

# Cat® D250 GC DIESEL GENERATOR SETS



Standby: 60 Hz, 208V, 480V & 600V



Image shown might not reflect actual configuration

Engine Model	Cat® C9 In-line 6, 4-cycle diesel
Bore x Stroke	112mm x 149mm (4.4in x 5.9in)
Displacement	8.8 L (538 in <sup>3</sup> )
Compression Ratio	16.3:1
Aspiration	Turbocharged Air-to-Air Aftercooled
Fuel Injection System	HEUI
Governor	Electronic ADEM™ A4

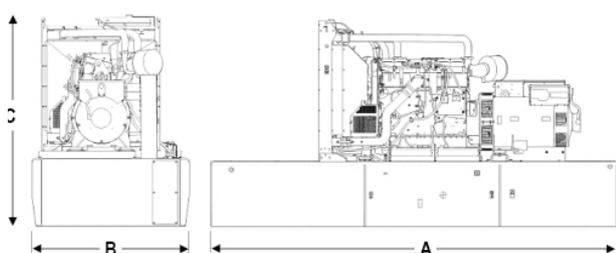
Standby	Performance Strategy
250 kW, 312.5kVA	EPA Certified for Stationary Emergency Application

## PACKAGE PERFORMANCE

Performance	Standby	
Frequency	60 Hz	
Genset Power Rating	312.5 kVA	
Gen set power rating with fan @ 0.8 power factor	250 kW	
Emissions	EPA TIER 3	
Performance Number	DM8501	
<b>Fuel Consumption</b>		
100% load with fan	73.3 L/hr	19.4 gal/hr
75% load with fan	58.8 L/hr	15.5 gal/hr
50% load with fan	43.8 L/hr	11.6 gal/hr
25% load with fan	27.4 L/hr	7.3 gal/hr
<b>Cooling System<sup>1</sup></b>		
Radiator air flow restriction (system)	0.12 kPa	0.48 in. Water
Radiator air flow	497 m <sup>3</sup> /min	17551 cfm
Engine coolant capacity	14 L	3.69 gal
Radiator coolant capacity	25 L	6.6 gal
Total coolant capacity	45 L	11.88 gal
<b>Inlet Air</b>		
Combustion air inlet flow rate	23.83 m <sup>3</sup> /min	841.5 cfm
Max. Allowable Combustion Air Inlet Temp	49 °C	120 °F
<b>Exhaust System</b>		
Exhaust stack gas temperature	460 °C	860 °F
Exhaust gas flow rate	63.6 m <sup>3</sup> /min	2246 cfm
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.0 in. water
<b>Heat Rejection</b>		
Heat rejection to jacket water	104 kW	5928 Btu/min
Heat rejection to exhaust (total)	277 kW	15772 Btu/min
Heat rejection to aftercooler	82 kW	4686 Btu/min
Heat rejection to atmosphere from engine	18 kW	1004 Btu/min
Heat rejection from alternator	20 kW	1120 Btu/min

Emissions (Nominal) <sup>2</sup>	Standby		
NOx	1637.5 mg/Nm <sup>3</sup>	3.14 g/hp-hr	
CO	323.2 mg/Nm <sup>3</sup>	0.68 g/hp-hr	
HC	71.2 mg/Nm <sup>3</sup>	0.17 g/hp-hr	
PM	63.7 mg/Nm <sup>3</sup>	0.16 g/hp-hr	
Alternator <sup>3</sup>			
Voltages	480V	208	600V
Motor Starting Capability @ 30% Voltage Dip	567	544	1006
Current	375.9	867.4	300.7
Frame Size	M2754L4	M2774L4	M2754L4
Excitation	S.E	S.E	AREP
Temperature Rise	105°C	105°C	105°C

## WEIGHTS & DIMENSIONS – OPEN SET



Base	Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Generator Set Weight kg (lb)
Skid (Wide Base)	3950 (155.5)	1440 (56.7)	1706 (67.2)	2415 (5324.2)
Integral Tank Base	3950 (155.5)	1430 (56.3)	2202 (86.7)	3055 (6735.1)

## FUEL TANK CAPACITY

Tank Design	Total Capacity		Useable Capacity	
	Litre	Gallon	Litre	Gallon
Integral	2270	600	2059	544

## DEFINITIONS AND CONDITIONS

<sup>1</sup> For ambient and altitude capabilities consult your Cat dealer. Air flow restriction (system) is added to existing restriction from factory.

<sup>2</sup> Emissions data measurement procedures are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. Data shown is based on steady state operating conditions of 77° F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 BTU/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations. Emissions data is based on 100% load and thus cannot be used to compare to EPA regulations which use values based on a weighted cycle.

<sup>3</sup> UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40° C ambient per NEMA MG1-32.

## APPLICABLE CODES AND STANDARDS:

AS1359, CSA C22.2 No100-04, UL142, UL489, UL869, UL2200, NFPA37, NFPA70, NFPA99, NFPA110, IBC, IEC60034-1, ISO3046, ISO8528, NEMA MG1-22, NEMA MG1-33, 2006/95/EC, 2006/42/EC, 2004/108/EC.

Note: Codes may not be available in all model configurations. Please consult your local Cat Dealer representative for availability.

**STANDBY:** Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

**RATINGS:** Ratings are based on SAE J1349 standard conditions. These ratings also apply at ISO3046 standard conditions.

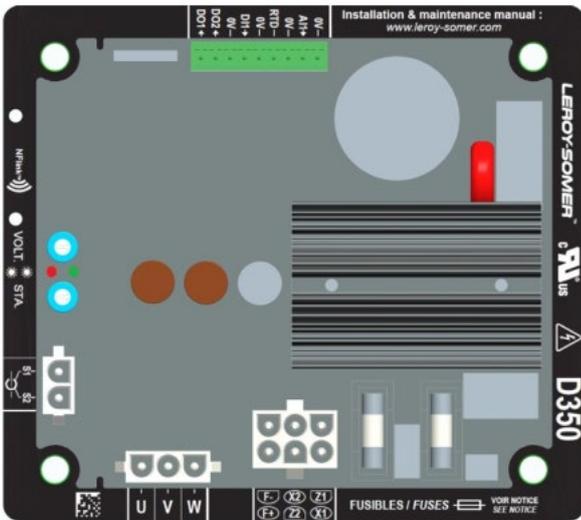
Fuel Rates are based on fuel oil of 35° API [16° C (60° F)] gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/litre (7.001 lbs/U.S. gal.). Additional ratings may be available for specific customer requirements, contact your Caterpillar representative for details. For information regarding Low Sulfur fuel and Biodiesel capability, please consult your Cat dealer.

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# AUTOMATIC VOLTAGE REGULATOR



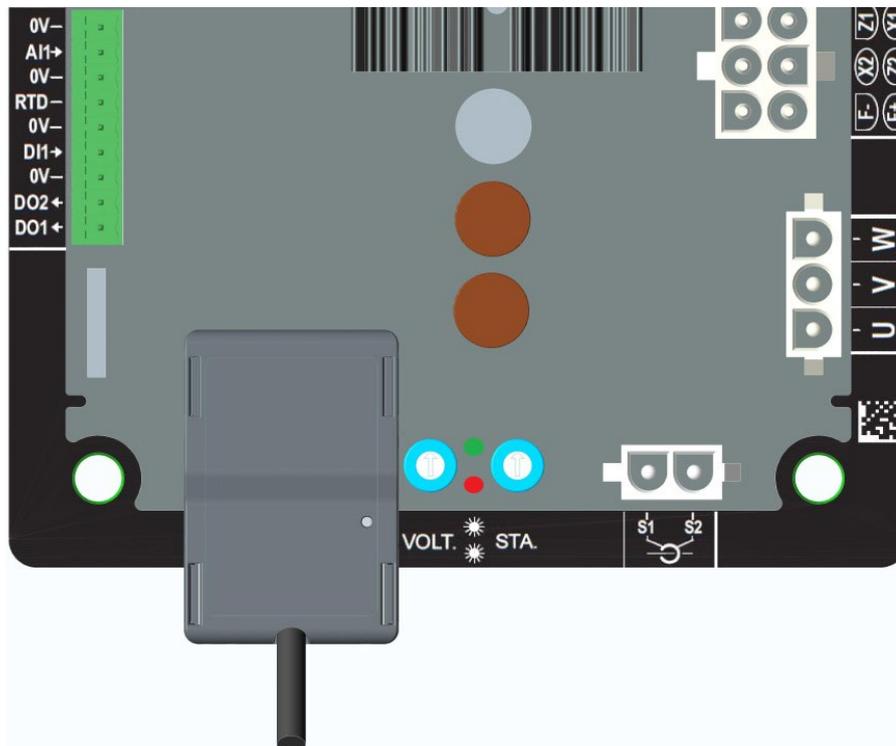
## D350 AVR

The D350, Digital Voltage Regulator is used to regulate alternators with a field current of less than 5 A in continuous operations, and 10 A maximum in the event of short-circuit for 10 seconds maximum.

Its design is in accordance with mounting in a generator terminal box or a control cabinet. It is required, at a minimum, to follow the local protection and safety standards, especially those specific to electrical installations for voltages of 300 VAC phase-to-neutral maximum.

## NFLink™ configuration module

The D350 is equipped with NFC technology for communication and configuration purposes. The configuration module is placed over the two dedicated positioning holes on the plastic enclosure as shown below. Once the configuration is done, the NF Link must be removed as it is not supposed to be left on the D350 when it is in continuous operation.



## Technical characteristics

D350 regulator can be used to perform the following functions:

Voltage regulation

- With or without reactive droop compensation (Reactive droop to allow parallel operation)
- With or without line droop compensation.

Regulation of the field current, or manual mode, which allows direct control of the field current.

The D350 can also be used to:

- Adjust the reference for the regulation mode in progress, using an analogue input (0-10V and potentiometer)
- Monitoring of temperature sensor (Pt100 or CTP)
- Limit the minimum field current delivered to the exciter field
- Monitoring of the maximum stator current limit
- Loss of voltage sensing
- Withstand a sudden short-circuit for 10 seconds maximum in AREP, PMG
- Signals monitoring (events logger).
- 2 digital outputs for various trip, regulation mode and measurement data

### Alternator voltage sensing:

- 3 phases without neutral, 2 phases or 1 phase with neutral
- Three-phase range 0-530VAC
- Consumption < 2VA

### Stator current measurement with CT:

- Range 0-1A or 0-5A
- Consumption < 2VA

### Power supply:

- 4 terminals for PMG, AREP, SHUNT
- Range 50-277 VAC
- Consumption max < 3000VA

### Field excitation:

- Rated 0-5 A
- Short-circuit 10A max.
- Field winding resistance > 4 ohms

### Frequency:

- Range 10-100Hz

# AUTOMATIC VOLTAGE REGULATOR



- Regulation accuracy: +/-0.25% of the average of the three phases on a linear load, with harmonic distortion less than 5%
- Voltage adjustment range: 0 to 150% of the rated voltage
- Quadrature droop adjustment range: -20% to 20%
- Under frequency protection: integrated, adjustable threshold, slope adjustable from 0.5 to 3V/Hz in steps of 0.1 V/Hz
- Excitation ceiling: adjustable by configuration at 3 points
- Environment: ambient temperature from -40°C to +65°C, relative humidity of less than 95% non-condensing, mounted in a cabinet or in a terminal box

## Easy Reg Advanced:

- All the D350 settings are entered / configured using the "EasyReg Advanced" software.
- This program is only compatible with computers running WINDOWS® versions Windows 7 and Windows 10 operating systems.

## Dimensions:

- Height : 52.9mm
- width : 125mm
- Length : 140mm

## Mounting:

- Holes spacing on the Length : 115mm
- Holes spacing on the width: 100mm

**Weight:** 0.45kg

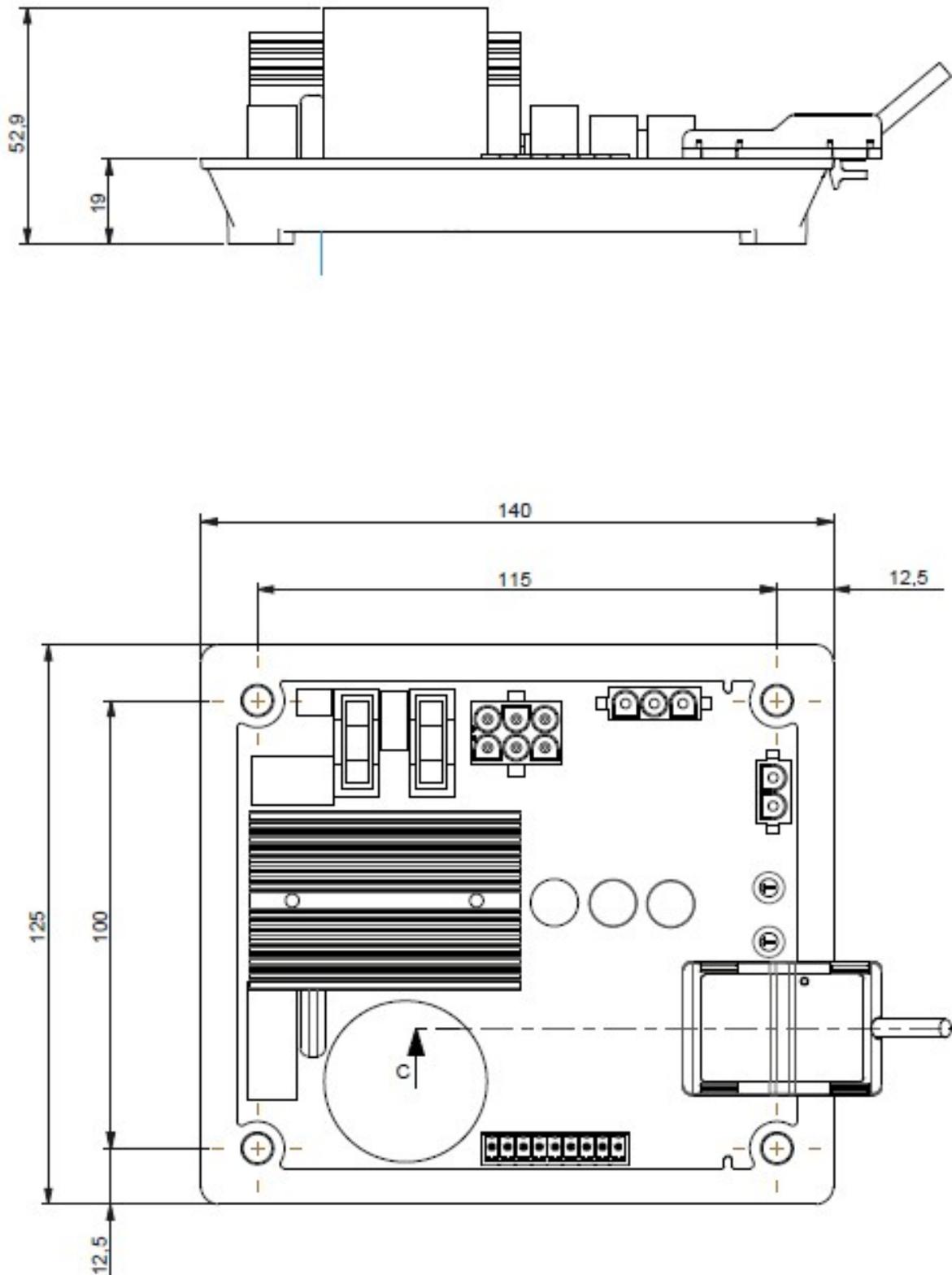
## Conformity to standards

- EMC: IEC 61000-6-2, IEC 61000-6-4
- Humidity: IEC 60068-1 and test in accordance with IEC 60068-2-14
- Dry heat: IEC 60068-2-2
- Damp heat: IEC 60028-2-30
- Cold: IEC 600068-2-1

# AUTOMATIC VOLTAGE REGULATOR



## D350 AVR and NFLink™ Dimensions



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## ADEM™ A4 Engine Controller

The ADEM™ A4 is the main Electronic Control Module (ECM) used on select diesel engines. The ADEM A4 provides a higher degree of control over a large number of combustion variables. The ADEM A4 is designed to control/interface Electronic Unit Injector (EUI) equipped engines. The ADEM A4 engine system is composed of the ADEM A4 ECM, control software, sensors, actuators, fuel injectors, and interface to the generator system. The prime benefit of an ADEM A4 engine system is to better control and maintain the particulate emissions, both steady state and transient, while improving engine performance.

## Features

### Reliable, Durable

All ADEM A4 controllers are designed to survive the harshest environments.

- Environmentally sealed, die-cast aluminum housing isolates and protects electronic components from moisture and dirt contamination
- Rigorous vibration testing ensures product reliability and durability
- Accuracy maintained from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Electrical noise immunity to 100 volts / meter
- Internal circuits are designed to withstand shorts to + battery and – battery

### Simple Servicing

Each ADEM A4 system works in combination with the Cat® ET service tool software to keep the engine operating at peak performance.

- Displays measured parameters
- Retrieves active and logged event code documenting abnormal system operation
- Performs calibrations and diagnostic tests
- Supports flash programming of new software into the ADEM A4 ECM

### Self Diagnostics

Each ADEM A4 ECM has a full compliment of diagnostics. The ECM can detect faults in the electrical system and report those faults to the service technician for quick repair.

- Self-diagnostic capability pinpoints operational problems in need of attention.

### Advanced Features

- Enhanced performance from fuel injection timing and limiting
- Adjustable monitoring of vital engine parameters
- Programmable speed acceleration ramp rate
- Data link interfaces

## Description

The ECM is housed in an environmentally sealed cast-ing. All wiring connections to the ECM are made using two sealed connectors: a single seventy-pin connector and a single one hundred twenty-pin connector.

## Engine Speed Governing

Desired engine speed is calculated by the ECM and held within  $\pm 0.2$  Hz for isochronous and droop mode. The ECM accounts for droop that is requested. The proper amount of fuel is sent to the injectors due to these calculations. The ECM also employs cooldown/shutdown strategies, acceleration delays on startup, acceleration ramp times and speed reference.

## Fuel Limiting

Warm and cold fuel-air ratio control limits are controlled by the ECM. Electronic monitoring system derates, torque limit, and cranking limit, programmable torque scaling, and cold cylinder cutout mode are standard features.

## Fuel Injection Timing

Master timing for injection is controlled by the ECM control. Temperature dependencies are accounted for in the fuel injection calculations.

## Electronic Monitoring

Electronic monitoring of vital engine parameters can be programmed. Warning, derate, and shutdown event conditions may be customized by the user.

## Information Management

The ECM stores information to assist with electronic troubleshooting. Active and logged diagnostic codes, active events, logged events, fuel consumption, engine hours, and instantaneous totals aid service technicians when diagnosing electronic faults and scheduling preventive maintenance.

