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	PAGE
BPH10078	1

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

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
Eastern Electric LLC
PO Bx 92
Mount Nebo, WV 26679

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

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B	FREIGHT TERMS
03/10/2010				

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 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.

****

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 "REASONABL

RECEIVED
2010 APR -8 PM 12:54
WV PURCHASING DIVISION

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304.872.4868 DATE 4/8/10

TITLE Member FEIN 55-0775642

ADDRESS CHANGES TO BE NOTED ABOVE

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	PAGE
BPH10078	2

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ROBERTA WAGNER
304-558-0067

VENDOR
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TYPE NAME/ADDRESS HERE
Eastern Electric, LLC
PO Box 92
Mount Nebo, WV 26679

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TIME" THE VENDOR MAY TERMINATE THIS CONTRACT FOR ANY REASON UPON GIVING THE DIRECTOR OF PURCHASING 30 DAYS WRITTEN NOTICE.

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.

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.

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.

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.)

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

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304-872-4868 DATE 4/8/10

TITLE Member FEIN 55-0775642

ADDRESS CHANGES TO BE NOTED ABOVE

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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	PAGE
BPH10078	4

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

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
Eastern Electric, LLC
PO Box 92
Mount Nebo, WV 26679

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

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03/10/2010				

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LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT

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:

ROBERTA WAGNER
DEPARTMENT OF ADMINISTRATION
PURCHASING DIVISION
2019 WASHINGTON STREET, EAST
CHARLESTON, WV 25311
FAX: 304-558-4115
EMAIL: ROBERTA.A.WAGNER@WV.GOV

EXHIBIT 4

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.

REV. 3/88

MANDATORY PRE-BID

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304.872.4868 DATE 4/8/10

TITLE Member FEIN 55-0775642 ADDRESS CHANGES TO BE NOTED ABOVE

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	PAGE
BPH10078	6

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

VENDOR
RFQ COPY
TYPE NAME/ADDRESS HERE
Eastern Electric, LLC
PO Box 92
Mount Nebo, WV 26679

SHIP TO
HEALTH AND HUMAN RESOURCES
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VARIOUS LOCALES AS INDICATED ON PURCHASE ORDER

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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:

----------304.872.[redacted]3634----------

CONTACT PERSON (PLEASE PRINT CLEARLY):

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE [signature] TELEPHONE 304.872.4868 DATE 4/8/10

TITLE Member FEIN 55-0775042 ADDRESS CHANGES TO BE NOTED ABOVE

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

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

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)

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
		LP Generators	* ** ***		
1.	~~2~~	~~10 kW (single phase)~~	~~LP Generator~~		
2.	~~6~~	~~15 kW (single phase)~~	~~LP Generator~~		
3.	4	20 kW (single phase)	LP Generator	$ 20,810.00	83,240.-
4.	2	30 kW (single phase)	LP Generator	$ 22,943.00	45,886.-
5.	2	35 kW (single phase)	LP Generator	$ 24,981.00	49,962.-
6.	1	45 kW (single phase)	LP Generator	$ 25,184.00	25,184.-
7.	1	60 kW (single phase)	LP Generator	$ 26,075.00	26,075.-
8.	1	60 kW (three phase)	LP Generator	$ 26,193.00	26,193.-
9.	1	75 kW (three phase)	LP Generator	$ 28,473.00	28,473.-
10.	1	85 kW (three phase)	LP Generator	$ 33,025.00	33,025.-
11.	1	100 kW (three phase)	LP Generator	$ 34,566.00	34,566.-
12.	1	125 kW (three phase)	LP Generator	$ 44,327.00	44,327.-
13.	1	150 kW (three phase)	LP Generator	$ 49,361.00	49,361.-
14.	1	200 kW (three phase)	LP Generator	$ 115,820.00	115,820.-
15.	1	250 kW (three phase)	LP Generator	$ 115,820.00	115,820.-
16.	1	300 kW (three phase)	LP Generator	$ 161,900.00	161,900.-
17.	1	350 kW (three phase)	LP Generator	$ 161,900.00	161,900.-
		Diesel Generators	*		
18.	1	60 kW (three phase)	Diesel Generator	$ 36,632.00	36,632.00
19.	1	75 kW (three phase)	Diesel Generator	$ 39,140.00	39,140.-
20.	1	85 kW (three phase)	Diesel Generator	$ 44,211.00	44,211.00 → 44,211.00
21.	1	100 kW (three phase)	Diesel Generator	$ 44,211.00	44,211.00
22.	1	125 kW (three phase)	Diesel Generator	$ 49,562.00	49,562.-
23.	1	150 kW (three phase)	Diesel Generator	$ 53,780.00	53,780.-
24.	1	200 kW (three phase)	Diesel Generator	$ 64,020.00	64,020.-
25.	1	250 kW (three phase)	Diesel Generator	$ 75,066.00	75,066.-
26.	1	300 kW (three phase)	Diesel Generator	$ 94,238.00	94,238.-
27.	1	350 kW (three phase)	Diesel Generator	$ 101,541.00	101,541.-
					(cont.)....

Notes:

* All ATS ratings are Nema 1.

** LP Tanks not included.

*** Trailer units include generator, fuel tank & trailer, ATS supply & delivery only. ATS rating is Nema 1.

State of West Virginia
Department of Administration
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ADDRESS CORRESPONDENCE TO ATTENTION OF:
ROBERTA WAGNER
304-558-0067

VENDOR
Eastern Electric
Michael Harlow
PO Box 92
Mt. Nebo, WV 26679

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

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
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 ..✓.....

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 [signature] TELEPHONE 304.872.4808 DATE 4/8/10

TITLE Member FEIN 55-0775642 ADDRESS CHANGES TO BE NOTED ABOVE

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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.

Michael W Fish
SIGNATURE

Eastern Electric, LLC
COMPANY

4/8/10
DATE

NOTE: THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE BID.

REV. 09/21/2009

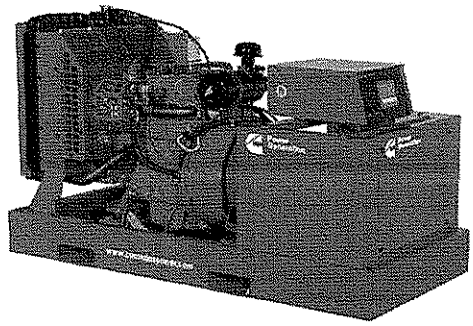
END OF ADDENDUM NO. 1

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE
TITLE Member
FEIN 55-0775042
TELEPHONE 304.872.4868
DATE 4/8/10

WHEN RESPONDING TO RFQ INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED VENDOR
ADDRESS CHANGES TO BE NOTED ABOVE

Diesel generator set V2203-M series engine EPA emissions



> Specification sheet
20 kW 60 Hz

Our energy working for you.™

Cummins 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.

ISO 9001	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.
PTS	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.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DSKBA	20 (25)		18.2 (22.7)				D-3373	

S-1562c (9/08)

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^3)
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
• 120/208	• 139/240	• 240/416	• 347/600	• 120/240
• 120/240 Delta	• 220/380	• 277/480		

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine
- ☐ 120 V 1000 W coolant heater

Fuel System
- ☐ 24 hour sub-base tank (dual wall)
- ☐ Regional fuel tank code kits

Alternator
- ☐ 105 °C rise
- ☐ 120 V 100 W anti-condensation heater
- ☐ Single phase

Exhaust system
- ☐ Engine exhaust muffler (mounted)

Generator set
- ☐ Battery
- ☐ Battery charger
- ☐ Enclosure: aluminum, steel, weather protective or sound attenuated
- ☐ Export box packaging
- ☐ 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.

