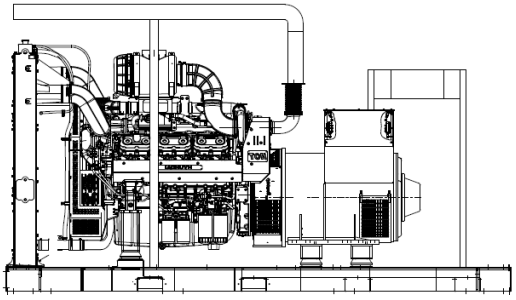
# GILLETTE GENERATORS

## LIQUID COOLED DIESEL ENGINE GENERATOR SET

**60 HZ MODEL**

# SPHD-9000

| Model | HZ | STANDBY 120ºC RISE |
|---|---|---|
| **SPHD-9000-60 HERTZ** | 60 | 900 |



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**

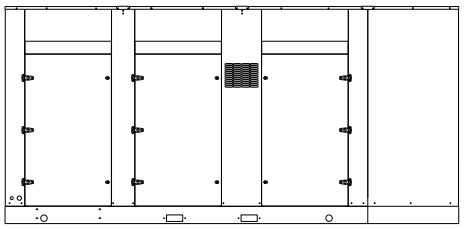
**NEMA ICS10, MG1, ICS6, AB1**

**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, 1054, 1065, 1068**

**"OPEN" GEN-SET**
There is no enclosure, so gen-set must be placed within a weather protected area, uninhabited 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 | 120°C RISE STANDBY RATING | | POWER LEAD CONNECTIONS |
|---|---|---|---|---|---|---|---|
| | L-N | L-L | | | KW/KVA | AMP | |
| **SPHD-9000-3-4** | 277 | 480 | 3 | 60 | 900/1125 | 1353 | 12 LEAD HIGH WYE |
| **SPHD-9000-3-16** | 346 | 600 | 3 | 60 | 900/1125 | 1082 | 4 LEAD HIGH 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. 120° 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. 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 120°C (standby) R/R winding temperature, within a maximum 40°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 & ENGINEERING DATA FOR MODEL SPHD-9000-60 HZ

## GENERATOR SPECIFICATIONS

Manufacturer.....Stamford Electric Generators
Model/Type……S6DD311, 4 Pole, 12 Lead, 480V, Three Phase
..... S6DE17-018, 4 Pole, 6 Lead, 600V, Three Phase
Exciter.....Brushless, shunt excited
Voltage Regulator .....Solid State, HZ/Volts
Voltage Regulation .....½%, No load to full load
Frequency.....60 HZ
Frequency Regulation .....± ½% (1/2 cycle, no load to full load)
Unbalanced Load Capability.....100% of standby amps
One Step Load Acceptance ..... 100% of nameplate rating
Total Stator and Load Insulation.....Class H, 180°C
Temperature Rise ..... 120°C R/R, standby rating @ 40°C amb.
3 Ø Motor Starting @ 30% Voltage Dip (480V -600V) 3100kVA
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)
Alternator.....Self ventilating and drip-proof
Ltd. Warranty Period..... 24 Months from start-up date 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 MKII** 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.

# ENGINE SPECIFICATIONS AND APPLICATIONS DATA

## ENGINE

Manufacturer.....HYUNDAI
Model and Type .....DP222CCS, 4-cycle, Water-Cooled
Aspiration..... Turbo After Cooler, H2O to Air
Charged Air Cooled System ..... H2O to Air
Cylinder Arrangement..... 12 Cylinders, Vee
Displacement Cu. In. (Liters).....1336.4 (21.9)
Bore & Stroke in (mm) .....5.04 X 5.59 (128 x 142)
Compression Ratio..... 14.6:1
Main Bearings..... Tin Overlay with Babbit Backing
Cylinder Head .....Cast Iron with overhead Cam
Pistons.....Aluminum Alloy with Graphite Coating
Crankshaft.....Induction Hardened, Heat Treated Forged
Valves ..... Heat Treated and Hardened Exhaust Valve
Governor .....Electronic
Frequency Regulation .....± 1/4%
Air Cleaner.....Dry, Replaceable Cartridge
Engine Speed .....1800 rpm
Max Power, bhp (kwm) Standby ..... .....1334.3 (995)
BMEP: psi (MPa) Standby..... .....435.1 (3.0)
Ltd. Warranty Period..... 2 Year or 1000 hrs, first to occur

## FUEL SYSTEM

Type ..... Diesel Fuel Oil (ASTM No. 2-D)
Combustion System ..... Direct Injection
Fuel Injection Pump.....BOSCH Electronic
24 VDC Coolant heaters .....Optional Equipment
Fuel Filter ..... ……..Yes with Water Separator

## FUEL CONSUMPTION

| GAL/HR (LITER/HR) | STANDBY |
|---|---|
| 100% LOAD | 64.99 (246) |
| 75% LOAD | 50.99 (193) |
| 50% LOAD | 35.66 (135) |

## OIL SYSTEM

Type ..... Full Pressure
Oil Pan Capacity qt. (L) .....79.25 (75)
Oil Filter.....2, Replaceable Cartridge type
Oil Type…….SAE 10W40

## ELECTRICAL SYSTEM

Ignition System .....Electronic
Eng. Alternator/Starter: …24 VDC, negative ground, 45 amp/hr.