## Calibrations

Engine performance is optimized through injection timing. Auto/manual sensor calibrations are standard features.

## On-Board System Tests

System tests are available to assist in electronic troubleshooting. These tests include: injector activation, injector cutout, and override of control outputs.

## Data Link Interfaces

The ADEM A4 communicates with the EMCP via a dedicated communication network.

## Electronic Sensing

The following sensing is available on the ADEM A4: oil pressure, fuel pressure, fuel temperature, atmospheric pressure, air inlet temperature, turbo outlet pressure, engine coolant temperature, engine speed, throttle, position, exhaust temperature, oil filter pressure differential, fuel filter pressure differential, air filter pressure differential and crankcase pressure.

## SPECIFICATIONS

### Impervious to:

Salt spray, fuel, oil and oil additives, coolant, spray cleaners, chlorinated solvents, hydrogen sulfide and methane gas, and dust.

### Input and output protection

All inputs and outputs are protected against short circuits to +battery and –battery

### Input voltage range (24 VDC nominal)

18 to 32 VDC

### Mounting

Engine mounted

### Reverse polarity protected

### Shock, withstands 20g

### Temperature range

Operating: –40°C to 85°C (–40°F to 185°F)

Storage: –50°C to 120°C (–58°F to 248°F)

### Vibration

Withstands 8.0g @ 24 to 2 kHz

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# GENERATOR SPACE HEATER



## Generator Space Heater for C13/C15/C18

Picture shown may not reflect actual configuration

### GENERAL DESCRIPTION

Humidity is a natural enemy of generators and all electrical equipment.

Space heaters are design to protect generator windings from abnormally high humidity conditions when the generator is idle. The heater maintains the air around the windings at a suitable temperature to prevent winding corrosion due to condensation

Generator space heaters are electrical resistance heater and located within the generator stator housing. Space heaters are particularly recommended for generating located in a low ambient and/or high humidity environment. As a further benefit, space heaters provide an excellent method of drying out a generator after long transit or storage.

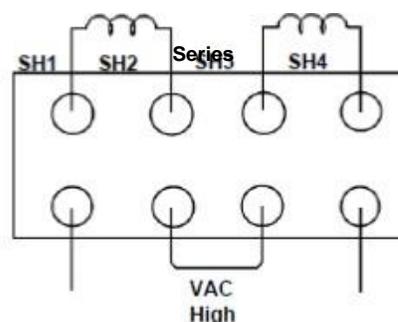
Because space heaters are required only during non-operative periods, they are require availability of a power source separate from the generator itself.

When the generating set is not running the heater is automatically connected to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed.

The space heater for C13/C15/C18 generator sets uses one heating element. Heater element electrical data: Voltage - 120V/230V, Power - 150W / 250W\*.

All space heaters are designed for 120 / 230 Volt operation (50 or 60 Hz) by making series connections at the terminal strip.

### Space Heaters Connection Diagram

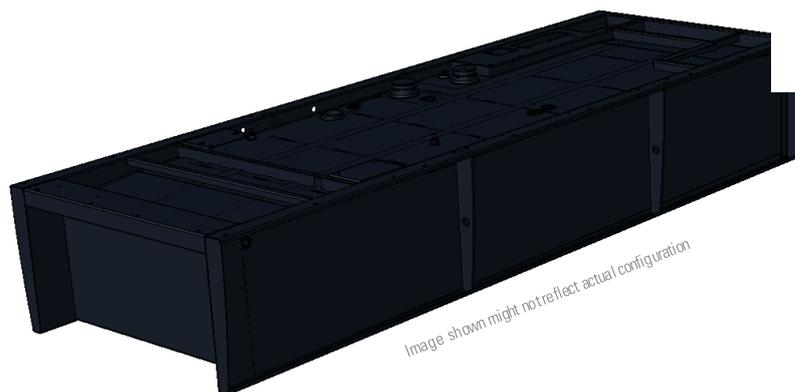


\* for North American Region

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## INTEGRAL FUEL TANKS D250 GC – D600 GC

### FEATURES

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- UL Listed for United States (UL 142) and Canada (CAN/ULC S601)
- Facilitates compliance with NFPA 30 code, NFPA 37 and 110 standards and CSA C282 code
- Dual wall
- Low fuel level warning standard, customer configurable warning or shutdown
- Primary tank leak detection switch in containment basin
- Tank design provides capacity for thermal expansion of fuel
- Fuel supply dip tube is positioned so as not to pick up fuel sediment
- Fuel return and supply dip tube is separated by an internal baffle to prevent immediate re-supply of heated return fuel
- Pressure washed with an iron phosphate solution
- Interior tank surfaces coated with a solvent-based thin-film rust preventative
- Heavy gauge steel gussets with internal lifting rings
- Primary and secondary tanks are leak tested at 20.7 kPa (3 psi) minimum
- Compatible with open packages and enclosures
- Gloss black polyester alkyd enamel exterior paint
- Welded steel containment basin (minimum of 110% of primary tank capacity)
- Direct reading fuel gauge with variable electrical output
- Emergency vents on primary and secondary tanks are sized in accordance with NFPA 30.

### INTEGRAL

- Integral diesel fuel tank is incorporated into the generator set base frame
- Robust base design includes linear vibration isolators between tank base and engine generator.

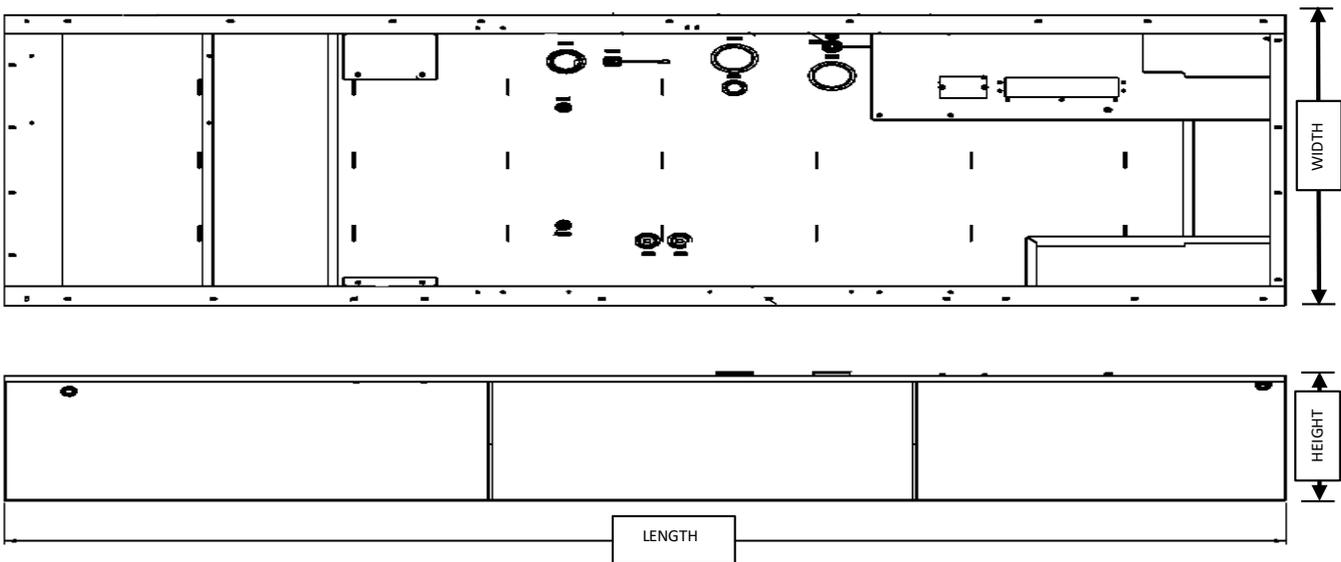
### OPTIONS

- Audio/visual fuel level alarm panel
- 5gal (18.9 L) spill containment\*
- Locking Fuel Fill
- Overfill prevention Valve\*

\*Applicable for D350GC-D600GC Models only

## Integral Fuel Tank Base Useable Capacities with Fuel Tank Dimensions & Weights

Standby ekW	Width mm	Width in
250-300	1430	56.3
350-400	1630	64.1
450-500	1630	64.1
550-600	1865	73.4



The heights listed above do not include lumber used during manufacturing and shipping

### A. Open Set & Sound Attenuated Enclosure

Tank Design	Feature Code	Total Capacity		Useable Capacity		Tank Only						Overall Package Height with Tank			
		Litre	Gallon	Litre	Gallon	Dry Weight		Height 'H'		Length 'L'		Open		Enclosure	
						kg	lb	mm	in	mm	in	mm	in	mm	in
Integral Tank	FTDW035	2270.7	599.8	2059.9	543.9	970	2138	762.4	30.0	3958	155.8	2202	86.7	2487	97.9
	FTDW036	2820	744.9	2553	674.4	1165	2568	818.8	32.2	4625	182.1	2584	101.7	2644	104
	FTDW037	3671	969.7	3323	877.8	1331	2934	668.2	26.3	4622	181.9	2456	96.7	2644	104
	FTDW038	4292	1133.8	3889	1027.3	1657	3653	816.4	32.1	4980	196	2560	100.7	2721	107.1

## B. Estimated Run Time (Hours)

Tank Design	Feature Code	Standby Ratings (kVA)						
		ekW	100%		75%		50%	
			Hrs	L/hr	Hrs	L/hr	Hrs	L/hr
Integral Tank	FTDW035	250	28.1	73.3	35	58.8	47	43.8
		300	24	86.0	30.8	66.8	40	51.5
	FTDW036	350	27.1	94.3	31.2	81.9	42.4	60.2
		400	24.1	105.9	28.1	90.7	38.6	66.2
	FTDW037	450	25.2	131.7	31.3	106.1	42.0	79.1
		500	24.3	137	30.1	110.5	46.6	71.3
	FTDW038	550	25.7	151.1	32.9	118.1	45.2	86.1
		600	24.1	161.6	30.0	129.6	42.4	91.7

Tanks with full electrical stub-up area include removable end channel. Tanks with RH stub-up include stubup area directly below the circuit breaker or power terminal strips.

Fuel tanks and applicable options facilitate compliance with the following United States NFPA Code and Standards:

NFPA 30: Flammable and Combustible Liquids Code

NFPA 37: Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

NFPA 110: Standard for Emergency and Standby Power Systems

Fuel tanks and applicable options facilitate compliance with the following Canadian Standard and Code:

CSA C282 – Emergency Electrical Power Supply for Buildings

CSA B139-09 – Installation Code for Oil-Burning Equipment

## SOUND ATTENUATED LEVEL 2

### ENCLOSURES

#### D250GC – D600GC

#### 60 Hz



*Image shown might not reflect actual configuration*

## FEATURES

### Robust / Highly Corrosion Resistant Construction

- Factory installed on skid base or tanks base
- Environmentally friendly, polyester powder baked paint
- Enclosure constructed with 18-gauge steel
- Interior zinc plated fasteners
- Internally mounted exhaust silencing system
- Comply with ASCE/SEI 7 for Wind loads up to 100mph
- Designed and tested to comply with UL 2200 Listed generator set package

### Excellent Access

- Large cable entry area for installation ease.
- Accommodates side mounted single or multiple breakers.
- Two doors on both sides.
- Vertically hinged allow 180° opening rotation
- Radiator fill cover.

### Security and Safety

- Lockable access doors which give full access to control panel and breaker.
- Cooling fan and battery charging alternator fully guarded.
- Fuel fill, oil fill and battery can only be reached via lockable access.
- Externally mounted emergency stop button (Optional).
- Designed for spreader bar lifting to ensure safety.
- Stub-up area is rodent proof.

### Sound Attenuated Level 2

- Caterpillar white paint
- UL Listed integral fuel tank with 24 hours running time capacity (Optional).
- DC lighting package (Optional)

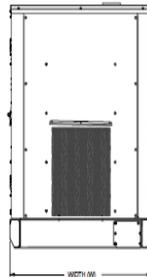
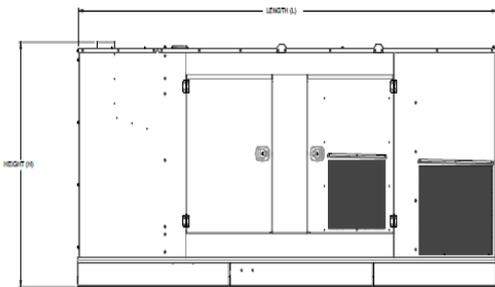
## Enclosure Package Operating Characteristics

Enclosure Type	Standby ekW	Cooling Air Flow Rate		Ambient Capability*		Sound Pressure Levels (dBA) at 7m (23 ft)
		m <sup>3</sup> /s	cfm	°C	°F	100% Load
<b>Level 2 Sound Attenuated Enclosure (Steel)</b>	250	6.4	13561	57	135	74
	300	6.4	13561	51	125	74
	350	7.4	15680	57	134	71
	400	7.4	15680	53	127	71
	450	8.4	17692	54	130	73
	500	8.4	17692	50	122	73
	550	11.2	23731	56	133	73
	600	11.2	23731	53	127	73

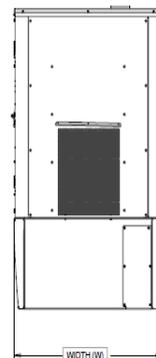
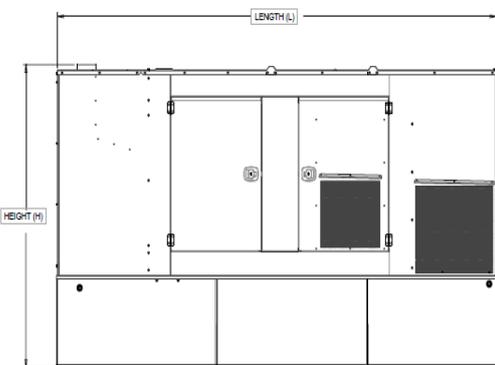
\*Cooling system performance at sea level. Consult your Cat® dealer for site specific ambient and altitude capabilities.

**Note:** Sound level measurements are subject to instrumentation, installation and manufacturing variability, as well as ambient site conditions.

## DIMENSIONS



Sound Attenuated Enclosure on Skid Base



Sound Attenuated Enclosure on a UL Listed Integral Fuel Tank Base

Image shown might not reflect actual configuration

## WEIGHTS & DIMENSIONS

Enclosure Type	Standby Ratings, ekW	Length, L		Width, W		Height, H		Package Weights	
		mm	in	mm	in	mm	in	kg	lb
Sound Attenuated Enclosure on Skid Base	250	3958	155.8	1440	56.7	1991	78.4	2857	6298.6
	300							2945	6492.6
	350	4633	182.4	1630	64.2	2227	87.7	3983	8781.0
	400							4017	8856.0
	450	4823	189.8	1630	64.2	2227	87.7	4408	9718.0
	500							4457	9826.0
	550	4980	196.1	1865	73.4	2172	85.5	4754	10480.8
	600							4837	10663.8
Sound Attenuated Enclosure on UL Listed Integral Fuel Tank Base	250	3958	155.8	1440	56.7	2487	97.9	3497	7709.6
	300							3585	7903.6
	350	4633	182.4	1630	64.2	2644	104.1	4765	10505.0
	400							4799	10580.0
	450	4823	189.8	1630	64.2	2777	109.3	5345	11783.7
	500							5394	11891.7
	550	4980	196.1	1865	73.4	2723	107.2	5973	13168.2
	600							6056	13351.2
Sound Attenuated Enclosure on UL Listed Extended Integral Fuel Tank Base	250	4608	181.4	1430	56.3	2379	93.7	3590	7914.6
	300	5251	203.7	1620	63.8	2561	100.8	3678	8108.6
	350							4876	10749.7
	400	5909	232.6	1620	63.8	2612	102.8	4910	10824.7
	450							5497	12118.8
	500	6759	266.1	1865	73.4	2487	97.9	5546	12226.8
	550							6237	13750.2
	600	6320	13933.2						

# LET'S DO THE WORK.™

LEHE2014-4(11-20)

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# 100 Amp Load Center



Image shown may not reflect actual package.

## 100 Amp Load Center

Specifications	
Number of Spaces	6
System Voltage	120 / 240VAC
Number of Tandem Circuit Breakers	6
Phase	1 Ph
NEMA Degree of Protection	NEMA 3R Outdoor
Electrical Connection	Lugs
Wiring Configuration	3-Wire
Material	Tin Plated Aluminum Busbar
Enclosure Material	Welded Galvanized Steel
Cover Finish	Gray Baked Enamel
Product Certifications	UL E-6294
Gauge	AWG 8...AWG 1 (Aluminium / Copper)

Dimensions and Specifications	
Height / Width / Depth	321 mm / 226 mm / 127 mm
GFCI	16A (120V)
Battery Charger	6A (120V)
Jacket Water Heater	11.25A (240V)
Alternator Heater	1.04A (240V)
Total Load	34.29A Max

L1	
GFCI	16A (120V)
Jacket Water Heater	11.25A (240V)
Alternator Heater	1.04A (240V)
Total Load	28.29A Max

L2	
Battery Charger	6A (120V)
Jacket Water Heater	11.25A (240V)
Alternator Heater	1.04A (240V)
Total Load	18.29A Max

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## 20A Tamper-Resistant, Weather-Resistant GFCI Receptacles

### Features and Benefits

- Automatically tests the GFCI every time the reset button is pushed in. The GFCI will not reset if the GFCI circuit is not functioning properly.
- By blocking reset of the GFCI if protection has been compromised, SmartLockPRO reduces the possibility of end-users incorrectly assuming that a reset GFCI outlet is providing ground fault protection when it actually is not.
- A line-load reversal diagnostic feature is provided which prevents the GFCI from being reset and stops power from being fed to the GFCI receptacle face or through to downstream devices. A green LED indicator on the GFCI's face also illuminates to alert the installer to the line-load wiring reversal.

#### Weather-Resistant GFCIs

- Meet UL 498 requirements for weather-resistant receptacles.

#### Tamper-Resistant GFCIs

- Shutter mechanism inside the receptacle blocks access to the contacts unless a two-prong plug is inserted, helping ensure foreign objects will be locked out.

### Product Features

- Grounding: GFCI ground fault
- Feature: Weather and tamper-resistant
- Amperage: 20 Amp
- Voltage: 125 Volt
- NEMA: 5-20R
- Trip Level: Class A, 5mA plus or minus 1mA
- Pole: 2
- Wire: 3
- Color: White

### Standards and Certifications

- NEMA: WD-6
- ANSI: C-73
- UL498: File E13399
- CSA C22.2 No. 42: File LR-57811
- NOM: 057
- UL 943: File E48380

Receptacles contained in a weather resistant box and in-use cover.



