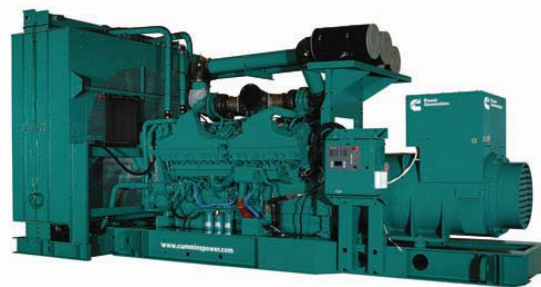


Bill of Materials
Re: 2250KW

Item	Description	Qty
	Diesel Genset: 60Hz-2250kW	
Install-US-Stat	Installation-In USA, Stationary	1
2250DQKH	Genset-Diesel, 60Hz, 2250kW-Standby Rating	1
A331-2	Duty Rating-Standby Power	1
L090-2	Listing-UL 2200	1
L097-2	Emissions-EPA, Tier1, NR Levels CI	1
R002-2	Voltage-277/480,3 Phase,Wye,4 Wire	1
B453-2	Alt-60Hz,Y480V,150-105C-SPC,40C amb	1
H611-2	Set Control-PCC	1
H605-2	Display-Control, Graphical	1
H606-2	Meters-AC Output, Analog	1
H608-2	Control Mounting-Right Facing	1
KP80-2	Circuit Breaker – 3000A Breaker	1
H666-2	Indication-Ground Fault, 3-Pole Xfr Sw, Rmt Mt CT	1
C127-2	Separator-Fuel/Water	1
A334-2	Engine Starter-24 VDC Motor	1
A333-2	Battery Charging Alternator-Normal Output	1
E041-2	Engine Cooling-Radiator	1
H556-2	Coolant Heater-208/240/480V	1
D041-2	Engine Air Cleaner-Normal Duty	1
H607-2	Filters-Engine Oil, Full Flow and Bypass	1
L028-2	Genset Warranty-1 Year Comprehensive	1
0416-0527	Battery Rack & Hold down Assembly	1
BA	Batteries	1
BC	Battery Charger	1
VI	Vibration Isolators	1
CM	Critical Muffler (Shipped Loose)	1
EF	Exhaust Flex (Shipped Loose)	1
EN	Weather Protective Enclosure	1
FT	24 Hour Subbase Fuel Tank	1

Diesel generator set QSK60 series engine EPA emissions



> Specification sheet

1450 kW - 2250 kW 60 Hz

1200 kW - 2000 kW 50 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, prime power and continuous duty power applications.



This generator set is designed in facilities certified to ISO9001 and manufactured in facilities certified to ISO9001 or ISO9002.



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

All 60 Hz models comply with EPA emissions requirements for stationary applications. Some 60 Hz models comply with EPA TPEM requirements for mobile applications.

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 - 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.

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

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

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DQKB	1750 (2188)	1500 (1875)	1600 (2000)	1350 (1688)	1450 (1813)	1200 (1500)	D-3220/3224	D-3221
DQKC	2000 (2500)	1650 (2063)	1825 (2281)	1500 (1875)	1600 (2000)	1200 (1500)	D-3222/3225	D-3223
DQKD		1800 (2250)		1600 (2000)		1320 (1650)		D-3250
DQKH	2250 (2813)	2000 (2500)					D-3235	D-3236

Generator set specifications

Governor regulation class	ISO8528 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 through IEC 801.5; MIL STD 461C, Part 9

Engine specifications

Design	4 cycle, V-block, turbocharged and low temperature aftercooled
Bore	158.8 mm (6.25 in)
Stroke	190.0 mm (7.48 in)
Displacement	60.2 litres (3673 in ³)
Cylinder block	Cast iron, 60°V, 16 cylinder
Battery capacity	2200 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	40 amps
Starting voltage	24 volt, negative ground
Fuel system	Direct injection: number 2 diesel fuel
Fuel filter	Triple element, 10 micron filtration, spin-on fuel filters with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Four spin-on, combination full flow and bypass filters
Standard cooling system	104 °F (40 °C) ambient radiator

Alternator specifications

Design	Brushless, 4 pole, revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible disc
Insulation system	Class H is available on low and medium voltage, Class F is available on high voltage
Standard temperature rise	150 °C standby
Exciter type	PMG (permanent magnet generator)
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 line-neutral/line-line	50 Hz line-neutral/line-line
<ul style="list-style-type: none"> • 219/380 • 254/440 • 277/480 • 347/600 • 2400/4160 • 7200/12470 • 7620/13200 • 7970/13800 	<ul style="list-style-type: none"> • 220/380 • 230/400 • 240/415 • 254/440 • 1905/3300 • 3640/6300 • 3810/6600 • 6350/11000

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine

- ☐ Low exhaust emission configuration DQKB 60 Hz, 5.5 g/hp-hr NO_x data sheet D-3224
- ☐ DQKC 60 Hz, 5.5 g/hp-hr NO_x data sheet D-3225
- ☒ 208/240/480 V coolant heater for ambient above 4.5 °C (40 °F)
- ☐ 208/240/480 V coolant heater for ambient below 4.5 °C (40 °F)
- ☐ High capacity oil pan

Cooling system

- ☐ Radiator, 50 °C ambient
- ☐ Heat exchanger cooling
- ☐ Remote radiator cooling

Control panel

- ☐ 120/240 V, 100 W control anti-condensation space heater
- ☐ Paralleling configurations
- ☐ Remote fault signal package
- ☐ Run relay package

Exhaust system

- ☐ Industrial grade exhaust silencer
- ☐ Residential grade exhaust silencer
- ☒ Critical grade exhaust silencer

Alternator

- ☐ 80 °C rise alternator
- ☐ 105 °C rise alternator
- ☐ 125 °C rise alternator
- ☐ 120/240 V, 300 W anti-condensation heater
- ☐ Temperature sensor - RTDs, 2/phase
- ☐ Temperature sensor - alternator bearing RTD
- ☐ Differential current transformers

Generator set

- ☐ DQKC 60 Hz, 5.5 g/hp-hr NO_x data sheet D-3225
- ☐ 208/240/480 V coolant heater
- ☐ Batteries
- ☒ Battery Rack w/hold-down - floor standing
- ☒ Circuit breaker - set mounted
- ☐ Disconnect switch - set mounted
- ☐ PowerCommand network
- ☐ Remote annunciator panel
- ☒ Spring isolators
- ☐ 2 year warranty
- ☐ 5 year 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-1383p (9/07)



Control system

Operator panel features

Analog AC metering panel - Provides color-coded display of generator set output voltage, current, frequency, power factor and kW. All phases of voltage and current are simultaneously displayed. Easy to see output status from a distance.

Graphical data display - Allows operator to view all engine and alternator data; perform operator adjustments for speed, voltage and time delays; view fault history; and set up and adjust the generator set (set up requires password access). A portion of the display is allocated to display system status including alarm and shutdown conditions. Display is controlled by sealed membrane switches. Up to 9 lines of data can be displayed with approximately 26 characters per line.

LED status lamps - The status lamps indicate remote start command (green), not in auto (red-flashing), warning (amber) and shutdown (red).

Mode selector switch - Off/manual/auto and run/stop switches allow remote automatic starting or manual starting from the operator panel. Panel includes an LED lamp to indicate manual mode operation.

Exerciser switch - Automated exercise function in the control allows an operator to initiate an exercise period and have it automatically completed by the control.

Fault reset switch - Allows the operator to reset the control after a warning or shutdown condition. LED lamp with switch indicates that a fault is present on the system.

Panel lamps and switch - Operator panel can be illuminated by a series of high-intensity LED lamps controlled by a membrane switch on the panel. Panel lamps include a time delay to automatically switch off after a preset time period.

Emergency stop switch - Provides positive and immediate shutdown of the generator set on operation.

Construction - Operator panel is a sealed design with membrane switches for most functions. Mechanical switches are oil-tight design. Plug interfaces are provided to the generator set control system. Display panel labeling is configurable for language.

Standard control functions

- Integrated Isochronous governing and fuel control system.
- Integrated 3-phase sensing voltage regulation system with automatic single and three phase fault regulation.
- Integrated AC protective functions include over/under voltage, short-circuit, overcurrent (warning and shutdown) and overload.
- Integrated engine management system including configurable cycle-cranking functions and configurable start sequence.
- Comprehensive warning and shutdown protection including customer configurable warning and shutdown conditions.
- Comprehensive data displays including 3-phase AC voltage, current, power factor, kW and kVA; engine oil pressure, coolant temperature, DC volts and other service functions; operating history (load and fault conditions) and system setup information.

Options

- ☐ Integrated digital paralleling controls including options for semi-automatic and automatic (isolated bus) applications.
- ☐ LonMark compliant network interface.
- ☐ Control anti-condensation heater.
- ☐ Key-type mode select switch.
- ☐ Relay outputs for genset running, common warning and common shutdown.
- ☐ Exhaust temperature alarm.
- ☐ Alternator temperature alarm(s).
- ☐ Centinel™ lube oil burn system.
- ☐ Power transfer control function to allow generator set to control remote power circuit breakers for open, fast closed or soft (ramping) power transfer from a utility source to the genset (2 minute maximum fail-to-disconnect timer).



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Ratings definitions

Emergency standby power (ESP):

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

Limited-time running power (LTP):

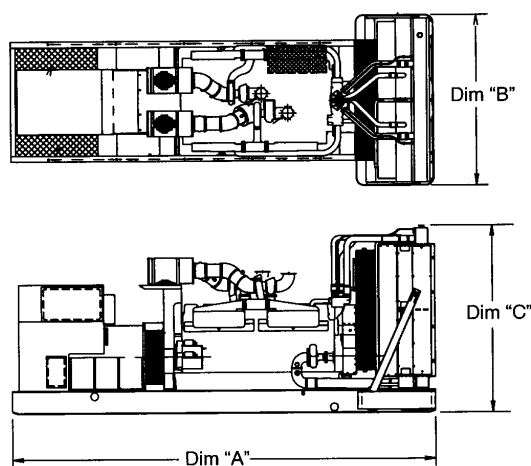
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime power (PRP):

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

Base load (continuous) power (COP):

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



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

Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DQKB	6175 (243)	2286 (90)	2537 (100)	14365 (31669)	14868 (32779)
DQKC	6175 (243)	2286 (90)	2537 (100)	14649 (32296)	15152 (33405)
DQKD	6175 (243)	2286 (90)	2537 (100)	14863 (32767)	15366 (33876)
DQKH	6175 (243)	2494 (98)	3116 (123)	15254 (33629)	15781 (34790)

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

Cummins Power Generation

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Telephone: 763 574 5000
Fax: 763 574 5298

Important: 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-1383p (9/07)



Model: DQKH
Frequency: 60
Fuel type: Diesel

➤ **Generator set data sheet**
2250 kW standby

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Exhaust emission data sheet:	EDS-1014
Emission compliance sheet:	EPA-1067
Sound performance data sheet:	MSP-1001
Cooling performance data sheet:	MCP-126
Prototype test summary data sheet:	PTS-155
Standard set-mounted radiator cooling outline:	0500-3877
Optional set-mounted radiator cooling outline:	
Optional heat exchanger cooling outline:	
Optional remote radiator cooling outline:	0500-3878

