

SPECIFICATION SHEET

QUIET CONNECT™ Series RS80



Shown with
Sound Level 1 option

Features and benefits

Robust product design and testing - The generator is designed to operate under extreme environmental conditions including cold weather starts at as low as -40 °F when equipped with the necessary accessories. The generator is tested and certified per the latest EPA, UL and IBC Seismic standards and is capable of meeting NFPA 110 requirements when equipped with the necessary accessories and properly installed.

Flexible exercise mode - The innovative, flexible exercise mode enables the generator to exercise at a time, frequency and duration that suits the customer's preference - as little as 2 minutes every 6 months - reducing unnecessary fuel consumption, emissions and noise.

Advanced enclosure design - The aesthetically appealing enclosure incorporates special designs that deliver the quietest generator of its kind. Aluminum material plus durable powder coat paint provides the best anti-corrosion performance. The generator set enclosure has been evaluated to withstand 180 mph wind loads in accordance with ASCE 7-10. The design has hinged doors to provide easy access for service and maintenance.

Control system - The PowerCommand® electronic control is standard equipment and provides total generator set 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.

Self-diagnostics and easy service - The PowerCommand® electronic control provides industry-leading self-diagnostic capabilities. In addition, critical components of the generator are designed to ensure service and preventive maintenance can be completed in a short period of time.

Weight, size, and sound level

Weight: 2782 lbs. (1262 kg)

Size: Length 118.7 in (3016 mm), width 40.0 in (1016 mm), height 58.3 in (1480 mm)

Sound: 73 dB(A) at 23 ft. (7 m) with sound level 1 enclosure

| Series | Model | Phase | Voltage (V) | Frequency (Hz) | Rated amps ¹ (NG/LPV fuel) | Circuit breaker (Amps) |
|--------|-------|-------|-------------|----------------|--|---------------------------|
| RS80 | C80N6 | 1 | 120/240 | 60 | 333/333 | 125-400 |
| | | 3 | 120/208 | 60 | 278/278 | 125-400 |
| | | 3 | 120/240 | 60 | 241/241 | 70-250 |
| | | 3 | 277/480 | 60 | 120/120 | 150 |

¹Derating guidelines: Engine power available up to 1829 m (6000 ft.) at ambient temperatures up to 40 °C (104 °F).

Above these elevations derate at 4% per 305m (1000 ft.) and 2% per 10 °C above 40 °C (104 °F).

Product features

Engine

- Natural gas/propane 1800 rpm engine
- Engine air cleaner – normal duty
- Electronic governor, isochronous
- Engine starter, 12 VDC motor
- Shutdown – low oil pressure
- Extension – oil drain
- Engine oil – included

Fuel system

- Single fuel – natural gas or propane vapor, field selectable

Alternator

- 60 Hz, 1 phase, 4 lead, or 3 phase, 12 lead,
- 120 °C temperature rise at 40 °C ambient
- Exciter/Voltage regulator – torque match

Control

- PowerCommand 1.1
- Display language – English
- Control mounting, left facing

Electrical

- Single circuit breaker, UL certified, right-side mounted
- Battery charging alternator, normal duty
- Battery charger – 6 Amp, regulated

Cooling

- Generator set cooling capability – 50 °C
- Shutdown – low coolant level
- Engine coolant – 50/50 mixture
- Extension – coolant drain

Enclosure

- Aluminum enclosure Sound Level 1 with muffler installed, sandstone color
- Wind rating – 180 mph

Code compliance

- UL 2200
- EPA emissions, stationary emergency, 40CFR60
- IBC Seismic
- NFPA 110 capable

Generator set application

- Coolant heater
- Crank case vent heater
- Battery rack
- Flexible fuel line
- Literature (English) – operator's manual, installation manual

Packaging

- Shipping pallet

Generator set performance

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: ± 0.25% @ 60 Hz

Radio frequency emissions compliance: FCC code

Title 47 part 15 Class B

Engine Specifications

Design: Turbocharged and aftercooled

Bore: 102.1 mm (4.02 in)

Stroke: 119.9 mm (4.72 in)

Displacement: 5.9 liters (359 in³)

Cylinder block: Cast iron, in-line 6 cylinder

Battery capacity: 850 Amps at ambient temperature of 0 °F to 32 °F (-18 °C to 0 °C)

Battery charging alternator: 52 Amps

Starting voltage: 12 Volt, negative ground

Lube oil filter type(s): Spin-on with relief valve

Standard cooling system: 50° C (122° F) ambient cooling system

Rated speed: 1800 rpm

Fuel supply pressure

Minimum fuel supply pressure: 1.5 kPa (6.0 in H₂O)

Maximum fuel supply pressure: 3.5 kPa (14.0 in H₂O)

Warranty

Base warranty – 2-year standby

Extended warranties available

Typical fuel consumption

Fuel consumption – natural gas

| Load: | 1/4 | 1/2 | 3/4 | Full |
|----------------------|-------|-------|-------|--------|
| ft ³ /hr: | 455.3 | 678.7 | 877.0 | 1083.5 |
| m ³ /hr: | 12.9 | 19.2 | 24.8 | 30.7 |

Fuel consumption – LP vapor

| Load: | 1/4 | 1/2 | 3/4 | Full |
|----------------------|-------|------|-------|-------|
| ft ³ /hr: | 181.9 | 263 | 339.8 | 420.8 |
| m ³ /hr: | 5.2 | 7.5 | 9.6 | 11.9 |
| gal/hr | 5.00 | 7.23 | 9.34 | 11.56 |

Conversion factor:

