STANDARD FEATURES

- All generator sets are USA wound, built, and thoroughly tested. Complete production models are USA factory built.
- Full power capacity to start up to a 5 ton A/C unit, equipped with “Easy Start” circuitry.
- All generator sets will accept 100% rated load in one step, per NFPA-110.
- All generators are UL-1446 certified.
- Capacitor load compensated (CLC) voltage regulation for ±3% is standard on all gen-sets.
- Mechanical engine governor incorporates a special actuator, which allows precise ±2% frequency regulation, from no load to full load. Built-in dual oil coolers yield longer engine service life.
- 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).
- 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, uninhabited by humans or animals, with proper ventilation.
- “LEVEL 1” All Aluminum Housing: Full weather protection and average sound attenuation for normal applications.
- “LEVEL 2” All Aluminum Housing: Full weather protection and superior sound attenuation for specific low noise applications. (See “Sound Level” chart on page 3)
- New, 3 year LTD. Warranty on all Subaru dry fuel engines.

**GENERATOR RATINGS**

<table>
<thead>
<tr>
<th>GENERATOR MODEL</th>
<th>VOLTAGE</th>
<th>PH</th>
<th>HZ</th>
<th>LIQUID PROPANE GAS FUEL</th>
<th>NATURAL GAS FUEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L-N</td>
<td>L-L</td>
<td></td>
<td>KW/KVA</td>
<td>AMP</td>
</tr>
<tr>
<td>SPS-120-1-1</td>
<td>120</td>
<td>240</td>
<td>1</td>
<td>12/12</td>
<td>50</td>
</tr>
<tr>
<td>SPS-120-3-2</td>
<td>120</td>
<td>208</td>
<td>3</td>
<td>12/15</td>
<td>42</td>
</tr>
<tr>
<td>SPS-120-3-3</td>
<td>120</td>
<td>240</td>
<td>3</td>
<td>12/15</td>
<td>36</td>
</tr>
<tr>
<td>SPS-120-3-4</td>
<td>277</td>
<td>480</td>
<td>3</td>
<td>12/15</td>
<td>18</td>
</tr>
<tr>
<td>SPS-120-3-5</td>
<td>127</td>
<td>220</td>
<td>3</td>
<td>12/15</td>
<td>40</td>
</tr>
</tbody>
</table>

**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. 130° “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° “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 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 SPS-120

GENERATOR SPECIFICATIONS

Type .................................. LPG or NAT. GAS, vapor withdrawal
Exciter .................................. Brushless, shunt excited
Voltage Regulator .................... Capacitor load compensated (CLC)
Voltage Regulation ................. ±3%, No load to full load
Frequency .................................. 60 HZ (50 HZ available)
Frequency Regulation ............. 2% (2 cycles, no load to full load)
Unbalanced Load Capability ...... 50% of nameplate rating
Motor Starting ..................... 4 HP, Code G w/ 35% Dip on specific voltages
Total Stator and Rotor 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.
Bearing .................................. 1, Pre-lubed and sealed
Power Leads ......................... 4 Leads for dedicated single phase
....................................... Optional 3 Leads for dedicated three phase
Coupling .................................. Direct taper shaft
Total Harmonic Distortion ......... Max 6/5% (MIL-STD705B)
Telephone Interference Factor ... Max 250 (NEMA MG1-22)
Deviation Factor ..................... Max 5% (MIL-STD 405B)
Alternator .......................... Self ventilating and drip-proof
Ltd. Standby Warranty .............. 24 Months or 1000 hrs., first to occur
Ltd. Prime Warranty ................. 12 Months or 500 hrs., first to occur

