GENERAC® | MOBILE

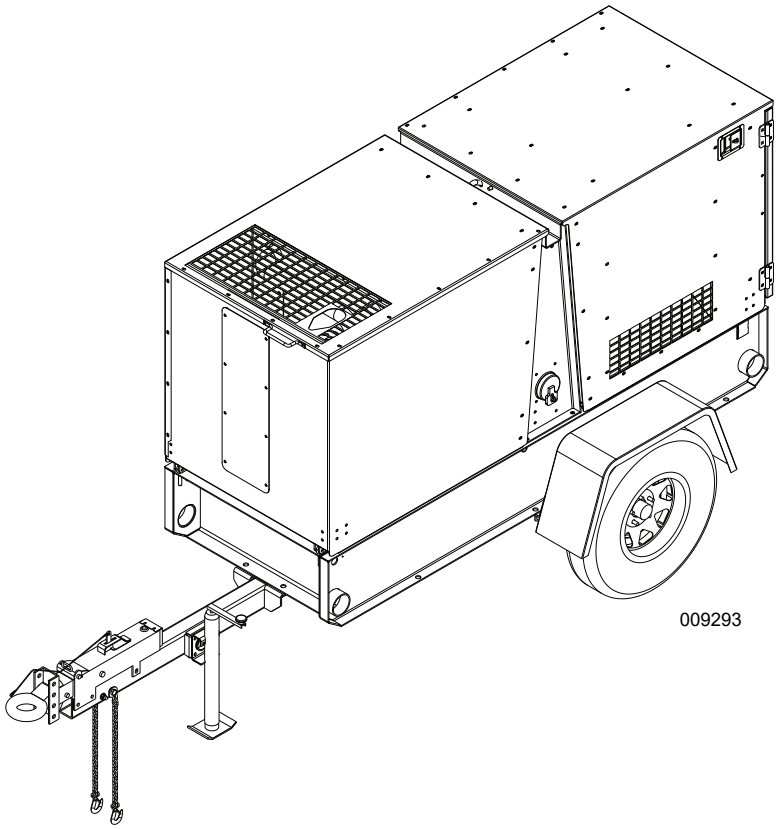
Owner's Manual

For

Diesel Generator

MMG25FHI • MMG35FH

MMG45FHK • MMG55FH



For technical assistance contact:

www.generacmobileproducts.com

Technical Support

1-800-926-9768

SAVE THIS MANUAL FOR FUTURE REFERENCE

Use this page to record important information about your Mobile Generator

Unit Model Number	
Unit Serial Number	
Engine Model Number	
Engine Serial Number	
Generator Model Number	
Generator Serial Number	
Date Purchased	

Record the information found on your unit data label on this page. See ***Control Panel (rear of unit)***

Engine and generator serial numbers are located on separate data plates affixed to the engine and generator respectively.

When contacting a Generac Mobile Products Authorized Service Dealer (ASD) about parts and service, always supply the complete model number and serial number of the unit.

Operation and Maintenance: Proper maintenance and care of the generator ensures a minimum number of problems and keeps operating expenses at a minimum. It is the operator's responsibility to perform all safety checks, to verify that all maintenance for safe operation is performed promptly, and to have the equipment checked periodically by an ASD. Normal maintenance, service and replacement of parts are the responsibility of the owner/operator and, as such, are not considered defects in materials or workmanship within the terms of the warranty. Individual operating habits and usage may contribute to the need for additional maintenance or service.

⚠WARNING

CANCER AND REPRODUCTIVE HARM
www.P65Warnings.ca.gov.

(000393a)

⚠WARNING

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65Warnings.ca.gov/diesel. (000394)

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Section 1: Introduction and Safety

Introduction

Thank you for purchasing a Generac Mobile Products LLC product. This unit has been designed to provide high performance, efficient operation, and years of use when maintained properly.

The information in this manual is accurate based on products produced at the time of publication. The manufacturer reserves the right to make technical updates, corrections, and product revisions at any time without notice.

Read This Manual Thoroughly

⚠WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury.

(000100a)

If any section of this manual is not understood, contact your nearest Generac Mobile Products Authorized Service Dealer (ASD), or contact Generac Mobile Products Technical Service at 1-800-926-9768 or ***www.generacmobileproducts.com*** with any questions or concerns.

The owner is responsible for proper maintenance and safe use of the equipment. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established, or with equivalent standards. Also, verify that the unit is applied, used, and maintained in accordance with the manufacturer's instructions and recommendations. Do nothing that might alter safe application/usage and render the unit in noncompliance with the aforementioned codes, standards, laws, and regulations.

Save these instructions for future reference. This manual contains important instructions for the unit that should be followed during setup, operation and maintenance of the unit and battery. ALWAYS supply this manual to any individual that will use this machine.

How to Obtain Service

When the unit requires service or repairs, contact a Generac Mobile Products Authorized Service Dealer (GMP ASD) for assistance. Service technicians are factory-trained for all service needs.

To locate a GMP ASD, go to:

www.generacmobileproducts.com/parts-service/find-service

When contacting a GMP ASD about parts and service, always supply the complete model number and serial number of the unit from the data decal located on the unit. Record the model number and serial numbers in the spaces provided on the inside front cover of this manual.

Safety Rules

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all inclusive. If using a procedure, work method or operating technique that the manufacturer does not specifically recommend, verify it is safe for others. Also make sure the procedure, work method or operating technique utilized does not render the equipment unsafe.

Safety Symbols and Meanings

Throughout this publication, and on tags and decals affixed to the unit, DANGER, WARNING, CAUTION and NOTE blocks are used to alert personnel to special instructions about a particular operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. Their definitions are as follows:

⚠DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

(000001)

⚠WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

(000002)

⚠CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

(000003)

NOTE: Notes contain additional information important to a procedure and will be found within the regular text of this manual.

These safety alerts cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the action or service are essential to preventing accidents.

General Hazards

DANGER

Asphyxiation. Running engines produce carbon monoxide, a colorless, odorless, poisonous gas. Carbon monoxide, if not avoided, will result in death or serious injury.

(000103)

DANGER

Asphyxiation. Do not operate unit without a properly functioning exhaust system. Doing so will result in death or serious injury.

(000340)

WARNING

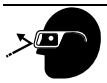
Loss of life. This product is not intended to be used in a critical life support application. Failure to adhere to this warning could result in death or serious injury.

(000209b)

WARNING

Hearing Loss. Hearing protection is recommended when using this machine. Failure to wear hearing protection could result in permanant hearing loss.

(000107)



WARNING

Vision loss. Eye protection is required when operating unit. Failure to wear appropriate eye protection could result in vision loss or serious injury.

(000407)

WARNING

Moving Parts. Keep clothing, hair, and appendages away from moving parts. Failure to do so could result in death or serious injury.

(000111)

WARNING

Hot Surfaces. When operating machine, do not touch hot surfaces. Keep machine away from combustibles during use. Hot surfaces could result in severe burns or fire.

(000108)

WARNING

Equipment damage. Do not attempt to start or operate a unit in need of repair or scheduled maintenance. Doing so could result in serious injury, death, or equipment failure or damage.

(000291)

WARNING

Risk of injury. Do not operate or service this machine if not fully alert. Fatigue can impair the ability to service this equipment and could result in death or serious injury.

(000215)

WARNING

Equipment damage. Only qualified service personnel may install, operate, and maintain this equipment. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage.

(000182a)

CAUTION

Equipment or property damage. Do not block air intake or restrict proper air flow. Doing so could result in unsafe operation or damage to unit.

(000229)

Trailer Hazards

WARNING

Personal injury. Trailer must be securely coupled to the hitch with the chains correctly attached. Uncoupled or unchained towing could result in death or serious injury.

(000233a)

WARNING

Personal injury. Do not operate unit during transport. Doing so could result in death, serious injury, or property damage.

(000231a)

WARNING

Crushing hazard. Verify unit is properly secured and on level ground. An unsecured unit can suddenly roll or move, causing death or serious injury.

(000234a)

WARNING

Property or Equipment Damage. Tighten wheel lug nuts after first 50 miles to factory specifications. Failure to do so could result in death, serious injury, property or equipment damage.

(000235)

Electrical Hazards

⚠DANGER

Electrocution. In the event of electrical accident, immediately shut power OFF. Use non-conductive implements to free victim from live conductor. Apply first aid and get medical help. Failure to do so will result in death or serious injury. (000145)

⚠DANGER

Electrocution. Water contact with a power source, if not avoided, will result in death or serious injury.

(000104)

⚠DANGER

Electrocution. Contact with bare wires, terminals, and connections while generator is running will result in death or serious injury. (000144)

⚠DANGER

Electrocution. Verify electrical system is properly grounded before applying power. Failure to do so will result in death or serious injury. (000152)

⚠DANGER

Electrocution. Turn utility supply OFF before working on utility connections of the transfer switch. Failure to do so will result in death or serious injury. (000123)

⚠DANGER

Electrocution. Never connect this unit to the electrical system of any building unless a licensed electrician has installed an approved transfer switch. Failure to do so will result in death or serious injury. (000150)

⚠WARNING

Explosion. Batteries emit explosive gases. Always disconnect negative battery cable first to avoid spark. Failure to do so could result in death or serious injury. (000238)

Lifting Hazards

⚠WARNING

Personal injury. Failure to properly connect lifting cables, chains, or straps could result in death, serious injury, or property damage. (000346)

⚠WARNING

Personal Injury. Do not use lifting eye if there are signs of damage or corrosion. Doing socould result in death, serious injury, or property damage.

(000433)

⚠WARNING

Personal Injury. Do not use lifting eye other than as directed. Doing so could result in death, serious injury, or property damage.

(000434)

⚠WARNING

Personal Injury. Verify all fasteners are properly tightened prior to lifting unit. Failure to do so could result in death, serious injury, or property damage.

(000351)

Explosion and Fire Hazards

⚠DANGER

Explosion and Fire. Fuel and vapors are extremely flammable and explosive. Add fuel in a well ventilated area. Keep fire and spark away. Failure to do so will result in death or serious injury. (000105)

⚠WARNING

Fire risk. Fuel and vapors are extremely flammable. Do not operate indoors. Doing so could result in death, serious injury, or property or equipment damage. (000281)

⚠WARNING

Risk of Fire. Unit must be positioned in a manner that prevents combustible material accumulation underneath. Failure to do so could result in death or serious injury. (000147)

Battery Hazards

⚠DANGER

Electrocution. Do not wear jewelry while working on this equipment. Doing so will result in death or serious injury.

(000188)

⚠WARNING

Explosion. Batteries emit explosive gases while charging. Keep fire and spark away. Wear protective gear when working with batteries. Failure to do so could result in death or serious injury.

(000137a)

⚠WARNING

Explosion. Do not dispose of batteries in a fire. Batteries are explosive. Electrolyte solution can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention.

(000162)

⚠WARNING

Risk of burn. Do not open or mutilate batteries. Batteries contain electrolyte solution which can cause burns and blindness. If electrolyte contacts skin or eyes, flush with water and seek immediate medical attention. (000163a)

⚠WARNING

Environmental Hazard. Always recycle batteries at an official recycling center in accordance with all local laws and regulations. Failure to do so could result in environmental damage, death or serious injury.

(000228)

Always recycle batteries in accordance with local laws and regulations. Contact your local solid waste collection site or recycling facility to obtain information on local recycling processes. For more information on battery recycling, visit the Battery Council International website at: ***http://batterycouncil.org***

Fuel Hazards

⚠DANGER

Explosion and fire. Fuel and vapors are extremely flammable and explosive. No leakage of fuel is permitted. Keep fire and spark away. Failure to do so will result in death or serious injury.

(000192)

⚠DANGER

Risk of fire. Allow fuel spills to completely dry before starting engine. Failure to do so will result in death or serious injury.

(000174)

- **DO NOT** fill fuel tank near an open flame, while smoking, or while engine is running. **DO NOT** fill tank in an enclosed area with poor ventilation.
- **DO NOT** operate with the fuel tank cap loose or missing.

Engine Safety

Internal combustion engines present special hazards during operation and fueling. Failure to follow the safety guidelines described below could result in severe injury or death. Read and follow all safety alerts described in the engine operator's manual. A copy of this manual was supplied with the unit when it was shipped from the factory.

- **DO NOT** run engine indoors or in an area with poor ventilation. Verify engine exhaust cannot seep into closed rooms or ventilation equipment.
- **DO NOT** clean air filter with gasoline or other types of low flash point solvents.
- **DO NOT** operate the unit without a functional exhaust system.
- Shut the engine down if any of the following conditions exist during operation:
  - •Abnormal change in engine speed.
  - •Loss of electrical output.
  - •Equipment connected to the unit overheats.
  - •Sparking occurs.
  - •Engine misfires or there is excessive engine/generator vibration.
  - •Protective covers are loose or missing.
  - •Ambient air temperature is above 120°F (49°C).

Operating Safety

Positioning the Unit

⚠WARNING

Crushing hazard. Verify unit is properly secured and on level ground. An unsecured unit can suddenly roll or move, causing death or serious injury.

(000234a)

- The area immediately surrounding the unit should be dry, clean, and free of debris.
- If the unit is equipped with a frame grounding stud, follow any local, state, and National Electrical Code (NEC) guidelines when connecting.

Lowering Trailer Tongue

For units shipped with the trailer tongue in the upright position, follow the steps below to lower the tongue.

1. Elevate the unit using a hoist or forklift, or use the jack located on the trailer tongue.

NOTE: If using the front jack for support, it must first be moved to the jack mount location nearest the frame.