Fuel consumption	Standby				Prime				Continuous
	kW (kVA)				kW (kVA)				kW (kVA)
Ratings	2250 (2812)								
Load	1/4	1/2	3/4	Full	1/4	1/2	3/4	Full	Full
US gph	45	80	113	150					
L/hr	171	303	429	569					

Engine	Standby rating	Prime rating	Continuous rating
Engine manufacturer	Cummins Inc.		
Engine model	QSK60-G9		
Configuration	Cast iron, 60°V 16 cylinder		
Aspiration	Turbocharged and low temperature aftercooled		
Gross engine power output, kWm (bhp)	2425 (3251)		
BMEP at set rated load, kPa (psi)	2682 (389)		
Bore, mm (in)	159 (6.25)		
Stroke, mm (in)	190 (7.48)		
Rated speed, rpm	1800		
Piston speed, m/s (ft/min)	11.4 (2243)		
Compression ratio	14.5:1		
Lube oil capacity, L (qt)	176 (186)		
Overspeed limit, rpm	2100 ±50		
Regenerative power, kW	207		

Fuel flow			
Maximum fuel flow, L/hr (US gph)	1685 (445)		
Maximum fuel inlet restriction, kPa (in Hg)	8.4 (2.5)		
Maximum fuel inlet temperature, °C (°F)	71 (160)		

Air	Standby rating	Prime rating	Continuous rating
Combustion air, m ³ /min (scfm)	183 (6455)		
Maximum air cleaner restriction, kPa (in H ₂ O)	6.2 (25)		
Alternator cooling air, m ³ /min (cfm)	161 (5700)		

Exhaust

Exhaust gas flow at set rated load, m ³ /min (cfm)	445 (15705)		
Exhaust gas temperature, °C (°F)	479 (895)		
Maximum exhaust back pressure, kPa (in H ₂ O)	6.7 (27)		

Standard set-mounted radiator cooling

Ambient design, °C (°F)	40 (104)		
Fan load, kW/m (HP)	57.4 (77)		
Coolant capacity (with radiator), L (US gal)	492 (130)		
Cooling system air flow, m ³ /min (scfm)	2294 (81000)		
Total heat rejection, MJ/min (Btu/min)	94.1 (97177)		
Maximum cooling air flow static restriction, kPa (in H ₂ O)	0.12 (0.5)		
Maximum fuel return line restriction kPa (in Hg)	23.7 (7)		

Optional set-mounted radiator cooling

Ambient design, °C (°F)			
Fan load, kW/m (HP)			
Coolant capacity (with radiator), L (US gal)			
Cooling system air flow, m ³ /min (scfm)			
Total heat rejection, MJ/min (Btu/min)			
Maximum cooling air flow static restriction, kPa (in H ₂ O)			
Maximum fuel return line restriction, kPa (in Hg)			

Optional heat exchanger cooling

Set coolant capacity, L (US gal)			
Heat rejected, jacket water circuit, MJ/min (Btu/min)			
Heat rejected, aftercooler circuit, MJ/min (Btu/min)			
Heat rejected, fuel circuit, MJ/min (Btu/min)			
Total heat radiated to room, MJ/min (Btu/min)			
Maximum raw water pressure, jacket water circuit, kPa (psi)			
Maximum raw water pressure, aftercooler circuit, kPa (psi)			
Maximum raw water pressure, fuel circuit, kPa (psi)			
Maximum raw water flow, jacket water circuit, L/min (US gal/min)			
Maximum raw water flow, aftercooler circuit, L/min (US gal/min)			
Maximum raw water flow, fuel circuit, L/min (US gal/min)			
Minimum raw water flow @ 27 °C (80 °F) Inlet temp, jacket water circuit, L/min (US gal/min)			
Minimum raw water flow @ 27 °C (80 °F) Inlet temp, aftercooler circuit, L/min (US gal/min)			
Minimum raw water flow @ 27 °C (80 °F) Inlet temp, fuel circuit, L/min (US gal/min)			
Raw water delta P @ min flow, jacket water circuit, kPa (psi)			
Raw water delta P @ min flow, aftercooler circuit, kPa (psi)			
Raw water delta P @ min flow, fuel circuit, kPa (psi)			
Maximum jacket water outlet temp, °C (°F)			
Maximum aftercooler inlet temp, °C (°F)			
Maximum aftercooler inlet temp @ 25 °C (77 °F) ambient, °C (°F)			
Maximum fuel return line restriction, kPa (in Hg)			

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D-3235g (4/08)



Optional remote radiator cooling¹	Standby rating	Prime rating	Continuous rating
Set coolant capacity, L (US gal)	193 (51)		
Max flow rate @ max friction head, jacket water circuit, L/min (US gal/min)	1817 (480)		
Max flow rate @ max friction head, aftercooler circuit, L/min (US gal/min)	503 (133)		
Heat rejected, jacket water circuit, MJ/min (Btu/min)	45.1 (42765)		
Heat rejected, aftercooler circuit, MJ/min (Btu/min)	36.4 (34525)		
Heat rejected, fuel circuit, MJ/min (Btu/min)	2.1 (2000)		
Total heat radiated to room, MJ/min (Btu/min)	18.8 (17887)		
Maximum friction head, jacket water circuit, kPa (psi)	69 (10)		
Maximum friction head, aftercooler circuit, kPa (psi)	48 (7)		
Maximum static head, jacket water circuit, m (ft)	18 (60)		
Maximum static head, aftercooler circuit, m (ft)	18 (60)		
Maximum jacket water outlet temp, °C (°F)	104 (220)		
Maximum aftercooler inlet temp @ 25 °C (77 °F) ambient, °C (°F)	49 (120)		
Maximum aftercooler inlet temp, °C (°F)	71 (160)		
Maximum fuel flow, L/hr (US gph)	1685 (445)		
Maximum fuel return line restriction, kPa (in Hg)	30.5 (9)		

Weights²

Unit dry weight kgs (lbs)	15254 (33629)
Unit wet weight kgs (lbs)	15781 (34790)

Notes:

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

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

Derating factors

Standby	Engine power available up to 260 m (853 ft) at ambient temperatures up to 40 °C (104 °F). Above these elevations, derate at 3.3% per 305 m (1000 ft) and 8.4% per 10 °C (18 °F).
Prime	
Continuous	

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.

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Alternator data

Voltage	Connection ¹	Temp rise degrees C	Duty ²	Single phase factor ³	Max surge kVA ⁴	Winding No.	Alternator data sheet	Feature Code
380	Wye, 3-phase	125	S		7327	13	ADS-515	B598
380	Wye, 3-phase	105	S		7963	13	ADS-516	B599
440	Wye, 3-phase	150	S		7284	12	ADS-515	B701
440	Wye, 3-phase	105	S		8438	12	ADS-516	B665
480	Wye, 3-phase	150	S		7695	312	ADS-335	B453
480	Wye, 3-phase	125	S		7284	12	ADS-515	B276
480	Wye, 3-phase	105	S		8438	12	ADS-516	B600
480	Wye, 3-phase	80	S		9728	12	ADS-517	B601
600	Wye, 3-phase	150	S		7695	07	ADS-335	B419
600	Wye, 3-phase	125	S		7265	07	ADS-515	B602
600	Wye, 3-phase	105	S		8253	07	ADS-516	B603
600	Wye, 3-phase	80	S		9611	07	ADS-517	B604
4160	Wye, 3-phase	150	S		6307	51	ADS-518	B606
4160	Wye, 3-phase	125	S		6307	51	ADS-518	B467
4160	Wye, 3-phase	105	S		6307	51	ADS-518	B313
4160	Wye, 3-phase	80	S		7315	51	ADS-519	B605
12470	Wye, 3-phase	125	S		6038	87	ADS-521	B609
12470	Wye, 3-phase	105	S		6685	87	ADS-522	B608
13200-13800	Wye, 3-phase	125	S		6062	91	ADS-521	B611
13200-13800	Wye, 3-phase	105	S		6833	91	ADS-522	B612
13800	Wye, 3-phase	80	S		8012	91	ADS-523	B610

Notes:

¹ Limited single phase capability is available from some three phase rated configurations. To obtain single phase rating, multiply the three phase kW rating by the Single Phase Factor³. All single phase ratings are at unity power factor.

² Standby (S), Prime (P) and Continuous ratings (C).

³ Factor for the *Single Phase Output from Three Phase Alternator* formula listed below.

⁴ Maximum rated starting kVA that results in a minimum of 90% of rated sustained voltage during starting.

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

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

Cummins Power Generation

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Phone: 763 574 5000
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Important: 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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ALTERNATOR DATA SHEET

Frame Size **P734G**

CHARACTERISTICS

WEIGHTS:

Stator Assembly:	3503 lb	1589 kg
Rotor Assembly:	2705 lb	1227 kg
Complete Assembly:	9259 lb	4200 kg

MAXIMUM SPEED:

2250 rpm

EXCITATION CURRENT:

Full Load 3.24 Amps

No Load 0.54 Amps

INSULATION SYSTEM: Class H Throughout

3 Ø RATINGS

(0.8 power factor)

(Based on specific temperature rise at 40°C ambient temperature)

60 Hz Voltage

(winding no)

		<u>220/380</u> (13)	<u>240/416</u> (13)	<u>220/380</u> (312)	<u>240/416</u> (312)	<u>254/440</u> (312)	<u>277/480</u> (312)	<u>347/600</u> (07)
163°C Rise Ratings	kW			1864	2120	2260	2356	2356
	kVA			2330	2650	2825	2945	2945
150°C Rise Ratings	kW			1812	2060	2200	2288	2288
	kVA			2265	2575	2750	2860	2860
125°C Rise Ratings	kW			1744	1980	2112	2200	2200
	kVA			2180	2475	2640	2750	2750
105°C Rise Ratings	kW			1620	1844	1964	2048	2048
	kVA			2025	2305	2455	2560	2560
80°C Rise Ratings	kW			1500	1704	1816	1892	1892
	kVA			1875	2130	2270	2365	2365

REACTANCES

(per unit ± 10%)

(Based on full load at 125°C Rise Rating)

Synchronous

Transient

Subtransient

Negative Sequence

Zero Sequence

	<u>220/380</u> (13)	<u>240/416</u> (13)	<u>220/380</u> (312)	<u>240/416</u> (312)	<u>254/440</u> (312)	<u>277/480</u> (312)	<u>347/600</u> (07)
Synchronous			4.73	4.48	4.27	3.74	2.91
Transient			0.27	0.25	0.24	0.21	0.16
Subtransient			0.19	0.18	0.17	0.15	0.11
Negative Sequence			0.26	0.25	0.23	0.21	0.15
Zero Sequence			0.05	0.05	0.04	0.04	0.03

MOTOR STARTING

Maximum kVA (90% Sustained Voltage)

	<u>220/380</u> (13)	<u>240/416</u> (13)	<u>220/380</u> (312)	<u>240/416</u> (312)	<u>254/440</u> (312)	<u>277/480</u> (312)	<u>347/600</u> (07)
Maximum kVA			7695	7695	7695	7695	7695

TIME CONSTANTS

(Sec)

Transient

Subtransient

Open Circuit

DC

	<u>220/380</u> (13)	<u>240/416</u> (13)	<u>220/380</u> (312)	<u>240/416</u> (312)	<u>254/440</u> (312)	<u>277/480</u> (312)	<u>347/600</u> (07)
Transient			0.160	0.160	0.160	0.160	0.160
Subtransient			0.010	0.010	0.010	0.010	0.010
Open Circuit			2.890	2.890	2.890	2.890	2.890
DC			0.020	0.020	0.020	0.020	0.020

