

CUMMINS GENERATOR 114 KVA (91 KW) (INDIA)



6BTA5.9-G6



> Specification sheet

Our energy working for you.™

Description

The B5.9 engine has established an unrivalled reputation for reliability, incorporating features designed to maximise engine integration within OEM installation.



This engine has been built to comply with CE certification.

<u>150 9001</u>

This engine has been designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO 9002 orTS16949.

Features

Single Poly Vee belt drive for fan, alternator and water pump, with self-tensioning idler for minimum maintenance.

Inline-type Bosch A-Series pump operates at high injection pressures for cleaner combustion and lower emissions.

Spin-on fuel filter and full-flow lubricating oil filter.

Top mounted Holset HX35 turbocharger for increased power, fuel economy, and lower smoke and noise levels.

Coolpac Integrated Design - Products are supplied complete with cooling package and air cleaner kit for a complete power package. Each component has been specifically developed and rigorously tested for G-Drive products, ensuring high performance, durability and reliability.

Service and Support - G-Drive products are backed by an uncompromising level of technical support and after sales service, delivered through a world class service network.

1800 rpm (60 Hz Ratings)

| Gros | ss Engine O | utput | Net | Engine Out | Typical Generator Set Output | | | | | | |
|---------|-------------|---------|---------|------------|------------------------------|---------|-------|-------|---------|------------|-----|
| Standby | Prime | Base | Standby | Prime | Base | Standby | (ESP) | Prime | e (PRP) | Base (COP) | |
| | kWm/BHP | | | kWm/BHP | | kWe | kVA | kWe | kVA | kWe | kVA |
| 132/177 | 119/159 | 101/135 | 120/161 | 109/146 | 91/122 | 100 | 125 | 91 | 114 | 88 | 110 |



General Engine Data

| Туре | 4 cycle, in-line, Turbo Charged |
|---|--|
| Bore mm | 102 mm (4.02 in.) |
| Stroke mm | 120 mm (4.72 in.) |
| Displacement Litre | 5.9 litre (359.0 in. ³) |
| Cylinder Block | Cast iron, 6 cylinder |
| Battery Charging Alternator | 55 amps |
| | |
| Starting Voltage | 12 volt, 55 Amp negative ground |
| Starting Voltage Fuel System | 12 volt, 55 Amp negative ground Direct injection |
| Starting Voltage Fuel System Fuel Filter | 12 volt, 55 Amp negative ground Direct injection Spin-on fuel filters with water separator |
| Starting Voltage Fuel System Fuel Filter Lube Oil Filter Type(s) | 12 volt, 55 Amp negative ground Direct injection Spin-on fuel filters with water separator Spin-on full flow filter |
| Starting Voltage Fuel System Fuel Filter Lube Oil Filter Type(s) Lube Oil Capacity (I) | 12 volt, 55 Amp negative ground Direct injection Spin-on fuel filters with water separator Spin-on full flow filter 16.4 |
| Starting Voltage Fuel System Fuel Filter Lube Oil Filter Type(s) Lube Oil Capacity (I) Flywheel Dimensions | 12 volt, 55 Amp negative ground Direct injection Spin-on fuel filters with water separator Spin-on full flow filter 16.4 3/11.5 |

Coolpac Performance Data

| Cooling System Design | Jacket Water After Cooled |
|---|--|
| Coolant Ratio | 50% ethylene glycol; 50% water |
| Coolant Capacity (I) | 19.75 |
| Limiting Ambient Temp.** | 55.0 |
| Fan Power(kWm) | 9.6 |
| Cooling System Air Flow (m ³ /s)** | 6.17 |
| Air Cleaner Type (Normal Duty) | Dry replaceable element with restriction indicator |
| ** @ 12 mm H ² 0 at 1009/ Drima | |

@ 13 mm H²0 at 100% Prime

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, DIN6271 and BS 5514.

