



State of West Virginia  
 Department of Administration  
 Purchasing Division  
 2019 Washington Street East  
 Post Office Box 50130  
 Charleston, WV 25305-0130

**Request for Quotation**

RFQ NUMBER  
**BPH70348**

PAGE  
**1**

ADDRESS CORRESPONDENCE TO ATTENTION OF  
**ROBERTA WAGNER  
 304-558-0067**

RFQ COPY  
 TYPE NAME/ADDRESS HERE

Master Service Mid-Atlantic, Inc.  
 P O Box 2417  
 1403 Livingston Ave.  
 Elkins, WV 26241

HEALTH AND HUMAN RESOURCES  
 BPH - TRAUMA & EMERGENCY CARE  
 SYSTEM  
 VARIOUS LOCALES AS INDICATED  
 ON PURCHASE ORDER

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
01/03/2007				

BID OPENING DATE: **02/06/2007** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOF	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	JB		285-39		
<p>OPEN END CONTRACT TO PROVIDE AC POWER GENERATORS</p> <p>OPEN END CONTRACT</p> <p>TO ESTABLISH AN OPEN END CONTRACT FOR VARIOUS STANDBY AC POWER GENERATORS FOR THE STATEWIDE MEDICAL COMMAND MICROWAVE SYSTEM AND INTEROPERABLE RADIO SYSTEM FOR SUBDIVISIONS. THIS CONTRACT WOULD BE FOR PURCHASE OF THE GENERATORS, ACCESSORIES, DELIVERY AND INSTALLATION TO SPECIFIC TOWER SITES AS PER THE ATTACHED SPECIFICATIONS.</p> <p>EXHIBIT 3</p> <p>LIFE OF CONTRACT: THIS CONTRACT BECOMES EFFECTIVE ON ..... AND EXTENDS FOR A PERIOD OF ONE (1) YEAR OR UNTIL SUCH "REASONABLE TIME" THEREAFTER AS IS NECESSARY TO OBTAIN A NEW CONTRACT OR RENEW THE ORIGINAL CONTRACT. THE "REASONABLE TIME" PERIOD SHALL NOT EXCEED TWELVE (12) MONTHS. DURING THIS "REASONABLE TIME" THE VENDOR MAY TERMINATE THIS CONTRACT FOR ANY REASON UPON GIVING THE DIRECTOR OF PURCHASING 30 DAYS WRITTEN NOTICE.</p> <p>UNLESS SPECIFIC PROVISIONS ARE STIPULATED ELSEWHERE IN THIS CONTRACT DOCUMENT, THE TERMS, CONDITIONS AND PRICING SET HEREIN ARE FIRM FOR THE LIFE OF THE CONTRACT.</p> <p>RENEWAL: THIS CONTRACT MAY BE RENEWED UPON THE MUTUAL WRITTEN CONSENT OF THE SPENDING UNIT AND VENDOR, SUBMITTED TO THE DIRECTOR OF PURCHASING THIRTY (30)</p>						

**RECEIVED**

2007 FEB -6 P. 12:31

PURCHASING DIVISION  
 STATE OF WV

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Robert A. [Signature]</i>	TELEPHONE 304-636-8170	DATE 02/05/2007
TITLE Vice-President	FEIN 55-0667885	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

**GENERAL TERMS & CONDITIONS  
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)**

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division.
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125.00 registration fee.
5. All services performed or goods delivered under State Purchase Orders/Contracts are to be continued for the term of the Purchase Order/Contract, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, this contract is automatically null and void, and is terminated without further order.
14. **HIPAA Business Associate Addendum** - The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Covered Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

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**INSTRUCTIONS TO BIDDERS**

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Complete all sections of the quotation form.
4. Unit prices shall prevail in cases of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications.

**SIGNED BID TO:**

Department of Administration  
Purchasing Division  
2019 Washington Street East  
Post Office Box 50130  
Charleston, WV 25305-0130



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VENDOR

SHIP TO

HEALTH AND HUMAN RESOURCES  
 BPH - TRAUMA & EMERGENCY CARE  
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 VARIOUS LOCALES AS INDICATED  
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01/03/2007				

BID OPENING DATE: 02/06/2007 BID OPENING TIME 01:30PM

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<p>DAYS PRIOR TO THE EXPIRATION DATE. SUCH RENEWAL SHALL BE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THE ORIGINAL CONTRACT AND SHALL BE LIMITED TO TWO (2) ONE (1) YEAR PERIODS.</p> <p>CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM TO THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.</p> <p>OPEN MARKET CLAUSE: THE DIRECTOR OF PURCHASING MAY AUTHORIZE A SPENDING UNIT TO PURCHASE ON THE OPEN MARKET, WITHOUT THE FILING OF A REQUISITION OR COST ESTIMATE, ITEMS SPECIFIED ON THIS CONTRACT FOR IMMEDIATE DELIVERY IN EMERGENCIES DUE TO UNFORESEEN CAUSES (INCLUDING BUT NOT LIMITED TO DELAYS IN TRANSPORTATION OR AN UNANTICIPATED INCREASE IN THE VOLUME OF WORK.)</p> <p>QUANTITIES: QUANTITIES LISTED IN THE REQUISITION ARE APPROXIMATIONS ONLY, BASED ON ESTIMATES SUPPLIED BY THE STATE SPENDING UNIT. IT IS UNDERSTOOD AND AGREED THAT THE CONTRACT SHALL COVER THE QUANTITIES ACTUALLY ORDERED FOR DELIVERY DURING THE TERM OF THE CONTRACT, WHETHER MORE OR LESS THAN THE QUANTITIES SHOWN.</p> <p>ORDERING PROCEDURE: SPENDING UNIT(S) SHALL ISSUE A WRITTEN STATE CONTRACT ORDER (FORM NUMBER WV-39) TO THE VENDOR FOR COMMODITIES COVERED BY THIS CONTRACT. THE ORIGINAL COPY OF THE WV-39 SHALL BE MAILED TO THE VENDOR AS AUTHORIZATION FOR SHIPMENT, A SECOND COPY MAILED TO THE PURCHASING DIVISION, AND A THIRD COPY RETAINED BY THE SPENDING UNIT.</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES</p>						

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<p>FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED WITHOUT FURTHER ORDER.</p> <p>THE TERMS AND CONDITIONS CONTAINED IN THIS CONTRACT SHALL SUPERSEDE ANY AND ALL SUBSEQUENT TERMS AND CONDITIONS WHICH MAY APPEAR ON ANY ATTACHED PRINTED DOCUMENTS SUCH AS PRICE LISTS, ORDER FORMS, SALES AGREEMENTS OR MAINTENANCE AGREEMENTS, INCLUDING ANY ELECTRONIC MEDIUM SUCH AS CD-ROM.</p> <p>REV. 04/11/2001</p> <p>WRITTEN QUESTIONS SHALL BE ACCEPTED THROUGH CLOSE OF BUSINESS ON FRIDAY, 1/12/07. QUESTIONS MAY BE SENT VIA USPS, FAX, COURIER OR EMAIL. IN ORDER TO ASSURE NO VENDOR RECEIVES AN UNFAIR ADVANTAGE, NO SUBSTANTIVE QUESTIONS WILL BE ANSWERED ORALLY. IF POSSIBLE, EMAIL QUESTIONS ARE PREFERRED. ADDRESS INQUIRIES TO:</p> <p>ROBERTA WAGNER            DEPARTMENT OF ADMINISTRATION            PURCHASING DIVISION            2019 WASHINGTON STREET, EAST            CHARLESTON, WV 25311            FAX: 304-558-4115            EMAIL: RWAGNER@WVADMIN.GOV</p> <p>EXHIBIT 6</p> <p>PRICE ADJUSTMENT PROVISION:            THE STATE OF WEST VIRGINIA WILL CONSIDER BIDS THAT CONTAIN PROVISIONS FOR PRICE ADJUSTMENTS PRIOR TO THE ORIGINAL EXPIRATION OF THE CONTRACT, PROVIDED THAT SUCH</p>						

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<p>PRICE ADJUSTMENT COVERS BOTH UPWARD AND DOWNWARD MOVEMENT OF THE COMMODITY PRICE, AND THAT ADJUSTMENT IS BASED ON THE "PASS THROUGH" INCREASE OR DECREASE OF RAW MATERIALS AND/OR LABOR, WHICH MAKE UP ALL OR A SUBSTANTIAL PART OF A PRODUCT. ADJUSTMENTS ARE TO BE BASED UPON AN ACTUAL DOLLAR FIGURE, NOT A PERCENTAGE. ALL PRICE ADJUSTMENT REQUESTS MUST BE SUBSTANTIATED IN A MANNER ACCEPTABLE TO THE DIRECTOR PURCHASING, E.G. GOVERNMENTAL BENCH MARKS, GENERAL MARKET INCREASE, PUBLISHED PRICE LISTS. SUCH REQUESTS FOR AN INCREASE SHOULD BE RECEIVED IN WRITING BY THE DIRECTOR OF PURCHASING AT LEAST 30 DAYS IN ADVANCE OF THE EFFECTIVE DATE OF THE INCREASE. ANY TIME THE VENDOR REQUESTS A PRICE ADJUSTMENT, THE PURCHASING DIVISION MAY EITHER ACCEPT THE PRICE ADJUSTMENT AND AMEND THE CONTRACT ACCORDINGLY OR REJECT THE ADJUSTMENT IN ITS ENTIRETY AND CANCEL THE CONTRACT.</p> <p>PREFERRED TERMS:            IT IS PREFERRED THAT THE PRICES ON THIS CONTRACT ARE FIRM FOR LIFE OF THE CONTRACT, AS INDICATED IN THE LIFE OF CONTRACT CLAUSE CONTAINED HEREIN, NOT TO EXCEED ONE (1) YEAR.</p> <p>IF THE VENDOR CANNOT GUARANTEE A FIRM PRICE FOR THE LIFE OF CONTRACT, HE MUST INDICATE ONE OF THE PARAGRAPHS LISTED BELOW. FAILURE TO QUALIFY THE PREFERRED TERMS WILL BIND THE VENDOR TO A FIRM PRICE FOR THE LIFE OF THE CONTRACT.</p> <p>ALTERNATE TERMS:  <input checked="" type="checkbox"/> THE PRICES ON THIS CONTRACT WILL REMAIN FIRM FOR <u>60</u> DAYS AFTER THE EFFECTIVE DATE OF THE</p>						

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<p>CONTRACT. PRICES WILL REMAIN FIRM AFTER EACH PRICE ADJUSTMENT FOR A MINIMUM OF <b>.60</b>... DAYS.</p> <p>( ) THE VENDOR DOES NOT AGREE TO MAINTAIN A FIRM PRICE FOR THE LENGTH OF THE CONTRACT BUT OFFERS AN ALTERNATE PROPOSAL AS FOLLOWS:</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>VENDOR PREFERENCE CERTIFICATE</p> <p>CERTIFICATION AND APPLICATION* IS HEREBY MADE FOR PREFERENCE IN ACCORDANCE WITH WEST VIRGINIA CODE, 5A-3-37 (DOES NOT APPLY TO CONSTRUCTION CONTRACTS).</p> <p>A. APPLICATION IS MADE FOR 2.5% PREFERENCE FOR THE REASON CHECKED:</p> <p>( ) BIDDER IS AN INDIVIDUAL RESIDENT VENDOR AND HAS RESIDED CONTINUOUSLY IN WEST VIRGINIA FOR FOUR (4) YEARS IMMEDIATELY PRECEDING THE DATE OF THIS CERTIFICATION; OR</p> <p><input checked="" type="checkbox"/> BIDDER IS A PARTNERSHIP, ASSOCIATION OR CORPORATION RESIDENT VENDOR AND HAS MAINTAINED ITS HEAD-QUARTERS OR PRINCIPAL PLACE OF BUSINESS CONTINUOUSLY IN WEST VIRGINIA FOR FOUR (4) YEARS IMMEDIATELY PRECEDING THE DATE OF THIS CERTIFICATION; OR 80% OF THE OWNERSHIP INTEREST OF BIDDER IS HELD BY ANOTHER INDIVIDUAL, PARTNERSHIP, ASSOCIATION OR CORPORATION RESIDENT VENDOR WHO HAS MAINTAINED ITS HEADQUARTERS OR PRINCIPAL PLACE OF BUSINESS CONTINUOUSLY IN WEST VIRGINIA FOR FOUR (4) YEARS IMMEDIATELY PRECEDING THE DATE OF THIS CERTIFICATION; OR</p>						

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<p>( ) BIDDER IS A CORPORATION NONRESIDENT VENDOR WHICH HAS AN AFFILIATE OR SUBSIDIARY WHICH EMPLOYS A MINIMUM OF ONE HUNDRED STATE RESIDENTS AND WHICH HAS MAINTAINED ITS HEADQUARTERS OR PRINCIPAL PLACE OF BUSINESS WITHIN WEST VIRGINIA CONTINUOUSLY FOR THE FOUR (4) YEARS IMMEDIATELY PRECEDING THE DATE OF THIS CERTIFICATION.</p> <p>B. APPLICATION IS MADE FOR 2.5% PREFERENCE FOR THE REASON CHECKED:</p> <p>(X) BIDDER IS A RESIDENT VENDOR WHO CERTIFIES THAT, DURING THE LIFE OF THE CONTRACT, ON AVERAGE AT LEAST 75% OF THE EMPLOYEES WORKING ON THE PROJECT BEING BID ARE RESIDENTS OF WEST VIRGINIA WHO HAVE RESIDED IN THE STATE CONTINUOUSLY FOR THE TWO YEARS IMMEDIATELY PRECEDING SUBMISSION OF THIS BID;  OR  ( ) BIDDER IS A NONRESIDENT VENDOR EMPLOYING A MINIMUM OF ONE HUNDRED STATE RESIDENTS OR IS A NONRESIDENT VENDOR WITH AN AFFILIATE OR SUBSIDIARY WHICH MAINTAINS ITS HEADQUARTERS OR PRINCIPAL PLACE OF BUSINESS WITHIN WEST VIRGINIA EMPLOYING A MINIMUM OF ONE HUNDRED STATE RESIDENTS WHO CERTIFIES THAT, DURING THE LIFE OF THE CONTRACT, ON AVERAGE AT LEAST 75% OF THE EMPLOYEES OR BIDDERS' AFFILIATE'S OR SUBSIDIARY'S EMPLOYEES ARE RESIDENTS OF WEST VIRGINIA WHO HAVE RESIDED IN THE STATE CONTINUOUSLY FOR THE TWO YEARS IMMEDIATELY PRECEDING SUBMISSION OF THIS BID.</p> <p>BIDDER UNDERSTANDS IF THE SECRETARY OF TAX &amp; REVENUE DETERMINES THAT A BIDDER RECEIVING PREFERENCE HAS FAILED TO CONTINUE TO MEET THE REQUIREMENTS FOR SUCH PREFERENCE, THE SECRETARY MAY ORDER THE DIRECTOR OF PURCHASING TO: (A) RESCIND THE CONTRACT OR PURCHASE ORDER ISSUED; OR (B) ASSESS A PENALTY AGAINST SUCH</p>						

