



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

BPH10078

PAGE

1

ADDRESS CORRESPONDENCE TO ATTENTION OF

ROBERTA WAGNER  
304-558-0067

\*709063426 304-622-7923

MICHEL INC  
PO BOX 1140

BRIDGEPORT WV 26330


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
03/10/2010				

BID OPENING DATE:

04/08/2010

BID OPENING TIME 01:30PM

04/08/2010		BID OPENING TIME		01:30PM		
LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
OPEN-END BLANKET CONTRACT						
***** MANDATORY PRE-BID MEETING AT WV DHHR MEDICAL COMMAND CENTER AT 89 RICHARD D. MINNICH DRIVE, SUITE 301, SUTTON, WV 26601 ON 3/23/2010 AT 1:30 PM. *****						
0001	1	JB	285-39			
OPEN END CONTRACT TO PROVIDE VARIOUS GENERATORS						
OPEN END CONTRACT						
TO ESTABLISH AN OPEN END CONTRACT FOR VARIOUS SIZE GENERATORS TO BE PLACED AT TOWER SITES FOR THE STATE- WIDE MEDICAL COMMAND MICROWAVE COMMUNICATIONS AND INTEROPERABLE RADIO SYSTEM AS WELL AS ALL STATE AGENCIES AND POLITICAL SUBDIVISIONS AND MUNICIPALITIES, PER THE ATTACHED SPECIFICATIONS.						
EXHIBIT 3						
LIFE OF CONTRACT: THIS CONTRACT BECOMES EFFECTIVE ON UPON AWARD 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						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE 				TELEPHONE	DATE	
TITLE PRESIDENT				304-622-7923	4/2/10	
FEIN 61-1109182				ADDRESS CHANGES TO BE NOTED ABOVE		

RECEIVED

2010 APR -7 AM 9:51

WV PURCHASING  
DIVISION

RECEIVED

2010 APR -7 AM 9:51

WV PURCHASING  
DIVISION

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. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
  4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, 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.
  5. Payment may only be made after the delivery and acceptance of goods or services.
  6. Interest may be paid for late payment in accordance with the *West Virginia Code*.
  7. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
  8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
  9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
  10. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern the purchasing process.
  11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
  12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
  13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at [www.state.wv.us/admin/purchase/vrc/hipaa.htm](http://www.state.wv.us/admin/purchase/vrc/hipaa.htm) and is hereby made part of the agreement. Provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
  14. **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. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>.
  15. **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, and the West Virginia Insurance Commission. 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.
  16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.
- I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

### INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.
2. 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. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
4. 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: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130
5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).



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304-558-0067

\*709063426 304-622-7923

MICHEL INC  
PO BOX 1140

BRIDGEPORT WV 26330

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
03/10/2010				

BID OPENING DATE:

04/08/2010

BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>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) 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</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE 304-622-7923	DATE 4/2/10
TITLE PRESIDENT	FEIN 61-1109182	ADDRESS CHANGES TO BE NOTED ABOVE

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



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LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
ORDERED FOR DELIVERY DURING THE TERM OF THE CONTRACT, WHETHER MORE OR LESS THAN THE QUANTITIES SHOWN.						
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.						
BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED WITHOUT FURTHER ORDER.						
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.						
REV. 04/11/2001						
INSURANCE: SUCCESSFUL VENDOR SHALL FURNISH PROOF OF COVERAGE OF COMMERCIAL GENERAL LIABILITY INSURANCE PRIOR TO ISSUANCE OF THE CONTRACT. UNLESS OTHERWISE SPECIFIED IN THE BID DOCUMENTS, THE MINIMUM AMOUNT OF INSURANCE COVERAGE REQUIRED IS \$250,000.						
WORKER'S COMPENSATION: VENDOR IS REQUIRED TO PROVIDE A CERTIFICATE FROM WORKER'S COMPENSATION IF SUCCESSFUL.						
INQUIRIES: WRITTEN QUESTIONS SHALL BE ACCEPTED THROUGH CLOSE OF						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE				TELEPHONE		DATE
				304-622-7923		4/2/10
TITLE		FEIN		ADDRESS CHANGES TO BE NOTED ABOVE		
PRESIDENT		61-1109182				

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03/10/2010						
BID OPENING DATE: 04/08/2010		BID OPENING TIME 01:30PM				
LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>BUSINESS ON 3/24/2010. 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: ROBERTA.A.WAGNER@WV.GOV</p> <p>EXHIBIT 4</p> <p>LOCAL GOVERNMENT BODIES: UNLESS THE VENDOR INDICATES ON 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.</p> <p>REV. 3/88</p> <p>MANDATORY PRE-BID</p>						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE				TELEPHONE	DATE	
				304-622-7923	4/2/10	
TITLE		FEIN		ADDRESS CHANGES TO BE NOTED ABOVE		
PRESIDENT		61-1109182				

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01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>A MANDATORY PRE-BID WILL BE HELD ON 3/23/2010 AT 1:30 PM IN WV DHHR MCC, SUTTON, WV 26601. ALL INTERESTED PARTIES ARE REQUIRED TO ATTEND THIS MEETING. FAILURE TO ATTEND THE MANDATORY PRE-BID SHALL RESULT IN DISQUALIFICATION OF THE BID. NO ONE PERSON MAY REPRESENT MORE THAN ONE BIDDER.</p> <p>AN ATTENDANCE SHEET WILL BE MADE AVAILABLE FOR ALL POTENTIAL BIDDERS TO COMPLETE. THIS WILL SERVE AS THE OFFICIAL DOCUMENT VERIFYING ATTENDANCE AT THE MANDATORY PRE-BID. FAILURE TO PROVIDE YOUR COMPANY AND REPRESENTATIVE NAME ON THE ATTENDANCE SHEET WILL RESULT IN DISQUALIFICATION OF THE BID. THE STATE WILL NOT ACCEPT ANY OTHER DOCUMENTATION TO VERIFY ATTENDANCE. THE BIDDER IS RESPONSIBLE FOR ENSURING THEY HAVE COMPLETED THE INFORMATION REQUIRED ON THE ATTENDANCE SHEET. THE PURCHASING DIVISION AND THE STATE AGENCY WILL NOT ASSUME ANY RESPONSIBILITY FOR A BIDDER-S FAILURE TO COMPLETE THE PRE-BID ATTENDANCE SHEET. IN ADDITION, WE REQUEST THAT ALL POTENTIAL BIDDERS INCLUDE THEIR E-MAIL ADDRESS AND FAX NUMBER.</p> <p>ALL POTENTIAL BIDDERS ARE REQUESTED TO ARRIVE PRIOR TO THE STARTING TIME FOR THE PRE-BID. BIDDERS WHO ARRIVE LATE, BUT PRIOR TO THE DISMISSAL OF THE TECHNICAL PORTION OF THE PRE-BID WILL BE PERMITTED TO SIGN IN. BIDDERS WHO ARRIVE AFTER CONCLUSION OF THE TECHNICAL PORTION OF THE PRE-BID, BUT DURING ANY SUBSEQUENT PART OF THE PRE-BID WILL NOT BE PERMITTED TO SIGN THE ATTENDANCE SHEET.</p> <p>PURCHASING CARD ACCEPTANCE: THE STATE OF WEST VIRGINIA CURRENTLY UTILIZES A VISA PURCHASING CARD PROGRAM WHICH IS ISSUED THROUGH A BANK. THE SUCCESSFUL VENDOR MUST ACCEPT THE STATE OF WEST VIRGINIA VISA PURCHASING CARD FOR PAYMENT OF ALL ORDERS PLACED BY ANY STATE AGENCY AS A CONDITION OF AWARD.</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TITLE	FEIN	TELEPHONE	DATE
	PRESIDENT	61-1109182	304-622-7923	4/2/10
ADDRESS CHANGES TO BE NOTED ABOVE				

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03/10/2010				

BID OPENING DATE:

04/08/2010

BID OPENING TIME

01:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
NOTICE						
A SIGNED BID MUST BE SUBMITTED TO:						
DEPARTMENT OF ADMINISTRATION						
PURCHASING DIVISION						
BUILDING 15						
2019 WASHINGTON STREET, EAST						
CHARLESTON, WV 25305-0130						
PLEASE NOTE: A CONVENIENCE COPY WOULD BE APPRECIATED.						
THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF						
THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:						
SEALED BID						
BUYER:-----RW/FILE 22-----						
RFQ. NO.:-----BPH10078-----						
BID OPENING DATE:-----4/8/2010-----						
BID OPENING TIME:-----1:30 PM-----						
PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY						
TO CONTACT YOU REGARDING YOUR BID:						
304-624-1252						
CONTACT PERSON (PLEASE PRINT CLEARLY):						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
	304-622-7923	4/2/10
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
PRESIDENT	61-1109182	

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SHIP TO  
HEALTH AND HUMAN RESOURCES  
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DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
03/10/2010				

BID OPENING DATE: 04/08/2010 BID OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
				Thomas H. Michel		
***** THIS IS THE END OF RFQ BPH10078 ***** TOTAL:						2,718,765.00

SIGNATURE <i>Thomas H. Michel</i>		SEE REVERSE SIDE FOR TERMS AND CONDITIONS		TELEPHONE 304-622-7923	DATE 4/2/10
TITLE PRESIDENT		FEIN 61-1109182		ADDRESS CHANGES TO BE NOTED ABOVE	

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## RFQ BPH 10078

The West Virginia Department of Health and Human resources (DHHR), Bureau for Public Health (BPH), State Trauma and Emergency Medical System (STEMS) 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 throughout West Virginia. Vendor shall include in the quote all materials, delivery, and installation costs including, automatic transfer switch, connection of the 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 (1) year, with the 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.
- 1.7 Payment to vendor will be made following delivery of the generator once a final, complete invoice is received. Payment will be made within 60 days of invoice.
- 1.8 Award of this contract will go to a single vendor who meets **all** of the specifications as outlined in this RFQ at the lowest price.

#### 2.0 Mandatory Engine Features

- 2.1 Liquid Propane (LP) fuel system
- 2.2 Diesel options on generators 60 kW and greater
- 2.3 Heavy duty 4 cycle engine
- 2.4 Electronic distributor-less ignition system
- 2.5 Liquid cooled
- 2.6 Electronic governor
- 2.7 12 volt DC electrical starting system
- 2.8 Twist-on full flow cartridge oil filter

- 2.9 Dry air cleaner with disposable element
- 2.10 Low oil pressure shutdown
- 2.11 Low coolant level shutdown
- 2.12 High coolant temperature shutdown
- 2.13 Easily accessible coolant and oil drains piped to edge of base
- 2.14 Seven (7) days of continuous operation with fuel monitoring capabilities for both LP and diesel generators

### **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 Three phase up to 480 volts AC output
- 3.6 Gas pressure regulator
- 3.7 Radiator and cooling fan with guards
- 3.8 Volts adjust potentiometer
- 3.9 Safety shutdown and alarm indicators
- 3.10 Engine and generator instrumentation
- 3.11 Audible alarms for all faults
- 3.12 Auto start control panel

### **4.0 Mandatory Additional 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 LP or natural gas generator units are being requested:
  - A. 10 kW (single phase)
  - B. 15 kW (single phase)
  - C. 20 kW (single phase)
  - D. 30 kW (single phase)
  - E. 35 kW (single phase)
  - F. 45 kW (single phase)

- G. 60kW (single phase)
- H. 60 kW (three phase)
- I. 75 kW (three phase)
- J. 85 kW (three phase)
- K. 100 kW (three phase)
- L. 125 kW (three phase)
- M. 150 kW (three phase)
- N. 200 kW (three phase)
- O. 250 kW (three phase)
- P. 300 kW (three phase)
- Q. 350 kW (three phase)

5.2 The following size diesel generator units are being requested:

- A. 60 kW (three phase)
- B. 75 kW (three phase)
- C. 85 kW (three phase)
- D. 100 kW (three phase)
- E. 125 kW (three phase)
- F. 150 kW (three phase)
- G. 200 kW (three phase)
- H. 250 kW (three phase)
- I. 300 kW (three phase)
- J. 350 kW (three phase)

5.3 The following size trailer mounted diesel units are being requested:

- A. 20 kW (single phase)
- B. 30 kW (single phase)
- C. 35 kW (single phase)
- D. 45 kW (single phase)
- E. 60 kW (three phase)
- F. 75 kW (three phase)
- G. 85 kW (three phase)
- H. 100 kW (three phase)
- I. 125 kW (three phase)
- J. 150 kW (three phase)
- K. 200 kW (three phase)
- L. 250 kW (three phase)
- M. 300 kW (three phase)
- N. 350 kW (three phase)



- 5.4 The ratings in item 5.1 are for "standby" power as defined in ISO8528 and ISO 3046. Individual unit ratings may be +/- 2kW, except 60kW unit may be +/- 5kW.
- 5.5 Optional pricing to provide 500 gallon and 1000 gallon LP tanks. All LP generators will have their own fuel tank capable of running for seven (7) days.
- 5.6 Optional pricing for 500 gallon and 1000 gallon diesel fuel tanks. All diesel generators will have their own fuel tank capable of running for seven (7) days.

## Bid Evaluation Sheet

The bid will be evaluated based on the Grand Total Price listed below. Award will be given to one vendor and will be based on the lowest grand total price which meets all specification in items 1.0 through 5.0.

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

Item	Qty	Size	Description	Unit Price	Total Price
<b>LP Generators</b>					
1.	2	10 kW (single phase)	LP Generator	—	<i>Deleted</i>
2.	6	15 kW (single phase)	LP Generator	—	<i>Deleted</i>
3.	4	20 kW (single phase)	LP Generator	22,835.00	91,340.00
4.	2	30 kW (single phase)	LP Generator	27,980.00	55,960.00
5.	2	35 kW (single phase)	LP Generator	30,705.00	61,410.00
6.	1	45 kW (single phase)	LP Generator	32,800.00	32,800.00
7.	1	60 kW (single phase)	LP Generator	41,820.00	41,820.00
8.	1	60 kW (three phase)	LP Generator	39,165.00	39,165.00
9.	1	75 kW (three phase)	LP Generator	41,820.00	41,820.00
10.	1	85 kW (three phase)	LP Generator	47,660.00	47,660.00
11.	1	100 kW (three phase)	LP Generator	53,245.00	53,245.00
12.	1	125 kW (three phase)	LP Generator	73,035.00	73,035.00
13.	1	150 kW (three phase)	LP Generator	81,655.00	81,655.00
14.	1	200 kW (three phase)	LP Generator	151,825.00	151,825.00
15.	1	250 kW (three phase)	LP Generator	164,685.00	164,685.00
16.	1	300 kW (three phase)	LP Generator	222,405.00	222,405.00
17.	1	350 kW (three phase)	LP Generator	231,170.00	231,170.00
<b>Diesel Generators</b>					
18.	1	60 kW (three phase)	Diesel Generator	42,035.00	42,035.00
19.	1	75 kW (three phase)	Diesel Generator	44,275.00	44,275.00
20.	1	85 kW (three phase)	Diesel Generator	45,065.00	45,065.00
21.	1	100 kW (three phase)	Diesel Generator	52,280.00	52,280.00
22.	1	125 kW (three phase)	Diesel Generator	60,050.00	60,050.00
23.	1	150 kW (three phase)	Diesel Generator	67,275.00	67,275.00
24.	1	200 kW (three phase)	Diesel Generator	75,435.00	75,435.00
25.	1	250 kW (three phase)	Diesel Generator	92,230.00	92,230.00
26.	1	300 kW (three phase)	Diesel Generator	114,865.00	114,865.00
27.	1	350 kW (three phase)	Diesel Generator	126,055.00	126,055.00
					(cont.)....

Item	Qty	Size	Description	Unit Price	Total Price
		<b>Trailer Mounted</b>			
28.	1	20 kW (single phase)	Diesel Generator	18,810.00	18,810.00
29.	1	30 kW (single phase)	Diesel Generator	23,505.00	23,505.00
30.	1	35 kW (single phase)	Diesel Generator	23,505.00	23,505.00
31.	1	45 kW (single phase)	Diesel Generator	24,950.00	24,950.00
32.	1	60 kW (three phase)	Diesel Generator	26,240.00	26,240.00
33.	1	75 kW (three phase)	Diesel Generator	27,720.00	27,720.00
34.	1	85 kW (three phase)	Diesel Generator	31,470.00	31,470.00
35.	1	100 kW (three phase)	Diesel Generator	31,470.00	31,470.00
36.	1	125 kW (three phase)	Diesel Generator	32,600.00	32,600.00
37.	1	150 kW (three phase)	Diesel Generator	35,885.00	35,885.00
38.	1	200 kW (three phase)	Diesel Generator	42,415.00	42,415.00
39.	1	250 kW (three phase)	Diesel Generator	50,105.00	50,105.00
40.	1	300 kW (three phase)	Diesel Generator	61,680.00	61,680.00
41.	1	350 kW (three phase)	Diesel Generator	70,505.00	70,505.00
		<b>LP Tanks (Optional)</b>			
42.	5	500 gallon	LP storage tank	4,260.00	21,300.00
43.	5	1000 gallon	LP storage tank	6,206.00	31,030.00
		<b>Diesel Tanks (Optional)</b>			
44.	5	500 gallon	Diesel storage tank	4,926.00	24,630.00
45.	5	1000 gallon	Diesel storage tank	6,277.00	31,385.00
		<b>Grand Total</b>			2,718,765.00

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

#### END OF SPECIFICATIONS.

\$175.00	Optional Concrete Pavers Installed Per Tank
\$1,080.00	Optional Low Level Electronic Fuel Monitoring Gage
\$600.00	Voluntary Optional Sola Surge Protector Installed



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

BPH10078

PAGE

1

ADDRESS CORRESPONDENCE TO ATTENTION OF

ROBERTA WAGNER  
304-558-0067

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Michel Inc.  
Thomas Michel  
PO Box 1140  
Bridgeport, WV 26330

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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
03/29/2010				

BID OPENING DATE:

04/08/2010

BID OPENING TIME

01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
ADDENDUM NO. 1						
1. QUESTIONS AND ANSWERS 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.						
EXHIBIT 10						
REQUISITION NO.: BPH10078						
ADDENDUM ACKNOWLEDGEMENT						
I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.						
ADDENDUM NO.'S:						
NO. 1 .. <del>X</del> ...3/29/10						
NO. 2 .....						
NO. 3 .....						
NO. 4 .....						
NO. 5 .....						
I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
PRESIDENT	304-622-7923	4/2/10
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
	61-1109182	

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



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

BPH10078

PAGE

2

ADDRESS CORRESPONDENCE TO ATTENTION OF:

ROBERTA WAGNER  
304-558-0067

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

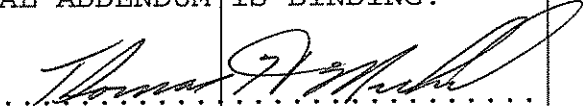
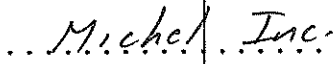
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03/29/2010				

BID OPENING DATE:

04/08/2010

BID OPENING TIME

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LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.						
						
SIGNATURE						
						
COMPANY						
4/2/10						
DATE						
NOTE: THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE BID.						
REV. 09/21/2009						
END OF ADDENDUM NO. 1						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
	304-622-7923	4/2/10
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
PRESIDENT	61-1109182	

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



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

BPH10078

PAGE

3

ADDRESS CORRESPONDENCE TO ATTENTION OF

ROBERTA WAGNER  
304-558-0067

RFQ COPY

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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
03/29/2010				

BID OPENING DATE:

04/08/2010

BID OPENING TIME 01:30PM

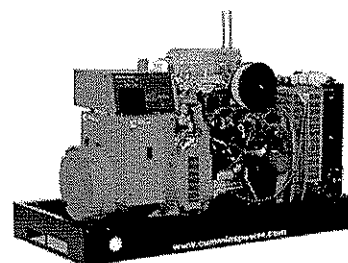
LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	JB		285-39		
OPEN END CONTRACT TO PROVIDE VARIOUS GENERATORS						
***** THIS IS THE END OF RFQ BPH10078 ***** TOTAL:						2,718,765.00

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE	TELEPHONE	DATE
<i>Thomas D. Mahan</i>	304-622-7923	4/2/10
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE
PRESIDENT	61-1109182	

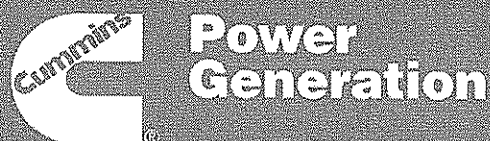
WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

# Spark-ignited generator set 20 – 30 kW standby EPA Emissions



## > Specification sheet

Our energy working for you.™



### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.