Shipping Weight & Dimensions

| | Length | Width | Height | Weight (dry) | |
|--------------|--------|-------|--------|--------------|--|
| | mm | mm | mm | kg | |
| Engine only* | 1065 | 698 | 981 | 402 | |
| Coolpac | 1526 | 817 | 1262 | 505 | |

*Fan to flywheel

Fuel Consumption 1500 (50 Hz)

| % | kWm | BHP | L/ph | US gal/ph | | | | | | |
|------------------|-----|-----|------|-----------|--|--|--|--|--|--|
| Standby Power | | | | | | | | | | |
| 100 | 132 | 177 | 35 | 9.1 | | | | | | |
| Prime Power | | | | | | | | | | |
| 100 | 119 | 159 | 31 | 8.1 | | | | | | |
| 75 | 89 | 120 | 23 | 5.9 | | | | | | |
| 50 | 59 | 80 | 16 | 4.1 | | | | | | |
| 25 | 30 | 40 | 9 | 2.4 | | | | | | |
| Continuous Power | | | | | | | | | | |
| 100 | 101 | 135 | 25 | 6.7 | | | | | | |

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www.cumminsgdrive.com





UCI274C - Technical Data Sheet



UCI274C SPECIFICATIONS & OPTIONS



STANDARDS

Newage Stamford industrial generators meet the requirements of BS EN 60034 and the relevant section of other international standards such as BS5000, VDE 0530, NEMA MG1-32, IEC34, CSA C22.2-100, AS1359. Other standards and certifications can be considered on request.

VOLTAGE REGULATORS

SX460 AVR - STANDARD

With this self excited control system the main stator supplies power via the Automatic Voltage Regulator (AVR) to the exciter stator. The high efficiency semiconductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three phase full wave bridge rectifier. This rectifier is protected by a surge suppressor against surges caused, for example, by short circuit.

SX440 AVR

With this self-excited system the main stator provides power via the AVR to the exciter stator. The high efficiency semi-conductors of the AVR ensure positive build-up from initial low levels of residual voltage.

The exciter rotor output is fed to the main rotor through a three-phase full-wave bridge rectifier. The rectifier is protected by a surge suppressor against surges caused, for example, by short circuit or out-of-phase paralleling. The SX440 will support a range of electronic accessories, including a 'droop' Current Transformer (CT) to permit parallel operation with other ac generators.

If 3-phase sensing is required with the self-excited system, the SX421 AVR must be used.

SX421AVR

This AVR also operates in a self-excited system. It combines all the features of the SX440 with, additionally, three-phase rms sensing for improved regulation and performance. Over voltage protection is provided via a separate circuit breaker. An engine relief load acceptance feature is built in as standard.

MX341 AVR

This sophisticated AVR is incorporated into the Stamford Permanent Magnet Generator (PMG) control system.

The PMG provides power via the AVR to the main exciter, giving a source of constant excitation power independent of generator output. The main exciter output is then fed to the main rotor, through a full wave bridge, protected by a surge suppressor. The AVR has in-built protection against sustained over-excitation, caused by internal or external faults. This de-excites the machine after a minimum of 5 seconds.

An engine relief load acceptance feature can enable full load to be applied to the generator in a single step.

If three-phase sensing is required with the PMG system the MX321 AVR must be used.

We recommend three-phase sensing for applications with greatly unbalanced or highly non-linear loads.

MX321 AVR

The most sophisticated of all our AVRs combines all the features of the MX341 with, additionally, three-phase rms sensing, for improved regulation and performance. Over voltage protection is built-in and short circuit current level adjustments is an optional facility.

WINDINGS & ELECTRICAL PERFORMANCE

All generator stators are wound to 2/3 pitch. This eliminates triplen (3rd, 9th, 15th ...) harmonics on the voltage waveform and is found to be the optimum design for trouble-free supply of non-linear loads. The 2/3 pitch design avoids excessive neutral currents sometimes seen with higher winding pitches, when in parallel with the mains. A fully connected damper winding reduces oscillations during paralleling. This winding, with the 2/3 pitch and carefully selected pole and tooth designs, ensures very low waveform distortion.

TERMINALS & TERMINAL BOX

Standard generators are 3-phase reconnectable with 12 ends brought out to the terminals, which are mounted on a cover at the non-drive end of the generator. A sheet steel terminal box contains the AVR and provides ample space for the customers' wiring and gland arrangements. It has removable panels for easy access.

SHAFT & KEYS

All generator rotors are dynamically balanced to better than BS6861:Part 1 Grade 2.5 for minimum vibration in operation. Two bearing generators are balanced with a half key.