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<p>BIDDER IN AN AMOUNT NOT TO EXCEED 5% OF THE BID AMOUNT AND THAT SUCH PENALTY WILL BE PAID TO THE CONTRACTING AGENCY OR DEDUCTED FROM ANY UNPAID BALANCE ON THE CONTRACT OR PURCHASE ORDER.</p> <p>BY SUBMISSION OF THIS CERTIFICATE, BIDDER AGREES TO DISCLOSE ANY REASONABLY REQUESTED INFORMATION TO THE PURCHASING DIVISION AND AUTHORIZES THE DEPARTMENT OF TAX AND REVENUE TO DISCLOSE TO THE DIRECTOR OF PURCHASING APPROPRIATE INFORMATION VERIFYING THAT BIDDER HAS PAID THE REQUIRED BUSINESS TAXES, PROVIDED THAT SUCH INFORMATION DOES NOT CONTAIN THE AMOUNTS OF TAXES PAID NOR ANY OTHER INFORMATION DEEMED BY THE TAX COMMISSIONER TO BE CONFIDENTIAL.</p> <p>UNDER PENALTY OF LAW FOR FALSE SWEARING (WEST VIRGINIA CODE 61-5-3), BIDDER HEREBY CERTIFIES THAT THIS CERTIFICATE IS TRUE AND ACCURATE IN ALL RESPECTS; AND THAT IF A CONTRACT IS ISSUED TO BIDDER AND IF ANYTHING CONTAINED WITHIN THIS CERTIFICATE CHANGES DURING THE TERM OF THE CONTRACT, BIDDER WILL NOTIFY THE PURCHASING DIVISION IN WRITING IMMEDIATELY.</p> <p>BIDDER: <u>Master Service Mid Atlantic</u></p> <p>DATE: <u>FEBRUARY 5, 2007</u></p> <p>SIGNED: <u>[Signature]</u></p> <p>TITLE: <u>VICE PRESIDENT</u></p> <p>* CHECK ANY COMBINATION OF PREFERENCE CONSIDERATION(S)</p>						

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<p>IN EITHER "A" OR "B", OR BOTH "A" AND "B" WHICH YOU ARE ENTITLED TO RECEIVE. YOU MAY REQUEST UP TO THE MAXIMUM 5% PREFERENCE FOR BOTH "A" AND "B". (REV. 12/00)</p> <p style="text-align: center;">NOTICE</p> <p>AN ORIGINAL, SIGNED BID MUST BE SUBMITTED TO:</p> <p style="text-align: center;">DEPARTMENT OF ADMINISTRATION          PURCHASING DIVISION          BUILDING 15          2019 WASHINGTON STREET, EAST          CHARLESTON, WV 25305-0130</p> <p>THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED: SEALED BID.</p> <p>BUYER: ROBERTA WAGNER - 22</p> <p>RFQ. NO.: BPH70348</p> <p>BID OPENING DATE AND TIME: 02/06/2007@ 1:30 PM</p> <p>PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:  <span style="font-size: 1.2em;">304-636-8206</span></p> <p>CONTACT PERSON (PLEASE PRINT CLEARLY):  <span style="font-size: 1.2em;">PATRICK SMITH 304-678-9065</span></p>						

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** PLEASE ENCLOSE A CONVENIENCE COPY **						
***** THIS IS THE END OF RFQ BPH70348 ***** TOTAL: _____						
<p><b>EXHIBIT 4</b></p> <p><b>LOCAL GOVERNMENT BODIES: UNLESS THE VENDOR INDICATES IN THE BID HIS REFUSAL TO EXTEND THE PRICES, TERMS, AND CONDITIONS OF THE BID TO COUNTY, SCHOOL, MUNICIPAL AND OTHER LOCAL GOVERNMENT BODIES, THE BID SHALL EXTEND TO POLITICAL SUBDIVISIONS OF THE STATE OF WEST VIRGINIA. IF THE VENDOR DOES NOT WISH TO EXTEND THE PRICES, TERMS, AND CONDITIONS OF THE BID TO ALL POLITICAL SUBDIVISIONS OF THE STATE, THE VENDOR MUST CLEARLY INDICATE SUCH REFUSAL IN HIS BID. SUCH REFUSAL SHALL NOT PREJUDICE THE AWARD OF THIS CONTRACT IN ANY MANNER.</b></p> <p>REV. 3/88</p>						

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The West Virginia Department of Health and Human Resources (DHHR), Bureau for Public Health (BPH), State Trauma and Emergency Care System (STECS) desires to establish an open-end contract for the purchase of various **standby AC power generators** for the Statewide Medical Command communications and interoperable radio system as well as all state agencies and political subdivisions.

## **SPECIFICATIONS**

### **1.0 General**

- 1.1** Quoted price for each generator shall include delivery and installation of generator unit onto concrete pad at specified tower sites through out West Virginia. Vendor shall include in quote all materials, delivery, and installation costs including, automatic transfer switch, connection of generator to transfer switch with appropriate conduit and wiring, as well as start-up test of generator.
- 1.2** Quote shall be valid for a period of one year, with option to renew for two (2) additional one year periods.
- 1.3** All generator units must meet applicable UL, NFPA, ISA, IEC, CSA, and OSHA guarding, standards.
- 1.4** Successful bidder must be able to provide parts and maintenance for the units quoted.
- 1.5** Units quoted must have a minimum warranty on parts and labor of one (1) year.
- 1.6** Bidder to include copy of unit specifications to confirm compliance with bid specifications.

### **2.0 Mandatory Engine features**

- 2.1** Liquid Propane (LP) fuel system
- 2.2** Heavy duty 4 cycle engine
- 2.3** Electronic distributorless ignition system
- 2.4** Liquid cooled
- 2.5** Electronic governor
- 2.6** 12 volt DC electrical starting system
- 2.7** Twist-on full flow cartridge oil filter
- 2.8** Dry Air cleaner with disposable element
- 2.9** Low oil pressure shutdown
- 2.10** Low coolant level shutdown
- 2.11** High coolant temperature shutdown
- 2.12** Easily accessible coolant and oil drains piped to edge of base

### **3.0 Mandatory Electrical Unit Features**

- 3.1** Auto remote starting and stopping
- 3.2** Precise frequency and voltage regulation
- 3.3** Random voltage regulation of +/- 1%
- 3.4** Single phase 120/240 volts AC output
- 3.5** Gas pressure regulator
- 3.6** Radiator and cooling fan with guards
- 3.7** Volts adjust potentiometer
- 3.8** Safety shutdown and alarm indicators
- 3.9** Engine and generator instrumentation
- 3.10** Audible alarms for all faults
- 3.11** Auto start control panel

### **4.0 Mandatory Additional required features**

- 4.1** Weather protective enclosure with anticorrosive heavy duty weather resistant paint
- 4.2** Skid base with vibration isolation
- 4.3** Engine coolant/oil heater
- 4.4** Remote monitoring and auto start functions
- 4.5** Must include operation and maintenance manual with wiring diagrams
- 4.6** Automatic transfer switch shall be inclusive within the price quoted for each generator.

### **5.0 Size and type of generator units**

- 5.1** The following size generator units are being requested.

- a. 10 kW
- b. 15 kW
- c. 20 kW
- d. 30 kW
- e. 35 kW
- f. 45 kW
- g. 60 Kw

- 5.2** The ratings in item 5.1 are for "Standby" power as defined in ISO8528 and ISO 3046. Individual unit ratings may be +/- 2 kW, except 60 Kw unit may be +/- 5 Kw.

## 6.0 Bid Evaluation Sheet

Bid will be evaluated based on the Grand Total Price listed below. Award will be based on the lowest Grand Total Price which meets all specifications in items 1.0 through 5.0.

Note: Vendors should take particular note of the specifications in General Section 1.0 to assure compliance.

Qty	Size	Description	Unit Price	Total Price
2	10 kW	LP Generator	16,754.00	33,508.00
6	15 kW	LP Generator	16,788.00	100,728.00
4	20 kW	LP Generator	20,193.00	80,770.00
2	30 kW	LP Generator	21,988.00	43,976.00
2	35 kW	LP Generator	22,962.00	45,925.00
1	45 kW	LP Generator	23,062.00	23,062.00
1	60 kW	LP Generator	26,533.00	26,533.00
<b>GRAND TOTAL OF BID PRICE</b>				<b>354,502.00</b>

Above quantities are for sample purposes only. Actual ordered amounts may be more or less.

**END OF SPECIFICATIONS**

# A F F I D A V I T

**West Virginia Code §5A-3-10a states:**

No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owned is an amount greater than one thousand dollars in the aggregate

**DEFINITIONS:**

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

**EXCEPTION:**

The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

**LICENSING:**

Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agencies or political subdivision. Furthermore, the vendor must provide all necessary releases to obtain information to enable the Director or spending unit to verify that the vendor is licensed and in good standing with the above entities.

**CONFIDENTIALITY:**

The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures and rules. Vendors should visit [www.state.wv.us/admin/purchase/privacy](http://www.state.wv.us/admin/purchase/privacy) for the Notice of Agency Confidentiality Policies.

Under penalty of law for false swearing (West Virginia Code, §61-5-3), it is hereby certified that the vendor acknowledges the information in this said affidavit and are in compliance with the requirements as stated.

Vendor's Name: Master Service Mid Atlantic

Authorized Signature:  Date: FEBRUARY 5, 2007



State of West Virginia  
 Department of Administration  
 Purchasing Division  
 2019 Washington Street East  
 Post Office Box 50130  
 Charleston, WV 25305-0130

# Request for Quotation

RFQ NUMBER  
 BPH70348

PAGE  
 1

ADDRESS CORRESPONDENCE TO ATTENTION OF  
 ROBERTA WAGNER  
 304-558-0067

RFQ COPY  
 TYPE NAME/ADDRESS HERE

VENDOR

Master Service Mid-Atlantic, Inc.  
 P O Box 2417  
 Livingston Avenue  
 Elkins, WV 26241

SHIP TO

HEALTH AND HUMAN RESOURCES  
 BPH - TRAUMA & EMERGENCY CARE  
 SYSTEM  
 VARIOUS LOCALES AS INDICATED  
 ON PURCHASE ORDER

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
01/16/2007	02/06/2007			
BID OPENING DATE:		BID OPENING TIME		01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
*****ADDENDUM #1*****						
1. ANSWERS TO VENDOR QUESTIONS AS PER ATTACHED.						
2. ADDENDUM ACKNOWLEDGEMENT IS ATTACHED. THIS DOCUMENT SHOULD BE SIGNED AND RETURNED WITH YOUR BID. FAILURE TO SIGN AND RETURN MAY RESULT IN DISQUALIFICATION OF YOUR BID.						
***END OF ADDENDUM #1***						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Patricia A. Sato</i>	TELEPHONE 304-636-8170	DATE 2/05/2007
TITLE Vice-President	FEIN 55-0667885	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

**GENERAL TERMS & CONDITIONS  
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)**

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. All quotations are governed by the *West Virginia Code* and the *Legislative Rules* of the Purchasing Division.
4. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125.00 registration fee.
5. All services performed or goods delivered under State Purchase Orders/Contracts are to be continued for the term of the Purchase Order/Contract, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods, this Purchase Order/Contract becomes void and of no effect after June 30.
6. Payment may only be made after the delivery and acceptance of goods or services.
7. Interest may be paid for late payment in accordance with the *West Virginia Code*.
8. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
9. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
10. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
11. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern all rights and duties under the Contract, including without limitation the validity of this Purchase Order/Contract.
12. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
13. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, this contract is automatically null and void, and is terminated without further order.
14. **HIPAA Business Associate Addendum -** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, and available online at the Purchasing Division's web site (<http://www.state.wv.us/admin/purchase/vrc/hipaa.htm>) is hereby made part of the agreement. Provided that, the Agency meets the definition of a Covered Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.

---

**INSTRUCTIONS TO BIDDERS**

1. Use the quotation forms provided by the Purchasing Division.
2. **SPECIFICATIONS:** Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Complete all sections of the quotation form.
4. Unit prices shall prevail in cases of discrepancy.
5. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
6. **BID SUBMISSION:** All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications.

