OPERATION MANUAL



MODEL CG500C2 CONTAINER GENERATOR (CUMMINS QSX15 DIESEL ENGINE)

Revision #0 (11/08/13)

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THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES.

PN: EE57425



If you believe that your vehicle has a defect that could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Multiquip at 1-800-421-1244.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Multiquip.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153), go to http://www.nhtsa.dot.gov; or write to:

Administrator NHTSA 1200 New Jersey Avenue S.E. Washington, DC 20590

You can also obtain information about motor vehicle safety from http://www.safecar.gov.

CG500C2 Container Generator

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NOTICE

Specifications and part numbers are subject to change without notice.

Do not operate or service the equipment before reading the entire manual. Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the safety messages and operating instructions could result in injury to yourself and others.

SAFETY MESSAGES

The four safety messages shown below will inform you about potential hazards that could injure you or others. The safety messages specifically address the level of exposure to the operator and are preceded by one of four words: **DANGER, WARNING, CAUTION** or **NOTICE.**

SAFETY SYMBOLS

DANGER

Indicates a hazardous situation which, if not avoided, WILL result in **DEATH** or **SERIOUS INJURY**.

WARNING

Indicates a hazardous situation which, if not avoided, COULD result in DEATH or SERIOUS INJURY.

Indicates a hazardous situation which, if not avoided, **COULD** result in **MINOR** or **MODERATE INJURY**.

NOTICE

Addresses practices not related to personal injury.

Potential hazards associated with the operation of this equipment will be referenced with hazard symbols which may appear throughout this manual in conjunction with safety messages.

Symbol	Safety Hazard		
	Lethal exhaust gas hazards		
	Explosive fuel hazards		
	Burn hazards		
	Overspeed hazards		
	Rotating parts hazards		
	Pressurized fluid hazards		
*	Electric shock hazards		

GENERAL SAFETY

NEVER operate this equipment without proper protective clothing, shatterproof glasses, respiratory protection, hearing protection, steel-toed boots and other protective devices required by the job or city and state regulations.





NEVER operate this equipment when not feeling well due to fatigue, illness or when under medication.



NEVER operate this equipment under the influence of drugs or alcohol.







- ALWAYS check the equipment for loosened threads or bolts before starting.
- DO NOT use the equipment for any purpose other than its intended purposes or applications.

NOTICE

- This equipment should only be operated by trained and qualified personnel 18 years of age and older.
- Whenever necessary, replace nameplate, operation and safety decals when they become difficult read.
- Manufacturer does not assume responsibility for any accident due to equipment modifications. Unauthorized equipment modification will void all warranties.

- NEVER use accessories or attachments that are not recommended by MQ Power for this equipment. Damage to the equipment and/or injury to user may result.
- ALWAYS know the location of the nearest fire extinguisher.



ALWAYS know the location of the nearest first aid kit.



■ ALWAYS know the location of the nearest

phone or **keep a phone on the job site.** Also, know the phone numbers of the nearest **ambulance, doctor** and **fire department.** This information will be invaluable in the case of an emergency.



GENERATOR SAFETY

DANGER

NEVER operate the equipment in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe bodily harm or even death.



WARNING

NEVER disconnect any emergency or safety devices. These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death. Disconnection of any of these devices will void all warranties.

NEVER lubricate components or attempt service on a running machine.

NOTICE

- ALWAYS ensure generator is on level ground before use.
- ALWAYS keep the machine in proper running condition.
- Fix damage to machine and replace any broken parts immediately.
- ALWAYS store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children and unauthorized personnel

ENGINE SAFETY

A DANGER

- The engine fuel exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled.
- The engine of this equipment requires an adequate free flow of cooling air. NEVER operate this equipment in any enclosed or narrow area where free flow of the air is restricted. If the air flow is



restricted it will cause injury to people and property and serious damage to the equipment or engine.

- **DO NOT** place hands or fingers inside engine compartment when engine is running.
- NEVER operate the engine with heat shields or guards removed.
- Keep fingers, hands hair and clothing away from all moving parts to prevent injury.



DO NOT remove the radiator cap while the engine is hot. High pressure boiling water will gush out of the radiator and severely scald any persons in the general area of the generator.



- DO NOT remove the coolant drain plug while the engine is hot. Hot coolant will gush out of the coolant tank and severely scald any persons in the general area of the generator.
- DO NOT remove the engine oil drain plug while the engine is hot. Hot oil will gush out of the oil tank and severely scald any persons in the general area of the generator.

NEVER touch the hot exhaust manifold, muffler or cylinder. Allow these parts to cool before servicing equipment.



NOTICE

- NEVER run engine without an air filter or with a dirty air filter. Severe engine damage may occur. Service air filter frequently to prevent engine malfunction.
- NEVER tamper with the factory settings of the engine or engine governor. Damage to the engine or equipment can result if operating in speed ranges above the maximum allowable.



Wet stacking is a common problem with diesel engines which are operated for extended periods with light or no load applied. When a diesel engine operates without sufficient load (less than 40% of the rated output), it will not operate at its optimum temperature. This will allow unburned fuel to accumulate in the exhaust system, which can foul the fuel injectors, engine valves and exhaust system, including turbochargers, and reduce the operating performance.

In order for a diesel engine to operate at peak efficiency, it must be able to provide fuel and air in the proper ratio and at a high enough engine temperature for the engine to completely burn all of the fuel.

Wet stacking does not usually cause any permanent damage and can be alleviated if additional load is applied to relieve the condition. It can reduce the system performance and increase maintenance. Applying an increasing load over a period of time until the excess fuel is burned off and the system capacity is reached usually can repair the condition. This can take several hours to burn off the accumulated unburned fuel.