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### Remote Emergency Stop Button

Image shown may not reflect actual configuration.

#### Features and Benefits

- Enclosure degree of protection – IP 69K (NEMA 6)
- UL Listed (NKCR)
- Assembled enclosure with shroud
- 40 mm mushroom emergency stop
- Twist release
- 2NC – horizontally mounted

#### Dimensions

- Net Width: 0.065 m
- Net Height: 0.078 m
- Net Depth: 0.065 m
- Net Weight: 0.124 kg

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## SPECIFICATION

### AC SUPPLY

VOLTAGE RANGE 90 V to 305 V (L-N)

### FREQUENCY RANGE

48 Hz to 64 Hz (L-N)

### DC OUTPUT RATING

10 A DC at 24 V DC

### RIPPLE AND NOISE

<1%

### EFFICIENCY

>86%

### REGULATION LINE

<0.5%

### LOAD

2%

### TEMPERATURE SENSOR INPUT

PT1000

### PROTECTIONS

Short Circuit  
DC Over Voltage  
DC Over Current  
Reverse Polarity  
Over Temperature  
AC Under & Over Voltage

### CHARGE FAILURE RELAY

3 A at 30 V DC volt free relay

### DIMENSIONS OVERALL

70 mm x 200 mm x 130 mm  
2.7" x 7.9" x 5.1"

### WEIGHT

0.75 kg

### OPERATING TEMPERATURE RANGE

-30 °C to +80 °C  
-22 °F to +176 °F

### STORAGE TEMPERATURE RANGE

-40 °C to +70 °C  
-22 °F to +158 °F

## BATTERY CHARGER

The intelligent battery charger has been developed with safety, usability, optimised battery performance and maximum battery lifetimes in mind.

A comprehensive range of input and output protections ensures a continued safe charging environment also enabling the use of the charger as a power supply.

## FEATURES

- Intelligent two, three and four stage charging profiles
- Configurable to suit most battery types (12V/24V)
- Adjustable current limit
- Can be used as a battery charger, power supply or both at the same time
- Automatic or Manual boost and storage charge functions to help maintain battery condition
- Digital Microprocessor Technology
- Temperature compensation for battery charging
- Low Output Ripple and superb line regulation
- Three LED Indicators
- AC input Under voltage
- AC input Over voltage
- Battery charger output Over voltage
- Battery charger output Over current
- Optional battery temperature compensation with over temperature protection
- Output short circuit and Inversion polarity with auto recovery
- Configurable charge termination
- UL1236 /UL1564 Compliant

### Automatic Boost Mode

- Boosts and equalises cell charge improving battery performance and life

### Power Save Mode

- Once the battery is fully charged the chargers switch to Eco-Power to save energy

### Communication

- Can be integrated into external systems through MODBUS RTU using RS485
- Fully configurable via PC Software

## BENEFITS

- Fully flexible to maximise the life of the battery
- Suitable for a wide range of battery types
- Switched mode design
- Minimum 86% efficiency throughout full operating range
- No external intervention for boost mode
- Multiple chargers can be linked together to provide larger current output
- Can be permanently connected to battery and mains (utility) supply. No need to disconnect through high load conditions.

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## Jacket Water Heater (WHHH01/WHHH03)

Appropriate when the generator set is to be sited in a low ambient environment, the heater maintains the engine coolant at a temperature [typically 38°C (100°F)] which facilitates rapid starting and load acceptance. The heater assembly uses UL compliant components (to UL1030) and has CSA certification which is to both CSA and UL Standards.

The heater itself is powered by a 240V for 60 Hz AC auxiliary supply. A thermostatic controller is included to regulate the output temperature to within safe limits. When the generator set is not running the heater is automatically connected to the AC supply through a power relay mounted in the control panel.

Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed, and the engine has stopped.

### Features

- Uniform heat distribution
- Reduces wear from cold spots
- Improves startability
- Thermostatically controlled and protected
- 6' (1.8m) cord length (577-1758)
- 16.4' (5.0m) cord length (578-9355).
- Ensures generator is at optimal starting temperature and ready to accept load
- Durable pump with non-magnetic impeller that does not attract metal debris
- Robust die cast aluminum housing improves sealing of the hoses, eliminates leaking and breakage
- Corrosion resistant steel brackets for superior strength and durability
- Reduces thermal stress on coolant hoses
- Element designed for long life with maximum heat transfer
- IP44 Ingress Protection Rating
- No evaporation of coolant from hoses
- Reduces low coolant level alarms because coolant does not boil

Part No	Outlet Location	Watts	Volts	Amps	Regulating Thermostat	Safety Thermostat
577-1758/578-9355	Right	2700	240	11.25	On 90°F (32°C) Off 115°F (46°C)	210°F (98°C)

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## C9GC , C13GC , C15GC , C18GC Circuit Breakers

### Manually Operated Circuit Breakers

Current (A)	Frame	Number of Poles	Interrupting Ratings (kA rms)			Trip Units	(Lugs) Cable Size Range / Phase	Auxiliary Options
			240V	480V	600V			
100	XT2	3	65	25	18	Electronic LS/I or LSI	14-1/0AWG	1 Form C + 1 Bell Alarm Shunt Trip 24 VDC
250	XT4	3	65	25	18	Electronic LS/I or LSI	14-1/0AWG	1 Form C + 1 Bell Alarm Shunt Trip 24 VDC
<b>400</b>	<b>T5N</b>	<b>3</b>	<b>65</b>	<b>25</b>	<b>18</b>	Electronic LS/I (S or I) or <b>LSI</b>	<b>(2) 3/0 – 250 kcmil</b>	1 Form C + 1 Bell Alarm 250VAC/VDC Shunt Trip 24VDC
600	T6N	3	65	35	20		(3) 2/0 – 400 kcmil	1 Form C + 1 Bell Alarm 400VAC / 250VDC Shunt Trip 24VDC
800	T6N	3	65	35	20		(3) 2/0 – 400 kcmil	1 Form C + 1 Bell Alarm 400VAC / 250VDC Shunt Trip 24VDC
1200	T7S	3	65	50	25		(4) 2/0 – 500 kcmil	1 Form C + 1 Bell Alarm 400VAC / 250VDC Shunt Trip 24VDC

### 1st Breaker Options (400 – 1200A)

Model	Current (A)	Operation
C9, C13, C15	400	Manually Operated
C9, C13, C15, C18	600	Manually Operated
C9, C13, C15, C18	800	Manually Operated
C9, C18	1200	Manually Operated

1st Breaker FLC Capacity or one frame less than FLC capacity except when 1st breaker is 400 A

### 2nd Breaker Options

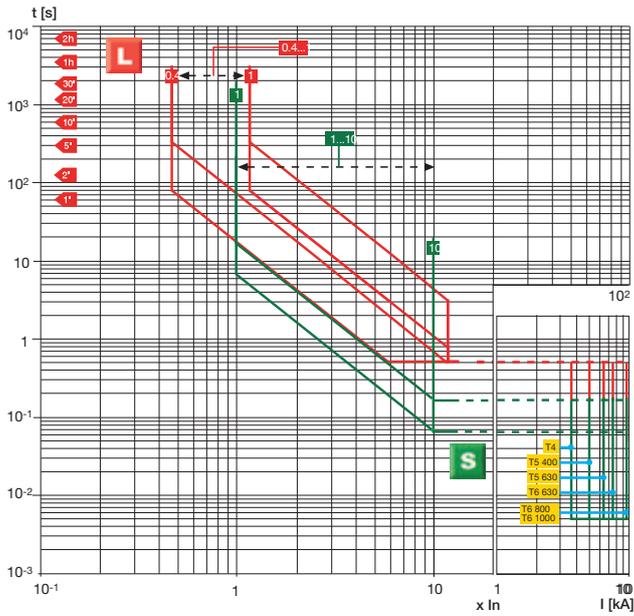
Model	Current (A)	Operation
C9, C13, C15, C18	100 / 250	Manually Operated

2nd breaker either 100A or 250A

## T4 250/320 - T5 400/630 - T6 630/800/1000 PR221DS

### L-S Functions

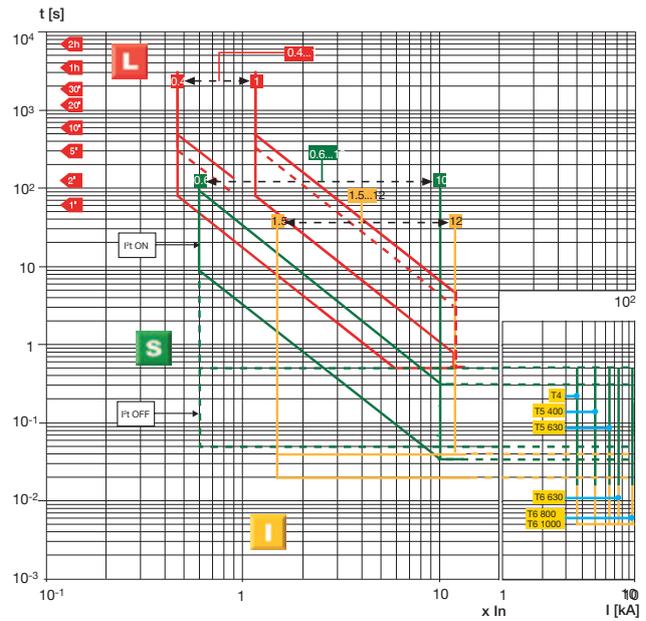
Note: For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A  $\Rightarrow t_{max} = 9.5 \times I_n$



## T4 250/320 - T5 400/630 - T6 630/800/1000

### PR222DS - PR222DS/PD - PR223DS

### L-S-I Functions



Note: The dotted curve of function L corresponds to the maximum delay ( $t_1$ ) which can be set at  $6 \times I_n$  in the case where 320 A CTs are used for T4 and 630 A for T5. For all the CT sizes  $t_1 = 18s$  except with 320 A CT (T4), 630 A CT (T5) and 1000 A CT (T6) where  $t_1 = 10.5s$ . For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A  $\Rightarrow t_{max} = 9.5 \times I_n$ ,  $t_{max} = 9.5 \times I_n$ . For T6 In = 800 A  $\Rightarrow t_{max} = 10.5 \times I_n$ . For PR223DS the L protection function can be set to  $I_1 = 0.18...1 \times I_n$ .