8.58 ft³ =

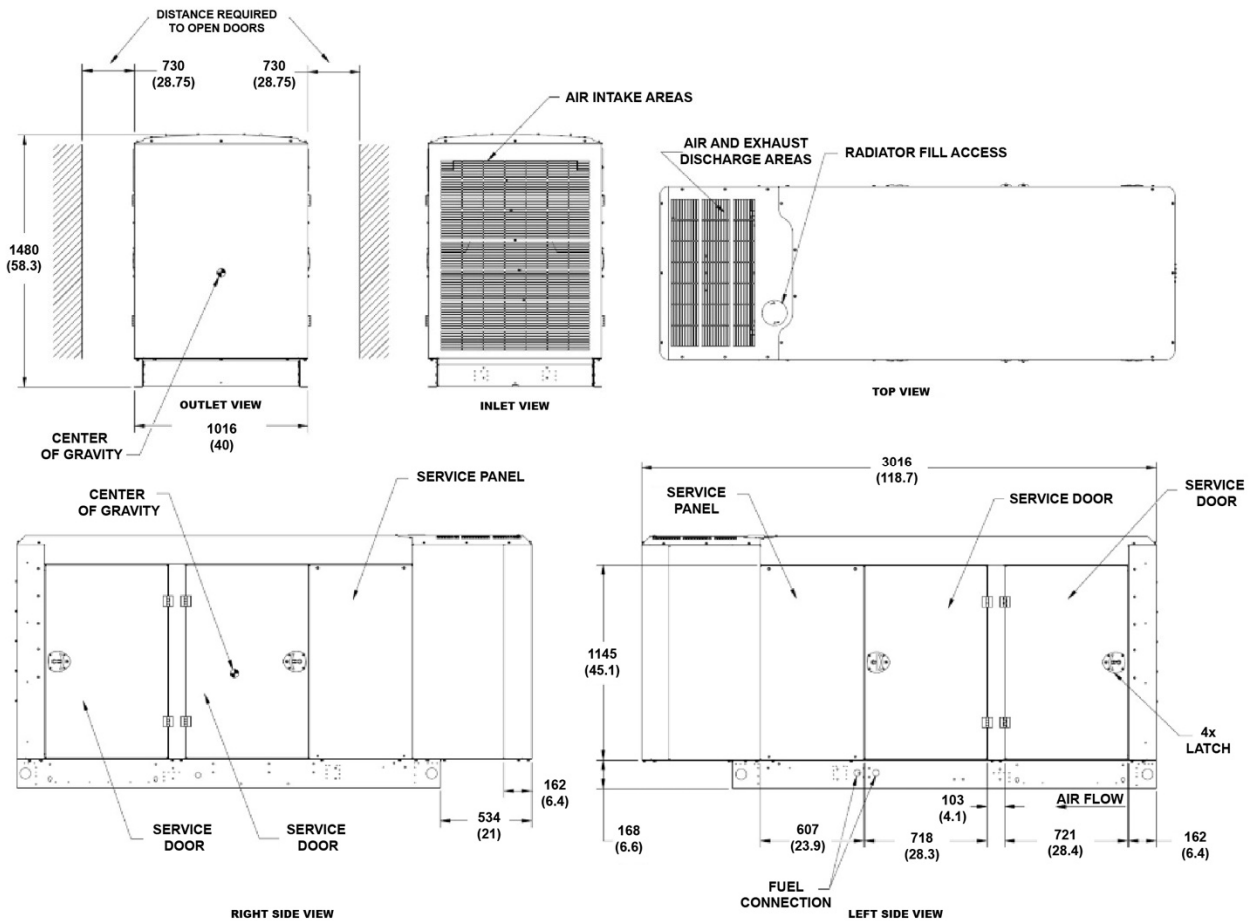
1 lb

0.535m³ =

1 kg

36.39 ft³ = 1 gal

Basic dimensions



Note: This outline drawing is provided for general reference only and is not intended for use in design or installation. For more information, see Operators and Installation manuals or contact your dealer for assistance.

Accessories

- HMI211RS in-home display, including pre-configured 12" harness
- HMI211 remote display, including pre-configured 12" harness
- HMI220 remote display
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS 485
- Internet monitoring device – PowerCommand 500
- Battery chargers – stand-alone, 12V
- Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- Enclosure paint touch up kit
- Base barrier – elevated generator set
- Alternator heater
- Maintenance and service kit
- Extreme cold weather kit for operating temperatures below 0 °F (-17 °C)



WARNING:

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. See T030.

WARNING:

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

Transfer switch (sold separately)

- Automatic Transfer Switches available at various amperages. (Refer to NAS-5810-EN, S-1639)
- Service Entrance models are also available, which helps reduce the installation cost.
- All models listed to UL 1008 standard.
- Available for both indoor and outdoor applications.
- Compatibility with Cummins generator set helps reduce the installation time for the complete application.

Warranty policy

Cummins RS liquid cooled generator set models come with a 2 year base warranty when used in EPA-Stationary Emergency application. The RA series Automatic Transfer Switches come with a 2 year base warranty. Extended warranty options are available. Please contact your Cummins dealer for details.

After sale support

Largest dealer support network

Cummins generator sets are supported by the best trained and certified dealer network in the industry. This network of knowledgeable dealers will help you select the right generator for your application and advise you on associated accessories for your generator. Cummins dealers can also help answer any questions you may have regarding operation and maintenance requirements of the generators. Certified dealers also offer a complete selection of commonly used generator set maintenance parts and manuals.

Manuals: Operation and installation manuals ship with the generator set. To obtain additional copies or other manuals for this model, see your dealer. To easily locate the nearest certified dealer for Cummins generators in your area, or for more information, contact us at 1-800-344-0039 or visit power.cummins.com.

Contact your dealer for more information.

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Columbus, IN 47202-3005
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NAS-6170-EN (7/21)

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Generator set data sheet



Model: C80 N6
Frequency: 60 Hz
Fuel type: Natural gas/propane
kW rating: 80 natural gas Standby
 80 propane Standby
Emissions level: EPA Emissions

| Fuel consumption | Natural gas Standby | | | | Propane Standby | | | |
|-------------------------|---------------------|------------|------------|-------------|-----------------|------------|------------|-------------|
| | kW (kVA) | | | | kW (kVA) | | | |
| Ratings | 80 (100) | | | | 80 (100) | | | |
| Load | 1/4 | 1/2 | 3/4 | Full | 1/4 | 1/2 | 3/4 | Full |
| scfh | 450.5 | 671.5 | 867.7 | 1072.0 | 182.9 | 264.2 | 340.0 | 427.2 |
| m³/hr | 12.76 | 19.02 | 24.57 | 30.36 | 5.18 | 7.48 | 9.63 | 12.10 |

| Engine | Natural gas Standby rating | Propane Standby rating |
|--------------------------------------|-------------------------------|------------------------|
| Engine model | QSJ5.9G-G3 | |
| Configuration | Cast iron, in-line 6 cylinder | |
| Aspiration | Turbocharged and after-cooled | |
| Gross engine power output, kWm (bhp) | 121.3 (162.7) | |
| Bore, mm (in.) | 102.1 (4.02) | |
| Stroke, mm (in.) | 119.9 (4.72) | |
| Rated speed, rpm | 1800 | |
| Compression ratio | 8.5:1 | |
| Lube oil capacity, L (qt) | 14.2 (15) | |
| Overspeed limit, rpm | 2250 | |

| Fuel supply pressure | |
|---|------------|
| Minimum operating pressure, kPa (in H ₂ O) | 1.5 (6.0) |
| Maximum operating pressure, kPa (in H ₂ O) | 3.2 (13.0) |

| Air | Natural gas Standby rating | Propane Standby rating |
|--|----------------------------|------------------------|
| Combustion air, m ³ /min (scfm) | 7.6 (268.1) | 7.6 (269.1) |
| Maximum normal duty air cleaner restriction, kPa (in H ₂ O) | 0.4 (1.5) | 0.4 (1.5) |
| Maximum heavy duty air cleaner restriction, kPa (in H ₂ O) | 3.7 (15) | 3.7 (15) |

| Exhaust | Natural gas Standby rating | Propane Standby rating |
|--|-----------------------------------|-------------------------------|
| Exhaust flow at rated load, m ³ /min (cfm) | 23.0 (810.8) | 21.2 (750.2) |
| Exhaust temperature, °C (°F) | 633.9 (1173.1) | 644.0 (1191.2) |
| Exhaust maximum back pressure, kPa (in H ₂ O) | 7 (28.1) | 7 (28.1) |

Standard set-mounted radiator cooling¹

| | |
|--|--------------|
| Ambient design, °C (°F) | 50 (122) |
| Fan load, kW (HP) | 9 (12) |
| Coolant capacity (with radiator), L (US gal) | 16 (4.2) |
| Cooling system air flow, m ³ /min (scfm) | 218.0 (7700) |
| Maximum cooling air flow static restriction, kPa (in H ₂ O) | 0.12 (0.5) |

Weights²

| | |
|---------------------------|-------------|
| Unit dry weight kgs (lbs) | 1216 (2680) |
| Unit wet weight kgs (lbs) | 1255 (2766) |

Notes:

¹ For non-standard remote installations contact your local Cummins representative.

² Weights represent a set with standard features. See outline drawing for weights of other configurations.