### U.S. EPA

Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

### Features

**GM heavy-duty gas engine** - Rugged 4-cycle, industrial spark-ignited delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 53 °C (127 °F) ambient temperature at the rated power level.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Natural gas				Propane					
	Standby rating		Prime rating		Standby rating		Prime rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>GGMA</b>	20.0 (25.0)				20.0 (25.0)				D-3390	
<b>GGMB</b>	25.0 (31.0)				25.0 (31.0)				D-3391	
<b>GGMC</b>	29.0 (36.0)				30.0 (38.0)				D-3392	



## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.5% @ 60 Hz
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications

## Engine specifications

Design	Naturally aspirated
Bore	101.6 mm (4.0 in)
Stroke	91.4 mm (3.6 in)
Displacement	3.0 litres (181 in <sup>3</sup> )
Cylinder block	Cast iron, in-line 4 cylinder
Battery capacity	420 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	60 amps
Starting voltage	12 volt, negative ground
Lube oil filter type(s)	Spin-on full flow
Standard cooling system	53 °C (127 °F) ambient cooling system

## Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	125 °C (257 °F) at standby
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 40 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

Reconnectable	Non-Reconnectable
3-phase	1-phase      3-phase
<ul style="list-style-type: none"> <li>• 120/208</li> <li>• 120/240 delta</li> <li>• 127/220</li> <li>• 139/240</li> <li>• 240/416</li> <li>• 254/440</li> <li>• 277/480</li> </ul>	<ul style="list-style-type: none"> <li>• 120/240</li> <li>• 220/380</li> <li>• 347/600</li> </ul>

Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <input type="checkbox"/> 120/240 V 1500 W coolant heaters <input type="checkbox"/> Heavy duty air cleaner <b>Fuel system</b> <input type="checkbox"/> Natural gas <input type="checkbox"/> Propane vapor withdrawal <input type="checkbox"/> Natural gas/propane vapor with auto changeover	<b>Alternator</b> <input type="checkbox"/> 12 lead, broad range (full single phase output) <input type="checkbox"/> Single phase (4 lead) <input type="checkbox"/> 105 °C (221 °F) rise alternator (prime) <input type="checkbox"/> 125 °C (257 °F) rise alternator (standby)	<b>Generator set</b> <input type="checkbox"/> Battery <input type="checkbox"/> Battery charger <input type="checkbox"/> Coolant drain extension <input type="checkbox"/> Oil drain extension <input type="checkbox"/> Duct adapter <input type="checkbox"/> Enclosure, aluminum weather protective, with critical silencer	<input type="checkbox"/> Export box packaging <input type="checkbox"/> Main line circuit breakers <input type="checkbox"/> UL 2200 Listed <input type="checkbox"/> 2 year prime power warranty <input type="checkbox"/> 2 year standby warranty <input type="checkbox"/> 5 year basic power warranty <input type="checkbox"/> 5 year comprehensive warranty <input type="checkbox"/> Flex fuel lines
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Note: Some options may not be available on all models - consult factory for availability.

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## Control system

### PowerCommand control

- The PowerCommand Control is an integrated generator set control system providing isochronous governing, voltage regulation, engine protection, generator protection and operator interface functions.
- Control provides battery monitoring and testing features, and smart starting control system.
- InPower™ PC-based service tool available for detailed diagnostics.
- Standard PCCNet RS485 network interface to devices such as remote annunciator for NFPA110 applications.
- Control boards are potted for environmental protection.
- Suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F), and altitudes to 5000 m (13,000 ft).
- Prototype tested; UL, CSA and CE compliant.

### AC protection

- Over current warning and shutdown\*
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation
- Field overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown\*
- High coolant temperature warning and shutdown\*
- Low coolant level warning or shutdown\*
- Low coolant temperature warning\*
- High, low and weak battery voltage warning\*
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel pressure warning\*

### Operator/display panel (optional)

- Manual off switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode, remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C (-4 °F to 158 °F).

### Alternator data

- Line-to-line and line-to-neutral AC volts\*
- Three phase AC current\*
- Frequency\*
- Total kVA\*

### Engine data

- DC voltage\*
- Lube oil pressure\*
- Coolant temperature\*

### Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower Service Tool)

### Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

### Digital voltage regulation

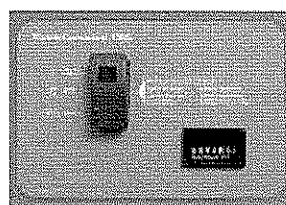
- Integrated digital electronic voltage regulator
- Two phase line-to-line sensing
- Configurable torque matching

### Control functions

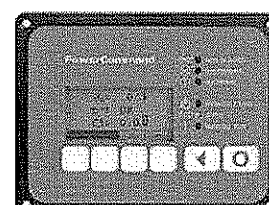
- Time delay start and cooldown
- Cycle cranking
- (2) configurable inputs
- (2) configurable outputs
- Remote emergency stop

### Options

- ☐ Local operator/display panel
- ☐ Digital electronic governing
- ☐ Auxiliary output relays (2)
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ Emergency stop switch
- ☐ Remote annunciator with (3) configurable inputs and (4) configurable outputs
- ☐ PowerCommand for Windows remote monitoring software (direct connect)
- ☐ Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)



**Standard operator panel**



**Optional operator/display panel**

\* Optional operator/display panel required to display warnings and sensor data, and for NFPA 110 and CSA 282 applications.

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## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

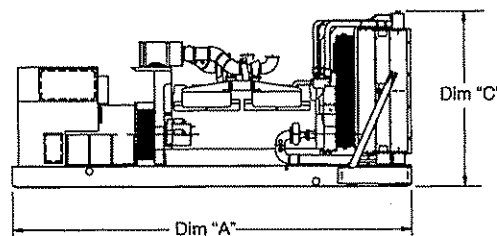
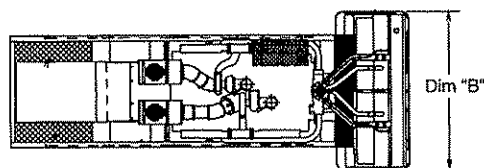
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
<b>GGMA</b>	1626 (64.0)	762.0 (30.0)	889.0 (35.0)	418 (922)	434 (956)
<b>GGMB</b>	1626 (64.0)	762.0 (30.0)	889.0 (35.0)	440 (970)	455 (1004)
<b>GGMC</b>	1626 (64.0)	762.0 (30.0)	889.0 (35.0)	507 (1117)	522 (1151)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

## Cummins Power Generation

1400 73<sup>rd</sup> Avenue N.E.  
Minneapolis, MN 55432 USA  
Telephone: 763 574 5000  
Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

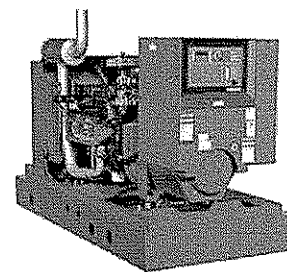
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# Spark-ignited generator set 35 - 50 kW standby EPA Emissions



## > Specification sheet

Our energy working for you.™



**Power  
Generation**

### Description

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This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



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The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.

### U.S. EPA

Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60 for emergency (standby) application.

### Features

**GM heavy-duty gas engine** - Rugged 4-cycle, industrial spark-ignited delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 50 °C (122 °F) ambient temperature at the rated power level.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Natural gas				Propane					
	Standby rating		Prime rating*		Standby rating		Prime rating*		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
GGPA	35.0 (44.0)		30.0 (38.0)		35.0 (44.0)		30.0 (38.0)		D-3482	
GGPB	40.0 (50.0)		35.0 (44.0)		40.0 (50.0)		35.0 (44.0)		D-3483	
GGPC	45.0 (56.0)	35.0 (44.0)	40.0 (50.0)	30.0 (38.0)	50.0 (63.0)	35.0 (44.0)	40.0 (50.0)	30.0 (38.0)	D-3485	D-3484

\* Prime rated sets are not available for installations within the U.S. territory.

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.6%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications

## Engine specifications

Design	Naturally aspirated
Bore	95.3 mm (3.75 in)
Stroke	88.4 mm (3.48 in)
Displacement	5.0 litres (305 in <sup>3</sup> )
Cylinder block	Cast iron, V8 cylinder
Battery capacity	625 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	70 amps
Starting voltage	12 volt, negative ground
Lube oil filter type(s)	Single spin-on canister-combination full flow with bypass
Standard cooling system	50 °C (122 °F) ambient cooling system

## Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled by flexible drive disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	150 °C (302 °F) at standby
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz				50 Hz			
3-phase			1-phase	3-phase			1-phase
• 110/190	• 120/240	• 240/416	• 110/220	• 110/190	• 110/220	• 115/200	• 110/220
• 110/220	• 127/220	• 254/440	• 115/230	• 115/230	• 120/208	• 120/240	• 115/230
• 115/200	• 139/240	• 277/480	• 120/240	• 127/220	• 220/380	• 230/400	• 120/240
• 115/230	• 220/380	• 347/600		• 240/416	• 254/440		
• 120/208	• 230/400						

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- ☐ 120/240 V 1500 W coolant heaters
- ☐ Heavy duty air cleaner

### Fuel system

- ☐ Natural gas
- ☐ Natural gas/propane liquid with automatic changeover
- ☐ Natural gas/propane vapor with automatic changeover
- ☐ Propane liquid withdrawal
- ☐ Vapor withdrawal

### Alternator

- ☐ 105 °C (221 °F) rise alternator
- ☐ 125 °C (257 °F) rise alternator
- ☐ 150 °C (302 °F) rise alternator
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ 12 lead, broad range extended stack (full single phase output)
- ☐ Lower broad range
- ☐ PMG excitation
- ☐ Upper broad range
- ☐ Single phase (4 lead)

### Exhaust System

- ☐ Adapter NPT
- ☐ Mounted muffler

### Generator set

- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Coolant drain extension
- ☐ Duct adapter
- ☐ Enclosure: Aluminum, steel, weather protection or sound attenuated

- ☐ Export box packaging
- ☐ Main line circuit breaker
- ☐ Oil drain extension
- ☐ Remote annunciator panel
- ☐ UL 2200 Listed
- ☐ 2 year prime power, 6000 hours, warranty
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty
- ☐ 5 year comprehensive warranty

Note: Some options may not be available on all models - consult factory for availability.

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## Control system

**PowerCommand PCC2100** - An integrated generator set control system providing isochronous governing, voltage regulation, engine protection and operator interface functions.

- Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.
- Control function provides battery monitoring and testing features, and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet interface.
- Suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 m (13,000 ft).
- Prototype tested; UL, CSA and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

### AC protection

- AmpSentry Protective Relay – UL-listed
- Over current and short-circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field Overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shutdown
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Operator Interface

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp/test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- (5) configurable LED lamps
- LED bargraph AC data display (optional)

### Alternator data

- Line-to-line and line-to-neutral AC volts
  - Three phase AC current
  - Frequency
- Total and individual phase kW and kVA

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### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

### Governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

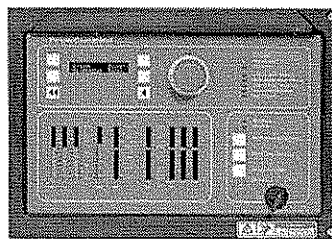
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

### Control functions

- Time delay start and cooldown
- Fault simulation (requires InPower)
- Cycle cranking
- Data logging on faults
- (4) configurable customer inputs
- (4) configurable customer outputs
- Remote emergency stop

### Options

- ☐ Analog AC Meter Display
- ☐ Thermostatically Controlled Space Heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon® LONWORKS® interface
- ☐ Modlon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch™ web server for remote monitoring and alarm notification (loose)
- ☐ PCCNet and Lonworks Digital input and output module(s) and Remote annunciators (loose)



**PowerCommand 2100 control operator/display panel**



**Power  
Generation**

## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

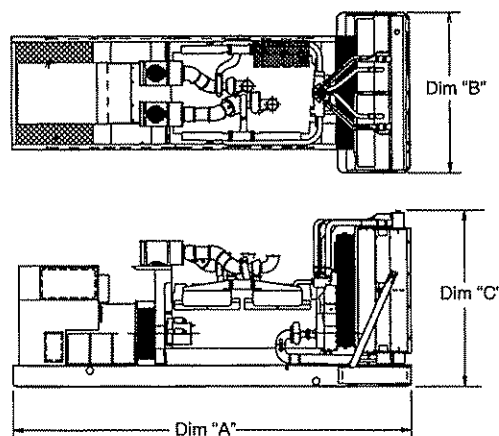
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
GGPA	2104 (83.0)	1016 (40.0)	1255 (49.0)	795 (1752)	821 (1811)
GGPB	2104 (83.0)	1016 (40.0)	1255 (49.0)	819 (1805)	845 (1864)
GGPC	2104 (83.0)	1016 (40.0)	1255 (49.0)	857 (1889)	884 (1948)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

### Cummins Power Generation

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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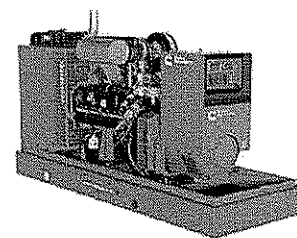
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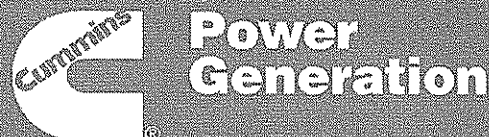


# Spark-ignited generator set 60 – 75 kW standby EPA Emissions



## > Specification sheet

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### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

### U.S. EPA

Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

### Features

**Ford heavy-duty gas engine** - Rugged 4-cycle industrial spark-ignited delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 40 °C (104 °F) ambient temperature.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Natural gas				Propane					
	Standby rating		Prime rating		Standby rating		Prime rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
GGHE	60 (75)				60 (75)				D-3382	
GGHF	70 (87)	55 (69)			75 (94)	60 (75)			D-3383	D-3386

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.6%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications

## Engine specifications

Design	Naturally aspirated
Bore	90.2 mm (3.55 in)
Stroke	105.9 mm (4.17 in)
Displacement	6.8 L (412.5 in <sup>3</sup> )
Cylinder block	Cast iron, V 10 cylinder
Battery capacity	600 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	65 amps
Starting voltage	12 volt, negative ground
Lube oil filter type(s)	Single spin-on canister-combination full flow with bypass
Standard cooling system	40 °C (104 °F) ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	150 °C (302 °F) standby
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz			50 Hz				
3-phase			1-phase	3-phase			1-phase
• 120/208	• 120/240	• 127/220	• 120/240	• 110/190	• 110/220	• 115/200	• 110/220 • 120/240
• 139/240	• 240/416	• 254/440		• 115/230	• 120/208	• 120/240	
• 277/480	• 347/600			• 127/220	• 220/380	• 230/400	
				• 240/416	• 254/440		

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- ☐ 120/240 V 1500 W coolant heaters

### Fuel system

- ☐ Natural gas
- ☐ Natural gas/propane liquid with automatic changeover
- ☐ Natural gas/propane vapor with automatic changeover
- ☐ Propane liquid withdrawal
- ☐ Vapor withdrawal

### Alternator

- ☐ 105 °C (221 °F) rise alternator
- ☐ 125 °C (257 °F) rise alternator
- ☐ 150 °C (302 °F) rise alternator
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ 12 lead, broad range, extended stack (full single phase output)
- ☐ Lower broad range
- ☐ PMG excitation
- ☐ Upper broad range
- ☐ Single phase (4 lead)

### Exhaust system

- ☐ Adapter NPT to slip fit
- ☐ Mounted residential muffler

### Generator set

- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Coolant drain extension
- ☐ Duct adapter
- ☐ Enclosure: Aluminum, steel, weather protection or sound attenuated

- ☐ Export box packaging
- ☐ Main line circuit breaker
- ☐ Oil drain extension
- ☐ Remote annunciator panel
- ☐ UL 2200 Listed
- ☐ 2 year prime power, 6000 hours, warranty
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty
- ☐ 5 year comprehensive warranty

Note: Some options may not be available on all models - consult factory for availability.

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## Control system

**PowerCommand PCC2100** - An integrated generator set control system providing isochronous governing, voltage regulation, engine protection and operator interface functions.

- Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.
- Control function provides battery monitoring and testing features, and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet interface.
- Suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 m (13,000 ft).
- Prototype tested; UL, CSA and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

### AmpSentry AC protection

- AmpSentry Protective Relay – UL-listed
- Over current and short-circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field Overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- High oil temperature warning (optional)
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shutdown
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Operator interface

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp/test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- (5) configurable LED lamps
- LED bargraph AC data display (optional)

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase kW and kVA

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## Engine Data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (optional)

## Other data

- Genset model data
- Start attempts, starts, running hours
- KW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

## Governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

## Voltage regulation

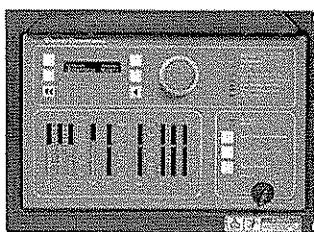
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

## Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- (4) configurable customer inputs
- (4) configurable customer outputs

## Options

- ☐ Analog AC Meter Display
- ☐ Thermostatically Controlled Space Heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modlon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ PCCNet and Lonworks Digital input and output module(s) and Remote annunciators (loose)



**PowerCommand 2100 control operator/display panel**



## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

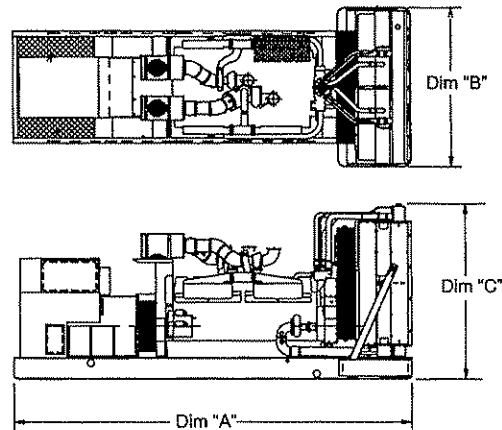
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
GGHE	2103 (82.8)	1016 (40.0)	1265 (49.8)	892 (1966)	929 (2048)
GGHF	2103 (82.8)	1016 (40.0)	1265 (49.8)	945 (2083)	982 (2165)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

### Cummins Power Generation

1400 73<sup>rd</sup> Avenue N.E.  
Minneapolis, MN 55432 USA  
Telephone: 763 574 5000  
Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

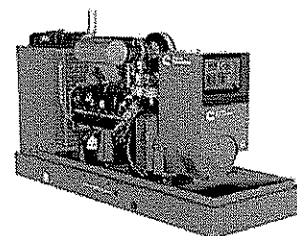
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# Spark-ignited generator set 60 – 75 kW standby EPA Emissions



## > Specification sheet

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**Power  
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### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

### U.S. EPA

Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

### Features

**Ford heavy-duty gas engine** - Rugged 4-cycle industrial spark-ignited delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 40 °C (104 °F) ambient temperature.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Natural gas				Propane				Data sheets	
	Standby rating		Prime rating		Standby rating		Prime rating		60 Hz	50 Hz
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)		
GGHE	60 (75)				60 (75)				D-3382	
GGHF	70 (87)	55 (69)			75 (94)	60 (75)			D-3383	D-3386

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.6%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications

## Engine specifications

Design	Naturally aspirated
Bore	90.2 mm (3.55 in)
Stroke	105.9 mm (4.17 in)
Displacement	6.8 L (412.5 in <sup>3</sup> )
Cylinder block	Cast iron, V 10 cylinder
Battery capacity	600 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	65 amps
Starting voltage	12 volt, negative ground
Lube oil filter type(s)	Single spin-on canister-combination full flow with bypass
Standard cooling system	40 °C (104 °F) ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	150 °C (302 °F) standby
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz				50 Hz			
3-phase			1-phase	3-phase			1-phase
• 120/208	• 120/240	• 127/220	• 120/240	• 110/190	• 110/220	• 115/200	• 110/220 • 120/240
• 139/240	• 240/416	• 254/440		• 115/230	• 120/208	• 120/240	
• 277/480	• 347/600			• 127/220	• 220/380	• 230/400	
				• 240/416	• 254/440		

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- ☐ 120/240 V 1500 W coolant heaters

### Fuel system

- ☐ Natural gas
- ☐ Natural gas/propane liquid with automatic changeover
- ☐ Natural gas/propane vapor with automatic changeover
- ☐ Propane liquid withdrawal
- ☐ Vapor withdrawal

### Alternator

- ☐ 105 °C (221 °F) rise alternator
- ☐ 125 °C (257 °F) rise alternator
- ☐ 150 °C (302 °F) rise alternator
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ 12 lead, broad range, extended stack (full single phase output)
- ☐ Lower broad range
- ☐ PMG excitation
- ☐ Upper broad range
- ☐ Single phase (4 lead)

### Exhaust system

- ☐ Adapter NPT to slip fit
- ☐ Mounted residential muffler

### Generator set

- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Coolant drain extension
- ☐ Duct adapter
- ☐ Enclosure: Aluminum, steel, weather protection or sound attenuated

- ☐ Export box packaging
- ☐ Main line circuit breaker
- ☐ Oil drain extension
- ☐ Remote annunciator panel
- ☐ UL 2200 Listed
- ☐ 2 year prime power, 6000 hours, warranty
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty
- ☐ 5 year comprehensive warranty

Note: Some options may not be available on all models - consult factory for availability.