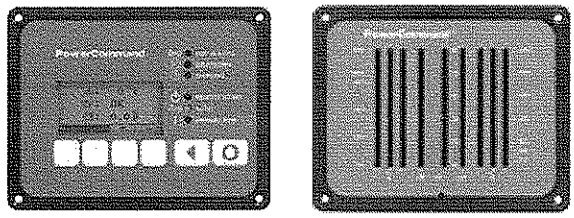
Our energy working for you.™

www.cumminspower.com

S-1562c (9/08)

Power Generation

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-1562c (9/08)

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):

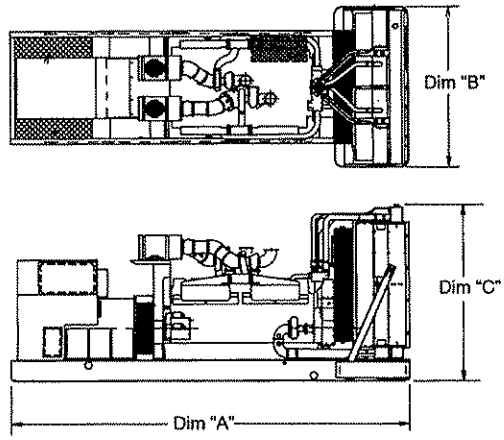
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
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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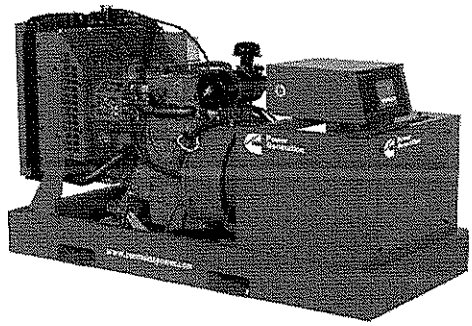
S-1562c (9/08)

Power Generation

Diesel generator set V3300 series engine EPA emissions



> Specification sheet
25 kW 60 Hz

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Cummins 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.

ISO 9001	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.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DSKCA	25 (31.3)		22.7 (28.4)				D-3374	

S-1563c (9/08)

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^3)
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
• 120/208	• 139/240	• 240/416	• 347/600	• 120/240
• 120/240 Delta	• 220/380	• 277/480		

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine
- ☐ 120 V 1000 W coolant heater

Fuel System
- ☐ 24 hour sub-base tank (dual wall)
- ☐ Regional fuel tank code kits

Alternator
- ☐ 105 °C rise
- ☐ 120 V 100 W anti-condensation heater
- ☐ Single phase

Exhaust system
- ☐ Engine exhaust muffler (mounted)

Generator set
- ☐ Battery
- ☐ Battery charger
- ☐ Enclosure: aluminum, steel, weather protective or sound attenuated
- ☐ Export box packaging
- ☐ 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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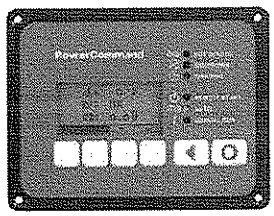
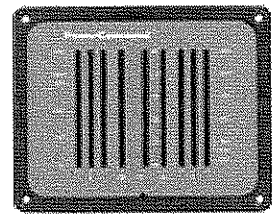
S-1563c (9/08)

Power Generation

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)

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):

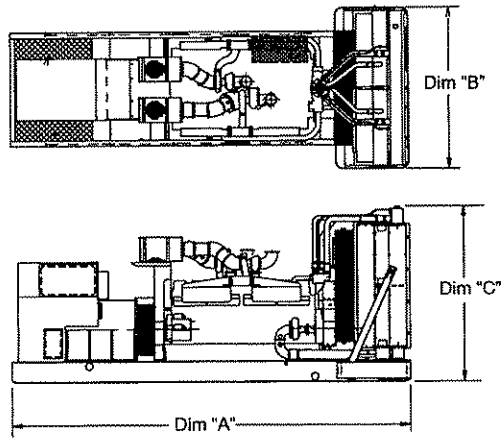
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
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.

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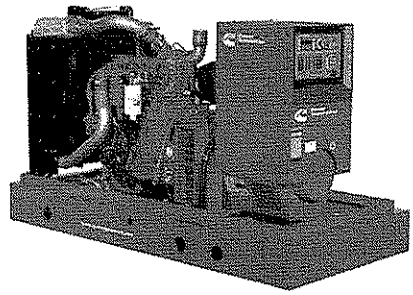
S-1563c (9/08)

Power Generation

Diesel generator set QSB5 series engine EPA emissions



> Specification sheet
35 kW - 80 kW 60 Hz

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Cummins 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.

ISO 9001	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.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DSFAA	35 (44)		32 (40)				D-3366	
DSFAB	40 (50)		35 (44)				D-3367	
DSFAC	50 (63)		45 (56)				D-3368	
DSFAD	60 (75)		55 (69)				D-3369	
DSFAE	80 (100)		72 (90)				D-3370	

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^3)
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
• 120/208	• 139/240	• 240/416	• 277/480	• 120/240
• 120/240 Delta	• 220/380	• 255/440	• 347/600	
• 127/220				

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine
- ☐ 120 V 150 W lube oil heater
- ☐ 120/240 V 1000 W coolant heater

Fuel System
- ☐ 24 hour sub-base tank (dual wall)
- ☐ 12 hour sub-base tank (dual wall)

Alternator
- ☐ 105 °C rise
- ☐ 125 °C rise
- ☐ 120 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
- ☐ Main line circuit breaker
- ☐ PowerCommand Network Communications Module (NCM)
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ UL 2200 Listed
- ☐ 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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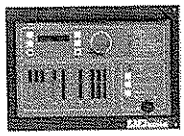
S-1559e (3/09)

Power Generation

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-1559e (3/09)

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):

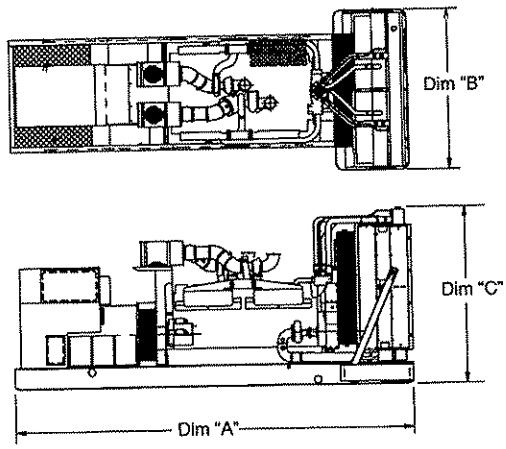
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
DSFAA	2104 (82.8)	1016 (40.0)	1255 (49.4)		1080 (2380)
DSFAB	2104 (82.8)	1016 (40.0)	1255 (49.4)		1080 (2380)
DSFAC	2104 (82.8)	1016 (40.0)	1255 (49.4)		1120 (2470)
DSFAD	2104 (82.8)	1016 (40.0)	1255 (49.4)		1140 (2520)
DSFAE	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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1400 73rd Avenue N.E.
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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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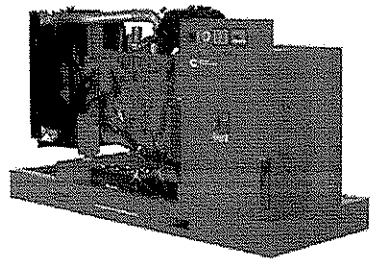
S-1559e (3/09)

Power Generation

Diesel generator set QSB7 series engine EPA emissions



> Specification sheet
100 kW - 150 kW 60 Hz

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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.