Alternator data

| Standard alternators | Natural gas/propane single phase table | Natural gas/propane three phase table | | | | | Full single phase output, reconnectable | |
|---|--|---------------------------------------|---------|---------|---------|---------|---|-----|
| | | | | | | | | |
| Maximum temperature rise above 40 °C ambient | 120 °C | 120 °C | 120 °C | 120 °C | 120 °C | 120 °C | 120 °C | |
| Feature code | BB90-2 | B986-2 | B946-2 | B943-2 | B952-2 | BB86-2 | BB88-2 | |
| Alternator data sheet number | ADS-206 | ADS-205 | ADS-205 | ADS-205 | ADS-205 | ADS-206 | ADS-208 | |
| Voltage ranges | 120/240 | 120/240 | 120/208 | 277/480 | 347/600 | 127/220 | 120 - 480 | |
| Voltage feature code | R104-2 | R106-2 | R098-2 | R002-2 | R114-2 | R020-2 | Varies by voltage | |
| Surge kW | 96.9 | 103.4 | 103.4 | 103.2 | 103.2 | 103.2 | Varies by voltage | |
| Motor starting kVA (at 90% sustained voltage) | Shunt | 313 | 260 | 260 | 260 | 260 | 313 | 422 |
| | PMG | 368 | 306 | 306 | 306 | 306 | 368 | 497 |
| Full load current amps at Standby rating | 333 | 241 | 278 | 120 | 92 | 262 | Varies by voltage | |

Alternator data (continued)

| Optional alternators for improved starting capability | Natural gas/propane single phase table | Natural gas/propane three phase table | | | | | Full single phase output, reconnectable |
|---|--|---------------------------------------|---------|---------|---------|---------|---|
| | | | | | | | |
| Maximum temperature rise above 40 °C ambient | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C | 105 °C |
| Feature code | BB91-2 | BB94-2 | BB93-2 | BB95-2 | BB92-2 | BB85-2 | BB87-2 |
| Alternator data sheet number | ADS-207 | ADS-206 | ADS-206 | ADS-206 | ADS-206 | ADS-206 | ADS-208 |
| Voltage ranges | 120/240 | 120/240 | 120/208 | 277/480 | 347/600 | 127/220 | 120 - 480 |
| Voltage feature code | R104-2 | R106-2 | R098-2 | R002-2 | R114-2 | R020-2 | Varies by voltage |
| Surge kW | 97.7 | 102.8 | 102.8 | 103.6 | 103.6 | 103.6 | Varies by voltage |
| Motor starting kVA (at 90% sustained voltage) | Shunt | 360 | 313 | 313 | 313 | 313 | 422 |
| | PMG | 423 | 368 | 368 | 368 | 368 | 497 |
| Full load current amps at Standby rating | 333 | 241 | 278 | 120 | 92 | 262 | Varies by voltage |

Derating factors

Natural gas/propane

| | |
|---------|--|
| Standby | Engine power available up to 1829 m (6000 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations derate at 4% per 305 m (1000 ft) and 2% per 10 °C above 40 °C (104 °F). |
|---------|--|

Ratings definitions

| Emergency Standby Power (ESP): | Limited-Time Running Power (LTP): | Prime Power (PRP): | Base Load (Continuous) Power (COP): |
|--|--|---|--|
| 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. | Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528. | 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. | Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) is in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514. |

Formulas for calculating full load currents:

Three phase output

$$\frac{\text{kW} \times 1000}{\text{Voltage} \times 1.73 \times 0.8}$$

Single phase output

$$\frac{\text{kW} \times \text{SinglePhaseFactor} \times 1000}{\text{Voltage}}$$

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.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™





PowerCommand®

1.1 Control System



Description

The PowerCommand control system is a microprocessor-based generator set monitoring, metering and control system designed to meet the demands of today's engine driven generator sets. The integration of all control functions into a single control system provides enhanced reliability and performance compared to conventional generator set control systems. These control systems have been designed and tested to meet the harsh environment in which gensets are typically applied.

Features

Easy to view: HMI 211RS for residential use. 128 x 64 pixel graphic LED backlight LCD.

Easy to use: Tactile buttons for generator set start/stop. Residential Standby display for convenient use.

Modbus® interface: Eliminates need for MODLON.

Progressive protective functions: Advanced Overcurrent Protection – Generator set monitoring & protection.

Digital voltage regulation: Single phase full wave SCR type regulator compatible with either shunt or PMSG systems.

Digital engine speed governing: Provides isochronous frequency regulation.

12 and 24 VDC battery operation.

Automatic mains failure: Smooth & automatic transfer and re-transfer of load from utility to generator set & vice-versa.

Exerciser clock: Runs generator set exerciser routines for dependability of operation.

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

Certification: Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC Mil Std., CE, UKCA and CSA standards.

PowerCommand Digital Generator Set Control PCC 1302



Description

The PowerCommand generator set control is suitable for use on a wide range of generator sets in non-parallel applications. The PowerCommand control is compatible with shunt or PMG excitation style. It is suitable for use with reconnectable or non-reconnectable generators, and it can be configured for any frequency, voltage and power connection from 120-600 VAC Line-to-Line.

Power for this control system is derived from the generator set starting batteries. The control functions over a voltage range from 8 VDC to 30 VDC.

Features

- 12 and 24 VDC battery operation.
- Digital voltage regulation.
- Digital engine speed governing (where applicable) - Provides isochronous frequency regulation.
- Full authority engine communications (where applicable) - Provides communication and control with the Engine Control Module (ECM).
- Common harnessing - with higher feature Cummins controls allows for easy field upgrades.
- Generator set monitoring - Monitors status of all critical engine and alternator functions.
- Digital genset metering (AC and DC).
- Genset battery monitoring system - to sense and warn against a weak battery condition.
- Engine starting - Includes relay drivers for starter, fuel shut off (FSO), glow plug/spark ignition power and switch B+ applications.
- Generator set protection - Protects engine and alternator.
- Advanced serviceability - using InPower™, a PC-based software service tool.
- Environmental protection - The control system is designed for reliable operation in harsh environments. The main control board is a fully encapsulated module that is protected from the elements.
- Exerciser function – Routine exercising of generator set.
- Supports dual fuel control.
- Automatic Mains Failure function built in generator set controller. Modbus interface - for interconnecting to customer equipment.

- Configurable inputs and outputs - Four discrete inputs and two dry contact relay outputs.
- Warranty and service - Backed by a comprehensive warranty and worldwide distributor service network.
- Certifications - Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE, UKCA and CSA standards.

Base Control Functions

HMI capability

Operator adjustments - The HMI includes provisions for many set up and adjustment functions.

Generator set hardware data - Access to the control and software part number, generator set rating in kVA and generator set model number is provided from the HMI or InPower™.

Data logs - Includes engine run time, controller on time, number of start attempts.

Fault history - Provides a record of the most recent fault conditions with control hours time stamp. Up to 10 events are stored in the control non-volatile memory.

Alternator data

- Voltage (single or three phase Line-to-Line and Line-to-Neutral)
- Current (single or three phase)
- kVA (three phase and total)
- Frequency
- Engine data
- Starting battery voltage
- Engine speed
- Engine temperature
- Engine oil pressure
- Partial Full Authority Engine (FAE) data (where applicable)
- Service adjustments - The HMI includes provisions for adjustment and calibration of generator set control functions. Adjustments are protected by a password. Functions include:
 - Engine speed governor adjustments
 - Voltage regulation adjustments
 - Cycle cranking
 - Configurable fault set up
 - Configurable output set up
 - Meter calibration
 - Units of measurement

Engine control

SAE-J1939 CAN interface to full authority ECMs (where applicable) - Provides data swapping between genset and engine controller for control, metering and diagnostics.

