

# SENTRY-PRO POWER SYSTEMS

By Gillette Generators, Inc.

MODEL  
**SP-400**  
60 HERTZ

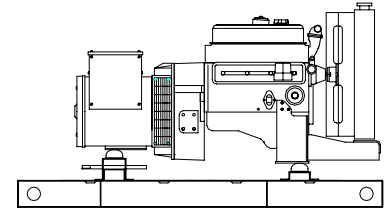
## LIQUID COOLED LPG/NG ENGINE GENERATOR SET

### KW POWER RATINGS RANGE FOR 60 HZ

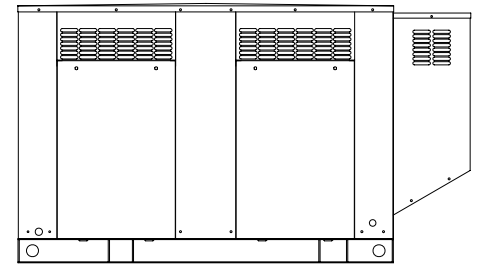
Model	HZ	STANDBY 130°C RISE		PRIME 105°C RISE	
		LPG	N.G.	LPG	N.G.
<b>SP-400-60 HERTZ</b>	60	40	38	35	31

### STANDARD FEATURES

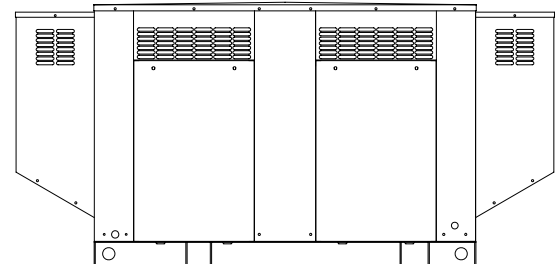
- All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.
- All generator sets will accept 100% rated load in one step, per NFPA-110.
- All generators are UL-1446 certified. Certain generator are UL 2200 certified.
- Solid state, frequency compensated voltage regulation is standard on all gen-sets.
- Electronic engine governor incorporates a throttle body actuator, which allows precise isochronous frequency regulation.
- A brushless rotating field generator design with shunt wound excitation system and connectable at 1 phase or a broad range of 3 phase voltages.
- 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, "open" 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 standard.
- "SUPER-SILENT" Housing: Full weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.



"OPEN" GEN-SET



"STANDARD" HOUSED GEN- SET



"SUPER-SILENT" HOUSED GEN-SET

### GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	LIQUID PROPANE GAS FUEL				NATURAL GAS FUEL			
	L-N	L-L			130°C RISE STANDBY RATING		105°C RISE PRIME RATING		130°C RISE STANDBY RATING		105°C RISE PRIME RATING	
					KW/KVA	AMP	KW/KVA	AMP	KW/KVA	AMP	KW/KVA	AMP
SP-400-1-1	120	240	1	60	40/40	167	35/35	146	38/38	158	31/31	129
SP-400-3-2	120	208	3	60	40/50	139	35/43.8	122	38/47.5	132	31/38	108
SP-400-3-3	120	240	3	60	40/50	120	35/43.8	105	38/47.5	114	31/38	93
SP-400-3-4	277	480	3	60	40/50	63	35/43.8	53	38/47.5	57	31/38	47
SP-400-3-5	127	220	3	60	40/50	131	35/43.8	115	38/47.5	125	31/38	102

RATINGS: All single phase gen-sets are dedicated 4 lead wiring, rated at unity (1.0) power factor. All three phase gen-sets are 12 lead wiring, 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 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 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 SP-400-60 HZ

## GENERATOR SPECIFICATIONS

Type ..... 4 Pole, revolving field design  
 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  
 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) ..... 120 KVA  
 3 Ø Motor Starting @ 35% Voltage Dip (208-240V) ..... 100 KVA  
 3 Ø Motor Starting @ 35% Voltage Dip (480V) ..... 152 KVA  
 Bearing ..... 1, Pre-lubed and sealed  
 Power Leads ..... 12 Leads re-connectable for three phase  
 ..... or 4 Leads for dedicated 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. Standby 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 ..... General Motors  
 Model and Type ..... Ind. Power Train, Vortec, 4.3L, 4 cycle  
 Aspiration ..... Natural  
 Cylinder Arrangement ..... 6 Cylinders, V-6  
 Displacement Cu. In. (Liters) ..... 262 (4.3)  
 Bore & Stroke In. (Cm.) ..... 4 x 3.48 (10.2 x 8.4)  
 Compression Ratio ..... 9.05:1  
 Main Bearings & Style ..... 4, Babbitt  
 Cylinder Head ..... Cast Iron  
 Pistons ..... 6, Silicon Aluminum  
 Crankshaft ..... Nodular Iron  
 Exhaust Valve ..... Forged Steel  
 Governor ..... Electronic  
 Frequency Reg. (no load-full load) ..... Isochronous  
 Frequency Reg. (steady state) ..... ± 1/4%  
 Air Cleaner ..... Dry, Replaceable Cartridge  
 Engine Speed ..... 1800 rpm  
 Piston Speed, ft/min (m./min) ..... 1044 (318)  
 Max Power, bhp (kwm) Standby /LPG ..... 65 (49)  
 Max Power, bhp (kwm) Prime /LPG ..... 59 (44)  
 Ltd. Warranty .... 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”-15”  
 Secondary Fuel Regulator ..... LPG or NG Vapor System  
 Auto Fuel Lock-Off Solenoid ..... Standard on all sets  
 Fuel Supply Inlet Line ..... 1” NPTF  
 \* Measured at gen-set fuel inlet, downstream of any dry fuel accessories.

