STANDBY PRIME 60-100 kW 54-90 kW

60 Hz

<table>
<thead>
<tr>
<th>Model</th>
<th>Standby kW (kVA)</th>
<th>Prime kW (kVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D60-4S</td>
<td>60 (60)</td>
<td>54 (54)</td>
</tr>
<tr>
<td>D75-4S</td>
<td>75 (75)</td>
<td>67.5 (67.5)</td>
</tr>
<tr>
<td>D80-4</td>
<td>80 (100)</td>
<td>72 (90)</td>
</tr>
<tr>
<td>D90-4S</td>
<td>90 (90)</td>
<td>82 (82)</td>
</tr>
<tr>
<td>D100-4</td>
<td>100 (125)</td>
<td>90 (112.5)</td>
</tr>
<tr>
<td>D100-4S</td>
<td>100 (100)</td>
<td>90 (90)</td>
</tr>
</tbody>
</table>

Tier II EPA Approved, Emissions Certified

FEATURES

GENERATOR SET
- Complete system designed and built at ISO 9001 certified facilities
- Factory tested to design specifications at full load conditions

ENGINE
- Governor, electronic
- Electrical system, 12 VDC
- Cartridge type filters
- Battery rack and cables
- Coolant and lube drains piped to edge of base

GENERATOR
- Insulation system, class H
- Drip proof generator air intake (NEMA 2, IP23)
- Electrical design in accordance with BS5000 Part 99, EN61000-6, IEC60034-1, NEMA MG-1.33

CONTROL SYSTEM
- EMCP 3.1 digital control panel
- Vibration isolated NEMA 1 enclosure with lockable hinged door
- DC and AC wiring harnesses

MOUNTING ARRANGEMENT
- Heavy-duty fabricated steel base with lifting points
- Anti-vibration pads to ensure vibration isolation
- Complete OSHA guarding
- Stub-up pipe ready for connection to silencer pipework
- Flexible fuel lines to base with NPT connections

COOLING SYSTEM
- Radiator and cooling fan complete with protective guards
- Standard ambient temperatures up to 50° C (122° F)

CIRCUIT BREAKER
- UL/CSA listed
- 3-pole with solid neutral
- NEMA 1 steel enclosure, vibration isolated
- Electrical stub-up area directly below circuit breaker

AUTOMATIC VOLTAGE REGULATOR
- Voltage within ± 0.5% 3-phase and ± 1.0% single phase at steady state from no load to full load
- Provides fast recovery from transient load changes

EQUIPMENT FINISH
- All electroplated hardware
- Anticorrosive paint protection
- High gloss polyurethane paint for durability and scuff resistance

QUALITY STANDARDS
- BS4999, BS5000, BS5514, EN61000-6, IEC60034, NEMA MG-1.33, NFPA 110 (with optional equipment)

DOCUMENTATION
- Operation and maintenance manuals provided
- Wiring diagrams included

WARRANTY
- All equipment carries full manufacturer’s warranty.

4016 Quartz Drive
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web: www.generatorjoe.NET

DIESEL GENERATOR SET

4016 Quartz Drive
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web: www.generatorjoe.NET
OPTIONAL EQUIPMENT*

ENCLOSURE
- B Series weather protective enclosure (includes internal silencer system)
  - Single point lift
  - Panel viewing window
  - External emergency stop pushbutton
- Sound attenuated enclosure (includes internal silencer system)

SILENCER SYSTEM – OPEN UNIT
- Level 1 silencer
- Level 2 silencer
- Level 3 silencer
- Mounting kit
- Through-wall installation kits

ENGINE
- Battery heater
- Lube oil drain pump
- High lube oil temperature shutdown
- Lube oil sump heater

CIRCUIT BREAKER
- Auxiliary voltfree contacts
- Shunt trip (100+ amp breakers)

GENERATOR
- Anti-condensation heater
- Permanent magnet generator
- AREP excitation system (D80-4, D100-4)
- Generator upgrade 1 size (D80-4, D100-4)

CONTROL SYSTEM
- No control system
- EMCP 3.2 digital control panel

MOUNTING ACCESSORIES
- Seismic (Zone 4) vibration isolators

FUEL SYSTEM
- Metal fuel tank
- UL listed closed top-diked skid-mounted fuel tank base (12/24-hour capacity) with fuel alarm (low level/leak detected)
- Critical high fuel alarm
- Critical low fuel level shutdown

COOLING SYSTEM
- Coolant heater
- Low coolant temperature alarm
- Low coolant level shutdown
- Radiator transition flange

REMOTE ANNUNCIATORS
- 16-channel remote annunciator panel (supplied loose)

MISCELLANEOUS ACCESSORIES
- Toolkit
- Additional operator’s manual pack
- Special enclosure color
- UL listing
- CSA certification
- French or Spanish language labels

EXTENDED SERVICE CONTRACTS
- Extended Service Coverage available

TESTING
- Factory witness test (restricted to 6 hours – full load, 1.0 pf)

* Some options may not be available on all models. Not all options are listed.
## Generator Set Dimensions and Weights