ISO 9001	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.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DSGAA	100 (125)		90 (113)				D-3349	
DSGAB	125 (156)		113 (141)				D-3350	
DSGAC	150 (188)		135 (169)				D-3351	

S-1544g (9/08)

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^3)
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			
• 110/190	• 115/230 Delta	• 127/220	• 240/416
• 110/220	• 120/208	• 139/240	• 255/440
• 115/200	• 120/240 Delta	• 220/380	• 277/480
		• 230/400	• 347/600

60 Hz Single phase line-neutral/line-line		
• 110/220	• 115/230	• 120/240

* Note: Consult factory for other voltages.

Generator set options and accessories

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

Fuel System
- ☐ 24 hour sub-base tank (dual wall)

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

Exhaust system
- ☐ Heavy duty exhaust elbow
- ☐ Slip on exhaust connection

Generator set
- ☐ Battery
- ☐ Battery charger
- ☐ Enclosure: aluminum, steel, weather protective or sound attenuated
- ☐ Main line circuit breaker
- ☐ PowerCommand Network Communications Module (NCM)
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ UL 2200 Listed
- ☐ 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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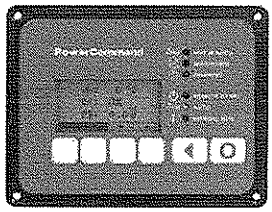
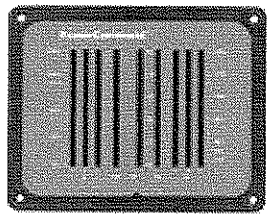
S-1544g (9/08)

Power Generation

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-1544g (9/08)

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):

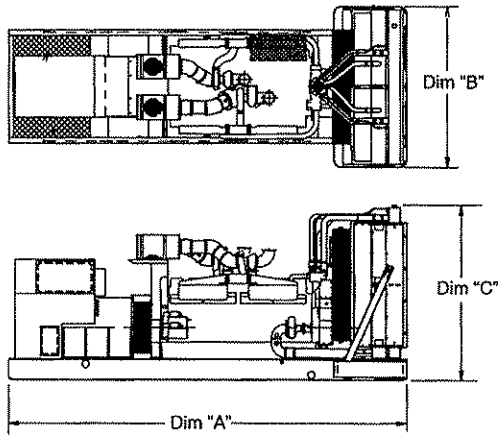
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
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.

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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)

Power Generation

Diesel generator set
QSL9-G2 series engine
EPA emissions

> Specification sheet
175 kW - 230 kW standby

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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.

ISO 9001	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.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DSHAB	175 (219)		160 (200)				D-3451	
DSHAC	200 (250)		180 (225)				D-3452	
DSHAD	230 (288)		209 (261)				D-3453	

S-1587b (9/08)

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^3)
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**	
•120/208	•120/240	•127/220	•139/240	•120/240	•220/380	•347/600
•240/416	•254/440	•277/480				

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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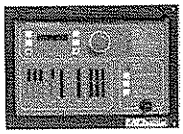
S-1587b (9/08)

Power Generation

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-1587b (9/08)

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):

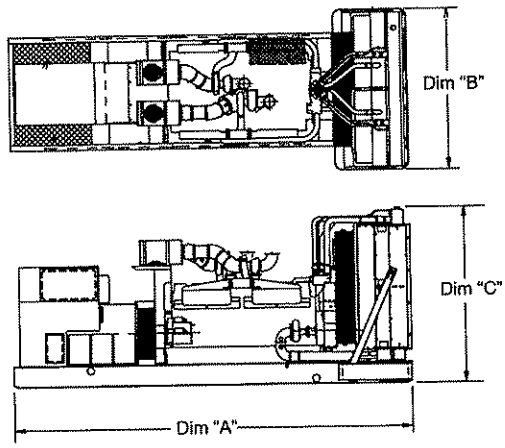
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
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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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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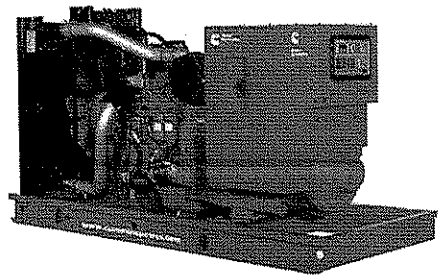
S-1587b (9/08)

Power Generation

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



> Specification sheet
220 kW - 300 kW standby

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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.

ISO 9001	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.
CSA	All low voltage models are CSA certified to product class 4215-01.
UL	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 CRF 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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DQDAA	250 (313)	220 (275)	225 (281)	200 (250)			D-3441, 3442	D-3445
DQDAB	275 (344)	250 (313)	250 (313)	227 (284)			D-3443	D-3446
DQDAC	300 (375)	265 (331)	270 (338)	240 (300)			D-3444	D-3447

S-1585a (9/08)

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^3)
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

Engine
- ☐ 120/240 V 1500 W coolant heater
- ☐ 120/240 V 150 W lube oil heater
- ☐ Heavy duty air cleaner
- ☐ Engine oil temperature

Control panel
- ☐ 120/240 V 100 W control anti-condensation heater
- ☐ Exhaust pyrometer
- ☐ Ground fault indication
- ☐ Remote fault signal package
- ☐ Run relay package
- ☐ Paralleling configuration

Alternator
- ☐ 80 °C rise
- ☐ 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
- ☐ NPT exhaust connection

Cooling system
- ☐ 50 °C ambient

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)

Generator set
- ☐ AC entrance box
- ☐ Battery
- ☐ Battery charger
- ☐ Export box packaging
- ☐ UL 2200 Listed
- ☐ Main line circuit breaker
- ☐ PowerCommand Network Communications Module (NCM)
- ☐ Remote annunciator panel
- ☐ Spring isolators
- ☐ Enclosure: aluminum, steel, weather protective or sound attenuated
- ☐ 2 year standby power warranty
- ☐ 2 year prime power warranty
- ☐ 5 year basic power warranty
- ☐ 10 year major components warranty

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

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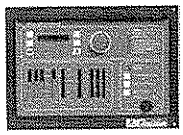
S-1585a (9/08)

Power Generation

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 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):

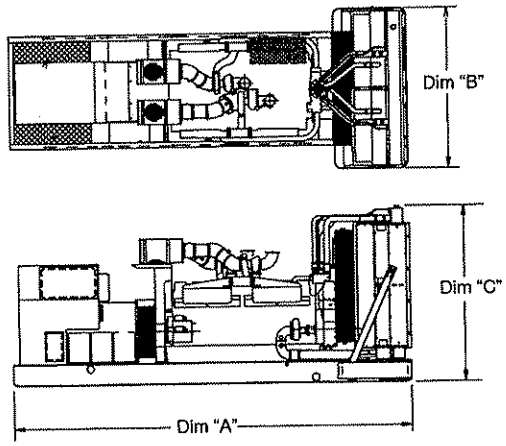
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
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.

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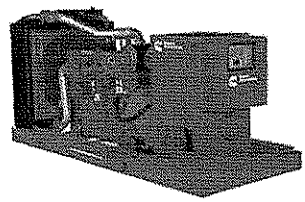
S-1585a (9/08)

Power Generation

Diesel generator set QSX15 series engine EPA emissions



> Specification sheet
350 kW - 500 kW standby

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Cummins® 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. 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.