INSULATION/IMPREGNATION

The insulation system is class 'H'.

All wound components are impregnated with materials and processes designed specifically to provide the high build required for static windings and the high mechanical strength required for rotating components.

QUALITY ASSURANCE

Generators are manufactured using production procedures having a quality assurance level to BS EN ISO 9001.

The stated voltage regulation may not be maintained in the presence of certain radio transmitted signals. Any change in performance will fall within the limits of Criteria 'B' of EN 61000-6-2:2001. At no time will the steady-state voltage regulation exceed 2%.

NB Continuous development of our products entitles us to change specification details without notice, therefore they must not be regarded as binding.

STAMFORD

UCI274C

WINDING 311



UCI274C



Winding 311

THREE PHASE EFFICIENCY CURVES









UCI274C

Winding 311



THREE PHASE EFFICIENCY CURVES













Winding 311

Locked Rotor Motor Starting Curve



STAMFORD

UCI274C

Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.





Sustained Short Circuit = 550 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

| 50 | Hz | 60Hz | | | | |
|---------|-------------|---------|--------|--|--|--|
| Voltage | Factor | Voltage | Factor | | | |
| 380v | 380v X 1.00 | | X 1.00 | | | |
| 400v | X 1.07 | 440v | X 1.06 | | | |
| 415v | X 1.12 | 460v | X 1.12 | | | |
| 440v | 440v X 1.18 | | X 1.17 | | | |

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

| | 3-phase | 2-phase L-L | 1-phase L-N |
|-------------------------|---------|-------------|-------------|
| Instantaneous | x 1.00 | x 0.87 | x 1.30 |
| Minimum | x 1.00 | x 1.80 | x 3.20 |
| Sustained | x 1.00 | x 1.50 | x 2.50 |
| Max. sustained duration | 10 sec. | 5 sec. | 2 sec. |

All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For other connection the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732

UCI274C



Winding 311 / 0.8 Power Factor

| RATINGS | R | Α. | ΤI | Ν | G | S |
|---------|---|----|----|---|---|---|
|---------|---|----|----|---|---|---|

| | Class - Temp Rise | C | ont. F - | 105/40° | °C | Co | ont. H - | 125/40 | °C | Sta | andby - | 150/40 | °C | St | andby - | 163/27 | °C |
|----|-------------------|------|----------|---------|-------|-------|----------|--------|-------|-------|---------|--------|-------|-------|---------|--------|-------|
| 50 | Series Star (V) | 380 | 400 | 415 | 440 | 380 | 400 | 415 | 440 | 380 | 400 | 415 | 440 | 380 | 400 | 415 | 440 |
| 50 | Parallel Star (V) | 190 | 200 | 208 | 220 | 190 | 200 | 208 | 220 | 190 | 200 | 208 | 220 | 190 | 200 | 208 | 220 |
| п∠ | Series Delta (V) | 220 | 230 | 240 | 254 | 220 | 230 | 240 | 254 | 220 | 230 | 240 | 254 | 220 | 230 | 240 | 254 |
| | kVA | 84.0 | 84.0 | 84.0 | n/a | 100.0 | 100.0 | 100.0 | n/a | 106.0 | 106.0 | 106.0 | n/a | 110.0 | 110.0 | 110.0 | n/a |
| | kW | 67.2 | 67.2 | 67.2 | n/a | 80.0 | 80.0 | 80.0 | n/a | 84.8 | 84.8 | 84.8 | n/a | 88.0 | 88.0 | 88.0 | n/a |
| | Efficiency (%) | 90.7 | 91.1 | 91.3 | n/a | 89.8 | 90.3 | 90.6 | n/a | 89.5 | 90.0 | 90.4 | n/a | 89.2 | 89.8 | 90.2 | n/a |
| | kW Input | 74.1 | 73.8 | 73.6 | n/a | 89.1 | 88.6 | 88.3 | n/a | 94.7 | 94.2 | 93.8 | n/a | 98.7 | 98.0 | 97.6 | n/a |
| | | | | | | | | | | | | | | | | | |
| 60 | Series Star (V) | 416 | 440 | 460 | 480 | 416 | 440 | 460 | 480 | 416 | 440 | 460 | 480 | 416 | 440 | 460 | 480 |
| Hz | Parallel Star (V) | 208 | 220 | 230 | 240 | 208 | 220 | 230 | 240 | 208 | 220 | 230 | 240 | 208 | 220 | 230 | 240 |
| | Series Delta (V) | 240 | 254 | 266 | 277 | 240 | 254 | 266 | 277 | 240 | 254 | 266 | 277 | 240 | 254 | 266 | 277 |
| | kVA | 97.5 | 106.3 | 106.3 | 112.5 | 112.5 | 117.5 | 117.5 | 125.0 | 116.3 | 125.0 | 125.0 | 132.5 | 120.0 | 127.5 | 127.5 | 137.5 |
| | kW | 78.0 | 85.0 | 85.0 | 90.0 | 90.0 | 94.0 | 94.0 | 100.0 | 93.0 | 100.0 | 100.0 | 106.0 | 96.0 | 102.0 | 102.0 | 110.0 |
| | Efficiency (%) | 90.9 | 91.0 | 91.4 | 91.5 | 90.2 | 90.6 | 91.0 | 91.1 | 90.0 | 90.2 | 90.7 | 90.8 | 89.8 | 90.1 | 90.6 | 90.6 |
| | kW Input | 85.8 | 93.5 | 93.0 | 98.4 | 99.8 | 103.8 | 103.3 | 109.8 | 103.4 | 110.9 | 110.3 | 116.7 | 106.9 | 113.2 | 112.6 | 121.4 |



