Stator and Load Insulation.....Class H, 180°C
Temperature Rise ..... 130°C R/R, standby rating @ 30°C amb.
..... 105°C R/R, prime rating @ 30°C amb.
1 Ø Motor Starting @ 35% Voltage Dip (240V) .....360 KVA
3 Ø Motor Starting @ 35% Voltage Dip (208-240V) ....220 KVA
3 Ø Motor Starting @ 35% Voltage Dip (480V) .....307 KVA
Bearing..... 1, Pre-lubed and sealed
Power Leads.....12 Leads re-connectable for three phase
.....4 leads dedicated winding for single phase
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)
Alternator .....Self ventilating and drip-proof
Ltd. Warranty..... 24 Months from date of start-up or
..... 1000 hours use, which ever comes first

## GENERATOR FEATURES

- Full alternator protection with **SENTINEL "SCOUT"** 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.
- Alternator 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 listing on all alternators. Certain generators are UL-2200 certified.
- Complete engine-alternator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-alternator sets, before shipping.

# ENGINE SPECIFICATIONS AND APPLICATIONS DATA

## ENGINE

Manufacturer..... John Deere
Model and Type ..... 4045HF285, 4 cycle, liquid Cooled
Aspiration.....Turbocharged
Charged Air Cooling System .....Air to Air
Cylinder Arrangement.....4 Cylinders, In-Line
Displacement Cu. In. (Liters).....276 (4.5)
Bore & Stroke In. (Cm.).....4.19 x 5.0 (106 x 127)
Compression Ratio..... 19.0:1
Main Bearings & Style.....Tin-Aluminum, Babbitt
Cylinder Head .....Cast Iron
Pistons.....4, Aluminum Alloy
Crankshaft..... Forged Chrome Steel
Exhaust Valve .....Forged Heat Resistant Steel
Governor .....Electronic, Isochronous
Frequency Regulation .....± 1/4 %
Air Cleaner.....Dry, Replaceable Cartridge
Engine Speed .....1800 rpm
Oil Filter..... 1, Replaceable Spin-On
Max Power, bhp (kwm) Standby ..... .....158 (118)
Max Power, bhp (kwm) Prime ..... .....144 (107)
BMEP: psi (kpa) Standby ..... .....254 (1748)
BMEP: psi (kpa) Prime ..... .....230 (1589)
Ltd. Warranty..... 24 months or 2000 hrs, first to occur

## FUEL SYSTEM

Type ..... Diesel Fuel Oil (ASTM No. 2-D)
Combustion System ..... Direct Injection
Fuel Injection Pump..... Stanadyne Rotary Type
12 VDC Air Intake Heaters.....Standard Equipment
Fuel Filter and Water Separator.....Yes

## FUEL CONSUMPTION

| GAL/HR (LITER/HR) | STANDBY | PRIME |
|---|---|---|
| 100% LOAD | 7.9 (29.9) | 7.1 (26.9) |
| 75% LOAD | 6.0 (22.7) | 5.5(20.8) |
| 50% LOAD | 4.0 (15.1) | 3.9 (14.8) |

## OIL SYSTEM

Type ..... Full Pressure
Oil Pan Capacity qt. (L) .....17.0 (16.1)
Oil Pan Cap. W/ filter qt. (L) .....18.0 (17.0)
Oil Filter..... 1, Replaceable Spin-On

## ELECTRICAL SYSTEM

Ignition System .....Electronic
Eng. Alternator: 12 VDC, negative ground, 55 amp/hr.

Recommended Battery to -18°C (0°F): 12 VDC, Size BCI# 27 or #27F, Max Dimensions: 12 1/4" lg X 7" wi X 9"hi, with standard round posts. Max output at 800 CCA. Battery holder, hold down straps, battery cables, and battery charger, is furnished. Installation of (1) starting battery is required, with possible higher AMP/HR rating, as described above, if normal environment averages -13°F (-25°C) or cooler.

## CERTIFICATIONS

All engines are CARB and EPA emissions certified. All stationary diesel engines are Tier III complaint.

# APPLICATION AND ENGINEERING DATA FOR MODEL SPJD-1000-60 HZ

## COOLING SYSTEM

Type of System ..... Air to Air, Charged air cooler
Coolant Pump .....Pre-lubricated, self-sealing
Cooling Fan Type (no. of blades) .....Pusher (7)
Fan Diameter inches (cm).....22" (55.9)
Ambient Capacity of Radiator °F (°C).....125 (51.6)
Engine Jacket Coolant Capacity Qt. (L) .....13.0 (11.9)
Radiator Coolant Capacity Qt. (L).....24 (22)
Water Pump Capacity gpm (L/min)..... ..... 41 (157)
Heat Reject Coolant: Btu/min (kw) ..... .....3188 (56)
Air to Air Heat Reject Btu/min (kw) ..... .....1281 (22.5)
Low Radiator Coolant Level Shutdown……..…Standard
Note: Coolant temp. shut-down switch setting at 212°F (100°C) with 50/50 (water/antifreeze) mix.