Figure 1

## T6 600 / 800 -PR221DS L-1 Functions

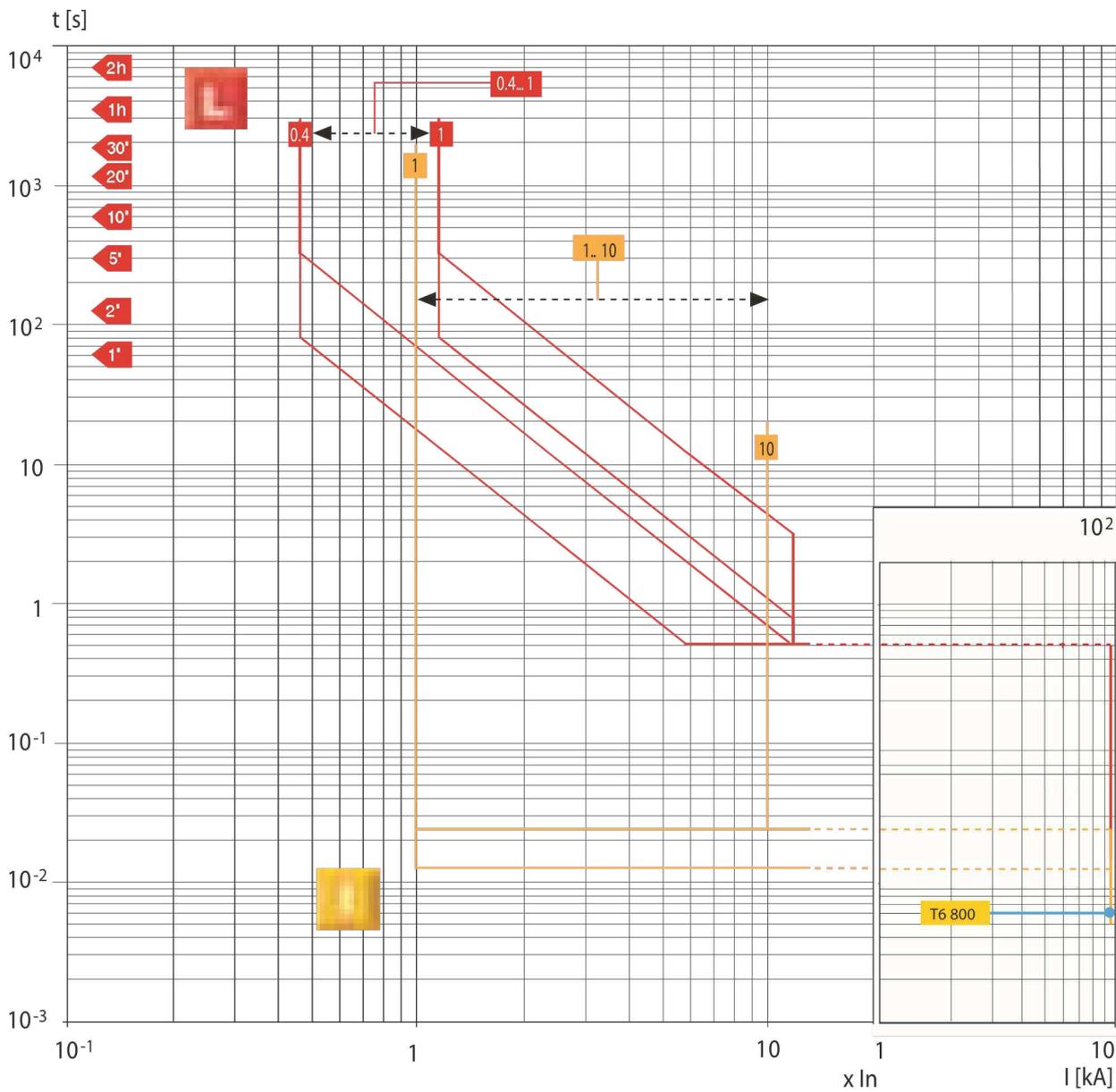


Figure 2



## Tmax T7 PR231/P Functions

### L-S Functions

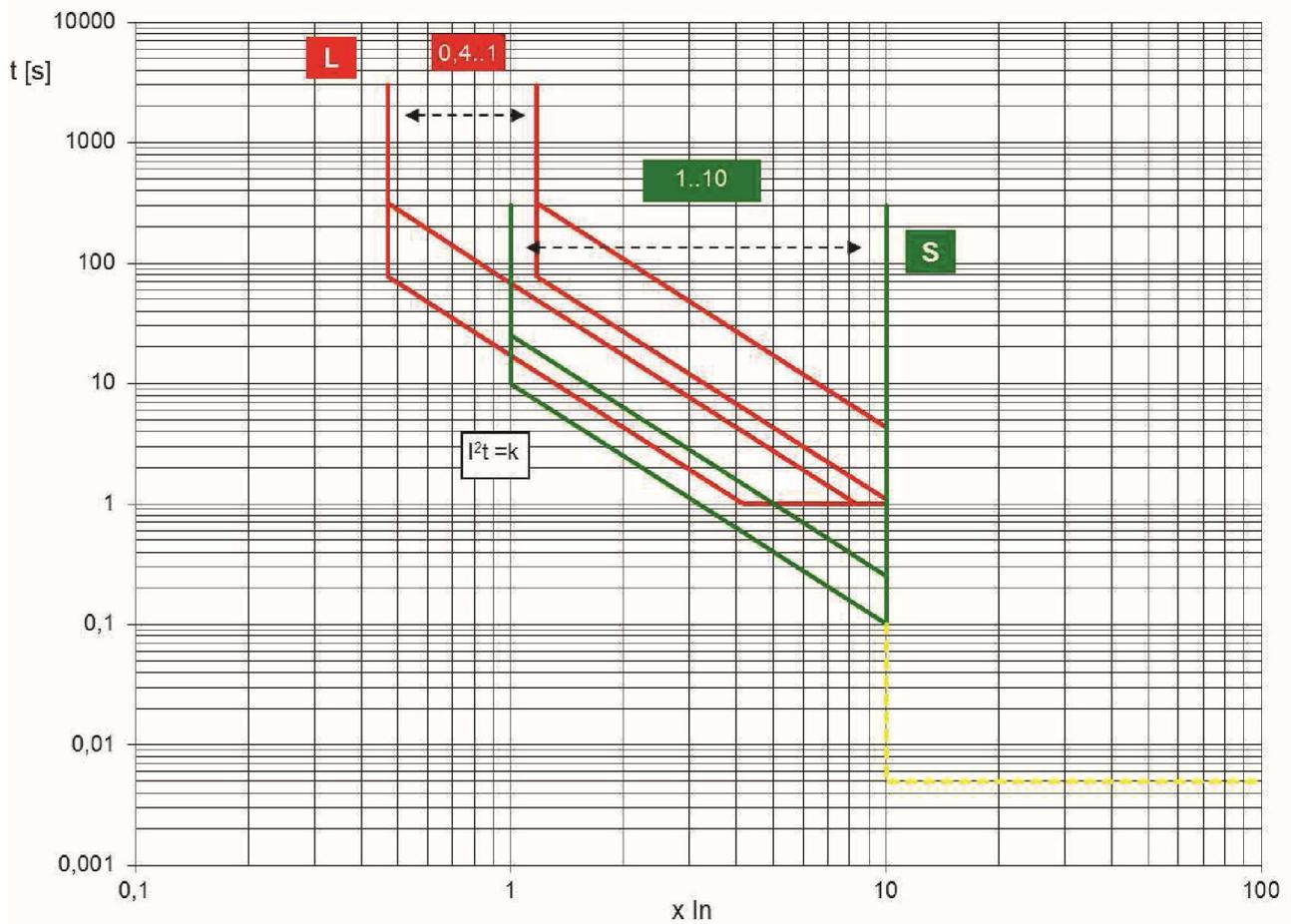


Figure 4

## T6 800 - PR222DS and PR222DS/PD-A L-S-I Functions

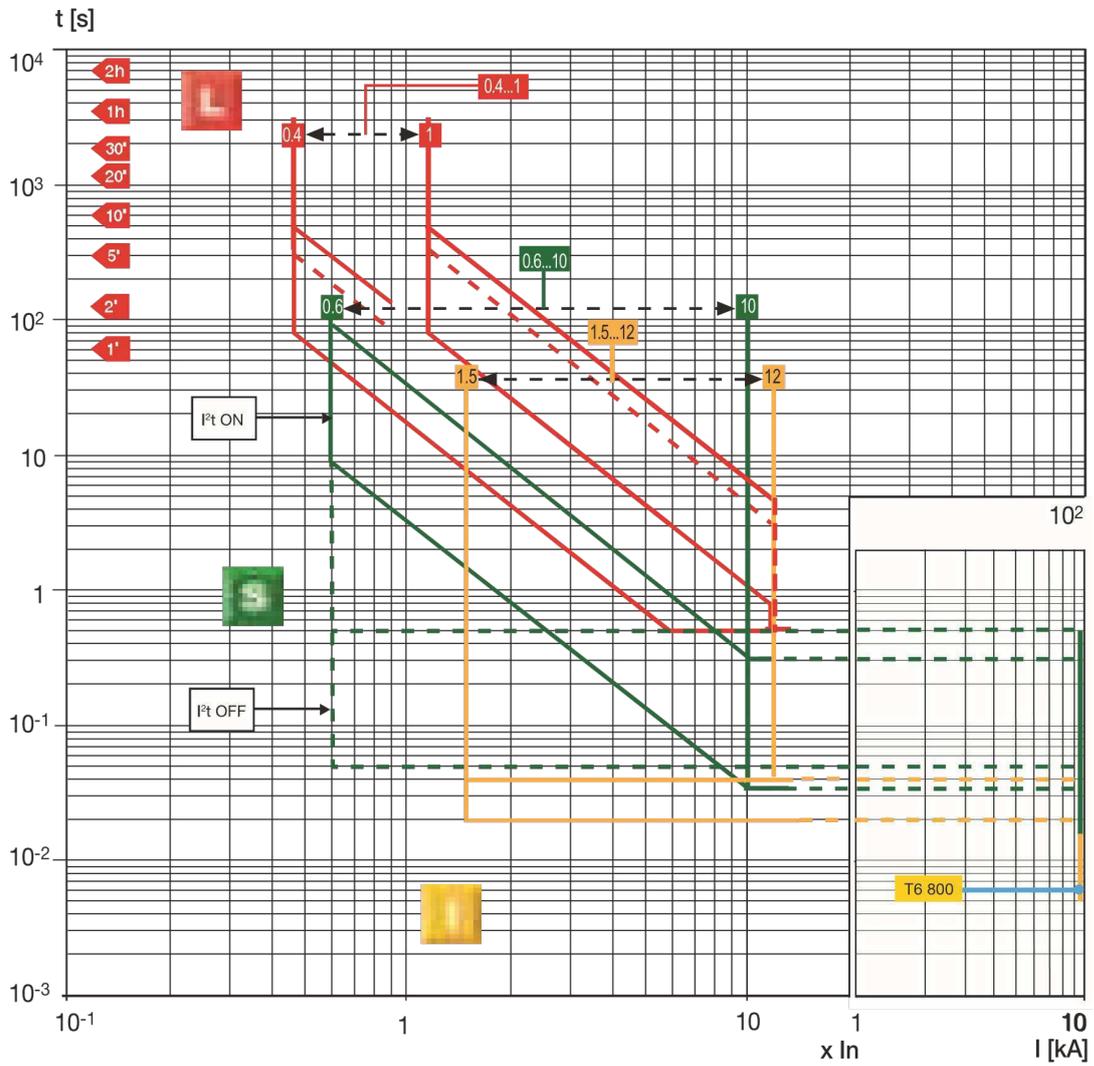


Figure 5

## T7 1000/1200 - PR232/P L-S-I Functions

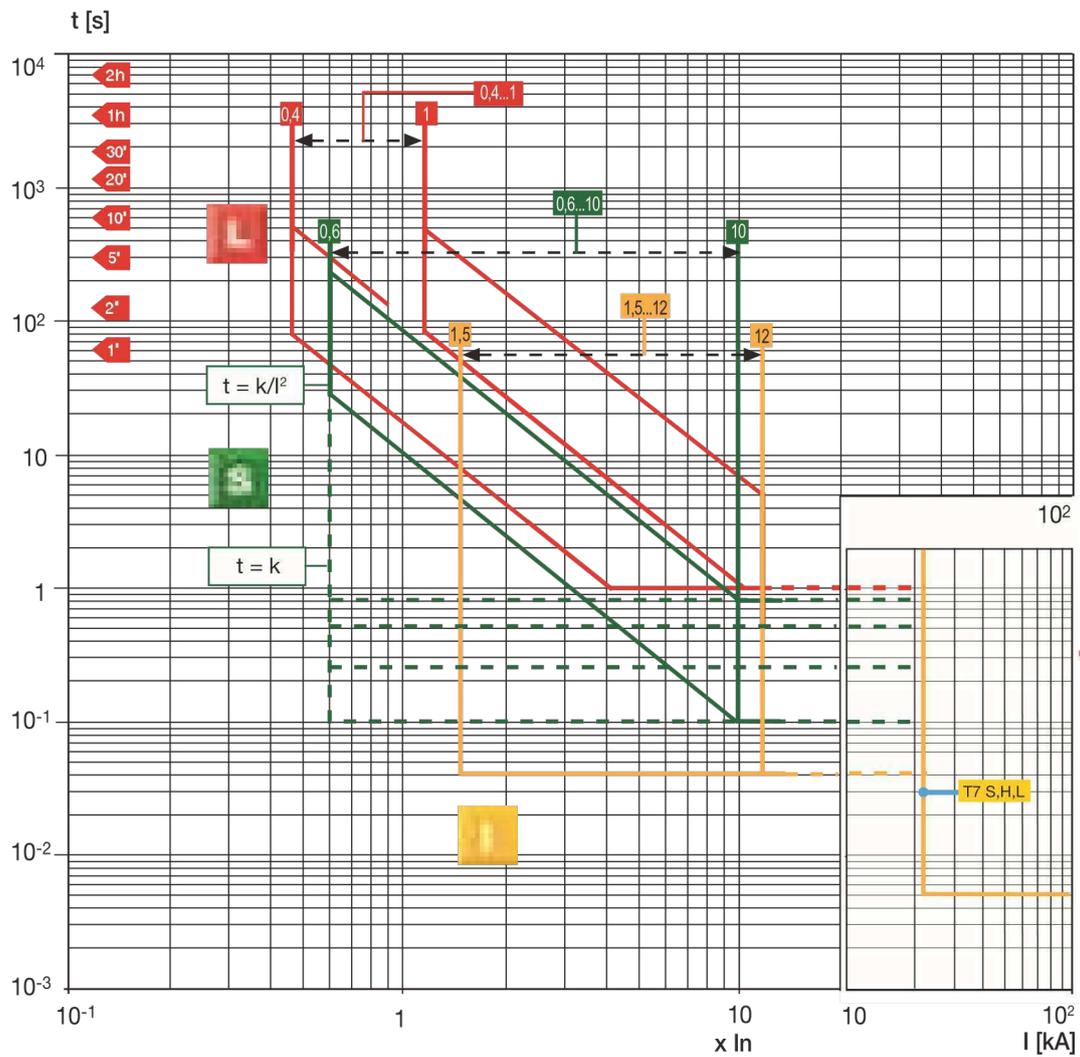


Figure 6

## T7 1000/1200 - PR332/P L-S-I Functions

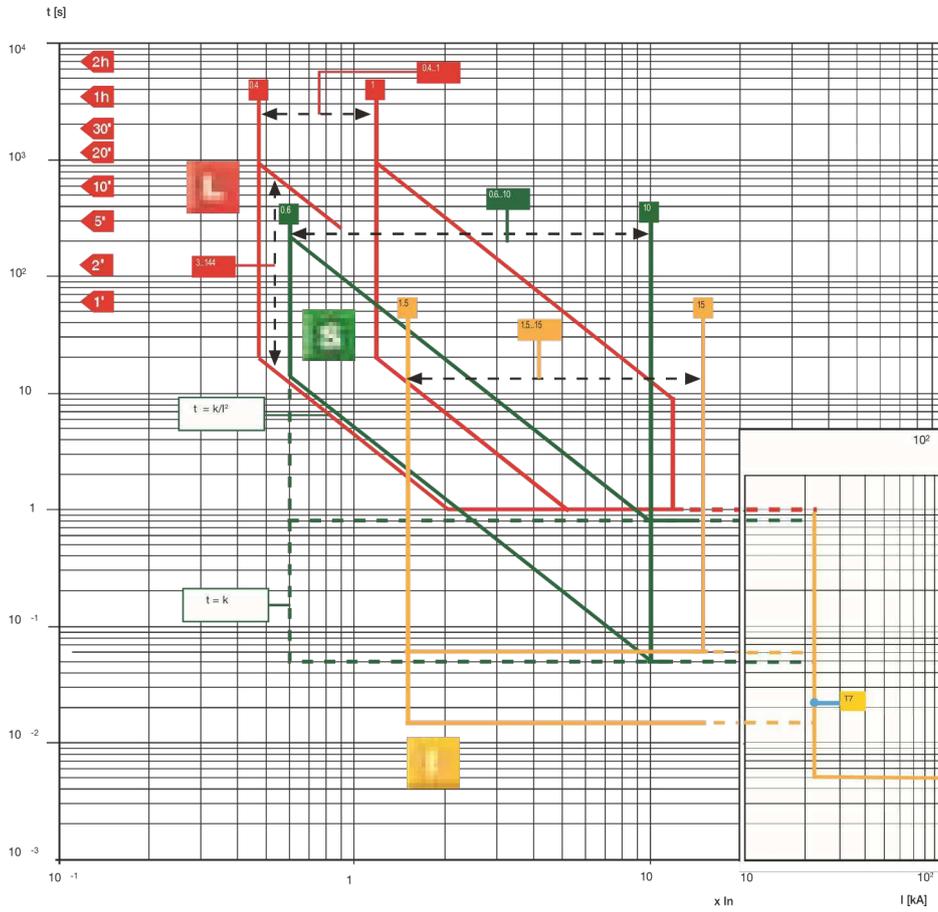


Figure 7

## XT2 Ekip LSI L-S-I functions

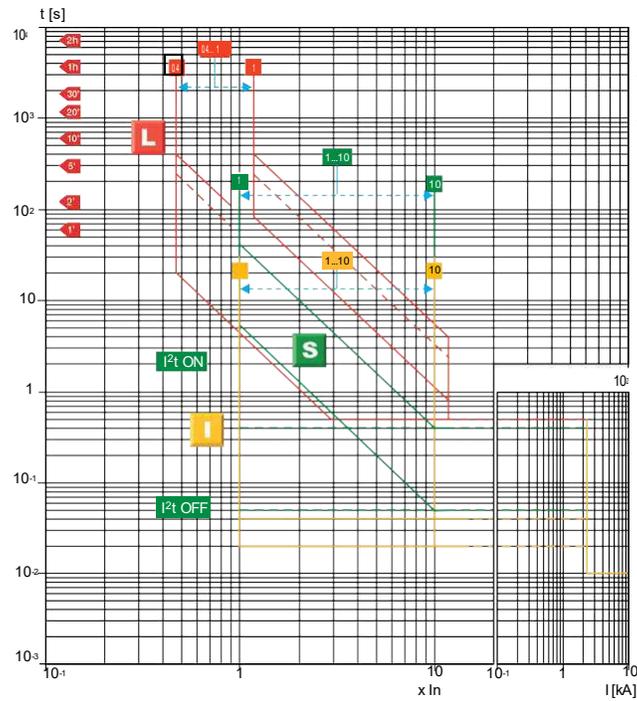
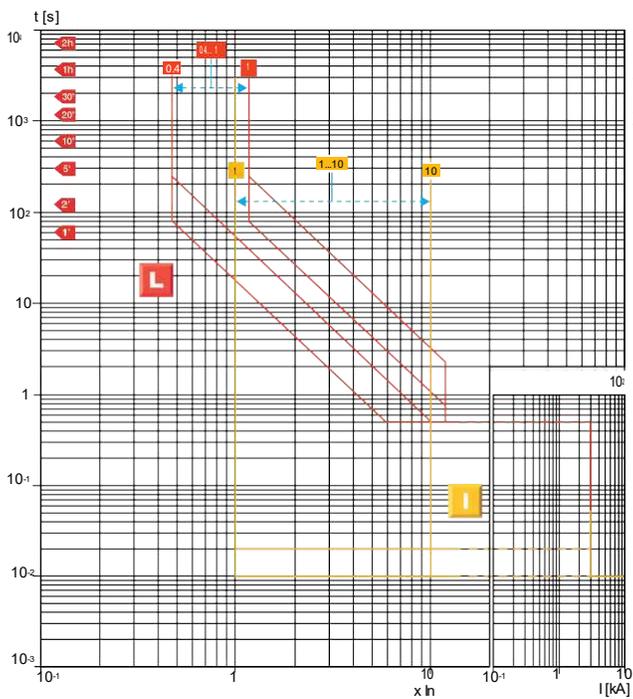


Figure - 8

## XT4 Ekip LS/I L-I Functions



## XT4 Ekip LS/I L-S functions

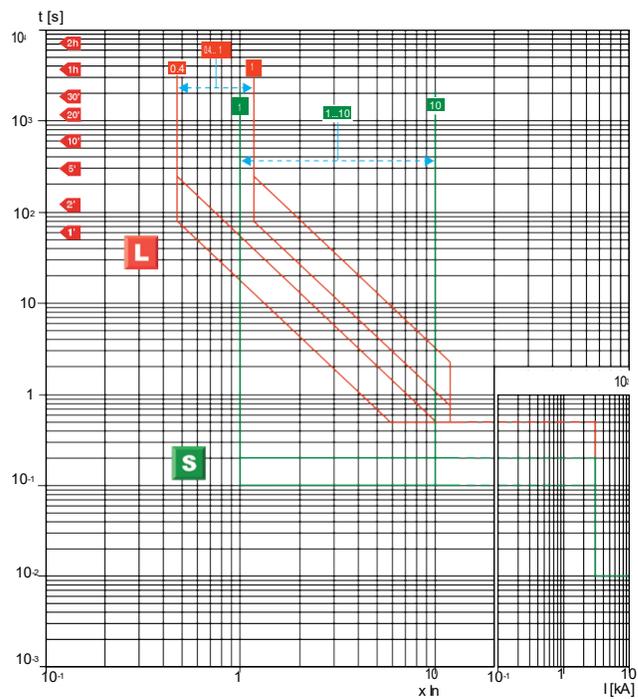
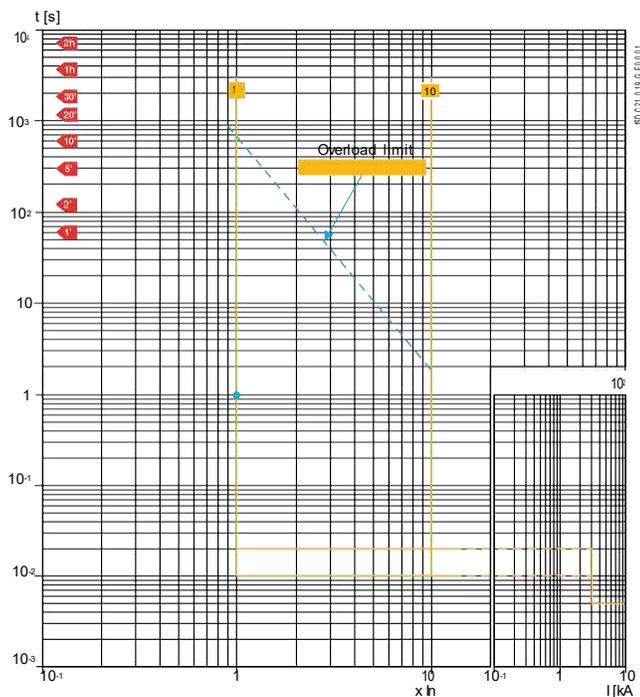


Figure - 9

## XT4 Ekip LS/I I function



## XT4 Ekip L-S-I functions

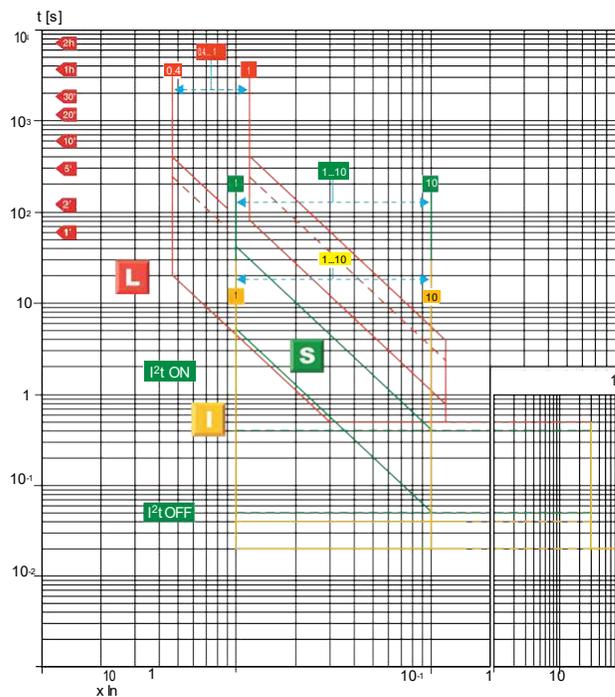


Figure - 10

LEHE2459-00 (02-20)



Image shown might not reflect actual configuration

## AIR CLEANERS FOR C9 ENGINES

### GENERAL DESCRIPTION

Air cleaners reduce contaminants flowing into the air intake system, provide a high level of engine protection from harmful contaminants and increase engine performance and fuel efficiency.

Dual element air cleaners provide additional protection for the engine.

### FEATURES

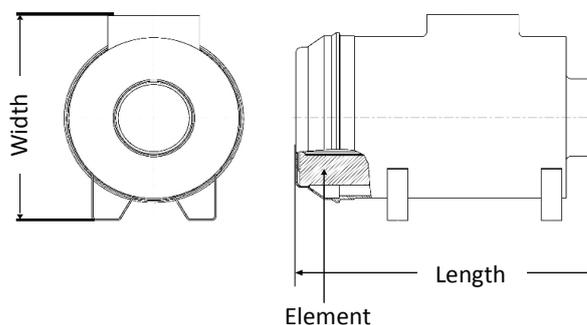
Single element cleaner

- Element
  - Radial Seal & Pleatloc technology
  - No Safety Element
  - Standard Yellow Media
  - Unique fit filters with a proprietary design
  - More filter media in a smaller area
- Housing
  - Metal Body
- Service indicator
  - 1/8-27 NPT

### SPECIFICATION

#### Single element cleaner

	Element
Flow rate (m <sup>3</sup> /min)	14 - 19
Overall Efficiency	99.9 %
Effective filtering Area (m <sup>2</sup> )	10.46
Number of convolutions	258
Depth of convolutions	50.8
Applicable Feature Codes	ACLSS04



### CLEANER DIMENSIONS

- Length – 497 mm
- Width – 347 mm
- Height – 530 mm
- Weight – 8.6 Kg

LEHE1871-02 (04-19)



Image shown might not reflect actual configuration

## GCCP 1.2 - Control Panel

GCCP 1.2 is an auto Start Control Module suitable for a wide variety of diesel gen-set applications. Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the backlit LCD screen, illuminated LEDs and remote PC.