2. See *Figure 1-1* Remove the mounting hardware securing the tongue shipping brace to the trailer frame (A).

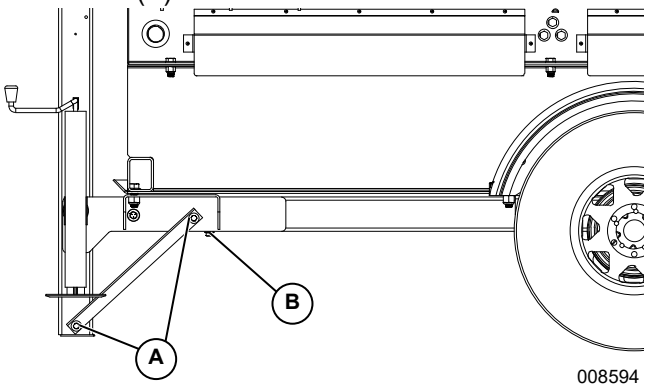


Figure 1-1. Lowering Tongue Trailer

3. Remove the shipping brace and slide it into the trailer tube opening. Secure the brace to the trailer with the bolt located on the underside of the trailer (B) and a new nylon locking nut.
4. See *Figure 1-2* Flip the trailer tongue down and reinstall the bolts and washers removed in step two using two new nylon locking nuts (C). **DO NOT** reuse the nylon locking nuts. Tighten bolts to 80-109 ft-lbs (108-148 Nm).

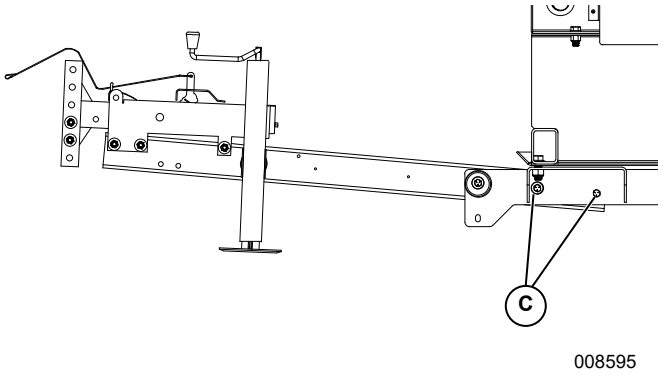


Figure 1-2. Lowering Tongue Trailer

NOTE: If the jack was used to support the unit while removing the shipping brace, the jack must be moved back to the tongue location before the unit can be towed. Connect the trailer tongue to a vehicle or other support and move the jack to the tongue location.

5. Tighten the new nylock bolt inside the jack mounting tube nearest the frame.
6. See *Figure 1-3* Remove the mounting hardware from the front hood actuator clearance hole panel (D). Tilt the panel forward. Reinstall the hardware to secure the panel.

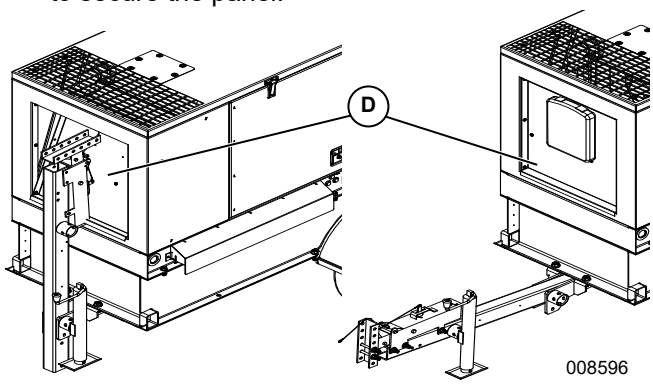


Figure 1-3. Lowering Tongue Trailer

Towing Safety

Towing a trailer requires care. Both the trailer and vehicle must be in good condition and securely fastened to each other to reduce the possibility of an accident. Some states require that large trailers be registered and licensed. Contact your local Department of Transportation office to check on license requirements for your particular unit.

Hitch and Coupling

- Verify the hitch and coupling on the towing vehicle are rated equal to, or greater than, the trailer's Gross Vehicle Weight Rating (GVWR).
- Verify the trailer hitch and the coupling are compatible. Verify the coupling is securely fastened to the vehicle.

- **DO NOT** tow trailer using defective parts. Inspect the hitch and coupling for wear or damage.
- Connect safety chains in a crossing pattern under the tongue.
- Before towing the unit, verify the weight of the trailer is equal across all tires. On trailers with adjustable height hitches, adjust the angle of the trailer tongue to keep the trailer as level as possible.

Safe Towing Techniques

- Practice turning, stopping and backing up in an area away from heavy traffic prior to transporting the unit.
- Maximum recommended speed for highway towing is 45 mph (72 km/h). Recommended off-road towing speed is 10 mph (16 km/h) or less, depending on terrain.
- When towing, maintain extra space between vehicles and avoid soft shoulders, curbs and sudden lane changes.

Reporting Trailer Safety Defects

If you believe your trailer has a defect which 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 Generac Mobile Products LLC.

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 an individual problem between you, your GMP ASD, or Generac Mobile Products LLC.

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

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

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

Section 2: General Information

Specifications

Description	Units	MMG25FHI	MMG25HI Super Start
Engine			
Make/Brand	—	ISUZU	ISUZU
EPA Tier	—	iT4	iT4
Fuel consumption—100%: Prime	gph (Lph)	1.8 (6.8)	1.8 (6.8)
Battery voltage	V (quantity per unit)	12 (1)	12 (1)
Battery rating	CCA	720	720
Generator			
Three phase—standby	kW (kVA)	20 (25)	22 (27)
Amps—Three phase—standby	480V (208V)	30 (69)	32 (75)
Three phase—prime	kW (kVA)	18 (23)	19 (24)
Amps—three phase—prime	480V (208V)	28 (64)	29 (67)
Single phase—standby	kW (kVA)	16 (16)	21 (21)
Amps—single phase—standby	240V	67	88
Single phase—prime	kW (kVA)	15 (15)	19 (19)
Amps—single phase—prime	240V	63	79
Frequency	Hz	60	60
Weights			
Dry weight—skid mounted	lb (kg)	2048 (929)	2139 (970)
Operating weight—skid mounted	lb (kg)	2517 (1142)	2608 (1183)
Dry weight—trailer mounted	lb (kg)	2289 (1038)	2380 (1080)
Operating weight—trailer mounted	lb (kg)	2758 (1251)	2849 (1292)
Capacities			
Usable fuel	gal (L)	56 (212)	56 (212)
Coolant system	qts (L)	12.0 (11.4)	12. (11.4)
Oil	qts (L)	6.7 (6.3)	6.7 (6.3)
Maximum run time	hours	31	31
AC Distribution			
Circuit breaker size	amperes	90	90
Specifications are subject to change without notice. Refer to the product specification sheet for complete list.			

Description	Units	MMG35FH	MMG35FH Super Start
Engine			
Make/Brand	—	John Deere	John Deere
EPA Tier	—	iT4	iT4
Fuel consumption—100%: Prime	gph (Lph)	2.6 (9.8)	2.6 (9.8)
Battery voltage	V (quantity per unit)	12 (1)	12 (1)
Battery rating	CCA	720	720
Generator			
Three phase—standby	kW (kVA)	29 (36)	30 (38)
Amps—Three phase—standby	480V (208V)	43 (100)	46 (105)
Three phase—prime	kW (kVA)	26 (33)	27 (34)
Amps—three phase—prime	480V (208V)	40 (92)	41 (94)
Single phase—standby	kW (kVA)	26 (26)	29 (29)
Amps—single phase—standby	240V	108	121
Single phase—prime	kW (kVA)	25 (25)	26 (26)
Amps—single phase—prime	240V	104	108
Frequency	Hz	60	60
Weights			
Dry weight—skid mounted	lb (kg)	2196 (996)	2250 (1021)
Operating weight—skid mounted	lb (kg)	2658 (1206)	2712 (1230)
Dry weight—trailer mounted	lb (kg)	2573 (1167)	2627 (1192)
Operating weight—trailer mounted	lb (kg)	2758 (1251)	2849 (1292)
Capacities			
Usable fuel	gal (L)	56 (212)	56 (212)
Coolant system	qts (L)	16.0 (15.1)	16.0 (15.1)
Oil	qts (L)	8.5 (8.0)	8.5 (8.0)
Maximum run time	hours	22	22
AC Distribution			
Circuit breaker size	amperes	125	125
Specifications are subject to change without notice. Refer to the product specification sheet for complete list.			

Description	Units	MMG45FHK	MMG45FHK Super Start
Engine			
Make/Brand	—	Kubota	Kubota
EPA Tier	—	iT4	iT4
Fuel consumption—100%: Prime	gph (Lph)	3.0 (11.4)	3.0 (11.4)
Battery voltage	V (quantity per unit)	12 (1)	12 (1)
Battery rating	CCA	720	720
Generator			
Three phase—standby	kW (kVA)	35 (44)	38 (47)
Amps—Three phase—standby	480V (208V)	53 (122)	57 (130)
Three phase—prime	kW (kVA)	33 (41)	34 (43)
Amps—three phase—prime	480V (208V)	49 (114)	52 (119)
Single phase—standby	kW (kVA)	33 (33)	36 (36)
Amps—single phase—standby	240V	138	150
Single phase—prime	kW (kVA)	30 (30)	33 (33)
Amps—single phase—prime	240V	138	150
Frequency	Hz	60	60
Weights			
Dry weight—skid mounted	lb (kg)	2329 (1056)	2524 (1145)
Operating weight—skid mounted	lb (kg)	3082 (1398)	3277 (1486)
Dry weight—trailer mounted	lb (kg)	2853 (1294)	3048 (1383)
Operating weight—trailer mounted	lb (kg)	3606 (1636)	3801 (1724)
Capacities			
Usable fuel	gal (L)	95 (360)	95 (360)
Coolant system	qts (L)	17.5 (16.6)	17.5 (16.6)
Oil	qts (L)	14.5 (13.7)	14.5 (13.7)
Maximum run time	hours	35	35
AC Distribution			
Circuit breaker size	amperes	200	200
Specifications are subject to change without notice. Refer to the product specification sheet for complete list.			

Description	Units	MMG55FH	MMG55FH Super Start
Engine			
Make/Brand	—	John Deere	John Deere
EPA Tier	—	iT4	iT4
Fuel consumption—100%: Prime	gph (Lph)	4.0 (15.1)	4.0 (15.1)
Battery voltage	V (quantity per unit)	12 (1)	12 (1)
Battery rating	CCA	720	720
Generator			
Three phase—standby	kW (kVA)	52 (65)	52 (65)
Amps—Three phase—standby	480V (208V)	78 (180)	78 (180)
Three phase—prime	kW (kVA)	47 (59)	47 (59)
Amps—three phase—prime	480V (208V)	71 (164)	71 (164)
Single phase—standby	kW (kVA)	49 (49)	50 (50)
Amps—single phase—standby	240V	204	208
Single phase—prime	kW (kVA)	45 (45)	45 (45)
Amps—single phase—prime	240V	188	188
Frequency	Hz	68	68
Weights			
Dry weight—skid mounted	lb (kg)	2570 (1170)	2640 (1197)
Operating weight—skid mounted	lb (kg)	3255 (1480)	3325 (1508)
Dry weight—trailer mounted	lb (kg)	3090 (1400)	3160 (1433)
Operating weight—trailer mounted	lb (kg)	3770 (1710)	3840 (1742)
Capacities			
Usable fuel	gal (L)	95 (360)	95 (360)
Coolant system	qts (L)	18.0 (17.0)	18.0 (17.0)
Oil	qts (L)	9.0 (8.5)	9.0 (8.5)
Maximum run time	hours	24	24
AC Distribution			
Circuit breaker size	amperes	225	225
Specifications are subject to change without notice. Refer to the product specification sheet for complete list.			

Unit Dimensions

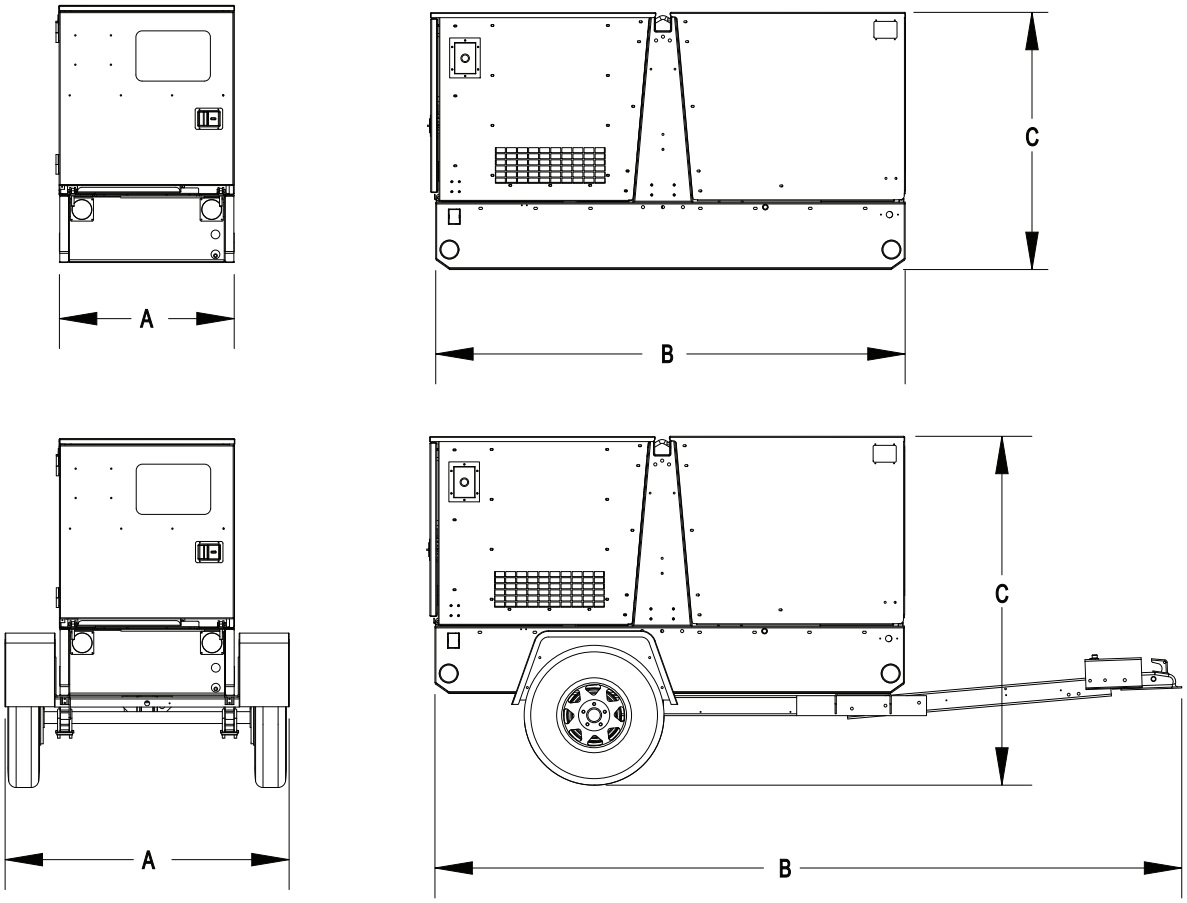


Figure 2-1. Unit Dimensions

	A	B	C
Skid Mounted	35 in (0.89 m)	95 in (2.41 m)	52 in (1.32 m)
Trailer Mounted	57 in (1.45 m)	150 in (3.81 m)	67 in (1.70 m)

Unit and Serial Number Locations

See ***Figure 2-2*** to locate the unit ID tag (A) and vehicle identification number (VIN) tag (B). Important information such as the unit model number, serial number, VIN, and tire loading information are listed on these tags. Record the information from these tags in the event the tags are lost or damaged. This information may be needed when ordering parts or requesting assistance.