**SIGNED BID TO:**

Department of Administration  
Purchasing Division  
2019 Washington Street East  
Post Office Box 50130  
Charleston, WV 25305-0130



RFQ# BPH70348

RESPONSE TO VENDOR QUESTIONS, AS FOLLOWS:

1. Question: Who installs the concrete generator pad referred to on P10?  
Response: The installation of the pad is not a part of the bid.
2. Question: Who supplies/install the LP gas tank, gas piping, tank regulator and concrete tank pad?  
Response: The installation of the LP system is not a part of this bid.
3. Question: We need a list of the sites so that we can go to each site and determine what materials and labor are needed?  
Response: This is an open end contract and involves many different sites and many which are not yet determined. It is not practical to "visit" the sites. This is a generic open end bid for the generator and its installation and hook-up. All sites are essentially the same with only minor variations. This should be clear after reading response to questions 4 and 5, below.
4. Question: Should we include an allowance for a concrete pad or is it existing?  
Response: No. Do not include the cost of the concrete pad. It will already be in place. Also, the main large conduit from the generator to the building will be in place with pull cord in place. The average distance from the generator pad to the building is 50 feet.
5. Question: Are there any blueprints for this project?  
Response: There are drawings for some of the current sites. However, again this is an open end contract and my sites are not yet determined. For the purpose of this open end contract, there is adequate information with the above clarifications to provided a bid.
6. Question: What is the location of each Communication Tower Site? This is needed to determine freight.  
Response: As stated in the specifications, this is for many different sites throughout West Virginia. Since this is an open end contract, many of the sites are not known at this time.
7. Question: What are the Offloading conditions? This is needed to determine if boom truck or crane will be needed.  
Response: Off-loading is onto a concrete pad which is already provided. There is road access to the tower sites.
8. Question: Are these new generators replacing any old ones or are they all new installs?  
Response: All new.

9. Question: What is the layout of the project? We need this information to estimate materials for install, wiring, etc.

Response: As was answered before, each site could be slightly different, but for the purpose of the bid the generator will be an average of 50 feet from the building. The concrete pad will be in place and the large conduit from pad to building will be in place with pull string.

10. Question: What lead-time is required? The lead time may vary for each type, size of generator. What are your requirements?

Response: Lead time ASAP (4-6 weeks)

Vendor: Master Service Mid-Atlantic, Inc.	Spending Unit:
---	----------------

Requisition No.: BPH70348

ADDENDUM ACKNOWLEDGEMENT

I hereby acknowledge receipt of the following checked addendum(s) and have made the necessary revisions to my proposal, plans and/or specifications, etc.

Addendum No.'s:

- No. 1 PS
- No. 2 \_\_\_\_\_
- No. 3 \_\_\_\_\_
- No. 4 \_\_\_\_\_
- No. 5 \_\_\_\_\_

I understand that failure to confirm the receipt of the addendum(s) is cause for rejection of bids.

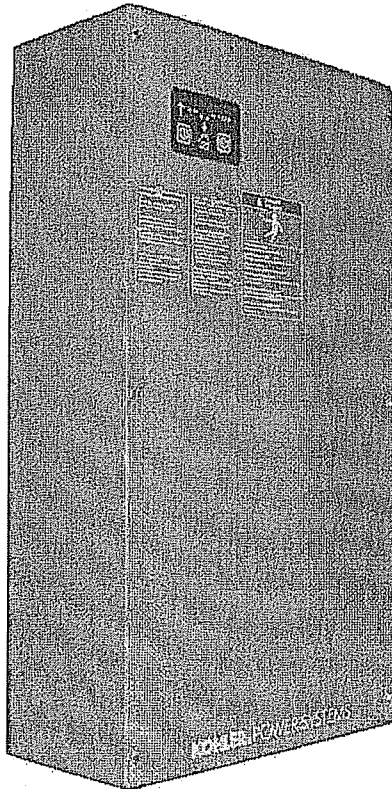
*Pat A. Smith*  
Signature

Master Service Mid ATLANTIC  
Company

FEBRUARY 5, 2007  
Date



MASTER SERVICE MID-ATLANTIC, INC.  
1403 LIVINGSTON AVENUE  
P.O. BOX 2817  
ELMINS, NY 12624



## Standard Features Transfer Switch

- UL and cUL Listed:
  - Models with load centers are UL 67 listed, file #E251086
  - Models without load centers are UL 1008 listed, file #E58962
  - All models are UL listed to Canadian safety standards
- 220/240 VAC, 50/60 Hz (jumper)
- Two-pole, single-phase open-transition transfer switch
- Contactor electrically and mechanically interlocked
- Double throw inherently interlocked design
- Solid neutral
- Contactor manually operable for maintenance purposes
- Silver alloy main contacts
- All models are 100% equipment rated and can be applied at the rated current without derating
- 100 and 200 amp models available with or without prewired Square D type QO load center:
  - 100 amp load center models use up to 12 circuit breakers
  - 200 amp load center models use up to 24 circuit breakers
- Two enclosures available:
  - NEMA Type 1, for indoor installation. 100 amp models with and without load centers and 200 amp models without load centers can be recess-mounted between wall studs
  - NEMA Type 3R, padlockable and approved for indoor or outdoor installation
- 2-year extended warranty included

## MPAC™ 500 Controller

- User-friendly interface with easy-to-read international symbols
- Source available and contactor position indicators
- LED indication of system faults:
  - Failure to acquire standby source
  - Failure to transfer
  - Auxiliary switch fault
- Common fault contact: latches closed on system faults shown above
- Engine start contact: provides contact closure to start the generator set
- Load control contact: allows 5-minute delay in startup of selected loads
- Test button (with or without load)
- Exercise set button:
  - Weekly 20-minute generator set exercise
  - With or without load
- Single-phase voltage sensing on both sources,  $\pm 5\%$
- Line-to-line frequency sensing,  $\pm 2\%$
- Fixed time delays

Environmental Specifications	
Operating temperature:	-20°C to 70°C (-4°F to 158°F)
Storage temperature:	-40°C to 85°C (-40°F to 185°F)
Humidity:	5 to 95% noncondensing

Contact Ratings	
Engine start	0.5 A @ 125 VAC; 2 A @ 30 VDC SPST normally closed (NC)
Common fault	0.5 A @ 125 VAC; 2 A @ 30 VDC SPST normally open (NO)
Load control	10 A @ 120 VAC SPST normally open (NO)
Auxiliary contacts (optional)	15 A @ 277 VAC Form C

Source Sensing	
Undervoltage dropout	80%
Undervoltage pickup	85%
Underfrequency dropout	90%
Underfrequency pickup	96%

Time Delays			
Time Delay	Factory Setting	Adjustment with Accessory Board*	
		Range	Increment
Engine Start	3 sec.	1-10 sec.	1 second
Transfer from Normal to Emergency	3 sec.	1-10 sec.	1 second
Retransfer from Emergency to Normal	6 min.	3-30 min.	3 minutes
Engine Cooldown	5 min.	1-10 min.	1 minute
Exercise Run Time	20 min.	5-50 min.	5 minutes
Exercise Interval	1 week	1 week/2 week (DIP switch)	
Load Control Connection Delay	5 min.	5 or 10 minutes (DIP switch)	
Failure to Acquire Emergency Source	78 sec.	NA	
Undervoltage Dropout	0.5 sec.	NA	
Underfrequency Dropout	3 sec.	NA	
* Optional accessory board required for time delay adjustments NA = not adjustable			

## Codes and Standards

The ATS meets or exceeds the requirements of the following specifications:

- Underwriters Laboratories UL 67, Enclosed Panel Boards (load center models)
- Underwriters Laboratories UL 1008, Standard for Automatic Transfer Switches for Use in Emergency Systems
- Underwriters Laboratories UL 508, Standard for Industrial Control Equipment
- NFPA 70, National Electrical Code
- NFPA 110, Emergency and Standby Power Systems
- IEEE Standard 446, IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
- NEMA Standard IC10-1993 (formerly ICS2-447), AC Automatic Transfer Switches
- ANSI C37.90.1 (IEEE472), 2000, EFT/Surge Relay Systems
- EN61000-4-5 Surge Immunity Class 4 (voltage sensing and programmable inputs only)
- EN61000-4-4 Fast Transient Immunity Severity Level 4
- IEC Specifications for EMI/EMC Immunity:
  - CISPR 11, Radiated and Conducted Emissions, Class B
  - IEC 1000-4-2, 2001, Electrostatic Discharge
  - IEC 1000-4-3, 2002, Radiated Immunity
  - IEC 1000-4-4, 2001, Electrical Fast Transients (Bursts)
  - IEC 1000-4-5, 2001, Surge Voltage Immunity
  - IEC 1000-4-6, 2003, Conducted RF Immunity
  - IEC 1000-4-8, Magnetic Field Immunity
  - IEC 1000-4-11, Voltage Dips and Interruptions

Cable Sizes		
AL/CU UL-Listed Solderless Screw-Type Terminals for External Power Connections		
Switch Size, Amps	Range of Wire Sizes, Cu/Al	
	Normal, Emergency, Load, and Neutral	Ground
100	(1) #12 to 1/0 AWG	(1) #14 to #4 AWG Cu
200	(1) #6 AWG to 250 MCM	(1) #14 to #4 AWG Cu
400	(2) #1/0 AWG to 250 MCM or (1) #4 AWG to 600 MCM	(1) #14 to 1/0 AWG

## Accessories (optional)

### Accessory board

- Alarm horn indicates system faults
- Adjustable time delays:
  - Engine start
  - Engine cooldown
  - Preferred to standby
  - Standby to preferred
  - Exercise duration
- Inputs and Outputs:
  - Remote start/stop input (loaded)
  - Programmable exerciser input
  - Generator set supplying load output: 10 A @ 120 V SPST normally open (NO) contact
- External alarm module connection
- Dip switches:
  - 1 week/2 week exerciser
  - Load/no load exercise mode (for optional programmable exerciser)
  - Momentary/maintained external start/stop input: Selects momentary (1 second) push button or maintained contact closure for remote start/stop signal
  - Load control, 5 minutes/10 minutes: Allows adjustment of the startup delay after transfer to generator set for selected loads (e.g. air conditioners or other large motor starting loads)
  - Audible alarm disable

### Auxiliary position-indicating contacts

- One closed on normal position and one closed on emergency position
- Form C contacts rated 15 A @ 277 VAC

### Programmable exerciser

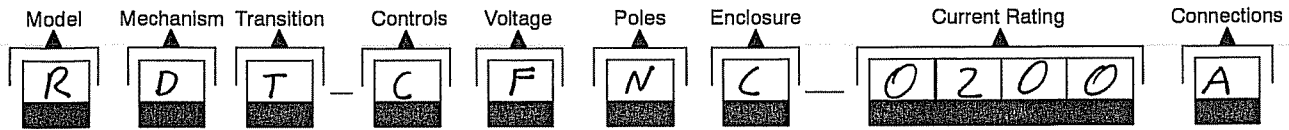
- Seven-day programmable timer allows scheduling up to 20 on/off events
- LCD display indicates day, time, program/run modes, and on/off/override status
- Daylight time changeover button
- Manual override button
- Backup capacitor maintains time and programs up to 5 days without power
- Transparent cover

### Wall-mount bezel for 100 and 200 amp recess-mounted switches (NEMA type 1 enclosures only)

### Extended 5-year warranty

KOHLER CO., Kohler, Wisconsin 53044 USA  
 Phone 920-565-3381, Fax 920-459-1646  
 For the nearest sales and service outlet in the  
 US and Canada, phone 1-800-544-2444  
 KohlerPowerSystems.com

Kohler Power Systems  
 Asia Pacific Headquarters  
 7 Jurong Pier Road  
 Singapore 619159  
 Phone (65) 6264-6422, Fax (65) 6264-6455



**Kohler® Model Designation Key**

This chart explains the Kohler® transfer switch model designation system. The sample model designation shown is for a Model R automatic transfer switch that uses an open-transition contactor with MPAC™ 500 electrical controls rated at 240 volts/60 Hz, 2 poles, 3 wires, and solid neutral in a NEMA 1 enclosure with a current rating of 100 amperes and equipped with a load center.

**SAMPLE MODEL DESIGNATION**

**RDT-CFNA-0100B**

**Model**

R: Model R automatic transfer switch

**Mechanism**

D: Series-Rated

**Transition**

T: Open-Transition

**Electrical Controls**

C: MPAC™ 500 (Microprocessor ATS Controls)

**Voltage/Frequency**

D: 220 Volts/50 Hz  
 F: 240 Volts/60 Hz

**Number of Poles/Wires**

N: 2-pole, 3-wire, solid neutral

**Enclosure**

A: NEMA 1  
 C: NEMA 3R

**Current Rating:** Numbers indicate the current rating of the switch in amperes:

0100: 100 amps      0200: 200 amps      0400: 400 amps

**Load Center**

A: Without load center  
 B: With load center

**DISTRIBUTED BY:**

Availability is subject to change without notice. Kohler Co. reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. Contact your local Kohler® generator distributor for availability.

© 2004, 2005 by Kohler Co. All rights reserved.