12 VDC/24 VDC battery operations - PowerCommand will operate either on 12 VDC or 24 VDC batteries.

Isochronous governing (where applicable) - Capable of controlling engine speed within +/-0.25% for any steady state load from no load to full load. Frequency drift will not exceed +/-0.5% for a 33 °C (60 °F) change in ambient temperature over an 8 hour period.

Temperature dependent governing dynamics (with electronic governing) - Modifies the engine governing control parameters as a function of engine temperature. This allows the engine to be more responsive when warm and more stable when operating at lower temperature levels.

Remote start mode - Accepts a ground signal from remote devices to automatically start the generator set and immediately accelerate to rated speed and voltage. The remote start signal will also wake up the control from sleep mode. The control can incorporate a time delay start and stop.

Remote and local Emergency stop - The control accepts a ground signal from a local (genset mounted) or remote (facility mounted) Emergency stop switch to cause the generator set to immediately shut down. The generator set is prevented from running or cranking with the switch engaged. If in sleep mode, activation of either Emergency stop switch will wake up the control.

Sleep mode - The control includes a configurable low current draw state to minimize starting battery current draw when the genset is not operating. The control can also be configured to go into a low current state while in auto for Prime applications or applications without a battery charger.

Engine starting - The control system supports automatic engine starting. Primary and backup start disconnects are achieved by one of three methods: magnetic pickup, battery charging alternator feedback or main alternator output frequency. The control also supports configurable glow plug control when applicable.

Cycle cranking - Configurable for the number of starting cycles (1 to 7) and duration of crank and rest periods. Control includes starter protection algorithms to prevent the operator from specifying a starting sequence that might be damaging.

Time delay start and stop (cooldown) - Configurable for time delay of 0-300 seconds prior to starting after receiving a remote start signal and for time delay of 0-600 seconds prior to shut down after signal to stop in normal operation modes. Default for both time delay periods is 0 seconds.

Alternator control

The control includes an integrated line-to-line sensing voltage regulation system that is compatible with shunt or PMG excitation systems. The voltage regulation system is full wave rectified and has an SCR output for good motor starting capability. Major system features include:

Digital output voltage regulation - Capable of regulating output voltage to within +/-1.0% for any loads between no load and full load. Voltage drift will not exceed +/-1.5% for a 40 °C (104 °F) change in temperature in an eight hour period. On engine starting or sudden load acceptance, voltage is controlled to a maximum of 5% overshoot over nominal level.

The automatic voltage regulator feature can be disabled to allow the use of an external voltage regulator.

Torque-matched V/Hz overload control - The voltage roll-off set point and rate of decay (i.e. the slope of the V/Hz curve) is adjustable in the control.

Protective Functions

On operation of a protective function the control will indicate a fault by illuminating the appropriate status LED on the HMI, as well as display the fault code and fault description on the LCD. The nature of the fault and time of occurrence are logged in the control. The service manual and InPower service tool provide service keys and procedures based on the service codes provided. Protective functions include:

Battle short mode

When enabled and the battle short switch is active, the control will allow some shutdown faults to be bypassed. If a bypassed shutdown fault occurs, the fault code and description will still be annunciated, but the genset will not shutdown. This will be followed by a fail to shutdown fault. Emergency stop shutdowns and others that are critical for proper operation are not bypassed. Please refer to the Control Application Guide or Manual for list of these faults.

Configurable alarm and status inputs

The control accepts up to four alarm or status inputs (configurable contact closed to ground or open) to indicate a configurable (customer-specified) condition. The control is programmable for warning, shutdown or status indication and for labelling the input.

Emergency stop

Annunciated whenever either Emergency stop signal is received from external switch.

General engine protection

Low and high battery voltage warning - Indicates status of battery charging system (failure) by continuously monitoring battery voltage.

Weak battery warning - The control system will test the battery each time the generator set is signaled to start and indicate a warning if the battery indicates impending failure.

Fail to start (overcrank) shutdown - The control system will indicate a fault if the generator set fails to start by the completion of the engine crank sequence.

Fail to crank shutdown - Control has signaled starter to crank engine but engine does not rotate.

Cranking lockout - The control will not allow the starter to attempt to engage or to crank the engine when the engine is rotating.

Hydro mechanical fuel system engine protection

Overspeed shutdown - Default setting is 115% of nominal.

Low lube oil pressure warning/shutdown - Level is pre-set (configurable with InPower) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High lube oil temperature warning/shutdown - Level is pre-set (configurable with InPower) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

High engine temperature warning/shutdown - Level is pre-set (configurable with InPower) to match the capabilities of the engine used. Control includes time delays to prevent nuisance alarms.

Low coolant temperature warning - Indicates that engine temperature may not be high enough for a 10 second start or proper load acceptance.

Sensor failure indication - Logic is provided on the base control to detect analog sensor or interconnecting wiring failures.

Full authority electronic engine protection

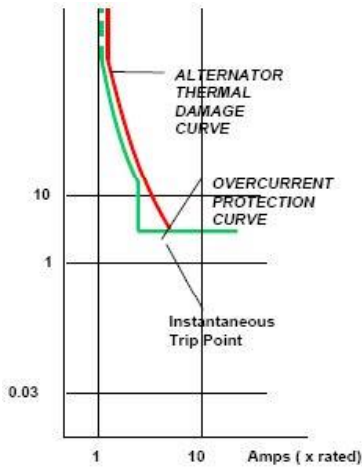
Engine fault detection is handled inside the engine ECM. Fault information is communicated via the SAE-J1939 data link for annunciation in the HMI

Alternator protection

High AC voltage shutdown (59) - Output voltage on any phase exceeds pre-set values. Time to trip is inversely proportional to amount above threshold. Values adjustable from 105-130% of nominal voltage, with time delay adjustable from 0.1-10 seconds. Default value is 110% for 10 seconds.

Low AC voltage shutdown (27) - Voltage on any phase has dropped below a pre-set value. Adjustable over a range of 50-95% of reference voltage, time delay 2-20 seconds. Default value is 85% for 10 seconds.

Overcurrent warning/shutdown - Implementation of the thermal damage curve with instantaneous trip level calculated based on current transformer ratio and application power rating.



Under frequency shutdown (81 u) - Generator set output frequency cannot be maintained. Settings are adjustable from 2-10 Hz below nominal governor set point, for a 5-20 second time delay. Default: 6 Hz, 10 seconds.

Over frequency shutdown/warning (81 o) - Generator set is operating at a potentially damaging frequency level. Settings are adjustable from 2-10 Hz above nominal governor set point for a 1-20 second time delay. Default: 6 Hz, 10 seconds, enabled.

Loss of sensing voltage shutdown - Shutdown of generator set will occur on loss of voltage sensing inputs to the control.