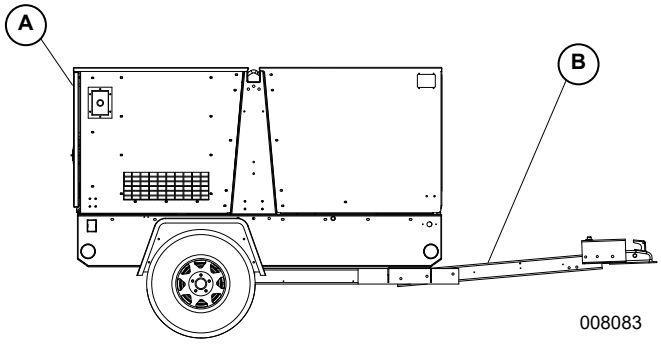


Figure 2-2. Unit and Serial Number Locations

Component Locations

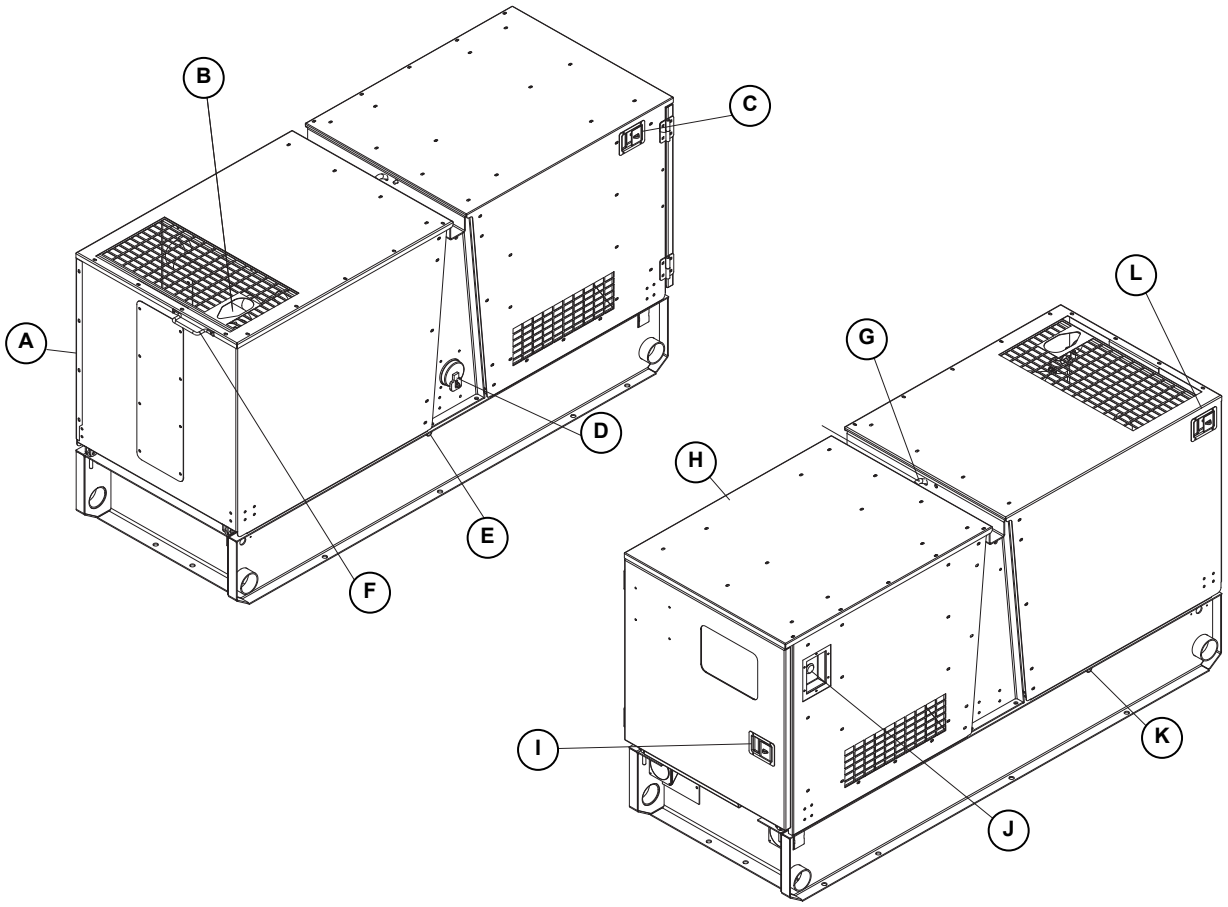


Figure 2-3. Component Locations

A Engine Access
B Engine Exhaust
C Secondary Hood Latch
D Fuel Fill
E Oil Drain Port
F Handle
G Central Lift Point
H Generator Access
I Control Panel and Voltage Selector Switch Access
J Emergency Stop
K Radiator Drain Port
L Front Hood Latch

Control Panel

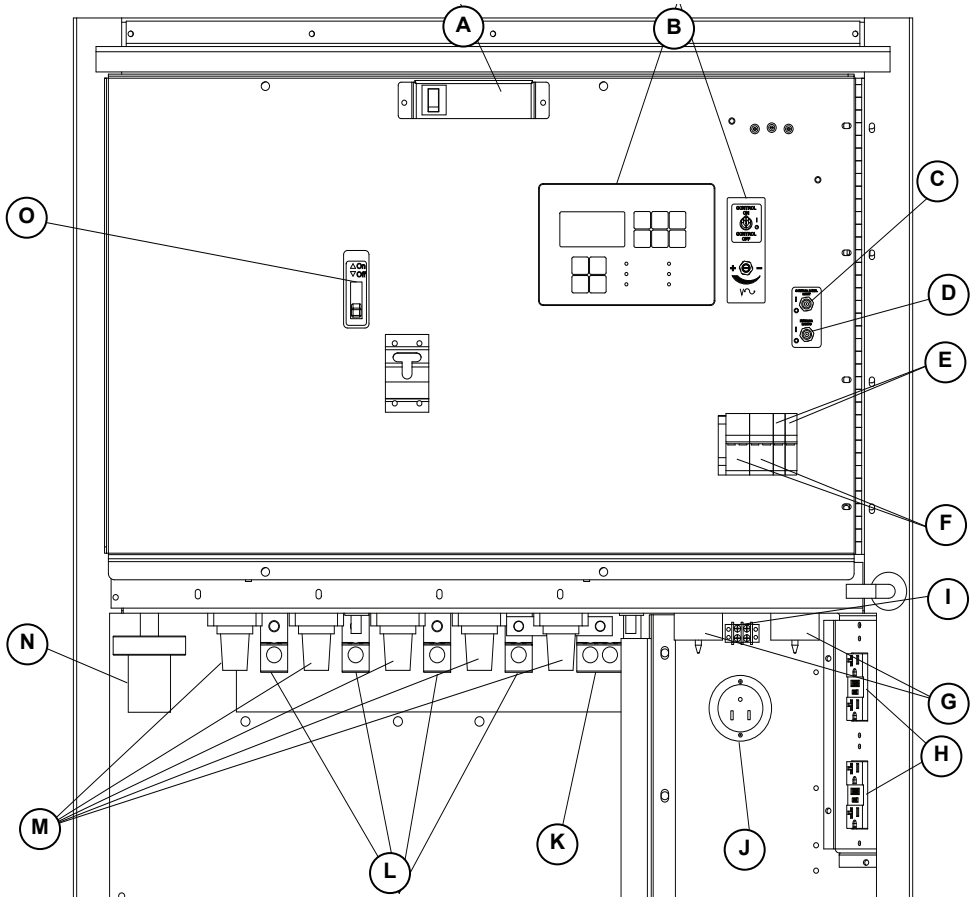


Figure 2-4. Control Panel (rear of unit)

(A) Control Panel Light (optional)

(B) Mobile Digital Controller (MDC)

(C) Control Panel Light Switch (optional)

(D) Interior Light Switch (optional)

(E) 20A Circuit Breakers

Disconnects power to 120V GFCI outlets.

(F) 50A Circuit Breakers

Disconnects power to 120/240V twist-lock outlets.

(G) 120/240V Twist-Lock Convenience Outlets

Allows for connecting additional loads or equipment.

(H) 120 GFCI Duplex Convenience Outlets

Allows for connecting additional loads or equipment.

(I) Remote Start Terminal Block

Allows generator to be started form a remote location with a dry contact closure switch when the generator is used for standby or remote power.

(J) Engine Accessory Connection

Powers battery charger or other engine accessories.

(K) Generator Connection Lug

Allows connection to a good earthen ground per any local, state or National Electric Code (NEC) guidelines before starting the generating the generator.

(L) Generator Connection Lugs

Allows appropriate loads to be wired directly to the generator.

(M) Cam Lock Connectors (optional)

Series 16 taper nose 400A/600V cam locks are connected here.

(N) Voltage Selector Switch

Mechanically changes connections between generator output leads and connection lugs and the optional cam lock connectors on the main control panel.

(O) Main Circuit Breaker

Disconnects power to connection lugs (L) and optional cam lock connectors (M). It WILL NOT disconnect power to the convenience outlets when the engine is running.

Mobile Digital Controller

The Mobile Digital Controller starts, stops and monitors the operation of the generator and the engine. The controller constantly monitors vital generator and engine functions for a number of pre-programmed alarm and fault conditions. When a fault condition occurs, the engine will shut down automatically and the Liquid Crystal Display (LCD) window will display the fault that caused the shut down; to resume operation the fault condition must be resolved. The controller has can provide the display readout in English and Spanish; other languages are available. A screen print out of the display screen is also available. The controller also records a history of the unit's performance which may be viewed at any time and will not be removed or lost when the controller is powered down.

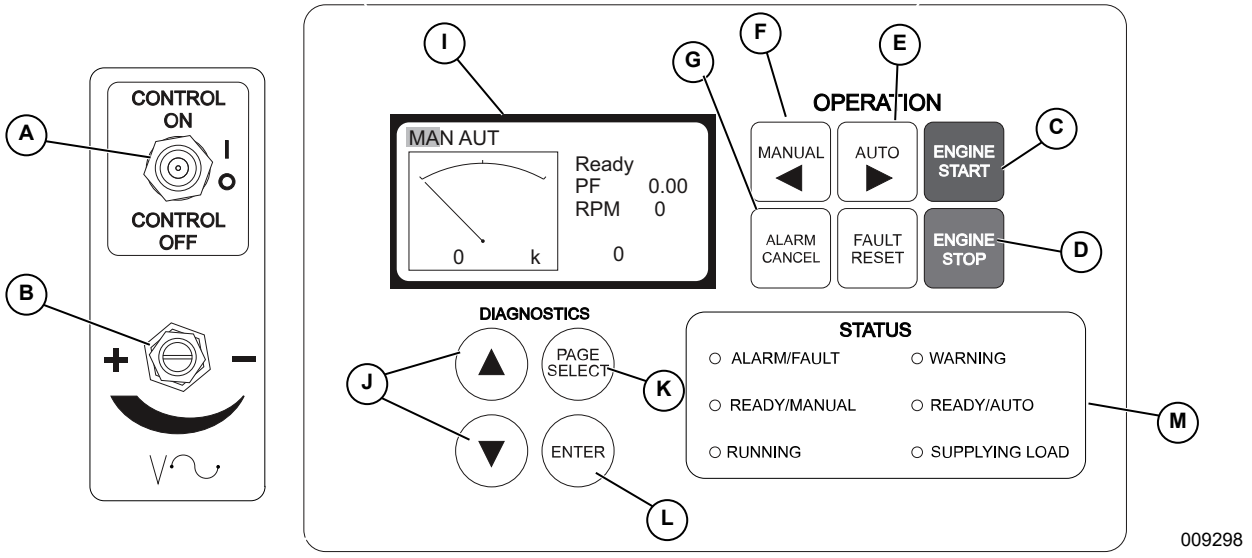


Figure 2-5. PowerZone Controller Layout

Control Panel Features and Functions

(A) Control On/Off

Powers-up the control panel and the controller.

(B) Fine Voltage Adjustment Screw

Sets generator output voltage after selector switch has been changed from one phase to another.

(C) Engine Start Button

(D) Engine Stop Button

(E) MANUAL ◀ Button

Changes from automatic (remote) starting to manual starting.