State Health Safety Codes and Public Resources Codes specify that in certain locations, spark arresters must be used on internal combustion engines that use hydrocarbon fuels. A spark arrester is a device designed to prevent accidental discharge of sparks or flames from the engine exhaust. Spark arresters are qualified and rated by the United States Forest Service for this purpose. In order to comply with local laws regarding spark arresters, consult the engine distributor or the local Health and Safety Administrator.

FUEL SAFETY

DANGER

- DO NOT start the engine near spilled fuel or combustible fluids. Diesel fuel is extremely flammable and its vapors can cause an explosion if ignited.
- ALWAYS refuel in a well-ventilated area, away from sparks and open flames.
- ALWAYS use extreme caution when working with flammable liquids.
- **DO NOT** fill the fuel tank while the engine is running or hot.
- DO NOT overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system.
- Store fuel in appropriate containers, in well-ventilated areas and away from sparks and flames.
- **NEVER** use fuel as a cleaning agent.
- DO NOT smoke around or near the equipment. Fire or explosion could result from fuel vapors or if fuel is spilled on a hot engine.



TOWING SAFETY

Check with your local county or state safety towing regulations, in addition to meeting *Department of Transportation (DOT) Safety Towing Regulations,* before towing your generator.



- Refer to MQ Power trailer manual for additional safety information.
- In order to reduce the possibility of an accident while transporting the generator on public roads, ALWAYS make sure the trailer that supports the generator and the towing vehicle are mechanically sound and in good operating condition.
- ALWAYS shutdown engine before transporting

- Make sure the hitch and coupling of the towing vehicle are rated equal to, or greater than the trailer "gross vehicle weight rating."
- ALWAYS inspect the hitch and coupling for wear. NEVER tow a trailer with defective hitches, couplings, chains, etc.
- Check the tire air pressure on both towing vehicle and trailer. *Trailer tires should be inflated to 105 psi cold.* Also check the tire tread wear on both vehicles.
- ALWAYS make sure the trailer is equipped with a safety chain.
- ALWAYS properly attach trailer's safety chains to towing vehicle.
- ALWAYS make sure the vehicle and trailer directional, backup, brake and trailer lights are connected and working properly.
- DOT Requirements include the following:
 - Connect and test electric brake operation.
 - Secure portable power cables in cable tray with tie wraps.
- The maximum speed for highway towing is 55 MPH unless posted otherwise. Recommended off-road towing is not to exceed 15 MPH or less depending on type of terrain.
- Avoid sudden stops and starts. This can cause skidding, or jack-knifing. Smooth, gradual starts and stops will improve towing.
- Avoid sharp turns to prevent rolling.
- Trailer should be adjusted to a level position at all times when towing.
- Raise and lock trailer wheel stand in up position when towing.
- Place chock blocks underneath wheel to prevent rolling while parked.
- Place support blocks underneath the trailer's bumper to prevent tipping while parked.
- Use the trailer's swivel jack to adjust the trailer height to a level position while parked.

ELECTRICAL SAFETY

DANGER

DO NOT touch output terminals during operation. Contact with output terminals during operation can cause electrocution, electrical shock or burn.



The electrical voltage required to operate the generator can cause severe

injury or even death through physical contact with live circuits. Turn generator and all circuit breakers **OFF** before performing maintenance on the generator or making contact with output terminals.

- NEVER insert any objects into the output receptacles during operation. This is extremely dangerous. The possibility exists of electrical shock, electrocution or death.
- Backfeed to a utility system can cause electrocution and/or property damage. NEVER connect the generator to a building's electrical system without a transfer switch or other approved device. All installations should be



performed by a **licensed electrician** in accordance with all applicable laws and electrical codes. Failure to do so could result in electrical shock or burn, causing **serious injury or even death.**

Power Cord/Cable Safety

DANGER

- NEVER let power cords or cables lay in water.
- NEVER stand in water while AC power from the generator is being transferred to a load.
- NEVER use damaged or worn cables or cords when connecting equipment to generator. Inspect for cuts in the insulation.
- NEVER grab or touch a live power cord or cable with wet hands. The possibility exists of electrical shock, electrocution or death.



Make sure power cables are securely connected to the generator's output receptacles. Incorrect connections may cause electrical shock and damage to the generator.

NOTICE

ALWAYS make certain that proper power or extension cord has been selected for the job. See Cable Selection Chart in this manual.

Grounding Safety

A DANGER

- ALWAYS make sure that electrical circuits are properly grounded to a suitable earth ground (ground rod) per the National Electrical Code (NEC) and local codes before operating generator. Severe injury or death by electrocution can result from operating an ungrounded generator.
- **NEVER** use gas piping as an electrical ground.

BATTERY SAFETY

DANGER

- DO NOT drop the battery. There is a possibility that the battery will explode.
- DO NOT expose the battery to open flames, sparks, cigarettes, etc. The battery contains combustible gases and liquids. If these gases and liquids come into contact with a flame or spark, an explosion could occur.



A WARNING

ALWAYS wear safety glasses when handling the battery to avoid eye irritation. The battery contains acids that can cause injury to the eyes and skin.



- Use well-insulated gloves when picking up the battery.
- ALWAYS keep the battery charged. If the battery is not charged, combustible gas will build up.
- ALWAYS recharge the battery in a well-ventilated environment to avoid the risk of a dangerous concentration of combustible gasses.

- If the battery liquid (dilute sulfuric acid) comes into contact with clothing or skin, rinse skin or clothing immediately with plenty of water.
- If the battery liquid (dilute sulfuric acid) comes into contact with eyes, rinse eyes immediately with plenty of water and contact the nearest doctor or hospital to seek medical attention.

- ALWAYS disconnect the NEGATIVE battery terminal before performing service on the generator.
- ALWAYS keep battery cables in good working condition. Repair or replace all worn cables.

ENVIRONMENTAL SAFETY/DECOMMISSIONING

NOTICE

Decommissioning is a controlled process used to safely retire a piece of equipment that is no longer serviceable. If the equipment poses an unacceptable and unrepairable safety risk due to wear or damage or is no longer cost effective to maintain (beyond life-cycle reliability) and is to be decommissioned (demolition and dismantlement),be sure to follow rules below.