	Standby rating		Prime rating		Continuous 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	50 Hz
DFEG	350 (438)		320 (400)				D-3398	
DFEH	400 (500)	352 (440)	350 (438)	320 (400)			D-3399	D-3402
DFEJ	450 (563)	400 (500)	410 (513)	364 (455)			D-3400	D-3403
DFEK	500 (625)	440 (550)	455 (569)	400 (500)			D-3401	D-3404

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^3)
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

- 110/190
- 110/220
- 115/200
- 115/230
- 120/208
- 127/220
- 139/240
- 220/380
- 230/400
- 240/416
- 255/440
- 277/480
- 347/600

50 Hz line-neutral/line-line

- 110/190
- 110/220
- 115/200
- 115/230
- 120/208
- 127/220
- 139/240
- 220/380
- 230/400
- 240/415
- 255/440

Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- ☐ 208/240/480 V thermostatically controlled coolant heater for ambient above 4.5 °C (40 °F)
- ☐ 208/240/480 V thermostatically controlled coolant heater for ambient below 4.5 °C (40 °F)
- ☐ 120 V 300 W lube oil heater
- ☐ Heavy duty air cleaner with safety element

Alternator

- ☐ 80 °C rise
- ☐ 105 °C rise
- ☐ 150 °C rise
- ☐ 120/240 V 300 W anti-condensation heater

Exhaust system

- ☐ Critical grade exhaust silencer
- ☐ Exhaust packages
- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer

Fuel system - 60 Hz

- ☐ 1136 L (300 gal) sub-base tank
- ☐ 1514 L (400 gal) sub-base tank
- ☐ 1893 L (500 gal) sub-base tank
- ☐ 2271 L (600 gal) sub-base tank
- ☐ 2498 L (660 gal) sub-base tank
- ☐ 3218 L (850 gal) sub-base tank
- ☐ 6435 L (1700 gal) sub-base tank

Fuel system - 50 Hz

- ☐ 155 L (41 gal) in-skid day tank (dual wall)
- ☐ 208 L (55 gal) in-skid day tank (single wall)
- ☐ 1595 L (425 gal) sub-base tank
- ☐ 3191 L (850 gal) sub-base tank

Cooling system

- ☐ High ambient 50 °C radiator

Control panel

- ☐ 120/240 V 100 W control anti-condensation heater
- ☐ Ground fault indication
- ☐ Power transfer control
- ☐ Remote fault signal package
- ☐ Run relay package

Generator set

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

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

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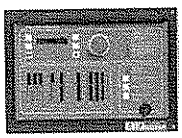
S-1582b (1/09)

Power Generation

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
- ☐ 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 on PCC 2100 see document S-1409.
For further detail on PCC 3201 see document S-1444.

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S-1582b (1/09)

Power Generation

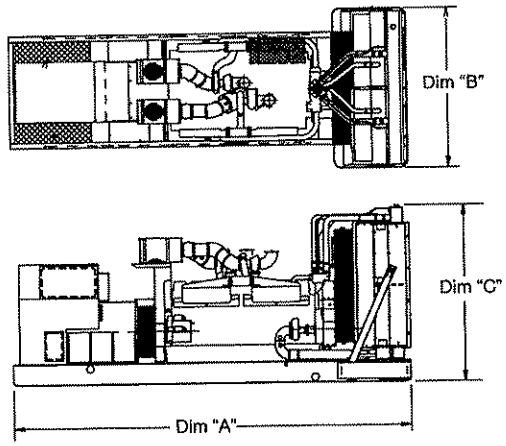
Ratings definitions

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)
DFEG	3864 (152.1)	1524 (60.0)	1812 (71.3)	3856 (8500)	3992 (8800)
DFEH	3864 (152.1)	1524 (60.0)	1812 (71.3)	3856 (8500)	3992 (8800)
DFEJ	3864 (152.1)	1524 (60.0)	1812 (71.3)	4082 (9000)	4218 (9300)
DFEK	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
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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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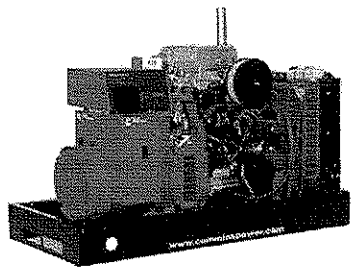
S-1582b (1/09)

Power Generation

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



> Specification sheet

Our energy working for you.™

Cummins 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.

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.

	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
GGMA	20.0 (25.0)				20.0 (25.0)				D-3390	
GGMB	25.0 (31.0)				25.0 (31.0)				D-3391	
GGMC	29.0 (36.0)				30.0 (38.0)				D-3392	

S-1591b (1/09)

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^3)
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	
• 120/208	• 120/240 delta	• 127/220	• 139/240	• 120/240	• 220/380	• 347/600
• 240/416	• 254/440	• 277/480				

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
- ☐ Propane vapor withdrawal
- ☐ Natural gas/propane vapor with auto changeover

Alternator
- ☐ 12 lead, broad range (full single phase output)
- ☐ Single phase (4 lead)
- ☐ 105 °C (221 °F) rise alternator (prime)
- ☐ 125 °C (257 °F) rise alternator (standby)

Generator set
- ☐ Battery
- ☐ Battery charger
- ☐ Coolant drain extension
- ☐ Oil drain extension
- ☐ Duct adapter
- ☐ Enclosure, aluminum weather protective, with critical silencer
- ☐ Export box packaging
- ☐ Main line circuit breakers
- ☐ UL 2200 Listed
- ☐ 2 year prime power warranty
- ☐ 2 year standby warranty
- ☐ 5 year basic power warranty
- ☐ 5 year comprehensive warranty
- ☐ Flex fuel lines

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

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S-1591b (1/09)

Power Generation

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*

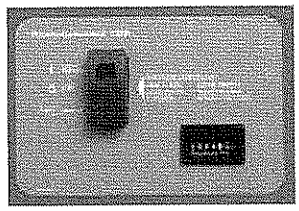
Other data
- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower Service Tool)

Digital governing (optional)
- Integrated digital electronic isochronous governor
- Temperature dynamic governing

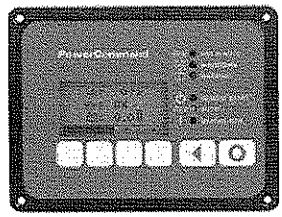
Digital voltage regulation
- Integrated digital electronic voltage regulator
- Two phase line-to-line sensing
- Configurable torque matching

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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Power Generation

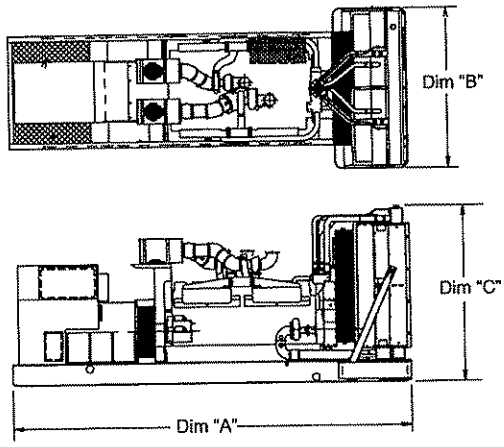
Ratings definitions

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)
GGMA	1626 (64.0)	762.0 (30.0)	889.0 (35.0)	418 (922)	434 (956)
GGMB	1626 (64.0)	762.0 (30.0)	889.0 (35.0)	440 (970)	455 (1004)
GGMC	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.

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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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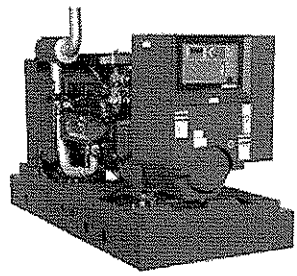
S-1591b (1/09)

Power Generation

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



> Specification sheet

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Cummins 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.

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.

	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
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.