WINDINGS

(@20°C)

Stator Resistance (Line to Line, Ohms)

Rotor Resistance (Ohms)

Number of Leads

	<u>220/380</u> (13)	<u>240/416</u> (13)	<u>220/380</u> (312)	<u>240/416</u> (312)	<u>254/440</u> (312)	<u>277/480</u> (312)	<u>347/600</u> (07)
Stator Resistance			0.00080	0.00080	0.00080	0.00080	0.00212
Rotor Resistance			2.42	2.42	2.42	2.42	2.42
Number of Leads			6	6	6	6	6



Exhaust Emission Data Sheet

2250DQKH

60 Hz Diesel Generator Set

Engine Information:

Model:	Cummins Inc. QSK60-G9 Nonroad 1	Bore:	6.25 in. (159 mm)
Type:	4 Cycle, 60°V, 16 Cylinder Diesel	Stroke:	7.48 in. (190 mm)
Aspiration:	Turbocharged and Low Temperature Aftercooled	Displacement:	3673 cu. in. (60.2 liters)
Compression Ratio:	14.5:1		
Emission Control Device:	Turbocharged and Low Temperature Aftercooled		

	<u>1/4</u> Standby	<u>1/2</u> Standby	<u>3/4</u> Standby	<u>Full</u> Standby		
PERFORMANCE DATA						
BHP @ 1800 RPM (60 Hz)	813	1626	2438	3251		
Fuel Consumption (gal/Hr)	45.1	80.0	113.2	150.2		
Exhaust Gas Flow (CFM)	5605	9415	12485	15705		
Exhaust Gas Temperature (°F)	710	790	820	895		
EXHAUST EMISSION DATA						
HC (Total Unburned Hydrocarbons)	0.29	0.16	0.10	0.10		
NOx (Oxides of Nitrogen as NO ₂)	5.30	5.40	6.70	7.70		
CO (carbon Monoxide)	0.39	0.90	0.61	0.83		
PM (Particular Matter)	0.16	0.15	0.06	0.05		
SO ₂ (Sulfur Dioxide)	0.13	0.11	0.11	0.11		
Smoke (Bosch)	0.80	0.90	0.40	0.40		

All except Smoke are in g/bhp-hr

TEST CONDITIONS**Test Methods:**

Steady-state emissions recorded per ISO8178-1 during operation at rated engine speed(+/-2%) and stated constant load (+/-2%) with engine temperatures, pressures and emission rates stabilized.

Fuel Specification: 40-48 Cetane Number, 0.05 Wt.% Sulfur; Reference ISO8178-5, 40 CFR86.1313-98 Type 2-D and ASTM D975 No. 2-D.

Reference Conditions:

25 °C (77 °F) Air inlet Temperature, 40 ° C(104 ° F) Fuel Inlet Temperature, 100kPa (29.53 inHg.) Barometric pressure; 10.7 g/kg (75 grains H₂O/lb) of dry air Humidity (required for NOX correction); Intake Restriction set to maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

Data was taken from a single engine test according to the test methods, fuel specification and reference conditions stated above and is subjected to instrumentation and engine-to-engine variability. Tests conducted with alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Data Subject to Change Without Notice.



**Power
Generation**

EPA Stationary New Source Exhaust Emission Compliance Statement 2250DQKH 60 Hz Diesel Generator Set

Compliance Information:

The engine used in this generator set complies with U.S. EPA regulations under the provisions of 40 CFR 60, Stationary New Source emissions limits when tested per ISO 8178 D2.

Engine Manufacturer: Cummins Inc.
EPA Certificate Number: CEX-STATCI-07-46
Effective Date: 05/04/07
Date Issued: 05/07/07
EPA Nonroad Diesel Engine Family: 7CEXL060.AAE

Engine Information:

Model: Cummins Inc. QSK60-G9 Bore: 6.25 in. (159 mm)
Engine Nameplate HP: 3251
Type: 4 Cycle, 60°V, 16 Cylinder Diesel Stroke: 7.48 in. (190 mm)
Aspiration: Turbocharged and Low Temperature Aftercooled Displacement: 3673 cu. in. (60.2 liters)
Compression Ratio: 14.5:1
Emission Control Device: Turbocharged and Low Temperature Aftercooled

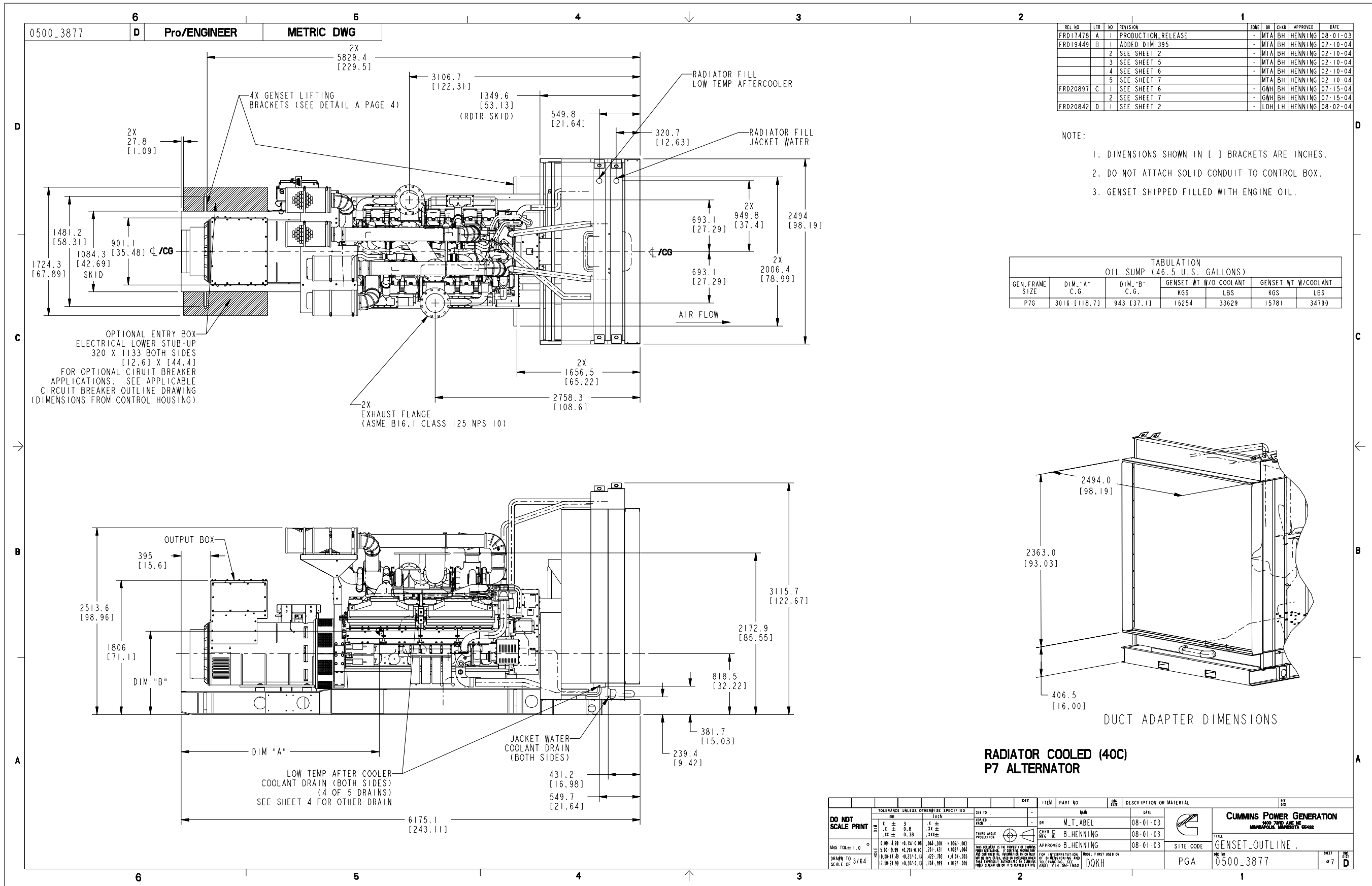
U.S. Environmental Protection Agency Stationary New Source Limits

(All values are Grams per HP-Hour)

COMPONENT

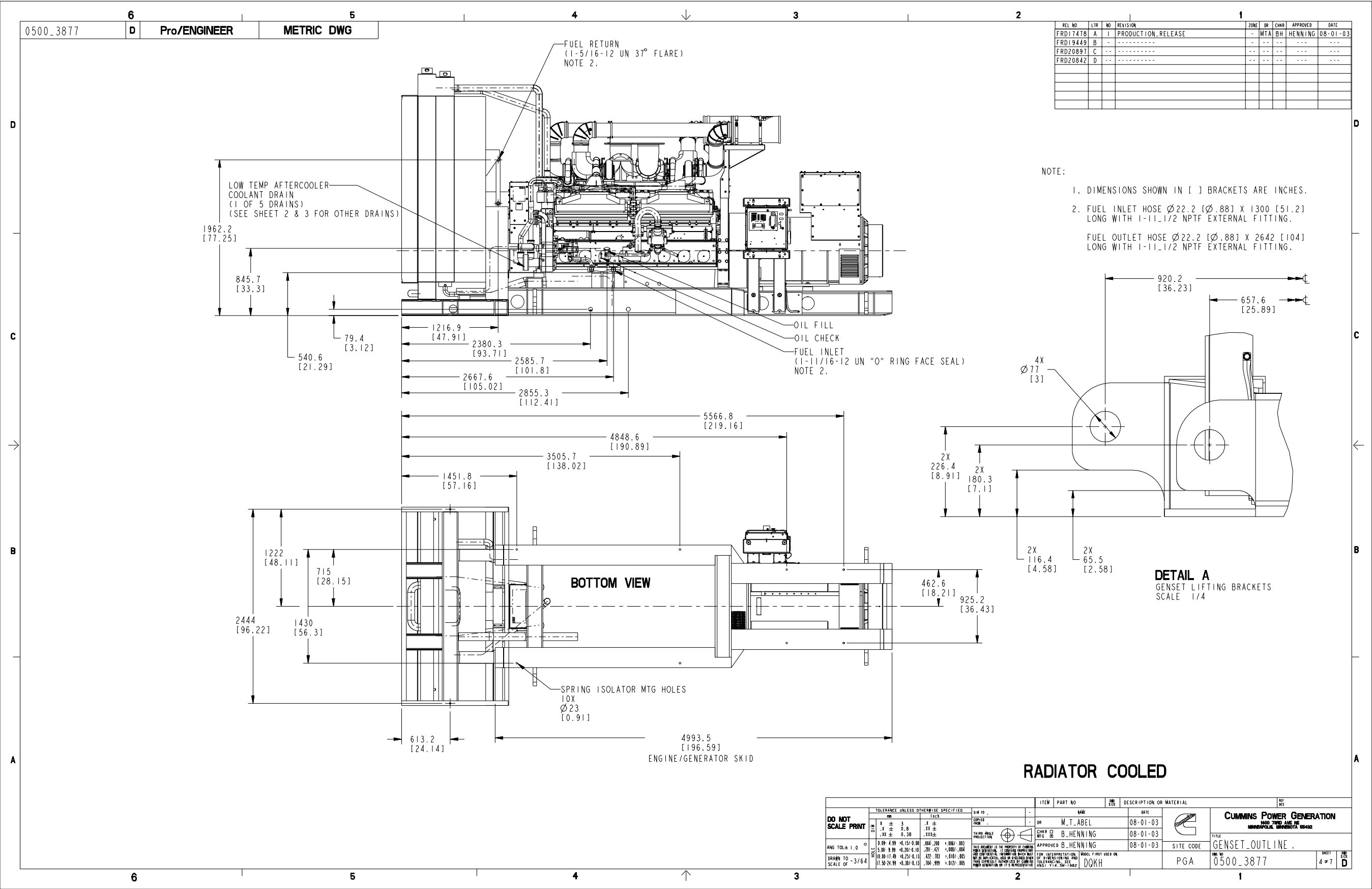
NOx	6.9
HC	1.0
CO (Carbon Monoxide)	8.5
PM (Particulate Matter)	0.40