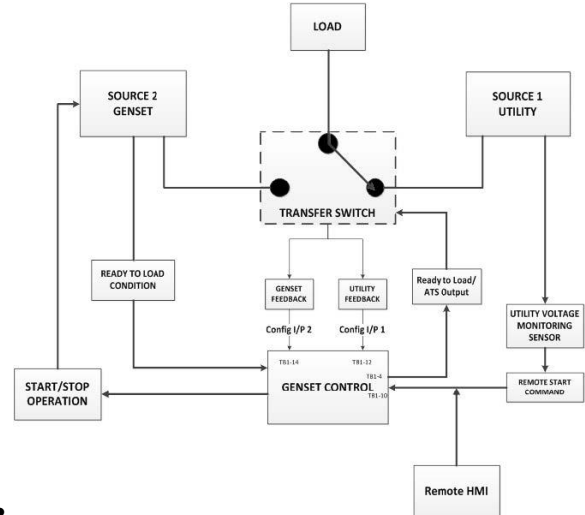
Field overload shutdown - Uses field voltage to shutdown generator set when a field overload condition occurs.

Advanced Functions

Automatic mains failure*

The built in AMF feature provides the automatic transfer and re-transfer of the load from utility to generator set and vice-versa.

- Automatically starts-stops the generator set in the event of utility failure.
- Annunciates faults.



- * A utility voltage monitoring sensor (as shown in the AMF diagram above) must be connected in order to use the AMF feature on the 1302 control. Use Schneider Electric Relay RSB1A120U7 and Socket RSZE1S35M.

Exerciser clock

The exerciser clock runs the generator set exerciser routines for dependability of operation.

Field Control Interface

Input signals to the base control include:

- Remote start
- Local and Emergency stop
- Configurable inputs: Control includes (4) input signals from customer discrete devices that are configurable for warning, shutdown or status indication, as well as message displayed.

Output signals from the PowerCommand control include:

- Configurable relay outputs: Control includes (2) relay output contacts rated at 2 A. These outputs can be configured to activate on any control warning or shutdown fault as well as ready to load, not in auto, common alarm, common warning and common shutdown.
- Ready to load (generator set running) signal: Operates when the generator set has reached 90% of rated speed and voltage and latches until generator set is switched to off or idle mode.

PowerCommand Human Machine Interface HMI211



Description

This control system includes an intuitive operator interface panel that allows for complete genset control as well as system metering, fault annunciation, configuration and diagnostics. The interface includes five generator set status LED lamps with both internationally accepted symbols and English text to comply with customer needs. The interface also includes an LED backlit LCD display with tactile feel soft-switches for easy operation and screen navigation. It is configurable for units of measurement and has adjustable screen contrast and brightness.

The *run/off/auto* switch function is integrated into the interface panel.

All data on the control can be viewed by scrolling through screens with the navigation keys. The control displays the current active fault and a time-ordered history of the five previous faults.

Features

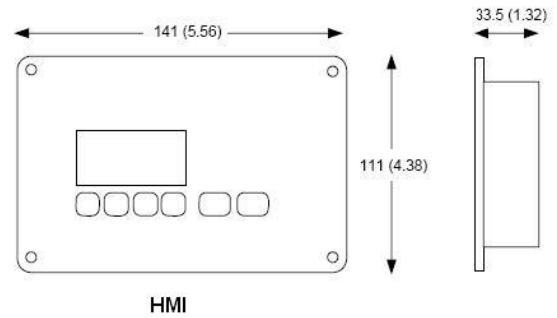
- LED indicating lamps:
 - Remote start
 - Not in auto
 - Shutdown
 - Warning
 - Auto
 - Run
- 128 x 64 pixels graphic LED backlight LCD.
- Four tactile feel membrane switches for LCD defined operation. The functions of these switches are defined dynamically on the LCD.
- Two tactile feel membrane switches dedicated for off and back.
- Allows for complete genset control setup.
- Certifications: Suitable for use on generator sets that are designed, manufactured, tested and certified to relevant UL, NFPA, ISO, IEC, Mil Std., CE, UKCA and CSA standards.
- HMI 211RS provides convenience for residential use.

Communications Connections

PC tool interface - This RS-485 communication port allows the HMI to communicate with a personal computer running InPower.

This RS-485 communication port allows the HMI to communicate with the main control board.

Mechanical Drawing



Dimensions: mm (inches)

Software

InPower (beyond 6.0 version) is a PC-based software service tool that is designed to directly communicate to PowerCommand generator sets and transfer switches, to facilitate service and monitoring of these products.

Environment

The control is designed for proper operation without recalibration in ambient temperatures from -40 °C (-40 °F) to +70 °C (158 °F), and for storage from -55 °C (-67 °F) to +80 °C (176 °F). Control will operate with humidity up to 95%, non-condensing.

The HMI is designed for proper operation in ambient temperatures from -40 °C* (-40 °F) to +70 °C (158 °F), and for storage from -40 °C* (-40 °F) to +80 °C (176 °F).

The control board is fully encapsulated to provide superior resistance to dust and moisture. Display panel has a single membrane surface, which is impervious to effects of dust, moisture, oil and exhaust fumes. This panel uses a sealed membrane to provide long reliable service life in harsh environments.

The control system is specifically designed and tested for resistance to RFI/EMI and to resist effects of vibration to provide a long reliable life when mounted on a generator set. The control includes transient voltage surge suppression to provide compliance to referenced standards.

* Heater accessory (pn: A040H853) is available for enhanced operation below -20 °C

Certifications

PowerCommand meets or exceeds the requirements of the following codes and standards:

- NFPA 110 for level 1 and 2 systems.
- ISO 8528-4: 1993 compliance, controls and switchgear.
- CE and UKCA marking: The control system is suitable for use on generator sets to be CE and UKCA-marked.
- EN 50081-1,2 residential/light industrial emissions or industrial emissions.
- EN 50082-1,2 residential/light industrial or industrial susceptibility.
- ISO 7637-2, level 2: DC supply surge voltage test.
- Mil Std. 202C, Method 101 and ASTM B117: Salt fog test.
- PowerCommand control systems and generator sets are designed and manufactured in ISO 9001 certified facilities.
- UL 6200 recognized and suitable for use on UL 2200 Listed generator sets.
- CSA C282-M1999 compliance.
- CSA 22.2 No. 14 M91 industrial controls.

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

Accessories

| | |
|----------------------------|-----------|
| 1301-1302 Upgrade Kit (HM) | 0541-1431 |
| PowerCommand 500 (LAN) | A040X126 |
| Remote HMI 211 | 0541-1394 |
| Remote HMI 211RS | A046K103 |
| I/O Expansion (Aux 101) | 0541-1291 |
| HMI Heater Accessory Kit | A040H853 |

Parts Ordering Information

| | |
|----------------------------|--------------|
| 1302 Control Board | 0327-1617-02 |
| 1302 control Board – Arrow | A043W505 |
| Aux 104 (Governor Control) | 0327-1507 |
| HMI 211 Without Heater | 0300-6014 |
| HMI 211 with Heater | A026G237 |

Additional Resources

| Resource | Where to find |
|---------------------------------|--|
| 1302 Service Manual | QSOL |
| Accessories Catalog | cumminspower.com |
| Additional Controls Information | PowerSuite Library |



For more information contact your local Cummins distributor or visit power.cummins.com

