

# **SENTRY-PRO POWER SYSTEMS**

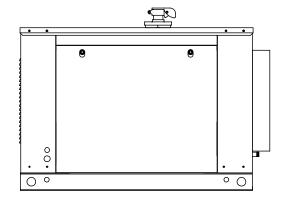
# By Gillette Generators, Inc.

**SPV-160** 

AIR COOLED LPG/NG, RESIDENTIAL STANDBY GEN-SET

## **KW POWER RATINGS RANGE**

Model SERIES		MAXIMUM 150°C RISE		STANDBY 125°C RISE		PRIME 105°C RISE	
SERIES	HZ	LPG	N.G.	LPG	N.G.	LPG	N.G.
SPV-160	60	16.0	14.0	15.0	12.5	13.0	11.0
	50	12.5	10.5	12.0	10.0	10.5	8.5



#### 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.
- Solid state, digital voltage regulation for  $\pm \frac{1}{2}\%$  is standard on all gen-sets.
- Mechanical engine governor incorporates a special actuator, which allows precise 5% frequency regulation, from no load to full load.
- A brushless rotating field generator design with shunt wound excitation system and available at a broad range of voltages.
- Solid state, digital microprocessor logic and ultra-bright LED, annunciation display for different engine and generator functions, plus automatic fault shutdowns; high temp., over-crank, over-speed, under-speed, low oil, and low battery.
- The heavy duty, rugged dry fueled engine is capable of delivering rated power at 3600 RPM (60 HZ) or 3000 RPM (50 HZ).
- All generator set control systems components and accessories provide a 2-year limited warranty at time of initial start-up. Optional extended warranties are available. 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. Flexible exhaust hose is supplied loose for final exhaust pipe installation system, furnished by installer.
- "STANDARD" Housing: Full weather protection and average sound attenuation for normal applications.
- "SUPER-SILENT" Housing: Full weather protection and superior sound attenuation for specific low noise applications. (See "Sound Level" chart).

GENERATOR RATINGS			L	.IQUI	D PROPA	NE GA	S FUEL		NATURAL GAS FUEL							
GENERATOR MODEL	VOLT	AGE	РΗ	ΗZ	150°C R MAXIMI RATIN	UM	125°C R STAND RATIN	BY	105°C R PRIM RATIN	E	150°C R MAXIM RATIN	UM	125°C R STAND RATIN	BY	105°C F PRIM RATIN	IE
	L-N	ᆣ			KW/KVA	AMP	KW/KVA	AMP	KW/KVA	AMP	KW/KVA	AMP	KW/KVA	AMP	KW/KVA	AMP
SPV-160-1-1	120	240	1	60	16/16	66	15/15	62	13/13	54	14/14	58	12.5/12.5	52	11/11	45
SPV-160-3-2	120	208	3	60	16/20	55	15/18.8	52	13/16.3	45	14/17.5	48	12.5/15.6	43	11/13.8	38
SPV-160-3-3	120	240	3	60	16/20	48	15/18.8	45	13/16.3	39	14/17.5	42	12.5/15.6	37	11/13.8	33
SPV-160-3-4	277	480	3	60	16/20	24	15/18.8	22	13/16.3	19	14/17.5	21	12.5/15.6	18	11/13.8	16
SPV-160-3-5	127	220	3	60	16/20	52	15/18.8	49	13/16.3	42	14/17.5	46	12.5/15.6	41	11/13.8	36
SPV-160-1-1-5	110	220	1	50	12.5/12.5	56	12/12	54	10.5/10.5	47	11/11	50	10/10	45	8.5/8.5	38
SPV-160-3-2-5	110	220	3	50	12.5/15.6	41	12/15	39	10.5/13	34	11/13.8	36	10/12.5	32	8.5/10.6	28
SPV-160-3-3-5	219	380	3	50	12.5/15.6	23	12/15	22	10.5/13	20	11/13.8	21	10/12.5	19	8.5/10.6	16
SPV-160-3-4-5	240	415	3	50	12.5/15.6	21	12/15	20	10.5/13	18	11/13.8	19	10/12.5	17	8.5/10.6	14
SPV-160-3-5-5	231	400	3	50	12.5/15.6	22	12/15	21	10.5/13	19	11/13.8	20	10/12.5	18	8.5/10.6	15

RATINGS: All single phase gen-sets are rated at unity (1.0) power factor. All three phase gen-sets are rated at .8 power factor. "MAXIMUM RATINGS" are for short period running, not exceeding 1 hour. "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. "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. 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 150°C (maximum), 125°C (standby), and 105°C (prime) R/R winding temperature, within a maximum 35°C ambient condition. Generators operated at maximum power ratings will 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 SPV-160