(F) AUTO ▶ Button

Changes from manual starting to automatic (remote) starting.

(G) Alarm Cancel Button

Silences or cancels alarm.

(H) Fault Reset Button

Press to clear the fault from the LCD window after the fault has been corrected. Press FAULT RESET and ENTER to clear the John Deere ECU Alarm List Code.

(I) Liquid Crystal Display

Toggles between generator display screen and engine display screen upon start-up. By viewing these screens, the operator can monitor both engine and generator status while the unit is running.

(J) ▲ Scroll-Up and ▼ Scroll-Down Button

Scrolls up or down within the LCD window.

(K) Page Select Button

Selects the next display screen.

(L) Enter Button

Places the operator inside the particular display to review the generators pre-programmed setpoints or parameters.

(M) Status Light Emitting Diodes (LED)

Displays current operational status of the generator.

- Alarm/Fault indicates active or inactive alarms, but not reset shut down alarms.
- Warning indicates an active or inactive alarm, or a warning alarm that has not been reset.
- Ready/Manual indicates the controller is ready to start and in the manual mode.
- Ready/Auto indicates the unit is in the "AUTO" mode ready for the remote start signal.
- Running indicates the unit is running.
- Supplying Load indicates a load is being applied.

Generator and Engine Monitoring

Generator and engine information is shown on the liquid crystal display (LCD) window in a toggling manner with engine information after the first 60 seconds of operation, then every five seconds thereafter.

Generator Monitoring

See ***Figure 2-6***. The generator display screen shows the following:

- **Hertz: Displays output frequency.**
- **Generator Output Voltage:** Line to Neutral display, single phase (1Ø).
- **Generator Output Voltage:** Line to Line display, 3 phase (3Ø).
- **Amps:** Displays AC output amperage.

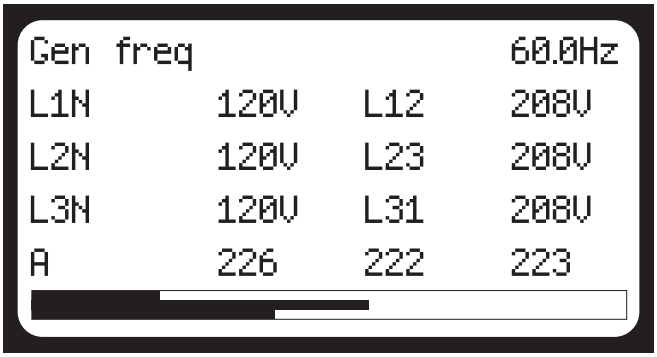


Figure 2-6. Generator Monitoring

Engine Monitoring

Upon generator start-up, the running screen will display SENSING and will countdown from 45 seconds to zero before the digital controller records the generator nominal output voltage. The nominal generator voltage is then compared to the voltage selector switch set point voltage. If the nominal voltage is greater than or lower than the voltage selector switch set point voltage by 10% or more, the controller will automatically shut down the generator. The display will read: Wrn VG1 or 2 or 3 Under/Over and/or Sd Vg1 or 2 or 3 Under/Over. This means the controller warned ("Wrn") or shut down ("Sd") the unit due to an output voltage irregularity.

See ***Figure 2-7***. Generator output voltage can be adjusted after the generator is running by using fine voltage adjustment screw (A). This screw increases (+) or decreases (-) generator output voltage as displayed on the power display screen. If voltage is increased or decreased too fast or too slow, the unit will automatically shut down. This adjustment must be made within the 45 second delay and countdown to zero period.

To adjust the output voltage, check the output voltage on the LCD window labeled Gen freq & Hz. Look at the L1N voltage or the L12 voltage on the display. The generator nominal output voltage should be within 10% of the voltage rating on the voltage selector switch.

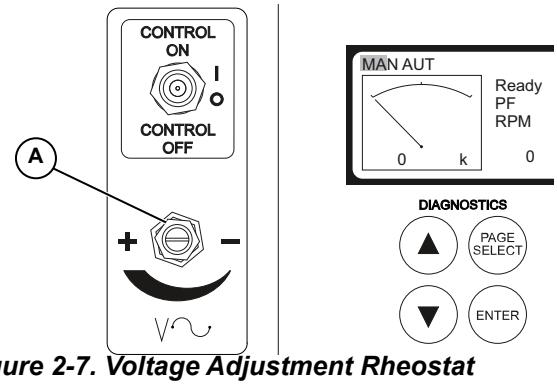


Figure 2-7. Voltage Adjustment Rheostat

To adjust output voltage loosen the lock nut at the base of the screw and turn the screw in the desired direction until the required voltage shown on the LCD window matches the stated voltage on the voltage selector switch.

For Example: With the voltage selector switch set to "208/120V" 3 Phase position, the voltage displayed on the Gen freq & Hz screen must be within ± 10% of the 208/120 position (188-228 V Line to Line / 108-132 V Line to Neutral).

NOTE: Each time the voltage selector switch is changed from one setting to another, an adjustment will need to be made to the fine voltage using this adjustment screw.

Front Hood Operation

⚠WARNING

Crushing Hazard. Stay clear of hood and lift structure when opening and closing generator hoods. Failure to do so could result in death or serious injury. (000300)

Opening Front Hood

1. See ***Figure 2-8***. Grip the handle located on the upper right side of the front panel.
2. Pull hood latch (A) and tilt hood open until it contacts the bulkhead panel.

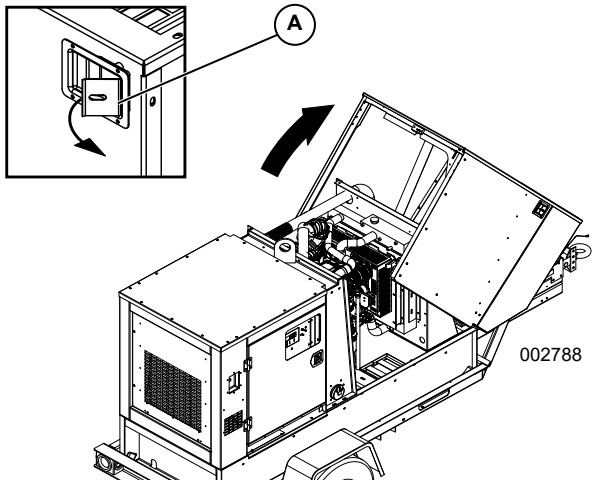


Figure 2-8. Front Hood Operation

Closing Front Hood

1. See ***Figure 2-8***. Verify skid is free of debris and all personnel are clear of unit.
2. Slowly push hood forward and allow it to close firmly to ensure hood latch (A) is engaged.

Verify hood is securely closed by attempting to open without pulling the hood latch.

Rear Hood Operation

⚠WARNING

Crushing Hazard. Stay clear of hood and lift structure when opening and closing generator hoods. Failure to do so could result in death or serious injury. (000300)

Opening Rear Hood

1. Open front hood. See ***Opening Front Hood***.
2. Verify control door is completely closed and secure.
3. See ***Figure 2-9***. Pull lever (A) to release primary hood latch.

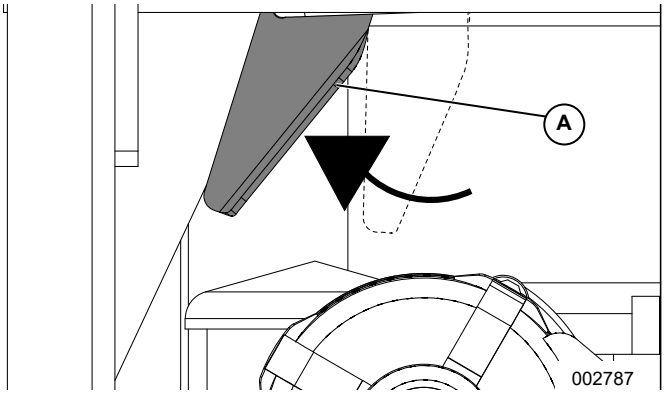


Figure 2-9. Primary Hood Latch

4. See ***Figure 2-10***. Grip lip of emergency stop panel (B) on right side of unit.

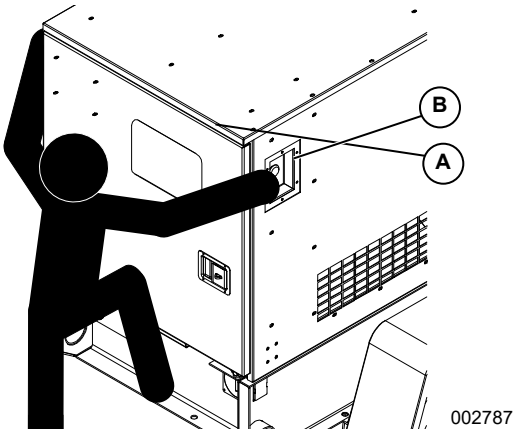


Figure 2-10. Emergency Stop Panel

5. See ***Figure 2-11***. Pull hood latch (C) on left hood side and tilt hood completely open.

NOTE: Travel is limited by two metal guide straps.

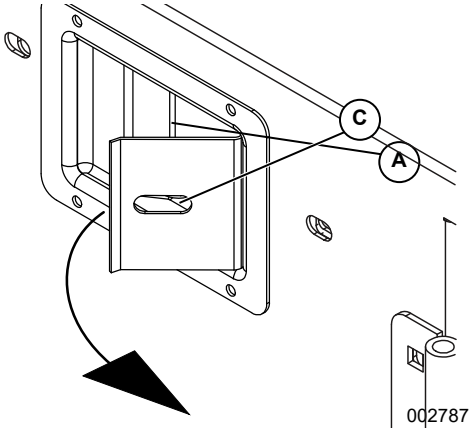


Figure 2-11. Hood latch (left side of hood)

6. See ***Figure 2-12***. Verify red safety link is engaged and undamaged.

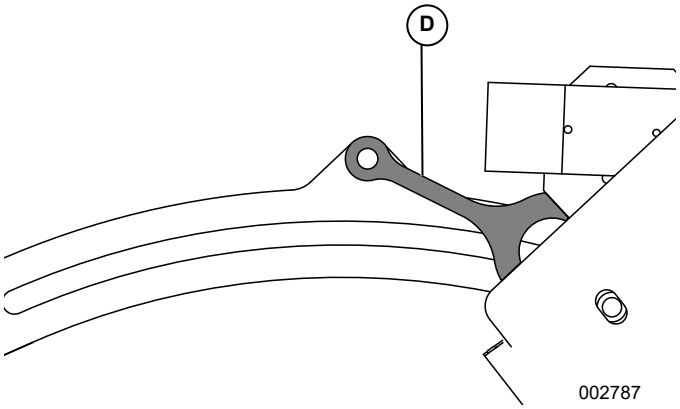


Figure 2-12. Safety Link

Closing Rear Hood

1. Verify skid is free of debris and all personal are clear of unit.
2. Verify control door is completely closed and secure.
3. Slowly push hood forward and allow it to close firmly to ensure hood latches have engaged.
4. Verify hood is securely closed by attempting to open without releasing the hood latches.

Section 3: Operation

Pre-start Checklist

All items in the pre-start checklist must be completed before starting the unit. This checklist applies to both manual and remote starting of the unit.

⚠WARNING

Consult Manual. Read and understand manual completely before using product. Failure to completely understand manual and product could result in death or serious injury. (000100a)

⚠WARNING

Equipment damage. Do not attempt to start or operate a unit in need of repair or scheduled maintenance. Doing so could result in serious injury, death, or equipment failure or damage. (000291)

⚠WARNING

Risk of Fire. Unit must be positioned in a manner that prevents combustible material accumulation underneath. Failure to do so could result in death or serious injury. (000147)

- ❒ Verify all maintenance procedures are up to date.
- ❒ Read and understand *ALL* safety sections at the beginning of this manual.
- ❒ Verify control ON/OFF toggle switch is OFF (O).
- ❒ Verify all circuit breakers are OFF (O).
- ❒ Verify the generator is properly grounded to a good earthen ground per local and NEC regulations.
- ❒ Verify all electrical connections at connection lugs and cam lock receptacles (if equipped) are wired correctly.
- ❒ Verify connection lugs are tight.
- ❒ Check the voltage selector switch and verify it is set to the desired voltage.
- ❒ Verify generator is level.
- ❒ Check for any water inside the unit, on or near the generator. Dry unit before starting.
- ❒ Check oil, coolant and fuel levels and engine battery connections.
- ❒ Check engine fan belt tension and condition.
- ❒ Check engine fan belt guard.
- ❒ Check engine exhaust system for loose or rusted components.
- ❒ Check radiator and surrounding shroud for debris.
- ❒ Verify all generator covers are secure
- ❒ Verify battery disconnect switch is on, if equipped.

Manually Starting Unit

⚠DANGER

Asphyxiation. Running engines produce carbon monoxide, a colorless, odorless, poisonous gas. Carbon monoxide, if not avoided, will result in death or serious injury. (000103)

⚠WARNING

Fire risk. Fuel and vapors are extremely flammable. Do not operate indoors. Doing so could result in death, serious injury, or property or equipment damage. (000281)

1. Move control ON/OFF to CONTROL ON (I).
2. The LCD will quickly display system information and all LEDs will flash.
3. See ***Figure 3-1***. The LCD will indicate MAN mode and Ready. The Ready/Manual LED will be lit.

NOTE: The unit must be in MAN mode with the Ready/Manual LED lit to start the unit.