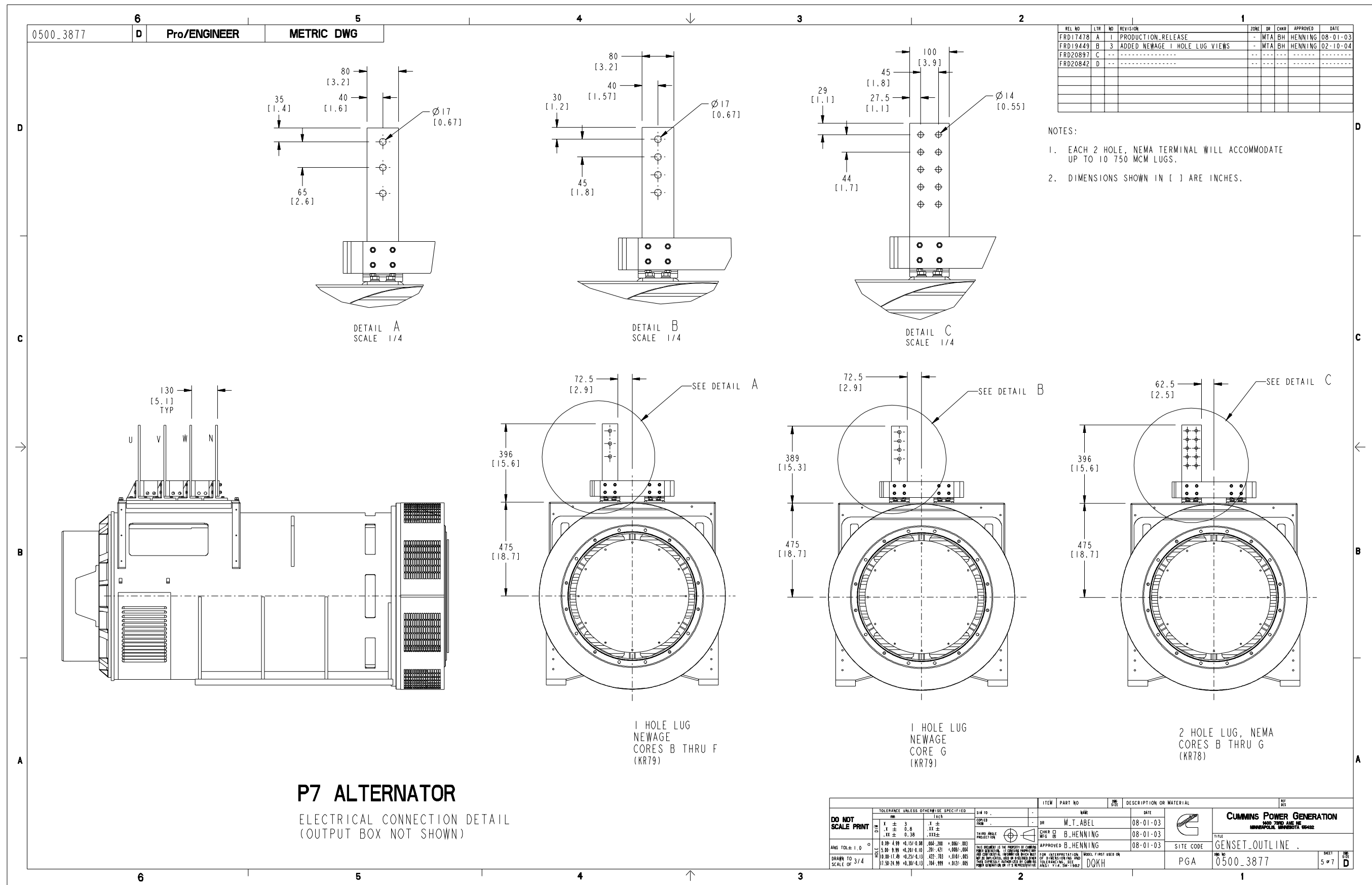
Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.



TABULATION	
GEN STYLE	DIM "A"
P7	1314.4 [51.75]
P80	1073.7 [42.27]

[illegible]





UL-142 Listed secondary containment generator base tank for 2250DQKH 0500-3877 engine generator.

	Gen-set footprint	Outside tank dimensions	Enclosure Dimensions	Approx. Overall Package Dim. (not including hoods)
Height	N/A	26.00	140.00	170.00
Width	98.19	120.00	132.00	132.00
Length	243.11	362.00	264.00	362.00
Top Width	N/A	132.00	Approx. Package Weight (silencer not included)	

50165 LBS

Heavy gauge steel tank, steel side rails, interior protective coating, rust proofed and finished painted exterior (gloss black standard). Tank fittings are engine supply diptube, fuel return, normal vent, emergency vent, two 2inch NPT's for manual fill and optional alarm. Fuel level gauge provided.

The above tank includes the following options:

Qty.	Option #	Description
1	UTSX	Secondary Containment Weatherproof Sub-base Fuel Tank with Diked Containment Basin No end Stub-up
1	*95	Flanged channel for enclosure, 9.0
1	2221	Rainshield on tank extended past enclosure
6	2839	"C" Channel with Recessed Isolator Mounts (1 extra for breaker support)
2	2841	"H" (w6 X 20) Beam Supportive Cross Members (6" high) to support customer provided genset
1	2865	Side/Internal Stub Up Area
2	2375	2"NPT spare fittings
8	2815	Lifting Plates (3" diameter hole, designed to lift generator with empty tank)
1	2298	8" NPT VFA Package (low fuel & basin alarm, 2"normal vent, 2" fill cap, emerg. vents)
1	3176	*95 (3177) Dual High/Low Level Switch in Lieu of 3178 (specify levels)
1	ENC-AH	Weather protective housing (see above for dim.), steel construction - unless otherwise specified below - fixed formed air intake louvers, expanded air outlet, stainless steel lift off hinges and lockable hardware door gaskets, exhaust mounting brackets, roof penetration rain shield, and powder coat finish. Mounting of genset, tank and housing is included. External Roof mounted silencer by customer ships loose, field installation by others required.
1	BOLT-ON	Housing rain collar to be bolt on, shipped loose
1	MNT BRKR	Mount customer provided breaker, 36" X 36" X 91" next to genset, right side (wiring Not included)
1	DUCT	Radiator Duct (customer to supply duct adaptor)
1	EXT	Extend coolant & oil drains through base channel
1	CAULK	Include caulk tubes for touch-up on site
1	ENC-AH	Ship Genset to: 3073 S. Chase Ave, Bldg 25, Milwaukee WI 53207 - Appointment required
1	STEEL SC	A steel surcharge is included in this quotation, price is valid through May 31, 2007

BK7-0377A

SHEET 1 OF 1

CUSTOMER APPROVAL

NAME _____
DATE _____

IMPORTANT: BY SIGNING THIS DRAWING YOU ARE APPROVING IT AS
IF CHANGES ARE REQUIRED, A NEW DRAWING WILL BE REQUIRED.

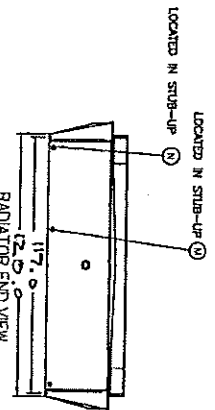
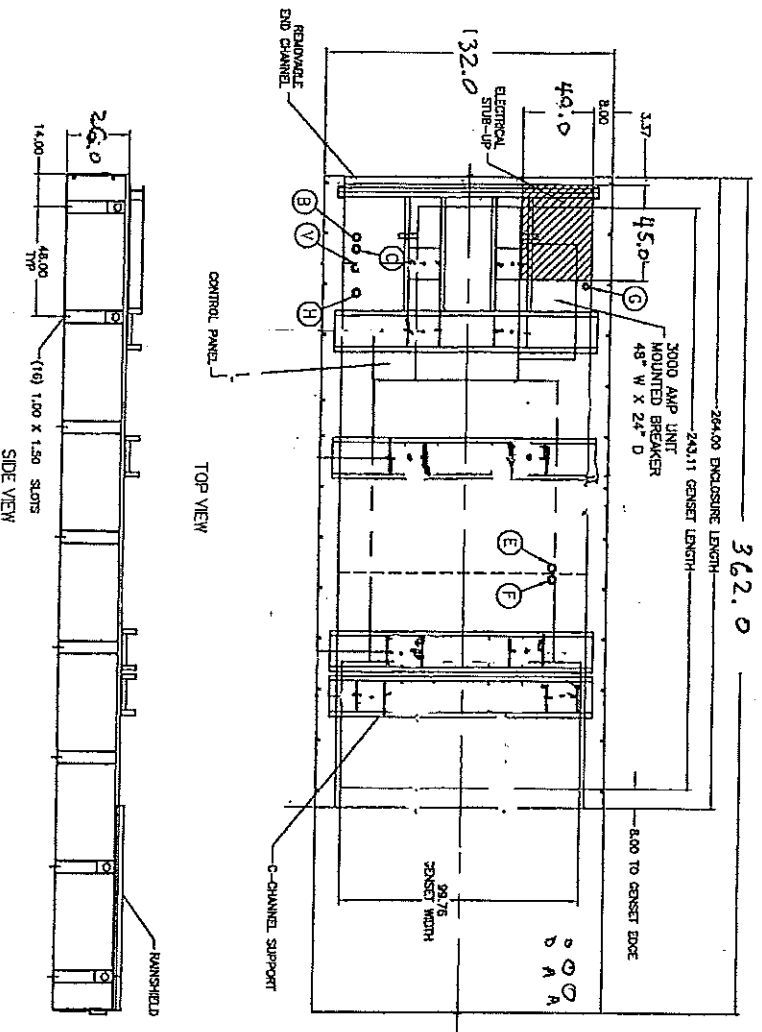
GENSET INFORMATION

GENSET MODEL	2250-DQKH
GENSET DRG#	0500-3897
FOOT PRINT	243.11 L X 99.76 W
GENSET WEIGHT	34,790 LBS
SUB BASE WEIGHT	10,100 LBS

NOTES:

1. THIS SUBBASE IS UL 142 LISTED UNDER THE SPECIAL PURPOSE TANKS CATEGORY AS A SECONDARY CONTAINMENT GENERATOR BASE TANK.
2. TANK TO BE INSTALLED IN ACCORDANCE WITH AFFIXED LABELING, THE FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE, NFPA 30 AND ANY OTHER PREVAILING CODE.
3. IN LINE WITH CONTINUOUS PRODUCT DEVELOPMENT, WE RESERVE THE RIGHT TO CHANGE SPECIFICATIONS WITHOUT NOTICE.
4. THIS SUBBASE TANK IS DESIGNED TO SUPPORT A DIESEL ENGINE GENERATOR AND ENCLOSURE.
5. EXTERIOR: PRIME AND PAINT.
6. INTERIOR: RUST PREVENTATIVE COATING.
7. SEE 1115 FOR MOUNTING LOCATION.