<table>
<thead>
<tr>
<th>Model</th>
<th>Length mm (in)</th>
<th>Width mm (in)</th>
<th>Height mm (in)</th>
<th>Weight kg (lb)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>D60-4S</td>
<td>2347 (92.4)</td>
<td>1100 (43.3)</td>
<td>1321 (52.0)</td>
<td>1342 (2,959)</td>
</tr>
<tr>
<td>D75-4S</td>
<td>2347 (92.4)</td>
<td>1100 (43.3)</td>
<td>1321 (52.0)</td>
<td>1382 (3,047)</td>
</tr>
<tr>
<td>D80-4</td>
<td>2347 (92.4)</td>
<td>1100 (43.3)</td>
<td>1321 (52.0)</td>
<td>1432 (3,157)</td>
</tr>
<tr>
<td>D90-4S</td>
<td>2347 (92.4)</td>
<td>1100 (43.3)</td>
<td>1321 (52.0)</td>
<td>1432 (3,157)</td>
</tr>
<tr>
<td>D100-4</td>
<td>2347 (92.4)</td>
<td>1100 (43.3)</td>
<td>1321 (52.0)</td>
<td>1432 (3,157)</td>
</tr>
<tr>
<td>D100-4S</td>
<td>2347 (92.4)</td>
<td>1100 (43.3)</td>
<td>1321 (52.0)</td>
<td>1502 (3,311)</td>
</tr>
</tbody>
</table>

**NOTE:** General configuration not to be used for installation. See specific dimensional drawings for detail.

*Includes oil and coolant
STANDBY  60-100 kW
PRIME  54-90 kW
60 Hz

SPECIFICATIONS

**GENERATOR**

- **Voltage regulation**: ± 0.5% 3-phase and ± 1.0% single phase at steady state from no load to full load
- **Frequency**: ± 0.25% for constant load, no load to full load
- **Waveform distortion**: THD < 4%, at no load
- **Radio interference**: Compliance with EN61000-6
- **Telephone interference**: TIF < 50, THF < 2%
- **Overspeed limit**: 2250 rpm
- **Insulation**: Class H
- **Temperature rise**: Within Class H limits
- **Available voltages**: 1-phase – 120/240, 115/230, 110/220
  3-phase – 277/480, 266/460, 120/240, 127/220, 120/208, 347/600
- **Deration**: Consult factory for available outputs
- **Ratings**: At 30°C (86°F), 152.4 m (500 ft), 60% humidity, 1.0 pf (1-phase), 0.8 pf (3-phase)

**ENGINE**

- **Manufacturer**: Caterpillar
- **Type**: 4-cycle
- **Bore – mm (in)**: 105.0 (4.13)
- **Stroke – mm (in)**: 127.0 (5.00)
- **Governor Type**: Electronic
- **Class**: G2
- **Engine speed – rpm**: 1800
- **Air cleaner type**: Dry, replaceable paper element type with restriction indicator

**CONTROL PANEL**

- **Heavy duty sheet steel enclosure with lockable hinged door**
- **Vibration isolated from generating set**
- **LCD display**
- **AC metering**
- **DC metering**
- **Fail to start shutdown**
- **Low oil pressure shutdown**
- **High engine temperature**
- **Low/high battery voltage**
- **Underspeed/overspeed**
- **Loss of engine speed detection**
- **2 spare fault channels**
- **20 event fault log**
- **2 LED status indicators**
- **Lockdown emergency stop push button**

**RATING DEFINITIONS AND CONDITIONS**

**Standby** – Applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator is peak rated (as defined in ISO8528-3).

**Prime** – Applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and the generator set can supply 10 percent overload power for 1 hour in 12 hours.

---

**D80-4, D60-4S, D75-4S – C4.4**

- **Aspiration**: Turbocharged
- **Cylinder configuration**: In-line 4
- **Displacement – L (cu in)**: 4.4 (269)
- **Compression ratio**: 19.3:1
- **Max power at rated rpm – kW (hp)**
  - **Standby**: 94 (126)
  - **Prime**: 85 (114.5)
- **BMEP – kPa (psi)**
  - **Standby**: 1422 (206)
  - **Prime**: 1252 (187)
- **Regenerative power – kW (hp)**: 13.8 (18.5)

**D90-4S, D100-4, D100-4S – C4.4**

- **Aspiration**: Turbocharged
- **Cylinder configuration**: In-line 4
- **Displacement – L (cu in)**: 4.4 (269)
- **Compression ratio**: 19.3:1
- **Max power at rated rpm – kW (hp)**
  - **Standby**: 117.5 (157.5)
  - **Prime**: 106.9 (143.2)
- **BMEP – kPa (psi)**
  - **Standby**: 1778 (258)
  - **Prime**: 1616 (234)
- **Regenerative power – kW (hp)**: 13.8 (18.5)

---

LEHE5157-00

4016 Quartz Drive
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web www.generatorjoe.NET
### Generator Set Technical Data – 1800 rpm/60 Hz

<table>
<thead>
<tr>
<th>Power Rating</th>
<th>kW</th>
<th>kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Prime</td>
<td>72</td>
<td>90</td>
</tr>
</tbody>
</table>

#### Lubricating System
- **Type:** full pressure
- **Oil filter:** spin-on, full flow
- **Oil cooler:** watercooled
- **Oil type required:** API CG4/CH4
- **Total oil capacity:**
  - L: 7.9
  - U.S. gal: 1.4
  - L: 6.4
  - U.S. gal: 1.2

#### Fuel System
- **Generator set fuel consumption:**
  - 100% load:
    - L/hr: 23.8
    - gal/hr: 6.3
    - Btu/min: 21.7
    - kW: 5.7
  - 75% load:
    - L/hr: 18.5
    - gal/hr: 4.2
    - Btu/min: 16.9
    - kW: 4.5
  - 50% load:
    - L/hr: 13.2
    - gal/hr: 3.5
    - Btu/min: 12.2
    - kW: 3.2