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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	± 0.6%
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^3)
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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S-1617 (1/10)

Power Generation

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

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

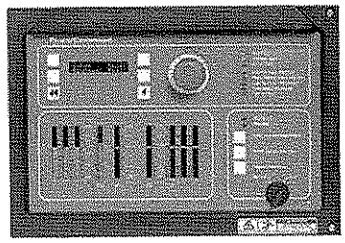
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

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

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S-1617 (1/10)

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):

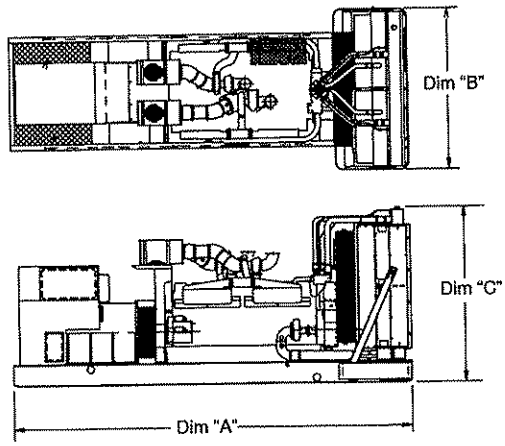
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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.

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1400 73rd Avenue N.E.
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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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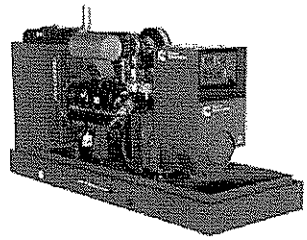
S-1617 (1/10)

Power Generation

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



> Specification sheet

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Cummins 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.

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.

	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
GGHE	60 (75)				60 (75)				D-3382	
GGHF	70 (87)	55 (69)			75 (94)	60 (75)			D-3383	D-3386

S-1589b (1/09)

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^3)
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
- ☐ 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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S-1589b (1/09)

Power Generation

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

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

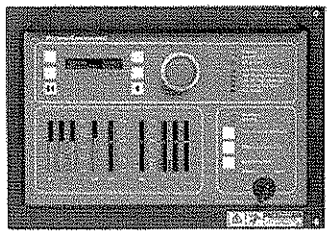
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

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

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S-1589b (1/09)

Power Generation

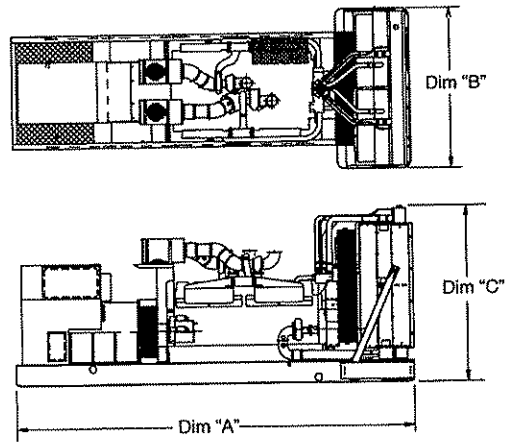
Ratings definitions

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)
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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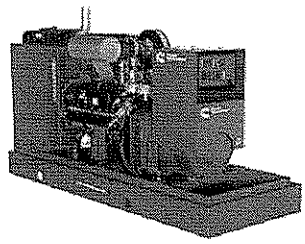
S-1589b (1/09)

Power Generation

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



> Specification sheet

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Cummins® 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_x, 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.

	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
GGHG	85 (106)				85 (106)				D-3384	
GGHH	100 (125)	75 (94)			100 (125)	75 (94)			D-3385	D-3387

S-1607 (1/09)

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^3)
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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S-1607 (1/09)

Power Generation

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

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

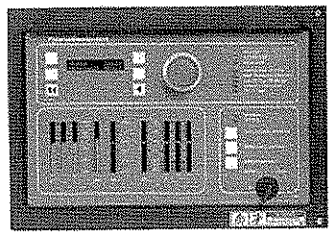
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

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

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S-1607 (1/09)

Power Generation

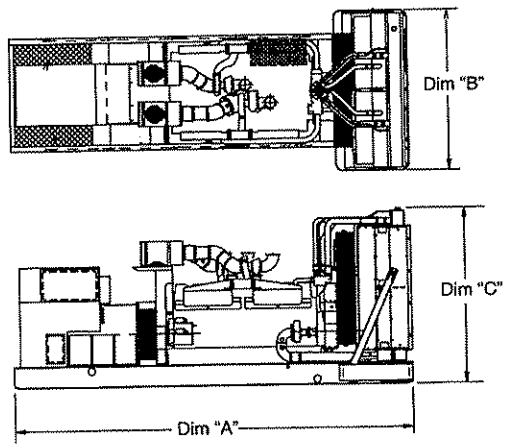
Ratings definitions

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)
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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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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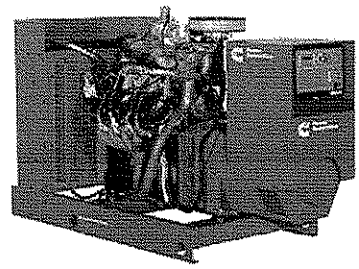
S-1607 (1/09)

Power Generation

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



> Specification sheet

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Cummins Power Generation

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_x, 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	

S-1590b (1/09)

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^3)
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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S-1590b (1/09)

Power Generation

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

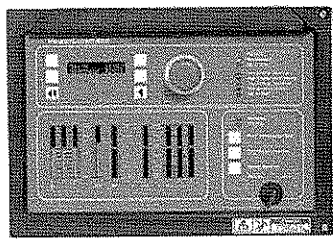
- Integrated digital electronic voltage regulator
- Three phase line-to-neutral sensing
- Configurable torque matching
- PMG (optional)

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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S-1590b (1/09)

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):

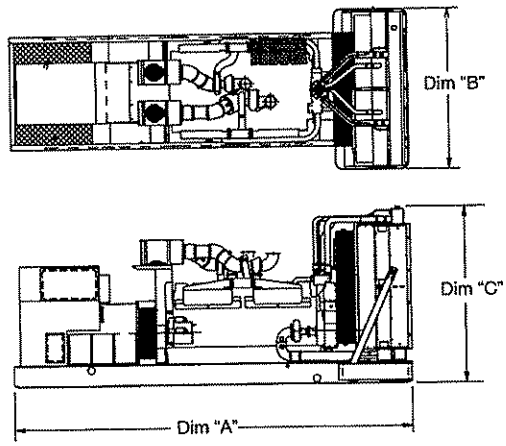
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

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)
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.

Cummins Power Generation
1400 73rd 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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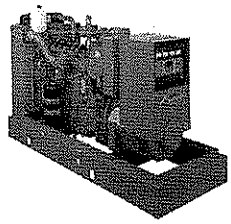
S-1590b (1/09)

Power Generation

Gaseous Fuel Generator Set
QSN14G Engine Series



Specification Sheet
Model GFBC EPA SI NSPS Compliant Capable

NPower

KW(KVA) @ 0.8 P.F.	60 HZ-1800 RPM
Compression Ratio	Standby
8.5:1 (note 1)	250 (312)

Notes:
(1) 54ºC (130ºF) 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 100% 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.

NPower

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)	66.00 (1676)
Unit Height, in (mm)	76.75 (1949)
Unit Length, in (mm)	147.00 (3734)
Unit Dry Weight, lb (kg)	
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 ki/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.³ L.H.V.)	
Running Pressure to Carburetor (After Regulation) – in. H_20 (mm H_20)	5 ~ 7 (127~177)
Running Pressure to Engine Mounted Regulator ~ in. H_20 (mm H_20)	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.