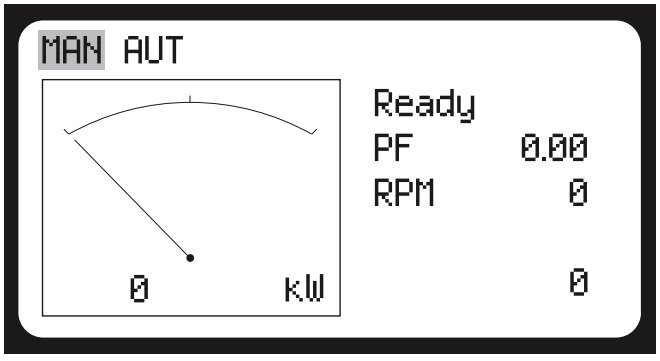


Figure 3-1. Ready/Manual Screen

4. Press ENGINE START. The prestart screen will display (if equipped) and a 20 second countdown will begin.
5. See ***Figure 3-2***. The starting screen will display. The engine will crank and start running.

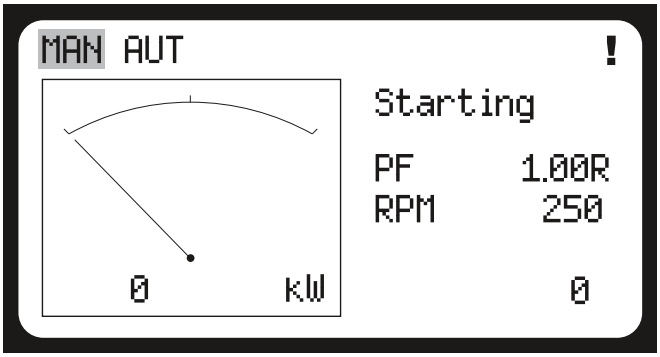


Figure 3-2. Starting Screen

6. See ***Figure 3-4***. The running screen displays

NOTE: It may take a few seconds for the engine to run smoothly and reach its governed operating speed. The 45 second sensing time delay will start to count down.

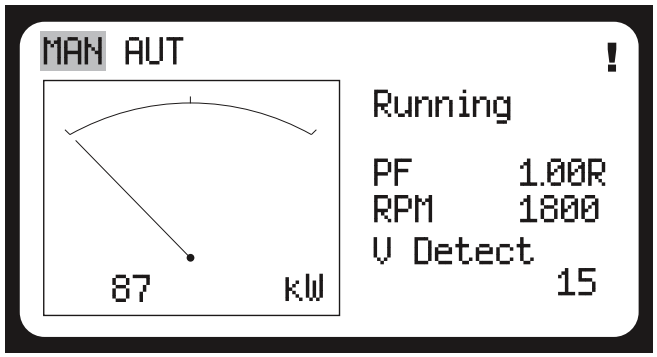


Figure 3-3. Running Screen

7. See ***Figure 3-4***. The LCD window will toggle from the running screen to the generator display screen and then to the engine display screen.

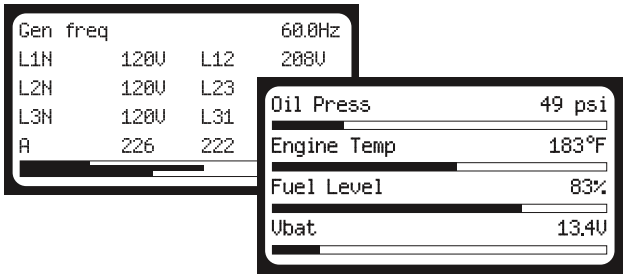


Figure 3-4. Generator Monitoring

8. If the engine does not start after the first attempt, the engine will pause for 15 seconds to allow the starter to cool. The LCD window will show PAUSE. The engine will make two more attempts to start for a total of three crank cycles.
9. Should the engine not start and run within three starting cycles, the display will show SD Start fail. The starting sequence may be repeated after the starter has had a minimum of two minutes to cool. Press the FAULT RESET button to clear the controller. To start the unit, press the ENGINE START button.
10. Once the engine starts it will immediately begin speeding up to a constant 1800 rpm. The engine may hunt or change speeds until operating speed is reached. After a few minutes of operation, the engine will be warmed up and the LCD window will show engine and generator operating parameters. Temperature will be shown as 0 until the engine temperature is approximately 100° F.
11. Check the generator for excessive noise or vibration and any coolant, oil or fuel leaks before applying any loads.
12. Verify the AC output voltage is correct. The output voltage can be fine adjusted by using the fine voltage adjustment screw (rheostat). See ***Generator and Engine Monitoring*** for more information.
13. Verify the frequency (Hz) is correct. With no loads connected to the generator, the frequency should read approximately 60 Hz, depending on the type of engine governing used.
14. If all wiring connections have been made correctly, switch the main circuit breaker to the ON (I) and then add any loads attached to the convenience outlets by switching the respective circuit breaker to ON (I). Expect a slight change in engine sound when a load is applied to the unit.

Auto (Remote) Starting

The AUTO button is used when the generator is started from a location other than the control panel and by using a transfer switch. AUTO (remote start) is the normal setting when the generator is being used as a standby power supply.

NOTE: Before putting the generator in the AUTO mode, review ***Pre-start Checklist*** and ***Manually Starting Unit***.

NOTE: Follow all safety warnings and information on isolating the generator with a transfer switch if the unit is to be used as a standby power supply.

1. Perform a manual start of the generator at least once to verify the engine is operating correctly.
2. If a check of the remote start circuit is desired, remove the wires from the remote start terminal block. Press the AUTO button. The LCD window should highlight AUTO in the upper left corner. Attach a jumper wire (minimum 16 gauge) across the two terminals on the remote start terminal block. This applies a ground to the digital controller to close the starting circuit contacts. The engine should crank, start and run.
3. Remove the jumper wire from the remote start terminal block and the engine will stop. Reconnect any necessary wires from the remote start switch (transfer switch) to the remote start terminal block.
4. Confirm unit is in AUTO mode. The LCD window should display AUTO in the upper left corner.
5. Close the main circuit breaker (set to “ON / I”).
6. Secure the generator by closing and locking all access doors.
7. The generator is now ready for remote starting.

Digital Controller Information Displays, Functions, and Reset

The digital controller monitors generator and engine functions for fault conditions. When a fault condition occurs, the engine automatically shuts down and the LCD displays the fault. To resume operation, the fault condition must be resolved. To reset the controller and resume operation, press the FAULT RESET button

Table 3-1. Digital Controller - Alert Management

No.	Type	Description
1	Sensor Fail (FLS)	Sensor fail is detected when measured value is 6% out of selected characteristic. Sensor fail indicated by ###### symbol instead of measured value.
2	Warning (WRN)	When warning comes up, see list of possible alarms.
3	Shut Down (SD)	When shutdown alarm comes up, digital controller opens outputs GCB CLOSE/OPEN, FUEL SOLENOID, STARTER AND PRE-START to stop engine immediately.

Table 3-2. Generator Operational Status

No.	Engine State	Description
1	After Cool	Engine aftercooling. Cooling pump output is closed
2	Cooling	The unit is cooling before stop.
3	Cranking	Engine is cranking.
4	EmergMan	Emergency Manual gen-set operation.
5	Init	Autotest during controller power on.
6	Loaded	Unit is running at nominal speed and GCB, OPEN/CLOSE is closed.
7	Not Ready	Unit is not ready to start.
8	Pause	Pause between start attempts.
9	Restart	Prestart sequence in process. Prestart output is closed.
10	Ready	Unit is ready to run.
11	Running	Unit is running at nominal speed.
12	Shutdown	Shutdown alarm is activated.
13	Starting	Starting speed reached and idle timer running.
14	Stop	Stop
No.	Electrical State	Description
1	StabiITO	Stabilization Timeout

Table 3-3. Digital Controller (MDC) - List of Possible Alarms/Descriptions

No.	Event Specification	Protection Type	Binary Output Info Available	Description
1	An InIOM SD	SD	YES	Shutdown alarm configurable on the input of IG-IOMGS-PTM.
2	An InIOM Wm	WRN	YES	Warning alarm configurable on the input of IG-IOMGS-PTM.
3	Battery Flat	SD	YES	If controller switches off during starting sequences due to bad battery connection it doesn't try to start again and activates this protection.
4	Binary Input	Configurable	YES	Configurable Warning/Shutdown alarms on the inputs of IL-NT.
5	ChrgAlternFail	WRN	YES	Failure of the alternator for charging battery
6	EmergencyStop	SD	NO	If the input Emergency Stop is opened shutdown is immediately activated.
7	Engine Temp SD	SD	NO	Water temperature is greater than SD Water temp setpoint
8	Engine Temp Wrn	WRN	YES	Water temperature is greater than Wrn Water temp setpoint.
9	Fgen <, >	SD	YES	Generator frequency is out of limits given by Gen >f and Gen <f setpoints.
10	Fuel Level Sd	SD	YES	Fuel level is less than SD Fuel Level setpoint
11	Fuel Level Wrn	WRN	NO	Fuel level is less than Wrn Fuel Level setpoint.
12	GCB Fail	SD	NO	Failure of generator circuit breaker.
13	Igen unbl	SD	NO	Generator current is unbalanced.
14	Low Backup Batt	WRN	NO	RTC backup battery is flat.
15	Oil Press SD	SD	NO	Oil pressure is less than SD Oil press setpoint.
16	Oil Press Wrn	WRN	YES	Oil pressure is less than Wrn Oil press setpoint.
17	Overload	SD	YES	Load is greater than value given by Overload setpoint.
18	Overspeed	SD	YES	Protection comes active if speed is greater than Overspeed setpoint.
19	ParamFail	None	NO	Wrong checksum of parameters. Happens typically after downloading new firmware or changing parameter. Controller stays in INIT mode.Verify all parameters write at least one new parameter.
20	PickupFault	SD	NO	Failure of the magntic pick-up sensor for speed measurement.
21	Sd IOM fail	SD	NO	Shutdown alarm in case of loss connection to IG-IOMGS-PTM module.
22	SprinklActive	WRN	NO	Protection is active if the output Sprinkler is closed.
23	Start failed	SD	YES	Gen-set start failed.
24	Stop fail	SD	YES	Gen-set stop failed.

No.	Event Specification	Protection Type	Binary Output Info Available	Description
25	Ubat	WRN	YES	Battery voltage out of limits given by Batt Overvolt and Batt Undervolt setpoint.
26	Underspeed	SD	YES	During starting of the engine when RPM reaches the value of starting RPM set-point the starter is switched off and the speed of the engine can drop under Start RPM again. Than the Underspeed protection becomes active. Protection evaluation starts 5 sec.
27	Vgen <,>	SD	YES	Generator voltage is out of limits given by Gen ,V and Gen > V.
28	Vgen unbal	SD	NO	Generator voltage is unbalanced more than the value of Volt unbal setpoint.
29	Wm ECU Alarm	WRN	NO	ECU alarm list is not empty.
30	Wm RA15 fail	WRN	NO	Warning alarm in case of lost connection to IGL-RA15 modlue.
31	WmServiceTime	WRN	NO	The period for servicing is set by Next ServTime setpoint. The protection comes active if the running hours of the engine reach this value.

MDC Controller - History

The Mobile Digital Controller (MDC) stores a record of each important event into the history file of the controller. The history file seats 118 records. When the history file is full, the oldest records are removed.

Table 3-4. MDC Controller - History

No.	Record Structure Abbreviation	Historical Value
1	AIM1	IG-IOM, IGS-PTM Analog Input 1 value (when configured IG-IOM, IGS-PTM)
2	AIM2	IG-IOM, IGS-PTM Analog Input 2 value (when configured IG-IOM, IGS-PTM)
3	AIM3	IG-IOM, IGS-PTM Analog Input 3 value (when configured IG-IOM, IGS-PTM)
4	AIM4	IG-IOM, IGS-PTM Analog Input 4 value (when configured IG-IOM, IGS-PTM)
5	BIM	IG-IOM, IGS-PTM Binary inputs (when configured IG-IOM, IGS-PTM)
6	BIN	Binary inputs IL-NT
7	BOM	IG-IOM, IGS-PTM Binary inputs (when configured IG-IOM, IGS-PTM)
8	BOUT	Binary inputs IL-NT
9	Date	Date of historical event in format DD/MM/YY
10	EngT	IL-NT Analog input 2 value (default Water temperature)
11	FC	ECU alarm FailureCode
12	FLvl	IL-NT Analog input 3 value (default Fuel level)
13	FMI	ECUalarm Failure Mode Identifier
14	Gfg	Generator frequency
15	IG1	Generator current L1
16	IG2	Generator current L2
17	IG3	Generator current L3
18	LChr	Character of the load
19	Num	Number of historical event
20	OilP	IL-NT Analog input 1 value (default Oil pressure)
21	PF	Generator PF
22	Pwr	Generator active power
23	Reason	Event specification
24	RPM	Engine Speed
25	Time	Time of historical event in format: HH:MM:SS
26	Ubat	Battery volage
27	Vg1	Generator voltage L1
28	Vg2	Generator voltage L2
29	Vg3	Generator voltage L3

MMG Engine Controller

The Mobile Digital Controller (MDC) constantly monitors vital engine functions for a number of operation, alarm, and fault conditions. When an operation, alarm or fault condition occurs, the LCD display will alert the operator either visually or audibly. Press ▲ on the diagnostic keypad to view the alarm list. This will allow you to view a description of the fault.

Adjusting Display Back Lighting

The LCD window brightness may be adjusted whenever the Mobile Digital Controller (MDC) is powered up.

NOTE: Anytime an * is displayed on the LCD window, the text or set point cannot be changed without the use of a password. Contact Generac Mobile Products Technical Support for assistance.

1. Press and hold ENTER then press ▲ or ▼ on the diagnostics keypad to adjust brightness.
2. Release ENTER when the desired brightness is attained.

Resetting Time to Service Reminder

The Mobile Digital Controller (MDC) will display the message WrnServiceTime when the unit is due for maintenance or service. The maintenance or service interval is set at 250 hours of engine running time. Once the unit has been serviced, the ServiceTime reminder needs to be reset to the 250 hour interval.