## **GENERATOR SPECIFICATIONS**

Type2	2 Pole, 3600 RPM, revolving field design
Exciter	Brushless, shunt excited
	Automatic, solid state
Voltage Regulation	$\pm \frac{1}{2}$ %, No load to full load
Frequency	60 HZ (50 HZ available)
Frequency Regulation	5% (3 cycles, no load to full load)
	oility100% of nameplate rating
	Code G w/ 35% Dip on specific voltages
Total Stator and Rotor In	nsulationClass H, 180°C
Temperature Rise 15	0°C R/R, maximum rating @ 35°C amb.
	125°C R/R, standby rating @ 35°C amb.
	105°C R/R, prime rating @ 35°C amb.
	4 Leads for dedicated single phase
O	ptional 3 Leads for dedicated three phase
CouplingSA	AE-5 Flywheel housing with flexible disc
Total Harmonic Distorti	on Max 6½% (MIL-STD705B)
Telephone Interference	Factor Max 250 (NEMA MG1-22)
	Max 5% (MIL-STD 405B)
Alternator	Self ventilating and drip-proof
	24 Months or 1000 hrs., first to occur
Ltd. Prime Warranty	12 Months or 500 hrs., first to occur

## **GENERATOR FEATURES**

- Full alternator protection with solid state microprocessor, based controller, for automatic shutdown protection.
- Automatic voltage regulation by automatic solid state, digital design, yielding ±½% from no load to full load.
- 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 3000 V. hi-potential test on main windings, and rotor windings receive a 3000 V. hi-potential test, as per MIL-STD 705B.
- All windings are subjected to "surge" testing to confirm winding integrity and consistency with dielectric voltage withstand test per UL2200.39.
- Full copper windings with UL-1446 listing on all alternators.
- All gen-sets are prototyped and production tested.
- Full load testing on all engine-alternator sets, before shipping.
- Harmful harmonic distortions over 10% in generator power will harm digital loads. Our distortions are only 6%.

## ENGINE SPECIFICATIONS AND APPLICATIONS DATA

#### **ENGINE**

Manufacturer	VANGUARD Motors
Model and Type	DM950G, 4 cycle
Aspiration	Naturally
Cylinder Arrangement	3 cylinder, in line
Displacement Cu. In. (cm <sup>3</sup> )	58.1 (952)
Bore x Stroke In. (mm.)	
Main Bearings & Style	Ball Bearings
Cylinder Head	Aluminum
Crankshaft	Forged Steel
Exhaust Valve	Hardened for dry fuel use
Governor	Mechanical
Frequency Reg. (steady state)	±5% (3 cycles)
Air Cleaner(1)	Replaceable main paper element
(1) Replaceable s	econdary dry-type foam element
Oil Filter	(1), Replaceable spin-on
Ltd. Standby Warranty24 M	lonths or 1000 hrs., first to occur
Ltd. Prime Warranty 12	months or 500 hrs., first to occur

Speed	. <u>60 HZ</u>	<u>50 HZ</u>
Rated RPM	3600	3000
Max Power, bhp Standby / LPG	28	22
Max Power, bhp Prime / LPG	26	20
Max Power, bhp Standby / Nat. Gas	25	20
Max Power, bhp Prime / Nat. Gas	23	18

## **FUEL SYSTEM**

Type LPC	G or NAT. GAS, vapor withdrawal
Fuel Pressure (kpa), in. H <sub>2</sub> O	(1.74-2.74), 7"-15" Water column
Secondary Fuel Regulator	LPG or NG vapor system
Auto Fuel Lock-Off Solenoid	(2) Solenoid on each set
	For back-up safety shut-down

## **FUEL CONSUMPTION**

	LP GAS: FT <sup>3</sup> /HR (M <sup>3</sup> /HR)	60 HZ	50 HZ				
Y	100% LOAD	125 (3.5)	100 (2.8)				
STDBY	75% LOAD	95 (2.7)	75 (2.1)				
S	50% LOAD	60 (1.7)	35 (1.0)				
E	100% LOAD	113 (3.2)	90 (2.5)				
PRIME	75% LOAD	86 (2.4)	68 (1.9)				
<u>-</u>	50% LOAD	52 (1.5)	32 (0.9)				
	LPG = 2500 BTU X FT <sup>3</sup> /HR = Total BTU/HR						