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**Power  
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## Control system

**PowerCommand PCC2100** - An integrated generator set control system providing isochronous governing, voltage regulation, engine protection and operator interface functions.

- Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.
- Control function provides battery monitoring and testing features, and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet interface.
- Suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 m (13,000 ft).
- Prototype tested; UL, CSA and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

### AmpSentry AC protection

- AmpSentry Protective Relay – UL-listed
- Over current and short-circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field Overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- High oil temperature warning (optional)
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shutdown
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Operator interface

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp/test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- (5) configurable LED lamps
- LED bargraph AC data display (optional)

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase kW and kVA

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### Engine Data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (optional)

### Other data

- Genset model data
- Start attempts, starts, running hours
- KW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

### Governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

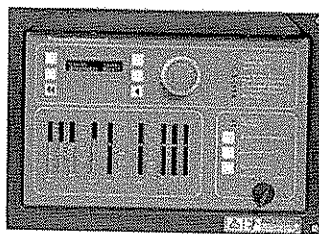
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

### Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- (4) configurable customer inputs
- (4) configurable customer outputs

### Options

- ☐ Analog AC Meter Display
- ☐ Thermostatically Controlled Space Heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modlon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ PCCNet and Lonworks Digital input and output module(s) and Remote annunciators (loose)



**PowerCommand 2100 control operator/display panel**



## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

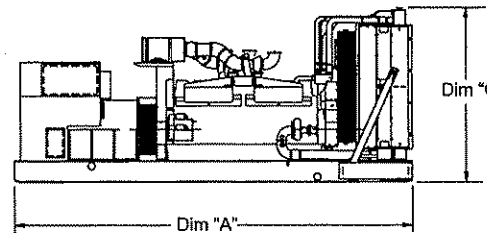
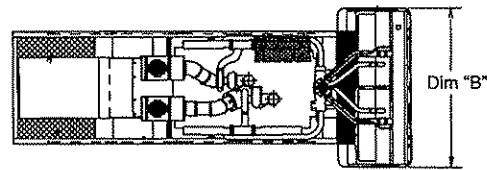
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
GGHE	2103 (82.8)	1016 (40.0)	1265 (49.8)	892 (1966)	929 (2048)
GGHF	2103 (82.8)	1016 (40.0)	1265 (49.8)	945 (2083)	982 (2165)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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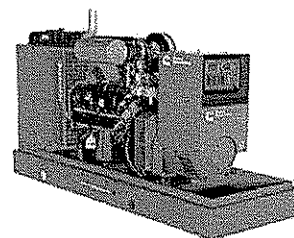
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# Spark-ignited generator set 85 – 100 kW standby EPA Emissions



## > Specification sheet

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**Power  
Generation**

### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

### U.S. EPA

Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

### Features

**Ford heavy-duty gas engine** - Rugged 4-cycle industrial spark-ignited delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

**Three-Way Catalyst** - Simultaneously converts NO<sub>x</sub>, CO and HC to nitrogen, oxygen, carbon dioxide and water, minimizing the harmful emissions of the genset.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at up to 40 °C (104 °F) ambient temperature.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Natural gas				Propane				Data sheets	
	Standby rating		Prime rating		Standby rating		Prime rating			
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
GGHG	85 (106)				85 (106)				D-3384	
GGHH	100 (125)	75 (94)			100 (125)	75 (94)			D-3385	D-3387

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	GGHH ± 0.5%, GGHG ± 0.33%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications

## Engine specifications

Design	Turbocharged
Bore	90.2 mm (3.55 in)
Stroke	105.9 mm (4.17 in)
Displacement	6.8 L (412.5 in <sup>3</sup> )
Cylinder block	Cast iron, V 10 cylinder
Battery capacity	600 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	65 amps
Starting voltage	12 volt, negative ground
Lube oil filter type(s)	Single spin-on canister-combination full flow with bypass
Standard cooling system	40 °C (104 °F) ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	150 °C (302 °F) standby
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz				50 Hz			
3-phase			1-phase	3-phase			1-phase
• 120/208	• 120/240	• 127/220	• 120/240	• 110/190	• 110/220	• 115/200	• 110/220
• 139/240	• 240/416	• 254/440		• 115/230	• 120/208	• 120/240	• 120/240
• 277/480	• 347/600			• 127/220	• 220/380	• 230/400	
				• 240/416	• 254/440		

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- ☐ 120/240 V 1500 W coolant heaters

### Fuel system

- ☐ Natural gas
- ☐ Natural gas/propane liquid with automatic changeover
- ☐ Natural gas/propane vapor with automatic changeover
- ☐ Propane liquid withdrawal
- ☐ Vapor withdrawal

### Alternator

- ☐ 105 °C (221 °F) rise alternator
- ☐ 125 °C (257 °F) rise alternator
- ☐ 150 °C (302 °F) rise alternator
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ 12 lead, broad range, extended stack (full single phase output)
- ☐ Lower broad range
- ☐ PMG excitation
- ☐ Upper broad range
- ☐ Single phase (4 lead)

### Exhaust system

- ☐ Mounted residential muffler

### Generator set

- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Duct adapter
- ☐ Enclosure: Aluminum, steel, weather protection or sound attenuated
- ☐ Export box packaging
- ☐ Main line circuit breaker

- ☐ Remote annunciator panel
- ☐ UL 2200 Listed
- ☐ 2 year prime power, 6000 hours, warranty
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty
- ☐ 5 year comprehensive warranty

Note: Some options may not be available on all models - consult factory for availability.

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## Control system

**PowerCommand PCC2100** - An integrated generator set control system providing isochronous governing, voltage regulation, engine protection and operator interface functions.

- Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.
- Control function provides battery monitoring and testing features, and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet interface.
- Suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 m (13,000 ft).
- Prototype tested; UL, CSA and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

### AmpSentry AC protection

- AmpSentry Protective Relay – UL-listed
- Over current and short-circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field Overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- High oil temperature warning (optional)
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shutdown
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Operator interface

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp/test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- (5) configurable LED lamps
- LED bargraph AC data display (optional)

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase kW and kVA

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## Engine Data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (optional)

## Other data

- Genset model data
- Start attempts, starts, running hours
- KW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

## Governing

- Integrated digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

## Voltage regulation

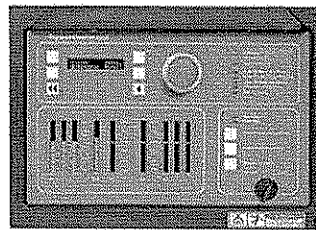
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

## Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- (3) configurable customer inputs
- (3) configurable customer outputs

## Options

- ☐ Analog AC Meter Display
- ☐ Thermostatically Controlled Space Heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modlon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ PCCNet and Lonworks Digital input and output module(s) and Remote annunciators (loose)



**PowerCommand 2100 control operator/display panel**

## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

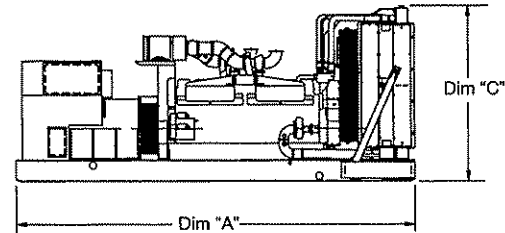
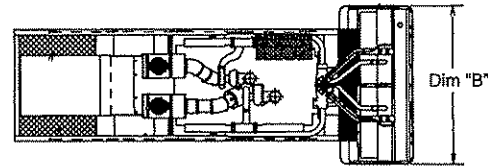
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

***Do not use for installation design***

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
GGHG	2662 (104.8)	1016 (40.0)	1397 (55.0)	1071 (2362)	1111 (2450)
GGHH	2662 (104.8)	1016 (40.0)	1397 (55.0)	1093 (2410)	1133 (2498)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

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Telephone: 763 574 5000  
Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

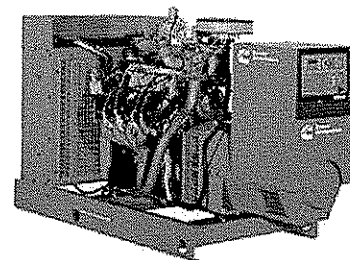
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# Spark-ignited generator set 125 – 150 kW standby EPA Emissions



## > Specification sheet

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**Power  
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### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

### U.S. EPA

Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.

### Features

**GM heavy-duty gas engine** - Rugged 4-cycle industrial spark-ignited delivers reliable power. The electronic air/fuel ratio control provides optimum engine performance and fast response to load changes.

**Three-Way Catalyst** - Simultaneously converts NO<sub>x</sub>, CO and HC to nitrogen, oxygen, carbon dioxide and water, minimizing the harmful emissions of the generator set.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering and auto-shutdown at fault detection.

**Cooling system** - Standard cooling package provides reliable running at up to 50 °C (122 °F) ambient temperature.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

	Natural gas				Propane					
	Standby rating		Prime rating		Standby rating		Prime rating		Data sheets	
Model	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
GGLA	125 (156)								D-3388	
GGLB	150 (188)				140 (175)				D-3389	

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## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.5%
Radio frequency emissions compliance	IEC 801.2 through IEC 801.5

## Engine specifications

Design	GGLA: Turbocharged, GGLB: Turbocharged and CAC
Bore	108.0 mm (4.25 in)
Stroke	111.0 mm (4.37 in)
Displacement	8.1 L (496.0 in <sup>3</sup> )
Cylinder block	Cast iron, V 8 cylinder
Battery capacity	600 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	70 amps
Starting voltage	12 volt, negative ground
Lube oil filter type	Single spin-on canister-combination full flow with bypass
Standard cooling system	50 °C (122 °F) ambient radiator cooling system

## Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled by a flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	150 °C (302 °F) standby
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% total no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

Reconnectable			Non-reconnectable	
3-phase			1-phase	3-phase
• 120/208	• 139/240	• 220/380	• 120/240	• 347/600
• 240/416	• 277/480	• 120/240 delta		

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- ☐ 120 V 1500 W coolant heaters
- ☐ 240 V 1500 W coolant heaters

### Alternator

- ☐ 105 °C (221 °F) rise alternator
- ☐ 125 °C (257 °F) rise alternator
- ☐ 120/240 V, 100 W alternator anti-condensation heater
- ☐ 12 lead, broad range extended stack (full single phase output)
- ☐ Single phase (4-lead)
- ☐ PMG excitation

### Fuel system

- ☐ Natural gas
- ☐ Natural gas/propane liquid with automatic changeover
- ☐ Natural gas/propane vapor with automatic changeover
- ☐ Propane liquid withdrawal
- ☐ Vapor withdrawal

### Exhaust system

- ☐ Mounted residential grade silencer

### Generator set

- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Enclosure: aluminum, steel, weather protective or sound attenuated
- ☐ Export box packaging
- ☐ Main line circuit breakers
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ UL 2200 Listed
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty
- ☐ 5 year comprehensive warranty

Note: Some options may not be available on all models - consult factory for availability.

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## Control system

**PowerCommand PCC2100** - An integrated generator set control system providing isochronous governing, voltage regulation, engine protection and operator interface functions.

- Includes integral AmpSentry protection, which provides a full range of alternator protection functions that are matched to the alternator provided.
- Control function provides battery monitoring and testing features, and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet interface.
- Suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 m (13,000 ft).
- Prototype tested; UL, CSA and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics, setup, data logging and fault simulation.

### AmpSentry AC protection

- AmpSentry Protective Relay – UL-listed
- Over current and short-circuit shutdown
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Field Overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Sensor failure indication

### Operator interface

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls and adjustments including voltage adjustment
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- (5) configurable LED lamps
- LED Bargraph AC data display (optional)

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase kW and kVA

### Engine Data

- DC voltage
- Lube oil pressure
- Coolant temperature

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

### Governing

- Digital engine speed control for fixed isochronous frequency regulation

### Voltage regulation

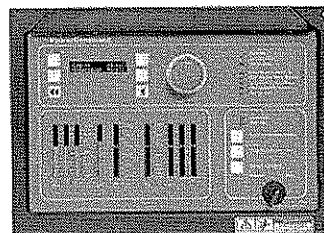
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

### Control functions

- Time delay start and cooldown
- Fault simulation (requires InPower)
- Cycle cranking
- Data logging on faults
- (2) configurable customer inputs
- (3) configurable customer outputs
- Remote emergency stop

### Options

- ☐ Analog AC Meter Display
- ☐ Thermostatically Controlled Space Heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon® LONWORKS® interface
- ☐ Modlon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch™ web server for remote monitoring and alarm notification (loose)
- ☐ PCCNet and Lonworks Digital input and output module(s) and Remote annunciators (loose)



**PowerCommand 2100 control operator/display panel**

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**Power  
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## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

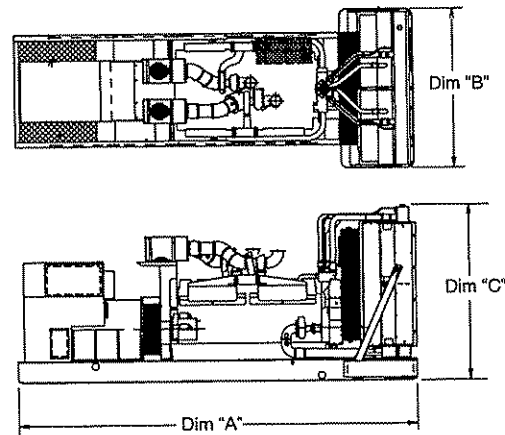
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
GGLA	2496 (98.2)	1016 (40.0)	1422 (56.0)	1157 (2550)	1213 (2675)
GGLB	2496 (98.2)	1016 (40.0)	1422 (56.0)	1157 (2550)	1213 (2675)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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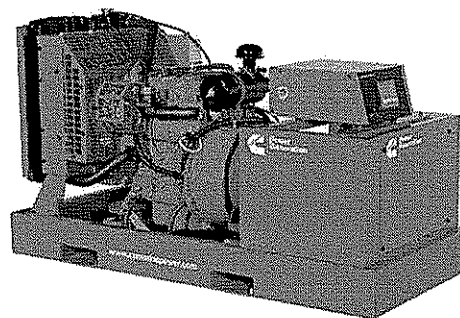




# Diesel generator set

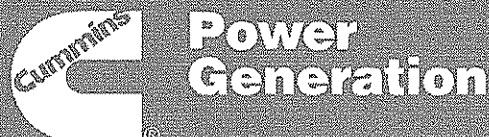
## V2203-M series engine

### EPA emissions



> **Specification sheet**  
20 kW 60 Hz

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#### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

#### U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 1039, Tier 4.

#### Features

**Kubota heavy-duty engine** - Rugged 4-cycle, liquid-cooled, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® 1.1 electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DSKBA	20 (25)		18.2 (22.7)				D-3373	

## Generator set specifications

Governor regulation class	
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 1%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	

## Engine specifications

Bore	87.0 mm (3.43 in)
Stroke	92.4 mm (3.64 in)
Displacement	2.20 litres (134.1 in <sup>3</sup> )
Configuration	Cast iron, in-line, 4 cylinder
Battery capacity	350 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	40 amps
Starting voltage	12 volt, negative ground
Fuel system	Indirect injection: low or ultra low sulfur, number 2 diesel fuel
Fuel filter	Single element, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 7% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 40 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz Three phase line-neutral/line-line	60 Hz Single phase line-neutral/line-line
<ul style="list-style-type: none"> <li>• 120/208</li> <li>• 139/240</li> <li>• 240/416</li> <li>• 347/600</li> <li>• 120/240 Delta</li> <li>• 220/380</li> <li>• 277/480</li> </ul>	<ul style="list-style-type: none"> <li>• 120/240</li> </ul>

\* Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <input type="checkbox"/> 120 V 1000 W coolant heater  <b>Fuel System</b> <input type="checkbox"/> 24 hour sub-base tank (dual wall) <input type="checkbox"/> Regional fuel tank code kits	<b>Alternator</b> <input type="checkbox"/> 105 °C rise <input type="checkbox"/> 120 V 100 W anti-condensation heater <input type="checkbox"/> Single phase  <b>Exhaust system</b> <input type="checkbox"/> Engine exhaust muffler (mounted)	<b>Generator set</b> <input type="checkbox"/> Battery <input type="checkbox"/> Battery charger <input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated <input type="checkbox"/> Export box packaging <input type="checkbox"/> Main line circuit breaker	<input type="checkbox"/> PowerCommand Network Communications Module (NCM) <input type="checkbox"/> Remote annunciator panel <input type="checkbox"/> Spring isolators <input type="checkbox"/> 2 year prime power warranty <input type="checkbox"/> 2 year standby power warranty <input type="checkbox"/> 5 year basic power warranty
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\* Note: Some options may not be available on all models - consult factory for availability.

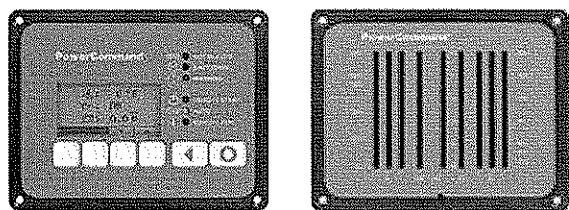
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S-1562c (9/08)



## Control system PCC 1302



**PowerCommand control** is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C
- Bargraph display (optional)

### AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

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### Alternator data

- Line-to-line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

### Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

### Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

### Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase line-to-line sensing
- Configurable torque matching

### Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Glow plug control (some models)

### Options

- ☐ Auxiliary output relays (2)
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ Remote annunciator with (3) configurable inputs and (4) configurable outputs
- ☐ PMG alternator excitation
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- ☐ Digital governing
- ☐ AC output analog meters (bargraph)
  - Color-coded graphical display of:
    - 3-phase AC voltage
    - 3-phase current
    - Frequency
    - kVa
- ☐ Remote operator panel
- ☐ PowerCommand 2.2 control with AmpSentry protection

For further detail see document S-1531.



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## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

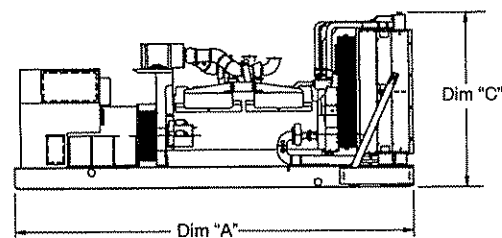
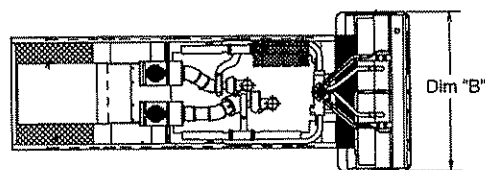
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSKBA	1700 (66.9)	787 (31.0)	928 (36.5)		568 (1252)

\* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

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Telephone: 763 574 5000  
Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

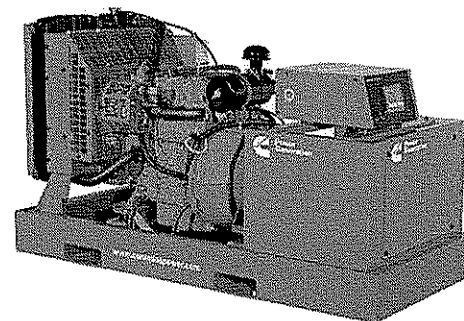
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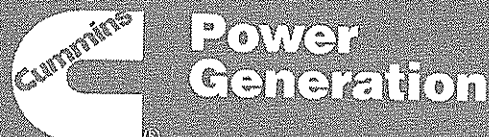


# Diesel generator set V3300 series engine EPA emissions



> **Specification sheet**  
25 kW 60 Hz

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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

## U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 1039, Tier 4.

## Features

**Kubota heavy-duty engine** - Rugged 4-cycle, liquid-cooled, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® 1.1 electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DSKCA	25 (31.3)		22.7 (28.4)				D-3374	

## Generator set specifications

Governor regulation class	
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 1%
Frequency regulation	5%
Random frequency variation	± 0.5% (Isochronous optional ± 0.25%)
Radio frequency emissions compliance	

## Engine specifications

Bore	98 mm (3.86 in)
Stroke	110.0 mm (4.33 in)
Displacement	3.3 litres (202.5 in <sup>3</sup> )
Configuration	Cast iron, in-line, 4 cylinder
Battery capacity	450 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	45 amps
Starting voltage	12 volt, negative ground
Fuel system	Indirect injection: low or ultra low sulfur, number 2 diesel fuel
Fuel filter	Single element, 5 micron filtration, spin-on fuel filter
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 7% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 40 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz Three phase line-neutral/line-line	60 Hz Single phase line-neutral/line-line
<ul style="list-style-type: none"> <li>• 120/208</li> <li>• 120/240 Delta</li> <li>• 139/240</li> <li>• 220/380</li> <li>• 240/416</li> <li>• 277/480</li> <li>• 347/600</li> </ul>	<ul style="list-style-type: none"> <li>• 120/240</li> </ul>

\* Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <input type="checkbox"/> 120 V 1000 W coolant heater <b>Fuel System</b> <input type="checkbox"/> 24 hour sub-base tank (dual wall) <input type="checkbox"/> Regional fuel tank code kits	<b>Alternator</b> <input type="checkbox"/> 105 °C rise <input type="checkbox"/> 120 V 100 W anti-condensation heater <input type="checkbox"/> Single phase <b>Exhaust system</b> <input type="checkbox"/> Engine exhaust muffler (mounted)	<b>Generator set</b> <input type="checkbox"/> Battery <input type="checkbox"/> Battery charger <input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated <input type="checkbox"/> Export box packaging <input type="checkbox"/> Main line circuit breaker	<input type="checkbox"/> PowerCommand Network Communications Module (NCM) <input type="checkbox"/> Remote annunciator panel <input type="checkbox"/> Spring isolators <input type="checkbox"/> 2 year prime power warranty <input type="checkbox"/> 2 year standby power warranty <input type="checkbox"/> 5 year basic power warranty
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\* Note: Some options may not be available on all models - consult factory for availability.