1. With the unit shut down, power up the controller with the CONTROL ON/OFF toggle switch. The initialization screen will be displayed. The controller will toggle automatically to the ready display screen.
2. Press ▲. The alarm list display screen will appear. The next screen will display lines of text; starting with the word “Password”, then “Basic Settings”, “Engine Params”, “Engine Protect”, etc.
3. Press ▼ to move the cursor down to the engine protect line of text.
4. Press ENTER. NextServTime will appear at the top left of the display screen. The current service time hour setting (250) will be one line below on the right side.
5. Press ENTER. The current run time in hours will now appear on the left side of the display screen, directly under NextServTime.
6. Press the ▲ button and reset the current run time hour setting to 250.
7. Press ENTER to save the current run time hour setting.
8. Move the “CONTROL ON / I” toggle switch to the “CONTROL OFF / O” position.

Troubleshooting Automatic Shut Down Conditions

⚠WARNING

Risk of Burn. Allow the engine to cool before performing the following procedure. Failure to do so could result in serious injury.

(000560)

Low Fuel Level Shut Down

1. Check fuel level on the LCD display.
2. Check for fuel tank leaks. The fuel tank will not run dry under normal circumstances. The engine controller will shut the engine down when there is five percent of fuel remaining in the tank. This is done to keep the fuel lines from running dry.
3. If the fuel level is good and no leaks are found, check the fuel level sender and connecting wiring for damage. To check for continuity between sender and engine controller, remove the appropriate bolts from control panel to access the inside of the control box. Consult the appropriate DC wiring diagram for the proper path between the engine controller and the fuel level sender.

Low Oil Pressure Shut Down

1. Check engine oil level with the dipstick. The controller will shut down the engine when oil pressure is less than 20 psi. Add oil if required.
2. Visually inspect the engine for oil leaks.
3. If oil level is good, restart the unit and verify the loss of oil pressure. Shut the engine down immediately if the oil pressure value does not read five psi within five seconds.
4. Check the oil pressure sender on the engine block and connecting wiring for damage. To check for continuity between sender and engine controller, remove the appropriate bolts from the control panel to access the inside of the control box. Consult the appropriate DC wiring diagram for the proper path between engine controller and pressure sender.
5. If the oil level, pressure sender and wiring are good, the oil loss may be caused by engine failure. Consult the engine OPERATION AND MAINTENANCE MANUAL for additional information on excessive oil consumption.

Low Coolant Level Shut Down

1. Allow the engine to cool!
2. Check the coolant level in the radiator. To access the radiator cap, you open the front hood. Add coolant until it is 3/4” below the filler neck. Secure the radiator cap back into its original position.
3. Inspect coolant hoses, engine block and water pump for visible leaks.

High Coolant Temperature Shut Down

1. Check coolant level in overflow jug.
2. Restart engine and read coolant temperature to verify high coolant temperature shut down. The engine will stop if coolant temperature is 230°F or more.
3. Allow engine to cool. Add coolant to overflow jug if it is low and then check coolant level in radiator. To access radiator cap, open the front hood. Add coolant until it is 3/4” below filler neck. Secure radiator cap back into its original position.
4. Check radiator shroud and ducting for blockage and remove any foreign matter.
5. Check water pump drive belt for tension.
6. Check the coolant temperature sender on the engine block and connecting wiring for damage. To check for continuity between the sender and the engine controller, remove the appropriate bolts from the control panel to access the inside of the control box. Consult the appropriate DC wiring diagram for the proper path between the engine controller and the temperature sender.
7. If the sender and wiring are good and no other problems are found, remove the load on the generator and restart the engine. Observe the coolant temperature and shut the engine down immediately if it starts to overheat. Consult the engine OPERATION AND MAINTENANCE MANUAL for additional information on engine overheating.

Overcrank Shut Down

1. Check the fuel level in tank.
2. Check for proper operation of the fuel pump.
3. Check air filter for blockage.
4. If the engine will not start, consult the engine operation and maintenance manual.

Overspeed or Underspeed Shut Down

1. Disconnect all loads and restart generator. Read the frequency (Hz) on the display. With no loads on the generator, the frequency should read 60.0 Hz.
2. If the frequency is above or below 60.0 Hz, the engine speed will have to be adjusted. See the engine manual for throttle adjustments on mechanical governed units and see the electronic governor manual for electronically controlled units.

Generator Output Connections

⚠DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage.

(000237)

⚠DANGER

Electrocution. Do not disable or modify the connection box door safety switch. Doing so will result in death or serious injury.

(000157)

⚠DANGER

Electrocution. Before connections are made to the unit, verify the main circuit breaker and battery disconnect switch are OFF. Failure to do so will result in death or serious injury. (000156)

⚠WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage.

(000155a)

IMPORTANT NOTE: The installation must be in compliance with the national electrical code (NEC), state, and local regulations.

IMPORTANT NOTE: The unit must be connected to a good earthen ground for proper operating safety. The ground connection must be in compliance with the national electrical code (NEC), state, and local regulations.

Generator Output Connections

See ***Figure 3-6***. The unit is equipped with connection lugs (A) and ground connection (B). The lugs provide connection points to attach external loads to the generator. A decal on the inside of the connection lug door details the proper connections for selected voltages.

Use a hex-wrench to tighten cable connections (A). The lug door is equipped with safety interlock switches that will trip the main circuit breaker and disable the voltage regulator, dropping the operator output to residual voltage, if the door is opened while the unit is operating.

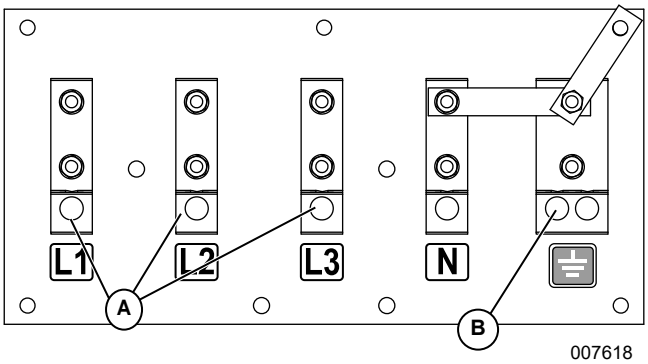


Figure 3-5. Generator Connection Lugs

Generator Cam Lock Connections (If Equipped)

See ***Figure 3-6***. The unit may be equipped with cam lock connections (A) and ground connection (B) located behind the lug door next to the customer convenience outlets. These receptacles provide connection points to attach external loads to the generator. A decal on the inside of the connection lug door details the proper connections for selected voltages.

Connections should be made by plugging power cables equipped with series 16 taper nose 400A, 600V cam lock plugs into the cam lock receptacles. Secure the connection by rotating the plug a 1/4 turn to the right. The connection lug door is equipped with safety interlock switches that will trip the main circuit breaker and disable the voltage regulator, dropping the operator output to residual voltage, if the door is opened while the unit is operating.

L1	Black
L2	Red
L3	Blue
N (Neutral)	White
G (Ground)	Green

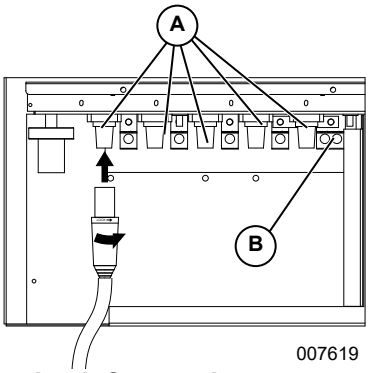


Figure 3-6. Cam Lock Connections

Using Voltage Selector Switch

⚠WARNING

Electric Shock. Never change the voltage selector switch while the engine is running or the controller is on. Doing so could result in death, serious injury or equipment damage. (000302)

⚠DANGER

Electrocution. Do not disable or modify the connection box door safety switch. Doing so will result in death or serious injury. (000157)

NOTE: The connection lug door is equipped with safety interlock switches that will trip the main circuit breaker and disable the voltage regulator if the door is opened while the unit is running.

The voltage selector switch is located under the control panel. The selector switch mechanically changes the connections between the generator output leads and the connection lugs or optional cam lock connectors. Voltage ranges are selected by rotating the switch handle to the desired voltage.

3-Position Voltage Selector Switch Ranges

When the voltage selector switch is in position for 480/277V 3Ø, voltage at the two GFCI duplex convenience outlets is 139 Volts and voltage at the two twist-lock outlets is 240/139 Volts. When the voltage selector switch is in position for 208/120V 3Ø, voltage at the two twist-lock outlets and the two GFCI duplex convenience outlets is 208/120 Volts.

4-Position Voltage Selector Switch Ranges (if equipped)

NOTE: The following applies to units without a convenience outlet buck transformer.

When the voltage selector switch is in position for 480/277V 3Ø, voltage at the two GFCI duplex convenience outlets is 139 Volts, and voltage at the two twist-lock convenience outlets is 240/139 Volts. When the voltage selector switch is in position for 208/120V 3Ø, voltage at the two GFCI duplex convenience outlets is 120 Volts, and voltage at the two twist-lock convenience outlets is 208/120 Volts. When the voltage selector switch is in position for 120/240 3Ø (DELTA), voltage at the two GFCI duplex convenience outlets is 120 Volts, and the two **TWIST-LOCK OUTLETS SHOULD NOT BE USED**. When the voltage selector switch is in position for 120/240V 1Ø, voltage at the two GFCI duplex convenience outlets is 120 Volts, and voltage at the two twist-lock outlets is 120/240 Volts.

Selector Switch Operation

1. Shut down unit. See ***Shutting Down the Unit***.
2. Remove padlock from voltage selector switch lockout device.
3. Move voltage selector switch to desired voltage.
4. Replace and lock padlock on voltage selector switch lockout device.
5. Start unit. See ***Manually Starting Unit*** or ***Auto (Remote) Starting*** .

Emergency Stop Switch

⚠CAUTION

Equipment Damage. The emergency stop switch is not to be used to power down the unit under normal operating circumstances. Doing so will result in equipment damage. (000246)

See ***Figure 2-3***. The unit is equipped with one emergency stop switch. The red button is clearly labeled EMERGENCY STOP. The switch can be accessed and activated with all doors closed and locked.

Activate the emergency stop switch by pushing the button in until it locks down. This trips the main circuit breaker which then opens the contact, disconnecting the load to the connection lugs. This will also open the fuel circuit, shutting down the engine. The emergency stop fault will be displayed on the control panel. The switch will remain closed until it is pulled out.

Main Circuit Breaker

The main circuit breaker is located on the main control panel. See ***Figure 2-3***. When the breaker is OFF (O), power is interrupted to the connection lugs, optional cam lock receptacles, and generator. The breaker may be switched ON (I) once the connections have been made to the connection lugs or the optional cam lock receptacles, and the unit has been started and allowed to reach normal operating temperature.

NOTE: Main circuit breaker can not be turned on until controller reads GENERATOR AVAILABLE.

Reasons the main circuit breaker may trip:

- Overload of the generator circuits to the connection lugs or the optional cam lock receptacles.
- The door covering the connection lugs or the optional cam lock receptacles is opened.
- If the emergency stop switch is activated.

Verify any problems that cause the main circuit breaker to trip are corrected before returning the switch to ON (I).

NOTE: The main circuit breaker only interrupts power to the connection lugs and the optional cam lock receptacles. The customer convenience receptacles have power even if the main circuit breaker is OFF (O). Use the individual circuit breakers located near each receptacle to disconnect power to these receptacles.

Voltage Regulator

The electronic voltage regulator controls the output of the generator by regulating the current into the exciter field. The regulator has three screwdriver adjustable potentiometers that may be adjusted for voltage, stability and voltage roll-off (U/F). The voltage regulator on your unit is adjusted before shipment from the factory. Contact an ASD for additional information before attempting to adjust the voltage regulator.

Customer Convenience Receptacles

⚠CAUTION

Equipment Damage. Verify voltage application before making changes to factory settings. Incorrect voltage applied to a load could result in equipment damage. (000303)

See ***Figure 2-3***. The generator is equipped with four convenience outlets. The large outlets are 240/120 VAC twist-lock receptacles rated at 50A each. The smaller outlets are 120 VAC duplex receptacles rated at 20A each with ground fault interrupt (GFCI) protection. These receptacles are not routed through the main circuit breaker. Each receptacle has its own circuit breaker, located directly above the receptacle panel, with the breaker sized to the maximum rating of the corresponding outlet.

NOTE: Power to the receptacles is available any time the generator is running, even if the main circuit breaker is OFF (O). Verify equipment connected to the receptacles is turned OFF before turning the breakers ON (I).

Derating for Altitude

All generator sets are subject to derating for altitude and temperature; this reduces available power for operation of tools and accessories connected to the auxiliary outlets. Typical reductions in performance are 2-4% for every 1000 ft. (305 meters) of elevation and 1% per 10º F (3-5º C) increase in ambient air temperature over 72º F (22.2º C).

Always park the unit in a safe location for elevated exhaust temperatures and check for adequate fuel level before beginning the exhaust after-treatment cleaning process. The cleaning cycle can take over 45 minutes. Cleaning is complete when the regeneration indicator remains off.

Remote Start Terminal Block

⚠DANGER

Loss of life. Property damage. Installation must always comply with applicable codes, standards, laws and regulations. Failure to do so will result in death or serious injury.

(000190)

⚠DANGER

Electrical backfeed. Use only approved switchgear to isolate generator from the normal power source. Failure to do so will result in death, serious injury, and equipment damage.

(000237)

⚠WARNING

Electric shock. Only a trained and licensed electrician should perform wiring and connections to unit. Failure to follow proper installation requirements could result in death, serious injury, and equipment or property damage.

(000155a)

⚠WARNING

Electric shock. Phase rotation must be compatible. Incompatible phase rotation could result in death, serious injury, or equipment damage.