Cummins NPower

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

Base Engine	Cummins Model QSN14G
Displacement in^3 (L)	855 (14)
Overspeed Limit, rpm	2100
Regenerative Power, kW	-
Cylinder Block Configuration	Cast iron with replaceable wet cylinder liners
Cranking Current	550 amps at ambient temperature of 32°F (0°C)
Battery Charging Alternator	37 amps
Starting Voltage	24-volt, negative ground
Lube Oil Filter Types	Single spin-on canister-combination full flow with bypass
Standard Cooling System	100°F ambient radiator

Fuel		**STANDBY**		
Fuel Consumption	Load	1/2	3/4	Full
(Approximate)	kW	125	188	250
	CFH	1951	2692	3440
Cooling				
Heat Rejection to Coolant*		15,628	BTU/min	
Heat Rejection to Room		2,135	BTU/min	
Coolant Capacity (with radiator)*		TBD		
Coolant Flow Rate*		139	GPM	
Maximum Coolant Friction Head		5	PSI	
Maximum Coolant Static Head		60	FT	
Radiator Fan Load		28	HP	
Air				
Combustion Air		672	CFM	
Maximum Air Cleaner Restriction		15	IN Water	
Alternator Cooling Air		2100	CFM	
Radiator Cooling Air		33750	CFM	
Maximum Restriction at Radiator Discharge (static)		2.2	IN Water	
Exhaust				
Gas Flow (Full Load)		1,704	CFM	
Gas Temperature		1,218	Deg.F	
Maximum Back Pressure		2	IN Hg	
Engine				
Gross Engine Power Output		383	BHP	
BMEP		197	PSI	
Piston Speed		1800	FPM	

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

Cummins NPower

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

Three Phase Reconnectable

[ ] 120/208
[ ] 127/220
[ ] 139/240
[ ] 120/240
[ ] 240/416
[ ] 254/440
[ ] 277/480

Single Phase Non-Reconnectable

[ ] 120/240

Three Phase Non-Reconnectable

[ ] 220/380
[ ] 347/600

Cummins NPower

Specifications – Alternator

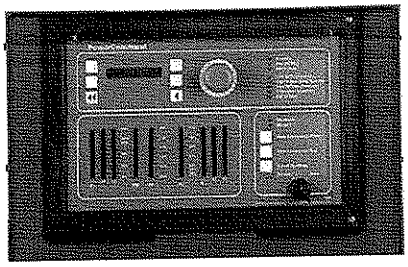
Design	Brushless, 4-pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Direct-coupled by flexible disc
Insulation System	Class H per NEMA MG1-1.65
Standard Temperature Rise	125°C standby
Exciter Type	PMG
Phase Rotation	A (U), B (V), C (W)
Alternator Cooling	Direct-drive centrifugal blower
AC Waveform 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

	80°C Alternator			105°C Alternator			125°C Alternator		
Voltage Ranges 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*	277/480	347/600
Motor Starting Maximum kVA (90% Sustained Voltage)	Broad Range 1210		600 V 1210	Broad Range 1028		600V 1028	Broad Range 904		600V 708
Alternator Data Sheet Numbers	ADS303		ADS303	ADS302		ADS302	ADS301		ADS301
Full Load Current (Amps @ Standby Rating)	120/208 867		127/220 820	139/240 751	220/380 474	240/416 433	254/440 410	277/480 376	

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.

Cummins NPower

Control System



PowerCommand Control with AmpSentry™ Protection

- The PowerCommand Control is an integrated generator set control system providing governing, voltage regulation, engine protection, and operator interface functions.
- PowerCommand Controls include integral AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided.
- Controls provided include Battery monitoring and testing features, and Smart-Starting control system.
- InPower PC-based service tool available for detailed diagnostics.
- Available with Echelon LonWorks™ network interface.
- NEMA 3R enclosure.
- Suitable for operation in ambient temperatures from -40C to +70C, and altitudes to 13,000 feet (5000 meters).
- Prototype tested; UL, CSA, and CE compliant.

AmpSentry AC Protection

- Overcurrent and short circuit shutdown
- Overcurrent warning
- Single & 3-phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Excitation fault

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
- 3-phase AC current
- Frequency
- Total and individual phase kW and kVA

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

Voltage Regulation

- Integrated digital electronic voltage regulator
- 3-phase line to neutral sensing
- PMG (Optional)
- 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
- (4) Configurable customer inputs
- (4) Configurable customer outputs
- (8) Configurable network inputs and (16) outputs (with optional network)

Options

[ ] Power Transfer Control
[ ] Analog AC Meter Display
[ ] Thermostatically Controlled Space Heater
[ ] Key-type mode switch
[ ] Ground fault module
[ ] Engine oil temperature
[ ] Auxiliary Relays (3)
[ ] Echelon LonWorks interface
[ ] Digital input and output module(s) (loose)
[ ] Remote annunciator (loose)

Cummins NPower

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

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 standby 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

NPower

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

NPower

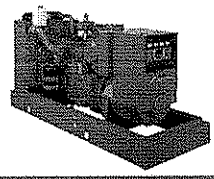
Cummins NPower LLC
875 Lawrence Drive
DePere, WI 54115
920.337.9750
Fax: 920.337.9746
www.cumminsnpower.com

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.

CNP-GFBCe CC (03/10)

NPower

Gaseous Fuel Generator Set
QSK19G Engine Series



Specification Sheet
Model GFEB EPA SI NSPS Compliant Capable

NPower

KW(KVA) @ 0.8 P.F.	
Compression Ratio	60 HZ-1800 RPM 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.

NPower

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 ki/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.³ L.H.V.)
Running Pressure to Carburetor (After Regulation) ~ in. H_20 (mm H_20) ..... 5 ~ 7 (127~177)
Running Pressure to Engine Mounted Regulator ~ in. H_20 (mm H_20) ..... 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.

NPower

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

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

Fuel		**STANDBY**		
Fuel Consumption	Load	1/2	3/4	Full
(Approximate)	kW	175	263	350
	CFH	2560	3588	4615
Cooling				
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		
Air				
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 Radiator Discharge (static)		0.5 in water		
Exhaust				
Gas Flow (Full Load)		3120 CFM		
Gas Temperature		1286° F		
Maximum Back Pressure		2 in Hg		
Engine				
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

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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

Three Phase Reconnectable

[ ] 120/208
[ ] 127/220
[ ] 139/240
[ ] 120/240
[ ] 240/416
[ ] 254/440
[ ] 277/480

Single Phase Non-Reconnectable

[ ] 120/240

Three Phase Non-Reconnectable

[ ] 220/380
[ ] 347/600

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Specifications – Alternator

Design	Brushless, 4-pole, drip-proof revolving field
Stator	2/3 pitch
Rotor	Direct-coupled by flexible disc
Insulation System	Class H per NEMA MG1-1.65
Standard Temperature Rise	125°C standby
Exciter Type	PMG
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

	80°C Alternator		105°C Alternator		125°C Alternator			
Voltage Ranges 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
Motor Starting Maximum kVA (90% Sustained Voltage)	Broad Range 1896	600 V 1749	Broad Range 1749	600V 1749	Broad Range 1372	480V 1372	600V 1372	
Alternator Data Sheet Numbers	306	305	305	305	304	304	304	
Full Load Current (Amps @ Standby Rating)	120/208 1214	127/220 1148	139/240 1052	220/380 665	240/416 607	254/440 547	277/480 526	347/600 421

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.

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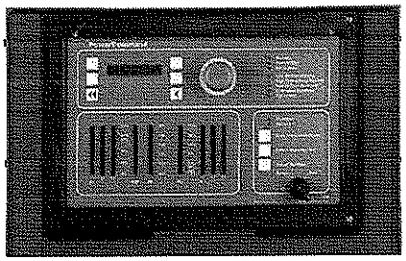
Control System



PowerCommand Control with AmpSentry™ Protection

- The PowerCommand Control is an integrated generator set control system providing governing, voltage regulation, engine protection, and operator interface functions.
- PowerCommand Controls include integral AmpSentry protection. AmpSentry provides a full range of alternator protection functions that are matched to the alternator provided.
- Controls provided include Battery monitoring and testing features, and Smart-Starting control system.
- InPower PC-based service tool available for detailed diagnostics.
- Available with Echelon LonWorks™ network interface.
- NEMA 3R enclosure.
- Suitable for operation in ambient temperatures from -40C to +70C, and altitudes to 13,000 feet (5000 meters).
- Prototype tested; UL, CSA, and CE compliant.