THIS UNIT ALSO USED FOR 10 KW

Model: 15RYG

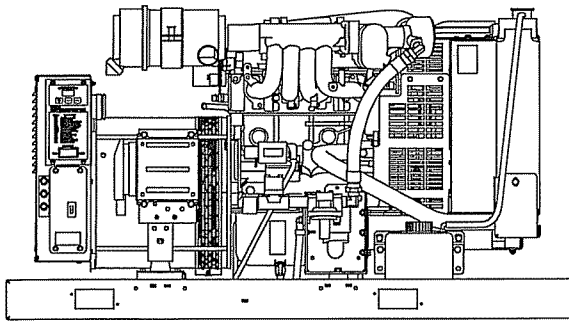
# KOHLER POWER SYSTEMS

Gas



## Ratings Range

		60 Hz	
Standby:	kW	13.0-15.0	
	kVA	13.0-18.8	



## Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The generator set accepts rated load in one step.
- UL 2200 listing and UL listing to Canadian safety standards available.
- A one-year limited warranty covers all systems and components. Two- and five-year extended warranties are also available.
- Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
- Engine features:
  - Natural gas or LP fueled
  - Electronic engine controls for optimized fuel and spark performance
  - Four cylinder, four cycle engine
  - An electronic, isochronous governor for precise frequency regulation
  - High silicone content pistons for improved durability
- ADC 2100 digital controller features:
  - LED display provides diagnostic capability
  - Digital voltage regulator with  $\pm 1.5\%$  no-load to full-load regulation
  - Superior electronics protection from corrosion and vibration
  - See more controller features inside

## Generator Set Ratings

Alternator	Voltage	Ph	Hz	Natural Gas Rating		LP Gas Rating	
				kW/kVA	Amps	kW/kVA	Amps
4H7	120/240	1	60	13.0/13.0	54	15.0/15.0	63
	120/208	3	60	13.0/16.2	45	15.0/18.8	52
	120/240	3	60	13.0/16.2	39	15.0/18.8	45
4J7	127/220	3	60	13.0/16.2	43	15.0/18.8	49
	139/240	3	60	13.0/16.2	39	15.0/18.8	45
	277/480	3	60	13.0/16.2	20	15.0/18.8	22

**RATINGS:** All three-phase units are rated at 0.8 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **NOTE:** Order separate generator set specs for 50 or 60 Hz as this model cannot change frequency. **GENERAL GUIDELINES FOR DERATION:** *Altitude:* Derate 1.5% per 305 m (1000 ft.) elevation above 1006 m (3300 ft.). *Temperature:* Derate 2.0% per 5.5°C (10°F) temperature above 21°C (70°F).

## Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Brush Type
Leads: quantity, type	4 or 12, Reconnectable
Voltage regulator	Digital
Insulation:	NEMA MG1-1.66
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load RMS	±1.5%
One-step load acceptance	100% of Rating
Unbalanced load capability	100% of Rated Standby Current
Peak motor starting kVA:	(35% dip for voltages below)
240 V, 1-phase	4H7 (4 lead) 42
480 V, 3-phase	4J7 (12 lead) 62

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- The generator set complies with ISO 8528-5 requirements for transient performance.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the generator field.
- Self-ventilated and drip-proof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.

## Application Data

### Engine

Engine Specifications	60 Hz
Manufacturer	GM
Engine: model, type	GM 1.6L OHC
Cylinder arrangement	4, Inline
Displacement, L (cu. in.)	1.6 (98)
Bore and stroke, mm (in.)	79 x 81.5 (3.11 x 3.21)
Compression ratio	9.4:1
Piston speed, m/min. (ft./min.)	293 (963)
Main bearings: quantity, type	5, Replaceable Inserts
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	19.0 (25.5)
Cylinder head material	Aluminum
Crankshaft material	Cast Iron
Valve (exhaust) material	High Alloy Steel
Governor type	Electronic
Frequency regulation, no load to full load	Isochronous
Frequency regulation, steady state	±0.5%
Air cleaner type, all models	Dry

### Engine Electrical

Engine Electrical System	60 Hz
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	70
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	600
Battery voltage (DC)	12

### Fuel

Fuel System		
Fuel type	LP Gas or Natural Gas	
Fuel supply inlet	3/4-14 NPT	
Fuel supply pressure kPa (in. H <sub>2</sub> O)	1.74-2.74 (7-11)	
Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C <sub>4</sub> and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, kJ/m <sup>3</sup> (Btu/ft <sup>3</sup> ), min.	26.6 (890)	67.5 (2260)

\* Contact your local distributor for suitability and rating derates based on fuel compositions outside these limits.

### Exhaust

Exhaust System	60 Hz
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	3.7 (131)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	649 (1200)
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)
Exhaust outlet size at engine hookup, mm (in.)	50.8 (2.0)

### Lubrication

Lubricating System	60 Hz
Type	Full Pressure
Oil pan capacity, L (qt.)	3.2 (3.4)
Oil pan capacity with filter, L (qt.)	3.5 (3.7)
Oil filter: quantity, type	1, Cartridge



## Application Data

### Cooling

Standard Radiator System	60 Hz
Ambient temperature °C (°F)	50 (122)
Engine jacket water capacity, L (gal.)	3.3 (0.9)
Engine jacket water flow, Lpm (gpm)	37.8 (10.0)
Radiator system capacity, including engine, L (gal.)	11.5 (3.0)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	15.7 (895)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	390 (15.35)
Fan, kWm (HP)	1.2 (1.6)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O)	0.13 (0.5)

### Operation Requirements

Air Requirements	60 Hz
Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm)‡	85 (3000)
Combustion air, m <sup>3</sup> /min. (cfm)	0.7 (25)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	35.7 (2032)
Alternator, kW (Btu/min.)	2.9 (165)

‡ Air density = 1.20 kg/m<sup>3</sup> or 0.075 lbm/ft<sup>3</sup>

Fuel Consumption	60 Hz
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load</b>	
100%	5.7 (200)
75%	4.5 (160)
50%	3.5 (125)
25%	2.5 (90)
<b>LP Gas, m<sup>3</sup>/hr. (cfh) at % load</b>	
100%	2.4 (85)
75%	1.8 (65)
50%	1.4 (51)
25%	1.0 (37)

LP vapor conversion factors:  
 8.58 ft.<sup>3</sup> = 1 lb.  
 0.535 m<sup>3</sup> = 1 kg  
 36.39 ft.<sup>3</sup> = 1 gal.

Nominal fuel rating:

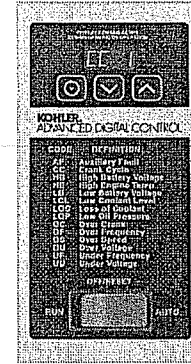
Natural gas: 37 MJ/m<sup>3</sup> (1000 Btu/ft.<sup>3</sup>)  
 LP vapor: 93 MJ/m<sup>3</sup> (2500 Btu/ft.<sup>3</sup>)

### Sound Data

#### Average Sound Levels at 7 m (23 ft.), with full load

Enclosure Type	Sound Level, dBA
Weather Enclosure	73
Weather Enclosure w/Sound Upfit Kit	69
Sound Enclosure	63

## Controller



### Advanced Digital Control Features

- Compact controller
- Integrally mounted to the generator set
- LED display:
  - Runtime hours
  - Crank cycle status
  - Diagnostics
  - Application software version
- LED display communicates faults:
  - Auxiliary fault
  - High battery voltage
  - High engine temperature
  - Low battery voltage
  - Low oil pressure
  - Overcrank safety
  - Overspeed
  - Overfrequency
  - Overvoltage
  - Underfrequency
  - Undervoltage
- Membrane keypad for configuration and adjustment
  - Password-protected user access to menus
  - Voltage, gain, and speed adjustment
  - System configuration: system voltage, phase, and frequency settings, battery voltage, and generator set model
- Master switch: Run/Off-Reset/Auto
- Remote two-wire start/stop capability
- Superior electronics protection from corrosion and vibration
  - Potted electronics
  - Sealed connections
- Automatic start with programmed cranking cycle

## Standard Features

- Base Frame with Steel Skid
- Battery Rack and Cables
- ADC 2100 Digital Controller
- Electronic, Isochronous Governor
- Engine Shutdowns for High Engine Temperature and Low Oil Pressure
- Fuel Solenoid Valve (two valves on UL-listed units)
- Secondary Regulator
- Integral Vibration Isolation
- Oil Drain Extension
- Operation and Installation Literature

## Optional Accessories

### Enclosed Unit

- Sound Enclosure (includes silencer)
- Sound Upfit Kit (for weather housing)
- Weather Housing (includes silencer)

### Open Unit

- Engine-Mounted Silencer
- Exhaust Silencer, Critical
- Flexible Exhaust Connector, Stainless Steel
- Radiator Duct Flange
- Rain Cap (for engine-mounted silencer)
- Skid End Caps (for unhooded units)

### Fuel System

- Additional Gas Solenoid Valve (standard on UL-listed models)
- Flexible Fuel Lines
- Natural Gas Strainer

### Electrical System

- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater
- Remote Connection/Extension Harness (15 ft. or 25 ft.)

### Engine and Alternator

- Air Cleaner Restriction Indicator
- Block Heater (recommended for ambient temperatures below 0°C (32°F))
- Engine Coolant (installed)
- Line Circuit Breaker
- Optional Alternators
- Rated Power Factor Testing
- Rodent Guards

## Maintenance and Literature

- General Maintenance Literature Kit
- Overhaul Literature Kit
- Production Literature Kit
- Maintenance Kit (includes air filter, oil filter, and belt)

## Extended Warranties

- Two-year Limited
- Five-Year Limited

## Controller

- Relay Kit, Includes Run Relay and Common Fault Relay
- Remote Digital Gauge (battery charger recommended)

## Miscellaneous Accessories

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

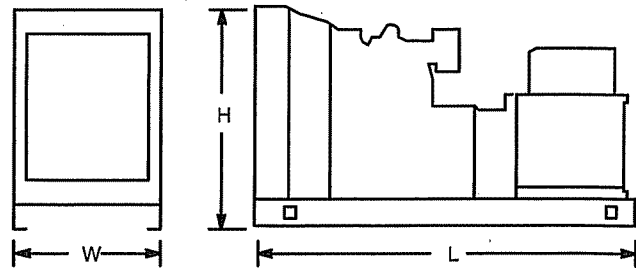
## Dimensions and Weights

Overall Size, L x W x H, mm (in.): 1400 x 685 x 951  
(55.1 x 27.0 x 37.4)

Weight, radiator model, wet, kg (lb.): 318 (700)

Weight, with weather enclosure and sound kit, wet, kg (lb.): 490 (1080)

Weight, with sound enclosure, wet, kg (lb.): 544 (1200)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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THIS UNIT ALSO USED FOR 20 kW Model: 25RZGB

# KOHLER POWER SYSTEMS

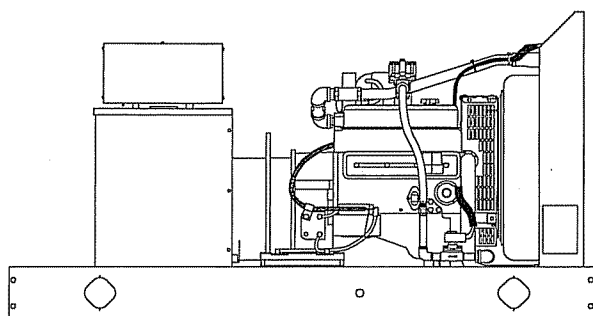
208-600 V

Gas



## Ratings Range

		<b>60 Hz</b>
<b>Standby:</b>	<b>kW</b>	25
	<b>kVA</b>	25-31
<b>Prime:</b>	<b>kW</b>	23
	<b>kVA</b>	23-28



## Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Alternator features:
  - The Fast-Response™ III wound field (WF) design alternator provides excellent voltage response and short-circuit capability using an auxiliary power brushless exciter.
  - The unique Fast-Response™ II excitation system delivers excellent voltage response and short circuit capability using a permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Controllers are available for all applications. See controller features inside.
  - The electronic, isochronous governor incorporates an integrated drive-by-wire throttle body actuator delivering precise frequency regulation.

## Generator Set Ratings

Alternator	Voltage	Ph	Hz	Natural Gas				LP Gas			
				130°C Rise		105°C Rise		130°C Rise		105°C Rise	
				Standby Rating	Prime Rating	Standby Rating	Prime Rating	Standby Rating	Prime Rating	Standby Rating	Prime Rating
				kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps
	120/208	3	60	25/31	87	23/28	80	25/31	87	23/28	80
	127/220	3	60	25/31	82	23/28	75	25/31	82	23/28	75
	120/240	3	60	25/31	75	23/28	69	25/31	75	23/28	69
4P4W/4P4	120/240	1	60	25/25	104	23/23	96	25/25	104	23/23	96
	139/240	3	60	25/31	75	23/28	69	25/31	75	23/28	69
	220/380	3	60	25/31	47	23/28	44	25/31	47	23/28	44
	277/480	3	60	25/31	38	23/28	35	25/31	38	23/28	35
	347/600	3	60	25/31	30	23/28	28	25/31	30	23/28	28

**RATINGS:** All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **GENERAL GUIDELINES FOR DERATION:** *Altitude:* Derate 1.3% per 100 m (328 ft.) elevation above 200 m (656 ft.). *Temperature:* Derate 3.0% per 10°C (18°F) temperature above 40°C (104°F).

# Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	
Wound field (WF)	Wound Exciter Field with Separate Excitation Power Winding
Permanent magnet (PM)	Brushless, Permanent-Magnet
Leads: quantity, type	12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	
Wound field (WF) alternator	±0.25% Average
Permanent magnet (PM) alternator	±2% Average
550 controller (with 0.5% drift due to temperature variation)	3-Phase Sensing, ±0.25%
Unbalanced load capability	100% of Rated Standby Current
One-step load acceptance	100% of Rating

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Fast-Response™ III wound field (WF) brushless alternator with auxiliary power brushless exciter for excellent load response.
- Fast-Response™ II brushless alternator with brushless exciter for excellent load response.