#### Engine Electrical System
- **Battery charging generator ampere rating:** 65, 65

#### Cooling System
- **Water pump type:** centrifugal
- **Generator system capacity incl. engine:**
  - m₃/O: 12.6
  - ft³/H: 3.3
- **Maximum coolant static head:**
  - m: 10.2
  - ft: 33.5
- **Coolant flow rate:**
  - L/hr: 11.640
  - gal/hr: 3.075
  - Btu/min: 276
- **Radiator system capacity incl. engine:**
  - L: 12.6
  - U.S. gal: 3.3
- **Heat rejected to coolant at rated power:**
  - kW: 52.5
  - Btu/min: 2,986
- **Total heat radiated to room at rated power:**
  - kW: 15.7
  - Btu/min: 893
- **Cooling airflow (@ rated speed):**
  - Rate with restriction:
    - L/min: 244
    - U.S. gal/hr: 6,816

#### Air Requirements
- **Combustion air flow:**
  - m³/min: 5.95
  - cfm: 218
- **Maximum air cleaner restriction:**
  - kPa: 5
  - in H₂O: 20
- **Cooling airflow:**
  - m³/min: 26.4
  - cfm: 933

#### Exhaust System
- **Maximum allowable backpressure:**
  - kPa: 15
  - in Hg: 4.5
- **Exhaust flow at rated kW:**
  - m³/min: 13.47
  - cfm: 565
- **Exhaust temperature at rated kW – Dry exhaust:**
  - °C: 544
  - °F: 1,011

#### Generator Set Noise Rating*
- (without attenuation) at 1 m (3 ft): dB(A) 96, 96

#### Generator Technical Data

<table>
<thead>
<tr>
<th>Voltage/ground</th>
<th>277/480V</th>
<th>266/460V</th>
<th>127/220V</th>
<th>120/240V</th>
<th>120/208V</th>
<th>347/600V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Starting Capability: (kVA)</td>
<td>206</td>
<td>191</td>
<td>177</td>
<td>160</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(30% voltage dip)</td>
<td>Self excited</td>
<td>PM excited**</td>
<td>AREP excited</td>
<td>PMG Excited</td>
<td>271</td>
<td>252</td>
</tr>
<tr>
<td>Full Load Efficiencies:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby</td>
<td>91.7</td>
<td>91.4</td>
<td>91.3</td>
<td>90.9</td>
<td>91.7</td>
<td></td>
</tr>
<tr>
<td>Prime</td>
<td>91.8</td>
<td>91.8</td>
<td>91.5</td>
<td>91.3</td>
<td>91.8</td>
<td></td>
</tr>
<tr>
<td>Reactances (per unit):</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₀</td>
<td>2.87</td>
<td>3.12</td>
<td>3.41</td>
<td>3.82</td>
<td>2.87</td>
<td></td>
</tr>
<tr>
<td>X₁</td>
<td>0.11</td>
<td>0.12</td>
<td>0.13</td>
<td>0.15</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>X₂</td>
<td>0.087</td>
<td>0.073</td>
<td>0.079</td>
<td>0.089</td>
<td>0.087</td>
<td></td>
</tr>
<tr>
<td>X₃</td>
<td>1.72</td>
<td>1.87</td>
<td>2.05</td>
<td>2.29</td>
<td>1.72</td>
<td></td>
</tr>
<tr>
<td>X₄</td>
<td>0.083</td>
<td>0.090</td>
<td>0.099</td>
<td>0.110</td>
<td>0.083</td>
<td></td>
</tr>
<tr>
<td>X₅</td>
<td>0.075</td>
<td>0.082</td>
<td>0.089</td>
<td>0.100</td>
<td>0.075</td>
<td></td>
</tr>
<tr>
<td>X₆</td>
<td>0.004</td>
<td>0.004</td>
<td>0.005</td>
<td>0.005</td>
<td>0.004</td>
<td></td>
</tr>
<tr>
<td>Time Constants:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t₀₀</td>
<td>100 ms</td>
<td>10 ms</td>
<td>2555 ms</td>
<td>15 ms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## D60-4S (1-Phase)

**Materials and specifications are subject to change without notice.**

### Generator Set Technical Data – 1800 rpm/60 Hz

<table>
<thead>
<tr>
<th>Power Rating (at 240V)</th>
<th>kW</th>
<th>kVA</th>
<th>Standby</th>
<th>Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>U.S. gal</td>
<td>7.9</td>
<td>1.4</td>
<td>7.9</td>
</tr>
<tr>
<td>L</td>
<td>U.S. gal</td>
<td>6.4</td>
<td>1.2</td>
<td>6.4</td>
</tr>
</tbody>
</table>

### Lubricating System

- **Type:** full pressure
- **Oil filter:** spin-on, full flow
- **Oil cooler:** water cooled
- **Oil type required:** API CG-4/CH4
- **Total oil capacity:** L | U.S. gal | 7.9 | 1.4 | 7.9 | 1.4
- **Oil pan:** L | U.S. gal | 6.4 | 1.2 | 6.4 | 1.2

### Fuel System

- **Generator set fuel consumption:**
  - 100% load: L/hr | gal/hr | 19.1 | 5.0 | 17.5 | 4.6
  - 75% load: L/hr | gal/hr | 14.8 | 3.9 | 13.6 | 3.6
  - 50% load: L/hr | gal/hr | 10.8 | 2.9 | 10.0 | 2.6

### Engine Electrical System

- **Voltage/ground:** 12/ideal
- **Battery charging generator ampere rating:** amps | Standby | Prime |
| 65 | 65 |