ENGINE SPECIFICATIONS AND APPLICATIONS DATA

ENGINE

Manufacturer .................................. Subaru
Model and Type ......................... EH722LZ2640, 4 cycle
Aspiration .................................. Naturally
Cylinder Arrangement ................. V-Twin, 2 cylinders
Displacement Cu. In. (cm³) ............ 43.9 (720)
Bore x Stroke In. (mm) .................. 3.31 x 2.56 (84 x 65)
Compression Ratio ..................... 8.3:1
Main Bearings & Style ............... Over-sized Ball Bearing
Crankshaft .......................... Forged High Carbon Steel
Exhaust Valve ......................... Hardened for dry fuel use
Governor .................................. Mechanical
Frequency Reg. (steady state) .......... ±2%
Air Cleaner .......................... (1) Replaceable main paper element
Oil Filter .......................... (1), Replaceable spin-on
Special Ltd. Standby Subaru Engine Warranty ....... 36 Months
Speed .................................. 60 HZ
Rated RPM .................................. 3600
Max Power, bhp Standby / LPG ...... 25
Max Power, bhp Prime / LPG ........ 23
Max Power, bhp Standby / Nat. Gas .. 22.5
Max Power, bhp Prime / Nat. Gas . 20.0

FUEL SYSTEM (EPA-CARB Certified)

Type .................................. LPG or NAT. GAS, vapor withdrawal
Fuel Pressure (kpa), in. H₂O* (1.74-2.74), 7”-115” Water column
Secondary Fuel Regulator ............ NG or LPG vapor system
Auto Fuel Lock-Off Solenoid .......... (2) Solenoids
Add redundant fuel shutoff for safety precautions.

FUEL CONSUMPTION AT 3600 RPM, 60 HERTZ USE

<table>
<thead>
<tr>
<th>LP GAS: AT VARYING LOADS</th>
<th>FT³/HR (M³/HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% LOAD</td>
<td>88 (2.48)</td>
</tr>
<tr>
<td>75% LOAD</td>
<td>71 (2.00)</td>
</tr>
<tr>
<td>50% LOAD</td>
<td>53 (1.50)</td>
</tr>
<tr>
<td>100% LOAD</td>
<td>79 (2.23)</td>
</tr>
<tr>
<td>75% LOAD</td>
<td>64 (1.81)</td>
</tr>
<tr>
<td>50% LOAD</td>
<td>48 (1.36)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAT. GAS AT VARYING LOADS</th>
<th>FT³/HR (M³/HR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% LOAD</td>
<td>195 (5.51)</td>
</tr>
<tr>
<td>75% LOAD</td>
<td>170 (4.80)</td>
</tr>
<tr>
<td>50% LOAD</td>
<td>120 (3.39)</td>
</tr>
<tr>
<td>100% LOAD</td>
<td>176 (4.97)</td>
</tr>
<tr>
<td>75% LOAD</td>
<td>153 (4.32)</td>
</tr>
<tr>
<td>50% LOAD</td>
<td>108 (3.05)</td>
</tr>
</tbody>
</table>

LPG = 2500 BTU X FT³/HR = Total BTU/HR

OIL SYSTEM

Type .................................. Full Pressure
Oil Pan Capacity qt. (L) ............. 1.24 (1.2)
Oil Pan Capacity W/ filter & (2) oil coolers qt. (L) ....... 1.80 (1.7)
All Weather, Year around, synthetic oil use ............ #OW-40

ELECTRICAL SYSTEM

Ignition System ......................... Electronic
Eng. Alternator:
Ground .................................. Negative
Volts DC .................................. 12
Max. Amp Battery Charging Output ......... 15
Min. Battery Req ............... 12 VDC, 55 Amp/Hr, SizeBCI# 21R or
26R (8½”lg X 7”wi X 8¾”hi), type “T”, “L”, or “X” terminals.
Minimum Cold-Cranking amps at 0°F (-17.8°C) : 390 CCA
Eng. Starter Motor ............... 12 VDC

Generator Features

- Full alternator protection with solid state microprocessor, based controller, for automatic shutdown protection.
- Automatic voltage regulation by capacitor load compensation (CLC) design, yielding ±3% 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. Gillette distortions are only 6%.
COOLING SYSTEM

Air cooled by generator and engine suction fans. A maximum 759 CFM cooling intake air is needed for proper engine cooling.