Specifications	Alternator
Peak motor starting kVA:	(35% dip for voltages below)
480 V 4P4W/4P4 (12 lead)	121

## Application Data

### Engine

Engine Specifications	
Manufacturer	General Motors
Engine: model, type	Industrial Powertrain 3.0 L, 4-Cycle Natural Aspiration
Cylinder arrangement	4 Inline
Displacement, L (cu. in.)	3.0 (181)
Bore and stroke, mm (in.)	101.6 x 91.4 (4.00 x 3.60)
Compression ratio	8.2:1
Piston speed, m/min. (ft./min.)	329 (1080)
Main bearing caps	2 Bolt
Rated rpm	1800
Max. power at rated rpm, kW (HP)	35 (47)
Engine power at standby rating, kW (HP)	35 (47)
Cylinder head material	Cast Iron
Piston type and material	High Silicon Aluminum
Crankshaft material	Nodular Iron
Governor type	Electronic
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state	±0.5%
Air cleaner type, all models	Dry

### Exhaust

Exhaust System	
Exhaust manifold type	Dry
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	5.9 (208)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	566 (1050)
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)
Exhaust outlet size at engine hookup, mm (in.)	64 (2.5) OD

### Engine Electrical

Engine Electrical System	
Ignition system	Electronic, Distributor
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	12
Ampere rating	70
Starter motor rated voltage (DC)	12
Battery, recommended cold cranking amps (CCA):	
Qty., rating for -18°C (0°F)	1, 630
Battery voltage (DC)	12

### Fuel

Fuel System	
Fuel type	LPG or Natural Gas
Fuel supply line inlet	1 NPTF
Natural gas/LPG fuel supply pressure, measured at the generator set fuel inlet after any fuel system equipment accessories, kPa (in. H <sub>2</sub> O)	1.74-2.74 (7.0-11.0)

Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C <sub>4</sub> and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, kJ/m <sup>3</sup> (Btu/ft <sup>3</sup> ), min.	26.6 (890)	67.5 (2260)

\* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

# Application Data

## Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	3.8 (4.0)
Oil pan capacity with filter, L (qt.)	4.1 (4.3)
Oil filter: quantity, type	1, Cartridge

## Cooling

Radiator System	
Ambient temperature, °C (°F)*	50 (122)
Engine jacket water capacity, L (gal.)	6.8 (1.8)
Radiator system capacity, including engine, L (gal.)	18.9 (5.0)
Engine jacket water flow, Lpm (gpm)	42 (11)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	34.1 (1940)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	533 (21)
Fan, kWm (HP)	3.0 (4.0)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O)	0.125 (0.5)

\* Enclosure with enclosed silencer reduces ambient temperature capability by 5°C (9°F).

### Remote Radiator System†

Exhaust manifold type	Dry
Connection sizes:	
Water inlet, ID hose, mm (in.)	50.8 (2.00)
Water outlet, ID hose, mm (in.)	44.5 (1.75)
Static head allowable above engine, kPa (ft. H <sub>2</sub> O)	4.32 (17.0)

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

## Operation Requirements

### Air Requirements

Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm)†	200 (7100)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise and ambient temperature of 29°C (85°F), m <sup>3</sup> /min. (cfm)	41 (1448)
Combustion air, m <sup>3</sup> /min. (cfm)	1.8 (64)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	7.7 (438)
Alternator, kW (Btu/min.)	3.8 (216)

‡ Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>).

### Fuel Consumption§

Natural Gas, m <sup>3</sup> /hr. (cfh) at % load	Standby Ratings
100%	10.4 (367)
75%	8.4 (297)
50%	6.4 (226)
25%	4.8 (170)
Natural Gas, m <sup>3</sup> /hr. (cfh) at % load	Prime Ratings
100%	9.6 (339)
75%	7.8 (275)
50%	6.1 (215)
25%	4.6 (162)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Standby Ratings
100%	4.7 (166)
75%	3.6 (127)
50%	2.8 (99)
25%	1.9 (67)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Prime Ratings
100%	4.3 (152)
75%	3.4 (120)
50%	2.6 (92)
25%	1.8 (64)

§ Fuel consumption is based on 1015 Btu/standard cu. ft. natural gas.

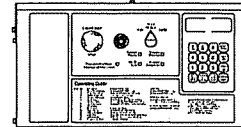
LP vapor conversion factors:

8.58 ft.<sup>3</sup> = 1 lb.

0.535 m<sup>3</sup> = 1 kg.

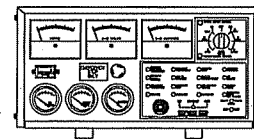
36.39 ft.<sup>3</sup> = 1 gal.

## Controllers



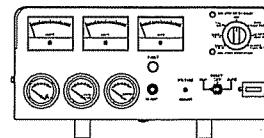
### Decision-Maker™ 550 Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Programmable microprocessor logic and digital display features. Alternator safeguard circuit protection. 12- or 24-volt engine electrical system capability. Remote start, remote annunciation, and remote communication options. Refer to G6-46 for additional controller features and accessories.



### Decision-Maker™ 3+, 16-Light Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Microprocessor logic, AC meters, and engine gauge features. 12- or 24-volt engine electrical system capability. Remote start, prime power, and remote annunciation options. Refer to G6-30 for additional controller features and accessories.



### Decision-Maker™ 1 Controller

Single-light annunciation and basic controls with NFPA capability. Relay logic, AC meters, and engine gauge features. 12-volt engine electrical system capability only. Remote or automatic start options. Refer to G6-29 for additional controller features and accessories. **Note:** Not available with 600-volt alternator.

### Additional Standard Features

- Alternator Protection (standard with 550 controller)
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System (includes fuel mixer, secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral Vibration Isolation
- Oil Drain Extension
- Operation and Installation Literature

### Available Accessories

#### Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)
- Weather Enclosure (with enclosed critical silencer)
- Weather Housing (with roof-mounted critical silencer)

#### Open Unit

- Exhaust Silencer, Critical (kits: PA-324468, PA-352663)
- Flexible Exhaust Connector, Stainless Steel

#### Cooling System

- Block Heater  
[recommended for ambient temperatures below 10°C (50°F)]
- City Water Cooling
- Radiator Duct Flange
- Remote Radiator Cooling

#### Fuel System

- Flexible Fuel Line  
(required when the generator set skid is spring mounted)
- Gas Filter
- Secondary Gas Solenoid Valve

#### Electrical System

- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater

#### Engine and Alternator

- Alternator, Wound Field (WF)
- Alternator, Permanent Magnet (PM)
- Air Cleaner Restrictor Indicator
- Alternator Strip Heater
- CSA Certification
- Engine Fluids (oil and coolant) Added
- Line Circuit Breaker (NEMA1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)
- Optional Alternators
- Rated Power Factor Testing
- Rodent Guards
- Safeguard Breaker (not available with 550 controller)
- Voltage Regulation, 1%
- Voltage Regulator Sensing, Three-Phase

#### Literature and Maintenance

- General Maintenance Literature Kit
- Maintenance Kit (includes standard air, oil, and fuel filters)
- NFPA 110 Literature
- Overhaul Literature Kit
- Production Literature Kit

### Controller (550 and 16-Light)

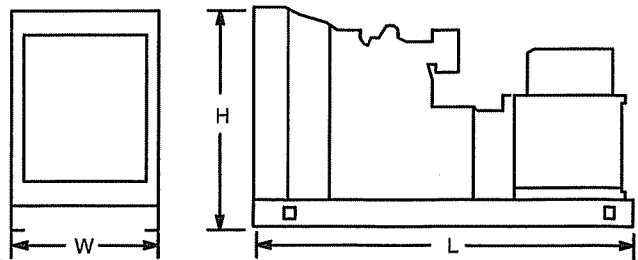
- Common Failure Relay Kit
- Communication Products and PC Software (550 controller only)
- Customer Connection Kit
- Dry Contact Kit (isolated alarm)
- Engine Prealarm Sender Kit
- Local Emergency Stop Kit
- Prime Power Switch (550 controller only)
- Remote Annunciator Panel
- Remote Audiovisual Alarm Panel
- Remote Emergency Stop Kit
- Remote Mounting Cable
- Run Relay Kit

### Miscellaneous Accessories

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
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### Dimensions and Weights

Overall Size, L x W x H, mm (in.):	
Wide Skid	2200 x 1040 x 1172 (86.6 x 40.9 x 46.1)
Narrow Skid	2200 x 865 x 1172 (86.6 x 34.0 x 46.1)
Weight (radiator model), wet, kg (lb.):	551 (1213)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

**DISTRIBUTED BY:**

THIS UNIT ALSO USED FOR 30 kW Model: 35RZG

# KOHLER POWER SYSTEMS

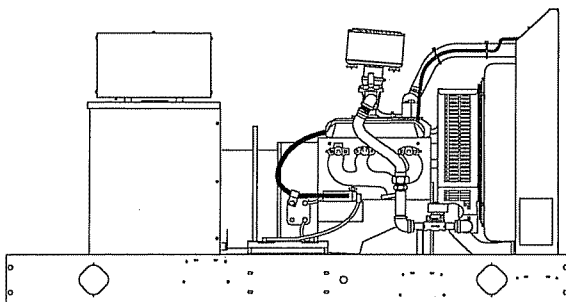
190-600 V

Gas



## Ratings Range

		60 Hz	50 Hz
Standby:	kW	31-42	27-34
	kVA	31-53	27-42
Prime:	kW	29-39	25-30
	kVA	29-49	25-37



## Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Alternator features:
  - The Fast-Response™ III wound field (WF) design alternator provides excellent voltage response and short-circuit capability using an auxiliary power brushless exciter.
  - The unique Fast-Response™ II excitation system delivers excellent voltage response and short circuit capability using a permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - A rugged industrial gas engine delivers rated power at 1800 rpm (60 Hz) and 1500 rpm (50 Hz).
  - Controllers are available for all applications. See controller features inside.
  - The electronic, isochronous governor incorporates an integrated drive-by-wire throttle body actuator delivering precise frequency regulation.

## Generator Set Ratings

Alternator	Voltage	Ph	Hz	Natural Gas				LP Gas			
				130°C Rise Standby Rating		105°C Rise Prime Rating		130°C Rise Standby Rating		105°C Rise Prime Rating	
				kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps
4P5BW/ 4P5B	120/208	3	60	38/48	132	35/44	121	38/48	132	35/44	121
	127/220	3	60	39/49	128	36/45	118	40/50	131	37/46	121
	120/240	3	60	37/46	111	34/43	102	37/46	111	34/43	102
	120/240	1	60	31/31	129	29/29	121	31/31	129	29/29	121
	139/240	3	60	39/49	117	36/45	108	42/53	126	39/49	117
	220/380	3	60	36/45	68	33/41	63	36/45	68	33/41	63
	277/480	3	60	39/49	58	36/45	55	42/53	63	39/49	59
	347/600	3	60	39/49	47	36/45	43	42/53	51	39/49	47
4Q5W/ 4Q5	110/190	3	50	31/39	118	29/36	109	32/40	122	29/36	109
	115/200	3	50	31/39	111	29/36	104	33/41	118	29/36	104
	120/208	3	50	31/39	108	29/36	100	34/42	117	30/37	103
	110/220	3	50	31/39	102	29/36	94	32/40	105	29/36	94
	110/220	1	50	27/27	123	25/25	114	27/27	123	25/25	114
	220/380	3	50	31/39	59	29/36	55	32/40	61	29/36	55
	230/400	3	50	31/39	56	29/36	52	33/41	59	29/36	52
	240/416	3	50	31/39	54	29/36	49	34/42	58	30/37	51
4Q5W/ 4Q5	120/240	1	60	38/38	158	34/34	142	38/38	158	34/34	142
	110/220	1	50	30/30	136	27/27	123	32/32	145	29/29	132

**RATINGS:** All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-3528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **GENERAL GUIDELINES FOR DERATION:** **Altitude:** Derate 1.3% per 100 m (328 ft.) elevation above 200 m (656 ft.). **Temperature:** Derate 3.0% per 10°C (18°F) temperature above 25°C (77°F). Dual fuel engines are optimized to run on the primary fuel (natural gas) and, as a result, the LPG ratings may not be attained. For dual fuel engines, use the natural gas ratings for both the primary and secondary fuels.

## Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	
Wound field (WF)	Wound Exciter Field with Separate Excitation Power Winding
Permanent magnet (PM)	Brushless, Permanent-Magnet
Leads: quantity, type	
4P5BW/4P5B	12, Reconnectable
4Q5W/4Q5	4, 110-120/220-240
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	
Wound field (WF) alternator	±0.25% Average
Permanent magnet (PM) alternator	±2% Average
550 controller (with 0.5% drift due to temperature variation)	3-Phase Sensing, ±0.25%
Unbalanced load capability	100% of Rated Standby Current
One-step load acceptance	100% of Rating

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Fast-Response™ III wound field (WF) brushless alternator with auxiliary power brushless exciter for excellent load response.
- Fast-Response™ II brushless alternator with brushless exciter for excellent load response.

Specifications	Alternator
Peak motor starting kVA:	(35% dip for voltages below)
480 V, 380 V 4P5BW/4P5B (12 lead)	130 (60Hz), 90 (50Hz)
240 V, 220 V 4Q5W/4Q5 (4 lead)	95 (60Hz), 78 (50Hz)

## Application Data

### Engine

Engine Specifications	60 Hz	50 Hz
Manufacturer	General Motors	
Engine: model, type	Industrial Powertrain Vortec 4.3 L, 4-Cycle Natural Aspiration	
Cylinder arrangement	V-6	
Displacement, L (cu. in.)	4.3 (262)	
Bore and stroke, mm (in.)	101.6 x 88.4 (4.00 x 3.48)	
Compression ratio	9.05:1	
Piston speed, m/min. (ft./min.)	318 (1044)	265 (870)
Main bearings: quantity, type	4, Babbitt	
Rated rpm	1800	1500
Max. power at rated rpm, kW (HP)	56 (75)	44.8 (60)
Engine power at standby rating, kW (HP)		
Natural Gas	49.2 (66)	40.3 (54)
LP Gas	53.7 (72)	42.5 (57)
Cylinder head material	Cast Iron	
Piston type and material	High Silicon Aluminum	
Crankshaft material	Nodular Iron	
Valve (exhaust) material	Forged Steel	
Governor type	Electronic	
Frequency regulation, no-load to full-load	Isochronous	
Frequency regulation, steady state	±0.5%	
Frequency	Field-Convertible	
Air cleaner type, all models	Dry	

### Exhaust

Exhaust System	60 Hz	50 Hz
Exhaust manifold type	Dry	
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	8.8 (310)	7.6 (270)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	649 (1200)	
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)	
Exhaust outlet size at engine hookup, mm (in.)	76 (3.0) OD	

### Engine Electrical

Engine Electrical System	60 Hz	50 Hz
Ignition system	Electronic, Distributor	
Battery charging alternator:		
Ground (negative/positive)	Negative	
Volts (DC)	12	
Ampere rating	70	
Starter motor rated voltage (DC)	12	
Battery, recommended cold cranking amps (CCA):		
Qty., rating for -18°C (0°F)	One, 630	
Battery voltage (DC)	12	

### Fuel

Fuel System	60 Hz	50 Hz
Fuel type	LP Gas or Natural Gas	
Fuel supply line inlet	1 NPTF	
Natural gas/LPG fuel supply pressure, measured at the generator set fuel inlet downstream of any fuel system equipment accessories, kPa (in. H <sub>2</sub> O)	1.74-2.74 (7.0-11.0)	

Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C <sub>4</sub> and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, kJ/m <sup>3</sup> (Btu/ft <sup>3</sup> ), min.	26.6 (890)	67.5 (2260)

\* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.