### FEATURES

- 4-line back-lit LCD text display
- Multiple display languages
- Five-key menu navigation
- LCD alarm indication
- Customisable power-up text and images
- Data logging facility
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB & RS485 communication
- Front panel configuration with PIN protection
- Power save mode
- 3-phase generator sensing and protection
- Generator current and power monitoring (kW, kvar, kVA, pf)
- kW and kvar overload and reverse power alarms
- Over current protection
- Unbalanced load protection
- Breaker control via fascia buttons
- Fuel and start outputs configurable when using CAN Support for 0 V to 10 V & 4 mA to 20 mA sensors
- 8 configurable digital inputs (3 available for Customer use)
- 8 configurable digital outputs (5 available for Customer use)
- 4 configurable analogue inputs (3 available for Customer Use)
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Engine pre-heat and post-heat functions
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel usage monitor and low fuel level alarms
- 3 configurable maintenance alarms

### BENEFITS

- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility
- PLC editor allows user configurable functions to meet user specific application requirements.
- RS485 Communication port can be used for the Remote Monitoring Communication (Compatible with Cat PLG)

### SPECIFICATION

#### DC SUPPLY

##### CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous  
5 V for upto 1 minute

#### CRANKING DROPOUTS

Able to survive 0 V for 100 ms, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries.

LEDs and backlight will not be maintained during cranking.

#### MAXIMUM OPERATING CURRENT

260 mA at 12 V, 150 mA at 24 V

#### MAXIMUM STANDBY CURRENT

145 mA at 12 V, 85 mA at 24 V

#### CHARGE FAIL/EXCITATION RANGE

0 V to 35 V

#### GENERATOR & MAINS (UTILITY) VOLTAGE RANGE

15 V to 415 V AC (Ph to N)  
26 V to 719 V AC (Ph to Ph)

#### FREQUENCY RANGE

3.5 Hz to 75 Hz

#### MAGNETIC PICKUP VOLTAGE RANGE

+/- 0.5 V to 70 V

#### FREQUENCY RANGE

10,000 Hz (max)

#### INPUTS

##### DIGITAL INPUTS A TO H

Negative switching

##### ANALOGUE INPUTS A & D

Configurable as:

Negative switching digital input 0 V to 10 V sensor  
4 mA to 20 mA sensor Resistive sensor

##### ANALOGUE INPUTS B & C

Configurable as:

Negative switching digital input Resistive sensor

#### OUTPUTS

##### OUTPUT A & B (FUEL & START)

15 A DC at supply voltage

##### AUXILIARY OUTPUTS C, D, E, F, G & H

2 A DC at supply voltage

#### DIMENSIONS OVERALL

216 mm x 158 mm x 43 mm  
8.5" x 6.2" x 1.5"

#### PANEL CUT-OUT

184 mm x 137 mm  
7.2" x 5.3"

#### MAXIMUM PANEL THICKNESS

8 mm  
0.3"

#### STORAGE TEMPERATURE RANGE

-40°C to +85°C  
-40 °F to +185 °F

#### OPERATING TEMPERATURE RANGE

-30°C to +70°C  
-22 °F to +158 °F

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## Remote Annunciator Module

It is an LED expansion module that can be used with compatible control modules. The module has been designed to display a maximum of eight individual LED indications up to a maximum distance of 1 KM (0.6 miles).

The Annunciator will consist of two modules to provide a 16 Channel Fault annunciation.

It is presented in a vertical enclosure. It includes an alarm sounder that is triggered when the host controller detects an alarm condition. The alarm can be muted using the front push button.

The Panels will be fitted with removable label cards which can be used to identify the standard NFPA alarms. If desired

It includes individual LEDs for each channel and a 'Power On' LED that flashes when the link with the host controller is lost.

## FEATURES

- The Remote annunciator has an integral Sounder / Horn
- Eight configurable LEDs (per module)
- Works up to 1 KM (0.6 miles) from the host controller
- A single Controller can support five Caterpillar Configured remote annunciator control boxes

LEHE2021-01 (03-21)

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## ENVIRONMENTAL TESTING STANDARDS

### ELECTRO-MAGNETIC COMPATIBILITY

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

### ELECTRICAL SAFETY

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

### TEMPERATURE

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

### VIBRATION

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

### SHOCK

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

### HUMIDITY

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

### DEGREES OF PROTECTION PROVIDED BY ENCLOSURES BS EN 60529

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

## SPECIFICATION

### CONTINUOUS VOLTAGE RATING

8 V to 35 V Continuous

### CRANKING DROPOUTS

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

### MAXIMUM OPERATING CURRENT

112 mA at 12 V, 53 mA at 24 V

### MAXIMUM STANDBY CURRENT

74 mA at 12 V, 35 mA at 24 V

### DIMENSIONS OVERALL

355 mm x 369 mm x 90 mm  
13.97" x 14.52" x 3.54"

### PANEL CUT-OUT

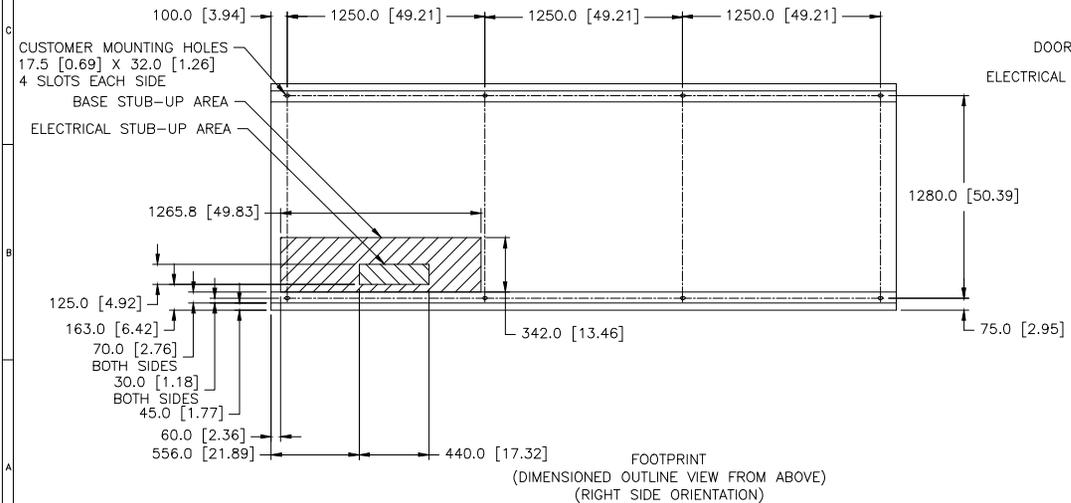
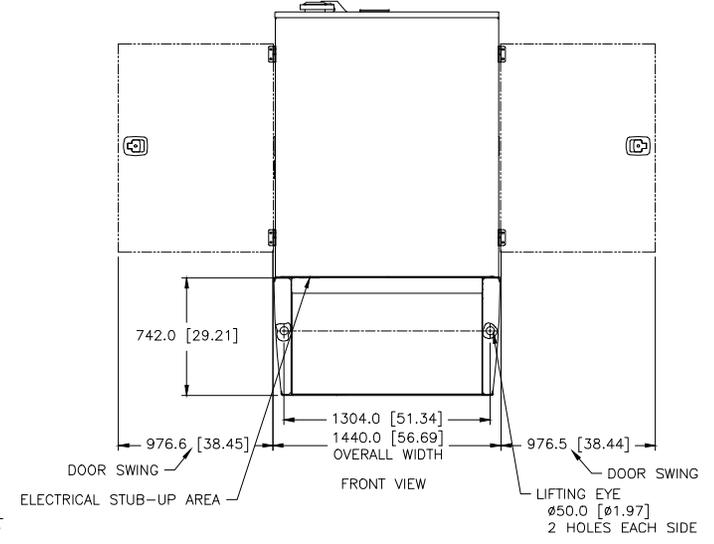
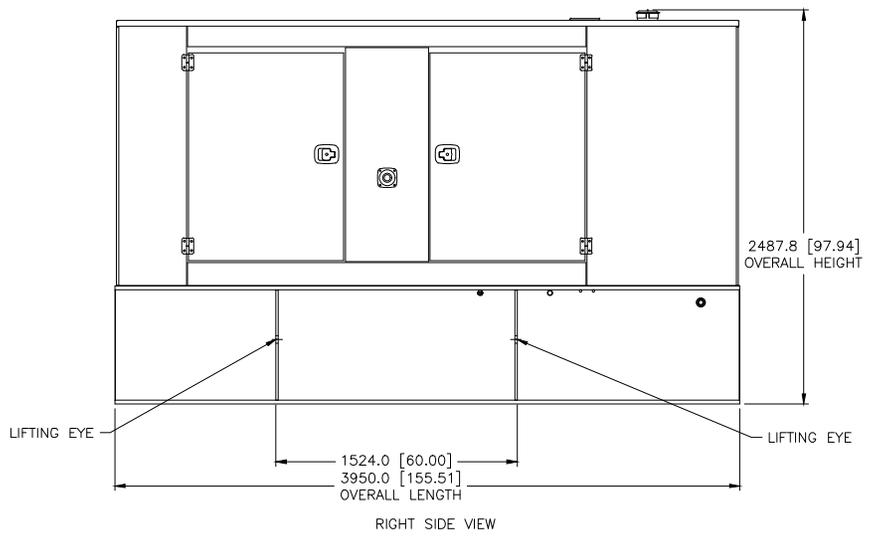
286 mm x 326 mm x 93 mm  
11.25" x 12.83" x 3.66"

### MAXIMUM PANEL THICKNESS

8 mm  
0.3"

QTY	ENGINE CONNECTIONS	SIZE	SHEET
1	COOLANT DRAIN	ø15.9 [ø0.625] I.D.	2,3
1	OIL DRAIN	ø15.88 [ø0.625] I.D. HOSE BEAD	2,3
1	EXHAUST	ø127.0 [ø5.0] O.D.	2,3
1	FUMES DISPOSAL TUBE	ø49.15 [ø1.94] I.D.	3

QTY	POSSIBLE TANK CONNECTIONS	SIZE	SHEET
1	FUEL RETURN	1" NPTF THD	3
1	FUEL SUPPLY	1" NPTF THD	3
2	SPARE PORTS	2" NPTF THD	3
1	FUEL FILL	4" NPT THD	3
1	MAIN TANK EMERGENCY VENT	4" NPT THD	3
1	MAIN TANK NORMAL VENT	2" NPTF THD	3
1	BASIN TANK EMERGENCY VENT	4" NPT THD	3



MODEL	TYPE	ENGINE AR	BASE AR	ENCLOSURE AR
C9	Y	LS-3971 CHG 00 LS-3972 CHG 00	LS-3869 CHG 00	LS-3857 CHG 00

PACKAGE LIFTED IN 4 PLACES  
PACKAGE SHOWN WITH MORE DETAIL ON SHEETS 2 & 3

1C2968BIDENTY  
1E2735 DRAWING - AUTOCAD  
1E0188BIBERN MARKINGS  
1E0013GCONFIDENTIALITY  
1E0012AINTEROPERATION  
1E0001 INTER & I/O

DESIGNED BY: J. R. VILLENA  
CHKD BY: J. R. VILLENA  
DATE: 08/19/19

RECORDS: 1X

DATE: 08/19/19

SHEET 1 OF 3

**RAIFORLLAN INC.**

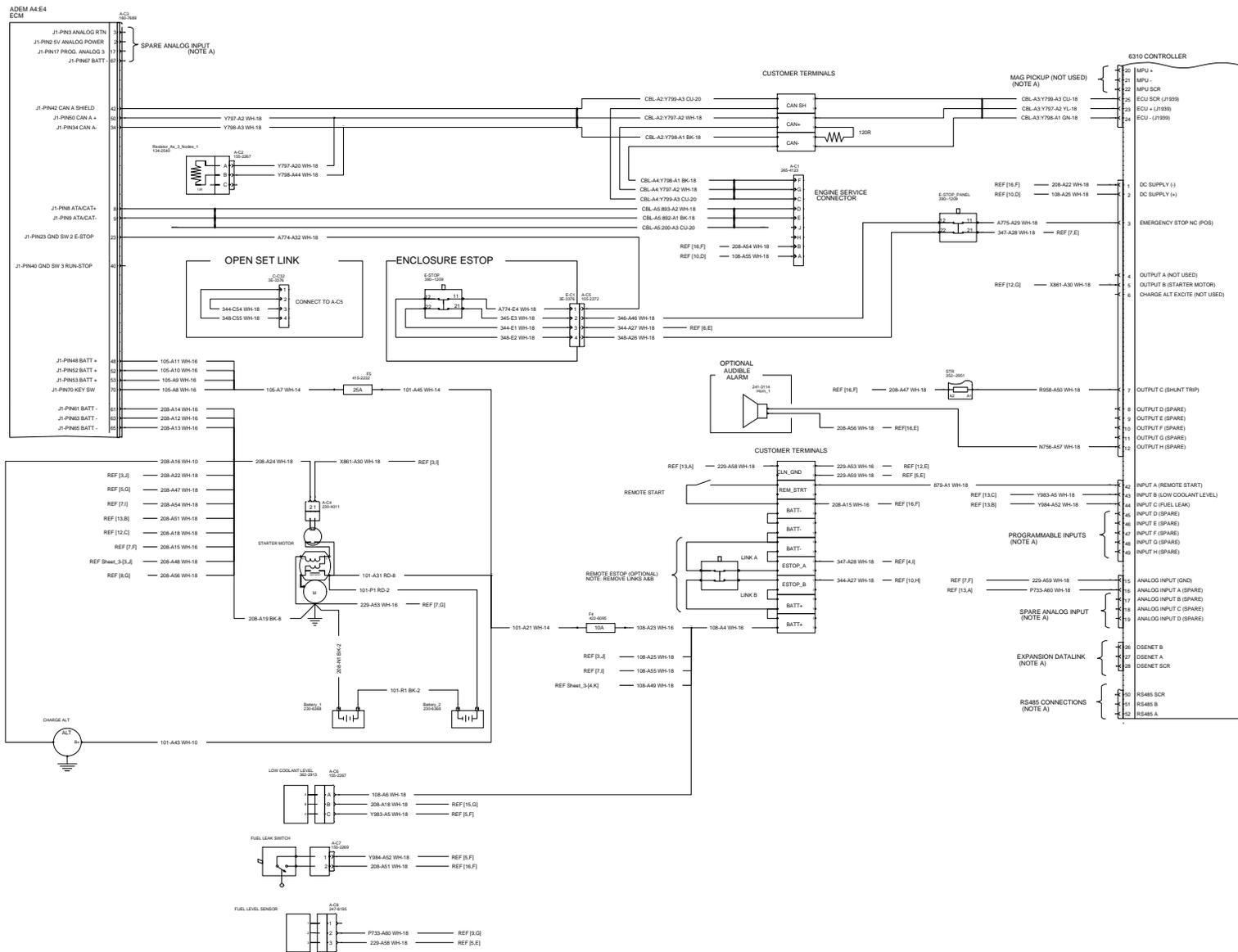
INSTALLATION COMPOSITE  
C9 SA W/ INTEG 24HR TANK  
588-1059







# CONTROL SCHEMATIC (DSE 6310)

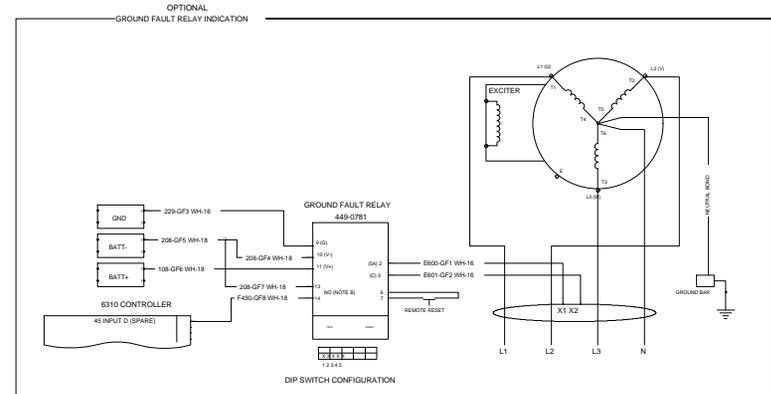
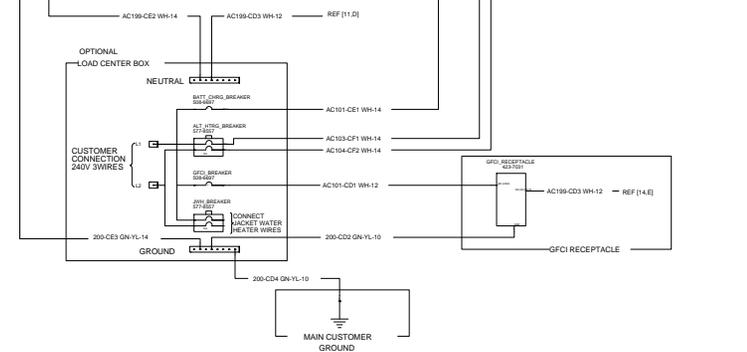
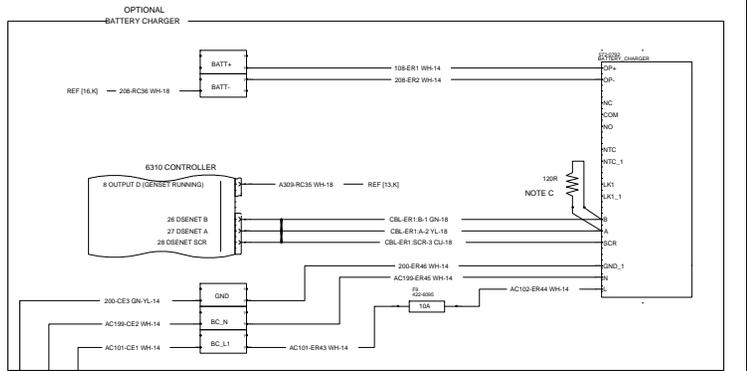
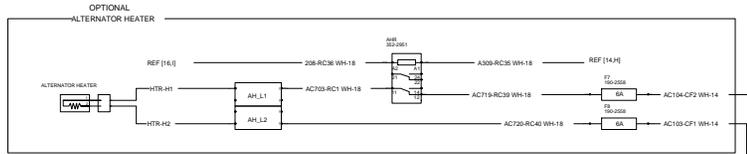