### FUEL CONSUMPTION

LP GAS: FT <sup>3</sup> /HR (M <sup>3</sup> /HR)	STANDBY	PRIME
100% LOAD	240 (6.9)	230 (6.5)
75% LOAD	200 (5.6)	180 (5.0)
50% LOAD	145 (4.0)	140 (4.0)
<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	PRIME
100% LOAD	584 (17)	550 (15.6)
75% LOAD	485 (14)	450 (12.8)
50% LOAD	375 (10)	340 (9.6)
<b>NG = 1000 BTU X FT<sup>3</sup>/HR = Total BTU/HR</b>		

### OIL SYSTEM

Type ..... Full Pressure  
 Oil Pan Capacity qt. (L) ..... 5.0 (4.7)  
 Oil Pan Cap. W/ filter qt. (L) ..... 6.5 (6.2)  
 Oil Filter ..... 1, Replaceable Spin-On

### ELECTRICAL SYSTEM

Ignition System ..... Electronic  
 Eng. Alternator and Starter:  
     Ground ..... Negative  
     Volts DC ..... 12  
     Max. Amp Output of Alternator ..... 70  
 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.

# APPLICATION AND ENGINEERING DATA FOR MODEL SP-400-60 HZ

## COOLING SYSTEM

Type of System .....	Pressurized, closed recovery
Coolant Pump .....	Pre-lubricated, self-sealing
Cooling Fan Type (no. of blades) .....	Pusher (10)
Fan Diameter inches (cm) .....	21" (533)
Ambient Capacity of Radiator °F (°C).....	125 (51.6)
Engine Jacket Coolant Capacity Gal (L).....	1.8 (6.8)
Radiator Coolant Capacity (including engine)Gal. (L).....	5.2 (19.7)
Maximum Restriction of Cooling Air Intake and discharge side of radiator in. H <sub>2</sub> O (kpa).....	.5 (.125)
Water Pump Capacity gpm (L/min).....	28 (106)
Heat Reject Coolant: Btu/min (kw) .....	2320 (40.8)
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 <sup>3</sup> /min) .....	98 (2.78)
Radiator Air Flow cfm (m <sup>3</sup> /min) .....	5000 (142)
Heat Rejected to Ambient:	
Engine: kw (btu/min).....	19.2 (1100)
Alternator: kw (btu/min).....	7.5 (422)

## EXHAUST SYSTEM

Emissions; HC : g/hp-hr.....	83-128*
Emissions; CO : g/hp-hr.....	1920-6400*
Emissions; NoX : g/hp-hr .....	122-333*
Muffler Inlet – Outlet Size .....	2.5"
Max. Back Pressure in. hg (KPA).....	3" (10.2)
Exhaust Flow, at rated kw: cfm (m <sup>3</sup> /min) .....	330 (9.4)
Exhaust Temp., at rated kw: °F (°C) .....	1240 (652)
*Engine manufacturer's estimated range.	

## SOUND LEVELS

	Open Set	Std. Encl.	Super- Silent Encl.
dB(A), Residential Muffler, no load .....	78	73	N/A
dB(A), Residential Muffler, full load.....	80	75	N/A
dB(A), Critical Muffler, no load .....	74	70	68
dB(A), Critical Muffler, full load.....	75	72	69

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

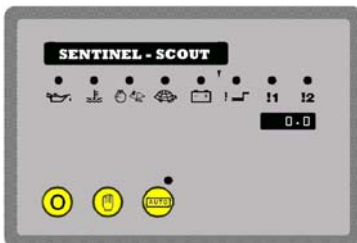
## DERATE GENERATOR FOR TEMPERATURE

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).....	78 (198)	94 (239)	110 (280)
Width in (cm).....	42 (107)	42 (107)	42 (107)
Height in (cm).....	36 (91)	53 (134)	53 (134)
1 Ø Net Weight lbs (kg).....	1326 (601)	1806 (819)	1986 (901)
1 Ø Ship Weight lbs (kg).....	1406 (638)	1936 (878)	2146 (973)
3 Ø Net Weight lbs (kg).....	1316 (597)	1796 (815)	1906 (865)
3 Ø Ship Weight lbs (kg).....	1396 (633)	1956 (887)	2066 (937)

# 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 SP-400-60 HZ

## STANDARD FEATURES

### 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 Level
  - Two auxiliary LED output
- 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
- 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
- flexible oil & radiator drain hose.

### 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 1Ø or 3 Ø 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.