## Application Data

### Lubrication

Lubricating System	60 Hz	50 Hz
Type	Full Pressure	
Oil pan capacity, L (qt.)	4.3 (4.5)	
Oil pan capacity with filter, L (qt.)	5.7 (6.0)	
Oil filter: quantity, type	1, Cartridge	

### Cooling

Radiator System	60 Hz	50 Hz
Ambient temperature, °C (°F) *	50 (122)	
Engine jacket water capacity, L (gal.)	6.8 (1.8)	
Radiator system capacity, including engine, L (gal.)	19.7 (5.2)	
Engine jacket water flow, Lpm (gpm)	106.0 (28)	87.1 (23)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	39.2 (2230)	33.9 (1930)
Water pump type	Centrifugal	
Fan diameter, including blades, mm (in.)	533 (21)	
Fan, kWm (HP)	3.0 (4.0)	1.7 (2.3)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O)	0.125 (0.5)	

\* Weather housing with roof-mounted silencer and enclosure with enclosed silencer reduce ambient temperature capability by 5°C (9°F).

Remote Radiator System†	60 Hz	50 Hz
Exhaust manifold type	Dry	
Connection sizes:		
Water inlet, ID hose, mm (in.)	44.45 (1.75)	
Water outlet, ID hose, mm (in.)	38.10 (1.50)	
Static head allowable above engine, kPa (ft. H <sub>2</sub> O)	4.32 (17.0)	

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

### Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm)‡	142 (5000)	113 (4000)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise and ambient temperature of 29°C (85°F), m <sup>3</sup> /min. (cfm)	82 (2900)	71 (2500)
Combustion air, m <sup>3</sup> /min. (cfm)	2.61 (92)	2.27 (80)
Heat rejected to ambient air:		
Engine, kW (Btu/min.)	16.0 (910)	13.0 (740)
Alternator, kW (Btu/min.)	6.3 (360)	6.2 (350)

‡ Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>)

Fuel Consumption	60 Hz	50 Hz
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load§</b>	<b>Standby Ratings</b>	
100%	16.5 (584)	13.5 (477)
75%	13.8 (486)	10.4 (367)
50%	10.2 (360)	8.0 (281)
25%	7.7 (272)	5.8 (206)
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load§</b>	<b>Prime Ratings</b>	
100%	15.5 (548)	12.4 (437)
75%	12.8 (452)	9.7 (344)
50%	9.7 (344)	7.6 (267)
25%	7.5 (264)	5.7 (200)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Standby Ratings	
100%	6.9 (242)	6.0 (211)
75%	5.4 (191)	4.5 (158)
50%	4.0 (141)	3.3 (116)
25%	2.9 (101)	2.4 (83)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Prime Ratings	
100%	6.3 (223)	5.4 (192)
75%	5.0 (177)	4.2 (147)
50%	3.8 (134)	3.1 (110)
25%	2.8 (98)	2.3 (80)

§ Fuel consumption is based on 1015 Btu/standard cu. ft. natural gas.

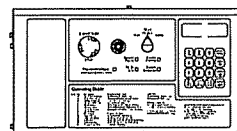
LP vapor conversion factors:

8.58 ft.<sup>3</sup> = 1 lb.

0.535 m<sup>3</sup> = 1 kg.

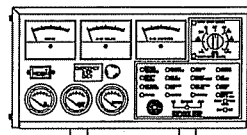
36.39 ft.<sup>3</sup> = 1 gal.

## Controllers



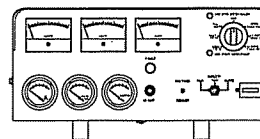
#### Decision-Maker™ 550 Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Programmable microprocessor logic and digital display features. Alternator safeguard circuit protection. 12- or 24-volt engine electrical system capability. Remote start, remote annunciation, and remote communication options. Refer to G6-46 for additional controller features and accessories.



#### Decision-Maker™ 3+, 16-Light Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Microprocessor logic, AC meters, and engine gauge features. 12- or 24-volt engine electrical system capability. Remote start, prime power, and remote annunciation options. Refer to G6-30 for additional controller features and accessories.



#### Decision-Maker™ 1 Controller

Single-light annunciation and basic controls with NFPA capability. Relay logic, AC meters, and engine gauge features. 12-volt engine electrical system capability only. Remote or automatic start options. Refer to G6-29 for additional controller features and accessories. **Note:** Not available with 600-volt alternator.

### Additional Standard Features

- Alternator Protection (standard with 550 controller)
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System (includes fuel mixer, secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral Vibration Isolation
- Oil Drain Extension
- Operation and Installation Literature

### Available Accessories

#### Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)
- Weather Enclosure (with enclosed critical silencer)
- Weather Housing (with roof-mounted silencer)

#### Open Unit

- Exhaust Silencer, Critical (kits: PA-324468, PA-352663)
- Flexible Exhaust Connector, Stainless Steel

#### Cooling System

- Block Heater  
[recommended for ambient temperatures below 10°C (50°F)]
- City Water Cooling
- Radiator Duct Flange
- Remote Radiator Cooling

#### Fuel System

- Automatic Changeover (natural gas to LP gas)
- Flexible Fuel Line  
(required when the generator set skid is spring mounted)
- Gas Filter
- LP Gas Liquid Withdrawal
- Manual Valve and Gas Solenoid Bypass
- Secondary Gas Solenoid Valve

#### Electrical System

- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater

#### Engine and Alternator

- Alternator, Wound Field (WF)
- Alternator, Permanent Magnet (PM)
- Air Cleaner Restrictor Indicator
- Alternator Strip Heater
- CSA Certification
- Engine Fluids (oil and coolant) Added
- Line Circuit Breaker (NEMA1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)
- Optional Alternators
- Rated Power Factor Testing
- Rodent Guards
- Safeguard Breaker (not available with 550 controller)
- Skid End Caps
- Voltage Regulation, 1%
- Voltage Regulator Sensing, 3-Phase

#### Literature and Maintenance

- General Maintenance Literature Kit
- Maintenance Kit (includes standard air, oil, and fuel filters)
- NFPA 110 Literature
- Overhaul Literature Kit
- Production Literature Kit

#### Controller (550 and 16-Light)

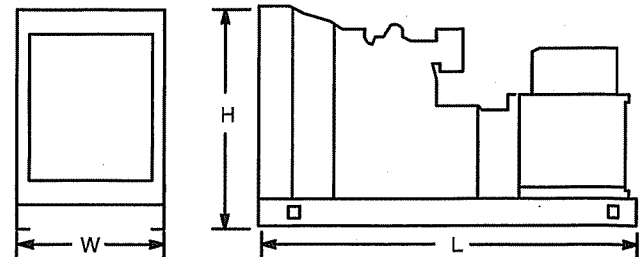
- Common Failure Relay Kit
- Communication Products and PC Software (550 controller only)
- Customer Connection Kit
- Dry Contact Kit (isolated alarm)
- Engine Prealarm Sender Kit
- Local Emergency Stop Kit
- Prime Power Switch (550 controller only)
- Remote Annunciator Panel
- Remote Audiovisual Alarm Panel
- Remote Emergency Stop Kit
- Remote Mounting Cable
- Run Relay Kit

#### Miscellaneous Accessories

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Dimensions and Weights

Overall Size, L x W x H, mm (in.):	
Wide Skid	2200 x 1040 x 1172 (86.6 x 40.9 x 46.1)
Narrow Skid	2200 x 865 x 1172 (86.6 x 34.0 x 46.1)
Weight (radiator model), wet, kg (lb.):	565 (1246)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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# KOHLER POWER SYSTEMS

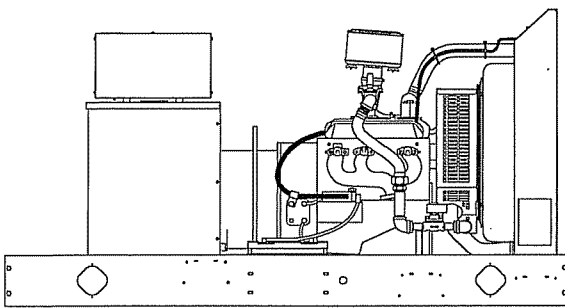
190-600 V

Gas



## Ratings Range

		60 Hz	50 Hz
Standby:	kW	37-46	31-37
	kVA	37-58	31-46
Prime:	kW	34-42	28-34
	kVA	34-53	28-42



## Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Alternator features:
  - The Fast-Response™ III wound field (WF) design alternator provides excellent voltage response and short-circuit capability using an auxiliary power brushless exciter.
  - The unique Fast-Response™ II excitation system delivers excellent voltage response and short circuit capability using a permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Controllers are available for all applications. See controller features inside.
  - The electronic, isochronous governor incorporates an integrated drive-by-wire throttle body actuator delivering precise frequency regulation.

## Generator Set Ratings

Alternator	Voltage	Ph	Hz	Natural Gas				LP Gas			
				130°C Rise		105°C Rise		130°C Rise		105°C Rise	
				Standby Rating	Prime Rating	Standby Rating	Prime Rating	Standby Rating	Prime Rating		
				kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps
4P7BW/ 4P7B	120/208	3	60	40/50	139	36/45	125	45/56	156	40/50	139
	127/220	3	60	40/50	131	36/45	118	45/56	148	40/50	131
	120/240	3	60	40/50	120	36/45	108	45/56	135	40/50	120
	120/240	1	60	37/37	154	34/34	142	41/41	171	38/38	158
	139/240	3	60	40/50	120	36/45	108	45/56	135	40/50	120
	220/380	3	60	40/50	76	36/45	68	45/56	85	40/50	76
	277/480	3	60	40/50	60	36/45	54	45/56	68	40/50	60
	347/600	3	60	40/50	48	36/45	43	45/56	54	40/50	48
	110/190	3	50	33/41	125	30/37	112	36/45	137	33/41	125
	115/200	3	50	33/41	118	30/37	107	36/45	130	33/41	118
	120/208	3	50	33/41	114	30/37	103	36/45	125	33/41	114
	110/220	3	50	33/41	108	30/37	97	36/45	118	33/41	108
	110/220	1	50	31/31	141	28/28	127	34/34	155	31/31	141
	220/380	3	50	33/41	62	30/37	56	36/45	68	33/41	62
230/400	3	50	33/41	59	30/37	53	36/45	65	33/41	59	
240/416	3	50	33/41	57	30/37	51	36/45	62	33/41	57	
120/208	3	60	41/51	142	37/46	128	46/58	160	42/53	146	
127/220	3	60	41/51	134	37/46	121	46/58	151	42/53	138	
120/240	3	60	41/51	123	37/46	111	46/58	138	42/53	126	
120/240	1	60	39/39	163	35/35	146	44/44	183	39/39	163	
139/240	3	60	42/53	126	38/48	114	46/58	138	42/53	126	
220/380	3	60	41/51	78	37/46	70	46/58	87	42/53	80	
277/480	3	60	42/53	63	38/48	57	46/58	69	42/53	63	
347/600	3	60	42/53	51	38/48	46	46/58	55	42/53	51	
4P8W/ 4P8	110/190	3	50	33/41	125	30/37	112	37/46	140	34/42	128
	115/200	3	50	33/41	118	30/37	107	37/46	133	34/42	121
	120/208	3	50	33/41	114	30/37	103	37/46	128	34/42	117
	110/220	3	50	33/41	108	30/37	97	37/46	121	34/42	110
	110/220	1	50	31/31	141	29/29	132	35/35	159	32/32	145
	220/380	3	50	33/41	62	30/37	56	37/46	70	34/42	64
	230/400	3	50	33/41	59	30/37	53	37/46	66	34/42	61
	240/416	3	50	33/41	57	30/37	51	37/46	64	34/42	58
4Q10W/ 4Q10	120/240	1	60	41/41	171	37/37	154	45/45	188	41/41	171
	110/220	1	50	33/33	150	30/30	136	37/37	168	34/34	155

**RATINGS:** All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **GENERAL GUIDELINES FOR DERATING:** Altitude: Derate 1.3% per 100 m (328 ft.) elevation above 200 m (656 ft.). Temperature: Derate 3.0% per 10°C (18°F) temperature above 25°C (77°F). Dual fuel engines are optimized to run on the primary fuel (natural gas) and, as a result, the LPG ratings may not be attained. For dual fuel engines, use the natural gas ratings for both the primary and secondary fuels.

## Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	
Wound field (WF)	Wound Exciter Field with Separate Excitation Power Winding
Permanent magnet (PM)	Brushless, Permanent-Magnet
Leads: quantity, type	
4P7BW/4P7B, 4P8W/4P8	12, Reconnectable
4Q10W/4Q10	4, 110-120/220-240
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	
Wound field (WF) alternator	±0.25% Average
Permanent magnet (PM) alternator	±2% Average
550 controller (with 0.5% drift due to temperature variation)	3-Phase Sensing, ±0.25%
Unbalanced load capability	100% of Rated Standby Current
One-step load acceptance	100% of Rating

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Fast-Response™ III wound field (WF) brushless alternator with auxiliary power brushless exciter for excellent load response.
- Fast-Response™ II brushless alternator with brushless exciter for excellent load response.