DIMENSIONS





| SINC | GLE BEARI | COUPLING DISCS | | | | |
|---------|-----------|----------------|-------|-------|----------|-------|
| ADAPTOR | A | B | C | D | DISC | AN |
| SAE 1 | 813,3 | 750,3 | 274,3 | 216,3 | SAE 10 | 53,98 |
| SAE 2 | 799 | 736 | 260 | 202 | SAE 11,5 | 39,68 |
| SAE 3 | 799 | 736 | 260 | 202 | SAE 14 | 25,40 |



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DSE**7310/20** AUTO START & AUTO MAINS FAILURE CONTROL MODULES

COMPREHENSIVE FEATURE LIST TO SUIT A

WIDE VARIETY OF GEN-SET APPLICATIONS

FEATURES

The DSE7310 is an Auto Start Control Module and the DSE7320 is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single, diesel or gas, gen-set applications.

Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs, remote PC and via SMS text alerts (with external modem). The DSE7320 will also monitor the mains (utility) supply. The modules include USB, RS232 and RS485 ports as well as dedicated DSENet® terminals for system expansion.

Both modules are compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements. The extensive list of features includes enhanced event and performance monitoring, remote communications, PLC functionality and dual mutual standby (DSE7310 only) to reduce engine wear.

The modules can be easily configured using the DSE Configuration Suite PC software. Selected front panel editing is also available.

ENVIRONMENTAL TESTING STANDARDS

ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2 EMC Generic Immunity Standard for the Industrial Environment BS EN 61000-6-4 EMC Generic Emission Standard for the Industrial Environment

ELECTRICAL SAFETY

BS EN 60950 Safety of Information Technology Equipment, including Electrical Business Equipment

TEMPERATURE

BS EN 60068-2-1 Ab/Ae Cold Test -30 °C BS EN 60068-2-2 Bb/Be Dry Heat +70 °C

VIBRATION

BS EN 60068-2-6 Ten sweeps in each of three major axes 5 Hz to 8 Hz @ +/-7.5 mm, 8 Hz to 500 Hz @ 2 gn

HUMIDITY

BS EN 60068-2-30 Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours BS EN 60068-2-78 Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

SHOCK

BS EN 60068-2-27 Three shocks in each of three major axes 15 gn in 11 mS

DEGREES OF PROTECTION

PROVIDED BY ENCLOSURES BS EN 60529

IP65 - Front of module when installed into the control panel with the supplied sealing gasket.