AmpSentry AC Protection

- Overcurrent and short circuit shutdown
- Overcurrent warning
- Single & 3-phase fault regulation
- Over and under voltage shutdown
- Over and under frequency shutdown
- Overload warning with alarm contact
- Reverse power and reverse Var shutdown
- Excitation fault

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
- 3-phase AC current
- Frequency
- Total and individual phase kW and kVA

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

Voltage Regulation

- Integrated digital electronic voltage regulator
- 3-phase line to neutral sensing
- PMG (Optional)
- 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
- (4) Configurable customer inputs
- (4) Configurable customer outputs
- (8) Configurable network inputs and (16) outputs (with optional network)

Options

[ ] Power Transfer Control
[ ] Analog AC Meter Display
[ ] Thermostatically Controlled Space Heater
[ ] Key-type mode switch
[ ] Ground fault module
[ ] Engine oil temperature
[ ] Auxiliary Relays (3)
[ ] Echelon LonWorks interface
[ ] Digital input and output module(s) (loose)
[ ] Remote annunciator (loose)

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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

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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

NPower

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920.337.9750
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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.

CNP-GFEB CC (03/10)

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INCORPORATED

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 10.1of 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

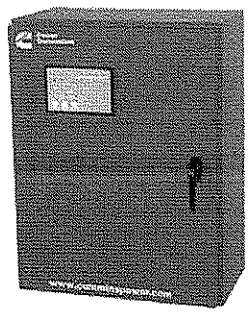
MGS UL-142 Listed Generator Base Tank Specification

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.

Transfer switch OTEC open or delayed transition



> Specification sheet
40 - 1000 Amp

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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.

UL	All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.
CSA	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.
NFPA	All switches comply with NFPA 70, 99 and 110.
NEMA	All switches comply with NEMA ICS 10.
IEEE	All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.
ISO 9001	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.

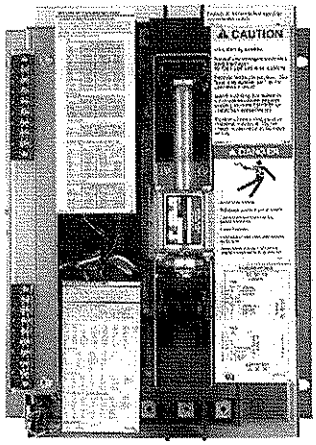
Easy service/access - Plug connections, door-mounted controls, ample access space, and compatible terminal markings. The control is field programmable.

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.

S-1464m (4/08)

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

Voltage rating	Transfer switches rated from 40 A through 1000 A are rated up to 600 VAC, 50 or 60 Hz.
Arc interruption	Multiple leaf arc chutes cool and quench the arcs. Barriers prevent interphase flashover.
Neutral bar	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
Auxiliary contacts	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.
Operating temperature	-22 °F (-30 °C) to 140 °F (60 °C)
Storage temperature	-40 °F (-40 °C) to 140 °F (60 °C)
Humidity	Up to 95% relative, non-condensing
Altitude	Up to 10,000 ft (3,000 m) without derating
Total transfer time (source-to-source)	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without delayed transition enabled.
Manual operation handles	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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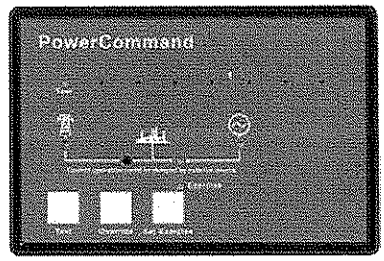
PowerCommand® microprocessor control

- 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.

	MCCB protection			Current limited breaker protection		
Transfer switch ampere	**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 50,000 @ 600	1400 A	098-6888	200,000 @ 600	1400 A	098-6921

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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Power Generation

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

	Height		Width		Depth				Weight		Outline drawing
					Door closed		Door open				
Amp rating	in	mm	in	mm	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

	Height		Width		Depth				Weight		Cabinet type	Outline drawing
					Door closed		Door open					
Amp rating	in	mm	in	mm	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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S-1464m (4/08)

Power Generation

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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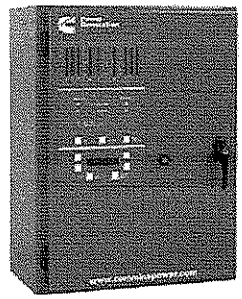
S-1464m (4/08)

Power Generation

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.

UL	All switches are UL 1008 Listed with UL Type Rated cabinets and UL Listed CU-AL terminals.
CSA	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.
NFPA	All switches comply with NFPA 70, 99 and 110 (Level 1).
NEMA	All switches comply with NEMA ICS 10.
IEEE	All switches comply with IEEE 446 Recommended Practice for Emergency and Standby Power Systems.
ISO 9001	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.

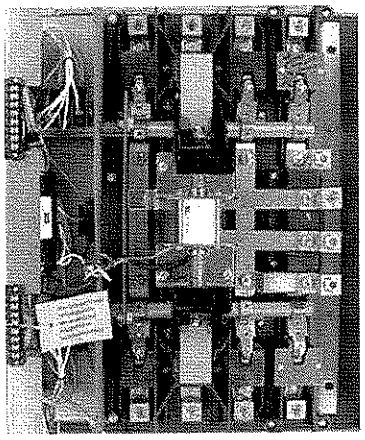
Easy service/access - Single-plug harness connection and compatible terminal markings simplify servicing. Access space is ample. Door-mounted controls are field-programmable; no tool is required.

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.

S-1270ab (1/10)

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

Voltage rating	600 VAC, 50 or 60 Hz.
Arc interruption	Multiple leaf arc chutes provide dependable arc interruption.
Neutral bar	A full current-rated neutral bar with lugs is standard on enclosed 3-pole transfer switches.
Auxiliary contacts	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.
Operating temperature	-40 °F (-40 °C) to 140 °F (60 °C)
Storage temperature	-40 °F (-40 °C) to 140 °F (60 °C)
Humidity	Up to 95% relative, non-condensing
Altitude	Up to 10,000 ft (3,000 m) without derating
Surge withstand ratings	Voltage surge performance and testing in compliance with the requirements of IEEE C62.41 (Category B3) and IEEE C62.45.
Total transfer time (source-to-source)	Will not exceed 6 cycles at 60 Hz with normal voltage applied to the actuator and without programmed transition enabled.
Manual operation handles	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)

Power Generation

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: =/- 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: =/- 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: ±0.05 Hz
Pickup: ±5% to ±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: +/- 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: ±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: =/- 0.05 Hz
Pickup: ±5% to ±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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Power Generation

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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Power Generation

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.

	MCCB protection			Special circuit breaker protection		
Transfer switch ampere	**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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Power Generation

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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S-1270ab (1/10)

Power Generation

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				Weight		Outline drawing
					Door closed		Door open				
	in	mm	in	mm	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	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				Weight		Cabinet type	Outline drawing
					Door closed		Door open					
	in	mm	in	mm	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
40, 70, 125 4-pole	42.5	1080	30.5	775	16.0	406	44.0	1118	190	86	3R, 12	0500-4896
											4	0500-4896
150, 225	42.5	1080	30.5	775	16.0	406	44.0	1118	215	97	3R, 12	0310-0454
											4	0310-0446
260	46.0	1168	32.0	813	16.0	406	46.0	1168	255	102	3R, 12	0310-0455
											4	0310-0447
300, 400, 600	59.0	1499	27.5	699	18.5	419	41.5	1054	290	132	3R, 12	0310-1315
											4	0310-1316
800, 1000	73.5	1867	32.5	826	20.8	529	49.5	1257	410	186	3R, 12	0310-0457
											4	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	826	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				Weight		Cabinet type	Outline drawing
					Door closed		Door open					
	in	mm	in	mm	in	mm	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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Power Generation

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)

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

Cummins Power Generation

North America
1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Phone 763 574 5000
Fax 763 574 5298

Brazil
Rua Jati, 310
Guarulhos – Sao Paulo
CEP – 07180-140
Phone 55 11 2186 4195
Fax 55 11 2186 4729

Europe, CIS, Middle East and Africa
Manston Park Columbus Ave.
Manston Ramsgate
Kent CT 12 5BF United Kingdom
Phone 44 1843 255000
Fax 44 1843 255902

Asia Pacific
10 Toh Guan Road #07-01
TT International Tradepark
Singapore 608838
Phone 65 6417 2388
Fax 65 6417 2399

Our energy working for you.™

www.cumminspower.com

S-1270ab (1/10)

Power Generation

INCORPORATED

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 10.1of 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.