- FITTINGS**
- A. (2) 8" NPT EMERGENCY VENTS
 - B. 2" NPT FOR FILL
 - C. 1-1/2" NPT FOR LEVEL GAUGE
 - D. 2" NPT FOR NORMAL VENT
 - E. 2" NPT W/ 1-1/4" NPT DIPTUBE FOR FUEL RETURN
 - F. 2" NPT W/ 1-1/4" NPT DIPTUBE FOR FUEL SUPPLY
 - G. 1-1/4" NPT WITH PIPE PLUG
 - H. 2" NPT FOR LEVEL SWITCH
 - M. 3/8" NPT FOR BASIN DRAIN
 - N. 1/2" NPT FOR LEAK DETECTION
 - V. 2" NPT FOR SPARE USE



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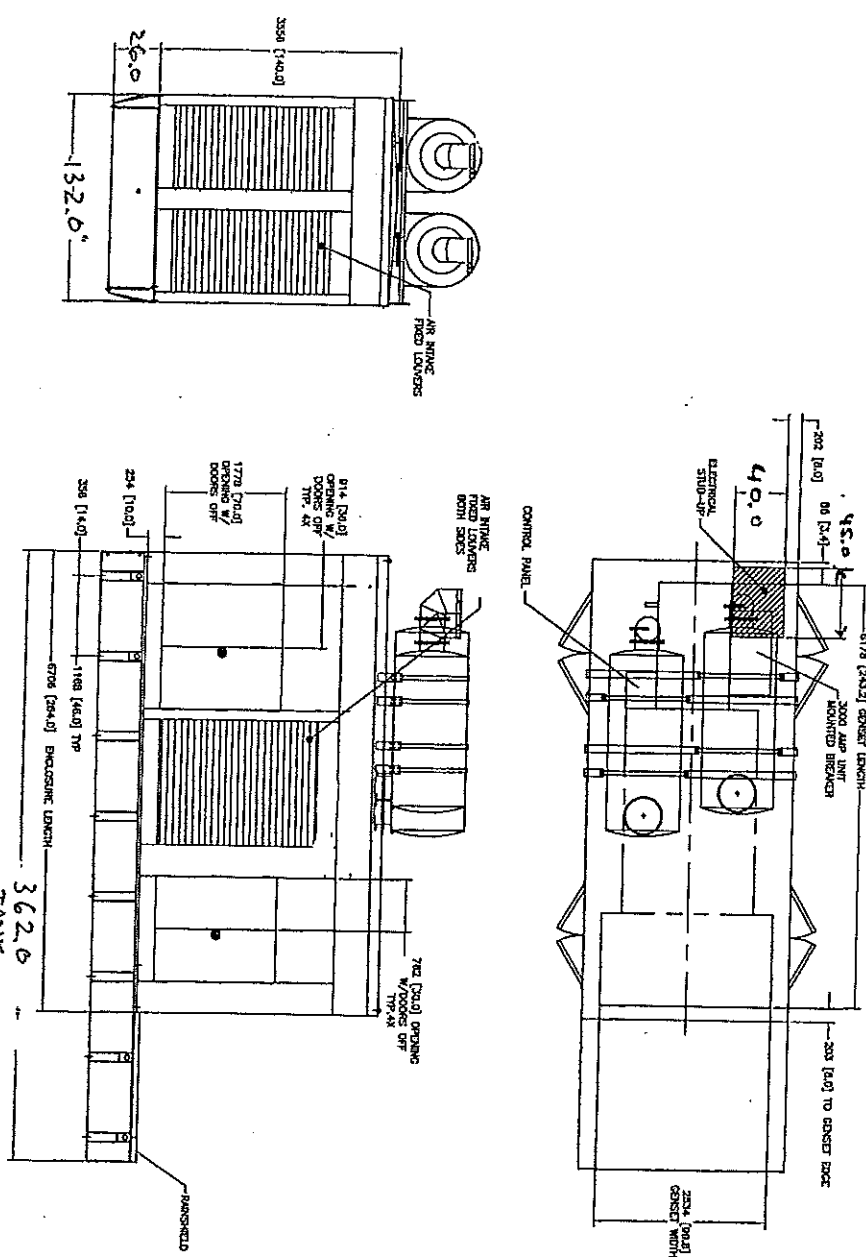
TSX-3600 GALLON SUB BASE TANK

A	7-11-07	START FROM 1115-16374	SCALE: NTS	FRACTIONS: +/- .5	DECIMALS: +/- .125	DRAWN BY: SALES	CYT	FOR	DRAWING NO: BK7-0377A
	DATE	DESCRIPTION	SCALE	DATE	05/18/07	SALES	ENG		
		CHANGE BLOCK							

REV	DATE	DESCRIPTION
1	10/1/79	TANK LENGTH WAS ADJ AND RECD WAS 30"
2		
3		
4		
5		
6		
7		
8		
9		
10		

FOR ESTIMATED TOTAL PACKAGE WEIGHT ADD THE FOLLOWING ITEMS:

HOUSING WEIGHT = 2724KG [6000LBS]
 APPROXIMATE GENSET WEIGHT = 15891KGS [35032LBS]
 TANK WEIGHT (GRV) = 4412KGS
 SILENCER WEIGHT = - 5K1 *per d 100Se*
 ESTIMATED TOTAL WEIGHT =



METRIC CAD FILE

DIMENSIONS IN [] ARE INCH EQUIVALENT

WEATHER HOUSING AND SILENCER
 W/SUB BASE TANK OPTION

DIMENSION PRINT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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Seamless Flexible Exhaust Tubing

All flexible tubing is made of type 321 stainless steel which meets type 18-8 Regulations up to 1500 DEG. F.

Part Number Figure 5	Dim.A	Dim.B	Dim.C
155-2355-01	1.00	2.00	18.00
155-2355-02	1.25	2.00	18.00
155-2355-03	1.50	2.00	18.00
155-2355-04	2.00	3.00	18.00
155-2355-05	2.50	3.00	18.00
155-2355-06	3.00	3.00	18.00
155-2355-07	3.50	4.00	18.00
155-0775	2.00	3.00	30.00
155-0776	2.50	3.00	30.00
155-0777	3.00	3.00	30.00
155-0778	4.00	4.00	32.00
155-2645-01	4.00	4.00	30.00
155-2645-02	5.00	6.00	30.00
155-2645-03	6.00	6.00	30.00

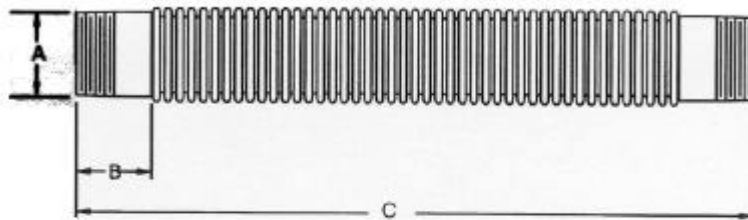


Figure 5: Flexible Exhaust Tubing

10" X 10" X 18" Long (2)

Dimension "A" denotes NPT pipe size

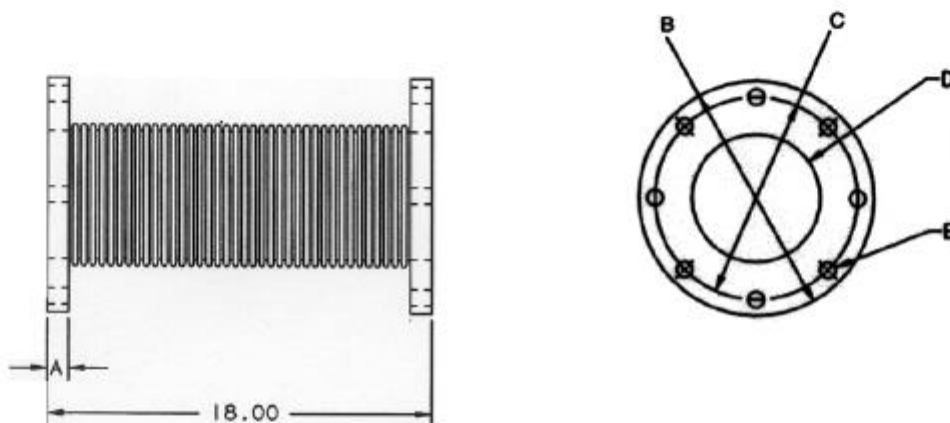


Figure 6: Flexible Exhaust Tubing

150# ASA drilled flat carbon steel fixed plate flanges.

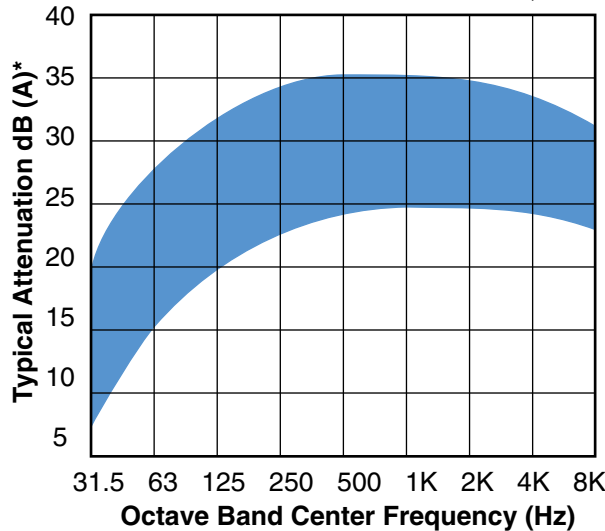
Part Number Figure 6	Nominal Pipe Size	Dim.A	Dim.B	Dim.C	Dim.D	Dim.E	Qty. Holes
155-2356-07	2.00	.625	6.00				
155-2356-08	2.50	.625	7.00				
155-2356-09	3.00	.625	7.50				
155-2356-01	4.00	.625	9.00				
155-2356-02	5.00	.750	10.00				
155-2356-03	6.00	.750	11.00				
155-2356-04	8.00	1.00	13.50				
155-2356-05	10.00	1.00	16.00				
155-2356-06	12.00	1.00	19.00				



Critical "300" Level Exhaust Silencers

Typical Attenuation Curve dB(A)*

(ACTUAL ATTENUATION MAY VARY ACCORDING TO APPLICATION)



*Estimated

Application:

These silencers are recommended where ambient noise is low and a high degree of silencing is necessary.

Construction:

Aluminized Steel: Nelson Silencers through 26" O.D. are fabricated of aluminized steel as standard materials. This material has a maximum operating temperature of 1250°F.

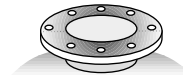
Mild Steel/Aluminized Steel: Nelson Silencers 30" O.D. and larger are fabricated of mild steel and aluminized steel. All silencers 30" O.D. and larger have aluminized steel bodies with all other components fabricated from mild steel.

Silicone Aluminum Paint: Nelson Silencers through 26" O.D. are given a coat of high heat resistant silicone aluminum paint.

Primer/Silicone Aluminum Paint: Nelson Silencers 30" O.D. and larger are given a coat of high heat, rust inhibiting primer and then a topcoat of high heat resistant silicone aluminum paint. Physical properties are maintained up to 900°F* on aluminized steel and 1100°F* on mild steel.