Specifications	Alternator
Peak motor starting kVA:	(35% dip for voltages below)
480 V, 380 V 4P7BW/4P7B (12 lead)	175 (60Hz), 125 (50Hz)
480 V, 380 V 4P8W/4P8 (12 lead)	210 (60Hz), 145 (50Hz)
240 V, 220 V 4Q10W/4Q10 (4 lead)	155 (60Hz), 133 (50Hz)

## Application Data

### Engine

Engine Specifications	60 Hz	50 Hz
Manufacturer	General Motors	
Engine: model, type	Industrial Powertrain Vortec 4.3 L, 4-Cycle Natural Aspiration	
Cylinder arrangement	V-6	
Displacement, L (cu. in.)	4.3 (262)	
Bore and stroke, mm (in.)	101.6 x 88.4 (4.00 x 3.48)	
Compression ratio	9.05:1	
Piston speed, m/min. (ft./min.)	318 (1044)	265 (870)
Main bearings: quantity, type	4, Babbitt	
Rated rpm	1800	1500
Max. power at rated rpm, kW (HP)	56.0 (75)	44.8 (60)
Engine power at standby rating, kW (HP)		
Natural Gas	50.7 (68)	40.3 (54)
LP Gas	56.0 (75)	44.8 (60)
Cylinder head material	Cast Iron	
Piston type and material	High Silicon Aluminum	
Crankshaft material	Nodular Iron	
Valve (exhaust) material	Forged Steel	
Governor type	Electronic	
Frequency regulation, no-load to full-load	Isochronous	
Frequency regulation, steady state	±0.5%	
Frequency	Field-Convertible	
Air cleaner type, all models	Dry	

### Exhaust

Exhaust System	60 Hz	50 Hz
Exhaust manifold type	Dry	
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	9.3 (327)	7.8 (274)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	649 (1200)	
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)	
Exhaust outlet size at engine hookup, mm (in.)	76 (3.0) OD	

### Engine Electrical

Engine Electrical System	60 Hz	50 Hz
Ignition system	Electronic, Distributor	
Battery charging alternator:		
Ground (negative/positive)	Negative	
Volts (DC)	12	
Ampere rating	70	
Starter motor rated voltage (DC)	12	
Battery, recommended cold cranking amps (CCA):		
Qty., rating for -18°C (0°F)	One, 630	
Battery voltage (DC)	12	

### Fuel

Fuel System	60 Hz	50 Hz
Fuel type	LP Gas or Natural Gas	
Fuel supply line inlet	1 NPTF	
Natural gas/LPG fuel supply pressure, measured at the generator set fuel inlet downstream of any fuel system equipment accessories, kPa (in. H <sub>2</sub> O)	1.74-2.74 (7.0-11.0)	
<b>Fuel Composition Limits *</b>	<b>Nat. Gas</b>	<b>LP Gas</b>
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C <sub>4</sub> and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, kJ/m <sup>3</sup> (Btu/ft <sup>3</sup> ), min.	26.6 (890)	67.5 (2260)

\* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

# Application Data

## Lubrication

Lubricating System	60 Hz	50 Hz
Type	Full Pressure	
Oil pan capacity, L (qt.)	4.3 (4.5)	
Oil pan capacity with filter, L (qt.)	5.7 (6.0)	
Oil filter: quantity, type	1, Cartridge	

## Cooling

Radiator System	60 Hz	50 Hz
Ambient temperature, °C (°F) *	50 (122)	
Engine jacket water capacity, L (gal.)	6.8 (1.8)	
Radiator system capacity, including engine, L (gal.)	19.7 (5.2)	
Engine jacket water flow, Lpm (gpm)	106.0 (28)	87.1 (23)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	40.8 (2320)	36.4 (2070)
Water pump type	Centrifugal	
Fan diameter, including blades, mm (in.)	533 (21)	
Fan, kWm (HP)	3.0 (4.0)	1.7 (2.3)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O)	0.125 (0.5)	

\* Weather housing with roof-mounted silencer and enclosure with enclosed silencer reduce ambient temperature capability by 5°C (9°F).

Remote Radiator System†	60 Hz	50 Hz
Exhaust manifold type	Dry	
Connection sizes:		
Water inlet, ID hose, mm (in.)	44.45 (1.75)	
Water outlet, ID hose, mm (in.)	38.10 (1.50)	
Static head allowable above engine, kPa (ft. H <sub>2</sub> O)	4.32 (17.0)	

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

## Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm)‡	142 (5000)	113 (4000)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise and ambient temperature of 29°C (85°F), m <sup>3</sup> /min. (cfm)	99 (3500)	85 (3000)
Combustion air, m <sup>3</sup> /min. (cfm)	2.78 (98)	2.32 (82)
Heat rejected to ambient air:		
Engine, kW (Btu/min.)	19.2 (1090)	16.2 (920)
Alternator, kW (Btu/min.)	7.4 (420)	6.5 (370)

‡ Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>)

Fuel Consumption	60 Hz	50 Hz
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load§</b>	<b>Standby Ratings</b>	
100%	16.5 (584)	13.5 (477)
75%	13.8 (486)	10.4 (367)
50%	10.2 (360)	8.0 (281)
25%	7.7 (272)	5.8 (206)
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load§</b>	<b>Prime Ratings</b>	
100%	15.5 (548)	12.4 (437)
75%	12.8 (452)	9.7 (344)
50%	9.7 (344)	7.6 (267)
25%	7.5 (264)	5.7 (200)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Standby Ratings	
100%	7.0 (246)	6.1 (216)
75%	5.7 (202)	4.7 (167)
50%	4.2 (147)	3.4 (121)
25%	2.9 (104)	2.4 (86)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Prime Ratings	
100%	6.5 (230)	5.6 (198)
75%	5.3 (187)	4.4 (154)
50%	3.9 (139)	3.3 (115)
25%	2.8 (100)	2.4 (83)

§ Fuel consumption is based on 1015 Btu/standard cu. ft. natural gas.

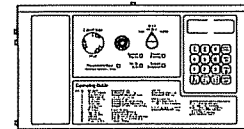
LP vapor conversion factors:

$$8.58 \text{ ft.}^3 = 1 \text{ lb.}$$

$$0.535 \text{ m}^3 = 1 \text{ kg.}$$

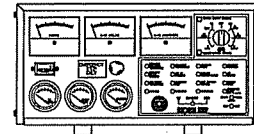
$$36.39 \text{ ft.}^3 = 1 \text{ gal.}$$

## Controllers



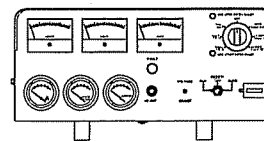
### Decision-Maker™ 550 Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Programmable microprocessor logic and digital display features. Alternator safeguard circuit protection. 12- or 24-volt engine electrical system capability. Remote start, remote annunciation, and remote communication options. Refer to G6-46 for additional controller features and accessories.



### Decision-Maker™ 3+, 16-Light Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Microprocessor logic, AC meters, and engine gauge features. 12- or 24-volt engine electrical system capability. Remote start, prime power, and remote annunciation options. Refer to G6-30 for additional controller features and accessories.



### Decision-Maker™ 1 Controller

Single-light annunciation and basic controls with NFPA capability. Relay logic, AC meters, and engine gauge features. 12-volt engine electrical system capability only. Remote or automatic start options. Refer to G6-29 for additional controller features and accessories. **Note:** Not available with 600-volt alternator.

### Additional Standard Features

- Alternator Protection (standard with 550 controller)
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System (includes fuel mixer, secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral Vibration Isolation
- Oil Drain Extension
- Operation and Installation Literature

### Available Accessories

#### Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)
- Weather Enclosure (with enclosed critical silencer)
- Weather Housing (with roof-mounted silencer)

#### Open Unit

- Exhaust Silencer, Critical (kits: PA-324468, PA-352663)
- Flexible Exhaust Connector, Stainless Steel

#### Cooling System

- Block Heater  
[recommended for ambient temperatures below 10°C (50°F)]
- City Water Cooling
- Radiator Duct Flange
- Remote Radiator Cooling

#### Fuel System

- Automatic Changeover (natural gas to LP gas)
- Flexible Fuel Line  
(required when the generator set skid is spring mounted)
- Gas Filter
- LP Gas Liquid Withdrawal
- Manual Valve and Gas Solenoid Bypass
- Secondary Gas Solenoid Valve

#### Electrical System

- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater

#### Engine and Alternator

- Alternator, Wound Field (WF)
- Alternator, Permanent Magnet (PM)
- Air Cleaner Restrictor Indicator
- Alternator Strip Heater
- CSA Certification
- Engine Fluids (oil and coolant) Added
- Line Circuit Breaker (NEMA1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)
- Optional Alternators
- Rated Power Factor Testing
- Rodent Guards
- Safeguard Breaker (not available with 550 controller)
- Skid End Caps
- Voltage Regulation, 1%
- Voltage Regulator Sensing, 3-Phase

### Literature and Maintenance

- General Maintenance Literature Kit
- Maintenance Kit (includes standard air, oil, and fuel filters)
- NFPA 110 Literature
- Overhaul Literature Kit
- Production Literature Kit

### Controller (550 and 16-Light)

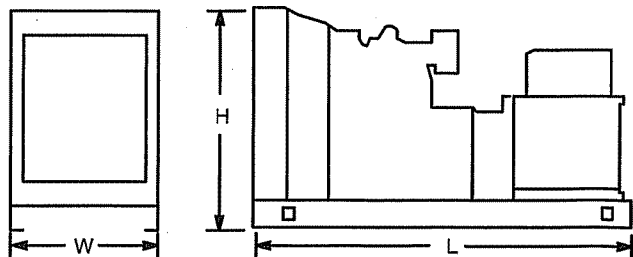
- Common Failure Relay Kit
- Communication Products and PC Software (550 controller only)
- Customer Connection Kit
- Dry Contact Kit (isolated alarm)
- Engine Prealarm Sender Kit
- Local Emergency Stop Kit
- Prime Power Switch (550 controller only)
- Remote Annunciator Panel
- Remote Audiovisual Alarm Panel
- Remote Emergency Stop Kit
- Remote Mounting Cable
- Run Relay Kit

### Miscellaneous Accessories

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Dimensions and Weights

Overall Size, L x W x H, mm (in.):	
Wide Skid	2200 x 1040 x 1172 (86.6 x 40.9 x 46.1)
Narrow Skid	2200 x 865 x 1172 (86.6 x 34.0 x 46.1)
Weight (radiator model), wet, kg (lb.):	4P7B: 601 (1326)
	4P8/4Q10: 617 (1361)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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# KOHLER POWER SYSTEMS

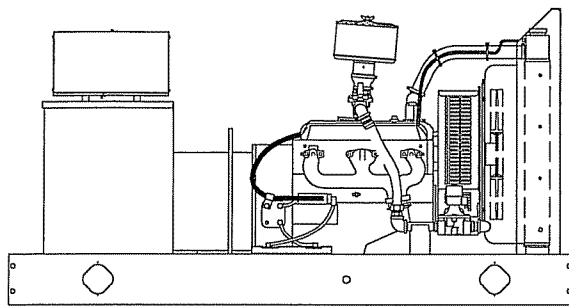
190-600 V

Gas



## Ratings Range

		60 Hz	50 Hz
Standby:	kW	54-64	45-53
	kVA	54-80	45-66
Prime:	kW	50-59	39-50
	kVA	50-74	40-62



## Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Alternator features:
  - The Fast-Response™ III wound field (WF) design alternator provides excellent voltage response and short-circuit capability using an auxiliary power brushless exciter.
  - The unique Fast-Response™ II excitation system delivers excellent voltage response and short circuit capability using a permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.
- Other features:
  - Controllers are available for all applications. See controller features inside.
  - The electronic, isochronous governor incorporates an integrated drive-by-wire throttle body actuator delivering precise frequency regulation.