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Alternator data sheet

Frame size: UC2G

| Characteristics | | | | | | | | |
|--|------------------------|-------------------|----------------|----------------|---------------------------|----------------|----------------|----------------|
| Weights: | Wound stator assembly: | 287 lb | 130 kg | | | | | |
| | Rotor assembly: | 276 lb | 125 kg | | | | | |
| | Complete alternator: | 816 lb | 370 kg | | | | | |
| Maximum speed: | | 2250 rpm | | | | | | |
| Excitation current: | Full load: | 2 Amps | | | | | | |
| | No load: | 0.5 Amps | | | | | | |
| Insulation system: | Class H throughout | | | | | | | |
| 1 ∅ Ratings (1.0 power factor) | | 60 Hz | | | 50 Hz | | | |
| (Based on specific temperature rise at 40 °C ambient temperature) | | Double delta | 4 lead | | Double delta | | | |
| | | <u>120/240</u> | <u>120/240</u> | | 110-120 <u>220-240</u> | | | |
| 125 °C rise ratings | kW/kVA | 63/63 | 75/75 | | 57/57 | | | |
| 105 °C rise ratings | kW/kVA | 59/59 | 66/66 | | 50/50 | | | |
| 3 ∅ Ratings (0.8 power factor) | | Upper broad range | | LBR* | 347/600 | Broad range | | |
| (Based on specified temperature rise at 40 °C ambient temperature) | | <u>120/208</u> | <u>139/240</u> | 190-208 | | <u>110/190</u> | <u>120/208</u> | <u>127/220</u> |
| | | <u>240/416</u> | <u>277/480</u> | <u>380-416</u> | <u>347/600</u> | <u>220/380</u> | <u>240/415</u> | <u>254/440</u> |
| 150 °C Rise ratings | kW | 79 | 88 | 82 | 88 | 70 | 70 | 65 |
| | kVA | 98 | 110 | 103 | 110 | 88 | 88 | 81 |
| 125 °C Rise ratings | kW | 75 | 83 | 80 | 83 | 68 | 68 | 63 |
| | kVA | 94 | 104 | 100 | 104 | 85 | 85 | 79 |
| 105 °C Rise ratings | kW | 70 | 76 | 75 | 76 | 60 | 60 | 57 |
| | kVA | 88 | 95 | 94 | 95 | 75 | 75 | 71 |
| 80 °C Rise ratings | kW | 60 | 66 | 65 | 66 | 54 | 54 | 50 |
| | kVA | 75 | 83 | 81 | 83 | 68 | 68 | 63 |
| 3 ∅ Reactances (per unit, ± 10%) | | | | | | | | |
| (Based on full load at 105 °C rise rating) | | | | | | | | |
| Synchronous | | 2.48 | 2.02 | 2.02 | 1.77 | 2.15 | 1.80 | 1.52 |
| Transient | | 0.18 | 0.15 | 0.15 | 0.13 | 0.17 | 0.14 | 0.12 |
| Subtransient | | 0.12 | 0.10 | 0.10 | 0.09 | 0.11 | 0.10 | 0.08 |
| Negative sequence | | 0.13 | 0.11 | 0.11 | 0.10 | 0.13 | 0.11 | 0.09 |
| Zero sequence | | 0.09 | 0.08 | 0.08 | 0.08 | 0.09 | 0.08 | 0.07 |
| 3 ∅ Motor starting | | | | | | | | |
| Maximum kVA | (Shunt) | 260 | 260 | 260 | | 189 | | |
| (90% sustained voltage) | (PMG) | 306 | 306 | 306 | | 236 | | |
| Time constants (Sec) | | | | | | | | |
| Transient | | 0.030 | 0.030 | 0.030 | | 0.030 | | |
| Subtransient | | 0.008 | 0.008 | 0.008 | | 0.008 | | |
| Open circuit | | 0.750 | 0.750 | 0.750 | | 0.750 | | |
| DC | | 0.007 | 0.007 | 0.007 | | 0.007 | | |



Alternator data sheet

Frame size: **UC2G**

| Windings | (@ 20 °C) | | | | |
|-------------------|----------------------|--------|--------|--------|--------|
| Stator resistance | (Line to Line, Ohms) | 0.1200 | 0.0720 | 0.1660 | 0.1200 |
| Rotor resistance | (Ohms) | 0.9300 | 0.9300 | 0.9300 | 0.9300 |
| Number of leads | | 12 | 12 | 6 | 12 |

* Lower broad range 110/190 thru 120/208, 220/380 thru 240/416.



Exhaust Emission Data Sheet

C80 N6

60 Hz Spark Ignited Generator Set

EPA Emissions

Engine Information:

| | | | |
|--------------------------|---|---------------|--------------------------|
| Model: | QSJ5.9G-G3 | Bore: | 4.02 in. (102.1 mm) |
| Type: | 4 cycle, in-line, 6 cylinder | Stroke: | 4.72 in. (119.9 mm) |
| Aspiration: | Turbocharged and Aftercooled | Displacement: | 359 cu. in. (5.9 liters) |
| Compression Ratio: | 8.5:1 | | |
| Emission Control Device: | Electronic Air/Fuel Ratio & Closed-Loop Breather System | | |

| | <u>Natural Gas</u> | <u>Propane</u> |
|--|--------------------|--------------------------------------|
| <u>Performance Data</u> | <u>Standby</u> | <u>Standby</u> |
| BHP @ 1800 RPM (60 Hz) | 127.6 | 127.6 |
| Fuel Consumption (SCFH) | 1072.0 | 427.2 |
| Exhaust Gas Flow (CFM) | 840.0 | 784.3 |
| Exhaust Gas Temperature (°F) | 1224.0 | 1274.0 |
| Air to Fuel Ratio | 23.4 | 22.0 |
| <u>Exhaust Emission Data</u> | | |
| HC (Total Unburned Hydrocarbons)* | 0.80 | 0.48 |
| NOx (Oxides of Nitrogen as NO ₂) | 1.53 | 1.78 |
| CO (Carbon Monoxide) | 0.88 | 1.39 |
| | | All values above are cited: g/BHP-hr |
| HC (Total Unburned Hydrocarbons)* | 393 | 247 |
| NOx (Oxides of Nitrogen as NO ₂) | 238 | 305 |
| CO (Carbon Monoxide) | 215 | 351 |
| | | All values above are cited: ppmv |

*HC includes NMHC, VOC, POC, and ROC constituents (Non-Methane HC, Volatile Organic Compounds, Precursor Organic Compounds and Reactive Organic Compounds).

Test Conditions

Data is representative of steady-state engine speed (± 25 RPM) with full load ($\pm 2\%$). Pressures, temperatures, and emission rates were stabilized.

| | |
|-------------------------|---|
| Fuel Specification: | Natural Gas: Dry gas received from Supplier (1000 BTU/SCF) Propane: Meets the requirements for Commercial Grade Propane under the ASTM D1835 Standard Specification for Liquefied Gases. |
| Fuel Temperature: | 60 \pm 9 °F at flow transmitter |
| Fuel Pressure: | 14.73 PSIA \pm 0.5 PSIA at Flow Transmitter |
| Intake Air Temperature: | 77 \pm 9 °F at inlet |
| Barometric Pressure: | 22.92 in Hg \pm 1 in. Hg |
| Humidity: | NOx measurement corrected to 75 grains H ₂ O/lb dry air |

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



Sound Pressure Level @ 7 meters, dB(A)

See Notes 2,5,7-11 listed below

| Configuration | | Position (Note 1) | | | | | | | | 8 Position Average |
|--|------------------|-------------------|------|------|------|------|------|------|------|--------------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| Standard Unhoused | Infinite Exhaust | 74.8 | 79.1 | 77.9 | 80.6 | 76.8 | 81.2 | 78.6 | 78.8 | 78.9 |
| F216-2 Weather Protective Enclosure, Aluminium | Mounted | 76.9 | 81.1 | 79.8 | 83 | 79.6 | 82.3 | 79.9 | 79.9 | 80.7 |
| F231-2 Sound Attenuated Level 1 Enclosure, Aluminium | Mounted | 75.5 | 74.7 | 70.2 | 72.9 | 72.3 | 73.1 | 69.8 | 74.8 | 73.3 |
| F217-2 Sound Attenuated Level 2 Enclosure, Aluminium | Mounted | 70.5 | 71.5 | 69 | 70.9 | 70.9 | 70.6 | 67.9 | 71.6 | 70.5 |