### Cooling System

- **Water pump type:** centrifugal
- **Radiator system capacity incl. engine:** L | U.S. gal | 12.6 | 3.3 | 12.6 | 3.3
- **Maximum coolant static head:** m | ft H₂O | 10.2 | 33.5 | 10.2 | 33.5
- **Coolant flow rate:** L/hr | U.S. gal/hr | 11.640 | 3.075 | 11.640 | 3.075
- **Minimum temperature to engine:** °C | °F | 70 | 158 | 70 | 158
- **Temperature rise across engine:** °C | °F | 4.4 | 7.7 | 4.0 | 7.0
- **Heat rejected to coolant at rated power:** kW | Btu/min | 52.5 | 2,986 | 47.8 | 2,719
- **Total heat radiated to room at rated power:** kW | Btu/min | 15.6 | 887 | 14.1 | 802
- **Radiator fan load:** kW | hp | 5.0 | 6.7 | 5.0 | 6.7

### Air Requirements

- **Combustion air flow:** m³/min | cfm | 5.95 | 210 | 5.4 | 191
- **Maximum air cleaner restriction:** kPa | in H₂O | 7.5 | 30.1 | 7.5 | 30.1
- **Radiator cooling air (zero restriction):** m³/min | cfm | 276 | 9,746 | 276 | 9,746
- **Generator cooling air:** m³/min | cfm | 19.2 | 678 | 19.2 | 678
- **Allowable airflow restriction (after radiator):** kPa | in H₂O | 0.120 | 0.48 | 0.120 | 0.48
- **Cooling airflow (@ rated speed):** m³/min | cfm | 244 | 8,816 | 244 | 8,816

### Exhaust System

- **Maximum allowable backpressure:** kPa | in Hg | 15.0 | 4.5 | 15.0 | 4.5
- **Exhaust flow at rated kW:** m³/min | cfm | 16.0 | 565 | 14.5 | 514
- **Exhaust temperature at rated kW:** °C | °F | 544 | 1,011 | 495 | 919

### Generator Set Noise Rating*

- (without attenuation) at 1 m (3 ft) dB(A) | Standby | Prime |
| 96 | 96 |

### Generator Technical Data

<table>
<thead>
<tr>
<th>120/240V</th>
<th>115/230V</th>
<th>110/220V</th>
</tr>
</thead>
<tbody>
<tr>
<td>(30% voltage dip)</td>
<td>Self excited</td>
<td>128</td>
</tr>
<tr>
<td>PM excited**</td>
<td>128</td>
<td>119</td>
</tr>
<tr>
<td>Full Load Efficiencies:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby</td>
<td>88.3</td>
<td>87.6</td>
</tr>
<tr>
<td>Prime</td>
<td>88.3</td>
<td>87.6</td>
</tr>
<tr>
<td>Reactances (per unit):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₀</td>
<td>2.14</td>
<td>2.33</td>
</tr>
<tr>
<td>Xᵦ</td>
<td>0.17</td>
<td>0.18</td>
</tr>
<tr>
<td>Xₚ</td>
<td>0.086</td>
<td>0.093</td>
</tr>
<tr>
<td>Xₚ₀</td>
<td>1.29</td>
<td>1.41</td>
</tr>
<tr>
<td>Xₚₚ</td>
<td>0.105</td>
<td>0.115</td>
</tr>
<tr>
<td>Time Constants:</td>
<td>t₀</td>
<td>t₀ₚ</td>
</tr>
<tr>
<td>80 ms</td>
<td>7 ms</td>
<td>1354 ms</td>
</tr>
</tbody>
</table>

---

* dB(A) levels are for guidance only
** With PMG Excited Option AVR12

---

**Generator Joe**

4016 Quartz Drive
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web: www.generatorjoe.NET
## Generator Set Technical Data – 1800 rpm/60 Hz

<table>
<thead>
<tr>
<th>Power Rating (at 240V)</th>
<th>kW</th>
<th>kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>Prime</td>
<td>67.5</td>
<td>67.5</td>
</tr>
</tbody>
</table>

### Lubricating System
- **Type:** full pressure
- **Oil filter:** spin-on, full flow
- **Oil cooler:** watercooled
- **Oil type required:** API CF-4

<table>
<thead>
<tr>
<th>Total oil capacity</th>
<th>L</th>
<th>U.S. gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standby</td>
<td>7.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Prime</td>
<td>7.9</td>
<td>1.4</td>
</tr>
</tbody>
</table>

### Fuel System
- **Generator set fuel consumption**
  - 100% load
    - L/hr | gal/hr | 22.9 | 6.0 |
    - 75% load
      - L/hr | gal/hr | 17.8 | 4.7 |
    - 50% load
      - L/hr | gal/hr | 12.7 | 3.4 |

### Engine Electrical System
- **Voltage/ground:** 12/0
- **Battery charging generator ampere rating:** 65, 65

### Cooling System
- **Water pump type:** centrifugal
- **Radiator system capacity incl. engine:**
  - L | U.S. gal | 12.6 | 3.3 |
  - 12.6 | 3.3 |
- **Coolant flow rate**
  - L/hr | U.S. gal/hr | 11.640 | 3.075 |
  - 11.64 | 3.075 |
- **Minimum temperature to engine**
  - °C | °F | 70 | 158 |
  - 70 | 158 |
- **Heat rejected to coolant at rated power**
  - kW | Btu/min | 52.5 | 2,986 |
  - 47.8 | 2,719 |
- **Total heat radiated to room at rated power**
  - kW | Btu/min | 17.0 | 967 |
  - 15.1 | 859 |
- **Cooler fan load**
  - kW | hp | 5.0 | 6.7 |
  - 5.0 | 6.7 |