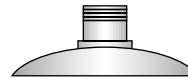
Sample Specification:

The silencer is to be a Nelson Critical "300" Level Silencer constructed of aluminized steel (26" body diameter and smaller) or mild steel/aluminized steel (larger than 26" body diameter) with all welded construction and suitable for mounting in any position.



"F" Mounting Flange:

Standard in sizes 4" to 22". Drilling matches 125/150# ASA standard.



"P" Male Pipe Threads:

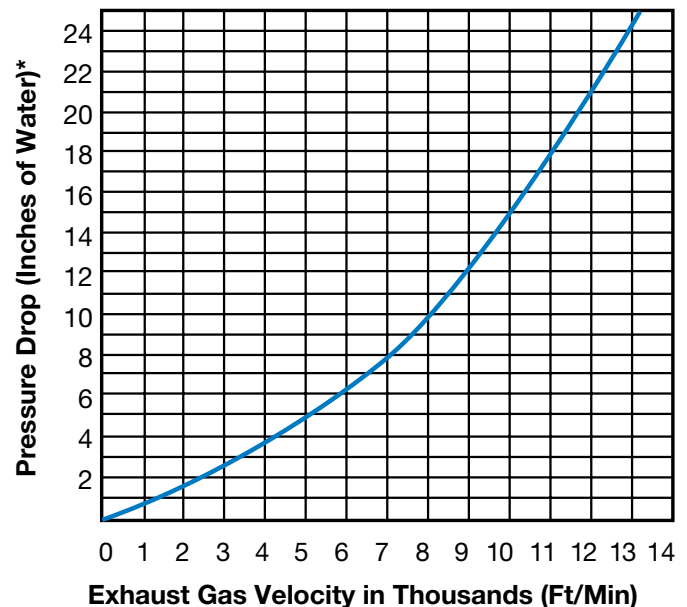
NPT ends offered in sizes 3/4" through 4".

Companion flanges available for 4" to 22".

Construction Features:

Double wrapped body is standard on all "300" Level Critical Silencers.

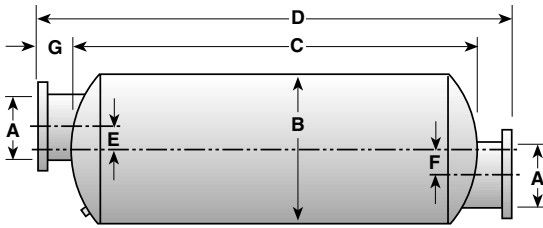
Pressure Drop



Note: When figuring pressure drop for side inlet or middle side inlet add 3" H₂O to back pressure shown on above curve.

*Estimated

Type 1



Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length
41307	.75	4.2	21.3	23.8	0	0	1.3
41310*	1.00	5.0	23.4	27.0	0.75	0.72	1.8
41313	1.25	6.1	27.5	31.2	0	0	1.8
41315	1.50	8.1	30.7	34.6	0	0	1.9
41320	2.00	9.0	40.8	44.0	0	0	1.6
41325	2.50	10.1	47.2	52.0	0	0	2.4
41330	3.00	11.1	49.5	55.6	0	0	3.1
41335	3.50	12.1	51.3	57.0	0	0	2.3
41340*	4.00	12.1	58.3	64.0	1.82	1.80	2.9
41350*	5.00	14.1	63.5	71.4	2.60	2.56	4.0
41360*	6.00	16.1	72.0	80.8	2.00	2.00	4.4
41380	8.00	22.1	78.7	86.0	0	0	3.7
41382	10.00	26.2	79.7	87.0	0	0	3.7
41384	12.00	30.2	104.8	112.0	0	0	3.6
41386	14.00	42.2	108.2	115.0	0	0	3.4
41388	16.00	42.2	156.2	163.0	0	0	3.4
41399	18.00	48.2	133.9	139.9	0	0	3.1
41321	20.00	54.3	159.6	165.5	0	0	3.3
41322	22.00	60.3	161.3	166.8	0	0	2.8

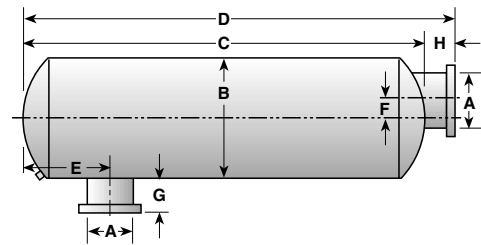
*Inlet and outlet offset from centerline of silencer as shown in dimension E and F.

Drains are standard on all silencers with a 9" body diameter or larger.

Note: Specifications are subject to change without notice.

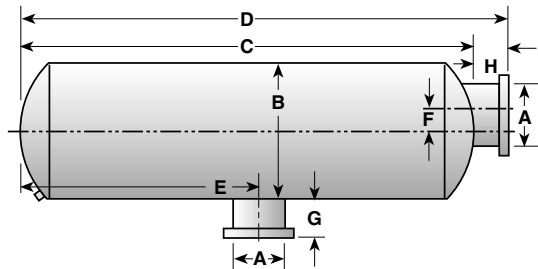
Note: All dimensions are in inches.

Type 3



Part Number	A Nominal Inlet Diameter	B Body Dia. O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length	H Outlet Length
43320	2.0	9.0	40.8	42.4	3.9	0	2.0	1.6
43325	2.5	10.1	46.6	49.3	3.8	0	2.5	2.7
43330	3.0	11.1	50.0	52.8	4.5	0	3.0	2.8
43335	3.5	12.1	51.4	54.2	5.2	0	3.0	2.8
43340	4.0	12.1	58.4	61.2	5.7	1.8	3.0	2.8
43350	5.0	14.1	63.5	67.4	5.8	2.6	4.0	3.9
43360	6.0	16.1	72.0	76.4	6.5	3.1	4.0	4.4
43380	8.0	22.1	78.7	82.3	11.3	0	4.0	3.6
43382	10.0	26.2	79.9	83.4	12.9	0	4.0	3.5
43384	12.0	30.2	104.8	108.4	14.4	0	4.0	3.6
43386	14.0	42.2	108.2	111.6	16.1	0	4.0	3.4
43388	16.0	42.2	156.2	159.6	16.1	0	4.0	3.4
43399	18.0	48.2	134.0	137.0	19.9	0	4.0	3.0
43321	20.0	54.3	159.7	162.9	22.1	0	4.0	3.2
43322	22.0	60.3	161.3	164.1	22.6	0	4.0	2.8

Type 4



Part Number	A Nominal Inlet Diameter	B Body Diameter O.D.	C Body Length	D Overall Length	E Offset To C/L	F Offset To C/L	G Inlet Length	H Outlet Length
44740	4.0	12.1	58.4	61.2	29.2	1.8	3.0	2.8
44750	5.0	14.1	63.6	67.5	31.8	2.6	4.0	3.9
44760	6.0	16.1	72.0	76.4	36.0	3.1	4.0	4.4
44780	8.0	22.1	78.7	82.3	39.3	0	4.0	3.6
44782	10.0	26.2	79.9	83.4	39.9	0	4.0	3.5
44784	12.0	30.2	104.8	108.4	52.4	0	4.0	3.6
44786	14.0	42.2	108.2	111.5	54.1	0	4.0	3.3



Batteries and Accessories

Qty - 4

Part Number	Battery	Cold Cranking Amps	Voltage	Reserve Capacity	Length	Width	Height	Group Size	Ship Weight lbs.	Qts. Electrolyte
0416-0439	Dry	1400	12	370	20.75	10.75	9.50	8D	110	16.0
0416-0579	Dry	420	12	60	10.25	6.80	9.00	24	28	5.9
0416-0579-01	Wet	500	12	75	10.25	6.80	9.00	24	37	5.9
0416-0774	Dry	390	12	90	13.00	5.56	9.00	29F	27	5.1
0416-0796	Wet	725	12	150	13.00	6.80	9.50	31	42	4.2
0416-0823	Wet	725	12	150	13.45	6.78	9.16	31	62	4.2
0416-0848	Dry	1080	12	270	20.80	8.80	9.50	4D	85	13
0416-0965	Wet	800	12	120	10.26	6.83	8.90	N/A	57	N/A
0416-0980	Wet	1000	12	200	13.00	7.00	9.63	24	65	4.2
0416-1040	Dry	800	12	NA	13.00	6.80	9.44	31	65	4.2
0416-1051	Wet	530	12	80	8.20	6.80	8.00	26	31	3.69
0416-1264	Dry	730	12	420	20.67	10.83	9.45	80	110	160
0416-1330	Dry	810	12	146	10.25	6.63	9.00	24	30	5.9

Electrolyte: 6-quart (5.7 liter) single plastic container with a convenient filter tube.

Part Number Description

0416-0534 1.265 specific gravity

Battery Racks: (not recommended for mounting on skids)

Part Number Description

0416-0527 Holds one #416-0439 (4D or 8D) Battery. (Includes hold down brackets) (20 1/2" x 11")

0416-0475 Holds two #416-0457 (1H) Batteries. (Loose rack, not intended for anchoring.) (14 1/2" x 9 1/4")

0541-0798 Holds two #416-0457 (1H) Batteries. (Includes hold down brackets) (13 7/8" x 9 7/8")

Battery Heater: Increases battery starting capability in lower than optimum ambient temperatures.

Part Number Description

0333-0469 Heater is a 6" x 9" pad installed in the battery rack directly under the battery case. Comes complete with an 8' cord and standard duplex plug. 200 watts @ 120 VAC

0541-0555 Heater is a 6 1/2" x 8" pad with 3' cord, 120 watt @ 120 VAC, 40° F/70° F preset thermostat

Battery Box:

Part Number Description

0416-1263 Battery Box has approximate inside dimensions of 21-1/8" Long X 11-3/4" Wide X 10-1/2" High. Box is constructed of black plastic with 4 mounting feet and a cover held on by 2 thumb screws. The box also has 2 slots on each side to accommodate battery cables. (See drawing on page 3). Note: Box material will become soft and pliable around 240° F.



Engine start battery charger for mission-critical applications

Product Highlights

Highest reliability starting

Dependable engine starting demands a battery that performs at its peak, every time. EnerGenius ensures this performance by supplying precisely the right charge to the battery at all times, year after year.

BatterySENS™: Industry-first battery fault warning

Unique BatterySENS system warns of high resistance battery or connections – helping dispatch service *before* engine start is needed.

User programmable

Battery settings are easily programmed in the field. Field selectable 12/24-volt output is optional.

Easy to read display

Accurate digital metering of output volts and amps; remote status is via NFPA 110 Form C contacts.

Environmentally and electrically hardened

EnerGenius is resistant to extreme temperatures, vibration and electrical disturbances.

Global acceptance

EnerGenius complies with international safety and EMC standards including UL, ANSI, CSA and CE.

SMART benefits:

EnerGenius solves the No. 1 problem with generator sets - failure to start.

Simple. Intuitive adjustments allow quick field reconfiguration for any battery.