- DO NOT pour waste or oil directly onto the ground, down a drain or into any water source.
- Contact your country's Department of Public Works or recycling agency in your area and arrange for proper disposal of any electrical components, waste or oil associated with this equipment.



- When the life cycle of this equipment is over, remove battery and bring to appropriate facility for lead reclamation. Use safety precautions when handling batteries that contain sulfuric acid.
- When the life cycle of this equipment is over, it is recommended that the trowel frame and all other metal parts be sent to a recycling center.

Metal recycling involves the collection of metal from discarded products and its transformation into raw materials to use in manufacturing a new product.

Recyclers and manufacturers alike promote the process of recycling metal. Using a metal recycling center promotes energy cost savings.

EMISSIONS INFORMATION

NOTICE

The diesel engine used in this equipment has been designed to reduce harmful levels of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NOx) contained in diesel exhaust emissions.

This engine has been certified to meet US EPA Evaporative emissions requirements in the installed configuration.

Attempting to modify or make adjustments to the engine emission system by unauthorized personnel without proper training could damage the equipment or create an unsafe condition.

Additionally, modifying the fuel system may adversely affect evaporative emissions, resulting in fines or other penalties.

Emission Control Label

The emission control label is an integral part of the emission system and is strictly controlled by regulations.

The label must remain with the engine for its entire life.

If a replacement emission label is needed, please contact your authorized engine distributor.

SPECIFICATIONS

Table 1. Generator Specifications			
Model	CG500C2		
Туре	Revolving field, Self- Ventilated, Drip-Proof		
Armature Connection	WYE Cor	nnection	
No of Poles	4		
Prime Rating	455 kW (56	68.75 kVA)	
Standby Rating	500 kW (6	625 kVA)	
Frequency	60	Hz	
Voltage Regulation	+0.2	5%	
(no load to full load)			
Frequency Regulation (steady state load)	Isochro	onous	
Speed	1800	rpm	
Power Factor	0.	8	
Weight (Generator Only)	20,440 lbs. (9,271 kg)		
Weight (Trailer Only)	6,480 lbs. (2,939 kg)		
Dimensions including Trailer (LxWxH)	282 x 96 x 150 in (716 x 244 x 381 cm)		
Table 2. Engine Specifications			
Model	Cummins QSX15-G9		
Emissions	Tier 2		
Туре	4-cycle design, turbocharged, aftercooled, direct injection		
Bore x Stroke in (mm)	5.39 x 6.65 (137 x 169)		
Displacement	912 cu. in.	(15 liters)	
Max. Power At Rated RPM (without fan)	755 hp (5	563 kW)	
Compression Ratio	17	:1	
Starting	Elec	tric	
Coolant Capacity	53.2 gal. (2	201 liters)	
Lube Oil Capacity	162.8 qt (1	154 liters)	
Fuel Type	#2 Dies	el Fuel	
Fuel Tank Capacity	600 gal. (2,271 liters)		
Fuel Consumption	31.1 gal. (117.8 L)/hr at full load	23.9 gal. (90.5 L)/hr at 3/4 load	
(Prime Rating)	17.2 gal. (65.3 L)/hr	9,9 gal. (37.4 L)/hr	
	at 1/2 load	at 1/4 load	
Table 3. B	attery Specifications		
Battery (Top Post)	12V x 2 (24 VDC System) Group 8D		
Dimensions HxWxL in. (cm)	8.5 x 8 x 20 (21.6 x 20.3 x 50.8)		



Table 4. Dimensions			
Reference Letter	Dimensions in. (mm)		
A	96 (2,438)		
В	238 (6,045)		
С	150 (3,810)		
D	44 (1,117)		

Generator

The MQ Power Model CG500C2 is a 500 kW containerized diesel with a fully integrated power generation system that provides optimum performance, reliability and versatility for stationary standby and prime power applications.

In keeping with Multiquip's policy of constantly improving its products, the specifications quoted herein are subject to change without prior notice.

Permanent Magnet Generator Excitation System

The CG500C2 generator is equipped with a PMG (Permanent Magnet Generator) which provides enhanced motor starting and fault clearing short-circuit capability.

Engine

This generator is powered by a 4-cycle, turbocharged, air-to-air charge air-cooling Cummins QSX158-G9 diesel engine.

Principle Of Operation

This generator is a brushless, self-excited, externally voltage regulated, synchronous AC generator. The generator is made up of six major components: main stator (armature), main rotor (field), exciter stator (field), exciter rotor (armature), rectifier assembly, and voltage regulator.

The generator's exciter consists of a stationary field and a rotating armature. The stationary field (exciter stator) is designed to be the primary source of the generator's residual magnetism. This residual magnetism allows the exciter rotor (armature) to produce AC voltage even when the exciter stator (field) is not powered. This AC voltage is rectified to DC by the rotating rectifier assembly and fed directly to the main rotor (field). As the generator shaft continues to rotate, the main rotor (field) induces a voltage into the generator's main stator (armature). At rated speed, the main stator's voltage produced by the residual magnetism of the exciter allows the automatic voltage regulator to function.

The regulator provides voltage to the exciter resulting in a build-up of generator terminal voltage. This system of using residual magnetism eliminates the need for a special field flashing circuit in the regulator. After the generator has established the initial residual voltage, the regulator provides a controlled DC field voltage to the exciter stator resulting in a controlled generator terminal voltage.

Control System

The electronic control provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, overcurrent protection, output metering, auto-shutdown and fault detection.

Battery

The battery's primary purpose is to provide starting power for the diesel engine starter motor. The battery system is comprised of two 8-D style, 12 VDC, sealed lead acid batteries. The battery is charged by the charging alternator while the engine is engaged.