Recommended battery to -18°C (0° F): ....(4) 12 VDC, BCI# 31, Max. Dimensions: 14”lg x 6 3/4” wi x 10” hi, with standard round posts. Min output 1000 CCA. Battery tray (max. dim. at 15”lg x 7”wi). This model has (2) battery trays, (2) hold down straps, (4) sets of battery cables, and (1) battery charger. Installation of (4) 12VDC starting batteries connected in series-parallel configuration 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.

## CERTIFICATIONS

All engines are EPA emissions certified. All emergency stationary diesel engines are Tier II compliant.

# APPLICATION & ENGINEERING DATA FOR MODEL SPHD-9000-60 HZ

## COOLING SYSTEM

Type of System ..... Air to Air, Charged Air Cooler
Coolant Pump .....Pre-lubricated, self-sealing
Cooling Fan Type .....Pusher
Fan Diameter inches (cm).....16.8 (42.7)
Fan drive ratio..... 1.05:1
Ambient Capacity of Radiator °F (°C).....131 (55)
Engine Jacket Coolant Capacity gal. (L).....6.34 (24)
Radiator Coolant Capacity gal. (L) .....17.44 (66)
Heat Reject Coolant: kW ..... ..... …….405
Heat Reject Exhaust, kW ..... ..... …….69
Heat Radiated to Ambient, kW……...710
Heat Rejection to CAC, kW ……242
Low Radiator Coolant Level Shutdown……..Standard
Note: Coolant temp. shut-down switch setting at 217°F (103°C) with 50/50 (water/antifreeze) mix.

## COOLING AIR REQUIREMENTS

Combustion Air cfm ($m^3$/min)..... .....2366 (67)
Max Air Intake Restrictions:
Clean Air Cleaner, KPA (psi)..... .....2.2 (0.32)
Radiator Cooling Air, SCFM ($m^3$/min)……..53,255 (1,510)

## EXHAUST SYSTEM

Exhaust Outlet Size.....12"
Max. Back Pressure in KPA (in. H2O).....5.9 (22)
Exhaust Flow, at rated KW, CFM (m3/min)..... 5,826 (165)
Exhaust Temp, (Stack) °F (ºC) ..... .....977 (525)

## SOUND LEVELS MEASURED IN dB(A)

| | Open Set | Level 2 Encl. |
|---|---|---|
| Level 2, Critical Silencer | 99 | 83 |
| Level 3, Hospital Silencer | 93 | 78 |

Note: Open sets (no enclosure) have optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to Level 3 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 104°F (40°C)

## DIMENSIONS AND WEIGHTS

| | Open Set | Level 2 Enclosure |
|---|---|---|
| Length in (cm) | 186 (472) | 234 (595) |
| Width in (cm) | 82 (208) | 82 (208) |
| Height in (cm) | 92 (234) | 110 (279) |
| 3 Ø Net Weight lbs (kg) | 9,764 (4429) | 12,264 (5563) |
| 3 Ø Ship Weight lbs (kg) | 10,205 (4629) | 12,705 (5763) |

# 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 "**7420MKII**" 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 132 x 64 pixel ratio display • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAr, kVAh, kVArh) • IP65 rating (with supplied gasket)

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 Deep Sea website and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.

Advanced Features:

PLC editor allow user configurable functions to meet specific application requirements • Data logging to assist with fault finding with 20 parameter data logging and recording on USB drives • Multiple date and time scheduler • Set maintenance periods can be configured to maintain optimum engine performance • Modules can be integrated into building management systems (BMS) using MODBUS • Configurable MODBUS pages with RTU & TCP support • Fully configurable via DSE Configuration Suite PC software • Remote SCADA monitoring via DSE Configuration Suite PC software • Engine exerciser • Automatic load transfer • Multiple configurations

# STANDARD FEATURES FOR MODEL SPHD-9000-60 HZ

## STANDARD FEATURES

**CONTROL PANEL:**

Deep Sea 7420 MKII 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:**

Fuel filter • Full flow Oil filter • Air filter • Fuel pump • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump • Thermostat • Pusher fan and guard • Exhaust manifold • Electronic Governor • 24 VDC battery charging alternator • Flexible fuel and exhaust connectors • Vibration isolators • Open coolant recovery system with 50/50 water to anti-freeze mixture • flexible oil & radiator hose • Shut-down sensors for low oil pressure, high coolant temp., low coolant level, high ambient temp.

**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:**

1% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

**DC ELECTRICAL SYSTEM:**

Battery trays • Battery cables • Battery hold down straps • 3-stage battery charger with float, absorption, & bulk automatic charge stages

**WEATHER / SOUNDPROOF 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

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