## Generator Set Ratings

Alternator	Voltage	Ph	Hz	Natural Gas				LP Gas			
				130°C Rise Standby Rating		105°C Rise Prime Rating		130°C Rise Standby Rating		105°C Rise Prime Rating	
				kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps	kW/kVA	Amps
4P10W/ 4P10	120/208	3	60	60/75	208	55/69	191	62/78	215	57/71	198
	127/220	3	60	60/75	197	55/69	180	61/76	200	55/69	180
	120/240	3	60	60/75	180	55/69	165	63/79	189	59/74	177
	120/240	1	60	54/54	225	50/50	208	54/54	225	50/50	208
	139/240	3	60	60/75	180	53/66	159	60/75	180	53/66	159
	220/380	3	60	60/75	114	55/69	104	60/75	114	56/70	106
	277/480	3	60	60/75	90	53/66	80	60/75	90	53/66	80
	347/600	3	60	60/75	72	53/66	64	60/75	72	53/66	64
	110/190	3	50	49/61	185	45/56	170	50/63	191	46/57	173
	115/200	3	50	47/59	170	42/52	150	47/59	170	42/52	150
	120/208	3	50	45/56	155	39/49	136	45/56	155	39/49	136
	110/220	1	50	45/45	205	40/40	182	45/45	205	40/40	182
110/220	3	50	49/61	160	45/56	147	51/64	168	46/57	150	
220/380	3	50	49/61	93	45/56	85	50/63	96	46/57	87	
230/400	3	50	47/59	85	42/52	75	47/59	85	42/52	75	
240/416	3	50	45/56	78	39/49	68	45/56	78	39/49	68	
4S7W/ 4S7	120/208	3	60	60/75	208	55/69	191	63/79	219	59/74	205
	127/220	3	60	60/75	197	55/69	180	63/79	207	59/74	194
	120/240	3	60	60/75	180	55/69	165	63/79	189	59/74	177
	120/240	1	60	54/54	225	50/50	208	57/57	238	53/53	221
	139/240	3	60	60/75	180	55/69	165	64/80	192	59/74	177
	220/380	3	60	60/75	114	55/69	104	63/79	120	59/74	112
	277/480	3	60	60/75	90	55/69	83	64/80	96	59/74	89
	347/600	3	60	60/75	72	55/69	66	64/80	77	59/74	71
	110/190	3	50	48/60	182	45/56	170	53/66	201	49/61	184
	115/200	3	50	49/61	176	45/56	162	53/66	191	50/62	179
	120/208	3	50	49/61	169	45/56	155	53/66	183	50/62	172
	110/220	3	50	48/60	157	45/56	147	53/66	173	49/61	160
110/220	1	50	45/45	205	41/41	186	47/47	214	44/44	200	
220/380	3	50	48/60	91	45/56	85	53/66	100	49/61	92	
230/400	3	50	48/60	87	45/56	81	53/66	95	50/62	89	
240/416	3	50	49/61	85	45/56	78	53/66	92	50/62	86	
4V7W/ 4V7	120/240	1	60	57/57	238	51/51	213	61/61	254	55/55	229
	110/220	1	50	47/47	214	42/42	191	51/51	232	46/46	209

**RATINGS:** All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **GENERAL GUIDELINES FOR OPERATION:** **Altitude:** Derate 1.3% per 100 m (328 ft.) elevation above 200 m (656 ft.). **Temperature:** Derate 3.0% per 10°C (18°F) temperature above 25°C (77°F). For units having a weather housing with roof-mounted silencer or an enclosure with enclosed silencer, add 5°C (9°F) for 60 Hz and 10°C (18°F) for 50 Hz to the ambient temperature. Dual fuel engines are optimized to run on the primary fuel (natural gas) and, as a result, the LPG ratings may not be attained. For dual fuel engines, use the natural gas ratings for both the primary and secondary fuels.

## Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	
Wound field (WF)	Wound Exciter Field with Separate Excitation Power Winding
Permanent magnet (PM)	Brushless, Permanent-Magnet
Leads: quantity, type	
4P10W/4P10, 4S7W/4S7	12, Reconnectable
4V7W/4V7	4, 110-120/220-240
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	
Wound field (WF) alternator	±0.25% Average
Permanent magnet (PM) alternator	±2% Average
550 controller (with 0.5% drift due to temperature variation)	3-Phase Sensing, ±0.25%
Unbalanced load capability	100% of Rated Standby Current
One-step load acceptance	100% of Rating

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Fast-Response™ III wound field (WF) brushless alternator with auxiliary power brushless exciter for excellent load response.
- Fast-Response™ II brushless alternator with brushless exciter for excellent load response.

Specifications	Alternator
Peak motor starting kVA:	(35% dip for voltages below)
480 V, 380 V 4P10W/4P10 (12 lead)	255 (60Hz), 180 (50Hz)
480 V, 380 V 4S7W/4S7 (12 lead)	270 (60Hz), 190 (50Hz)
240 V, 220 V 4V7W/4V7 (4 lead)	215 (60Hz), 175 (50Hz)

## Application Data

### Engine

Engine Specifications	60 Hz	50 Hz
Manufacturer	General Motors	
Engine: model, type	Industrial Powertrain Vortec 5.7 L, 4-Cycle Natural Aspiration	
Cylinder arrangement	V-8	
Displacement, L (cu. in.)	5.7 (350)	
Bore and stroke, mm (in.)	101.6 x 88.4 (4.00 x 3.48)	
Compression ratio	9.1:1	
Piston speed, m/min. (ft./min.)	318 (1044)	265 (870)
Main bearings: quantity, type	5, M400 Copper Lead	
Rated rpm	1800	1500
Max. power at rated rpm, kW (HP)	78.3 (105)	65.6 (88)
Cylinder head material	Cast Iron	
Piston type and material	High Silicon Aluminum	
Crankshaft material	Nodular Iron	
Valve (exhaust) material	Forged Steel	
Governor type	Electronic	
Frequency regulation, no-load to full-load	Isochronous	
Frequency regulation, steady state	±0.5%	
Frequency	Field-Convertible	
Air cleaner type, all models	Dry	

### Exhaust

Exhaust System	60 Hz	50 Hz
Exhaust manifold type	Dry	
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	16.4 (580)	13.6 (480)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	649 (1200)	
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)	
Exhaust outlet size at engine hookup, mm (in.)	76 (3.0) OD	

### Engine Electrical

Engine Electrical System	60 Hz	50 Hz
Ignition system	Electronic, Distributor	
Battery charging alternator:		
Ground (negative/positive)	Negative	
Volts (DC)	12	
Ampere rating	70	
Starter motor rated voltage (DC)	12	
Battery, recommended cold cranking amps (CCA):		
Qty., rating for -18°C (0°F)	One, 630	
Battery voltage (DC)	12	

### Fuel

Fuel System	60 Hz	50 Hz
Fuel type	LP Gas or Natural Gas	
Fuel supply line inlet	1 NPTF	
Natural gas/LPG fuel supply pressure, measured at the generator set fuel inlet downstream of any fuel system equipment accessories, kPa (in. H <sub>2</sub> O)	1.74-2.74 (7.0-11.0)	

Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C <sub>4</sub> and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, kJ/m <sup>3</sup> (Btu/ft <sup>3</sup> ), min.	26.6 (890)	67.5 (2260)

\* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.



# Application Data

## Lubrication

Lubricating System	60 Hz	50 Hz
Type	Full Pressure	
Oil pan capacity, L (qt.)	4.7 (5.0)	
Oil pan capacity with filter, L (qt.)	6.2 (6.5)	
Oil filter: quantity, type	1, Cartridge	

## Cooling

Radiator System	60 Hz	50 Hz
Ambient temperature, °C (°F) *	50 (122)	
Engine jacket water capacity, L (gal.)	6.8 (1.8)	
Radiator system capacity, including engine, L (gal.)	20.8 (5.5)	
Engine jacket water flow, Lpm (gpm)	117.3 (31)	98.4 (26)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	54.8 (3120)	45.7 (2600)
Water pump type	Centrifugal	
Fan diameter, including blades, mm (in.)	533 (21)	
Fan, kWm (HP)	4.5 (6.0)	2.6 (3.5)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O)	0.125 (0.5)	

\* Weather housing with roof-mounted silencer and enclosure with enclosed silencer reduce ambient temperature capability by 5°C (9°F) for 60 Hz and 10°C (18°F) for 50 Hz.

Remote Radiator System†	60 Hz	50 Hz
Exhaust manifold type	Dry	
Connection sizes:		
Water inlet, ID hose, mm (in.)	44.45 (1.75)	
Water outlet, ID hose, mm (in.)	38.10 (1.50)	
Static head allowable above engine, kPa (ft. H <sub>2</sub> O)	4.32 (17.0)	

† Contact your local distributor for cooling system options and specifications based on your specific requirements.

## Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm)‡	170 (6000)	136 (4800)
Cooling air required for generator set when equipped with city water cooling or remote radiator, based on 14°C (25°F) rise and ambient temperature of 29°C (85°F), m <sup>3</sup> /min. (cfm)	144 (5100)	125 (4400)
Combustion air, m <sup>3</sup> /min. (cfm)	5.2 (185)	4.4 (155)
Heat rejected to ambient air:		
Engine, kW (Btu/min.)	30.9 (1760)	26.5 (1510)
Alternator, kW (Btu/min.)	7.7 (440)	6.9 (390)

‡ Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>)

Fuel Consumption§	60 Hz	50 Hz
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load</b>	<b>Standby Rating</b>	
100%	22.4 (790)	18.1 (640)
75%	19.4 (685)	15.6 (550)
50%	14.7 (520)	11.8 (415)
25%	9.9 (350)	7.8 (275)
<b>Natural Gas, m<sup>3</sup>/hr. (cfh) at % load</b>	<b>Prime Rating</b>	
100%	21.2 (748)	17.1 (604)
75%	18.0 (636)	14.4 (510)
50%	13.8 (486)	11.0 (387)
25%	9.5 (335)	7.4 (263)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Standby Rating	
100%	9.3 (330)	7.9 (280)
75%	7.1 (250)	6.2 (220)
50%	5.4 (190)	4.7 (165)
25%	3.8 (135)	3.1 (110)

LP Gas, m <sup>3</sup> /hr. (cfh) at % load	Prime Rating	
100%	8.4 (298)	7.2 (256)
75%	6.6 (232)	5.8 (204)
50%	5.1 (179)	4.4 (154)
25%	3.7 (130)	3.0 (105)

§ Fuel consumption is based on 1015 Btu/standard cu. ft. natural gas.

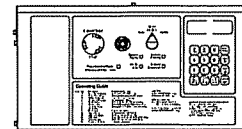
LP vapor conversion factors:

8.58 ft.<sup>3</sup> = 1 lb.

0.535 m<sup>3</sup> = 1 kg.

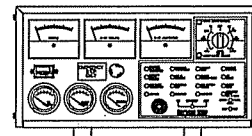
36.39 ft.<sup>3</sup> = 1 gal.

## Controllers



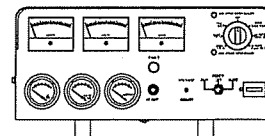
### Decision-Maker™ 550 Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Programmable microprocessor logic and digital display features. Alternator safeguard circuit protection. 12- or 24-volt engine electrical system capability. Remote start, remote annunciation, and remote communication options. Refer to G6-46 for additional controller features and accessories.



### Decision-Maker™ 3+, 16-Light Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Microprocessor logic, AC meters, and engine gauge features. 12- or 24-volt engine electrical system capability. Remote start, prime power, and remote annunciation options. Refer to G6-30 for additional controller features and accessories.



### Decision-Maker™ 1 Controller

Single-light annunciation and basic controls with NFPA capability. Relay logic, AC meters, and engine gauge features. 12-volt engine electrical system capability only. Remote or automatic start options. Refer to G6-29 for additional controller features and accessories. **Note:** Not available with 600-volt alternator.

## Additional Standard Features

- Alternator Protection (standard with 550 controller)
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Gas Fuel System (includes fuel mixer, secondary gas regulator, gas solenoid valve, and flexible fuel line between the engine and the skid-mounted fuel system components)
- Integral Vibration Isolation
- Oil Drain Extension
- Operation and Installation Literature

## Available Accessories

### Enclosed Unit

- Sound Enclosure (with enclosed critical silencer)
- Weather Enclosure (with enclosed critical silencer)
- Weather Housing (with roof-mounted silencer)

### Open Unit

- Exhaust Silencer, Critical (kits: PA-324468, PA-352663)
- Flexible Exhaust Connector, Stainless Steel

### Cooling System

- Block Heater  
[recommended for ambient temperatures below 10°C (50°F)]
- City Water Cooling
- Radiator Duct Flange
- Remote Radiator Cooling

### Fuel System

- Automatic Changeover (natural gas to LP gas)
- Conversion Kit (natural gas to LP gas)
- Flexible Fuel Line  
(required when the generator set skid is spring mounted)
- Gas Filter
- LP Gas Liquid Withdrawal
- Manual Valve and Gas Solenoid Bypass
- Secondary Gas Solenoid Valve

### Electrical System

- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater

### Engine and Alternator

- Alternator, Wound Field (WF)
- Alternator, Permanent Magnet (PM)
- Air Cleaner Restrictor Indicator
- Alternator Strip Heater
- CSA Certification
- Engine Fluids (oil and coolant) Added
- Line Circuit Breaker (NEMA1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)
- Optional Alternators
- Rated Power Factor Testing
- Rodent Guards
- Safeguard Breaker (not available with 550 controller)
- Skid End Caps
- Voltage Regulation, 1%
- Voltage Regulator Sensing, 3-Phase

## Literature and Maintenance

- General Maintenance Literature Kit
- Maintenance Kit (includes standard air, oil, and fuel filters)
- NFPA 110 Literature
- Overhaul Literature Kit
- Production Literature Kit

## Controller (550 and 16-Light)

- Common Failure Relay Kit
- Communication Products and PC Software (550 controller only)
- Customer Connection Kit
- Dry Contact Kit (isolated alarm)
- Engine Prealarm Sender Kit
- Local Emergency Stop Kit
- Prime Power Switch (550 controller only)
- Remote Annunciator Panel
- Remote Audiovisual Alarm Panel
- Remote Emergency Stop Kit
- Remote Mounting Cable
- Run Relay Kit

## Miscellaneous Accessories

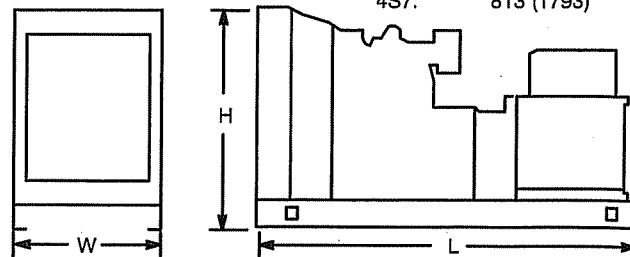
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## Dimensions and Weights

Overall Size, L x W x H, mm (in.):

4P10/4V7:	Wide Skid	2200 x 1040 x 1172 (86.6 x 40.9 x 46.1)
	Narrow Skid	2200 x 865 x 1172 (86.6 x 34.0 x 46.1)
4S7:	Wide Skid	2200 x 1040 x 1211 (86.6 x 40.9 x 47.7)
	Narrow Skid	2200 x 865 x 1211 (86.6 x 34.0 x 47.7)

Weight (radiator model), wet, kg (lb.): 4P10/4V7: 755 (1665)  
 4S7: 813 (1793)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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