Fuel Tank

This generator is equipped with a 600 gallon (2,271 liters) UL fuel tank. When refueling, it is recommended to use ASTM-D975/No. 2 diesel fuel.

Interior Lighting

The interior lighting system is comprised of four light fixtures. The lighting system operates from the 24 VDC battery system.

The light fixtures are sealed incandescent bulbs which are activated by two timer switches. Either timer switch can be used to turn on all the interior lights.

The DC lighting system can be used to perform offline maintenance or assist in setup prior to AC power connection.

Exhaust System

The exhaust system is located above the diesel engine. The exhaust system is comprised of rigid and flexible tubing, a silencer, and a roof-mounted exhaust riser with a rain cap.

Fuel Priming Pump

The generator set is equipped with an electric (24 VDC) fuel priming pump to assist in priming the system for maintenance purposes. The priming pump, bypass valves, and priming switch are located on the right side of the container.

Trailer

The generator is mounted on a 23.5-foot trailer. Contact the manufacturer, Chassis King, directly for information and support at ChassisKing.com or call (727) 585-1500.

Container

The 20-foot ISO container, that houses the generator, is made from sound-attenuated, acoustical fiberglass for extremely quiet operation. It has intregral vibration isolators, super critical grade silencer and acoustic insulation. The exterior polyurethane coating system provides long life in extreme operating conditions.

Accessories

- 6-Step Fueling/Personnel Ladder with Hand Rail
- Fire Extinguisher
- Battery Charger

Digital Controller Features

PowerCommand PCC 3201 is an integrated generator set control system providing governing, voltage regulation, engine protection and operator interface.

Functions

- Local and Remote Generator Start
- Automatic and Manual Starting and Stopping
- Engine and Generator Protection
- Digital Voltage Regulation
- ECU Communications via SAE J1939
- 4 Programmable Contact Inputs
- AC Output Metering
- Integrated RS485
- Auto Synchronizing
- Digital Alarm and Status Display

Monitoring:

- Engine RPM
- Engine Run Time
- Generator Voltage
- Generator Current
- Generator Frequency
- Oil Pressure
- Battery Voltage
- Low Fuel Alarm
- Running Hour Meter
- Coolant Temperature
- Generator Under/Over Voltage Alarm/Shutdown
- Generator Under/Over Frequency Alarm/Shutdown
- Over Current Alarm/Shutdown



Figure 1. Container Exterior Components

Table 5. Container Exterior Components			
ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	Fuel Fill Door	13	Louvers
2	Fueling Platform	14	Louvers
3	Door (Left Side)	15	Door (Right Side)
4	Acoustic Louvers	16	Fire Extinguisher
5	Rain Cap	17	Forklift Pocket (Right - 2)
6	Circuit Breaker Cover	18	Remote Start Connectors and Fuel Gauge Door
7	Emergency Stop Switch	19	External Fuel Rubber Flap
8	Camlock Panel Door	20	Control Panel Door
9	Ladder Attachment Plate (Left Door)	21	Ladder Attachment Plate (Right Door)
10	Oil Drain	22	Radiator Exhaust Grill
11	Water Drain	23	Super Critical Silencer
12	Forklift Pocket (Left - 2)	24	Fuel Tank Cover





Figure 2. Container Interior Components

Table 6. Container Interior Components			
ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	Light Switch 1	8	Camlock Panel
2	Circuit Breaker	9	Engine Base
3	Battery Charger	10	Saddle Box
4	Light Switch 2	11	Interior Lights (4)
5	Muffler	12	External Fuel Panel
6	Ladder	13	Control Panel
7	Fuel Tank	14	Fuel Priming Pump and Switch



Figure 3. Basic Engine Components

Table 7. Engine Components			
ITEM NO.	DESCRIPTION		
1	Radiator Cap		
2	Coolant Sight Glass		
3	Air Intake		
4	Fuel Pump		
5	Generator		
6	Saddle Box		
7	Starter		
8	Oil Dipstick		
9	Fuel Filter		
10	Battery		
11	Oil Fill Cap		
12	Radiator Fan Grill		
13	Voltage Reconnect Board		
14	Oil Filter		
15	Coolant Filter		
16	Oil Drain		
17	Air Filter		

EXTERNAL FUEL PANEL COMPONENTS



Figure 4. External Fuel Panel

- 1. **Fuel Gauge** indicates how much fuel is available in the internal fuel tank.
- 2. **Fuel In** Connection to additional external fuel tank.
- 3. Fuel Out Fuel return for external fuel tank.
- Controller Connector Terminal Provides connection for the PowerCommand 3201 Controller for remote start and paralleling capability.
- 30 Amp Inlet/EPO Switch Provides connection to external 120/240 V power source for battery charger and water heater.

CIRCUIT BREAKER COMPONENTS



Figure 5. Circuit Breaker Panel

- 1. **CLOSE Pushbutton** push for manual closing operation of the circuit breaker.
- 2. **Mechanical Indicator** indicates protection release tripped.
- 3. **OPEN Pushbutton** push for manual opening operation of the circuit breaker.
- 4. CLOSED/OPEN Indicator indicates if circuit breaker is OPEN (0) or CLOSED (I).
- 5. **Manual Loading Lever** used for the manual loading of the closing springs.
- 6. **Spring Load Indicator** indicates if the springs are loaded (yellow) or unloaded (white).



Figure 6. Camlok Panel

1. **BUS HOT Indicator Lamp** — When lit, this lamp indicates that the voltage bus is active (high voltage).

NEVER connect or disconnect cables from the camlok receptacles when the **BUS HOT** indicator lamp is **ON**. The possibility of electrocution, shock or even death, exists if cables are connected or unplugged while the lamp is **ON**.

- 2. L1 Receptacles Line 1 output voltage connection points used for load connection.
- 3. L2 Receptacles Line 2 output voltage connection points used for load connection.
- 4. L3 Receptacles Line 3 output voltage connection points used for load connection.
- 5. **N Receptacles** Neutral output voltage connection points used for load connection.
- 6. **G Receptacles** Ground output voltage connection points used for load connection.