178 Muddy Creek Church Road Denver, PA 17517-9386
ph 717/336-7528 fax 717/336-0514
www.mgsincorporated.com

INCORPORATED

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.

CONTRACTOR LICENSE

Authorized by the

West Virginia Contractor Licensing Board

Number: WV031621

Classification:

ELECTRICAL

EASTERN ELECTRIC LLC
DBA EASTERN ELECTRIC LLC
PO BOX 92
MT NEBO, WV 26679

Date Issued	Expiration Date
SEPTEMBER 12, 2009	SEPTEMBER 12, 2010

Michael C. Pritt
Authorized Company Signature

Michael A. Carl
Chair, West Virginia Contractor Licensing Board

WEST VIRGINIA CONTRACTOR LICENSING BOARD

This license, or a copy thereof, must be posted in a conspicuous place at every construction site where work is being performed. This license number must appear in all advertisements, on all bid submissions and on all fully executed and binding contracts. This license cannot be assigned or transferred by licensee. Issued under provisions of West Virginia Code, Chapter 21, Article 11.

2008

WEST VIRGINIA
STATE TAX DEPARTMENT

2010

BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
EASTERN ELECTRIC LLC
330 RIVIERA RD
MT NEBO, WV 26679

BUSINESS REGISTRATION ACCOUNT NUMBER: **1046-7172**

This certificate is issued for the registration period beginning: **July 1, 2008**

This certificate is valid until: **June 30, 2010**

This business registration certificate is issued by the West Virginia State Tax Commissioner in accordance with Chapter 11, Article 12 of the West Virginia Code.

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

ENGAGING IN BUSINESS WITHOUT CONSPICUOUSLY POSTING A WEST VIRGINIA BUSINESS REGISTRATION CERTIFICATE IN THE PLACE OF BUSINESS IS A CRIME AND MAY SUBJECT YOU TO FINES PER W. VA. CODE § 11-9.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL007 v.57
L0516751872

Client#: 1241987 18EASTEELE

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 01/29/2010

PRODUCER
BB&T-Carson Insurance Services
601 Tennessee Avenue
Charleston, WV 25302
304 346-0806

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: Brickstreet Mutual Insurance Co	RSDL
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	

INSURED
Eastern Electric LLC
P O Box 92
Mount Nebo, WV 26679-0092

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
		GENERAL LIABILITY				EACH OCCURRENCE	$
		COMMERCIAL GENERAL LIABILITY				DAMAGE TO RENTED PREMISES (Ea occurrence)	$
		CLAIMS MADE ☐ OCCUR ☐				MED EXP (Any one person)	$
						PERSONAL & ADV INJURY	$
		GEN'L AGGREGATE LIMIT APPLIES PER:				GENERAL AGGREGATE	$
		POLICY ☐ PRO-JECT ☐ LOC ☐				PRODUCTS - COMP/OP AGG	$
		AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$
		ANY AUTO				BODILY INJURY (Per person)	$
		ALL OWNED AUTOS				BODILY INJURY (Per accident)	$
		SCHEDULED AUTOS				PROPERTY DAMAGE (Per accident)	$
		HIRED AUTOS					
		NON-OWNED AUTOS					
		GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
		ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS / UMBRELLA LIABILITY				EACH OCCURRENCE	$
		OCCUR ☐ CLAIMS MADE ☐				AGGREGATE	$
							$
		DEDUCTIBLE					$
		RETENTION $					$
A		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY	WC1001787006	12/30/2009	12/30/2010	X WC STATU-TORY LIMITS ☐ OTH-ER	
		ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [N]	Includes Employers 23-4-2-(d)(2)(ii)	WV Broad Liability of WV Code	Form Section	E.L. EACH ACCIDENT	$1,000,000
		If yes, describe under SPECIAL PROVISIONS below				E.L. DISEASE - EA EMPLOYEE	$1,000,000
						E.L. DISEASE - POLICY LIMIT	$1,000,000
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS
Verification of Workers COmpensation Insurance

CERTIFICATE HOLDER
Eastern Electric, LLC
PO Box 92
Mount Nebo, WV 26679

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE
Jeremy B. Shanley

TKT

Existing Certificate for proof of coverage only...

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY): 03/02/10

PRODUCER
Russell E. Bennett
P.O. Box 97
Lookout, WV 25868
(304) 574-0499

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE

INSURED
Eastern Electric LLC
PO Box 92
Mt. Nebo, WV 26679

INSURER A: Farm Family Casualty Insurance Company
INSURER B:
INSURER C:
INSURER D:
INSURER E:

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A	GENERAL LIABILITY ☑ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS MADE ☐ OCCUR ☑ Hired auto ☑ Non owned auto GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☐ PRO-JECT ☐ LOC	4710X0061	06/01/09	06/01/10	EACH OCCURRENCE FIRE DAMAGE (Any one fire) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 250,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 1,000,000
	AUTOMOBILE LIABILITY ☐ ANY AUTO ☐ ALL OWNED AUTOS ☑ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS ☐	4710C0219	10/31/09	10/31/10	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
	GARAGE LIABILITY ☐ ANY AUTO ☐				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
	EXCESS LIABILITY ☑ OCCUR ☐ CLAIMS MADE ☑ Umbrella ☐ DEDUCTIBLE ☐ RETENTION $	4710E1000	06/01/09	06/01/10	EACH OCCURRENCE AGGREGATE	$ 3,000,000 $ 3,000,000 $ $ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				☐ WC STATU-TORY LIMITS ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $
	OTHER Inland Marine	4734I0015	11/24/09	11/24/10	All Risk w/RC	$100,000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

*Please note that the Umbrella policy 4710E1000 is excluded from having additional insureds and waiver of subrogation and its listed only for informational purposes.

CERTIFICATE HOLDER ☑ ADDITIONAL INSURED; INSURER LETTER: A

RSC Equipment Rental Inc.
3200 Harbor Lane North, suite 100
Plymouth, MN 55447

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 21 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE
Russell E. Bennett

ACORD 25-S (7/97)

Rev. 09/08

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: Eastern Electric, LLC Signed: _____

Date: 4/8/10 Title: Member

**Check any combination of preference consideration(s) indicated above, which you are entitled to receive.*

RFQ No. BPH10078

STATE 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 exceed five percent of the total contract amount.

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

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: Eastern Electric, LLC

Authorized Signature: _____ Date: 4/8/10

State of WV

County of Nicholas, to-wit:

Taken, subscribed, and sworn to before me this 8th day of April, 2010

My Commission expires April 9, 2010.

AFFIX SEAL HERE

NOTARY PUBLIC Kristin Moores

OFFICIAL SEAL
STATE OF WEST VIRGINIA
NOTARY PUBLIC
Kristin Moores
Eastern Electric
PO Box 92
Mount Nebo, WV 26679
My Commission Expires April 9, 2019