## COOLING AIR REQUIREMENTS

Combustion Air cfm ($m^3$/min)..... .....…318 (9)
Max. Air Intake Restriction:
Clean Air Cleaner, $H_2O$ (KPA)..... ..... 15 (3.75)
Intake Manifold Pressure, Psi (kpa)..... ..... 28 (190)
Max. Allowance Temp. Rise Amb:
Air to Engine Inlet °F (°C)..... .....…..15 (8)
Max. Temp. out of Charged Air Cooler:
@77° F (25°C) Amb. Air, °F (°C)..... ..... 140 (60)
Radiator Cooling Air, SCFM ($m^3$/min)……6400(181)

## EXHAUST SYSTEM

Muffler Inlet – Outlet Size ……Dual mufflers @ 2.5”
Max. Back Pressure in $H_2O$ (kpa) ……30 (7.5)
Exhaust Flow, at rated KW,cfm ($m^3$/min) .... .....840 (23.8)
Exhaust Temp,, at rated KW, °F (ºC)..... .....1076 (580)

## SOUND LEVELS

| | Open Set | Stnd. Encl.. | Super-Silent Encl. |
|---|---|---|---|
| dB(A), Residential Muffler, no load | 89 | 86 | n/a |
| dB(A), Residential Muffler, full load | 91 | 88 | n/a |
| dB(A), Critical Muffler, no load | 86 | 84 | 81 |
| dB(A), Critical Muffler, full load | 88 | 86 | 83 |

Note: Open sets (no enclosure) has no furnished muffler system due to unknown job-site applications. Standard enclosure has installed residential muffler. Super-Silent enclosure has installed critical muffler. Standard enclosure sets can be upgraded from residential to critical muffler. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise
.

## DERATE GENERATOR FOR ALTITUDE

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

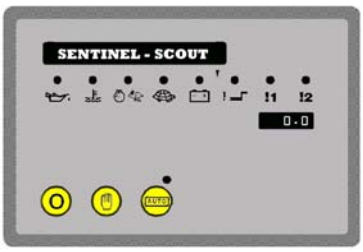
## DERATE GENERATOR FOR TEMPERATURE

2% per 10°F (5.6°C) above 85°F (29.4°C)

## DIMENSIONS AND WEIGHTS

| | Open Set | Standard Enclosure | Super-Silent Enclosure |
|---|---|---|---|
| Length in (cm) | 98 (249) | 122 (310) | 146 (371) |
| Width in (cm) | 48 (122) | 48 (122) | 48 (122) |
| Height in (cm) | 50 (127) | 71 (181) | 71 (181) |
| 1 Ø Net Weight lbs (kg) | 2557 (1160) | 3307 (1488) | 3527 (1600) |
| 1 Ø Ship Weight lbs (kg) | 2747 (1246) | 3527 (1600) | 3777(1713) |
| 3 Ø Net Weight lbs (kg) | 2424 (1099) | 3174 (1440) | 3394(1540) |
| 3 Ø Ship Weight lbs (kg) | 2614 (1186) | 3394 (1539) | 3644 (1653) |

# SENTINEL SCOUT DIGITAL MICROPROCESSOR CONTROLLER




**SENTINEL SCOUT**
This flexible controller allows programming to 8 basic engine functions in the field, and is standard equipment on all 4-pole gen-sets.
Controller has STOP-MANUAL-AUTO mode and (8) basic engine LED indicators: Low oil pressure • High engine temp • Over speed • Under speed • Fail to start • Battery charge fail • Low coolant level • and two auxiliary LED outputs.

**SPECIAL FEATURES :** Micro-processor design • Auto engine stop-start with (3) start attempts before final shutdown • Auto shutdown on fault condition • Push button operation • Adjustable start or stop delay timer • Energize to stop timer • Pre-heat timer • LED alarm indication • External remote start input • Load switch output capability • Solid state fuel and engine crank outputs • Tamper-proof engine hours LCD counter


**SENTINEL III UPGRADE :**
Digital controller with (47) different reporting functions programmable by means of graphic LCD display.


**SENTINEL IV UPGRADE:**
This controller is the same as the SENTINEL III, plus: monitors utility power • Communication via optional RS-232 port. Use this controller with remote annunciators.