CONTROL PANEL



Figure 7. Control Panel

Refer to Figure 7 for location of controls and indicators. For detailed information on the operation of the PowerCommand 3201 Controller, refer to the Cummins Generator Operator Manual.

OPERATOR PANEL

- 1. **Analog AC Metering Panel** Simultaneously displays 3-phase line to line AC volts and current, kW, power factor, and frequency.
- 2. **Graphical Display** Used to view menus of the menu-driven operating system.
- 3. **Display Menu Selection Buttons** Momentary buttons used to navigate through the system control menus and to adjust generator set parameters.

SWITCH PANEL

- 4. **Emergency Stop Push Button** Push this button for emergency stop of the engine. If button is pushed when the engine is not running, engine cannot be started.
- 5. **Exercise Button and Indicator** Initiates a preprogrammed exercise sequence. Used in conjunction with the 0/Manual/Auto switch to enable this function.
- Manual Run/Stop Button and Indicator Starts and stops the set locally and will bypass the Time Delay to Start and Stop sequences. The 0/Manual/Auto switch must be in the Manual position to enable this button.
- O/Manual/Auto Switch When set to the Manual position, enables the use of the switch panel Manual Run/Stop button. When set to the Auto position, enables start/stop control of the engine from a remote location and disables the use of the switch panel Manual Run/Stop button.

- Panel Lamp/Lamp Test Button Turns the panel lamp on or off, when pressed. To check that all control panel LEDs work, press and hold this button for three seconds. When button is released, the LEDs will turn off.
- Fault Acknowledge Button When pressed, acknowledges warning and shutdown messages after the fault has been corrected. When acknowledging a Warning message, the 0/Manual/Auto switch can be in any position. When acknowledging a Shutdown message, the 0/Manual/Auto switch must be in the 0 (off) position.
- 10. **Remote Start Indicator** Lights green when the control is receiving a remote run signal. Flashes to indicate a load demand stop mode.

- 11. Not in Auto Indicator Flashes red continuously when the 0/Manual/Auto switch is not in the Auto position.
- 12. **Shutdown Indicator** Lights red whenever the control detects a shutdown condition. To reset after condition is corrected, turn the 0/Manual/Auto switch to the 0 position and then press the Fault Acknowledge button.
- 13. Warning Status Indicator Lights yellow when the control detects a warning condition. To reset after condition is corrected, press the Fault Acknowledge button.

SINGLE PHASE LOAD

Always be sure to check the nameplate on the generator and equipment to insure the wattage, amperage, frequency, and voltage requirements are satisfactorily supplied by the generator for operating the equipment.

Generally, the wattage listed on the nameplate of the equipment is its rated output. Equipment may require 130-150% more wattage than the rating on the nameplate, as the wattage is influenced by the efficiency, power factor and starting system of the equipment.

NOTICE

If wattage is not given on the equipment's name plate, approximate wattage may be determined by multiplying nameplate voltage by the nameplate amperage.

WATTS = VOLTAGE x AMPERAGE

The power factor of this generator is 1.0. See Table 8 below when connecting loads.

Table 8. Power Factor By Load			
Type of Load Power Factor			
Single-phase induction motors	0.4-0.75		
Electric heaters, incandescent lamps 1.0			
Fluorescent lamps, mercury lamps	0.4-0.9		
Electronic devices, communication 1.0			
Common power tools	0.8		

Table 9. Cable Selection (60 Hz, Single Phase Operation)						
Current	Load in Watts		Maximum Allowable Cable Length			ength
in Amperes	At 100 Volts	At 200 Volts	#10 Wire	#12 Wire	#14 Wire	#16 Wire
2.5	300	600	1000 ft.	600 ft.	375 ft.	250 ft.
5	600	1200	500 ft.	300 ft.	200 ft.	125 ft.
7.5	900	1800	350 ft.	200 ft.	125 ft.	100 ft.
10	1200	2400	250 ft.	150 ft.	100 ft.	
15	1800	3600	150 ft.	100 ft.	65 ft.	
20	2400	4800	125 ft.	75 ft.	50 ft.	
CAUTION: Equipment damage can result from low voltage						

THREE PHASE LOAD

When calculating the power requirements for 3-phase power use the following equation.

NOTICE

If 3Ø load (kVA) is not given on the equipment nameplate, approximate 3Ø load may be determined by multiplying voltage by amperage by 1.732.

NOTICE

Motors and motor-driven equipment draw much greater current for starting than during operation.

An inadequate size connecting cable which cannot carry the required load can cause a voltage drop which can burn out the appliance or tool and overheat the cable. Refer to Table 9 to select the correct cable size.

- When connecting a resistance load such as an incandescent lamp or electric heater, a capacity of up to the generator's rated output (kW) can be used.
- When connecting a fluorescent or mercury lamp, a capacity of up to the generator's rated output (kW) multiplied by 0.6 can be used.
- When connecting an electric drill or other power tools, pay close attention to the required starting current capacity.
- When connecting ordinary power tools, a capacity of up to the generator's rated output (kW) multiplied by 0.8 can be used.

Before connecting this generator to any building's electrical system, a **licensed electrician** must install a **transfer switch**. Serious damage to the building's electrical system may occur without this transfer switch.

Before starting the engine, the following inspection should be made to make sure that the unit is ready for operation.

LUBRICATION

Check the engine oil level. Oil level should be as close to the dipstick high mark as possible, without overfilling.

DO NOT check oil while generator is operating. Crankcase pressure can blow out hot oil and cause severe burns.

NOTICE

DO NOT operate the engine with the oil level below the low mark or above the high mark on the dipstick. Overfilling can cause foaming or aeration of the oil while low oil may cause loss of oil pressure.