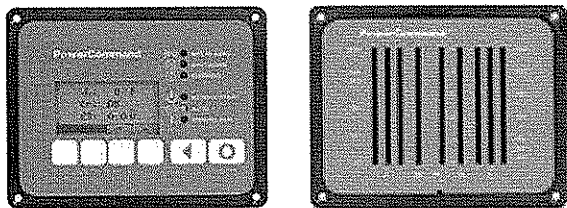
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S-1563c (9/08)



## Control system PCC 1302



**PowerCommand control** is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C
- Bargraph display (optional)

### AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

### Alternator data

- Line-to-line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

### Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

### Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

### Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase line-to-line sensing
- Configurable torque matching

### Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Glow plug control (some models)

### Options

- ☐ Auxiliary output relays (2)
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ Remote annunciator with (3) configurable inputs and (4) configurable outputs
- ☐ PMG alternator excitation
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- ☐ Digital governing
- ☐ AC output analog meters (bargraph)
  - Color-coded graphical display of:
    - 3-phase AC voltage
    - 3-phase current
    - Frequency
    - kVa
- ☐ Remote operator panel
- ☐ PowerCommand 2.2 control with AmpSentry protection

For further detail see document S-1531.

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S-1563c (9/08)



## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

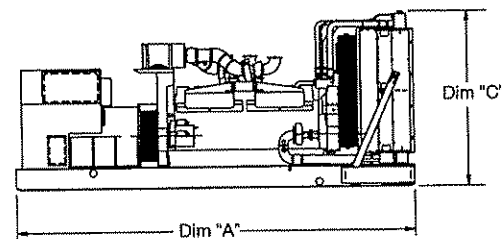
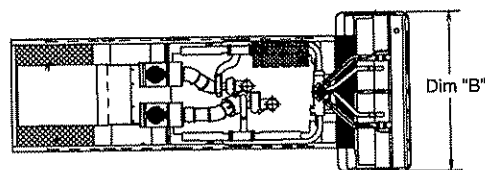
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSKCA	1700 (66.9)	787 (31.0)	965 (38.0)		598 (1320)

\* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

## Cummins Power Generation

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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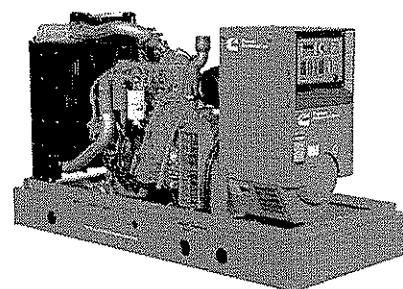
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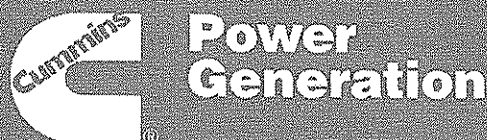


# Diesel generator set QSB5 series engine EPA emissions



> **Specification sheet**  
35 kW - 80 kW 60 Hz

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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

## U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 3.

## Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent magnet generator (PMG)** - Offers enhanced motor starting and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation. Optional features include alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>DSFAA</b>	35 (44)		32 (40)				D-3366	
<b>DSFAB</b>	40 (50)		35 (44)				D-3367	
<b>DSFAC</b>	50 (63)		45 (56)				D-3368	
<b>DSFAD</b>	60 (75)		55 (69)				D-3369	
<b>DSFAE</b>	80 (100)		72 (90)				D-3370	

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S-1559e (3/09)

## Generator set specifications

Governor regulation class	
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 0.5% - 3 phase only
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	

## Engine specifications

Bore	107 mm (4.21 in)
Stroke	124.0 mm (4.88 in)
Displacement	4.5 litres (272 in <sup>3</sup> )
Configuration	Cast iron, in-line, 4 cylinder
Battery capacity	1000 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	100 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	150 °C standby at 40 °C ambient
Exciter type	Torque match (shunt) standard, PMG optional
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz Three phase line-neutral/line-line	60 Hz Single phase line-neutral/line-line
<ul style="list-style-type: none"> <li>• 120/208</li> <li>• 120/240 Delta</li> <li>• 127/220</li> <li>• 139/240</li> <li>• 220/380</li> <li>• 240/416</li> <li>• 255/440</li> <li>• 277/480</li> <li>• 347/600</li> </ul>	<ul style="list-style-type: none"> <li>• 120/240</li> </ul>

\* Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 120 V 150 W lube oil heater</li> <li><input type="checkbox"/> 120/240 V 1000 W coolant heater</li> </ul> <b>Fuel System</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 24 hour sub-base tank (dual wall)</li> <li><input type="checkbox"/> 12 hour sub-base tank (dual wall)</li> </ul>	<b>Alternator</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 105 °C rise</li> <li><input type="checkbox"/> 125 °C rise</li> <li><input type="checkbox"/> 120 V 100 W anti-condensation heater</li> <li><input type="checkbox"/> PMG excitation</li> <li><input type="checkbox"/> Single phase</li> </ul> <b>Exhaust system</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Genset mounted muffler</li> <li><input type="checkbox"/> Heavy duty exhaust elbow</li> <li><input type="checkbox"/> Slip on exhaust connection</li> </ul>	<b>Generator set</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> AC entrance box</li> <li><input type="checkbox"/> Battery</li> <li><input type="checkbox"/> Battery charger</li> <li><input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated</li> <li><input type="checkbox"/> Export box packaging</li> <li><input type="checkbox"/> Main line circuit breaker</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> PowerCommand Network Communications Module (NCM)</li> <li><input type="checkbox"/> Remote annunciator panel</li> <li><input type="checkbox"/> Spring isolators</li> <li><input type="checkbox"/> UL 2200 Listed</li> <li><input type="checkbox"/> 2 year prime power warranty</li> <li><input type="checkbox"/> 2 year standby power warranty</li> <li><input type="checkbox"/> 5 year basic power warranty</li> </ul>
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\* Note: Some options may not be available on all models - consult factory for availability.

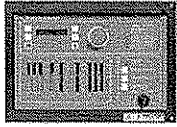
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S-1559e (3/09)



## Control system PCC 2100



**PowerCommand control** is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LONWORKS® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable LED lamps (5)
- Configurable for local language

### Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

### AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

### Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

### Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

### Options

- ☐ LED bargraph AC data display
- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modion Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☐ Remote annunciator (loose)

For further detail see document S-1409.

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## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

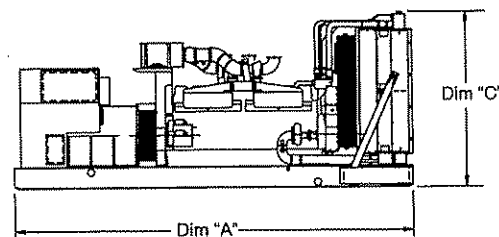
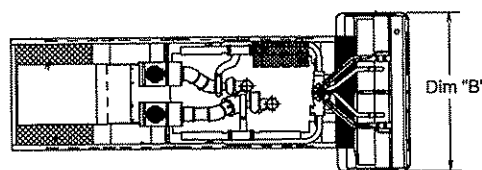
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

***Do not use for installation design***

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
<b>DSFAA</b>	2104 (82.8)	1016 (40.0)	1255 (49.4)		1080 (2380)
<b>DSFAB</b>	2104 (82.8)	1016 (40.0)	1255 (49.4)		1080 (2380)
<b>DSFAC</b>	2104 (82.8)	1016 (40.0)	1255 (49.4)		1120 (2470)
<b>DSFAD</b>	2104 (82.8)	1016 (40.0)	1255 (49.4)		1140 (2520)
<b>DSFAE</b>	2104 (82.8)	1016 (40.0)	1255 (49.4)		1220 (2690)

\* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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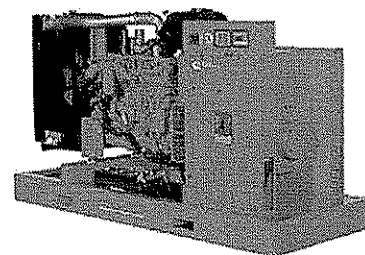
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S-1559e (3/09)



# Diesel generator set

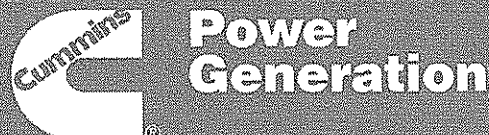
## QSB7 series engine

## EPA emissions



> **Specification sheet**  
100 kW - 150 kW 60 Hz

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### Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

### U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 3.

### Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® 1.1 electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance. The optional PowerCommand 2.2 control is UL 508 Listed and provides AmpSentry™ protection.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>DSGAA</b>	100 (125)		90 (113)				D-3349	
<b>DSGAB</b>	125 (156)		113 (141)				D-3350	
<b>DSGAC</b>	150 (188)		135 (169)				D-3351	

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications.

## Engine specifications

Bore	107 mm (4.21 in)
Stroke	124.0 mm (4.88 in)
Displacement	6.69 L (408 in <sup>3</sup> )
Configuration	Cast iron, in-line, 6 cylinder
Battery capacity	1100 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	100 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	150 °C standby at 40 °C ambient
Exciter type	Torque match (shunt) standard, PMG optional
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz Three phase line-neutral/line-line	60 Hz Single phase line-neutral/line-line
<ul style="list-style-type: none"> <li>• 110/190</li> <li>• 110/220</li> <li>• 115/200</li> <li>• 115/230 Delta</li> <li>• 120/208</li> <li>• 120/240 Delta</li> <li>• 127/220</li> <li>• 139/240</li> <li>• 220/380</li> <li>• 230/400</li> <li>• 240/416</li> <li>• 255/440</li> <li>• 277/480</li> <li>• 347/600</li> </ul>	<ul style="list-style-type: none"> <li>• 110/220</li> <li>• 115/230</li> <li>• 120/240</li> </ul>

\* Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 120 V 150 W lube oil heater</li> <li><input type="checkbox"/> 120/240 V 1500 W coolant heater</li> </ul> <b>Fuel System</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 24 hour sub-base tank (dual wall)</li> </ul>	<b>Alternator</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 105 °C rise</li> <li><input type="checkbox"/> 125 °C rise</li> <li><input type="checkbox"/> 120 V 100 W anti-condensation heater</li> <li><input type="checkbox"/> PMG excitation</li> <li><input type="checkbox"/> Single phase</li> </ul>	<b>Exhaust system</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Heavy duty exhaust elbow</li> <li><input type="checkbox"/> Slip on exhaust connection</li> </ul> <b>Generator set</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Battery</li> <li><input type="checkbox"/> Battery charger</li> <li><input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated</li> <li><input type="checkbox"/> Main line circuit breaker</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> PowerCommand Network Communications Module (NCM)</li> <li><input type="checkbox"/> Remote annunciator panel</li> <li><input type="checkbox"/> Spring isolators</li> <li><input type="checkbox"/> UL 2200 Listed</li> <li><input type="checkbox"/> 2 year prime power warranty</li> <li><input type="checkbox"/> 2 year standby power warranty</li> <li><input type="checkbox"/> 5 year basic power warranty</li> </ul>
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\* Note: Some options may not be available on all models - consult factory for availability.

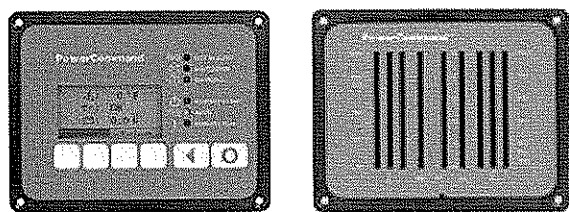
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S-1544g (9/08)



## Control system PCC 1302



**PowerCommand control** is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C
- Bargraph display (optional)

### AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

### Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

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S-1544g (9/08)

### Alternator data

- Line-to-line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

### Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

### Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

### Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase line-to-line sensing
- Configurable torque matching

### Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Glow plug control (some models)

### Options

- ☐ Auxiliary output relays (2)
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ Remote annunciator with (3) configurable inputs and (4) configurable outputs
- ☐ PMG alternator excitation
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- ☐ Digital governing
- ☐ AC output analog meters (bargraph)
  - Color-coded graphical display of:
    - 3-phase AC voltage
    - 3-phase current
    - Frequency
    - kVa
- ☐ Remote operator panel
- ☐ PowerCommand 2.2 control with AmpSentry protection

For further detail see document S-1531.



## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

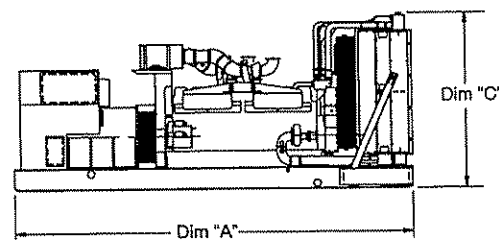
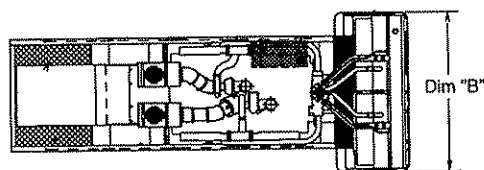
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSGAA	2656 (104.6)	1100 (43.3)	1549 (61)		1180 (2602)
DSGAB	2656 (104.6)	1100 (43.3)	1549 (61)		1225 (2700)
DSGAC	2656 (104.6)	1100 (43.3)	1549 (61)		1263 (2784)

\* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

### Cummins Power Generation

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**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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S-1544g (9/08)

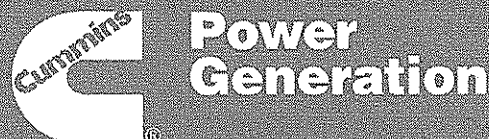




# Diesel generator set QSL9-G2 series engine EPA emissions

> **Specification sheet**  
175 kW - 230 kW standby

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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.

## U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 3.

## Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>DSHAB</b>	175 (219)		160 (200)				D-3451	
<b>DSHAC</b>	200 (250)		180 (225)				D-3452	
<b>DSHAD</b>	230 (288)		209 (261)				D-3453	

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	Meets requirements of most industrial and commercial applications.

## Engine specifications

Bore	114.0 mm (4.49 in)
Stroke	145 mm (5.69 in)
Displacement	8.9 L (543 in <sup>3</sup> )
Configuration	Cast iron in-line, 6 cylinder
Battery capacity	1500 amps minimum at ambient temperature of -18 °C (0 °F)
Battery charging alternator	100 amps
Starting voltage	12 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter, automatic electric fuel shutoff
Fuel filter	Single element, 10 micron filtration, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	150 °C standby at 40 °C ambient
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

Three phase reconnectable	Single phase non-reconnectable	Three phase non-reconnectable
<ul style="list-style-type: none"> <li>•120/208</li> <li>•120/240</li> <li>•240/416</li> <li>•127/220</li> <li>•254/440</li> <li>•277/480</li> <li>•139/240</li> </ul>	<ul style="list-style-type: none"> <li>•120/240</li> </ul>	<ul style="list-style-type: none"> <li>•220/380</li> <li>•347/600</li> </ul>

Note: Consult factory for other voltages.

## Generator set options and accessories

### Engine

- ☐ 120/240 V 1500 W coolant heater
- ☐ 120/240 V 150 W lube oil heater
- ☐ Engine oil temperature

### Fuel system

- ☐ 12 hour sub-base tank (dual wall)
- ☐ 24 hour sub-base tank (dual wall)
- ☐ 473 L (125 gal) sub-base tank (single wall)

### Alternator

- ☐ 105 °C rise
- ☐ 125 °C rise
- ☐ 120/240 V 100 W anti-condensation heater
- ☐ PMG excitation
- ☐ Single phase

### Exhaust system

- ☐ Genset mounted muffler
- ☐ Heavy duty exhaust elbow
- ☐ Slip on exhaust connection

### Generator set

- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Enclosure: aluminum, steel, weather protective or sound attenuated
- ☐ Export box packaging

- ☐ UL 2200 Listed
- ☐ Main line circuit breaker
- ☐ PowerCommand Network Communications Module (NCM)
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ 2 year prime power warranty
- ☐ 2 year standby power warranty
- ☐ 5 year basic power warranty

Note: Some options may not be available on all models - consult factory for availability.

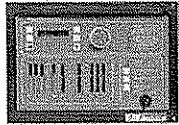
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## Control system PCC 2100



**PowerCommand control** is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LONWORKS® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable LED lamps (5)
- Configurable for local language

### Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

### AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

### Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

### Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

### Options

- ☐ LED bargraph AC data display
- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modicon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☐ Remote annunciator (loose)

For further detail see document S-1409.

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S-1587b (9/08)



## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

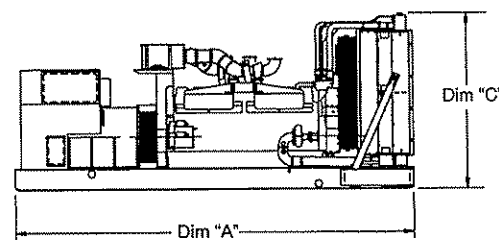
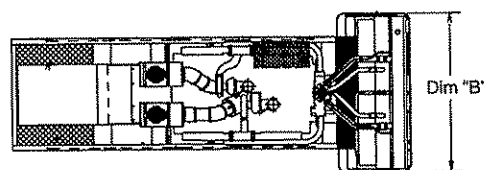
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSHAB	2662 (104.8)	1016 (40.0)	1361 (53.6)		1561 (3442)
DSHAC	2662 (104.8)	1016 (40.0)	1361 (53.6)		1561 (3442)
DSHAD	2667 (105.0)	1016 (40.0)	1372 (54.0)		1469 (3238)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

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Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

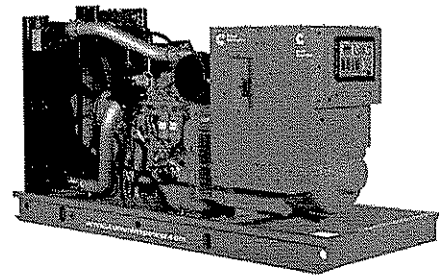
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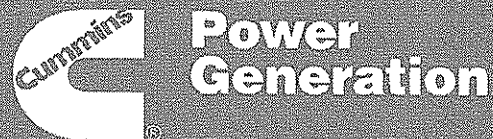


# Diesel generator set QSL9-G3/G5 series engine EPA emissions



> **Specification sheet**  
220 kW - 300 kW standby

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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage.

## U.S. EPA

Engine meets former U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 3 or exhaust emissions from the generator set meet levels formerly defined by U.S. EPA as Tier 1.

## Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent magnet generator (PMG)** - Offers enhanced motor starting and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard cooling package provides reliable running at the rated power level.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>DQDAA</b>	250 (313)	220 (275)	225 (281)	200 (250)			D-3441, 3442	D-3445
<b>DQDAB</b>	275 (344)	250 (313)	250 (313)	227 (284)			D-3443	D-3446
<b>DQDAC</b>	300 (375)	265 (331)	270 (338)	240 (300)			D-3444	D-3447

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.5%
Radio frequency emissions compliance	IEC 801.2 through IEC 801.5; MIL-STD-461C, Part 9

## Engine specifications

Bore	114.0 mm (4.49 in)
Stroke	119.1 mm (4.69 in)
Displacement	8.9 L (543 in <sup>3</sup> )
Configuration	Cast iron, in-line 6 cylinder
Battery capacity	750 amps minimum at ambient temperature of -12 °C (10 °F) and above
Battery charging alternator	70 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel, fuel filter (with water separator), automatic electric fuel shutoff
Fuel filter	
Air cleaner type	
Lube oil filter type(s)	Single spin-on, combination full flow and bypass filters
Standard cooling system	High ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby, 105 °C prime
Exciter type	PMG (Permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz 3-phase				50 Hz 3-phase			
Reconnectable			Non-Reconnectable	Reconnectable			Non-Reconnectable
• 110/190	• 120/208	• 127/220	• 277/480	• 110/190	• 120/208	• 127/220	• 277/480
• 139/240	• 120/240	• 220/380	• 347/600	• 139/240	• 120/240	• 220/380	• 347/600
• 240/416	• 254/440	• 277/480		• 240/416	• 254/440	• 277/480	

Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <input type="checkbox"/> 120/240 V 1500 W coolant heater <input type="checkbox"/> 120/240 V 150 W lube oil heater <input type="checkbox"/> Heavy duty air cleaner <input type="checkbox"/> Engine oil temperature  <b>Control panel</b> <input type="checkbox"/> 120/240 V 100 W control anti-condensation heater <input type="checkbox"/> Exhaust pyrometer <input type="checkbox"/> Ground fault indication <input type="checkbox"/> Remote fault signal package <input type="checkbox"/> Run relay package <input type="checkbox"/> Paralleling configuration	<b>Alternator</b> <input type="checkbox"/> 80 °C rise <input type="checkbox"/> 105 °C rise <input type="checkbox"/> 125 °C rise <input type="checkbox"/> 120/240 V 100 W anti-condensation heater <input type="checkbox"/> PMG excitation <input type="checkbox"/> Single phase  <b>Exhaust system</b> <input type="checkbox"/> Genset mounted muffler <input type="checkbox"/> Heavy duty exhaust elbow <input type="checkbox"/> Slip on exhaust connection <input type="checkbox"/> NPT exhaust connection	<b>Cooling system</b> <input type="checkbox"/> 50 °C ambient  <b>Fuel system</b> <input type="checkbox"/> 12 hour sub-base tank (dual wall) <input type="checkbox"/> 24 hour sub-base tank (dual wall) <input type="checkbox"/> 473 L (125 gal) sub-base tank (single wall)  <b>Generator set</b> <input type="checkbox"/> AC entrance box <input type="checkbox"/> Battery <input type="checkbox"/> Battery charger	<input type="checkbox"/> Export box packaging <input type="checkbox"/> UL 2200 Listed <input type="checkbox"/> Main line circuit breaker <input type="checkbox"/> PowerCommand Network Communications Module (NCM) <input type="checkbox"/> Remote annunciator panel <input type="checkbox"/> Spring isolators <input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated <input type="checkbox"/> 2 year standby power warranty <input type="checkbox"/> 2 year prime power warranty <input type="checkbox"/> 5 year basic power warranty <input type="checkbox"/> 10 year major components warranty
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Note: Some options may not be available on all models - consult factory for availability.

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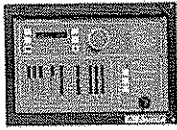
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S-1585a (9/08)



**Power  
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## Control system PCC 2100



**PowerCommand control** is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LonWorks® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable LED lamps (5)
- Configurable for local language

### Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant -start disconnect
- Cranking lockout
- Sensor failure indication

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

### AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history
- Load profile (hours less than 30% and hours more than 90% load)
- System data display (optional with network and other PowerCommand gensets or transfer switches)

### Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

### Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

### Options

- ☐ LED bargraph AC data display
- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modion Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☐ Remote annunciator (loose)

For further detail see document S-1409.

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S-1585a (9/08)



**Power  
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## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

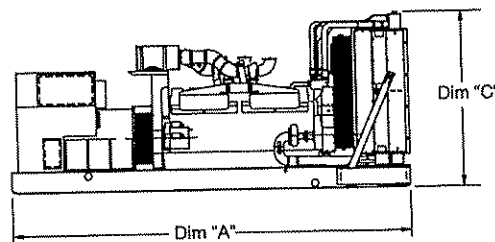
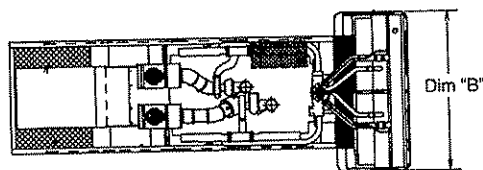
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DQDAA	3023 (119.0)	1270 (50.0)	1676 (66.0)	2184 (4814)	2234 (4926)
DQDAB	3023 (119.0)	1270 (50.0)	1676 (66.0)	2184 (4814)	2234 (4926)
DQDAC	3023 (119.0)	1270 (50.0)	1676 (66.0)	2319 (5113)	2370 (5225)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

### Cummins Power Generation

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Minneapolis, MN 55432 USA  
Telephone: 763 574 5000  
Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

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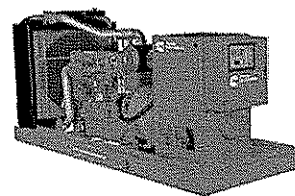
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S-1585a (9/08)





# Diesel generator set QSX15 series engine EPA emissions



> **Specification sheet**  
350 kW - 500 kW standby

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**Power  
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## Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies. The PowerCommand control is Listed to UL 508 - Category NITW7 for U.S. and Canadian usage. Circuit breaker assemblies are UL 489 Listed for 100% continuous operation and also UL 869A Listed Service Equipment.

## U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 89, Tier 2.

## Features

**Cummins® heavy-duty engine** - Rugged 4-cycle, industrial diesel delivers reliable power, low emissions and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

**Permanent magnet generator (PMG)** - Offers enhanced motor starting and fault clearing short-circuit capability.

**Control system** - The PowerCommand® electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

**Cooling system** - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

**Enclosures** - Optional weather protective and sound attenuated enclosures are available.

**Fuel tanks** - Dual wall sub-base fuel tanks are also available.

**NFPA** - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
<b>DFEG</b>	350 (438)		320 (400)				D-3398	
<b>DFEH</b>	400 (500)	352 (440)	350 (438)	320 (400)			D-3399	D-3402
<b>DFEJ</b>	450 (563)	400 (500)	410 (513)	364 (455)			D-3400	D-3403
<b>DFEK</b>	500 (625)	440 (550)	455 (569)	400 (500)			D-3401	D-3404

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S-1582b (1/09)

## Generator set specifications

Governor regulation class	ISO 8528 Part 1 Class G3
Voltage regulation, no load to full load	± 0.5%
Random voltage variation	± 0.5%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	IEC 801.2, Level 4 electrostatic discharge IEC 801.3; Level 3 radiated susceptibility

## Engine specifications

Design	Turbocharged with air-to-air charge air cooling
Bore	136.9 mm (5.39 in)
Stroke	168.9 mm (6.65 in)
Displacement	14.9 L (912.0 in <sup>3</sup> )
Configuration	Cast iron with replaceable wet liners, in-line 6 cylinder
Battery capacity	900 amps minimum at ambient temperature of 0 °C (32 °F)
Battery charging alternator	35 amps
Starting voltage	24 volt, negative ground
Fuel system	Full authority electronic (FAE) Cummins HPI-TP
Fuel filter	
Air cleaner type	
Lube oil filter type(s)	Single spin-on combination full flow and bypass filters
Standard cooling system	40 °C (104 °F) ambient radiator

## Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	PMG (Permanent magnet generator)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower
AC waveform total harmonic distortion	< 5% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 50 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

## Available voltages

60 Hz line-neutral/line-line	50 Hz line-neutral/line-line
<ul style="list-style-type: none"> <li>• 110/190</li> <li>• 110/220</li> <li>• 115/200</li> <li>• 115/230</li> <li>• 120/208</li> <li>• 127/220</li> <li>• 139/240</li> <li>• 220/380</li> <li>• 230/400</li> <li>• 240/416</li> <li>• 255/440</li> <li>• 277/480</li> <li>• 347/600</li> </ul>	<ul style="list-style-type: none"> <li>• 110/190</li> <li>• 110/220</li> <li>• 115/200</li> <li>• 115/230</li> <li>• 120/208</li> <li>• 127/220</li> <li>• 139/240</li> <li>• 220/380</li> <li>• 230/400</li> <li>• 240/415</li> <li>• 255/440</li> </ul>

Note: Consult factory for other voltages.

## Generator set options and accessories

<b>Engine</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)</li> <li><input type="checkbox"/> 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 °C (40 °F)</li> <li><input type="checkbox"/> 120 V 300 W lube oil heater</li> <li><input type="checkbox"/> Heavy duty air cleaner with safety element</li> </ul> <b>Alternator</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 80 °C rise</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> 105 °C rise</li> <li><input type="checkbox"/> 150 °C rise</li> <li><input type="checkbox"/> 120/240 V 300 W anti-condensation heater</li> </ul> <b>Exhaust system</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Critical grade exhaust silencer</li> <li><input type="checkbox"/> Exhaust packages</li> <li><input type="checkbox"/> Industrial grade exhaust silencer</li> <li><input type="checkbox"/> Residential grade exhaust silencer</li> </ul> <b>Fuel system - 60 Hz</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 1136 L (300 gal) sub-base tank</li> <li><input type="checkbox"/> 1514 L (400 gal) sub-base tank</li> <li><input type="checkbox"/> 1893 L (500 gal) sub-base tank</li> <li><input type="checkbox"/> 2271 L (600 gal) sub-base tank</li> <li><input type="checkbox"/> 2498 L (660 gal) sub-base tank</li> <li><input type="checkbox"/> 3218 L (850 gal) sub-base tank</li> <li><input type="checkbox"/> 6435 L (1700 gal) sub-base tank</li> </ul>	<b>Fuel system - 50 Hz</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 155 L (41 gal) in-skid day tank (dual wall)</li> <li><input type="checkbox"/> 208 L (55 gal) in-skid day tank (single wall)</li> <li><input type="checkbox"/> 1595 L (425 gal) sub-base tank</li> <li><input type="checkbox"/> 3191 L (850 gal) sub-base tank</li> </ul> <b>Cooling system</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> High ambient 50 °C radiator</li> </ul> <b>Control panel</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> 120/240 V 100 W control anti-condensation heater</li> <li><input type="checkbox"/> Ground fault indication</li> <li><input type="checkbox"/> Power transfer control</li> <li><input type="checkbox"/> Remote fault signal package</li> <li><input type="checkbox"/> Run relay package</li> </ul>	<b>Generator set</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> AC entrance box</li> <li><input type="checkbox"/> Battery</li> <li><input type="checkbox"/> Battery charger</li> <li><input type="checkbox"/> Export box packaging</li> <li><input type="checkbox"/> UL 2200 Listed</li> <li><input type="checkbox"/> Main line circuit breaker</li> <li><input type="checkbox"/> Paralleling accessories</li> <li><input type="checkbox"/> Remote annunciator panel</li> <li><input type="checkbox"/> Spring isolators</li> <li><input type="checkbox"/> Enclosure: aluminum, steel, weather protective or sound attenuated</li> <li><input type="checkbox"/> 2 year standby power warranty</li> <li><input type="checkbox"/> 2 year prime power warranty</li> <li><input type="checkbox"/> 5 year basic power warranty</li> <li><input type="checkbox"/> 10 year major components warranty</li> </ul>
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Note: Some options may not be available on all models - consult factory for availability.

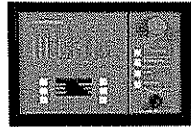
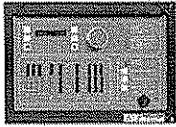
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S-1582b (1/09)



## Control system PCC 2100 or PCC 3201



**PowerCommand control** is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface functions. Major features include:

- Integral AmpSentry™ Protective Relay providing a full range of alternator protection functions that are matched to the alternator provided.
- Battery monitoring and testing features and smart starting control system.
- Three phase sensing, full wave rectified voltage regulation system, with a PWM output for stable operation with all load types.
- Standard PCCNet™ and optional Echelon® LONWORKS® network interface.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

### Operator/display panel

- Off/manual/auto mode switch
- Manual run/stop switch
- Panel lamp test switch
- Emergency stop switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments
- LED lamps indicating genset running, not in auto, common warning, common shutdown
- Configurable for local language

### Engine protection

- Overspeed shut down
- Low oil pressure warning and shut down
- High coolant temperature warning and shut down
- High oil temperature warning (some models)
- Low coolant level warning or shut down
- Low coolant temperature warning
- High and low battery voltage warning
- Weak battery warning
- Dead battery shut down
- Fail to start (overcrank) shut down
- Fail to crank shut down
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication

### Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Lube oil temperature (some models)
- Engine speed

### AmpSentry AC protection

- Over current and short-circuit shut down
- Over current warning
- Single and three phase fault regulation
- Over and under voltage shut down
- Over and under frequency shut down
- Overload warning with alarm contact
- Reverse power and reverse Var shut down
- Excitation fault

### Alternator data

- Line-to-line and line-to-neutral AC volts
- Three phase AC current
- Frequency
- Total and individual phase power factor, kW and kVA

### Other data

- Genset model data
- Start attempts, starts, running hours
- kW hours (total and since reset)
- Fault history

### Governing

- Digital electronic isochronous governor
- Temperature dynamic governing
- Smart idle speed mode
- Glow plug control (some models)

### Voltage regulation

- Digital PWM electronic voltage regulation
- Three phase line-to-neutral sensing
- Suitable for PMG or shunt excitation
- Single and three phase fault regulation
- Configurable torque matching

### Control functions

- Data logging on faults
- Fault simulation (requires InPower)
- Time delay start and cooldown
- Cycle cranking
- Configurable customer inputs (4)
- Configurable customer outputs (4)
- Configurable network inputs (8) and outputs (16) (with optional network)
- Remote emergency stop

### Paralleling (Option)

- Active digital phase lock loop synchronizer
- Isochronous kW and kVar load sharing controls
- kW import/export and kVar/PF control for utility (mains) paralleling

### Options

- ☐ PCC 3201 paralleling control
- ☐ LED bargraph AC data display
- ☐ Thermostatically controlled space heater
- ☐ Key-type mode switch
- ☐ Ground fault module
- ☐ Auxiliary relays (3)
- ☐ Echelon LONWORKS interface
- ☐ Modicon Gateway to convert to Modbus (loose)
- ☐ PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- ☐ Digital input and output module(s) (loose)
- ☐ Remote annunciator (loose)

For further detail on PCC 2100 see document S-1409.

For further detail on PCC 3201 see document S-1444.

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**Power  
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## Ratings definitions

### Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Limited-time running power (LTP):

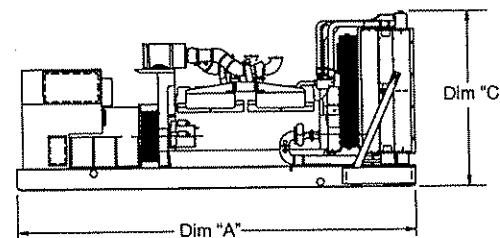
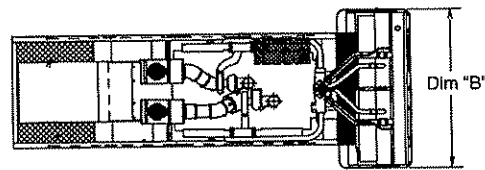
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

### Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

### Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

**Do not use for installation design**

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
<b>DFEG</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	3856 (8500)	3992 (8800)
<b>DFEH</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	3856 (8500)	3992 (8800)
<b>DFEJ</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	4082 (9000)	4218 (9300)
<b>DFEK</b>	3864 (152.1)	1524 (60.0)	1812 (71.3)	4309 (9500)	4445 (9800)

\* Weights represent a set with standard features. See outline drawings for weights of other configurations.

### Cummins Power Generation

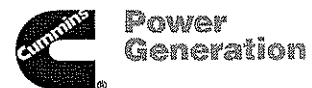
1400 73<sup>rd</sup> Avenue N.E.  
Minneapolis, MN 55432 USA  
Telephone: 763 574 5000  
Fax: 763 574 5298

**Warning:** Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

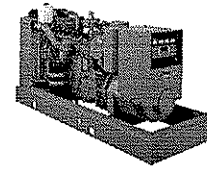
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S-1582b (1/09)



# Gaseous Fuel Generator Set QSK19G Engine Series



- **Specification Sheet**  
**Model GFEB EPA SI NSPS Compliant Capable**



KW(KVA) @ 0.8 P.F.	
Compression Ratio	60 HZ-1800 RPM
Ratio	Standby
8.5:1 (note 1)	350 (437)

Notes:  
(1) 54°C (130°F) or lower water temperature to the aftercooler

NOTE: This engine is EPA compliant capable. A site validation emission test must be performed to EPA requirements

Fuel Application Guide	
Compression Ratio	8.5:1
Dry Processed Natural Gas	Yes
Propane (HD-5)	N/A
All gases such as field gas, digester and sewage gas will require an analysis of the specified gas and pre-approval from CNGE. Consult your Cummins Distributor for details.	

## Description

The Cummins NPower GF-series commercial generator set is a fully integrated power generation system providing optimum performance, reliability, and versatility for stationary standby or prime power applications.

A primary feature of the GF GenSet is strong motor-starting capability and fast recovery from transient load changes. The torque-matched system includes a heavy-duty Cummins 4-cycle spark ignited engine, an AC alternator with high motor-starting kVA capacity, and an electronic voltage regulator with three phase sensing for precise regulation under steady-state or transient loads. The GF GenSet accepts 75% of the nameplate standby rating in one step. \*

The standard PowerCommand® digital electronic control is an integrated system that combines engine and alternator controls for high reliability and optimum GenSet performance.

Optional weather-protective housings and coolant heaters shield the generator set from extreme operating conditions. Environmental concerns are addressed by low exhaust emission engines, sound-attenuated housings, and exhaust silencers. A wide range of options, accessories, and services are available, allowing configuration to your specific power generation needs.

Every production unit is factory tested at rated load and power factor. This testing includes demonstration of rated power and single-step rated load pickup. Cummins NPower manufacturing facilities include quality standards, emphasizing our commitment to high quality in the design, manufacture, and support of our products. The generator is CSA certified. The PowerCommand control is UL508 Listed.

All Cummins NPower generator sets are backed by a comprehensive warranty program and supported by a worldwide network of 170 distributors and service branches to assist with warranty, service, parts, and planned maintenance support.

## Features

**Cummins Heavy-Duty Engine** - Rugged 4-cycle industrial spark ignited engine delivers reliable power, low emissions, and fast response to load changes.

**Alternator** - Several alternator sizes offer selectable motor-starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads, fault-clearing short-circuit capability, and class H insulation. The alternator electrical insulation system is UL1446 Recognized.

**Control Systems** - The PowerCommand electronic control is standard equipment and provides total genset system integration, including automatic remote starting/stopping, precise voltage regulation, alarm and status message display, AmpSentry™ protection, output metering, auto-shutdown at fault detection, and NFPA 110 compliance. PowerCommand control is Listed to UL508.

**Cooling System** - Standard cooling package provides reliable running at the rated power level, at up to 100°F ambient temperature.

**Housings** - Optional weather-protective housings are available.

**Certifications** - Generators are designed, manufactured, tested, and certified to relevant UL, NFPA, ISO, IEC, and CSA standards.

**Warranty and Service** - Backed by a comprehensive warranty and worldwide distributor service network.

\*Adequate fuel pressure and volume must be provided. Engines must be equipped with a functioning jacket water heater.

# Generator Set

The general specifications provide representative configuration details. Consult the outline drawing for installation design.

## Specifications – General

See outline drawing for installation design specifications.

Unit Width, in (mm)	66" (1676) Open set
Unit Height, in (mm)	80" (2032) Open set
Unit Length, in (mm)	147" (3734) Open set
Unit Dry Weight, lb (kg)	14,280 lbs (6477)
Rated Speed, rpm	1800
Voltage Regulation, No Load to Full Load	±1.0%
Random Voltage Variation	±1.0%
Frequency Regulation	5%
Random Frequency Variation	±0.5%
Radio Frequency Interference	Optional PMG excitation operates in compliance with BS800 and VDE level G and N. Addition of RFI protection kit allows operation per MIL-STD-461 and VDE level K.

## Rating Definitions

**Standby Rating based on:** Applicable for supplying emergency power for the duration of normal power interruption. No sustained overload capability is available for this rating. (Equivalent to Fuel Stop Power in accordance with ISO3046, AS2789, DIN6271 and BS5514). Nominally rated.

## Site Derating Factors

Engine power available up to 3000' (m) at ambient temperatures up to 100°F. Above 3000' (m) derate at 4% per 1000 ft (305 m), and 1% per 10°F (2% per 11°C) above 100°F.

1) Data represents gross engine performance capabilities obtained and corrected in accordance with SAEJ1349 conditions of 29.61 in. Hg.(100KPa) barometric pressure [300 ft. (91m) altitude], 77°F (25°C) inlet air temperature, and 0.30 in Hg.(100KPa) water vapor pressure using dry processed natural gas fuel with 905 BTU per standard cubic foot (33.72 kJ/l) lower heating value. Deration may be required due to altitude, temperature or type of fuel. Consult your local Cummins Distributor for details.