	NAT. GAS: FT <sup>3</sup> /HR (M <sup>3</sup> /HR)	60 HZ	50 HZ
Y	100% LOAD	280 (7.9)	224 (6.3)
STDBY	75% LOAD	210 (5.9)	168 (4.8)
S	50% LOAD	142 (4.0)	110 (3.1)
E	100% LOAD	252 (7.1)	202 (5.7)
PRIME	75% LOAD	189 (5.4)	151 (4.3)
P	50% LOAD	126 (3.6)	99 (2.8)
	$NC = 1000 \text{ RTU Y FT}^3/HR =$	Total RTII/HR	

LPG CONVERSION: 8.50 FT<sup>3</sup> = 1 LB. ; 36.4 FT<sup>3</sup> = 1 GAL

#### **OIL SYSTEM**

Type	Full Pressure
Oil Pan Capacity qt. (L)	2.75 (2.6)
Oil Pan Capacity W/ filter & oil cooler qt. (L)	

#### **ELECTRICAL SYSTEM**

Ignition System	Electronic
Eng. Alternator:	
Ground	Negative
Volts DC	12
Max. Amp Output	15
Recommended Battery: . 12 VDC, 55 Amp/Hr, Size B	CI# 21R or
26R (8½"lg X 7"wi X 8¾"hi), type "T", "L", or "X" t	erminals.
Minimum Cold-Cranking amps at 0°F (-17.8°C):	500 CCA
Eng. Starter Motor	12 VDC

#### **COOLING SYSTEM**

Liquid cooled by generator and engine pusher fans. A maximum radiator air flow of 3000 CFM is required for proper cooling.

## **EXHAUST SYSTEM**

Residential type muffler with 200 CFM exhaust flow and an exhaust back pressure at 3600 RPM full load, of 1½" hg water column.

#### **ENGINE CLASS AND EMISSION LIMITS**

If an engine is not handheld (trimmer, blower, etc.) and is greater than or equal to 225cc displacement, it is a Class II engine. Following are maximum emission levels for CARB & EPA Class II engines.

#### CALIFORNIA TIER 1 (GRAMS / HP-HOUR)

CLASS	DISPLACEMENT	HC+NO <sub>X</sub>	CO
II	27 HP = 952 CC	10	350

#### USA EPA PHASE 1 (GRAMS / KILOWATT HOUR)

COLLEGE	1111011 ( 01111110 ) 11	TEO TITLE II	0 0 11,
CLASS	DISPLACEMENT	HC+NO <sub>X</sub>	CO
II	27  HP = 952  CC	13.4	519

1 HORSEPOWER = .746 KW

1 KW = 1.341 HORSEPOWER

#### **DERATING FACTORS**

Engine horse power ratings meet SAE J1349 test codes. Reduce 3.5% for each 100 feet, over 328 feet above seal level and 1% for every 10°F (5.65°C) rise, above 77°F (25°C). Generator specifications are in accordance with ASA, NEMA, and IEEE standards.

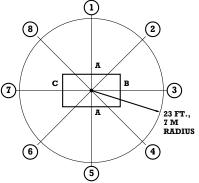
## **ACOUSTIC DATA**

A= Access Doors,

**B**= Engine Radiator End

C= Generator End

Note: All tests are full load operation in standard weather with Open (no enclosure), Standard Enclosure, or Super-Silent Enclosure.



Model SPV-160 O-Open (no enclosure)

1/10 de l' se l' 100 e e pen (no enclosure)								
Position	1	2	3	4	5	6	7	8
dB(A)	75	75	77	75	73	74	75	74

#### Model SPV-160 E-Standard Enclosure

Position	1	2	3	4	5	6	7	8
dB(A)	69	69	71	69	67	68	69	68

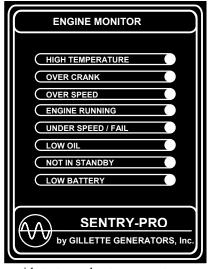
**Model SPV-160 S-Super-Silent Enclosure** 

Position	1	2	3	4	5	6	7	8
dB(A)	66	66	68	66	64	65	66	65

#### STANDARD ENCLOSURE FEATURES

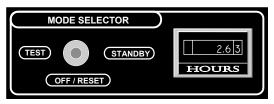
- Rust-free "Galvaneel" steel housing.
- Baked-on power coat paint, having UV protection and 1000 hr. salt spray deterioration test per UL standards.
- Interior sound damping preventing metal "ringing".
- Interior sound absorbing foam throughout enclosure.
- Full service access doors on both sides of enclosure.
- Hot muffler is concealed inside enclosure.
- Full steel base for firm-rigid mounting.
- Polymer mounting pad is furnished for easier and faster installations.