### Air Requirements
- **Combustion air flow**
  - m³/min | cfm | 7.79 | 279 |
  - 7.38 | 260 |
- **Maximum air cleaner restriction**
  - kPa | in H₂O | 5.0 | 20 |
  - 5.0 | 20 |
- **Generator cooling air**
  - m³/min | cfm | 276 | 9,746 |
  - 276 | 9,746 |
- **Allowable airflow restriction (after radiator)**
  - kPa | in H₂O | 0.120 | 0.48 |
  - 0.120 | 0.48 |
- **Cooling airflow (@ rated speed)**
  - Rate with restriction | m³/min | 244 | 8,616 |
  - 244 | 8,616 |

### Exhaust System
- **Maximum allowable backpressure**
  - kPa | in Hg | 15 | 4.5 |
  - 15 | 4.5 |
- **Exhaust flow at rated kW**
  - m³/min | cfm | 22.5 | 794 |
  - 20.0 | 705 |
- **Exhaust temperature at rated kW**
  - °C | °F | 580 | 1,076 |
  - 540 | 1,004 |

### Generator Set Noise Rating
- *dB(A) levels are for guidance only*

### Generator Technical Data

<table>
<thead>
<tr>
<th>Motor Starting Capability: (kVA)</th>
<th>120/240V</th>
<th>115/230V</th>
<th>110/220V</th>
</tr>
</thead>
<tbody>
<tr>
<td>(30% voltage dip)</td>
<td>170</td>
<td>160</td>
<td>150</td>
</tr>
<tr>
<td>Self excited</td>
<td></td>
<td>160</td>
<td>150</td>
</tr>
<tr>
<td>PM excited**</td>
<td>170</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Load Efficiencies:</td>
<td>Standby</td>
<td>88.9</td>
<td>88.4</td>
</tr>
<tr>
<td>Prime</td>
<td>89.3</td>
<td>88.8</td>
<td>88.2</td>
</tr>
<tr>
<td>Reactances (per unit):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X₀</td>
<td>2.02</td>
<td>2.20</td>
<td>2.40</td>
</tr>
<tr>
<td>X'₀</td>
<td>0.15</td>
<td>0.16</td>
<td>0.18</td>
</tr>
<tr>
<td>X''₀</td>
<td>0.077</td>
<td>0.084</td>
<td>0.092</td>
</tr>
<tr>
<td>X₅</td>
<td>1.21</td>
<td>1.32</td>
<td>1.44</td>
</tr>
<tr>
<td>X₆</td>
<td>0.095</td>
<td>0.103</td>
<td>0.113</td>
</tr>
<tr>
<td>Time Constants:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t₆₀</td>
<td>80 ms</td>
<td>7 ms</td>
<td>1431 ms</td>
</tr>
</tbody>
</table>

* *dB(A) levels are for guidance only*

** With PMG Excited Option AVR12

---

**Materials and specifications are subject to change without notice.**

---

**Generator Joe**

**4016 Quartz Drive**
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web www.generatorjoe.NET
## D90-4S (1-Phase)

### Generator Set Technical Data – 1800 rpm/60 Hz

<table>
<thead>
<tr>
<th>Power Rating (at 240V)</th>
<th>kW</th>
<th>kVA</th>
<th>Standby</th>
<th>Prime</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Lubricating System</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type: full pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil filter: spin-on, full flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil cooler: watercooled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil type required: API CG4/CH4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total oil capacity</td>
<td>L</td>
<td></td>
<td>7.9</td>
<td>7.9</td>
</tr>
<tr>
<td></td>
<td>U.S. gal</td>
<td></td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Oil pan</td>
<td>L</td>
<td></td>
<td>6.4</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>U.S. gal</td>
<td></td>
<td>1.2</td>
<td>1.2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fuel System</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generator set fuel consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100% load</td>
<td>L/hr</td>
<td>gal/hr</td>
<td>27.3</td>
<td>7.2</td>
</tr>
<tr>
<td>75% load</td>
<td>L/hr</td>
<td>gal/hr</td>
<td>20.9</td>
<td>5.5</td>
</tr>
<tr>
<td>50% load</td>
<td>L/hr</td>
<td>gal/hr</td>
<td>14.7</td>
<td>3.9</td>
</tr>
</tbody>
</table>

| Engine Electrical System|     |     |         |       |
|                        |     |     |         |       |