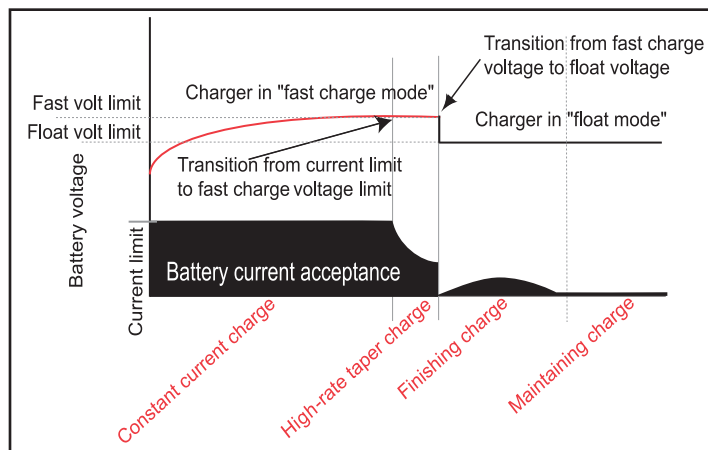
Modern. Ingenious BatterySENS feature provides advance warning of battery system problems.

Accurate. EnerGenius offers the most precise, fully automatic charging of lead and nickel-cadmium batteries.

Reliable. Meticulous design and premium components assure total system dependability and long life.

Tough. Hardened design and construction withstand vibration, electrical stress and extreme temperatures.

4-Rate Charging



EnerGenius Specifications

Electrical Performance

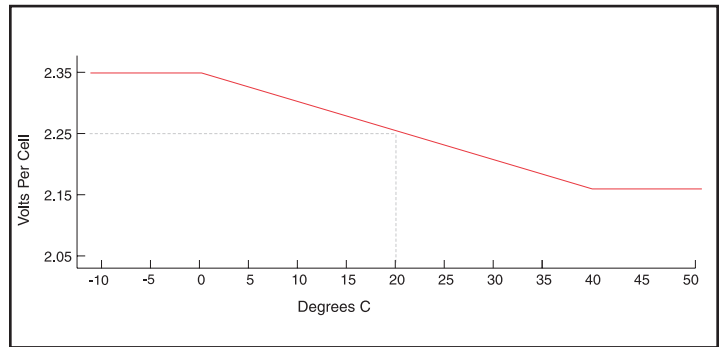
Input

Selection:	Dual input range switch select
Nominal:	120/208-240 VAC
Full output:	60 Hz: 94-132 VAC, 57-63 Hz 187-264 VAC
	50/60 Hz: 94-132 VAC, 47-63 HZ 187-264 VAC
Extended low line:	85/170 VAC

Output

Nominal voltage:	12-volt 24-volt 12/24-volt field programmable (optional)
Battery compatibility:	6 or 12-cell lead-acid; flooded or VRLA. 9, 10, 18, 19, 20-cell nickel cadmium.
Voltage adjustment:	6 discrete programs.
Voltage regulation:	$\pm 0.5\%$ line and load
Current limit:	10 amps, rectangular characteristic
Charge mode control:	4-rate automatic •Constant current •High-rate taper charge •Finishing charge •Maintaining charge Fast-charge program (boost) can be enabled or disabled in the field.
Dead battery charge:	Charger will recharge a fully discharged battery from zero volts.
Operation without battery:	BatterySENS system shuts down charger and issues alarm if the battery is disconnected.

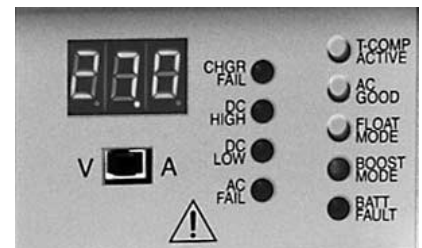
Figure 1



Compensation slope with upper and lower limits, per manufacturer recommendations.

Status Indicators & Alarms

The EnerGenius alarm system exceeds NFPA-110 requirements, and it is the most comprehensive alarm system available.



Charger/battery status and alarms

Local and remote indications by LED and individual Form C contacts for each alarm. Form C contacts can be field wired to provide a single summary alarm.

Output volts & amps:	Bright LED digital meter accurate to within $\pm 2\%$ volts & $\pm 5\%$ amps
AC on:	Green LED
Float mode:	Green LED
Fast charge:	Amber LED
TC active:	Green LED
AC fail:	Red LED and Form C contact
Low battery:	Red LED and Form C contact
High battery:	Red LED and Form C contact
Charger fail:	Red LED and Form C contact
Battery fault:	Red LED and Form C contact
	indicating:
	•Battery disconnected or reversed
	•Mismatched battery, charger voltage
	•Charger to battery connections damaged, loose or high resistance
	•Battery internal resistance excessive

Features

Temperature compensation:	Enable or disable in the field. Remote sensor is optional. (see Figure 1)
Protection:	Electronic current limit/short circuit protection. Soft start current walk-in. Input and output fuses.
Reverse, wrong, or no battery:	Charger inhibit and fault alarm.
Overtemperature:	Output current gradually reduces to protect charger.
Circuit card:	Surface Mount Technology (SMT), conformal coated to resist environmental attack.

Environmental

Operating temperature:	-20C to +60C. Full output available to +40C. Overtemperature protection provided.
Humidity:	5% to 95%, non-condensing. Circuit card is conformally coated.
Altitude:	0-2000 meters with no derating. Automatic derating above 2000 meters.
Vibration:	2G sinusoidal from 10 Hz to 150 Hz per UL 991.

Controls & Adjustments

Battery setting:	6 discrete programs for flooded, VRLA and Ni-Cd batteries.
12/24-volt program:	Optional 12/24-volt unit offers field selection of 12 or 24 volts. Alarms and battery programs automatically change with output selection.
Fast-charge control:	Fast charge can be enabled or disabled in the field.
Temp comp. control:	Local or remote temperature compensation can be enabled or disabled in the field.

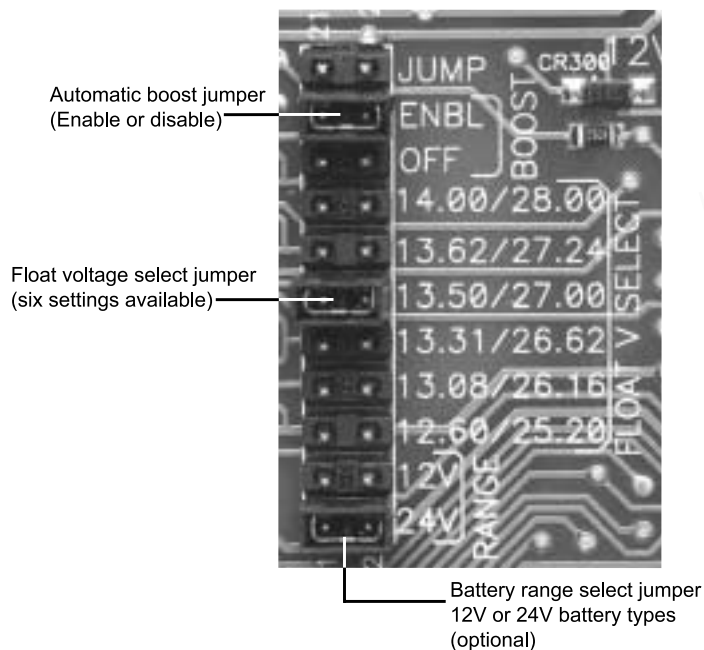
Standards Compliance

Safety:	UL 1236, UL 1012 CSA 22.2 No. 107.2-M89 EN 60335-2-29 NFPA 110
Vibration:	UL 991, Class B
EMC:	FCC Part 15, Class B ICES-003 EN 55011, Class A
Line harmonics:	EN 61000-3-2
Immunity:	EN 61000-6-2
Surge transient:	ANSI/IEEE C62.41, Cat. B EN 61000-4-5
ESD:	EN 61000-4-2
Radiated immunity:	EN 61000-4-3
Fast transient:	EN 61000-4-4
Injected RF:	EN 61000-4-6

Agency Markings

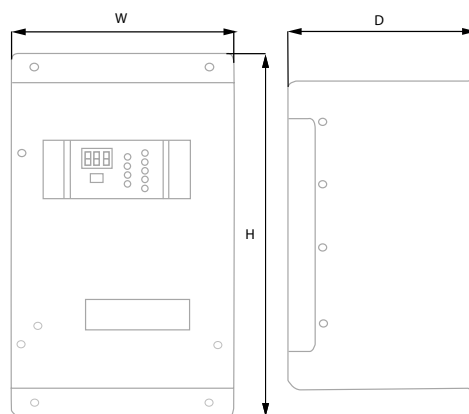
UL, CSA:	C-UL listed
EN:	CE marked, DOC to EN 60335 (50/60 Hz model only)

Easy field set up



Mechanical

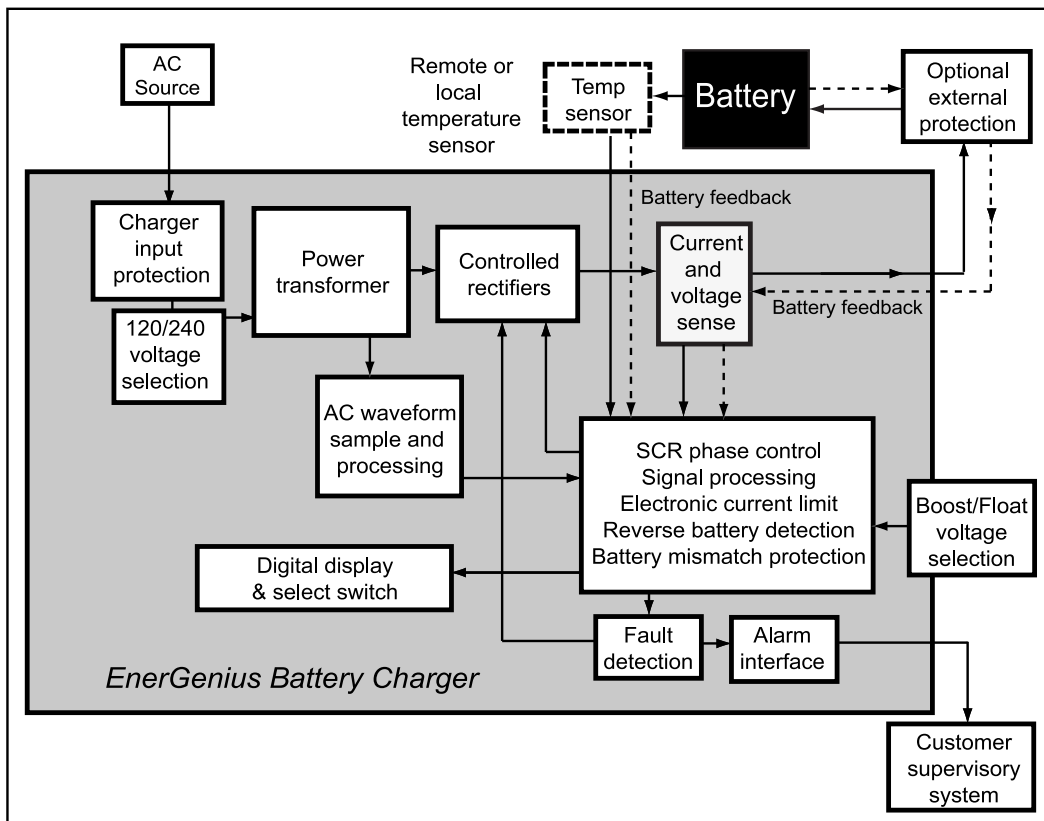
Housing:	Wall mount
Material:	.125" thick, non-corroding brushed aluminum
Connections:	Hard-wired input, output and alarm terminations
Cooling:	Natural convection



Housing Dimensions Table

Amps	Width	Depth	Height
10	7.66" (195mm)	6.48" (165mm)	10.50" (267mm)