ISSUE 6



DSE**7310/20** AUTO START & AUTO MAINS FAILURE CONTROL MODULES

FEATURES

DSE**7320**

1

DSE7310



KEY FEATURES

- 4-Line back-lit LCD text display
- Five key menu navigation
- Front panel editing with PIN protection
- Customisable status screens
- · Power save mode
- Support for up to three remote display units
- 9 configurable inputs
- 8 configurable outputs
- Flexible sender inputs
- Configurable timers and alarms
- 3 configurable maintenance alarms
- Multiple date and time scheduler
- Configurable event log (250)
- Tier 4 CAN engine support
- Integral PLC editor
- Easy access diagnostic page
- CAN and Magnetic Pick-up/Alt. sensing
- Fuel usage monitor and low fuel alarms
- Charge alternator failure alarm
- Manual speed control (on compatible CAN engines)
- Manual fuel pump control
- Engine exerciser
- "Protections disabled" feature
- kW & kV Ar protection

- Reverse power (kW & kV Ar)
- protection
- LED and LCD alarm indication
 Power monitoring (kW h, kV Ar, kV
- A h, kV Ar h)
- Load switching (load shedding and dummy load outputs)
- Automatic load transfer (DSE7320)
- Unbalanced load protection
- Independent Earth Fault trip
- True dual mutual standby with load balancing timer (DSE7310 only)
- USB connectivity
- Backed up real time clock
- Fully configurable via DSE Configuration Suite PC software
- Configurable display languages
- Configurable display languages
 Remote SCADA monitoring via DSE Configuration Suite PC
- software
- User selectable RS232 and RS485 communications
- Configurable Gencomm pages
 Advanced SMS messaging (additional external modem)
- required)Start & stop capability via SMS
- MessagingAdditional display screens to help
- with modern diagnostics
 - Idle control for starting & stopping.
- DSENet[®] expansion compatible

KEY BENEFITS

- 132 x 64 pixel ratio display for clarity
- Real-time clock provides accurate event logging
- Multiple date and time scheduler
- Set maintenance periods can be configured to maintain optimum engine performance
- Ethernet communications (via DSE860/865 modules), provides advanced remote monitoring at low cost
- Modules can be integrated into building management systems (BMS)
- Increased input and output expansion capability via DSENet[®]
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- PLC editor allows user configurable functions to meet specific application requirements



SPECIFICATION

DC SUPPLY

CONTINUOUS VOLTAGE RATING 8 V to 35 V Continuous

CRANKING DROPOUTS

Able to survive 0 V for 50 mS, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

MAXIMUM OPERATING CURRENT 340 mA at 12 V, 160 mA at 24 V

MAXIMUM STANDBY CURRENT 160 mA at 12 V, 80 mA at 24 V

CHARGE FAIL/EXCITATION RANGE 0 V to 35 V

MAINS (UTILITY) DSE7320 ONLY VOLTAGE RANGE 15 V - 333 V AC (L-N)

FREQUENCY RANGE 3.5 Hz to 75 Hz

OUTPUTS OUTPUT A (FUEL) 15 A DC at supply voltage

OUTPUT B (START) 15 A DC at supply voltage

OUTPUTS C & D 8 A 250 V (Volt free)

AUXILIARY OUTPUTS E,F,G,H 2 A DC at supply voltage

GENERATOR VOLTAGE RANGE 15 V - 333 V AC (L-N)

FREQUENCY RANGE 3.5 Hz to 75 Hz

MAGNETIC PICK UP VOLTAGE RANGE

+/- 0.5 V to 70 V

FREQUENCY RANGE 10,000 Hz (max)

DIMENSIONS OVERALL

240 mm x 181 mm x 42 mm 9.4" x 7.1" x 1.6"

PANEL CUT-OUT 220 mm x 160 mm 8.7" x 6.3"

MAXIMUM PANEL THICKNESS 8 mm 0.3"

| RELATED MATERIALS | |
|--|--|
| TITLE | |
| DSE7310 Installation Instructions | |
| DSE7320 Installation Instructions | |
| DSE7200/7300 Quick Start Guide | |
| DSE7200/7300 Operator Manual | |
| DSE7200/7300 Configuration Suite PC Manual | |

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Deep Sea Electronics PIc maintains a policy of continuous development and reserves the right to change the details shown on this data sheet without prior notice. The contents are intended for guidance only.

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