COOLANT

Cummins recommends antifreeze/summer coolant, for use in their engines, which can be purchased in concentrate (and mixed with 50% demineralized water) or pre-diluted. See the **Cummins Engine Owner's Manual** for further details.

A WARNING



If adding coolant/antifreeze mix to the radiator, **do not** remove the radiator cap until the unit has completely cooled. The possibility of **hot** coolant exists which can cause severe burns.

When adding coolant to the radiator, **DO NOT** remove the radiator cap until the unit has completely cooled. See Table 10 for engine, radiator, and recovery tank coolant capacities. Make sure the coolant level in the recovery tank is always between the "H" and the "L" markings.

Table 10. Coolant Capacity			
Engine and Radiator 7.8 gal (29.5 liters)			
Reserve Tank	6 quarts (6.6 liters)		

OPERATION IN FREEZING WEATHER

When operating in freezing weather, be certain the proper amount of antifreeze (Table 11) has been added.

Table 11. Anti-Freeze Operating Temperatures				
Vol %	Freezing Point		Boiling Point	
Anti- Freeze	°C	°F	°C	°F
50	-37	-34	108	226

NOTICE

When the antifreeze is mixed with water, the antifreeze mixing ratio **must be** less than 50%.

Check the engine coolant level. Add coolant if necessary.

Make sure engine is cool before removing coolant pressure cap. Hot coolant may cause severe scalding. Turn cap slowly, and do not open it fully until the pressure has been relieved.

NOTICE

Maintain coolant level for proper operation of the high engine temperature shutdown system. Loss of coolant may cause engine to overheat and cause severe damage to the engine.

FUEL

Make sure fuel tanks have enough fuel and that the fuel system is primed. Check to make sure that there are no leaks and that all fittings are tight.

RefillingThe Fuel System

ONLY properly-trained personnel who have read and understood this section should refill the fuel tank system.

1. Make sure that the generator is on firm level ground before refueling to prevent spilling and maximize the amount of fuel I that can be pumped into the tank. See Figure 8.



Figure 8. Fill on Level Ground

2. Remove fuel tank cap and fill tank with #2 diesel fuel. When filling tank, the fill light will turn on when the tank is 90% full. Stop filling the tank when light turns on. See Figure 9.



Figure 9. Refueling

External Fuel Tank

The CG500C2 is equipped with connections to an external fuel tank located on the side of the container (Figure 10). If used, make sure the external fuel tank is properly connected.

EXTERNAL FUEL RETURN



Figure 10. External Fuel Tank

VENTILATION

Make sure that the generator cooling inlet/outlet and exhaust ventilation opening are not blocked and operational.

Check that there are no loose debris in the surrounding are of the generator. Air flow from the radiator fan can blow loose items around and into the ventilation openings.

EXHAUST

Check to make sure that the entire exhaust system is tight and that no combustible materials are near and gases are discharged away from building openings.

🚹 DANGER

Exhaust gases contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconciousness and death.

Symptoms of carbon monoxide poisoning include:

- Dizziness
- Throbbing in Temples
- NauseaHeadache
- Muscular Twitching
- Incoherence
- VomitingWeakness/Sleepiness

IF YOU EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY.

If symptoms persist, seek medical attention.

Shut down the unit and do not operate until it has been inspected and repaired.

AIR CLEANER

Periodic cleaning/replacement is necessary. Inspect it in accordance with the **Cummins Engine Owner's Manual**.

FAN BELT TENSION

A slack drive belt may contribute to overheating, or to insufficient charging of the battery, adjust drive belt in accordance with the **Cummins Engine Owner's Manual**.

DRIVE BELT INSPECTION

Inspect the drive belt for damage and wear. Horizontal (across the belt) cracks are acceptable. See Figure 11. Vertical (direction of belt ribs) cracks that intersect with horizontal cracks are not acceptable.



Figure 11. Drive Belt Inspection

If the drive belt is frayed, punctured, or material is missing do not use drive belt.

BATTERY

This unit is of negative ground. **DO NOT** connect in reverse. Always maintain battery fluid level between the specified marks. **DO NOT** over fill. Battery life will be shortened if the fluid level is not properly maintained. Add only distilled water when replenishment is necessary.

Check to see whether the battery cables are loose. Poor contact may result in poor starting or malfunction. **Always** keep the terminals firmly tightened. Coat the terminals with an approved battery terminal treatment compound. Replace battery with only recommended type battery.

The battery is sufficiently charged if the specific gravity of the battery fluid is 1.28 (at 68° F). If the specific gravity should fall to 1.245 or lower, the battery is dead and needs to be recharged or replaced.

Before charging the battery with an external electric source, be sure to disconnect the battery cables.

There are two batteries in a rack on the container with a battery ON-OFF switch (Figure 12).

INSPECTION



Figure 12. Battery and ON/OFF Switch Location

Battery Cable Installation

ALWAYS make sure that the battery cables (Figure 13) are properly connected to the battery terminals as shown below.

ALWAYS disconnect the negative terminal **FIRST** and reconnect negative terminal **LAST**.



Figure 13. Battery

When connecting the battery, do the following:

- 1. Place a small amount of battery terminal treatment compound around both battery terminals. This will ensure a good connection and will help prevent corrosion around the battery terminals.
- 2. Connect the **red cable** to the positive terminal of the battery and the **black cable** to the negative terminal of the battery.

NOTICE

If the battery cable is connected incorrectly, electrical damage to the generator will occur. Pay close attention to the polarity when connecting the battery.

Inadequate battery connections may cause poor starting of the generator, and create other malfunctions.

LADDER INSTALLATION

The CG500C2 is equipped with a 6-step ladder with handrail stored behind the rear door of the container. The ladder can be used to acess the container interior through the doors and also to access the fueling platform.