Terminal	Signal	Notes
1	DC SUPPLY (+)	
2	DC SUPPLY (-)	
3	EMERGENCY STOP NC (POS)	
4	OUTPUT A (NOT USED)	
5	OUTPUT B (STARTER MOTOR)	
6	CHARGE ALT EXCITE (NOT USED)	
7	OUTPUT C (SHUNT TRIP)	
8	OUTPUT D (SPARE)	
9	OUTPUT E (SPARE)	
10	OUTPUT F (SPARE)	
11	OUTPUT G (SPARE)	
12	OUTPUT H (SPARE)	
13	INPUT A (REMOTE START)	
14	INPUT B (LOW COOLANT LEVEL)	
15	INPUT C (FUEL LEAK)	
16	INPUT D (SPARE)	
17	INPUT E (SPARE)	
18	INPUT F (SPARE)	
19	INPUT G (SPARE)	
20	INPUT H (SPARE)	
21	ANALOG INPUT (GND)	
22	ANALOG INPUT A (SPARE)	
23	ANALOG INPUT B (SPARE)	
24	ANALOG INPUT C (SPARE)	
25	ANALOG INPUT D (SPARE)	
26	DSENET B	
27	DSENET A	
28	DSENET SCR	
29	RS485 SCR	
30	RS485 B	
31	RS485 A	





# ADDITIONAL OPTIONS



NO.	DESCRIPTION	QTY	UNIT
1	200-RC36 WH-18	1	BRK
2	200-RC36 WH-18	1	BRK
3	200-RC36 WH-18	1	BRK
4	200-RC36 WH-18	1	BRK
5	200-RC36 WH-18	1	BRK
6	200-RC36 WH-18	1	BRK
7	200-RC36 WH-18	1	BRK
8	200-RC36 WH-18	1	BRK
9	200-RC36 WH-18	1	BRK
10	200-RC36 WH-18	1	BRK
11	200-RC36 WH-18	1	BRK
12	200-RC36 WH-18	1	BRK
13	200-RC36 WH-18	1	BRK
14	200-RC36 WH-18	1	BRK
15	200-RC36 WH-18	1	BRK
16	200-RC36 WH-18	1	BRK
17	200-RC36 WH-18	1	BRK
18	200-RC36 WH-18	1	BRK
19	200-RC36 WH-18	1	BRK
20	200-RC36 WH-18	1	BRK
21	200-RC36 WH-18	1	BRK
22	200-RC36 WH-18	1	BRK
23	200-RC36 WH-18	1	BRK
24	200-RC36 WH-18	1	BRK
25	200-RC36 WH-18	1	BRK
26	200-RC36 WH-18	1	BRK
27	200-RC36 WH-18	1	BRK
28	200-RC36 WH-18	1	BRK
29	200-RC36 WH-18	1	BRK
30	200-RC36 WH-18	1	BRK
31	200-RC36 WH-18	1	BRK
32	200-RC36 WH-18	1	BRK
33	200-RC36 WH-18	1	BRK
34	200-RC36 WH-18	1	BRK
35	200-RC36 WH-18	1	BRK
36	200-RC36 WH-18	1	BRK
37	200-RC36 WH-18	1	BRK
38	200-RC36 WH-18	1	BRK
39	200-RC36 WH-18	1	BRK
40	200-RC36 WH-18	1	BRK
41	200-RC36 WH-18	1	BRK
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43	200-RC36 WH-18	1	BRK
44	200-RC36 WH-18	1	BRK
45	200-RC36 WH-18	1	BRK
46	200-RC36 WH-18	1	BRK
47	200-RC36 WH-18	1	BRK
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49	200-RC36 WH-18	1	BRK
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91	200-RC36 WH-18	1	BRK
92	200-RC36 WH-18	1	BRK
93	200-RC36 WH-18	1	BRK
94	200-RC36 WH-18	1	BRK
95	200-RC36 WH-18	1	BRK
96	200-RC36 WH-18	1	BRK
97	200-RC36 WH-18	1	BRK
98	200-RC36 WH-18	1	BRK
99	200-RC36 WH-18	1	BRK
100	200-RC36 WH-18	1	BRK



**PERFORMANCE DATA [C09DE60]****JUNE 03, 2022**For Help Desk Phone Numbers [Click here](#)

Perf No: DM8501

Change Level: 03

[General](#)[Heat Rejection](#)[Emissions](#)[Regulatory](#)[Altitude Derate](#)[Cross Reference](#)[Perf Param Ref](#)[View PDF](#)

<b>SALES MODEL:</b>	C9	<b>COMBUSTION:</b>	DIRECT INJECTION
<b>BRAND:</b>	CAT	<b>ENGINE SPEED (RPM):</b>	1,800
<b>MACHINE SALES MODEL:</b>		<b>HERTZ:</b>	60
<b>ENGINE POWER (BHP):</b>	398	<b>FAN POWER (HP):</b>	30.2
<b>GEN POWER W/O FAN (EKW):</b>	265.0	<b>ASPIRATION:</b>	TA
<b>GEN POWER WITH FAN (EKW):</b>	250.0	<b>AFTERCOOLER TYPE:</b>	ATAAC
<b>COMPRESSION RATIO:</b>	16.1	<b>AFTERCOOLER CIRCUIT TYPE:</b>	JW+OC, ATAAC
<b>RATING LEVEL:</b>	STANDBY	<b>INLET MANIFOLD AIR TEMP (F):</b>	122
<b>PUMP QUANTITY:</b>	1	<b>JACKET WATER TEMP (F):</b>	192.2
<b>FUEL TYPE:</b>	DIESEL	<b>TURBO CONFIGURATION:</b>	SINGLE
<b>MANIFOLD TYPE:</b>	DRY	<b>TURBO QUANTITY:</b>	1
<b>GOVERNOR TYPE:</b>	ELEC	<b>TURBOCHARGER MODEL:</b>	S310-1.25
<b>CAMSHAFT TYPE:</b>	STANDARD	<b>CERTIFICATION YEAR:</b>	2005
<b>IGNITION TYPE:</b>	CI	<b>PISTON SPD @ RATED ENG SPD (FT/MIN):</b>	1,759.8
<b>INJECTOR TYPE:</b>	EUI		
<b>REF EXH STACK DIAMETER (IN):</b>	4		
<b>MAX OPERATING ALTITUDE (FT):</b>	3,281		

INDUSTRY	SUB INDUSTRY	APPLICATION
ELECTRIC POWER	STANDARD	PACKAGED GENSET
OIL AND GAS	LAND PRODUCTION	PACKAGED GENSET

**General Performance Data** [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	BRAKE MEAN EFF PRES (BMEP)	BRAKE SPEC FUEL CONSUMPTN (BSFC)	ISO BRAKE SPEC FUEL CONSUMPTN (BSFC)	VOL FUEL CONSUMPTN (VFC)	ISO VOL FUEL CONSUMPTN (VFC)
EKW	%	BHP	PSI	LB/BHP-HR	LB/BHP-HR	GAL/HR	GAL/HR
250.0	100	398	326	0.341	0.337	19.1	18.9
225.0	90	359	294	0.346	0.343	17.5	17.3
200.0	80	321	263	0.355	0.351	16.0	15.9
187.5	75	302	247	0.360	0.356	15.3	15.2
175.0	70	284	232	0.364	0.361	14.6	14.4
150.0	60	247	202	0.374	0.371	13.0	12.9
125.0	50	211	172	0.385	0.381	11.4	11.3
100.0	40	176	144	0.394	0.390	9.8	9.7
75.0	30	141	116	0.404	0.400	8.0	8.0
62.5	25	124	101	0.410	0.406	7.2	7.1
50.0	20	106	87	0.418	0.414	6.2	6.2
25.0	10	68.9	56	0.445	0.441	4.3	4.3

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
EKW	%	BHP	IN-HG	DEG F	DEG F	IN-HG	DEG F	IN-HG	DEG F
250.0	100	398	77.7	122.3	1,142.4	55.4	852.0	79	425.2
225.0	90	359	74.1	121.6	1,094.4	51.6	823.5	75	407.9
200.0	80	321	70.7	122.1	1,050.1	48.2	800.5	72	390.0
187.5	75	302	69.0	122.5	1,029.4	46.4	790.7	70	380.5
175.0	70	284	66.6	122.4	1,010.3	44.2	782.4	67	370.2

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	INLET MFLD PRES	INLET MFLD TEMP	EXH MFLD TEMP	EXH MFLD PRES	ENGINE OUTLET TEMP	COMPRESSOR OUTLET PRES	COMPRESSOR OUTLET TEMP
150.0	60	247	60.6	122.2	973.8	39.4	768.3	61	346.6
125.0	50	211	53.2	121.8	937.9	33.9	755.8	54	318.8
100.0	40	176	43.3	121.2	899.4	27.4	742.4	44	280.7
75.0	30	141	32.2	120.7	857.9	20.5	727.9	33	236.6
62.5	25	124	26.7	120.5	835.9	17.2	720.5	27	214.1
50.0	20	106	21.3	120.3	812.9	14.1	712.7	22	191.5
25.0	10	68.9	12.1	120.5	671.3	9.1	612.1	13	150.2

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	WET INLET AIR VOL FLOW RATE	ENGINE OUTLET WET EXH GAS VOL FLOW RATE	WET INLET AIR MASS FLOW RATE	WET EXH GAS MASS FLOW RATE	WET EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)	DRY EXH VOL FLOW RATE (32 DEG F AND 29.98 IN HG)
EKW	%	BHP	CFM	CFM	LB/HR	LB/HR	FT3/MIN	FT3/MIN
250.0	100	398	889.8	2,245.6	3,863.5	3,999.1	841.8	776.8
225.0	90	359	866.1	2,131.2	3,753.5	3,877.8	816.6	756.7
200.0	80	321	845.5	2,029.1	3,641.7	3,755.4	791.7	736.4
187.5	75	302	833.2	1,976.5	3,583.9	3,692.5	777.2	724.2
175.0	70	284	815.6	1,915.7	3,500.2	3,603.4	758.3	707.7
150.0	60	247	770.3	1,777.1	3,290.5	3,382.8	711.5	666.0
125.0	50	211	711.6	1,616.1	3,025.9	3,107.0	653.7	613.6
100.0	40	176	631.2	1,409.7	2,668.7	2,738.1	576.6	542.5
75.0	30	141	539.6	1,189.0	2,266.0	2,323.1	492.3	464.1
62.5	25	124	493.0	1,076.6	2,063.6	2,114.4	448.5	423.3
50.0	20	106	447.1	961.4	1,865.3	1,909.6	403.2	380.9
25.0	10	68.9	365.7	720.7	1,521.7	1,552.4	330.6	314.7

## Heat Rejection Data [Top](#)

GENSET POWER WITH FAN	PERCENT LOAD	ENGINE POWER	REJECTION TO JACKET WATER	REJECTION TO ATMOSPHERE	REJECTION TO EXH	EXHAUST RECOVERY TO 350F	FROM OIL COOLER	FROM AFTERCOOLER	WORK ENERGY	LOW HEAT VALUE ENERGY	HIGH HEAT VALUE ENERGY
EKW	%	BHP	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN	BTU/MIN
250.0	100	398	5,928	1,004	15,772	8,470	2,214	4,686	16,886	41,564	44,276
225.0	90	359	5,517	890	14,624	7,716	2,028	4,305	15,231	38,081	40,566
200.0	80	321	5,156	844	13,650	7,085	1,859	3,906	13,615	34,894	37,171
187.5	75	302	4,986	796	13,203	6,804	1,775	3,702	12,819	33,332	35,507
175.0	70	284	4,811	750	12,693	6,507	1,688	3,474	12,026	31,686	33,754
150.0	60	247	4,487	657	11,600	5,894	1,508	2,957	10,466	28,319	30,167
125.0	50	211	4,177	565	10,395	5,241	1,323	2,387	8,931	24,835	26,456
100.0	40	176	3,834	664	8,956	4,456	1,131	1,704	7,458	21,230	22,615
75.0	30	141	3,407	764	7,418	3,634	932	1,052	5,989	17,489	18,630
62.5	25	124	3,174	722	6,658	3,239	829	773	5,246	15,560	16,575
50.0	20	106	2,926	591	5,915	2,861	723	532	4,490	13,570	14,455
25.0	10	68.9	2,390	520	4,011	1,661	501	182	2,923	9,412	10,026

## Emissions Data [Top](#)

Units Filter

### DIESEL

#### RATED SPEED NOMINAL DATA: 1800 RPM

GENSET POWER WITH FAN	EKW	250.0	187.5	125.0	62.5	25.0
ENGINE POWER	BHP	398	302	211	124	68.9
PERCENT LOAD	%	100	75	50	25	10
TOTAL NOX (AS NO2)	G/HR	1,150	661	419	260	205
TOTAL CO	G/HR	144	145	113	152	144
TOTAL HC	G/HR	36	47	48	37	38
TOTAL CO2	KG/HR	193	155	115	71	43

<b>GENSET POWER WITH FAN ENGINE POWER</b>		<b>EKW BHP</b>	<b>250.0 398</b>	<b>187.5 302</b>	<b>125.0 211</b>	<b>62.5 124</b>	<b>25.0 68.9</b>
<b>PERCENT LOAD</b>		<b>%</b>	<b>100</b>	<b>75</b>	<b>50</b>	<b>25</b>	<b>10</b>
PART MATTER		G/HR	32.1	33.9	25.1	25.1	17.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,516.2	1,083.8	918.3	939.9	1,312.7
TOTAL CO	(CORR 5% O2)	MG/NM3	172.8	215.5	229.8	496.4	785.9
TOTAL HC	(CORR 5% O2)	MG/NM3	37.7	59.9	83.6	111.9	195.8
PART MATTER	(CORR 5% O2)	MG/NM3	32.6	43.3	43.2	76.0	79.5
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	739	528	447	458	639
TOTAL CO	(CORR 5% O2)	PPM	138	172	184	397	629
TOTAL HC	(CORR 5% O2)	PPM	70	112	156	209	365
TOTAL NOX (AS NO2)		G/HP-HR	2.91	2.20	2.00	2.11	2.98
TOTAL CO		G/HP-HR	0.36	0.48	0.54	1.23	2.08
TOTAL HC		G/HP-HR	0.09	0.15	0.23	0.30	0.55
PART MATTER		G/HP-HR	0.08	0.11	0.12	0.20	0.25
TOTAL NOX (AS NO2)		LB/HR	2.54	1.46	0.92	0.57	0.45
TOTAL CO		LB/HR	0.32	0.32	0.25	0.34	0.32
TOTAL HC		LB/HR	0.08	0.10	0.11	0.08	0.08
TOTAL CO2		LB/HR	425	342	255	156	94
PART MATTER		LB/HR	0.07	0.07	0.06	0.06	0.04
OXYGEN IN EXH		%	10.2	11.6	12.7	13.7	15.0
DRY SMOKE OPACITY		%	0.5	0.8	0.8	1.4	0.9
BOSCH SMOKE NUMBER			0.39	0.67	0.66	1.21	0.84

**RATED SPEED POTENTIAL SITE VARIATION: 1800 RPM**

<b>GENSET POWER WITH FAN ENGINE POWER</b>		<b>EKW BHP</b>	<b>250.0 398</b>	<b>187.5 302</b>	<b>125.0 211</b>	<b>62.5 124</b>	<b>25.0 68.9</b>
<b>PERCENT LOAD</b>		<b>%</b>	<b>100</b>	<b>75</b>	<b>50</b>	<b>25</b>	<b>10</b>
TOTAL NOX (AS NO2)		G/HR	1,242	714	452	281	222
TOTAL CO		G/HR	270	271	211	284	268
TOTAL HC		G/HR	69	88	92	70	71
PART MATTER		G/HR	62.6	66.0	49.0	49.0	34.1
TOTAL NOX (AS NO2)	(CORR 5% O2)	MG/NM3	1,637.5	1,170.5	991.8	1,015.1	1,417.8
TOTAL CO	(CORR 5% O2)	MG/NM3	323.2	403.0	429.8	928.3	1,469.7
TOTAL HC	(CORR 5% O2)	MG/NM3	71.2	113.1	157.9	211.5	370.0
PART MATTER	(CORR 5% O2)	MG/NM3	63.7	84.4	84.3	148.3	155.0
TOTAL NOX (AS NO2)	(CORR 5% O2)	PPM	798	570	483	494	691
TOTAL CO	(CORR 5% O2)	PPM	259	322	344	743	1,176
TOTAL HC	(CORR 5% O2)	PPM	133	211	295	395	691
TOTAL NOX (AS NO2)		G/HP-HR	3.14	2.38	2.16	2.27	3.22
TOTAL CO		G/HP-HR	0.68	0.90	1.01	2.30	3.89
TOTAL HC		G/HP-HR	0.17	0.29	0.44	0.57	1.03
PART MATTER		G/HP-HR	0.16	0.22	0.23	0.40	0.49
TOTAL NOX (AS NO2)		LB/HR	2.74	1.57	1.00	0.62	0.49
TOTAL CO		LB/HR	0.59	0.60	0.47	0.63	0.59
TOTAL HC		LB/HR	0.15	0.19	0.20	0.15	0.16
PART MATTER		LB/HR	0.14	0.15	0.11	0.11	0.08

**Regulatory Information** [Top](#)

<b>EPA TIER 3</b>		<b>2005 - 2010</b>		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 89 SUBPART D AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE NON-ROAD REGULATIONS.				
<b>Locality</b> U.S. (INCL CALIF)	<b>Agency</b> EPA	<b>Regulation</b> NON-ROAD	<b>Tier/Stage</b> TIER 3	<b>Max Limits - G/BKW - HR</b> CO: 3.5 NOx + HC: 4.0 PM: 0.20

<b>EPA EMERGENCY STATIONARY</b>		<b>2011 - ----</b>		
GASEOUS EMISSIONS DATA MEASUREMENTS PROVIDED TO THE EPA ARE CONSISTENT WITH THOSE DESCRIBED IN EPA 40 CFR PART 60 SUBPART IIII AND ISO 8178 FOR MEASURING HC, CO, PM, AND NOX. THE "MAX LIMITS" SHOWN BELOW ARE WEIGHTED CYCLE AVERAGES AND ARE IN COMPLIANCE WITH THE EMERGENCY STATIONARY REGULATIONS.				
<b>Locality</b> U.S. (INCL CALIF)	<b>Agency</b> EPA	<b>Regulation</b> STATIONARY	<b>Tier/Stage</b> EMERGENCY STATIONARY	<b>Max Limits - G/BKW - HR</b> CO: 3.5 NOx + HC: 4.0 PM: 0.20

**Altitude Derate Data** [Top](#)

**STANDARD****ALTITUDE CORRECTED POWER CAPABILITY (BHP)**

AMBIENT OPERATING TEMP (F)	30	40	50	60	70	80	90	100	110	120	130	140	NORMAL
ALTITUDE (FT)													
0	398	398	398	398	398	398	398	398	398	398	398	398	398
1,000	398	398	398	398	398	398	398	398	398	398	395	389	398
2,000	398	398	398	398	398	398	398	398	394	387	380	374	398
3,000	398	398	398	398	398	398	393	386	379	372	366	360	398
4,000	398	398	398	398	392	385	378	371	365	358	352	346	396
5,000	398	398	392	384	377	370	363	357	351	345	339	333	384
6,000	392	384	377	370	363	356	349	343	337	331	326	320	372
7,000	377	369	362	355	349	342	336	330	324	318	313	308	360
8,000	362	355	348	341	335	329	323	317	311	306	301	296	348
9,000	348	341	334	328	322	316	310	304	299	294	289	284	337
10,000	334	327	321	315	309	303	297	292	287	282	277	273	325
11,000	320	314	308	302	296	291	285	280	275	271	266	262	314
12,000	307	301	295	290	284	279	274	269	264	260	255	251	304
13,000	295	289	283	278	272	267	263	258	253	249	245	241	293
14,000	282	277	271	266	261	256	252	247	243	239	235	231	283
15,000	271	265	260	255	250	246	241	237	233	229	225	221	273

**Cross Reference** [Top](#)

Test Spec	Setting	Engine Arrangement	Engineering Model	Engineering Model Version	Start Effective Serial Number	End Effective Serial Number
0K6612	NAP	2575707	GS279	-	S9L00001	
0K6612	NAP	3950368	GS279	-	S9P00001	
4150078	PP5548	3950368	GS279	-	S9P00001	
4150078	PP5548	4529865	GS857	LS	S9P00001	
4150078	PP5548	5664658	PG350	G	RG300001	
4150078	PP5548	5664658	PG375	G	RE300001	

**Performance Parameter Reference** [Top](#)**Parameters Reference: DM9600 - 14****PERFORMANCE DEFINITIONS****PERFORMANCE DEFINITIONS DM9600**

**APPLICATION:** Engine performance tolerance values below are representative of a typical production engine tested in a calibrated dynamometer test cell at SAE J1995 standard reference conditions. Caterpillar maintains ISO9001:2000 certified quality management systems for engine test Facilities to assure accurate calibration of test equipment. Engine test data is corrected in accordance with SAE J1995. Additional reference material SAE J1228, J1349, ISO 8665, 3046-1:2002E, 3046-3:1989, 1585, 2534, 2288, and 9249 may apply in part or are similar to SAE J1995. Special engine rating request (SERR) test data shall be noted.