<table>
<thead>
<tr>
<th>Cooling System</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Water pump type: centrifugal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiator system capacity incl. engine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum coolant static head</td>
<td>m H₂O</td>
<td>ft H₂O</td>
<td>10.2</td>
<td>33.5</td>
</tr>
<tr>
<td>Coolant flow rate</td>
<td>L/hr</td>
<td>U.S. gal/hr</td>
<td>11,640</td>
<td>3,075</td>
</tr>
<tr>
<td>Minimum temperature to engine</td>
<td>°C</td>
<td>°F</td>
<td>70</td>
<td>158</td>
</tr>
<tr>
<td>Temperature rise across engine</td>
<td>°C</td>
<td>°F</td>
<td>5.5</td>
<td>9.9</td>
</tr>
<tr>
<td>Heat rejected to coolant at rated power</td>
<td>kW</td>
<td>Btu/min</td>
<td>65.6</td>
<td>3,731</td>
</tr>
<tr>
<td>Total heat radiated to room at rated power</td>
<td>kW</td>
<td>Btu/min</td>
<td>21.2</td>
<td>1,206</td>
</tr>
<tr>
<td>Radiator fan load</td>
<td>kW</td>
<td>hp</td>
<td>5.0</td>
<td>6.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Air Requirements</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustion air flow</td>
<td>m³/min</td>
<td>cfm</td>
<td>7.79</td>
<td>279</td>
</tr>
<tr>
<td>Maximum air cleaner restriction</td>
<td>kPa</td>
<td>in H₂O</td>
<td>5.0</td>
<td>20</td>
</tr>
<tr>
<td>Radiator cooling air (zero restriction)</td>
<td>m³/min</td>
<td>cfm</td>
<td>276</td>
<td>9,746</td>
</tr>
<tr>
<td>Generator cooling air</td>
<td>m³/min</td>
<td>cfm</td>
<td>26.4</td>
<td>933</td>
</tr>
<tr>
<td>Allowable air flow restriction (after radiator)</td>
<td>kPa</td>
<td>in H₂O</td>
<td>0.120</td>
<td>0.48</td>
</tr>
<tr>
<td>Cooling airflow (@ rated speed) &amp; with restriction</td>
<td>m³/min</td>
<td>cfm</td>
<td>244</td>
<td>8,816</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exhaust System</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum allowable backpressure</td>
<td>kPa</td>
<td>in Hg</td>
<td>15</td>
<td>4.5</td>
</tr>
<tr>
<td>Exhaust flow at rated kW</td>
<td>m³/min</td>
<td>cfm</td>
<td>22.5</td>
<td>794</td>
</tr>
<tr>
<td>Exhaust temperature at rated kW – Dry exhaust</td>
<td>°C</td>
<td>°F</td>
<td>580</td>
<td>1,076</td>
</tr>
<tr>
<td></td>
<td>dB(A)</td>
<td></td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Generator Set Noise Rating*</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(without attenuation) at 1 m (3 ft)</td>
<td>dB(A)</td>
<td></td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Generator Technical Data</th>
<th>120/240V</th>
<th>115/230V</th>
<th>110/220V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Starting Capability:</td>
<td>145</td>
<td>135</td>
<td>126</td>
</tr>
<tr>
<td>(kVA)</td>
<td>PM excited**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(30% voltage dip)</td>
<td>145</td>
<td>135</td>
<td>126</td>
</tr>
<tr>
<td>Full Load Efficiencies:</td>
<td>86.6</td>
<td>88</td>
<td>87.8</td>
</tr>
<tr>
<td>Standby</td>
<td>89.1</td>
<td>88.5</td>
<td>87.8</td>
</tr>
<tr>
<td>Prime</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reactances (per unit):</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Xₚ</td>
<td>2.99</td>
<td>3.25</td>
<td>3.55</td>
<td></td>
</tr>
<tr>
<td>Xₜ</td>
<td>0.25</td>
<td>0.28</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Xₗ</td>
<td>0.148</td>
<td>0.161</td>
<td>0.176</td>
<td></td>
</tr>
<tr>
<td>Xₜ₉</td>
<td>1.80</td>
<td>1.96</td>
<td>2.14</td>
<td></td>
</tr>
<tr>
<td>Xₚ₉</td>
<td>0.134</td>
<td>0.201</td>
<td>0.219</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Constants:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>t'ₚ₉</td>
<td>165 ms</td>
<td>13 ms</td>
<td>2555 ms</td>
<td>20 ms</td>
</tr>
</tbody>
</table>

* dB(A) levels are for guidance only
** With PMG Excited Option AVR12

---

Materials and specifications are subject to change without notice.
**STANDBY 60-100 kW**

**PRIME 54-90 kW**

**60 Hz**

---

### D100-4 (3-Phase)

Materials and specifications are subject to change without notice.

<table>
<thead>
<tr>
<th>Generator Set Technical Data – 1800 rpm/60 Hz</th>
<th>Standby</th>
<th>Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Rating</strong></td>
<td>kW</td>
<td>kVA</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>125.0</td>
</tr>
<tr>
<td></td>
<td>90</td>
<td>112.5</td>
</tr>
</tbody>
</table>

#### Lubricating System

Type: full pressure

Oil filter: spin-on, full flow

Oil cooler: watercooled

Oil type required: API CG4/CH4

Total oil capacity

**L** U.S. gal

- **Lubricating system**
  - Type: full pressure
  - Oil filter: spin-on, full flow
  - Oil cooler: watercooled
  - Oil type required: API CG4/CH4
  - Total oil capacity: 8.0 2.1 8.0 2.1

#### Fuel System

Generator set fuel consumption

- 100% load: L/hr gal/hr 29.8 7.9 26.8 7.1
- 75% load: L/hr gal/hr 22.5 5.9 20.4 5.4
- 50% load: L/hr gal/hr 15.8 4.2 14.6 3.9

#### Engine Electrical System

- Voltage/ground: 12/0
- Battery charging generator amperes rating: amps 65 65

#### Cooling System

- Water pump type: centrifugal
- Radiator system capacity incl. engine
  - L U.S. gal
  - 100% load: 12.6 3.3 12.6 3.3
  - 75% load: 10.2 2.7 10.2 2.7
  - 50% load: 8.0 2.1 8.0 2.1

#### Air Requirements

- Combustion air flow
  - m³/min cfm
  - 100% load: 78 276 7.75 274
  - 75% load: 68 232 6.40 230
  - 50% load: 58 196 5.80 195

- Maximum air cleaner restriction
  - kPa in Hg
  - 100% load: 15 4.5 15 4.5
  - 75% load: 12 3.6 12 3.6
  - 50% load: 9 2.7 9 2.7