(000226b)

See ***Figure 3-7***. The remote start terminal block is located between the two 240/120V VAC twist-lock outlets (A). It provides a connection for installation of a remote start switch which allows the generator to be started by a remote dry-contact closure switch**.**

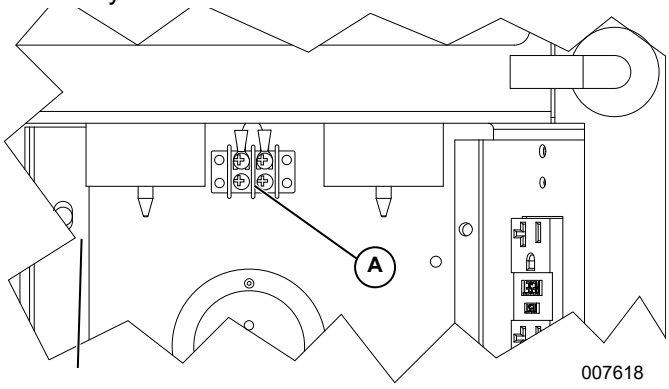


Figure 3-7. Generator Connection Lugs

Before pressing the AUTO button, verify contacts on any remote switch linked to the generator are OPEN. If the contacts on a remote switch are closed, the generator will crank and start when AUTO is selected. Attach the switch leads to the two unused terminals on the generator's remote start block.

When the unit is used as a standby power supply, it must be equipped with a transfer switch that isolates it from the utility's distribution system. A transfer switch is designed to transfer electrical loads from the normal power source (utility) to the emergency power source (generator) when normal voltage falls below a prescribed level. The transfer switch automatically returns the load back to the normal source when power is restored back to operating levels.

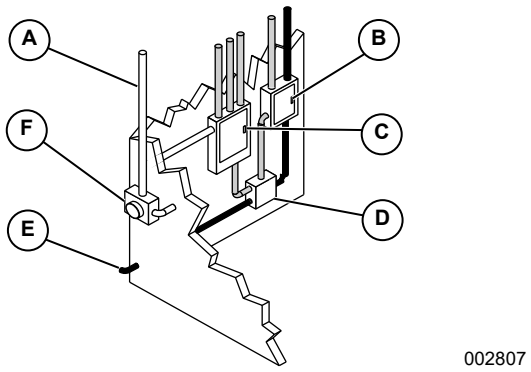


Figure 3-8. Transfer Switch Operation

A	Incoming utility power
B	Emergency distribution panel (generator power)
C	Main distribution panel (utility power)
D	Transfer switch
E	Power from generator
F	Utility meter
WHITE	Incoming utility power
GRAY	Normal utility power circuit
BLACK	Emergency generator power circuit

Shutting Down the Unit

Prior to shutting down the unit, check with personnel using power supplied by the generator and let them know the power is going to be turned off. Verify the power shut down will not create any hazards by accidentally turning off equipment that needs to be kept on (pumps, compressors, lights, etc.).

1. Remove all loads from the generator by opening all circuit breakers (turn OFF (O)).
2. Allow engine to run for approximately five minutes to allow it to cool down.
3. Press the engine STOP (O) button on the controller. This will result in the generator going into the shutdown cycle and starting a 15 second shutdown timer. If the unit does not shut down within 15 seconds, a stop fail alarm will be displayed on the display screen.
4. Move the "CONTROL ON/OFF" toggle switch to the "CONTROL OFF / O" position

Towing the Unit

⚠WARNING

Personal injury. Trailer must be securely coupled to the hitch with the chains correctly attached. Uncoupled or unchained towing could result in death or serious injury.

(000233a)

⚠WARNING

Personal injury. Do not operate unit during transport. Doing so could result in death, serious injury, or property damage.

(000231a)

⚠WARNING

Crushing hazard. Verify unit is properly secured and on level ground. An unsecured unit can suddenly roll or move, causing death or serious injury.

(000234a)

⚠WARNING

Property or Equipment Damage. Tighten wheel lug nuts after first 50 miles to factory specifications. Failure to do so could result in death, serious injury, property or equipment damage.

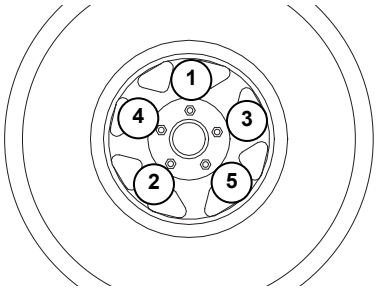
(000235)

IMPORTANT NOTE: Maximum recommended speed for highway towing is 45 mph (72 km/h). Recommended off-road towing speed is 10 mph (16 km/h).

1. Verify engine is OFF.
2. Use tongue jack to raise or lower trailer ttowing vehicle hitch. Lock the hitch coupling and attach safety chains or cables to the vehicle. Release the jack locking pin and rotate jack into travel position. Verify locking pin snaps into place.

NOTE: A film of grease on the coupler will extend coupler life and eliminate squeaking. Wipe the coupler clean and apply fresh grease each time the unit is towed.

3. Lubricate grease fittings located on leveling jacks to verify proper operation of the jacks. See ***Jack Maintenance***. For maintenance interval information, see ***Basic Maintenance Schedule - Engine***.
4. Connect trailer wiring to the tow vehicle. Check for proper operation of the directional and brake lights.
5. Verify all doors and hoods are properly latched.
6. Check for proper inflation of the trailer tires. Proper inflation is specified in ***Specifications***.
7. Check wheel lugs. Tighten or replace any loose or missing lugs. If a tire has been re-moved for axle service or replaced, tighten the lugs in the order shown in ***Figure 3-9*** to the following specifications



a. Start all lug nuts by hand.
b. First pass tighten to 20–25 ft-lbs (27–33 Nm).
c. Second pass tighten to 50–60 ft-lbs (67–81 Nm).
d. Third pass tighten to 90–120 ft-lbs (122–162 Nm).

Figure 3-9. Lug Sequence

Lifting the Unit

⚠WARNING

Personal injury. Failure to properly connect lifting cables, chains, or straps could result in death, serious injury, or property damage.

(000346)

⚠WARNING

Personal Injury. Do not use lifting eye if there are signs of damage or corrosion. Doing socould result in death, serious injury, or property damage.

(000433)

⚠WARNING

Personal Injury. Do not use lifting eye other than as directed. Doing so could result in death, serious injury, or property damage.

(000434)

IMPORTANT NOTE: Always remain aware of people and objects around area when moving or lifting the unit.

1. Verify lifting equipment is in good condition and has sufficient capacity. For weights, see ***Specifications***.
2. Close and lock all hoods and doors.
3. See ***Figure 3-10***. Attach any slings, chains or hooks directly to the central lift point (A).

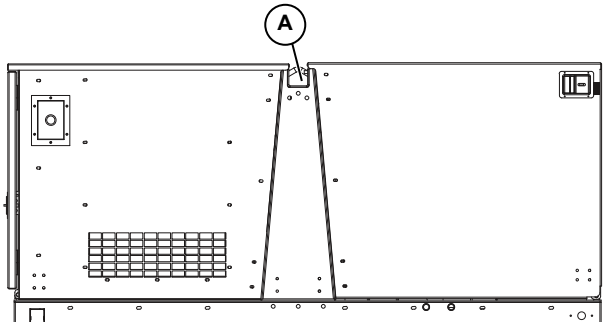


Figure 3-10. Lifting Points

Section 4: Maintenance

Emissions Information

For emissions information, see the OEM engine manual.

Maintenance

Regular maintenance will improve performance and extend engine/equipment life. Generac Mobile Products, LLC. recommends that all maintenance work be performed by a Generac Mobile Products Authorized Service Dealer (GMP ASD). Regular maintenance, replacement, or repair of the emissions control devices and systems may be performed by any repair shop or person of the owner's choosing. To obtain emissions control warranty service free of charge, the work must be performed by a GMP ASD. See the emissions warranty.

Daily Walk Around Inspection

⚠CAUTION

Equipment Damage. Failure to perform a daily inspection could result in damage to the unit.

(000306)

Inspect for conditions that could hinder performance or safety, such as (but not limited to) oil, coolant, and fuel leakage, blocked vents, loose or missing hardware, and improper electrical connections.

Inspect the fan belt for signs of cracking, fraying, and stretching, and verify the belt is properly seated in the pulley grooves. Replace the belt according to the manufacturer's recommendations.

NOTE: At the 500 hour or 12 month service interval, it is recommended that the belt be removed and checked for wear. While the belt is removed, inspect pulleys and bearings. Rotate and feel for hard turning or unusual sounds. Contact the engine manufacturer if pulleys or bearings need replacement.

General Maintenance

Poorly maintained equipment can become a safety hazard. Periodic maintenance and occasional repairs are necessary for equipment to operate safely and properly over a long period of time. Never perform any routine service (oil and oil filter changes, cleaning, etc.) unless all electrical components are shut off. Before servicing the unit, always follow the instructions listed below.

- Verify control power switch is turned OFF (O).
- Verify circuit breakers are turned OFF (O).
- Activate (push in) the emergency stop switch.
- Disconnect the negative (-) terminal on the battery.
- Attach a DO NOT USE sign to the control panel.
- Do not wash the unit with a high pressure hose or with any kind of power washer.
- Do not wash the engine block or fuel tank with a power washer or steam cleaner. Water may enter the cabinet and collect in the generator windings or other electrical parts, causing damage.
- Inspect for water inside the cabinet and generator before each use if the unit is stored outside. If wet, dry the unit thoroughly before starting.
- Inspect condition of electrical cords. **DO NOT** use the unit if insulation is cut or worn through.
- Verify the condition of the air filter by viewing the vacuum draw level on the filter minder gauge. Replace the air filter when the yellow center bar reaches the red section on the gauge (20 in. H_2O).
- Inspect wheel lugs. See ***Derating for Altitude***.
- Inspect wheel bearings. See ***Trailer Wheel Bearings***.
- Inspect the wheel bearings for unusual wear.
- Inspect coolant level daily. See engine operator's manual for coolant recommendations and proper mixture.
  - Visually inspect the level in the coolant overflow tank located near the radiator.
  - Normal operating level is between the FULL and ADD markings on the overflow jug.
  - When engine is stopped and completely cool, coolant may be added directly to the coolant overflow container.
- Check the oil level daily. See the engine operator's manual for the proper viscosity grade of oil, including special operating conditions such as a change in season or climate.
  - **DO NOT** start the unit if the engine oil level is below the add mark on the dipstick.
  - Normal operating level is in the cross-hatch pattern between FULL and ADD on the dipstick.
  - Add oil only if oil level is below ADD mark on the bottom of the cross-hatch pattern on the dipstick.
  - **DO NOT OVERFILL** the crankcase.
- Verify the fuel level.
- Verify the remote switch is off and tagged if the unit is connected to a remote start or transfer switch.

NOTE: If the engine was run out of fuel, or the fuel tank was drained, it may be necessary to purge the fuel lines. See the engine operator's manual supplied with the unit for more information.

Basic Maintenance Schedule - Engine

See the original equipment manufacturer's operating manual for a complete list of maintenance requirements. Failure to comply with the procedures as described in the engine operator's manual will nullify the warranty, decrease performance, and cause equipment damage or premature equipment failure. Maintenance records may be required to complete a warranty request.

NOTE: Refer to the engine operator's manual for additional maintenance information.

Table 4-1. Basic Maintenance Schedule - Engine

ITEM	DAILY	50 HRS.	250 HRS.	500 HRS.	1000 HRS.	ANNUALLY
Check engine oil level	♦					
Check air cleaner and filter minder gauge*	♦					
Check engine coolant level	♦					
Visual walk around inspection	♦					
Check fuel filter		♦				
Service battery			♦			
Inspect radiator for blockage, clean as necessary			♦			
Change engine oil and replace filter**			♦			
Replace fuel filter element			♦			
Inspect oil vapor recirculation filter (if equipped)			♦			
Check air intake hoses, connections and system				♦		
Check automatic belt tensioner and belt wear				♦		
Check cooling system				♦		
Perform coolant solution analysis				♦		
Replace oil vapor recirculation filter (if equipped)					♦	
Pressure test cooling system					♦	
Flush cooling system***					♦	
Check and adjust engine valve clearance					♦	
Check generator drive plate torque						♦

* *Replace primary air cleaner when restriction indicator shows a vacuum of 25 in. H_2O.*

** *Change the oil and oil filter after the first 100 hours, then every 250 hours.*

*** *If engine manufacturer's recommended coolant is used, the flushing interval may be extended. See engine OPERATION AND MAINTENANCE MANUAL.*

**** *Check the torque of the generator drive plate bolts after the first 250 hours of operation, then annually.*

NOTE: The EPA final Tier 4 Isuzu engines have an engine break-in duration that will prohibit the unit from providing rated standby power upon factory delivery. The unit is tested at the factory and is initially capable of a prime standby power output. The engine performance will increase to 95% of full rated power during the first 20 hours of loaded operation. The unit will provide full power after the complete engine break-in period of 70 hours of loaded operation.

Operate the engine at heavy loads (60–90% of maximum) as much as possible. If the engine has spent significant time at idle, constant speed(s), or light load, or if makeup oil is required, a longer break in period may be needed. Refer to the engine operator's manual for a full description of necessary procedures on the addition of break-in oil and extension of the break-in period.

Engine Break-In Requirements

NOTE: During the first 20 hours of operation, avoid long periods of no load or sustained maximum load operation. If the generator is to run for longer than five minutes without a load, shut the generator down.

The engine is supplied with engine break-in oil from the factory. Extra care during the first 100 hours of engine operation will result in better performance and longer engine life. **DO NOT** exceed 100 hours of operation with the break-in oil. Operate the engine at heavy loads (60-90% of maximum) as much as possible. If the engine has spent significant time at idle, constant speed(s) and/or light load or if makeup oil is required, a longer break in period may be needed. Consult the engine operation and maintenance manual for a full description of necessary procedures on the addition of oil and extension of the break-in period.