# STANDARD AND OPTIONAL FEATURES FOR MODEL SPJD-1000-60 HZ

## STANDARD FEATURES

**ENGINE: CONTROL PANEL:**

- SENTINEL "SCOUT" digital microprocessor with logic allows programming in the field. Controller has:
- STOP-MANUAL-AUTO modes and (8) basic engine failures, signaled by (8) LED indicators:
- Low oil pressure
- High engine temp
- Engine over speed
- Engine under speed
- Engine fail to start
- Battery charge fail
- Low Radiator Coolant Level
- 10 sec. Engine Pre-Heater

Also included is tamper-proof engine hour meter

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 • Residential Silencer • 12 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

**GENERATOR:**

AC generator • Shunt excited • Brushless design • Single bearing • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction

**VOLTAGE REGULATOR:**

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

**ELECTRICAL:**

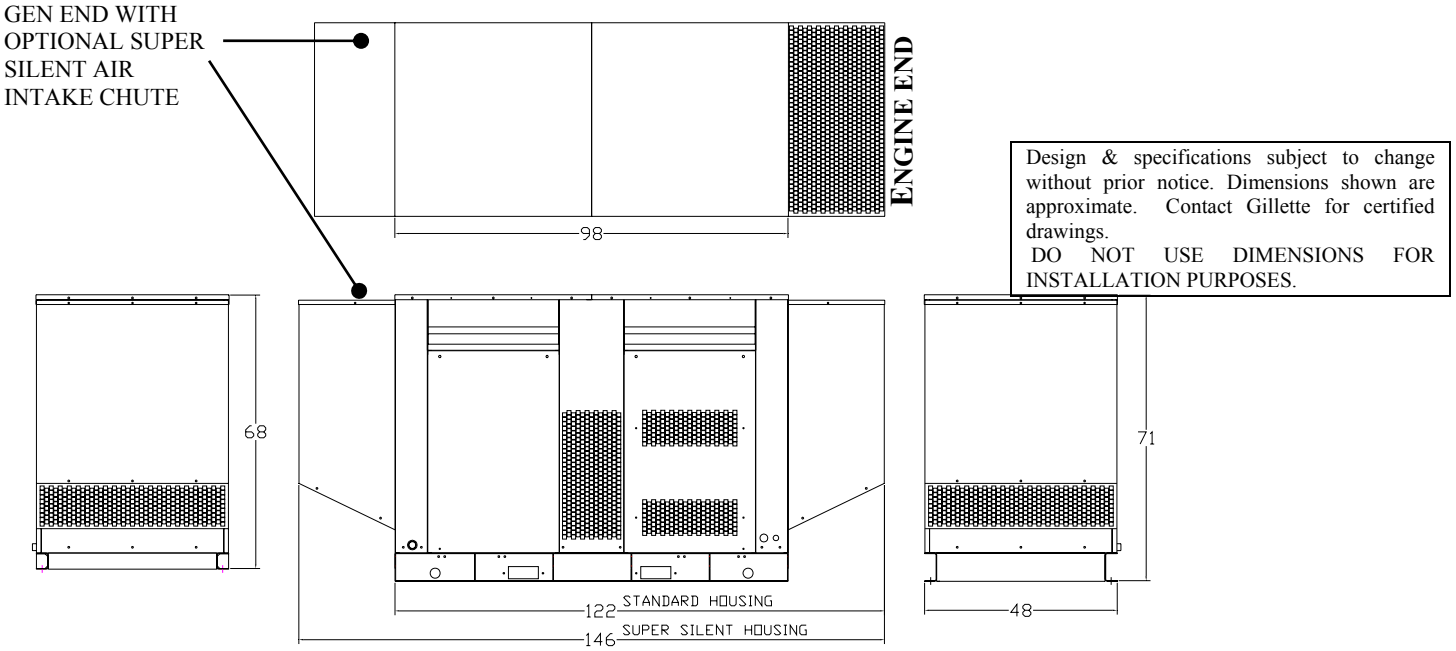
Battery tray • Battery cables • Battery hold down straps • 2-stage battery float charger

**WEATHER/SOUND PROOF STEEL HOUSING CORROSION RESISTANT PROTECTION CONSISTING OF:**

- 9 Heated And Agitated Wash Stages.
- Zinc Phosphate Etching-coating Stage
- E-Coat: Electrostatic Emerging
- Final Baked On Enamel Powder Coat

## ACCESSORY ITEMS

- ☐ Engine Coolant Heater with automatic 60°F on, 80°F off, thermostat
- ☐ Starting Battery Heater Blanket with automatic 60°F on, 80°F off, thermostat
- ☐ Battery Charger, float type, 12 VDC at max. charge, with ammeter.
- ☐ External Permanent Magnet Generator (PMG) for increased induction motor starting capacity on 1∅ or 3 ∅ sets, and to meet NFPA-110 requirements.
- ☐ Exhaust Silencer (Critical Grade) installed on "OPEN" sets or standard housing.
- ☐ Circuit Breaker installed and wired on gen-set. Note: NEMA-3R Breakers are shipped loose.
- ☐ All aluminum or stainless steel weather and sound deadening housing for coastal areas.
- ☐ SENTINEL III digital programmable controller with up to ( 47 ) different reporting functions.
- ☐ SENTINEL IV Controller with all features of Sentinel III, plus allowing full telemetry remote control annunciation, and utility power monitoring.
- ☐ Remote annunciator for up to (10) reporting functions. An additional relay expansion module, plus a second annunciator adds another (10) reporting functions. Note: SENTINEL IV must be selected, to achieve remote annunciation.




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