## ENGINE MONITOR & OPERATION MODE FOR RESIDENTIAL STANDBY GENERATOR SETS



These sets use standard (2) wire start interfacing fully compatible with any dry contact startstop system that might be installed on ATS, remote start-stop control panels, Trace inverters for controlling solar power battery arrays, etc. The start-stop signal on such equipment is utilized by the gen-set to initialize a (4) second countdown before the gen-set actually begins its first crank cycle, to

avoid start-ups due to momentary power outages.



These standby gen-sets are "stand-alone" units which can work with any type ATS system or any other type sensing device, using (2) wire start-stop interfacing.

## Standard features of SPV series standby sets are:

Solid State Digital Microprocessor providing automatic engine start-stop; auto shutdown for low oil, high temperature, over speed, under speed, engine fail, engine crank failure (after 3 failed crank attempts); battery charge fail; a "not in standby mode" warning indicator and a built-in (4) second engine start delay and (2) minute engine cool down delay. Timer cycles can be disabled in the field if application requirements so dictate. The "Mode Selector" switch serves (3) functions: A "Test" position (causing the gen-set to start and run indefinitely, without ATS switching the load); a "Standby" position (the system is ready to start automatically, whenever utility power fails); and an "Off/Reset" position (the engine can not start under any condition, so this is the service position and reset position when any fault is corrected). The "Engine Monitor" has (8) highly visible LED annunciators for all conditions. When mode switch is placed in "Standby" all (8) LED's will flash (3) times serving as a lamp test. The panel also includes a mainline circuit breaker and run time meter.

# STANDARD AND OPTIONAL FEATURES FOR MODEL SPV-160

#### **CONTROL PANEL:**

SPV Series, automatic start-stop engine controller, utilizing solid state digital microprocessor with (8) ultra-bright LED annunciators. Panel also has main line circuit breaker, run time meter, and mode selector switch with "Test", "Standby", or "Off/Reset" positions.

#### **ENGINE:**

Full flow air cleaner and oil filter • full pressure oil system with separate oil cooler • spin-on oil filter • residential muffler • 12 VDC battery charging alternator • vibration isolators • secondary dry fuel regulator with (2) dry fuel lock-off solenoids • 3 in line cylinder Vanguard engine

#### **GENERATOR:**

AC generator with digital regulation system • single bearing • brushless design • class H, 180°C insulation system • self ventilated, drip proof construction

#### **ELECTRICAL:**

Battery tray • battery cables • battery hold down straps • and 3-stage, float type 2 amp automatic battery charger

#### **SUPPORT:**

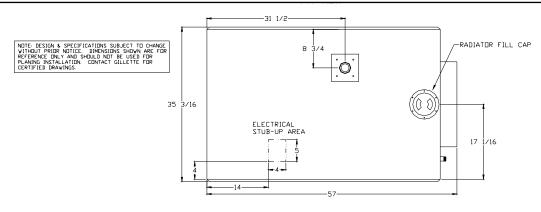
Operation, maintenance, and installation instructions Call 1-800-777-9639 or Fax 1-574-262-1840

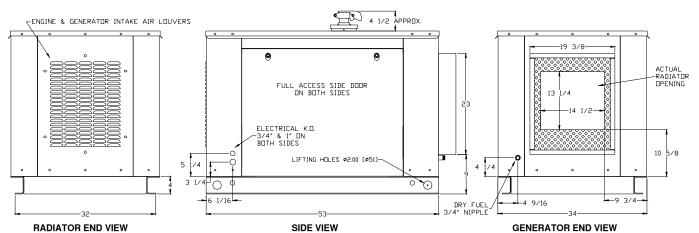
E-mail: sales@gillettegenerators.com Web: www.gillettegenerators.com

## **OPTIONAL FEATURES & ACCESSORIES**

Remote annunciator	Oil drain flex hose with on-off valve
3 Phase winding	Super-Silent housing w/ special sound deadening foam
3 Phase ATS system	"Resonator" muffler added to existing residential
1 Phase ATS system	muffler, to reduce high pitch exhaust tones
Open (no enclosure) for special applications	In hose water heater for faster cold weather starts
	All aluminum weather housing

## DIMENSIONAL OVERVIEW PRINT FOR MODEL SPV-150





**DIMENSIONS AND WEIGHTS** 

	Open	Standard	Super-Silent	
	Set	Enclosure	Enclosure	
Length in (cm)	48 (122)	57 (145)	71 (145)	
Width in (cm)	34 (86)	34 (86)	34 (86)	
Height in (cm)	31 (79)	38 (97)	38 (97)	
Net Weight lbs (kg)	430 (195)	570 (259)	625 (283)	
Ship Weight lbs (kg)	495 (225)	635 (288)	690 (313)	

DISTRIBUTED BY:		