1. Unhook the rubber straps that hold the ladder to the inside of the rear door of the container (Figure 14).



Figure 14. Removing Ladder from Door

- 2. Carefully lift ladder off the door. Get some assistance if the ladder is too heavy to lift.
- 3. Attach the ladder to the receivers located right below the doors or the fueling platform (Figure 15).





- 4. Adjust the jackstands so that the ladder securely sits on the ground.
- 5. Detach the handrail assembly off the door next to the ladder (Figure 14).
- 6. Lay the handrail on the ground or any clear surface.

INSPECTION

 Using a 3/16" allen wrench, loosen the the four set screws on the handrail as shown in Figure 16. Make sure that the screws loosened are the ones indicated in Figure 16.



Figure 16. Loosening Set Screws on Handrail

- 8. Install the handrail on the sockets on the left side of the ladder (Figure 17).
- 9. Tighten the screws that were loosened in step 7 to secure the handrail.

NOTICE

Handrail can only be installed on ladder when used on the right side door of the container or the fueling platform. The left side door cannot be accessed or opened if the handrail is attached to the ladder.

10. Reverse the procedure to detach and store ladder and handrail.



Figure 17. Installing Handrail

STARTUP

PRIMING ENGINE

1. If it is necessary to prime engine before starting (such as after changing the fuel filter or running out of fuel), place the fuel valves in the priming position (Figure 18). Push up and hold the fuel priming switch.





2. After priming is complete, release the fuel priming switch. Place the fuel valves in the run mode (Figure 19).



Figure 19. Fuel Valves (Run Mode)

CONNECTING LOAD

- 1. Connect the load to the receptacles on the Camlok panel.
- 2. When the camloks are inserted into the outlet connector, rotate clockwise until they are locked in place. Make sure that camloks are securely connected.

RESETTING THE EMERGENCY STOP BUTTON

If the Emergency Stop Switch was pushed in while the engine is not running, the engine cannot be started. It is necessary to reset as follows:

1. Locate the Emergency Stop button on the side of the container. See Figure 20.



Figure 20. Emergency Stop Switch

- 2. Pull out the Emergency Stop Switch.
- 3. Move the 0/Manual/Auto switch to the 0 position. See Figure 21. SWITCH PANEL



Figure 21. 0/Manual/Auto Switch and Fault Acknowledge Button Location

- 4. Press the Fault Acknowledge button on the control panel. See Figure 21.
- 5. Move the 0/Manual/Auto switch on the control panel to the desired position (manual or auto).

MANUAL STARTING

- 1. Move the 0/Manual/Auto switch to the manual position.
- 2. Press the Manual Run/Stop button.
- 3. The starter will begin cranking.
- 4. After a few seconds, the engine will start.
- 5. If the engine does not start:
 - a. Move the 0/Manual/Auto switch to the 0 position and press the Fault Acknowledge button to clear the Fail to Start shutdown.
 - b. Wait about 2 minutes for the starter motor to cool down.
 - c. Repeat starting procedure.

NOTICE

If the engine does not start after a second attempt, refer to the Troubleshooting section of the Cummins Generator Operator Manual.

EMERGENCY STOP

 In an emergency, push in the Emergency Stop Switch (Figure 20). The red Shutdown status LED (Figure 21) will light.

NOTICE

For more detailed information on the operation of the Power Command® 3201 Control Panel, refer to the Cummins Generator Operator Manual.

MAINTENANCE

Table 12. PERIODIC MAINTENANCE SCHEDULE					
	FREQUENCY				
MAINTENANCE PROCEDURE	Daily or After 8 Hours	Monthly or After 100 Hours	6 Months or after 250 Hours	1 year or after 1500 Hours	2 years or after 6000 Hours
General Inspection	Х				
Check Engine Oil Level	Х				
Check Coolant Level	Х				
Check Coolant Heater	Х				
Check Battery Charging System		Х			
Check All Hardware (Fittings, Clamps, Fasteners)		Х			
Check Battery Electrolyte Level		Х			
Check Generator Air Outlet		Х			
Check Radiator Hoses for Wears and Cracks			Х		
Test Rupture Basin Leak Detect Switch				Х	
Check Drive Belt	Х				
Check Air Cleaner (Replace as Necessary)				Х	
Check Anti-Freeze and DCA Concentration			Х		
Change Engine Oil and Filter			Х		
Change Water Coolant Filter				Х	
Change Crankcase Breather					Х
Change Fuel Filter			Х		
Clean Cooling Systems				Х	

GENERAL INSPECTION

Prior to each use, the generator should be cleaned and inspected for deficiencies. Check for loose, missing or damaged nuts, bolts, and other fasteners. Also check for fuel, oil, and coolant leaks. Use Table 12 as a general maintenance guideline. For detailed information on the maintenance of the engine, refer to the engine manufacturer's maintenance manual.

AIR FILTER

The air filter indicator (Figure 22) is attached to the air cleaner. As the air cleaner gets more clogged with dirt, air restriction increases and the **RED** indicator gradually rises. Replace air cleaner when there is excessive air restriction.



Figure 22. Air Filter Indicator

FUEL-WATER SEPARATOR

The fuel-water separator is connected to the fuel filter. Drain the water and the sediment from the fuel-water separator daily as follows: Turn the drain valve counterclockwise approximately 3 1/2 turns until the valve drops down 1 inch and water begins to drain out (Figure 23).



Figure 23. Draining the Water

- 2. Continue draining until clear fuel comes out.
- 3. Close the valve by lifting the valve and turning it clockwise until tight.

NOTICE

DO NOT overtighten valve. Overtightening can damage the threads.

REPLACING OIL FILTER

- 1. Run the engine until the water temperature reaches 140 °F (60 °C).
- 2. Turn off the engine.
- 3. Remove the oil drain plug and drain oil immediately to ensure that all oil and suspended contaminants are removed from the engine.
- 4. Remove the old oil filter (Figure 24).