Sound Power Level, dB(A)

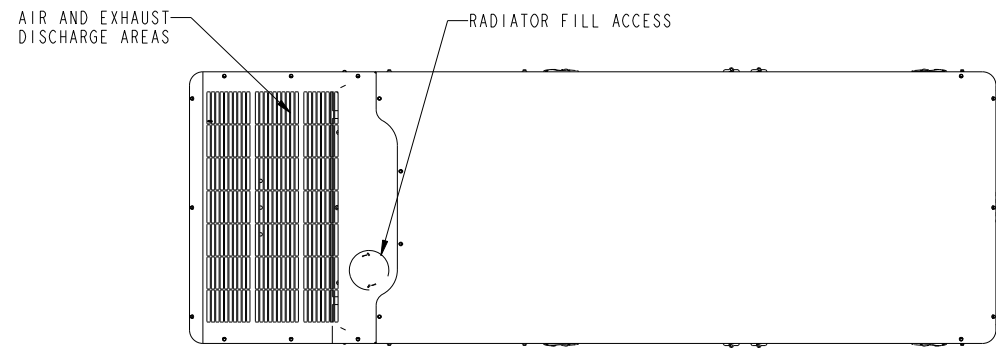
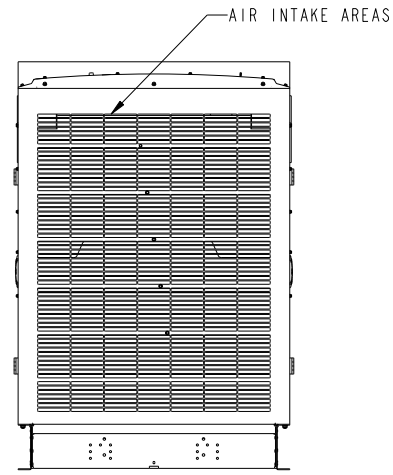
See Notes 1,3,6-11 listed below

| Configuration | | Octave Band Center Frequency (Hz) | | | | | | | | | | Overall Sound Power Level |
|--|------------------|-----------------------------------|------|------|------|-------|-------|-------|------|------|-------|---------------------------|
| | | 31.5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | |
| Standard Unhoused | Infinite Exhaust | 54.3 | 70.7 | 81.9 | 90.6 | 99.9 | 101.2 | 100.9 | 96.4 | 92.4 | 87.2 | 106.4 |
| F216-2 Weather Protective Enclosure, Aluminium | Mounted | 56.0 | 89.6 | 96.6 | 93.6 | 100.2 | 100.5 | 99.8 | 96.7 | 94.3 | 87.2 | 106.7 |
| F231-2 Sound Attenuated Level 1 Enclosure, Aluminium | Mounted | 56.5 | 73.1 | 82.2 | 89.0 | 96.4 | 96.7 | 96.0 | 92.0 | 87.4 | 79.9 | 102.1 |
| F217-2 Sound Attenuated Level 2 Enclosure, Aluminium | Mounted | 57.6 | 73.2 | 82.4 | 87.4 | 93.9 | 92.4 | 90.8 | 87.1 | 83.1 | 75.6 | 98.4 |

| REL NO | LTR | NO | REVISION | DRN | CAD | APVD | DATE |
|------------|-----|----|--------------------|-----|-----|-------------|---------|
| ECO-152551 | A | 1 | PRODUCTION RELEASE | CG | NK | M. WICKMANN | 14MAY15 |
| | | | | | | | |

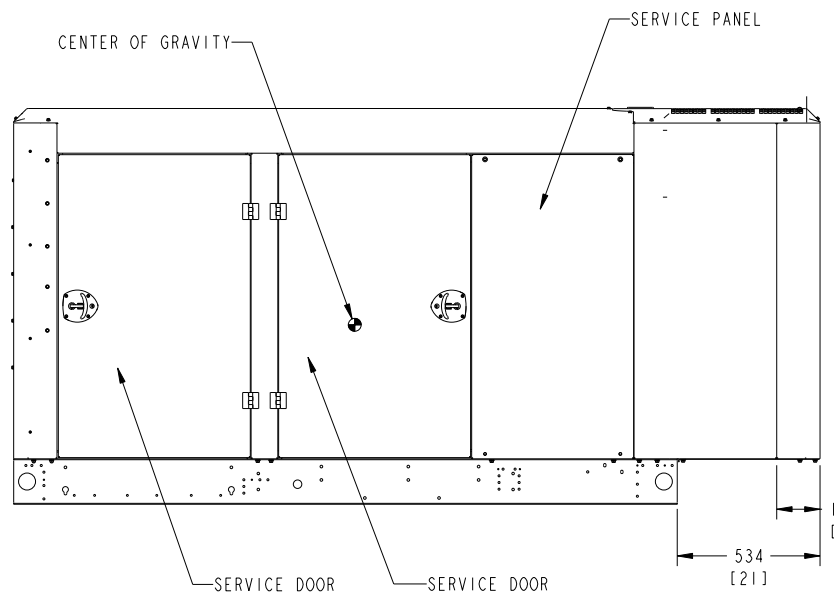
NOTES:

- DIM [] IN INCHES
- WHEN THE HOUSING INSTALLED ON AN OPEN GENERATOR SET, THE TOTAL WEIGHT WILL INCREASE BY 131.5 KG (290 LBS). THIS INCLUDES THE MUFFLER.
- THE CENTER OF GRAVITY (CG) OF THE GENERATOR SET WHEN EQUIPPED WITH THIS HOUSING SHIFTS APPROXIMATELY 65mm (2.55 inch) TOWARDS THE AIR DISCHARGE END OF THE HOUSING AND 42MM (1.66 INCH) HIGHER FROM THE GROUND, COMPARED TO THE EQUIVALENT NON-HOUSED PRODUCT WITH THE F179 SKID. SEE HOUSING READY SKID BASE OUTLINE DRAWING FOR CG LOCATION OF NON HOUSED PRODUCT.