EnerGenius Battery-Interactive Closed-Loop Feedback



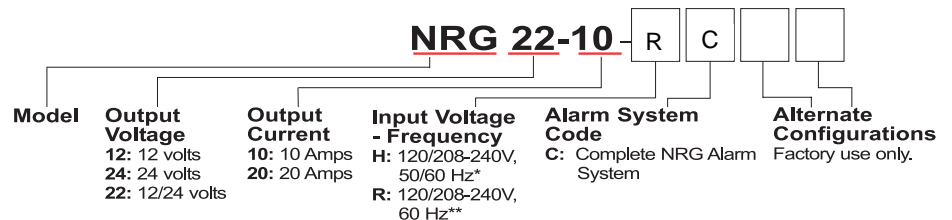
EnerGenius examines the battery to provide the correct charge at all times, and issues appropriate alarms. Parameters monitored include:

- Actual battery voltage
- Charger volt set point
- Battery current demand
- Temperature
- Battery polarity
- Battery connected
- Loose connections
- Open battery cell(s)

EnerGenius Ordering Information Table

Output Volts	Output Amps	Input VAC	Input Hz	NFPA-110 Alarms	Model Number	Net Weight LBS.	Net Weight KG	Agency Approvals
12	10	120/208-240	60	YES	NRG12-10-RC	24	10.9	UL, C-UL
12	10	120/208-240	50/60	YES	NRG12-10-HC	24	10.9	UL, C-UL, CE
24	10	120/208-240	60	YES	NRG24-10-RC	25	11.3	UL, C-UL
24	10	120/208-240	50/60	YES	NRG24-10-HC	25	11.3	UL, C-UL, CE
12/24	10	120/208-240	60	YES	NRG22-10-RC	25	11.3	UL, C-UL
12/24	10	120/208-240	50/60	YES	NRG22-10-HC	25	11.3	UL, C-UL, CE

Model Number Breakout



NOTE: Not all configurations are available on all models. Contact the factory for confirmation.

**UL, CSA listed.

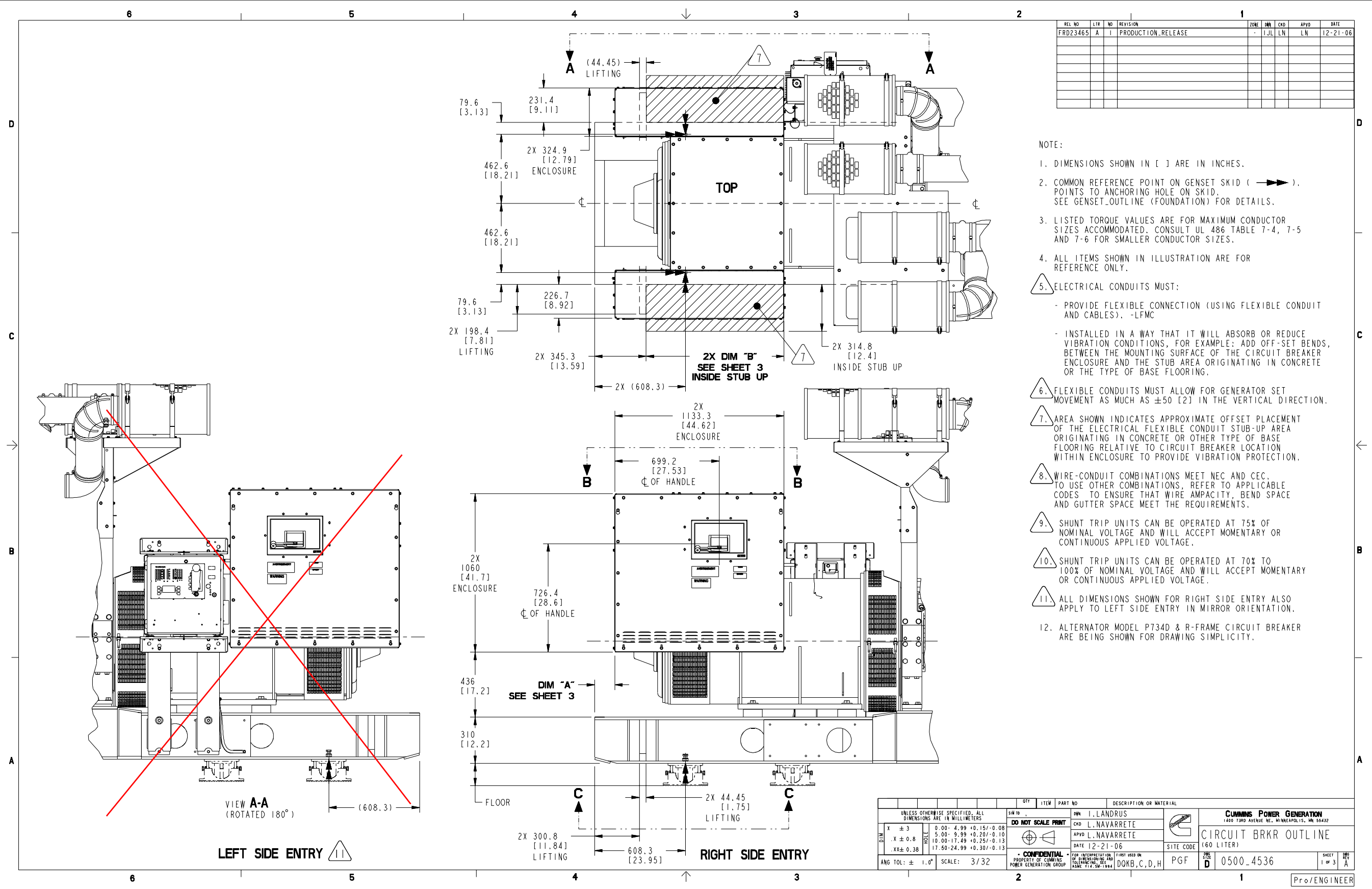
* UL, CSA listed and CE marked.

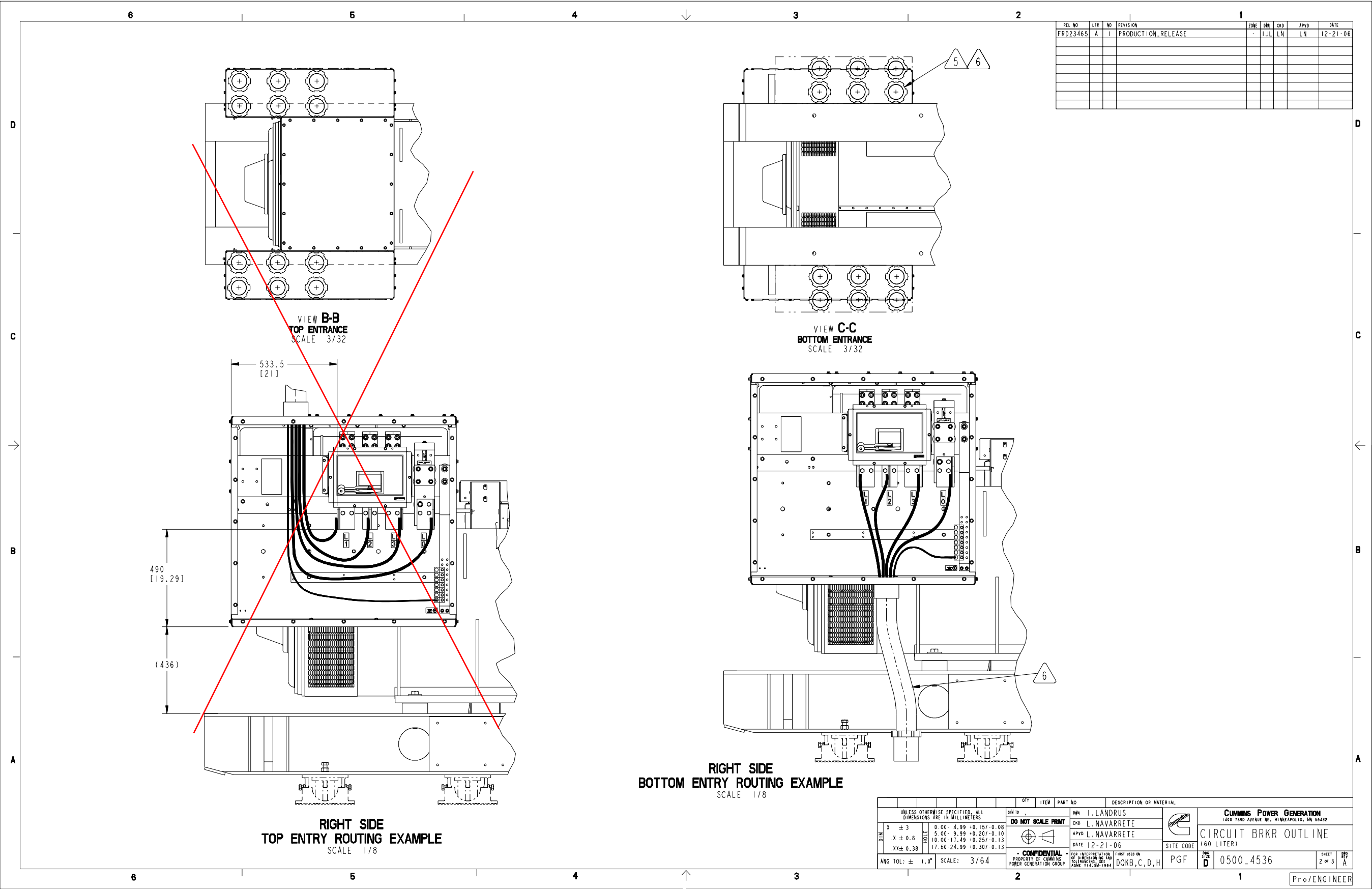
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Our energy means business

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SERIES C Vibro Isolators

Series C Vibro Isolators are rugged cast iron housed isolators with oil tempered steel springs for **all purpose** applications.

Isolators are available with *external* (**CK**) or *internal* (**CI**) adjustment and also feature adjustable or non-adjustable resilient snubbers for varying degrees of damping and to limit oscillation.

All isolators are provided with a bottom sound pad for maximum noise reduction. These isolators are also available with chrome vanadium springs for shock applications.

ISOL. NO.	RATED LOAD-lb.		ISOL. NO.	RATED LOAD-lb.	
	STEADY	IMPACT		STEADY	IMPACT
C*2-1	250	-	C*4-1	500	-
C*2-2	400	-	C*4-2	800	-
C*2-3	600	-	C*4-3	1200	-
C*2-4	1000	-	C*4-4	2000	-
C*2-5	1400	-	C*4-5	2800	-
C*2-6	2400	-	C*4-6	4800	-
C*2-S5	650	520	C*4-S5	1300	1040
C*2-S6	900	720	C*4-S6	1800	1440
C*2-S7	1200	960	C*4-S7	2400	1920
C*2-S8	2200	1650	C*4-S8	4400	3300
C*2-S9	2600	2450	C*4-S9	5200	4900

ISOL. NO.	RATED LOAD-lb.	
	STEADY	IMPACT
C*9-1	1125	-
C*9-2	1800	-
C*9-3	2700	-
C*9-4	4500	-
C*9-5	6300	-
C*9-6	10800	-
C*9-S5	2925	2340
C*9-S6	4000	3200
C*9-S7	5400	4320
C*9-S8	9900	7425
C*9-S9	11700	11025