- 5. Fill and install the new oil filter.
- 6. Check the oil level on the dipstick that it is filled to the H mark.
- 7. Run the engine for a while and check for leaks.
- 8. Shut off engine and wait 15 minutes for the oil to drain back to the oil pan.
- 9. Check the oil level again and add more oil if needed to bring to the H mark level.
- 10. Clean excessive oil from engine.

ADDING COOLANT

WARNING



Allow engine to **cool** before removing radiator pressure cap. Hot coolant spray could cause serious burns.

- 1. Remove the radiator pressure cap.
- 2. Add the correct proportion of antifreeze, supplemental coolant additive, and water to the radiator cooling system as specified by the engine manufacturer.
- 3. Reinstall the radiator pressure cap tightly.

REPLACING COOLANT FILTER

- 1. Remove the radiator pressure cap.
- Manually turn the coolant on/off valve 90° counterclockwise to the off position (Figure 25). Do not use a wrench or pliers to turn valve as this could damage the valve.
- 3. Remove the old filter with a filter wrench and discard.
- 4. Install the new filter and tighten 1/2 to 3/4 of a turn.

Figure 24. Oil Filter Replacement



Figure 25. Coolant Filter Replacement

Coolant is toxic. Keep away from children and pets. Dispose coolant in accordance with local environmental regulations.

- 5. Manually turn the coolant on/off valve back to the on position.
- 6. Reinstall the radiator pressure cap tightly.

TROUBLESHOOTING

Troubleshooting (Generator)				
Symptom	Possible Problem	Solution		
	AC Voltmeter defective?	Check output voltage using a voltmeter.		
	Is wiring connection loose?	Check wiring and repair.		
No Voltage Output	Is voltage regulator defective?	Replace if necessary.		
	Defective Rotating Rectifier?	Check and replace.		
	Defective Exciter Field?	Check and replace.		
	Is engine speed correct?	Turn engine throttle lever to "High".		
Low Voltage Output	Is wiring connections loose?	Check wiring and repair.		
	Defective AVR?	Replace if necessary.		
High Voltage Output	Is wiring connections loose?	Check wiring and repair.		
	Defective AVR?	Replace if necessary.		
Circuit Breaker Tripped	Short Circuit in load?	Check load and repair.		
	Over current?	Confirm load requirements and reduce.		
	Defective circuit breaker?	Check and replace.		
	Over current Relay actuated?	Confirm load requirement and replace.		

TROUBLESHOOTING

Troubleshooting (Engine)					
Symptom	Possible Problem	Solution			
	No Fuel reaching injection pump?	Add fuel. Check entire fuel system.			
	Defective fuel pump?	Replace fuel pump.			
	Fuel filter clogged?	Replace fuel filter and clean tank.			
	Faulty fuel supply line?	Replace or repair fuel line.			
	Compression too low?	Check piston, cylinder and valves. Adjust or repair per engine repair manual.			
although engine can be turned over.	Fuel pump not working correctly?	Repair or replace fuel pump.			
	Oil pressure too low?	Check engine oil pressure.			
	Low starting temperature limit exceeded?	Comply with cold starting instructions and proper oil viscosity.			
	Defective battery?	Charge or replace battery.			
	Air or water mixed in fuel system?	Check carefully for loosened fuel line coupling, loose cap nut, etc.			
At low temperatures engine will not start.	Engine oil too thick?	Refill engine crankcase with correct type of oil for winter environment.			
	Defective battery?	Replace battery.			
"	Fuel filter blocked?	Replace fuel filter.			
Engine fires but stops soon as starter is switched off	Fuel supply blocked?	Check the entire fuel system.			
	Defective fuel pump?	Replace fuel pump.			
	Fuel tank empty?	Add fuel.			
Engine stops by itself during permal	Fuel filter blocked?	Replace fuel filter.			
operation.	Defective fuel pump?	Replace fuel pump.			
	Mechanical oil pressure shutdown sensor stops the engine due to low oil?	Add oil. Replace low oil shutdown sensor if necessary.			
	Fuel tank empty?	Replace fuel filter.			
	Fuel filter clogged?	Replace fuel filter.			
	Fuel tank venting is inadequate?	Ensure that tank is adequately vented.			
Low engine power, output and speed.	Leaks at pipe unions?	Check threaded pipe unions tape and tighten unions a required.			
	Speed control lever does not remain in selected position?	See engine manual for corrective action.			
	Engine oil level too full?	Correct engine oil level.			
	Injection pump wear?	Use No. 2-D diesel fuel only. Check the fuel injection pump element and delivery valve assembly and replace as necessary.			

MAINTENANCE PARTS LOCATOR



MAINTENANCE PARTS LOCATOR



SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM



OPERATION MANUAL

HERE'S HOW TO GET HELP

PLEASE HAVE THE MODEL AND SERIAL NUMBER ON-HAND WHEN CALLING

UNITED STATES				
Multiquip Corporate Office		MQ Parts Department		
18910 Wilmington Ave. Carson, CA 90746 Contact: mq@multiquip.com	Tel. (800) 421-1244 Fax (310) 537-3927	800-427-1244 Fax: 310-537-3700 Fax:	: 800-672-7877 : 310-637-3284	
Service Department		Warranty Department		
800-421-1244 310-537-3700	Fax: 310-537-4259	800-421-1244 Fax: 310-537-3700	: 310-943-2249	
Technical Assistance				
800-478-1244	Fax: 310-943-2238			
CANADA		UNITED KINGDOM		
Multiquip		Multiquip (UK) Limited Head Office		
4110 Industriel Boul. Laval, Quebec, Canada H7L 6V Contact: jmartin@multiquip.com	Tel: (450) 625-2244 3 Tel: (877) 963-4411 Fax: (450) 625-8664	Unit 2, Northpoint Industrial Estate, Globe Lane, Dukinfield, Cheshire SK16 4UJ Contact: sales@multiquip.co.uk	Tel: 0161 339 2223 Fax: 0161 339 3226	

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