### 2) FUEL SYSTEM

Standard Carburetor – IMPCO Make	
Low Pressure Dry Processed Natural Gas – ( 905 BTU/ft. <sup>3</sup> L.H.V.)	
Running Pressure to Carburetor (After Regulation) – in. H <sub>2</sub> O (mm H <sub>2</sub> O) .....	5 ~ 7 (127~177)
Running Pressure to Engine Mounted Regulator ~ in. H <sub>2</sub> O (mm H <sub>2</sub> O) .....	10 ~ 20 (254 ~ 508)
Minimum Gas Supply Pipe Size @ Engine – in. (mm).....	2.0 (50.8)
Gas Supply Filter Pressure Rating – PSI (kPa).....	100 (690)

The preceding pipe sizes are only suggestions and piping may vary with temperatures, distance from fuel supply and application of local codes. Gas must be available at adequate volume and pressure for engine at the regulator.

## Engine

Cummins heavy-duty spark ignited engines use advanced combustion technology for reliable and stable power, low emissions, and fast response to sudden load changes.

Electronic governing is standard for applications requiring constant (isochronous) frequency regulation such as Uninterruptible Power Supply (UPS) systems, non-linear loads, or sensitive electronic loads. Optional coolant heaters are recommended for all emergency standby installations or for any application requiring fast load acceptance after start-up.

### Specifications – Engine

<b>Base Engine</b>	Cummins Model QSK19G
<b>Displacement in<sup>3</sup> (L)</b>	1150 (19)
<b>Overspeed Limit, rpm</b>	2100
<b>Regenerative Power, kW</b>	-
<b>Cylinder Block Configuration</b>	Cast iron with replaceable wet cylinder liners
<b>Cranking Current</b>	550 amps at ambient temperature of 32 °F (0 °C)
<b>Battery Charging Alternator</b>	37 amps
<b>Starting Voltage</b>	24-volt, negative ground
<b>Lube Oil Filter Types</b>	Single spin-on canister-combination full flow with bypass
<b>Standard Cooling System</b>	100°F ambient radiator

Fuel		STANDBY		
Fuel Consumption	Load	1/2	3/4	Full
(Approximate)	kW	175	263	350
	CFH	2560	3588	4615
<b>Cooling</b>				
Heat Rejection to Coolant*		10900 BTU/min	13847 BTU/min	16573 BTU/min
Heat Rejection to Room		1545 BTU/min	2165 BTU/min	2785 BTU/min
Coolant Capacity (with radiator)*		20 gal		
Coolant Flow Rate*		139 GPM		
Maximum Coolant Friction Head*		5 psi		
Maximum Coolant Static Head*		60 ft		
Radiator Fan Load		35 hp		
<b>Air</b>				
Combustion Air		644 CFM	924 CFM	1219 CFM
Maximum Air Cleaner Restriction		TBD		
Alternator Cooling Air		2202 CFM		
Radiator Cooling Air		36,000 CFM		
Maximum Restriction at		0.5 in		
Radiator Discharge (static)		water		
<b>Exhaust</b>				
Gas Flow (Full Load)		3120 CFM		
Gas Temperature		1286 °F		
Maximum Back Pressure		2 in Hg		
<b>Engine</b>				
Gross Engine Power Output		265 hp	398 hp	530 hp
BMEP		TBD		
Piston Speed		TBD		

\* Jacket water only. Contact factory for aftercooler heat rejections and coolant flows

## Alternator

Several alternators are available for application flexibility based on the required motor-starting kVA and other requirements. Larger alternator sizes have lower temperature rise for longer life of the alternator insulation system. In addition, larger alternator sizes can provide a cost-effective use of engine power in across-the-line motor-starting applications and can be used to minimize voltage waveform distortion caused by non-linear loads.

Single-bearing alternators couple directly to the engine flywheel with flexible discs for drivetrain reliability and durability. No gear reducers or speed changers are used. Two-thirds pitch windings eliminate third-order harmonic content of the AC voltage waveform and provide the standardization desired for paralleling of generator sets. The standard excitation system is a self (shunt) excited system with the voltage regulator powered directly from the generator set output.

## Alternator Application Notes

**Separately Excited Permanent Magnet Generator (PMG) System** - This option uses an integral PMG to supply power to the voltage regulator. A PMG system generally has better motor-starting performance, lower voltage dip upon load application, and better immunity from problems with harmonics in the main alternator output induced by non-linear loads. This option is recommended for use in applications that have large transient loads, sensitive electronic loads (especially UPS applications), harmonic content, or that require sustained short-circuit current (sustained 3-phase short circuit current at approximately 3 times rated for 10 seconds).

**Alternator Sizes** - On any given model, various alternator sizes are available to meet individual application needs. Alternator sizes are differentiated by maximum winding temperature rise, at the generator set standby or prime rating, when operated in a 40°C ambient environment. Available temperature rises range from 80°C to 150°C. Not all temperature rise selections are available on all models. Lower temperature rise is accomplished using larger alternators at lower current density. Lower temperature rise alternators have higher motor-starting kVA, lower voltage dip upon load application, and they are generally recommended to limit voltage distortion and heating due to harmonics induced by non-linear loads.

Alternator Space Heater - is recommended to inhibit condensation.

## Available Output Voltages

<u>Three Phase Reconnectable</u>	<u>Single Phase Non-Reconnectable</u>	<u>Three Phase Non-Reconnectable</u>
<input type="checkbox"/> 120/208	<input type="checkbox"/> 120/240	<input type="checkbox"/> 220/380
<input type="checkbox"/> 127/220		<input type="checkbox"/> 347/600
<input type="checkbox"/> 139/240		
<input type="checkbox"/> 120/240		
<input type="checkbox"/> 240/416		
<input type="checkbox"/> 254/440		
<input type="checkbox"/> 277/480		



## Specifications – Alternator

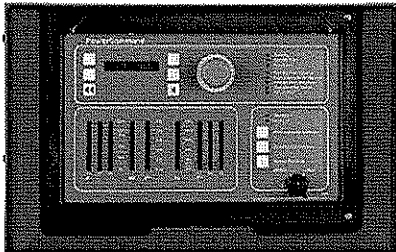
<b>Design</b>	Brushless, 4-pole, drip-proof revolving field
<b>Stator</b>	2/3 pitch
<b>Rotor</b>	Direct-coupled by flexible disc
<b>Insulation System</b>	Class H per NEMA MG1-1.65
<b>Standard Temperature Rise</b>	125°C standby
<b>Exciter Type</b>	PMG
<b>Phase Rotation</b>	A (U), B (V), C (W)
<b>Alternator Cooling</b>	Direct-drive centrifugal blower
<b>AC Waveform Total Harmonic Distortion</b>	<5% total no load to full linear load <3% for any single harmonic
<b>Telephone Influence Factor (TIF)</b>	<50 per NEMA MG1-22.43.
<b>Telephone Harmonic Factor (THF)</b>	<3

	80 °C Alternator			105 °C Alternator			125 °C Alternator		
<b>Voltage Ranges</b> The broad range alternator can supply single phase output up to 2/3 of the set rated 3-phase kW at 1.0 power factor	110/190 thru 139/240 220/380 Thru 277/480 120/240*	347/600		110/190 thru 139/240 220/380 Thru 277/480 120/240	347/600		110/190 Thru 139/240 220/380 Thru 277/480 120/240*	120/208 Thru 139/240 240/416 Thru 277/480 120/240*	277/480 347/600
<b>Motor Starting</b> Maximum kVA (90% Sustained Voltage)	<u>Broad Range</u> <u>600 V</u>			<u>Broad Range</u> <u>600V</u>			<u>Broad Range</u> <u>480V</u> <u>600V</u>		
	1896	1749		1749	1749		1372	1372	1372
<b>Alternator Data Sheet Numbers</b>	306	305		305	305		304	304	304
<b>Full Load Current (Amps @ Standby Rating)</b>	<u>120/208</u> 1214	<u>127/220</u> 1148		<u>139/240</u> 1052	<u>220/380</u> 665	<u>240/416</u> 607	<u>254/440</u> 547	<u>277/480</u> 526	<u>347/600</u> 421

### Notes:

1. The broad range alternators can supply single phase output up to 2/3 set rated 3-phase kW at 1.0 power factor.
2. The extended stack (full single phase output) and 4 lead alternators can supply single phase output up to full set rated 3-phase kW at 1.0 power factor.

## Control System

	<b>PowerCommand Control with AmpSentry™ Protection</b> <ul style="list-style-type: none"><li>• The PowerCommand Control is an integrated generator set control system providing governing, voltage regulation, engine protection, and operator interface functions.</li><li>• PowerCommand Controls include integral AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided.</li><li>• Controls provided include Battery monitoring and testing features, and Smart-Starting control system.</li><li>• InPower PC-based service tool available for detailed diagnostics.</li><li>• Available with Echelon LonWorks™ network interface.</li><li>• NEMA 3R enclosure.</li><li>• Suitable for operation in ambient temperatures from -40C to +70C, and altitudes to 13,000 feet (5000 meters).</li><li>• Prototype tested; UL, CSA, and CE compliant.</li></ul>	
<b>AmpSentry AC Protection</b> <ul style="list-style-type: none"><li>• Overcurrent and short circuit shutdown</li><li>• Overcurrent warning</li><li>• Single &amp; 3-phase fault regulation</li><li>• Over and under voltage shutdown</li><li>• Over and under frequency shutdown</li><li>• Overload warning with alarm contact</li><li>• Reverse power and reverse Var shutdown</li><li>• Excitation fault</li></ul>	<b>Engine Protection</b> <ul style="list-style-type: none"><li>• Overspeed shutdown</li><li>• Low oil pressure warning and shutdown</li><li>• High coolant temperature warning and shutdown</li><li>• High oil temperature warning (optional)</li><li>• Low coolant level warning or shutdown</li><li>• Low coolant temperature warning</li><li>• High and low battery voltage warning</li><li>• Weak battery warning</li><li>• Dead battery shutdown</li><li>• Fail to start (overcrank) shutdown</li><li>• Fail to crank shutdown</li><li>• Redundant start disconnect</li><li>• Cranking lockout</li><li>• Sensor failure indication</li></ul>	<b>Operator Interface</b> <ul style="list-style-type: none"><li>• OFF/MANUAL/AUTO mode switch</li><li>• MANUAL RUN/STOP switch</li><li>• Panel lamp test switch</li><li>• Emergency Stop switch</li><li>• Alpha-numeric display with pushbutton access, for viewing engine and alternator data and providing setup, controls, and adjustments</li><li>• LED lamps indicating genset running, not in auto, common warning, common shutdown</li><li>• (5) configurable LED lamps</li><li>• LED Bargraph AC data display (optional)</li></ul>
<b>Alternator Data</b> <ul style="list-style-type: none"><li>• Line-to-line and line-to-neutral AC volts</li><li>• 3-phase AC current</li><li>• Frequency</li><li>• Total and individual phase kW and kVA</li></ul>	<b>Engine Data</b> <ul style="list-style-type: none"><li>• DC voltage</li><li>• Lube oil pressure</li><li>• Coolant temperature</li><li>• Lube oil temperature (optional)</li></ul>	<b>Other Data</b> <ul style="list-style-type: none"><li>• Genset model data</li><li>• Start attempts, starts, running hours</li><li>• KW hours (total and since reset)</li><li>• Fault history</li><li>• Load profile (hours less than 30% and hours more than 90% load)</li><li>• System data display (optional with network and other PowerCommand gensets or transfer switches)</li></ul>
	<b>Voltage Regulation</b> <ul style="list-style-type: none"><li>• Integrated digital electronic voltage regulator</li><li>• 3-phase line to neutral sensing</li><li>• PMG (Optional)</li><li>• Single and three phase fault regulation</li><li>• Configurable torque matching</li></ul>	<b>Control Functions</b> <ul style="list-style-type: none"><li>• Data logging on faults</li><li>• Fault simulation (requires InPower)</li><li>• Time delay start and cooldown</li><li>• Cycle cranking</li><li>• (4) Configurable customer inputs</li><li>• (4) Configurable customer outputs</li><li>• (8) Configurable network inputs and (16) outputs (with optional network)</li></ul>
<b>Options</b>		
<input type="checkbox"/> Power Transfer Control <input type="checkbox"/> Analog AC Meter Display <input type="checkbox"/> Thermostatically Controlled Space Heater	<input type="checkbox"/> Key-type mode switch <input type="checkbox"/> Ground fault module <input type="checkbox"/> Engine oil temperature <input type="checkbox"/> Auxiliary Relays (3)	<input type="checkbox"/> Echelon LonWorks interface <input type="checkbox"/> Digital input and output module(s) (loose) <input type="checkbox"/> Remote annunciator (loose)

## Generator Set Options

### Engine

- ☐ 120/240 V, W coolant heaters
- ☐ 120/240 V, W lube oil heater
- ☐ Electronic governor

### Cooling System

- ☐ Heat exchanger cooling
- ☐ Remote radiator cooling

### Fuel System

- ☐ Flexible fuel connector
- ☐ Fuel strainer
- ☐ Dual fuel systems

### Alternator

- ☐ 105°C rise alternator
- ☐ 125°C rise alternator
- ☐ 120/240 V, 100 W anti-condensation heater
- ☐ Single phase

### Exhaust System

- ☐ GenSet mounted muffler
- ☐ Heavy duty exhaust elbow
- ☐ Slip on exhaust connection

### Generator Set

- ☐ AC entrance box
- ☐ Batteries
- ☐ Battery charger
- ☐ Export box packaging
- ☐ Main line circuit breaker
- ☐ PowerCommand Network Communication Module (NCM)
- ☐ Stage 1 housing w/silencer
- ☐ Stage II housing w/silencer
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ Weather protective enclosure with silencer
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty

## Available Products and Services

A wide range of products and services is available to match your power generation system requirements. Cummins Power Generation products and services include:

- Diesel and Spark-Ignited Generator Sets
- Transfer Switches
- Bypass Switches
- Parallel Load Transfer Equipment
- Digital Paralleling Switchgear
- PowerCommand Network and Software
- Distributor Application Support
- Planned Maintenance Agreements

## Warranty

All components and subsystems are covered by an express limited one-year warranty. Other optional and extended factory warranties and local distributor maintenance agreements are available. Contact your distributor/dealer for more information.

## Certifications



**CSA** - This generator is CSA certified to product class 4215-01.



**PTS** - The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Products bearing the PTS symbol have been subjected to demanding tests in accordance to NFPA 110 to verify the design integrity and performance under both normal and abnormal operating conditions including short circuit, endurance, temperature rise, torsional vibration, and transient response, including full load pickup.

**See your distributor for more information**



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AmpSentry is a trademark of Cummins Inc.  
LonWorks is a registered trademark of Echelon

**Important:** Backfeed to a utility system can cause electrocution and/or property damage. Do not connect generator sets to any building electrical system except through an approved device or after building main switch is open.



INNOVATORS AND MANUFACTURERS OF TRANSPORTATION

## **MGS UL-142 Listed Generator Base Tank Specification**

- 1) The generator base tank shall be manufactured by MGS Incorporated or approved subcontractor and be a UL-142 approved double wall design constructed in accordance with Flammable and Combustible Liquids Code, NFPA 30; The Standard for Installation and use of Stationary Combustible Engine and Gas Turbines, NFPA 37; and The Standard for Emergency and Standby Power Systems, NFPA 110.
- 2) The tank design shall be either a Secondary Containment Generator Base Tank or Closed Top Dike Generator Base Tank. It shall be of double wall construction having a primary tank to contain the diesel fuel, held within another tank or dike which is intended to collect and contain any accidental leakage from the primary fuel tank. The completed base tank assembly is to incorporate generator mounting locations and must be able to support four times the rated load.
- 3) The primary tank shall be designed to withstand normal and emergency internal pressures and external loads. It shall be capable of withstanding internal air pressures of 3 to 5 psig without showing signs of excessive or permanent distortion and 25 psig hydrostatic pressure without evidence of rupture or leakage. The outer tank of the Secondary Containment Generator Base Tank must also be able to withstand internal air pressures of 3 to 5 psig without evidence of rupture or leakage.
- 4) The primary and secondary tanks or dike shall have venting provisions to prevent the development of vacuum or pressure capable of distorting them as a result of the atmospheric temperature changes or while emptying or filling. The vent shall also permit the relief of internal pressures caused by exposure to fires. The vent size shall be determined by using the calculated wetted surface area in square feet (the top is excluded) in conjunction with venting capacity table 10.1 of UL-142. The tanks's vent shall also be equipped with a coupling device and shall be located to facilitate connection to a vent piping system. The dike's vent may be an opening for venting directly to the atmosphere and protection from the entrance of natural elements or debris shall be provided.
- 5) The primary tank is to be constructed of 7 gauge ASTM A569 or A-36 hot rolled steel. Internal baffles or reinforcement plates shall be located on a maximum of 24 inch centers in tanks up to 60 inch width and on a maximum of 19.5 inch centers in tanks over 60 inch width. At least one baffle shall separate the fuel suction pipe from the fuel return line.
- 6) The outer tank is to be constructed in a manner to be able to support four times the wet load of the generator and housing. All of the load is to be carried by the outer tank so no load or vibration stress is placed on the primary tank. If the generator base tank is wider than the generator set to be supported, structural rails are to be incorporated to span the width of the base tank so that the load is transferred to the side rails of the tank. Vertical reinforcements shall be welded to the outer sides of the secondary tank or dike at a maximum of 45 inch centers on tanks up to 30 inches high and on 24 inch centers on tanks greater than 30 inches high. At least one vertical reinforcement shall be positioned adjacent to each mounting hole location.

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INNOVATORS AND MANUFACTURERS OF TRANSPORTATION

## **MGS UL-142 Listed Generator Base Tank Specification**

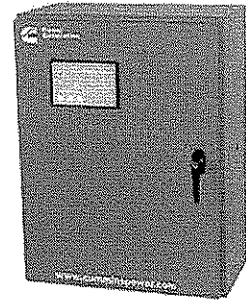
- 7) Both primary and secondary tanks shall be fitted with the proper welded pipe fittings to accommodate the requirements for the fill port and normal and emergency venting.
- 8) The completed assembly is to be cleaned with a heated pressure wash followed by a chromium free post treatment to ensure proper paint adhesion. The tank assembly is to be painted with an epoxy ester primer and high quality polyurethane enamel with total paint thickness of 3.5 mils. The painted tank assembly is to be baked at 180 degrees for 30 minutes to provide a hard durable finish.
- 9) Manufacturing and testing of this system shall be performed within the scope of Underwriters Laboratories, Inc. "Standard for Safety UL 142." A UL label shall be permanently attached to the tank system showing the following information:
  - The registered UL mark and the name: Underwriters Laboratories, Inc.
  - A control number and the word "listed"
  - The product's name as identified by Underwriters Laboratories Inc.
  - The serial number assigned by Underwriters Laboratories, Inc.
  - Other manufacturer's information may also be included.

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Subj: **Fw: WV State Bid**  
Date: 4/6/2010 2:27:10 P.M. Eastern Daylight Time  
From: [larry.w.cupit@cummins.com](mailto:larry.w.cupit@cummins.com)  
To: [michelin5@aol.com](mailto:michelin5@aol.com), [jkuhn@easternelectricllc.com](mailto:jkuhn@easternelectricllc.com), [patsmith@masterservicema.com](mailto:patsmith@masterservicema.com)

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Cell 304-389-3764

# Transfer switch OTEC open or delayed transition



## > Specification sheet

40 - 1000 Amp

Our energy working for you.™



## Power Generation

### Description

OTEC transfer switches are designed for operation and switching of electrical loads between primary power and standby generator sets. They are suitable for use in emergency, legally required, and optional standby applications. The switches monitor both power sources, signal generator set startup, automatically transfer power, and return the load to the primary power source once a stable utility is available.



All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.



All switches are certified to CSA 282 Emergency Electrical Power Supply for Buildings, up to 600 VAC.

### NEC

Equipment shall be suitable for use in systems compliant to 700, 701 and 702.



All switches comply with NFPA 70, 99 and 110.



All switches comply with NEMA ICS 10.



All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.



This transfer switch is designed and manufactured in facilities certified to ISO9001.

### Features

**PowerCommand® control** - A standard, fully featured microprocessor-based control. Software-enabled features, settings, and adjustments are available for ease of setup and accuracy.

**Advanced transfer switch mechanism** - Unique bi-directional linear actuator provides virtually friction-free, constant force, straight-line transfer switch action during automatic operation.

**Manual operation** - Manual operating handles, shielded termination, and over-center type contact mechanisms allow effective, manual operation, under de-energized conditions.

**Positive interlocking** - Mechanical and electrical interlocking prevent source-to-source connection through the power or control wiring.

**Main contacts** - Heavy-duty silver alloy contacts with separate arcing surfaces and multi-leaf arc chutes are rated for total system transfer including overload interruption.