- Radiator cooling air (zero restriction)
  - m³/min cfm
  - 100% load: 276 9,746 276 9,746
  - 75% load: 216 7,405 216 7,405
  - 50% load: 156 5,193 156 5,193

- Cooling airflow (@ rated speed)
  - Rate with restriction
  - m³/min cfm
  - 100% load: 244 8,616 244 8,616
  - 75% load: 204 7,200 204 7,200
  - 50% load: 164 5,600 164 5,600

- Exhaust System
  - Maximum allowable backpressure
    - kPa in Hg
    - 100% load: 15 4.5 15 4.5
    - 75% load: 12 3.6 12 3.6
    - 50% load: 9 2.7 9 2.7

- Exhaust flow at rated kW
  - m³/min cfm
  - 100% load: 20.4 721 18.4 651
  - 75% load: 16.3 570 14.3 500
  - 50% load: 12.2 420 10.2 350

- Exhaust temperature at rated kW – Dry exhaust
  - °C °F
  - 100% load: 574 1,065 517 963
  - 75% load: 483 881 426 782
  - 50% load: 402 744 345 639

<table>
<thead>
<tr>
<th>Generator Technical Data</th>
<th>277/480V</th>
<th>266/460V</th>
<th>127/220V</th>
<th>120/240V</th>
<th>120/208V</th>
<th>347/600V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Motor Starting Capability:</strong> (kVA) (30% voltage dip)</td>
<td>Self excited</td>
<td>206</td>
<td>191</td>
<td>177</td>
<td>160</td>
<td>N/A</td>
</tr>
<tr>
<td>PM excited**</td>
<td>271</td>
<td>252</td>
<td>233</td>
<td>211</td>
<td>271</td>
<td></td>
</tr>
<tr>
<td>AREP excited</td>
<td>271</td>
<td>252</td>
<td>233</td>
<td>211</td>
<td>271</td>
<td></td>
</tr>
<tr>
<td><strong>Full Load Efficiencies:</strong></td>
<td>Standby</td>
<td>Prime</td>
<td>Standby</td>
<td>Prime</td>
<td>Standby</td>
<td>Prime</td>
</tr>
<tr>
<td></td>
<td>91.0</td>
<td>90.9</td>
<td>90.5</td>
<td>90.0</td>
<td>91.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>91.4</td>
<td>91.0</td>
<td>90.9</td>
<td>90.4</td>
<td>91.4</td>
<td></td>
</tr>
<tr>
<td><strong>Reactances (per unit):</strong> Xr</td>
<td>3.58</td>
<td>3.90</td>
<td>4.26</td>
<td>4.77</td>
<td>3.58</td>
<td></td>
</tr>
<tr>
<td>Xr’</td>
<td>0.14</td>
<td>0.15</td>
<td>0.17</td>
<td>0.19</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Xr”</td>
<td>0.083</td>
<td>0.091</td>
<td>0.099</td>
<td>0.11</td>
<td>0.083</td>
<td></td>
</tr>
<tr>
<td>Xr’’’</td>
<td>2.15</td>
<td>2.34</td>
<td>2.56</td>
<td>2.86</td>
<td>2.15</td>
<td></td>
</tr>
<tr>
<td>Xr’’’’</td>
<td>0.104</td>
<td>0.113</td>
<td>0.123</td>
<td>0.138</td>
<td>0.104</td>
<td></td>
</tr>
<tr>
<td>Xr’’’’’</td>
<td>0.094</td>
<td>0.102</td>
<td>0.112</td>
<td>0.125</td>
<td>0.094</td>
<td></td>
</tr>
<tr>
<td>Xr’’’’’’</td>
<td>0.005</td>
<td>0.005</td>
<td>0.006</td>
<td>0.006</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td><strong>Time Constants:</strong> t’d t’d t’d t’d</td>
<td>100 ms</td>
<td>10 ms</td>
<td>2555 ms</td>
<td>15 ms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* dB(A) levels are for guidance only
** With PMG Excited Option AVR12

---

4016 Quartz Drive
Santa Rosa, CA 95405
Phone: 707 539-9003
Fax: 707 539-5212
Email: sales@generatorjoe.NET
Web: www.generatorjoe.NET

---

LEHE5157-00
D100-4S (1-Phase)  

### Generator Set Technical Data – 1800 rpm/60 Hz

<table>
<thead>
<tr>
<th>Power Rating (at 240V)</th>
<th>kW</th>
<th>kVA</th>
<th>Standby</th>
<th>Prime</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

#### Lubricating System
- Type: full pressure
- Oil filter: spin-on, full flow
- Oil cooler: watercooled
- Oil type required: API CF-4

<table>
<thead>
<tr>
<th>Total oil capacity</th>
<th>L</th>
<th>U.S. gal</th>
<th>7.9</th>
<th>1.4</th>
<th>7.9</th>
<th>1.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil pan</td>
<td>L</td>
<td>U.S. gal</td>
<td>6.4</td>
<td>1.2</td>
<td>6.4</td>
<td>1.2</td>
</tr>
</tbody>
</table>

#### Fuel System
- Generator set fuel consumption

<table>
<thead>
<tr>
<th>Load</th>
<th>L/hr</th>
<th>gal/hr</th>
<th>kW</th>
<th>Btu/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>29.6</td>
<td>7.8</td>
<td>26.8</td>
<td>7.1</td>
</tr>
<tr>
<td>75%</td>
<td>22.4</td>
<td>5.9</td>
<td>20.4</td>
<td>5.4</td>
</tr>
<tr>
<td>50%</td>
<td>15.9</td>
<td>4.2</td>
<td>15.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