EXHAUST SYSTEM

Residential type muffler with 58 CFM exhaust flow and an exhaust back pressure at 3600 RPM full load, of 30” 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 II (GRAMS / HP-HOUR)

<table>
<thead>
<tr>
<th>CLASS</th>
<th>DISPLACEMENT</th>
<th>HC+NOX</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>25 HP = 720 CC</td>
<td>6.8</td>
<td>214</td>
</tr>
</tbody>
</table>

USA EPA PHASE 2 (GRAMS / KILOWATT HOUR)

<table>
<thead>
<tr>
<th>CLASS</th>
<th>DISPLACEMENT</th>
<th>HC+NOX</th>
<th>CO</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>25 HP = 720 CC</td>
<td>8.0</td>
<td>549</td>
</tr>
</tbody>
</table>

1 HORSEPOWER = .746 KW 1 KW = 1.341 HORSEPOWER

Subaru engines are EPA and CARB (California Air Resources Board) certified for LPG and Natural Gas.

DERATING FACTORS

Engine horse power ratings meet SAE J1349 test codes. Reduce 3.5% for each 1000 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.

ENGINE MONITOR & OPERATION MODE FOR RESIDENTIAL STANDBY GENERATOR SETS

These sets use standard (2) wire start interfacing fully compatible with any dry contact start-stop 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 SPS 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.

ACOUSTIC DATA

A= Access Doors, B= Generator End cool air C= Generator End hot air & exhaust exit

Note: All tests are full load operation in standard weather with Open (no enclosure), Level 1 Enclosure, or Level 2 Enclosure.

Model SPS-120 O-Open (no enclosure)

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>dB(A)</td>
<td>75</td>
<td>74</td>
<td>76</td>
<td>74</td>
<td>75</td>
<td>77</td>
<td>79</td>
<td>77</td>
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</tbody>
</table>

Model SPS-120 E-Level 1 Enclosure

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>dB(A)</td>
<td>69</td>
<td>69</td>
<td>71</td>
<td>68</td>
<td>69</td>
<td>72</td>
<td>73</td>
<td>72</td>
</tr>
</tbody>
</table>

Model SPS-120 S-Level 2 Enclosure

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>dB(A)</td>
<td>66</td>
<td>66</td>
<td>67</td>
<td>66</td>
<td>66</td>
<td>68</td>
<td>70</td>
<td>69</td>
</tr>
</tbody>
</table>

STANDARD ENCLOSURE FEATURES

• All Aluminum Exterior Housing, ensuring a rust and tarnish free installation.
• Powder coat, backed-on enamel finish, passes UL 1000 hour salt spray test.
• 10 independent metal wash stages, with a final iron phosphate metal etching before powder coat finish.
• Interior “Sound Dampening” preventing metal “ringing”.
• Interior sound absorbing foam throughout enclosure.
• Two, locking doors for access to controllers.
• Hot muffler is concealed away from “touch”.
• Access to engine service through bolted access panels.
CONTROL PANEL:
SPS 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 (2) separate oil coolers • spin-on oil filter • residential muffler • 12 VDC battery charging alternator • vibration isolators • secondary dry fuel regulator with redundant dry fuel lock-off solenoid • overhead valve Subaru engine with EPA/CARB certified dry fuel system • 3 year engine warranty

OPTIONAL FEATURES & ACCESSORIES

- Remote annunciator
- 3 Phase winding
- 3 Phase ATS system
- 1 Phase ATS system
- Open (no enclosure) for special applications
- Super-Silent housing w/ special sound deadening foam
- All stainless steel weather housing
- Crankcase oil heater for faster cold weather starts

DIMENSIONAL OVERVIEW PRINT FOR MODEL SPS-120

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