**PERFORMANCE PARAMETER TOLERANCE FACTORS:** Power +/- 3% Torque +/- 3% Exhaust stack temperature +/- 8% Inlet airflow +/- 5% Intake manifold pressure-gage +/- 10% Exhaust flow +/- 6% Specific fuel consumption +/- 3% Fuel rate +/- 5% Specific DEF consumption +/- 3% DEF rate +/- 5% Heat rejection +/- 5% Heat rejection exhaust only +/- 10% Heat rejection CEM only +/- 10%

Heat Rejection values based on using treated water.

Torque is included for truck and industrial applications, do not use for Gen Set or steady state applications.

On C7 - C18 engines, at speeds of 1100 RPM and under these values are provided for reference only, and may not meet the tolerance listed.

On 3500 and C175 engines, at speeds below Peak Torque these values are provided for reference only, and may not meet the tolerance listed.

These values do not apply to C280/3600. For these models, see the tolerances listed below.

**C280/3600 HEAT REJECTION TOLERANCE FACTORS:** Heat rejection +/- 10% Heat rejection to Atmosphere +/- 50% Heat rejection to Lube Oil +/- 20% Heat rejection to Aftercooler +/- 5%

**TEST CELL TRANSDUCER TOLERANCE FACTORS:** Torque +/- 0.5% Speed +/- 0.2% Fuel flow +/- 1.0% Temperature +/- 2.0 C degrees Intake manifold pressure +/- 0.1 kPa

OBSERVED ENGINE PERFORMANCE IS CORRECTED TO SAE J1995 REFERENCE AIR AND FUEL CONDITIONS.

**REFERENCE ATMOSPHERIC INLET AIR FOR 3500 ENGINES AND SMALLER** SAE J1228 AUG2002 for marine engines, and J1995 JAN2014 for other engines, reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity at the stated aftercooler water temp, or inlet manifold temp.  
**FOR 3600 ENGINES** Engine rating obtained and presented in accordance with ISO 3046/1 and SAE J1995 JANJAN2014 reference atmospheric pressure is 100 KPA (29.61 in hg), and standard temperature is 25deg C (77 deg F) at 30% relative humidity and 150M altitude at the stated aftercooler water temperature.

**MEASUREMENT LOCATION FOR INLET AIR TEMPERATURE** Location for air temperature measurement air cleaner inlet at stabilized operating conditions.

**REFERENCE EXHAUST STACK DIAMETER** The Reference Exhaust Stack Diameter published with this dataset is only used for the calculation of Smoke Opacity values displayed in this dataset. This value does not necessarily represent the actual stack diameter of the engine due to the variety of exhaust stack adapter options available. Consult the price list, engine order or general dimension drawings for the actual stack diameter size ordered or options available.

**REFERENCE FUEL DIESEL** Reference fuel is #2 distillate diesel with a 35API gravity; A lower heating value is 42,780 KJ/KG (18,390 BTU/LB) when used at 15 deg C (59 deg F), where the density is 850 G/Liter (7.0936 Lbs/Gal).  
**GAS** Reference natural gas fuel has a lower heating value of 33.74 KJ/L (905 BTU/CU Ft). Low BTU ratings are based on 18.64 KJ/L (500 BTU/CU FT) lower heating value gas. Propane ratings are based on 87.56 KJ/L (2350 BTU/CU Ft) lower heating value gas.

**ENGINE POWER (NET) IS THE CORRECTED FLYWHEEL POWER (GROSS) LESS EXTERNAL AUXILIARY LOAD** Engine corrected gross output includes the power required to drive standard equipment; lube oil, scavenge lube oil, fuel transfer, common rail fuel, separate circuit aftercooler and jacket water pumps. Engine net power available for the external (flywheel) load is calculated by subtracting the sum of auxiliary load from the corrected gross flywheel out put power. Typical auxiliary loads are radiator cooling fans, hydraulic pumps, air compressors and battery charging alternators. For Tier 4 ratings additional Parasitic losses would also include Intake, and Exhaust Restrictions.

**ALTITUDE CAPABILITY** Altitude capability is the maximum altitude above sea level at standard temperature and standard pressure at which the engine could develop full rated output power on the current performance data set.

Standard temperature values versus altitude could be seen on TM2001.

When viewing the altitude capability chart the ambient temperature is the inlet air temp at the compressor inlet.

Engines with ADEM MEUI and HEUI fuel systems operating at conditions above the defined altitude capability derate for atmospheric pressure and temperature conditions outside the values defined, see TM2001.

Mechanical governor controlled unit injector engines require a setting change for operation at conditions above the altitude defined on the engine performance sheet. See your Caterpillar technical representative for non standard ratings.

**REGULATIONS AND PRODUCT COMPLIANCE** TMI Emissions information is presented at 'nominal' and 'Potential Site Variation' values for standard ratings. No tolerances are applied to the emissions data. These values are subject to change at any time. The controlling federal and local emission requirements need to be verified by your Caterpillar technical representative.

Customer's may have special emission site requirements that need to be verified by the Caterpillar Product Group engineer.

**EMISSION CYCLE LIMITS:** Cycle emissions Max Limits apply to cycle-weighted averages only. Emissions at individual load points may exceed the cycle-weighted limit.

**WET & DRY EXHAUST/EMISSIONS DESCRIPTION:** Wet - Total exhaust flow or concentration of total exhaust flow Dry - Total exhaust flow minus water vapor or concentration of exhaust flow with water vapor excluded

**EMISSIONS DEFINITIONS:** Emissions : DM1176

#### EMISSION CYCLE DEFINITIONS

1. For constant-speed marine engines for ship main propulsion, including,diesel-electric drive, test cycle E2 shall be applied, for controllable-pitch propeller sets test cycle E2 shall be applied.
2. For propeller-law-operated main and propeller-law-operated auxiliary engines the test cycle E3 shall be applied.
3. For constant-speed auxiliary engines test cycle D2 shall be applied.
4. For variable-speed, variable-load auxiliary engines, not included above, test cycle C1 shall be applied.

**HEAT REJECTION DEFINITIONS:** Diesel Circuit Type and HHV Balance : DM9500

**HIGH DISPLACEMENT (HD) DEFINITIONS:** 3500: EM1500

**RATING DEFINITIONS:** Agriculture : TM6008

Fire Pump : TM6009

Generator Set : TM6035

Generator (Gas) : TM6041

Industrial Diesel : TM6010

Industrial (Gas) : TM6040

Irrigation : TM5749

Locomotive : TM6037

Marine Auxiliary : TM6036

Marine Prop (Except 3600) : TM5747

Marine Prop (3600 only) : TM5748

MSHA : TM6042

Oil Field (Petroleum) : TM6011

Off-Highway Truck : TM6039

On-Highway Truck : TM6038

**SOUND DEFINITIONS:** Sound Power : DM8702

Sound Pressure : TM7080

Date Released : 10/27/21

Print

**Systems Data**

Reference Number: DM8501



June 03, 2022  
For Help Desk Phone  
Numbers [Click Here](#)

**AIR INTAKE SYSTEM**

*THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.*

MAXIMUM ALLOWABLE INTAKE RESTRICTION WITH CLEAN ELEMENT	15	IN-H2O
MAXIMUM ALLOWABLE INTAKE RESTRICTION WITH DIRTY ELEMENT	30	IN-H2O
MAXIMUM PRESSURE DROP FROM COMPRESSOR OUTLET TO MANIFOLD INLET (OR MIXER INLET FOR EGR)	4.4	IN-HG
MAXIMUM TURBO INLET AIR TEMPERATURE	122	DEG F
MAXIMUM AIR FILTER INLET AIR TEMPERATURE	122	DEG F
CHARGE AIR FLOW AT RATED SPEED	63.7	LB/MIN
TURBO COMPRESSOR OUTLET PRESSURE AT RATED SPEED (ABSOLUTE)	108.7	IN-HG

**COOLING SYSTEM**

ENGINE ONLY COOLANT CAPACITY	3.7	GAL
MAXIMUM ALLOWABLE JACKET WATER OUTLET TEMPERATURE	223	DEG F
REGULATOR LOCATION FOR JW (HT) CIRCUIT	OUTLET	
REGULATOR LOCATION FOR SCAC CIRCUIT		
MAXIMUM UNINTERRUPTED FILL RATE	5.0	G/MIN
MINIMUM COOLANT LOSS WITHOUT IMPACTING RADIATOR PERFORMANCE (PERCENT OF TOTAL)	90	PERCENT
COOLANT LOSS-MAXIMUM PERCENTAGE OF PUMP PRESSURE RISE LOSS	10	PERCENT
AIR VENT CAPABILITY AT 35% PUMP PRESSURE RISE LOSS	3.80	PT/MIN
MAXIMUM PERCENTAGE OF PUMP PRESSURE RISE LOSS (JW PUMP CAVITATION SENSITIVITY)	20	PERCENT
MINIMUM JACKET WATER INLET TEMPERATURE		DEG F
JACKET WATER THERMOSTAT START TO OPEN TEMPERATURE (KEEL)		DEG F
JACKET WATER THERMOSTAT FULL OPEN TEMPERATURE (KEEL)		DEG F
JACKET WATER THERMOSTAT START TO OPEN TEMPERATURE (HEX)		DEG F
JACKET WATER THERMOSTAT FULL OPEN TEMPERATURE (HEX)		DEG F

**ENGINE SPEC SYSTEM**

CYLINDER ARRANGEMENT	INLINE	
NUMBER OF CYLINDERS	6	
CYLINDER BORE DIAMETER	4.4	IN
PISTON STROKE	5.9	IN
TOTAL CYLINDER DISPLACEMENT	538	CU IN
STANDARD CRANKSHAFT ROTATION FROM FLYWHEEL END	CCW	
STANDARD CYLINDER FIRING ORDER	1-5-3-6-2-4	
NUMBER 1 CYLINDER LOCATION	FRONT	
STROKES/COMBUSTION CYCLE	4	
MINIMUM ENGINE SPEED DURING REVERSAL / MINIMUM CLUTCH IN SPEED		RPM

**EXHAUST SYSTEM**

*THE INSTALLED SYSTEM MUST COMPLY WITH THE SYSTEM LIMITS BELOW FOR ALL EMISSIONS CERTIFIED ENGINES TO ASSURE REGULATORY COMPLIANCE.*

MAXIMUM ALLOWABLE SYSTEM BACK PRESSURE	40	IN-H2O
MANIFOLD TYPE	DRY	

**FUEL SYSTEM**

MAXIMUM FUEL FLOW FROM TRANSFER PUMP TO ENGINE	46.5	G/HR
MAXIMUM ALLOWABLE FUEL SUPPLY LINE RESTRICTION	8.0	IN-HG
MAXIMUM ALLOWABLE FUEL TEMPERATURE AT TRANSFER PUMP INLET	151	DEG F
MAXIMUM FUEL FLOW TO RETURN LINE FROM ENGINE	29.9	G/HR
MAXIMUM ALLOWABLE FUEL RETURN LINE RESTRICTION	14.8	IN-HG
NORMAL FUEL PRESSURE IN A CLEAN SYSTEM	72.5	PSI
FUEL SYSTEM TYPE	HEUI	
MAXIMUM TRANSFER PUMP PRIMING LIFT WITHOUT PRIMING PUMP		FT
MAXIMUM HEAT REJECTION TO FUEL		BTU/MIN
MAXIMUM HEAD PRESSURE AT FUEL TRANSFER PUMP INLET		PSI

**LUBE SYSTEM**

LUBE SYSTEM OIL COOLER TYPE	PLATE	
CRANKCASE VENTILATION TYPE	TO ATM	
MAXIMUM ENGINE TO OIL BEARING TEMPERATURE		DEG F
MAXIMUM OIL FILTER PRESSURE DROP ACROSS A NEW ENGINE OIL FILTER		PSI
MINIMUM ACCEPTABLE CRANKCASE PRESSURE		IN-H2O
MAXIMUM ACCEPTABLE CRANKCASE PRESSURE		IN-H2O

**MOUNTING SYSTEM**

CENTER OF GRAVITY LOCATION - X DIMENSION - FROM REAR FACE OF BLOCK - (REFERENCE TM7077)	16.8	IN
CENTER OF GRAVITY LOCATION - Y DIMENSION - FROM CENTERLINE OF CRANKSHAFT - (REFERENCE TM7077)	8.2	IN
CENTER OF GRAVITY LOCATION - Z DIMENSION - FROM CENTERLINE OF CRANKSHAFT - (REFERENCE TM7077)	0.0	IN

**STARTING SYSTEM**

LOWEST AMBIENT START TEMPERATURE WITHOUT AIDS	32	DEG F
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**GENERATOR DATA****JUNE 03, 2022****(AT400240)-ENGINE (BAA126422A)-CEM**For Help Desk Phone Numbers [Click here](#)**Selected Model**

**Engine:** C9      **Generator Frame:** M2754L4      **Genset Rating (kW):** 250.0      **Line Voltage:** 480  
**Fuel:** Diesel      **Generator Arrangement:** 5652319      **Genset Rating (kVA):** 312.5      **Phase Voltage:** 277  
**Frequency:** 60      **Excitation Type:** Permanent Magnet      **Pwr. Factor:** 0.8      **Rated Current:** 375.9  
**Duty:** STANDBY      **Connection:** SERIES STAR      **Application:** EPG      **Status:** Current

Version: 42423 /44642 /43655 /8535

**Spec Information**

<b>Generator Specification</b>		<b>Generator Efficiency</b>			
<b>Frame:</b> M2754L4	<b>Type:</b> SR500	<b>No. of Bearings:</b> 1	<b>Per Unit Load</b>	<b>kW</b>	<b>Efficiency %</b>
<b>Winding Type:</b> RANDOM WOUND	<b>Flywheel:</b> 14.0		0.25	62.5	90.1
<b>Connection:</b> SERIES STAR	<b>Housing:</b> 1		0.5	125.0	93.0
<b>Phases:</b> 3	<b>No. of Leads:</b> 12		0.75	187.5	93.7
<b>Poles:</b> 4	<b>Wires per Lead:</b> 4		1.0	250.0	93.5
<b>Sync Speed:</b> 1800	<b>Generator Pitch:</b> 0.6667				

<b>Reactances</b>	<b>Per Unit</b>	<b>Ohms</b>
SUBTRANSIENT - DIRECT AXIS $X''_d$	0.1029	0.0759
SUBTRANSIENT - QUADRATURE AXIS $X''_q$	0.1280	0.0944
TRANSIENT - SATURATED $X'_d$	0.1287	0.0949
SYNCHRONOUS - DIRECT AXIS $X_d$	2.6377	1.9447
SYNCHRONOUS - QUADRATURE AXIS $X_q$	1.3452	0.9918
NEGATIVE SEQUENCE $X_2$	0.1154	0.0851
ZERO SEQUENCE $X_0$	0.0053	0.0039

<b>Time Constants</b>	<b>Seconds</b>
OPEN CIRCUIT TRANSIENT - DIRECT AXIS $T'_{d0}$	2.0492
SHORT CIRCUIT TRANSIENT - DIRECT AXIS $T'_d$	0.1000
OPEN CIRCUIT SUBTRANSIENT - DIRECT AXIS $T''_{d0}$	0.0124
SHORT CIRCUIT SUBTRANSIENT - DIRECT AXIS $T''_d$	0.0100
OPEN CIRCUIT SUBTRANSIENT - QUADRATURE AXIS $T''_{q0}$	0.1050
SHORT CIRCUIT SUBTRANSIENT - QUADRATURE AXIS $T''_q$	0.0100
EXCITER TIME CONSTANT $T_e$	0.0170
ARMATURE SHORT CIRCUIT $T_a$	0.0150