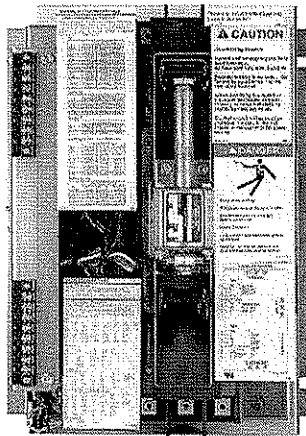
**Easy service/access** - Plug connections, door-mounted controls, ample access space, and compatible terminal markings. The control is field programmable.

**Product lines, accessories and services** - Cummins Power Generation offers a wide range of accessories and services to suit your requirements.

**Warranty and service** - Backed by a comprehensive warranty and worldwide distributor network.



## Transfer switch mechanism



- A bi-directional linear motor actuator powers OTEC Transfer Switches. This design provides virtually friction-free, constant force, straight-line transfer switch action with no complex gears or linkages.
- Independent break-before-make action is used for both 3-pole and 4-pole/switched neutral switches. On 3-pole/switched neutral switches, this action also prevents the objectionable ground currents and nuisance ground fault tripping that can result from overlapping designs.
- A mechanical interlock prevents simultaneous closing of normal and emergency contacts.
- Electrical interlocks prevent simultaneous closing signals to normal and emergency contacts and interconnection of normal and emergency sources through the control wiring.
- Long-life, high pressure, silver alloy contacts resist burning and pitting. Separate arcing surfaces further protect the main contacts. Contacts are mechanically held in both normal and emergency positions for reliable, quiet operation.
- Superior arc interruption is accomplished through multiple leaf arc chutes that cool and quench the arcs. Barriers separate the phases and prevent inter-phase flashover

## Specifications

<b>Voltage rating</b>	Transfer switches rated from 40 A through 1000 A are rated up to 600 VAC, 50 or 60 Hz.
<b>Arc interruption</b>	Multiple leaf arc chutes cool and quench the arcs. Barriers prevent interphase flashover.
<b>Neutral bar</b>	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
<b>Auxiliary contacts</b>	Two contacts (one for each source) are provided for customer use. Wired to terminal block for easy access. Rated at 10A continuous and 250 VAC maximum.
<b>Operating temperature</b>	-22 °F (-30 °C) to 140 °F (60 °C)
<b>Storage temperature</b>	-40 °F (-40 °C) to 140 °F (60 °C)
<b>Humidity</b>	Up to 95% relative, non-condensing
<b>Altitude</b>	Up to 10,000 ft (3,000 m) without derating
<b>Total transfer time (source-to-source)</b>	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without delayed transition enabled.
<b>Manual operation handles</b>	Transfer switches are equipped with permanently attached operating handles and quick-break, quick-make contact mechanisms suitable for manual operation under de-energized conditions.

**Open transition** - The OTEC automatic transfer switch, equipped with In-phase monitor, determines when to transfer the load from one source to another. The switch contacts operate in a break-before-make sequence. The Open Transfer OTEC is field-configurable for delayed transition below 1000 amps.

**Delayed (programmed) transition** - The OTEC is also available as a programmed (delayed) transition transfer switch. The delayed transition OTEC completely disconnects the load from both sources for an adjustable period of time to allow regenerative voltage to decay to a safe level prior to connecting to the new source. By allowing motor fields to decay, nuisance tripping breakers and load damage are prevented. Delayed transition transfer is recommended by NEMA MG-1.

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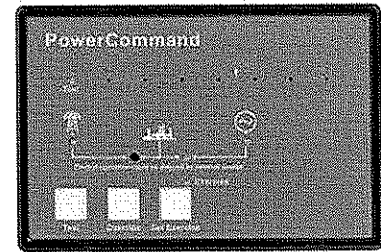
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## PowerCommand® microprocessor control

- Simple, easy-to-use control provides transfer switch information and operator controls
- LED lamps for source availability and source connected indication, exercise mode, and test mode. LED status lamps also provided for control set-up and configuration.
- Control pushbuttons to initiate test, override time delays, and set exercise time.
- Field-configurable for in-phase or delayed (programmed) transition.
- Integral exerciser clock
- Control is prototype-tested to withstand voltage surges per EN 60947-6-1.
- Gold-flashed generator start contacts



### Control functions

**Voltage sensing:** All phases on the normal source and single phase on generator source. Normal Source Pickup: adjustable 90-95%, Dropout: adjustable 70-90% of nominal voltage; Generator Source Pickup: 90%, dropout: 75% of nominal voltage.

**Frequency sensing:** Generator Source Pickup: 90% of nominal frequency; Dropout: 75% of nominal frequency.

**Operating modes:** Open transition with programmed transition (adjustable 0-10 seconds); Open transition with in-phase monitor and delayed transition backup; Exercise mode; and Test mode.

**In-phase:** Configurable for initiation of transfer functions when sources are in phase, and including ability to enable a programmed transition backup to the function so that if sources are not in-phase within 120 seconds the system will retransfer with programmed transition function.

**Exerciser clock:** Switch is furnished with an integral engine exerciser configurable for operation on a 7, 14, 21, or 28-day cycle with a fixed exercise period duration of 20 minutes. A 12-hr exerciser time offset allows for the convenient setting of exercise time without the need to activate the timer at the exact time that you need to schedule the generator exercise for. Software selectable capability allows for the exercising of the generator with or without load.

### Time-delay functions

**Engine start:** Prevents nuisance genset starts due to momentary power system variation or loss. Adjustable: 0-10 seconds; default: 3 seconds.

**Transfer normal to emergency:** Allows genset to stabilize before application of load. Prevents power interruption if normal source variation or loss is momentary. Allows staggered transfer of loads in multiple transfer switch systems. Adjustable 0-300 seconds, default 5 seconds.

**Retransfer emergency to normal:** Allows the utility to stabilize before retransfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. Adjustable 0-30 minutes, default 10 minutes.

**Genset stop:** Maintains availability of the genset for immediate reconnection in the event that the normal source fails shortly after transfer. Allows gradual genset cool down by running unloaded. Adjustable 0-30 minutes, default 10 minutes.

**Delayed (programmed) transition:** Controls the speed of operation of the transfer switch power contacts to allow load generated voltages from inductive devices to decay prior to connecting a live source. Adjustable 0-10 seconds, default 0 seconds.

**Elevator signal:** Provides a relay output contact for the elevator signal relay (load disconnect). The signal can also be configured to provide a post transfer delay of the same duration. Adjustable: 0-300 seconds (requires optional elevator signal relay for use).

### Options

**Elevator signal relay:** Provides a relay output contact for the signal relay function

**Programmable exerciser clock:** Provides a fully-programmable 7-day clock to provide greater flexibility in scheduling exercise periods than standard integral exerciser. Peaking function feature allows for generator operation during periods of high utility rates.

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## UL withstand and closing ratings

The transfer switches listed below must be protected by circuit breakers or fuses. Referenced drawings include detailed listings of specific breakers or fuse types that must be used with the respective transfer switches. Consult with your distributor/dealer to obtain the necessary drawings. Withstand and Closing Ratings (WCR) are stated in symmetrical RMS amperes.

Transfer switch ampere	MCCB protection			Current limited breaker protection		
	WCR @ volts max with specific manufacturers MCCBs	Max MCCB rating	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
40, 70, 125 3-pole	14,000 @ 600	225 A	098-6885	200,000 @ 600	225 A	098-6918
40, 70, 125 4-pole	30,000 @ 600	225 A	098-6885	200,000 @ 600	225 A	098-6918
150, 225, 260	30,000 @ 600	400 A	098-6886	200,000 @ 600	400 A	098-6919
300, 400, 600	65,000 @ 600	1200 A	098-6887	200,000 @ 600	1200 A	098-6920
800, 1000	65,000 @ 480	1400 A	098-6888	200,000 @ 600	1400 A	098-6921
	50,000 @ 600					

## Fuse protection

Transfer switch ampere	WCR @ volts max. with current limiting fuses	Max fuse, size and type	Drawing reference
40, 70, 125 3- and 4-pole	200,000 @ 600	200 A Class, J, RK1, RK5, T	098-6885
150, 225, 260	200,000 @ 600	1200 A Class L or T, or 600 A class J, RK1, RK5	098-6886
300, 400, 600	200,000 @ 600	1200 A Class L or T, or 600 A Class, J, RK1, RK5	098-6887
800, 1000	200,000 @ 600	2000 A Class L or 1200 A class T or 600 A class J, RK1, RK5	098-6888

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## Enclosures

The transfer switch and control are mounted in a key-locking enclosure. Wire bend space complies with 2008 NEC.

### Dimensions - transfer switch in UL type 1 enclosure

Amp rating	Height		Width		Depth		Door open		Weight		Outline drawing
	in	mm	in	mm	Door closed in	mm	in	mm	lb	kg	
40, 70, 125 3-pole	27.0	686	20.5	521	12.0	305	31.5	800	82	37	0310-0544
40, 70, 125 4-pole	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0500-4896
150, 225	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0310-0414
260	43.5	1105	28.5	724	16.0	406	43.0	1093	170	77	0310-0540
300, 400, 600	54.0	1372	25.5	648	18.0	457	42.0	1067	225	102	0310-1307
800, 1000	68.0	1727	30.0	762	19.5	495	48.5	1232	360	163	0310-0417

### Dimensions - transfer switch in UL type 3R, 4, 4X, or 12 enclosure

Amp rating	Height		Width		Depth		Door open		Weight		Cabinet type	Outline drawing
	in	mm	in	mm	Door closed in	mm	in	mm	lb	kg		
40, 70, 125 3-pole	34.0	864	26.5	673	12.5	318	36.5	927	125	57	3R, 12	0310-0453
											4	0310-0445
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
40, 70, 125 4-pole	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0500-4896
											4	0500-4896
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
150, 225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0310-0454
											4	0310-0446
	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	3R, 12	0310-0455
											4	0310-0447
											4X	0500-4184
300, 400, 600	59.0	1499	27.5	699	16.5	419	41.5	1054	275	125	3R, 12	0310-1315
											4	0310-1316
	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
800, 1000	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	3R, 12	0310-0457
											4	0310-0449
											4X	0500-4185

### Transfer switch lug capacities

All lugs accept copper or aluminum wire unless indicated otherwise.

Transfer switch ampere	Cables per phase	Size
40, 70, 125 3-pole	1	#12 AWG-2/0
40 4-pole	1	#12 AWG-2/0
70, 125 4-pole	1	#6 AWG - 300 MCM
150, 225	1	#6 AWG - 300 MCM
260	1	#6 AWG - 400 MCM
300, 400	1	3/0 - 600 MCM
300, 400	2	3/0 - 250 MCM
600	2	250 - 500 MCM
800	4	250 - 500 MCM

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## Submittal detail – options (accessories spec sheet AC-170)

### Amperage ratings

- ☐ 40
- ☐ 70
- ☐ 125
- ☐ 150
- ☐ 225
- ☐ 260
- ☐ 300
- ☐ 400
- ☐ 600
- ☐ 800
- ☐ 1000

### Voltage ratings

- ☐ R020 120
- ☐ R038 190
- ☐ R021 208
- ☐ R022 220
- ☐ R023 240
- ☐ R024 380
- ☐ R025 416
- ☐ R035 440
- ☐ R026 480
- ☐ R027 600

### Pole configuration

- ☐ A028 Poles - 3 (solid neutral)
- ☐ A029 Poles - 4 (switched neutral)

### Frequency

- ☐ A044 60 Hertz
- ☐ A045 50 Hertz

### Application

- ☐ A035 Utility to genset

### System options

- ☐ A041 Single phase, 2-wire or 3-wire
- ☐ A042 Three phase, 3-wire or 4-wire

### Enclosure

- ☐ B001 Type 1: general purpose indoor (similar to IEC type IP30)
- ☐ B002 Type 3R: intended for outdoor use (dustproof and rainproof, similar to IEC type IP34)
- ☐ B003 Type 4: indoor or outdoor use (watertight, similar to IEC type IP65)
- ☐ B004 Open construction: no enclosure - includes automatic transfer switch and controls.
- ☐ B010 Type 12: indoor use (dust-tight and drip-tight, similar to IEC type IP61)
- ☐ B025 Type 4X: stainless steel enclosure

### Standards

- ☐ A046 UL 1008/CSA certification
- ☐ A080 Seismic certification

### Control voltage

- ☐ M033 12V, Genset starting voltage
- ☐ M034 24V, Genset starting voltage

### Control options

- ☐ J030 External exercise clock
- ☐ M032 Elevator signal relay

### Battery chargers

- ☐ K001 2 amps, 12/24 volts
- ☐ KB59 15 amps, 12 volts
- ☐ KB60 12 amps, 24 volts

### Auxiliary relays

Relays are UL Listed and factory installed. All relays provide (2) normally closed isolated contacts rated 10 A @ 600 VAC. Relay terminals accept (1) 18 gauge to (2) 12 gauge wires per terminal.

- ☐ L101 24 VDC coil - installed, not wired (for customer use).
- ☐ L102 24 VDC coil - emergency position - relay energized when switch is in source 2 (emergency) position.
- ☐ L103 24 VDC coil - normal position - relay energized when switch is in source 1 (normal) position
- ☐ L201 12 VDC coil installed, not wired (for customer use)
- ☐ L202 12 VDC coil - emergency position - relay energized when switch is in source 2 (emergency) position
- ☐ L203 12 VDC coil - normal position - relay energized when switch is in source 1 (normal) position

### Miscellaneous options

- ☐ C027 Cover - guard
- ☐ M003 Terminal block - 30 points (not wired)

### Warranty

- ☐ G002 1 year basic
- ☐ G004 2 year comprehensive
- ☐ G006 5 year basic
- ☐ G007 5 year comprehensive
- ☐ G008 10 year major components

### Shipping

- ☐ A051 Packing - export box (800-1000 A)

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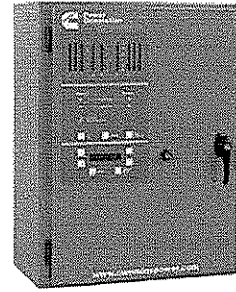
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# OTPC transfer switch open and closed transition



## > Specification sheet

40 - 4000 Amp

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### Description

OTPC transfer switches are designed for operation and switching of electrical loads between primary power and standby generator sets. They are suitable for use in emergency, legally required and optional standby applications. The switches monitor both power sources, signal generator set startup, automatically transfer power and return the load to the primary power source once the utility returns and is stabilized.

OTPC transfer switches are available with closed transition transfer. By briefly connecting the two sources (for 100 msec or less), the transfer from the alternate source back to the normal source occurs without interruption in the power supply to loads.



All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.



All switches are certified to CSA 282 Emergency Electrical Power Supply for Buildings, up to 600 VAC.

**NEC**

Suitable for use in emergency, legally required and standby applications per NEC 700, 701 and 702.



All switches comply with NFPA 70, 99 and 110 (Level 1).



All switches comply with NEMA ICS 10.



All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.



This transfer switch is designed and manufactured in facilities certified to ISO9001.

### Features

**PowerCommand® control** - A fully featured microprocessor-based control with digital display. Controls allow operator to enter settings and make adjustments to software-enabled features easily and accurately. Accommodates up to 8 event schedules.

**Programmed transition** - Open transition timing can be adjusted to completely disconnect the load from both sources for a programmed time period, as recommended by NEMA MG-1.

**Advanced transfer switch mechanism** - Unique bi-directional linear actuator provides smooth, continuous transfer switch action during automatic operation.

**Robust control system design** - Optically isolated logic inputs and isolation transformers for AC power inputs provide high-voltage surge protection.

**Main contacts** - Heavy-duty silver alloy contacts with multi-leaf arc chutes are rated for 100% load interruption. They require no routine contact maintenance and provide 100% continuous current ratings.

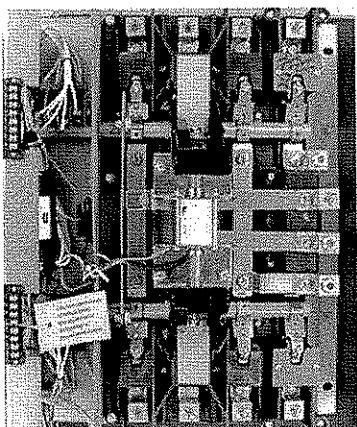
**Communications capability** - The transfer switch is capable of communicating with other transfer switches, accessories with a SCADA network or with Cummins Power Generation generators utilizing LonWorks® protocol.

**Easy service/access** - Single-plug harness connection and compatible terminal markings simplify servicing. Access space is ample. Door-mounted controls are field-programmable; no tool is required.

**Complete product line** - Cummins Power Generation offers a wide range of equipment, accessories and services to suit virtually any backup power application.

**Warranty and service** - Products are backed by a comprehensive warranty and a worldwide network of distributors with factory-trained service technicians.

## Transfer switch mechanism



- Transfer switch mechanism is electrically operated and mechanically held in the Source 1 and Source 2 positions. The transfer switch incorporates electrical and mechanical interlocks to prevent inadvertent interconnection of the sources.
- Independent break-before-make action is used for both 3-pole and 4-pole/ switched neutral switches. This design allows use of sync check operation when required, or control of the operating speed of the transfer switch for proper transfer of motor and rectifier-based loads (programmed transition feature).
- True 4-pole switching allows for proper ground (earth) fault sensing and consistent, reliable operation for the life of the transfer switch. The neutral poles of the transfer switch have the same ratings as the phase poles and are operated by a common crossbar mechanism, eliminating the possibility of incorrect neutral operation at any point in the operating cycle, or due to failure of a neutral operator.
- High pressure silver alloy contacts resist burning and pitting. Separate arcing surfaces further protect the main contacts. Contact wear is reduced by multiple leaf arc chutes that cool and quench the arcs. Barriers separate the phases to prevent interphase flashover. A transparent protective cover allows visual inspection while inhibiting inadvertent contact with energized components.
- Switch mechanism, including contact assemblies, is third party certified to verify suitability for applications requiring high endurance switching capability for the life of the transfer switch. Withstand and closing ratings are validated using the same set of contacts, further demonstrating the robust nature of the design.

## Specifications

<b>Voltage rating</b>	600 VAC, 50 or 60 Hz.
<b>Arc interruption</b>	Multiple leaf arc chutes provide dependable arc interruption.
<b>Neutral bar</b>	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches. Two isolated contacts (one for each source) indicating switch position are provided for customer use. Contacts are normally open, and close to indicate connection to the source. Wired to terminal block for easy access. Rated at 10 amps continuous and 250 VAC maximum. UL recognized, and CSA-certified.
<b>Auxiliary contacts</b>	
<b>Operating temperature</b>	-40 °F (-40 °C) to 140 °F (60 °C)
<b>Storage temperature</b>	-40 °F (-40 °C) to 140 °F (60 °C)
<b>Humidity</b>	Up to 95% relative, non-condensing
<b>Altitude</b>	Up to 10,000 ft (3,000 m) without derating
<b>Surge withstand ratings</b>	Voltage surge performance and testing in compliance with the requirements of IEEE C62.41 (Category B3) and IEEE C62.45.
<b>Total transfer time (source-to-source)</b>	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without programmed transition enabled.
<b>Manual operation handles</b>	Transfer switches rated through 1000 amps are equipped with permanently attached operating handles and quick-break, quick-make contact mechanisms suitable for manual operation. Transfer switches over 1000 amps are equipped with manual operators. All switches must be de-energized before manual operation is attempted.

## Transition modes

**Open transition/programmed:** Controls the time required for the device to switch from source to source, so that the load-generated voltages decay to a safe level before connecting to an energized source. Recommended by NEMA MG-1 to prevent nuisance-tripping breakers and load damage. Adjustable 0-60 seconds, default 0 seconds. Programmed transition is standard on 150-1000 amp switches, and optional on 1200-4000 amps.

**Open transition/in-phase:** Initiates open transition transfer when in-phase monitor senses both sources are in phase. Operates in a break-before-make sequence. Includes ability to enable programmed transition as a back-up. If sources are not in phase within 120 seconds, the system will transfer using programmed transition.

**Closed transition:** Used in applications where loads are sensitive to the momentary power interruption that occurs when performing open transition between sources. Closed transition is accomplished by briefly (<100 msec) paralleling two good sources to eliminate the momentary break in the power supply. Closed transition is only available as an option on OTPC models from 1000-4000 amps.

**Genset-to-genset:** Either genset can be designated as the lead genset. If the lead genset goes down or is taken offline, the transfer switch starts the second genset and transfers the load. The control can be programmed to alternate between the two gensets at a set interval up to 336 hours (2 weeks).

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S-1270ab (1/10)



## PowerCommand microprocessor control

PowerCommand controls are microprocessor based and developed specifically for automatic transfer switch operation. The control includes all of the features and options required for most applications.

- LED lamps for source availability and source connected indication, exercise/test mode.
- Flash memory stores the control settings.
- Contents of the memory are not lost even if power to the controller is lost.
- On-board battery maintains the real-time clock setting and the engine start time delay.
- Choice of two control packages allows selection of the most suitable control for the application.