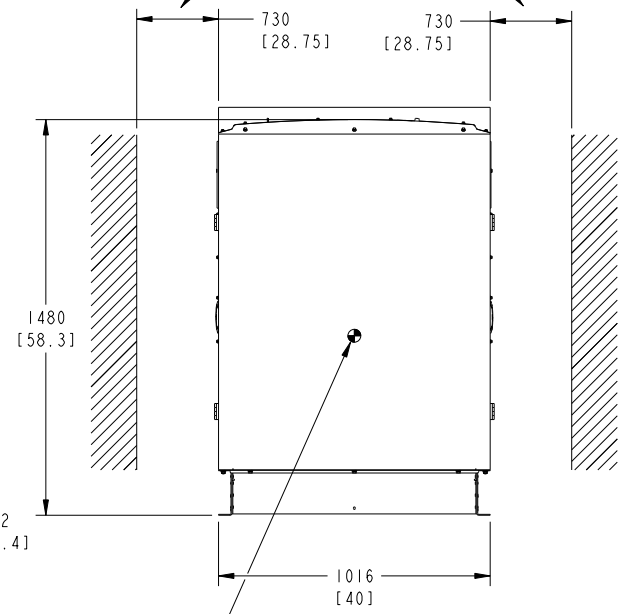


DISTANCE REQUIRED TO OPEN DOORS

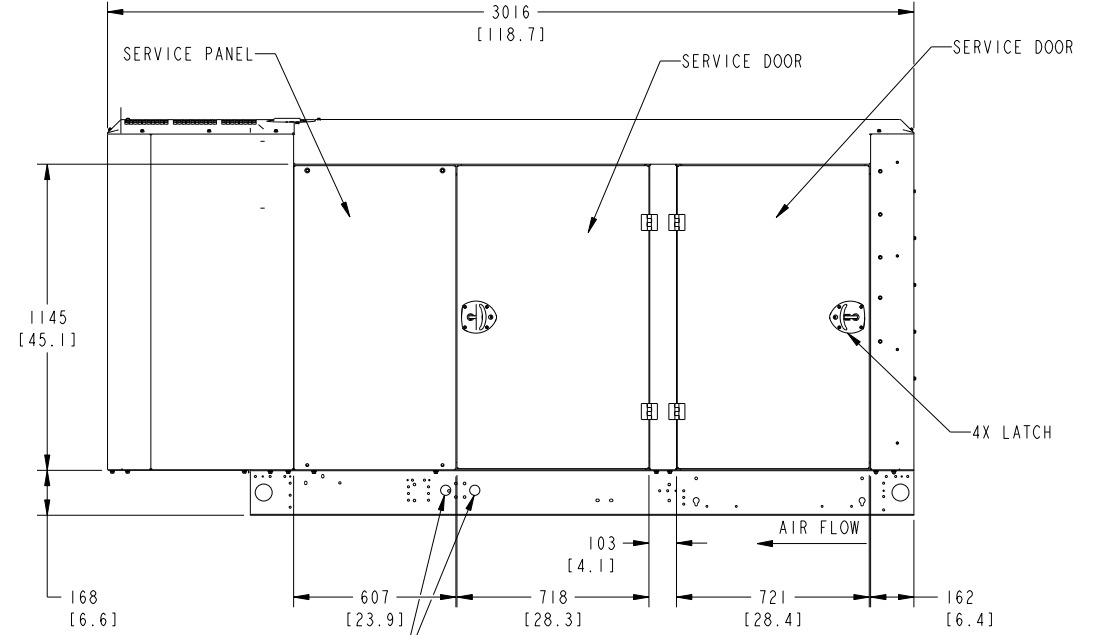
TOP VIEW



RIGHT SIDE VIEW



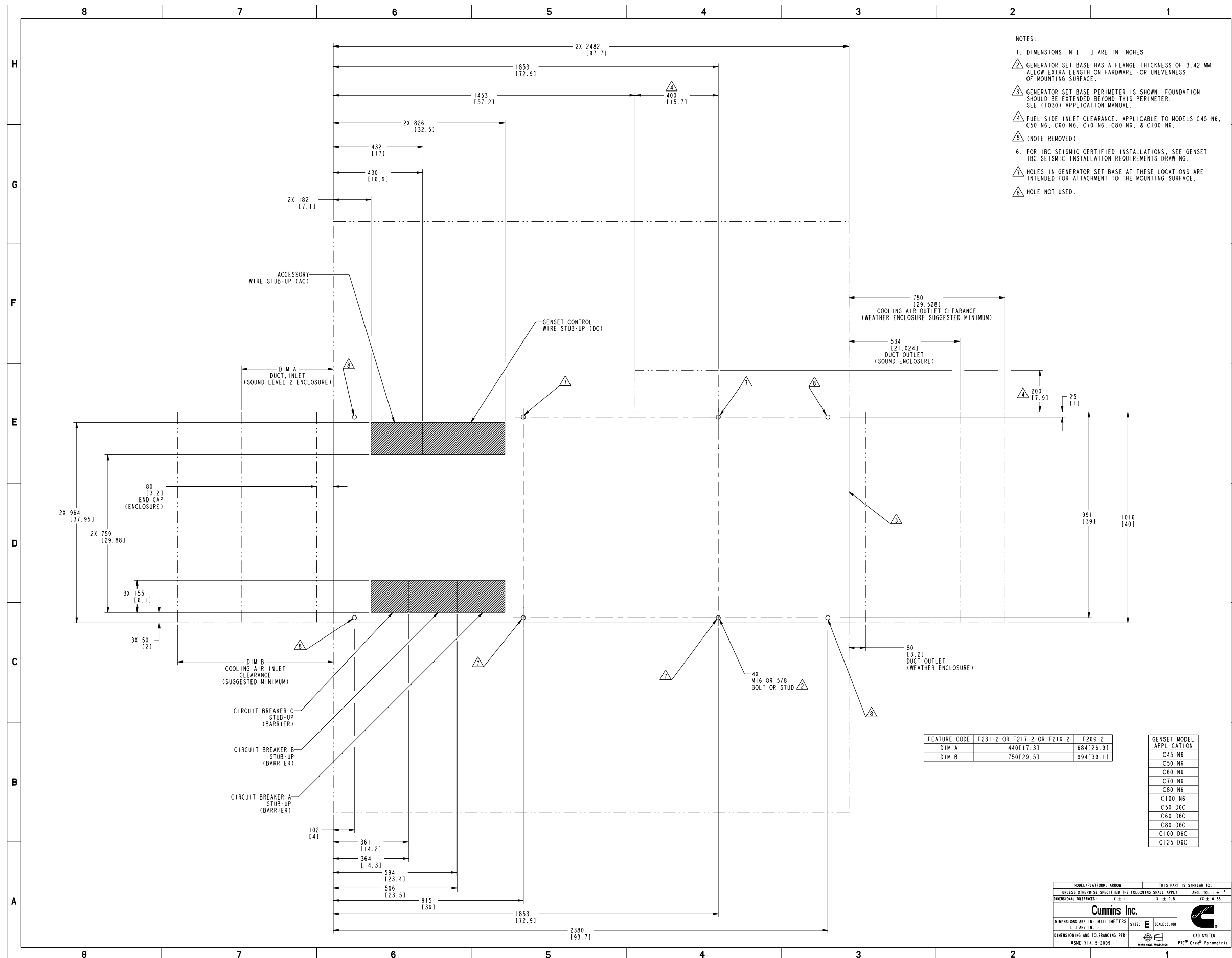
OUTLET VIEW



LEFT SIDE VIEW

F231-2 ENCLOSURE CONFIGURATION

| | | | | | | |
|---|------------|-------------------------|--|-----------|--------------------------|----------|
| UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS | | SIM 10 NONE | DRN C. GADE | | CUMMINS POWER GENERATION | |
| DO NOT SCALE PRINT | | CD N. KASIBHOTLA | OUTLINE, ENCLOSURE | | | |
| CH | X ± 1 | 0.00- 4.99 +0.15/-0.08 | APVD M. WICKMANN | SITE CODE | REV D | A051P365 |
| | .X ± 0.8 | 5.00- 9.99 +0.20/-0.10 | DATE 14MAY15 | PGF | SHEET 1 OF 2 | REV A |
| | .XX ± 0.38 | 10.00-17.49 +0.25/-0.13 | | ARROW | | |
| | | 17.50-24.99 +0.30/-0.13 | | | | |
| ANG TOL: ± 1.0° | | SCALE: ~3/32 | FOR INTERPRETATION OF DIMENSIONS AND TOLERANCING, SEE ASME Y14.5M-1994 | | | |



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