Short Circuit Ratio: 0.5

Stator Resistance = 0.0229 Ohms

Field Resistance = 0.6456 Ohms

<b>Voltage Regulation</b>		<b>Generator Excitation</b>		
<b>Voltage level adjustment:</b> +/-	5.0%	<b>No Load</b>	<b>Full Load, (rated) pf</b>	
<b>Voltage regulation, steady state:</b> +/-	0.8%		<b>Series</b>	<b>Parallel</b>
<b>Voltage regulation with 3% speed change:</b> +/-	0.8%	<b>Excitation voltage:</b>	13.52 Volts	47.33 Volts      Volts
<b>Waveform deviation line - line, no load:</b> less than	2.0%	<b>Excitation current</b>	1.14 Amps	3.28 Amps      Amps
<b>Telephone influence factor:</b> less than	50			

**Selected Model**

**Engine:** C9      **Generator Frame:** M2754L4      **Genset Rating (kW):** 250.0      **Line Voltage:** 480  
**Fuel:** Diesel      **Generator Arrangement:** 5652319      **Genset Rating (kVA):** 312.5      **Phase Voltage:** 277  
**Frequency:** 60      **Excitation Type:** Permanent Magnet      **Pwr. Factor:** 0.8      **Rated Current:** 375.9  
**Duty:** STANDBY      **Connection:** SERIES STAR      **Application:** EPG      **Status:** Current

Version: 42423 /44642 /43655 /8535

**Generator Mechanical Information**

<b>Center of Gravity</b>		
Dimension X	-445.0 mm	-17.5 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 754 kg	* Rotor WT = 302 kg	* Stator WT = 452 kg
1,662 LB	666 LB	996 LB

Rotor Balance = 0.0 mm deflection PTP  
 Overspeed Capacity = 125% of synchronous speed

**Generator Torsional Data**

**TOTAL J = J1 + J2 + J3**

<b>J1 = Coupling and Fan</b>			<b>J2 = Rotor</b>		<b>J3 = Exciter End</b>	
<b>K1 = Shaft Stiffness between J1 + J2 (Diameter 1)</b>			<b>K2 = Shaft Stiffness between J2 + J3 (Diameter 2)</b>			
J1	K1	Min Shaft Dia 1	J2	K2	Min Shaft Dia 2	J3
5.5 LB IN. s <sup>2</sup>	46.6 MLB IN./rad	4.3 IN.	23.5 LB IN. s <sup>2</sup>	50.2 MLB IN./rad	4.5 IN.	1.5 LB IN. s <sup>2</sup>
0.618 N m s <sup>2</sup>	5.27012 MN m/rad	110.0 mm	2.655 N m s <sup>2</sup>	5.67 MN m/rad	115.0 mm	0.168 N m s <sup>2</sup>
<b>Total J</b>						
			30.5 LB IN. s <sup>2</sup>			
			3.441 N m s <sup>2</sup>			

**Selected Model**

**Engine:** C9      **Generator Frame:** M2754L4      **Genset Rating (kW):** 250.0      **Line Voltage:** 480  
**Fuel:** Diesel      **Generator Arrangement:** 5652319      **Genset Rating (kVA):** 312.5      **Phase Voltage:** 277  
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Version: 42423 /44642 /43655 /8535

<b>Generator Cooling Requirements - Temperature - Insulation Data</b>	
<b>Cooling Requirements:</b>	<b>Temperature Data: (Ambient 40 °C)</b>
<b>Heat Dissipated:</b> 17.4 kW	<b>Stator Rise:</b> 105.0 °C
<b>Air Flow:</b> 30.0 m <sup>3</sup> /min	<b>Rotor Rise:</b> 105.0 °C
<b>Insulation Class: H</b>	
<b>Insulation Reg. as shipped: 100.0 MΩ minimum at 40 °C</b>	
<b>Thermal Limits of Generator</b>	
<b>Frequency:</b>	60 Hz
<b>Line to Line Voltage:</b>	480 Volts
<b>B BR 80/40</b>	300.0 kVA
<b>F BR -105/40</b>	341.3 kVA
<b>H BR - 125/40</b>	375.0 kVA
<b>F PR - 130/40</b>	375.0 kVA
<b>H PR - 150/40</b>	397.5 kVA
<b>H PR27 - 163/27</b>	412.5 kVA

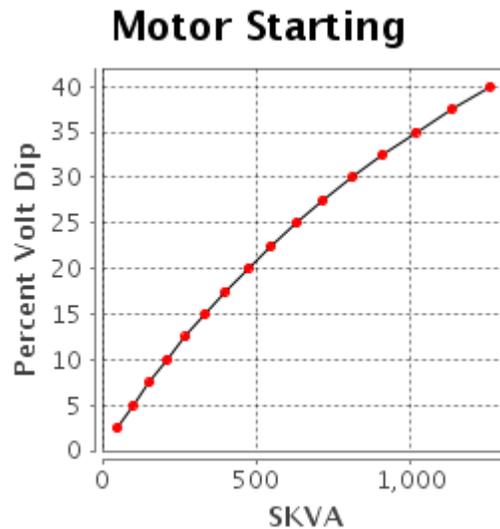
**Selected Model**

<b>Engine:</b> C9	<b>Generator Frame:</b> M2754L4	<b>Genset Rating (kW):</b> 250.0	<b>Line Voltage:</b> 480
<b>Fuel:</b> Diesel	<b>Generator Arrangement:</b> 5652319	<b>Genset Rating (kVA):</b> 312.5	<b>Phase Voltage:</b> 277
<b>Frequency:</b> 60	<b>Excitation Type:</b> Permanent Magnet	<b>Pwr. Factor:</b> 0.8	<b>Rated Current:</b> 375.9
<b>Duty:</b> STANDBY	<b>Connection:</b> SERIES STAR	<b>Application:</b> EPG	<b>Status:</b> Current

Version: 42423 /44642 /43655 /8535

**Starting Capability & Current Decrement  
Motor Starting Capability (0.6 pf)**

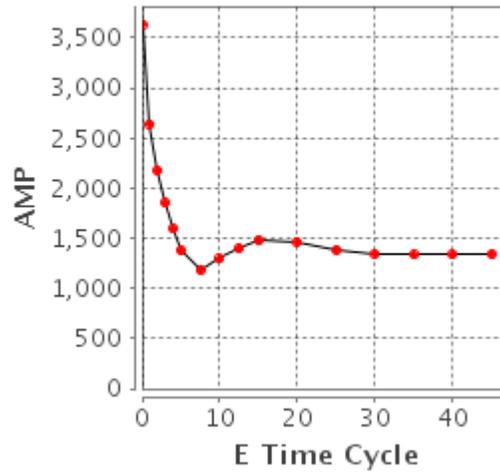
SKVA	Percent Volt Dip
48	2.5
99	5.0
153	7.5
210	10.0
270	12.5
333	15.0
400	17.5
472	20.0
548	22.5
629	25.0
716	27.5
809	30.0
908	32.5
1,016	35.0
1,132	37.5
1,258	40.0



**Current Decrement Data**

E Time Cycle	AMP
0.0	3,633
1.0	2,639
2.0	2,172
3.0	1,851
4.0	1,592
5.0	1,376
7.5	1,179
10.0	1,293
12.5	1,396
15.0	1,477
20.0	1,461
25.0	1,383
30.0	1,344
35.0	1,334
40.0	1,335
45.0	1,340

**Current Decrement**



**Instantaneous 3 Phase Fault Current: 3633 Amps**

**Instantaneous Line - Line Fault Current: 2966 Amps**

**Instantaneous Line - Neutral Fault Current: 5016 Amps**

**Selected Model**

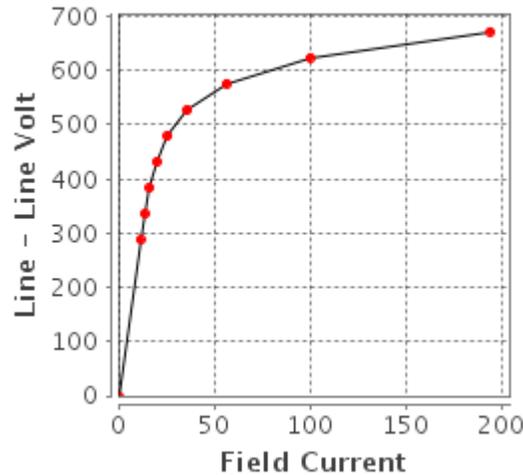
<b>Engine:</b> C9	<b>Generator Frame:</b> M2754L4	<b>Genset Rating (kW):</b> 250.0	<b>Line Voltage:</b> 480
<b>Fuel:</b> Diesel	<b>Generator Arrangement:</b> 5652319	<b>Genset Rating (kVA):</b> 312.5	<b>Phase Voltage:</b> 277
<b>Frequency:</b> 60	<b>Excitation Type:</b> Permanent Magnet	<b>Pwr. Factor:</b> 0.8	<b>Rated Current:</b> 375.9
<b>Duty:</b> STANDBY	<b>Connection:</b> SERIES STAR	<b>Application:</b> EPG	<b>Status:</b> Current

Version: 42423 /44642 /43655 /8535

**Generator Output Characteristic Curves  
Open Circuit Curve**

**Open Circuit**

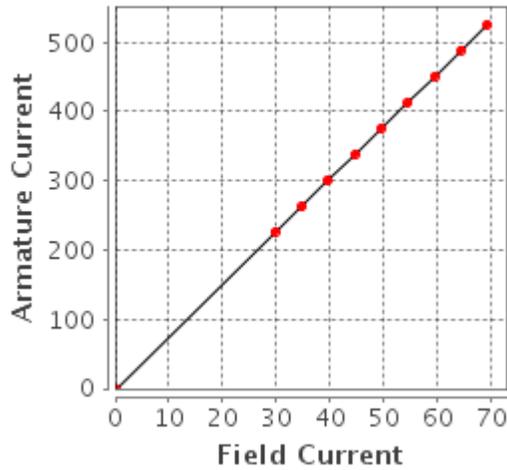
Field Current	Line - Line Volt
0.0	0
11.5	288
13.8	336
16.4	384
20.0	432
25.7	480
36.0	528
56.5	576
100.0	624
194.0	672



Short Circuit Curve

Short Circuit

Field Current	Armature Current
0.0	0
29.7	226
34.7	263
39.6	301
44.6	338
49.5	376
54.5	413
59.4	451
64.4	489
69.3	526



Selected Model

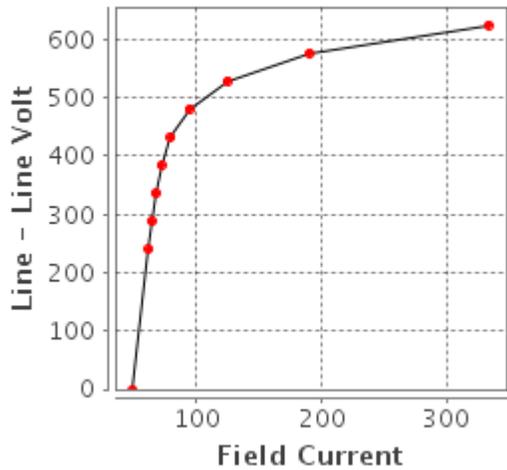
**Engine:** C9      **Generator Frame:** M2754L4      **Genset Rating (kW):** 250.0      **Line Voltage:** 480  
**Fuel:** Diesel      **Generator Arrangement:** 5652319      **Genset Rating (kVA):** 312.5      **Phase Voltage:** 277  
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**Duty:** STANDBY      **Connection:** SERIES STAR      **Application:** EPG      **Status:** Current

Version: 42423 /44642 /43655 /8535

Generator Output Characteristic Curves  
Zero Power Factor Curve

Zero Power

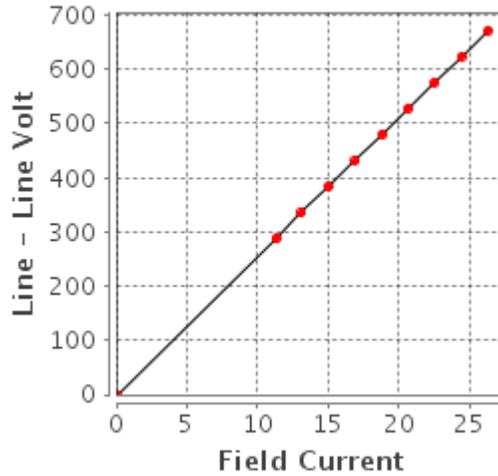
Field Current	Line - Line Volt
49.5	0
62.0	240
64.4	288
67.5	336
72.0	384
79.6	432
94.4	480
124.8	528
190.1	576
332.8	624



### Air Gap Curve

## Air Gap

Field Current	Line - Line Volt
0.0	0
11.3	288
13.1	336
15.0	384
16.9	432
18.8	480
20.6	528
22.5	576
24.4	624
26.3	672

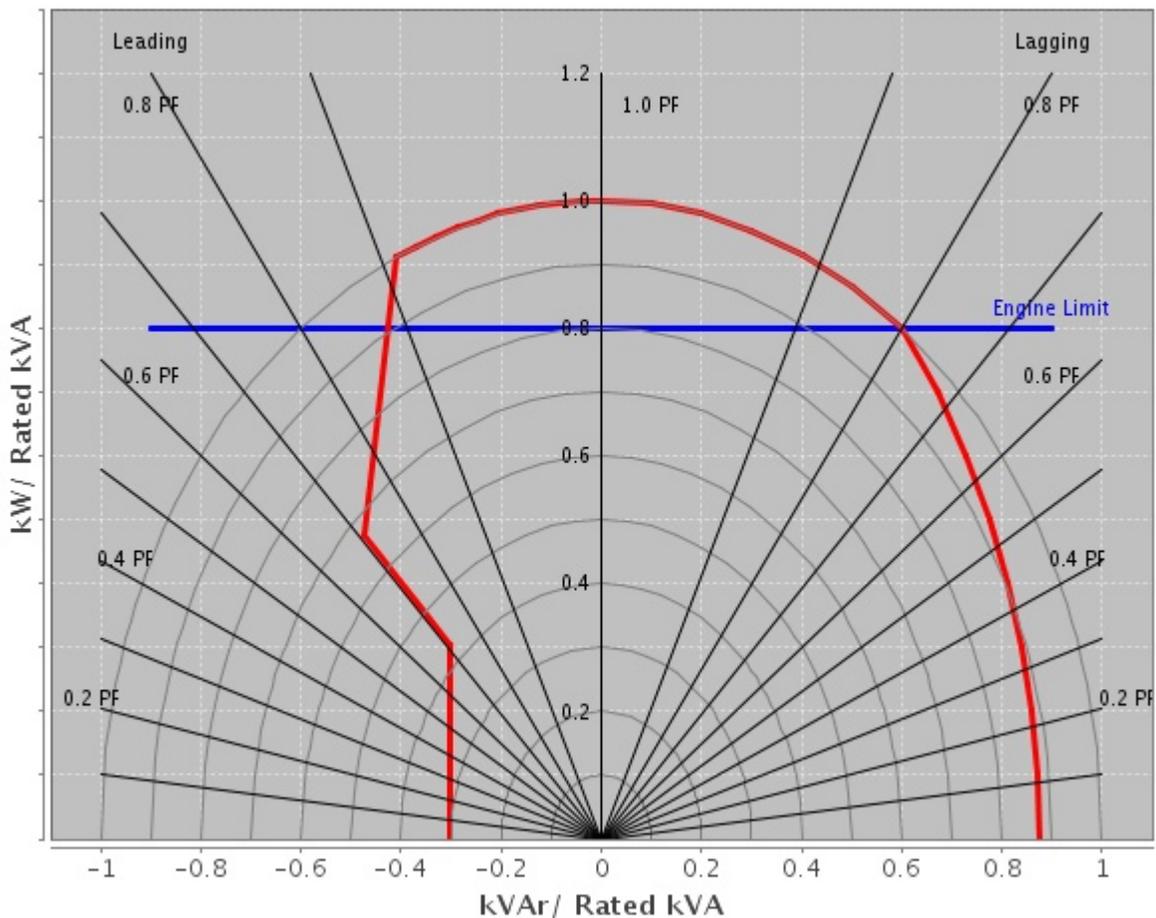


### Selected Model

**Engine:** C9      **Generator Frame:** M2754L4      **Genset Rating (kW):** 250.0      **Line Voltage:** 480  
**Fuel:** Diesel      **Generator Arrangement:** 5652319      **Genset Rating (kVA):** 312.5      **Phase Voltage:** 277  
**Frequency:** 60      **Excitation Type:** Permanent Magnet      **Pwr. Factor:** 0.8      **Rated Current:** 375.9  
**Duty:** STANDBY      **Connection:** SERIES STAR      **Application:** EPG      **Status:** Current

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### Reactive Capability Curve Operating Chart



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**Selected Model**

<b>Engine:</b> C9	<b>Generator Frame:</b> M2754L4	<b>Genset Rating (kW):</b> 250.0	<b>Line Voltage:</b> 480
<b>Fuel:</b> Diesel	<b>Generator Arrangement:</b> 5652319	<b>Genset Rating (kVA):</b> 312.5	<b>Phase Voltage:</b> 277
<b>Frequency:</b> 60	<b>Excitation Type:</b> Permanent Magnet	<b>Pwr. Factor:</b> 0.8	<b>Rated Current:</b> 375.9
<b>Duty:</b> STANDBY	<b>Connection:</b> SERIES STAR	<b>Application:</b> EPG	<b>Status:</b> Current

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**Version:** 42423 /44642 /43655 /8535

## General Information

### GENERATOR INFORMATION (DM7900)

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#### 1. Motor Starting

Motor starting curves are obtained in accordance with IEC60034, and are displayed at 0.6 power factor.

#### 2. Voltage Dip

Prediction of the generator synchronous voltage dip can be made by consulting the plot for the voltage dip value that corresponds to the desired motor starting kVA value.

#### 3. Definitions

##### A) Generator Keys

Frame: abbreviation of generator frame size

Freq: frequency in hertz.

PP/SB: prime/standby duty respectively

Volts: line - line terminal voltage

kW: rating in electrical kilo watts

Model: engine sales model

##### B) Generator Temperature Rise

The indicated temperature rises are the IEC/NEMA limits for standby or prime power applications. The quoted rise figures are maximum limits only and are not necessarily indicative of the actual temperature rise of a given machine winding.

##### C) Centre of Gravity

The specified centre of gravity is for the generator only. For single bearing, and two bearing close coupled generators, the center of gravity is measured from the generator/engine flywheel-housing interface and from the centreline of the rotor Shaft.

For two bearing, standalone generators, the center of gravity is measured from the end of the rotor shaft and from the centerline of the rotor shaft.

##### D) Generator Current Decrement Curves

The generator current decrement curve indicates the generator armature current arising from a symmetrical three-phase fault at the generator terminals. Generators equipped with AREP or PMG excitation systems will sustain 300% of rated armature current for 10 seconds.

##### E) Generator Efficiency Curves

The efficiency curve is displayed for the generator only under the given conditions of rating, voltage, frequency and power factor. This is not the overall generating set efficiency curve.