#### Engine Electrical System
- Voltage/ground: 12/0
- Battery charging generator ampere rating: 65, 65

#### Cooling System
- Water pump type: centrifugal

<table>
<thead>
<tr>
<th>Radiator system capacity incl. engine</th>
<th>L</th>
<th>U.S. gal</th>
<th>12.6</th>
<th>3.3</th>
<th>12.6</th>
<th>3.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum coolant static head</td>
<td>m H₂O</td>
<td>ft H₂O</td>
<td>10.2</td>
<td>33.5</td>
<td>10.2</td>
<td>33.5</td>
</tr>
<tr>
<td>Coolant flow rate</td>
<td>L/hr</td>
<td>U.S. gal/hr</td>
<td>11,640</td>
<td>3,075</td>
<td>11,640</td>
<td>3,075</td>
</tr>
<tr>
<td>Minimum temperature to engine</td>
<td>°C</td>
<td>°F</td>
<td>70</td>
<td>158</td>
<td>70</td>
<td>158</td>
</tr>
<tr>
<td>Temperature rise across engine</td>
<td>°C</td>
<td>°F</td>
<td>5.5</td>
<td>9.9</td>
<td>5.0</td>
<td>9.0</td>
</tr>
<tr>
<td>Heat rejected to coolant at rated power</td>
<td>kW</td>
<td>Btu/min</td>
<td>65.6</td>
<td>3,731</td>
<td>59.7</td>
<td>3,396</td>
</tr>
<tr>
<td>Total heat radiated to room at rated power</td>
<td>kW</td>
<td>Btu/min</td>
<td>21.2</td>
<td>1,206</td>
<td>18.8</td>
<td>1,069</td>
</tr>
<tr>
<td>Radiator fan load</td>
<td>kW</td>
<td>hp</td>
<td>5.0</td>
<td>6.7</td>
<td>5.0</td>
<td>6.7</td>
</tr>
</tbody>
</table>

#### Air Requirements

<table>
<thead>
<tr>
<th>Combustion air flow</th>
<th>m³/min</th>
<th>cfm</th>
<th>7.79</th>
<th>279</th>
<th>7.38</th>
<th>260</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum air cleaner restriction</td>
<td>kPa</td>
<td>in H₂O</td>
<td>5.0</td>
<td>20</td>
<td>5.0</td>
<td>20</td>
</tr>
<tr>
<td>Radiator cooling air (zero restriction)</td>
<td>m³/min</td>
<td>cfm</td>
<td>276</td>
<td>9,746</td>
<td>276</td>
<td>9,746</td>
</tr>
<tr>
<td>Generator cooling air</td>
<td>m³/min</td>
<td>cfm</td>
<td>26.4</td>
<td>933</td>
<td>26.4</td>
<td>933</td>
</tr>
<tr>
<td>Allowable air flow restriction (after radiator)</td>
<td>kPa</td>
<td>in H₂O</td>
<td>0.120</td>
<td>0.48</td>
<td>0.120</td>
<td>0.48</td>
</tr>
<tr>
<td>Cooling airflow (at rated speed)</td>
<td>rate with restriction</td>
<td>m³/min</td>
<td>cfm</td>
<td>244</td>
<td>8,816</td>
<td>244</td>
</tr>
</tbody>
</table>

#### Exhaust System
- Maximum allowable backpressure
- Exhaust flow at rated kW
- Exhaust temperature at rated kW
- Dry exhaust

| Maximum allowable backpressure | kPa | in Hg | 15 | 4.5 | 15 | 4.5 |
| Exhaust flow at rated kW | m³/min | cfm | 22.5 | 794 | 20.0 | 705 |
| Exhaust temperature at rated kW | °C | °F | 580 | 1,076 | 540 | 1,004 |

#### Generator Set Noise Rating*

| (without attenuation) at 1 m (3 ft) | dB(A) | 95 | 95 |

#### Generator Set Technical Data 120/240V

<table>
<thead>
<tr>
<th>Motor Starting Capability: (kVA) (30% voltage dip)</th>
<th>120/240V</th>
<th>115/230V</th>
<th>110/220V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self excited</td>
<td>188</td>
<td>174</td>
<td>162</td>
</tr>
<tr>
<td>PM excited**</td>
<td>188</td>
<td>174</td>
<td>162</td>
</tr>
<tr>
<td>Full Load Efficiencies:</td>
<td>Standby</td>
<td>90.5</td>
<td>90.0</td>
</tr>
<tr>
<td>Prime</td>
<td>90.5</td>
<td>90.0</td>
<td>89.4</td>
</tr>
<tr>
<td>Reactances (per unit):</td>
<td>X_r</td>
<td>2.67</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>X_s</td>
<td>0.21</td>
<td>0.23</td>
</tr>
<tr>
<td>Reactances shown</td>
<td>X''_s</td>
<td>0.127</td>
<td>0.138</td>
</tr>
<tr>
<td>applicable to the standby rating.</td>
<td>X''_r</td>
<td>1.60</td>
<td>1.74</td>
</tr>
<tr>
<td></td>
<td>X''''_s</td>
<td>0.151</td>
<td>0.164</td>
</tr>
<tr>
<td>Time Constants:</td>
<td>t''_r</td>
<td>165 ms</td>
<td>13 ms</td>
</tr>
</tbody>
</table>

---

* dB(A) levels are for guidance only
** With PMG Excited Option AVR12

---

4016 Quartz Drive  
Santa Rosa, CA 95405  
Phone:  707  539-9003  
Fax:    707  539-5212  
Email: sales@generatorjoe.NET  
Web      www.generatorjoe.NET
This page intentionally left blank.