### Control functions

#### Level 1 control (C023)

**Open transition** (in-phase)

**Open transition** (programmed)

**Utility-to-genset applications**

**Software adjustable time delays:**

Engine start: 0 to 120 sec

Transfer normal to emergency: 0 to 120 sec

Re-transfer emergency to normal: 0 to 30 min

Engine stop: 0 to 30 min

Programmed transition: 0 to 60 sec

**Undervoltage sensing:** 3-phase normal, 1-phase emergency

Accuracy:  $\pm$  2%

Pickup: 85% to 100% of nominal voltage

Dropout: 75% to 98% of pickup setting

Dropout time delay: 0-4 sec

**Overvoltage sensing:** 3-phase normal, 1-phase emergency

Accuracy:  $\pm$  2%

Dropout: 105% to 135% of nominal voltage

Pickup: 95% to 99% of dropout setting

Dropout time delay: 0 to 120 sec

**Over/under frequency sensing:**

Accuracy:  $\pm$  0.05 Hz

Pickup:  $\pm$  5% to  $\pm$  20% of nominal frequency

Dropout: 1-5% beyond pickup

Dropout time delay: 0.1 to 15.0 sec

**Programmable genset exerciser:** One event/schedule with or w/o load

**Basic indicator panel:**

Source available/connected LED indicators

Test/exercise/override buttons

Digital display – optional (M018)

Analog bar graph meter display – optional (D009)

**Date/time-stamped event recording:** 50 events

**Load sequencing:** Optional with network communications module M031. Provides control for eight steps of load with an adjustable time delay for each step on transfer, re-transfer or both.

#### Level 2 control (C024)

**Open transition** (in-phase)

**Open transition** (programmed)

**Closed transition** (includes fail-to-disconnect timer to prevent extended paralleling with the utility)

**Utility-to-genset applications**

**Utility-to-utility applications**

**Genset-to-genset applications**

**Software adjustable time delays:**

Engine start: 0 to 120 sec

Transfer normal to emergency: 0 to 120 sec

Re-transfer emergency to normal: 0 to 30 min

Engine stop: 0 to 30 min

Programmed transition: 0 to 60 sec

**Undervoltage sensing:** 3-phase normal, 3-phase emergency

Accuracy:  $\pm$  2%

Pickup: 85% to 100% of nominal voltage

Dropout: 75% to 98% of pickup setting

Dropout time delay: 0-4 sec

**Overvoltage sensing:** 3-phase normal, 3-phase emergency

Accuracy:  $\pm$  2%

Pickup: 95% to 99% of dropout setting

Dropout: 105% to 135% of nominal voltage

Dropout time delay: 0 to 120 sec

**Over/under frequency sensing:**

Accuracy:  $\pm$  0.05 Hz

Pickup:  $\pm$  5% to  $\pm$  20% of nominal frequency

Dropout: 1-5% beyond pickup

Dropout time delay: 0.1 to 15.0 sec

**Voltage imbalance sensing:**

Dropout: 2% to 10%

Pickup: 90% of dropout

Time delay: 2.0 to 20.0 sec

**Phase rotation sensing:**

Time delay: 100 msec

**Loss of single phase detection:**

Time delay: 100 msec

**Programmable genset exerciser:** Eight events/schedules with or w/o load

**Basic indicator panel:**

Source available/connected LED indicators

Test/exercise/override buttons

Digital display – standard

Analog bar graph meter display – optional (D009)

**Date/time-stamped event recording:** 50 events

**Load sequencing:** Optional with network communications module M031. Provides control for eight steps of load with an adjustable time delay for each step on transfer, re-transfer, or both.

**Genset-to-genset:** Same functions as above, for lead and secondary generators.

**Utility-to-utility:** Same functions as above, for preferred and alternate source.

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## Time-delay functions

**Engine start:** Prevents nuisance genset starts in the event of momentary power system variation or loss. Not included in utility-to-utility systems.

**Transfer normal to emergency:** Allows genset to stabilize before application of load. Prevents power interruption if normal source variation or loss is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays transfer of load from lead to secondary generator.

**Re-transfer emergency to normal:** Allows the utility to stabilize before re-transfer of load. Prevents needless power interruption if return of normal source is momentary. Allows staggered transfer of loads in multiple transfer switch systems. For genset-to-genset applications, delays re-transfer of load from secondary back to lead generator.

**Engine stop:** Maintains availability of the genset for immediate reconnection if the normal source fails shortly after retransfer. Allows gradual genset cool down by running unloaded. Not included in utility-to-utility systems.

**Elevator pre-transfer signal:** Requires optional relay signal module (M023). Delays transfer for pre-set interval of 0-60 seconds to prevent a power interruption during elevator operation.

## User interfaces

### Basic interface panel

LED indicators provide at-a-glance source and transfer switch status for quick summary of system conditions. Test and override buttons allow delays to be bypassed for rapid system checkout.

### Digital display (M018)

The digital display provides a convenient method for monitoring load power conditions, adjusting transfer switch parameters, monitoring PowerCommand network status or reviewing transfer switch events. Password protection limits access to adjustments to authorized personnel. The digital display is optional with the PowerCommand Level 1 control and comes standard with the Level 2 control.

### User interface options

#### Front panel security key (M017)

Locks front panel to prohibit access to digital control settings. Prevents unauthorized activation of transfer or test functions.

#### Bar graph meter display (D009)

An LED bar graph display provides an easy-to-read indicator of the level of power being supplied to the load. Information displayed includes: 3-phase voltage and current, frequency, power factor, and kilowatts. Green, amber, and red LEDs provide at-a-glance indication of system acceptability. Available as an option with the Level 2 PowerCommand microprocessor control.

## Control options

### Relay signal module (M023)

Provides relay output contacts for sending information to the building monitoring and control system. Relay outputs include: Source 1 connected/available, Source 2 connected/available, not in auto, test/exercise active, failed to disconnect, failed to synchronize, failed to transfer/re-transfer, and elevator control pre-transfer signal.

### Loadshed (M007)

Removes the load from the emergency power source by driving the transfer switch to the neutral position when signaled remotely. Transfers load back to the emergency source when the signal contacts open. Immediately re-transfers back to the primary source when available. Available for utility-to-genset applications only.

### PowerCommand network interface (M031)

Provides connection to the PowerCommand network. LonWorks compatible for integration with building monitoring and control system.

### Load power and load current monitoring (M022)

Measures load phase and neutral, current, power factor, real power (kW) and apparent power (kVA). Warns of excessive neutral current resulting from unbalanced or nonlinear loads. Minimum current level detection is 3%.

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## UL withstand and closing ratings

OTPC transfer switches must be protected by circuit breakers or fuses. Referenced drawings include detailed listings of specific breakers or fuse types that must be used with the respective transfer switches. Consult with your distributor/dealer to obtain the necessary drawings. Withstand and closing ratings (WCR) are stated in symmetrical RMS amperes.

Transfer switch ampere	MCCB protection			Special circuit breaker protection		
	WCR @ volts max with specific manufacturers MCCBs	Max MCCB rating	Drawing reference	With specific current limiting breakers (CLB)	Max CLB rating	Drawing reference
40, 70, 125 3-pole	14,000 @ 480 14,000 @ 600	225 A	0098-6885	200,000 @ 480 100,000 @ 600	225 A	0098-6918
40, 70, 125 4-pole	30,000 @ 480 30,000 @ 600	400 A	0098-6886	200,000 @ 480 100,000 @ 600	400 A	0098-6919
150, 225, 260	30,000 @ 480 30,000 @ 600	400 A	0098-6886	200,000 @ 480 100,000 @ 600	400 A	0098-6919
300, 400, 600	65,000 @ 480 65,000 @ 600	1200 A	0098-6887	200,000 @ 480 100,000 @ 600	1200 A	0098-6920
800, 1000	65,000 @ 480 50,000 @ 600	1400 A	0098-6888	150,000 @ 480 100,000 @ 600	1400 A	0098-6921
1000, 1200	85,000 @ 480 65,000 @ 600*	1600 A	0098-7312	85,000 @ 480 65,000 @ 600	1600 A	0098-7312
1600, 2000	100,000 @ 480 85,000 @ 600*	4000 A	0098-7311	100,000 @ 480 85,000 @ 600	4000 A	0098-7311
3000	100,000 @ 480 85,000 @ 600*	4000 A	0098-7313	100,000 @ 480 85,000 @ 600	4000 A	0098-7313
4000	100,000 @ 480 85,000 @ 600*	5000 A	0098-8576	100,000 @ 480	5000 A	0098-8576

## Fuse protection

Transfer switch ampere	WCR @ volts max. with current limiting fuses	Max fuse, size and type	Drawing reference
40, 70, 125 3- and 4-pole	200,000 @ 480 200,000 @ 600	200 A Class, J, RK1, RK5, T	0098-6885
150, 225, 260	200,000 @ 480 200,000 @ 600	600 A Class, J, RK1, RK5 1200 A Class L or T	0098-6886
300, 400, 600	200,000 @ 480 200,000 @ 600	600 A Class, RK1 or RK5 1200 A Class L or T	0098-6887
800, 1000	200,000 @ 480 200,000 @ 600	600 A Class, J, RK1 or RK5 1200 A Class T 2000 A Class L	0098-6888
1000, 1200	200,000 @ 480 150,000 @ 600*	3000 A Class L	0098-7312
1600, 2000	200,000 @ 480 150,000 @ 600*	2500 A Class L	0098-7311
3000	200,000 @ 480 150,000 @ 600*	4000 A Class L	0098-7313
4000	200,000 @ 480 150,000 @ 600*	6000 A Class L	0098-8576

\* CSA only

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### 3-cycle ratings

Transfer switch ampere	WCR @ volts max 3-cycle rating	Max MCCB rating	Drawing reference
1000, 1200	50,000 @ 480	1600 A	0098-7312
	42,000 @ 600*		
1600, 2000	100,000 @ 480	4000 A	0098-7311
	85,000 @ 600*		
3000	100,000 @ 480	4000 A	0098-7313
	85,000 @ 600*		
4000	100,000 @ 480	5000 A	0098-8576
	85,000 @ 600*		

\* CSA only

### Transfer switch lug capacities

All lugs accept copper or aluminum wire unless indicated otherwise.

Amp rating	Cables per phase	Size
40, 70, 125 3-pole	1	#12 AWG-2/0
40 4-pole	1	#14 AWG-2/0
70, 125 4-pole	1	#6 AWG - 300 MCM
150, 225	1	#6 AWG - 300 MCM
260	1	#6 AWG - 400 MCM
300, 400	1	3/0 - 600 MCM
	1 or 2	3/0 - 250 MCM
600	2	250 - 500 MCM
800, 1000	4	250 - 500 MCM
1000, 1200	4	#2 AWG to 600 MCM
1600, 2000	8	#2 AWG to 600 MCM (lugs optional)
3000	8	#2 AWG to 600 MCM (lugs optional)
4000	12	1/0 AWG to 750 MCM (lugs optional)

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## Enclosures

The transfer switch and control are mounted in a key-locking enclosure. Switches from 40-1000 amps are wall-mounted. Switches from 1200-4000 amps are floor-mounted. Wire bend space complies with 2009 NEC.

### Dimensions - transfer switch in UL type 1 enclosure

Amp rating	Height		Width		Depth		Door open		Weight		Outline drawing
	in	mm	in	mm	Door closed	Door open	in	mm	lb	kg	
40, 70, 125 3-pole	27.0	686	20.5	521	12.0	305	31.5	800	82	37	0310-0544
40, 70, 125 4-pole	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0500-4896
150, 225	35.5	902	26.0	660	16.0	406	41.0	1042	165	75	0310-0414
260	43.5	1105	28.5	724	16.0	406	43.0	1093	170	77	0310-0540
300, 400, 600	54.0	1372	25.5	648	18.0	457	42.0	1067	225	102	0310-1307
800, 1000	68.0	1727	30.0	762	20.6	524	48.5	1232	360	163	0310-0417
1000, 1200	76.3	1937	36.0	915	22.7	577	54.0	1372	450	204	0310-0482
1600, 2000*	90.0	2290	36.0	915	48.0	1219	84.0	2134	1100	499	0310-0483
3000*	90.0	2290	36.0	915	48.0	1219	84.0	2134	1250	567	0310-0484
4000*	90.0	2290	46.5	1180	60.0	1520	106	2700	1850	839	0500-4485

### Dimensions - transfer switch in UL type 3R, 4 or 12 enclosure

Amp rating	Height		Width		Depth		Door open		Weight		Cabinet type	Outline drawing
	in	mm	in	mm	Door closed	Door open	in	mm	lb	kg		
40, 70, 125 3-pole	34.0	864	26.5	673	12.5	318	36.5	927	125	57	3R, 12 4	0310-0453 0310-0445
40, 70, 125 4-pole	42.5	1080	30.5	775	16.0	406	44.0	1118	190	86	3R, 12 4	0500-4896 0500-4896
150, 225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12 4	0310-0454 0310-0446
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	3R, 12 4	0310-0455 0310-0447
300, 400, 600	59.0	1499	27.5	699	18.5	419	41.5	1054	290	132	3R, 12 4	0310-1315 0310-1316
800, 1000	73.5	1867	32.5	826	20.8	529	49.5	1257	410	186	3R, 12 4	0310-0457 0310-0449
1000, 1200	76.3	1937	36.0	915	22.7	577	54.0	1372	450	204	3R, 12, 4	0310-0482
1600, 2000*	90.0	2290	38.0	965	50.9	1293	80.0	2032	1100	499	3R, 12, 4	0310-0744
3000*	90.0	2290	38.0	965	51.0	1295	84.5	2146	1250	567	3R	0310-0745
4000*	90.0	2290	49.0	1244	60.0	1524	105	2654	1850	839	3R	0500-4486

### Dimensions - transfer switch in UL type 4X stainless steel enclosure

Amp rating	Height		Width		Depth		Door open		Weight		Cabinet type	Outline drawing
	in	mm	in	mm	Door closed	Door open	in	mm	lb	kg		
40, 70, 125 3-pole	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
40, 70, 125 4-pole	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4896
150, 225	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	4X	0500-4184
300, 400, 600	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
800, 1000	73.5	1867	32.5	826	19.5	495	49.5	1257	410	186	4X	0500-4185
1000, 1200	70.0	1778	40.0	1016	19.8	502	59.0	1499	450	204	4X	0310-0482
1600, 2000	90.0	2290	35.5	826	50.9	1293	80.0	2032	1100	499	4X	0310-0744

\* Rear and side access is required for installation. Dimensions shown are for 4-pole. For information on 3-pole switches, call factory.

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## Submittal detail - options

### Amperage ratings

- ☐ 40
- ☐ 70
- ☐ 125
- ☐ 150
- ☐ 225
- ☐ 260
- ☐ 300
- ☐ 400
- ☐ 600
- ☐ 800
- ☐ 1000
- ☐ 1200
- ☐ 1600
- ☐ 2000
- ☐ 3000
- ☐ 4000

### Voltage ratings

- ☐ R020 120\*
- ☐ R038 190
- ☐ R021 208
- ☐ R022 220
- ☐ R023 240
- ☐ R024 380
- ☐ R025 416
- ☐ R035 440
- ☐ R026 480
- ☐ R027 600

\* Single phase connection (not available on 1200-4000 amps)

### Pole configuration

- ☐ A028 Poles - 3 (solid neutral)
- ☐ A029 Poles - 4 (switched neutral)

### Frequency

- ☐ A044 60 Hertz
- ☐ A045 50 Hertz

### Transfer mode

- ☐ A077 Open transition/in-phase
- ☐ A078 Open transition/programmed
- ☐ A079 Closed transition (available 1000-4000 amps, for closed transition below 1000 amps, see CHPC spec sheet S-1437)

### Application

- ☐ A035 Utility to genset
- ☐ A036 Utility to utility
- ☐ A037 Genset to genset

### System options

- ☐ A041 Single Phase, 2-wire or 3-wire (not available 1200-4000 amps)
- ☐ A042 Three Phase, 3-wire or 4-wire

### Enclosure

- ☐ B001 Type 1: General purpose indoor (similar to IEC type IP30)
- ☐ B002 Type 3R: Intended for outdoor use (dustproof and rainproof) (Similar to IEC type IP34)
- ☐ B003 Type 4: Indoor or outdoor use (watertight) (Similar to IEC type IP65)
- ☐ B004 Open Construction: No enclosure - includes automatic transfer switch and controls (call factory for dimensions)
- ☐ B010 Type 12: Indoor use, dust-tight and drip-tight (similar to IEC type IP61)
- ☐ B025 Type 4X: Indoor or outdoor use (watertight) (similar to IEC Type IP65)

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### Standards

- ☐ A046 UL 1008/CSA certification
- ☐ A064 NFPA 20 compliant (not available on 1200-4000 amp switches)
- ☐ A080 Seismic certification

### Controls

- ☐ C023 PowerCommand control - Level 1
- ☐ C024 PowerCommand control - Level 2

### Control options

- ☐ M017 Security key - front panel
- ☐ M018 Digital display
- ☐ M022 Load monitoring (min current level 3%)
- ☐ M023 Relay signal module. Includes pre-transfer module for elevator control
- ☐ M031 LonWorks network communications module (FTT-10)

### Meter

- ☐ D009 Analog bar graph meter

### Battery chargers

- ☐ K001 2 amps, 12/24 volts
- ☐ KB59 15 amps, 12 volts
- ☐ KB60 12 amps, 24 volts

### Protective relays (closed transition)

- ☐ M036 62PL relay
- ☐ M038 86 Lock-out relay

**Auxiliary relays** - Relays are UL Listed and factory installed. All relays provide two normally closed isolated and two normally open contacts rated 10 amps at 600 VAC. Relay terminals accept from one 18 gauge to two 12 gauge wires per terminal.

- ☐ L101 24 VDC coil - installed, not wired (for customer use).
- ☐ L102 24 VDC coil - emergency position - relay energized when switch is in Source 2 (emergency) position.
- ☐ L103 24 VDC coil - normal position - relay energized when switch is in Source 1 (normal) position
- ☐ L201 12 VDC coil - installed, not wired
- ☐ L202 12 VDC coil - emergency position - relay energized when switch is in Source 2 (emergency) position
- ☐ L203 12 VDC coil - normal position - relay energized when switch is in Source 1 (normal) position

### Miscellaneous options

- ☐ M003 Terminal block - 30 points (not wired)
- ☐ N020 Terminal block - re-transfer inhibit
- ☐ M007 Load shed - from emergency - drives switch to neutral position when remote signal contact closes
- ☐ N009 Power connect - bus stabs (150-1200 amp open construction only)
- ☐ N013 Extension harness (open construction only)

### Optional lug kits

- ☐ N008 Terminal lugs - cable (1600-3000 amps only)
- ☐ N056 Terminal lugs - cable (4000 amps only)

### Warranty

- ☐ G010 Years 0-2: Parts, labor and travel  
Years 3-5: Parts only  
Years 6-10: Main contacts only

### Shipping

- ☐ A051 Packing - export box

### Accessories

AC-167 Accessories specifications sheet



**Power  
Generation**

## State of West Virginia

# VENDOR PREFERENCE CERTIFICATE

Certification and application\* is hereby made for Preference in accordance with *West Virginia Code*, §5A-3-37. (Does not apply to construction contracts). *West Virginia Code*, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the *West Virginia Code*. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

1. ☒ Application is made for 2.5% resident vendor preference for the reason checked:  
 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,  
☒ Bidder is a partnership, association or corporation resident vendor and 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 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,  
 Bidder is a 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; or,
2. ☒ Application is made for 2.5% resident vendor preference for the reason checked:  
 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,
3. Application is made for 2.5% resident vendor preference for the reason checked:  
 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 Bidder's 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; or,
4. ☒ Application is made for 5% resident vendor preference for the reason checked:  
 Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,
5. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:  
 Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,
6. Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:  
 Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of 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) reject the bid; or (b) assess a penalty against such 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.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of 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.

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.

Bidder: MICHEL, INC.

Signed: 

Date: APRIL 2, 2010

Title: PRESIDENT

\*Check any combination of preference consideration(s) indicated above, which you are entitled to receive.

RFQ No. BPH 10078STATE OF WEST VIRGINIA  
Purchasing Division**PURCHASING AFFIDAVIT**

**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 owed 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.

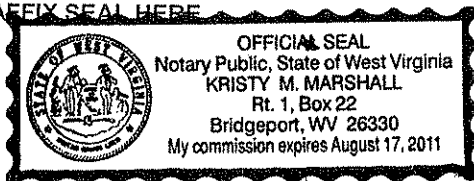
"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality 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 exceeds 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.

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

**WITNESS THE FOLLOWING SIGNATURE**Vendor's Name: MICHEL, INC.Authorized Signature: *Thomas P. Marshall*Date: 4/2/10State of WVCounty of HARRISON, to-wit:Taken, subscribed, and sworn to before me this 2nd day of APRIL, 2010.My Commission expires AUGUST 17, 2011.

AFFIX SEAL HERE



NOTARY PUBLIC

*Kristy M. Marshall*