Belt Tensioners

Isuzu engines use two types of belt tensioners: manual and automatic. Adjust the belt using the manual tensioner according to the manufacturer's specifications. The automatic tensioner cannot be adjusted or repaired and is designed to maintain proper tension over the belt's life. Units with an automatic belt tensioner must be inspected according to the manufacturer's specifications.

Exhaust Filter Service Requirements

⚠WARNING

Hazardous Material. Only an authorized engine service dealer should remove, handle and dispose of Diesel Particulate Filter (DPF) ash. Failure to dispose of DPF ash properly could result in serious injury and environmental damage. (000307)

The exhaust filter system contains a Diesel Particulate Filter (DPF). Over time, the DPF will require professional servicing to remove ash buildup. The expected service interval will be at least 3,000 or 4,500 hours, based on engine power and operating conditions. Actual service should take place when the indicator light appears on the controller. The DPF should be cleaned or replaced by an authorized service provider only.

To avoid buildup of diesel particulates or soot in the exhaust filter system:

- Utilize the Automatic Exhaust Filter Cleaning mode.
- Avoid unnecessary idling.
- Use proper engine oil. See the engine operator's manual.
- Use only ultra low sulfur diesel fuel. See the engine operator's manual.
- Do not run with less than 30% of a full load.

Checking Generator Drive Plate Torque

1. Disconnect battery.
2. Remove generator fan guard.
3. Tighten each of the drive plate bolts to the torque shown in ***Table 4-2***.

Table 4-2. Drive Plate Torque Values

Unit	ft-lbs (Nm)
MMG25FHI	36 (40)
MMG45FHK	41 (54)

4. Install generator fan guard.
5. Connect battery.

Jack Maintenance

The following procedures should be performed annually.

Side-Wind Models

- The jack gearing and bushings must be kept lubricated. Apply a small amount of automotive grease to the internal gearing by removing the jack cover, or if equipped, use a needle nose applicator or standard grease gun on the lubrication point on the side of the jack near the crank. Rotate the jack handle to distribute the grease evenly.
- A lightweight oil must be applied to the handle unit at both sides of the tube.
- If equipped, the axle bolt and nut assembly of the caster wheel must be lubricated with lightweight oil.

Top-Wind Models

- Apply a lightweight oil to the screw stem.

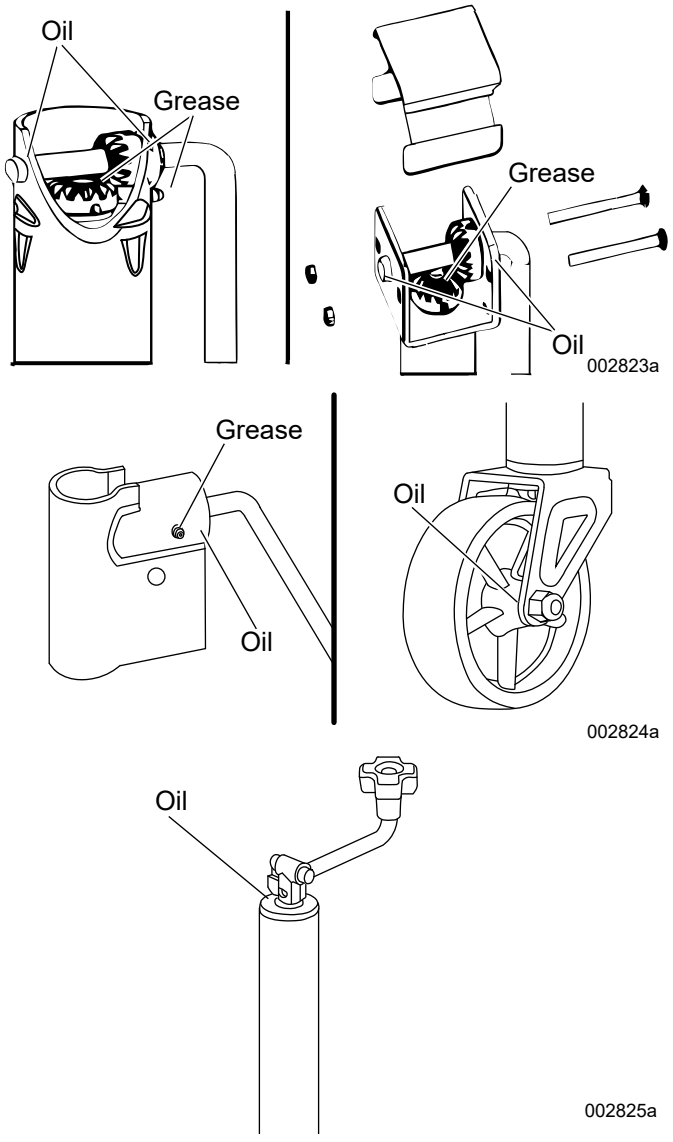


Figure 4-1. Lubrication Points

Trailer Wheel Bearings

The trailer axles are equipped with a grease fitting to allow lubrication of the wheel bearings without needing to disassemble the axle hub. To lubricate the axle bearings, remove the small rubber plug on the grease cap, attach a standard grease gun fitting to the grease fitting, and pump grease into the fitting until new grease is visible around the nozzle of the grease gun. Use only a high quality grease made specifically for lubrication of wheel bearings. Wipe any excess grease from the hub with a clean cloth and replace the rubber plug when finished. The minimum recommended lubrication is every 12 months or 12,000 miles (19,312 km). More frequent lubrication may be required under extremely dusty or damp operating conditions.

Auxiliary Fuel Tank (if equipped)

The auxiliary fuel tank option is designed so the unit can run from an external fuel tank. The unit is still programed to shut down when the internal tank's fuel level drops below five percent. In order for the unit to run off of an auxiliary tank, the fuel level in the internal tank must remain over five percent. To operate the unit using an auxiliary fuel tank, use the following procedure:

1. Shut down the unit and check that the level of fuel in the tank is above five percent.
2. Attach the auxiliary fuel tank's fuel lines to the auxiliary fuel inlet and auxiliary fuel outlet fittings on the unit.
3. Open the auxiliary fuel inlet and auxiliary fuel outlet valves located above the fuel fill cap behind the lift structure

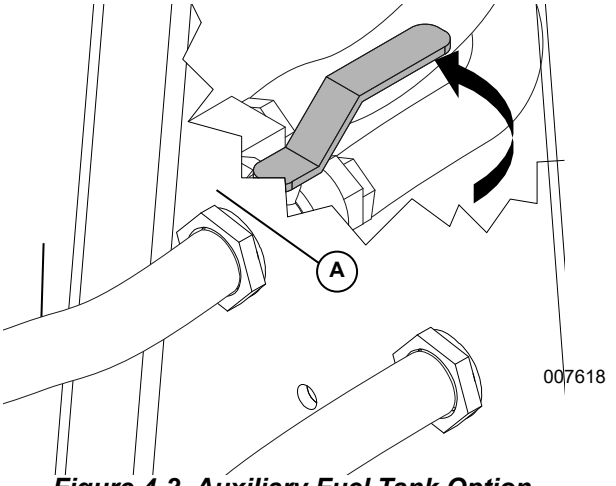


Figure 4-2. Auxiliary Fuel Tank Option

Fuel Transfer Pump (if equipped)

The fuel transfer pump option allows the fuel tank to be refilled from an external bulk fuel source. When the fuel transfer switch is on, anytime the fuel level drops below 15% the fuel transfer pump will begin pumping fuel from an external bulk fuel source into the fuel tank on the unit. The fuel transfer pump will shut off when the fuel level of the internal tank reaches 90%. The pump will also be monitored to ensure a certain percentage increase in fuel level over a given period of time to prevent the pump from running dry. To operate the fuel transfer system, use the following procedure:

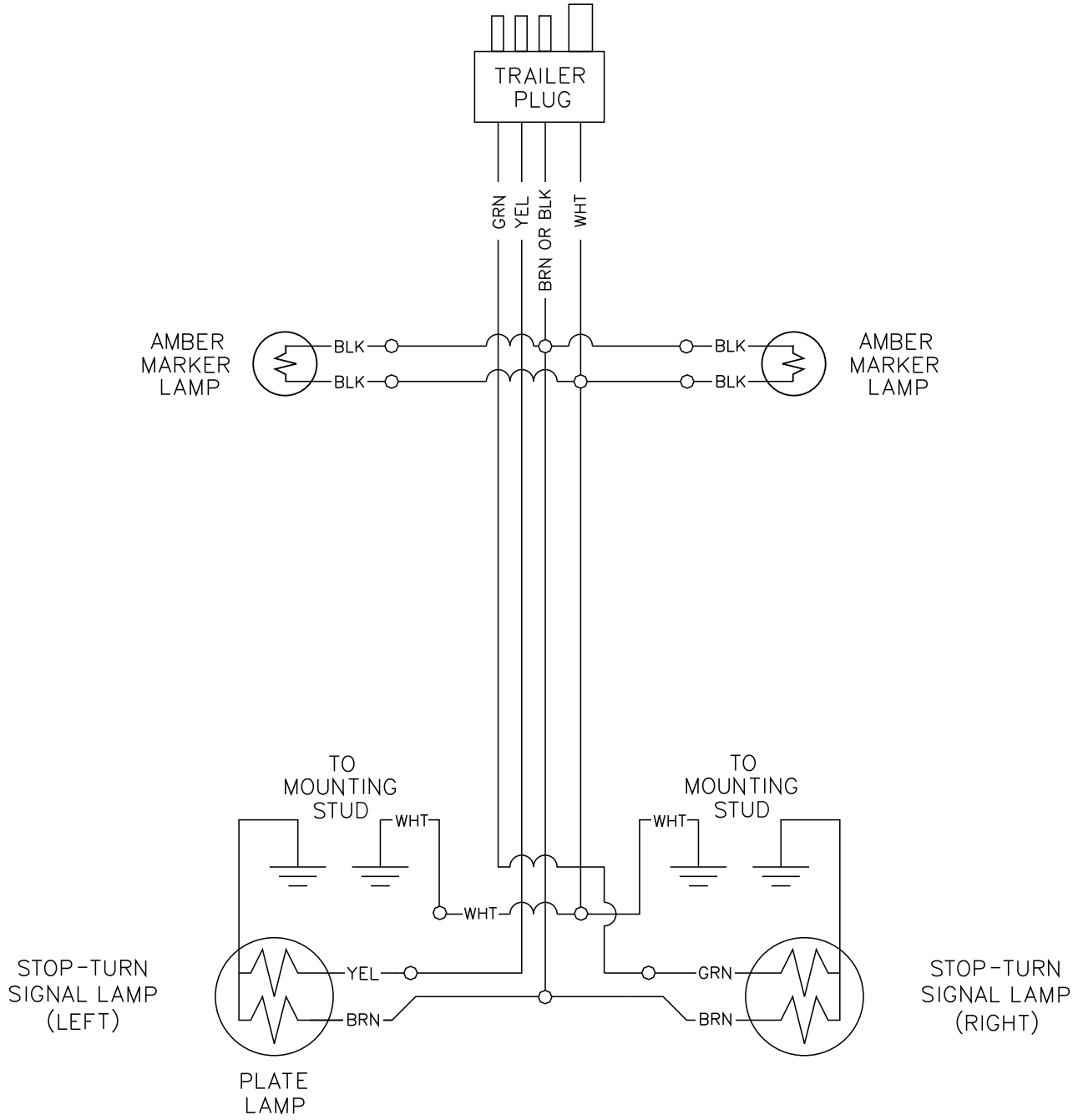
1. Shut down the unit.

NOTE: If the external bulk fuel supply is already connected, the unit does not have to be shut down to turn the fuel transfer pump option on or off.

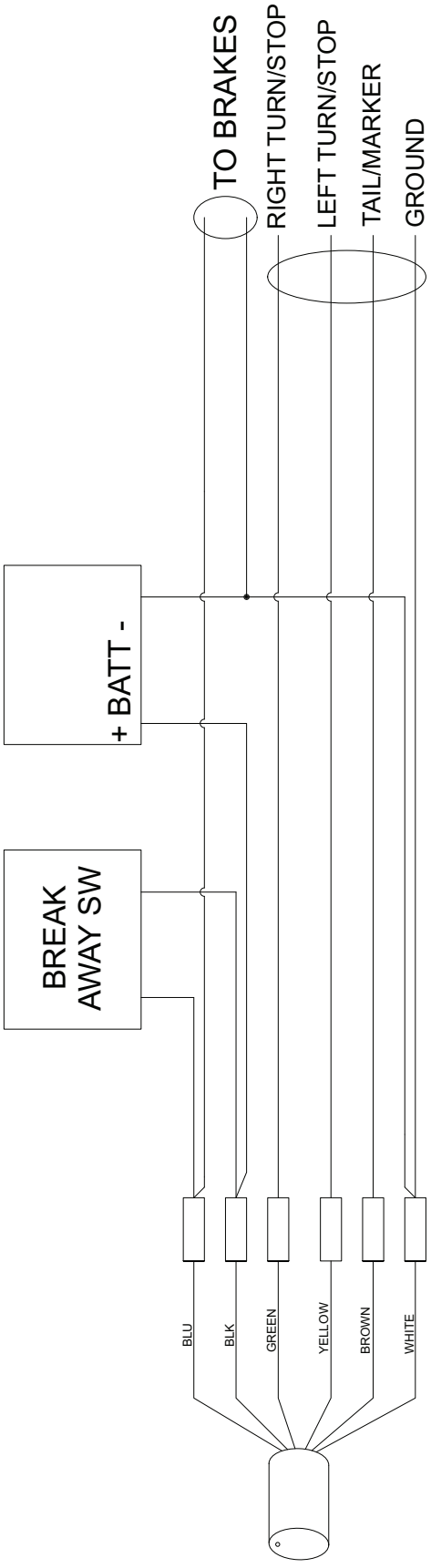
2. Attach the external bulk fuel supply to fuel transfer inlet fitting on the unit.
3. Turn on fuel transfer switch.

Section 5: Wiring Diagrams

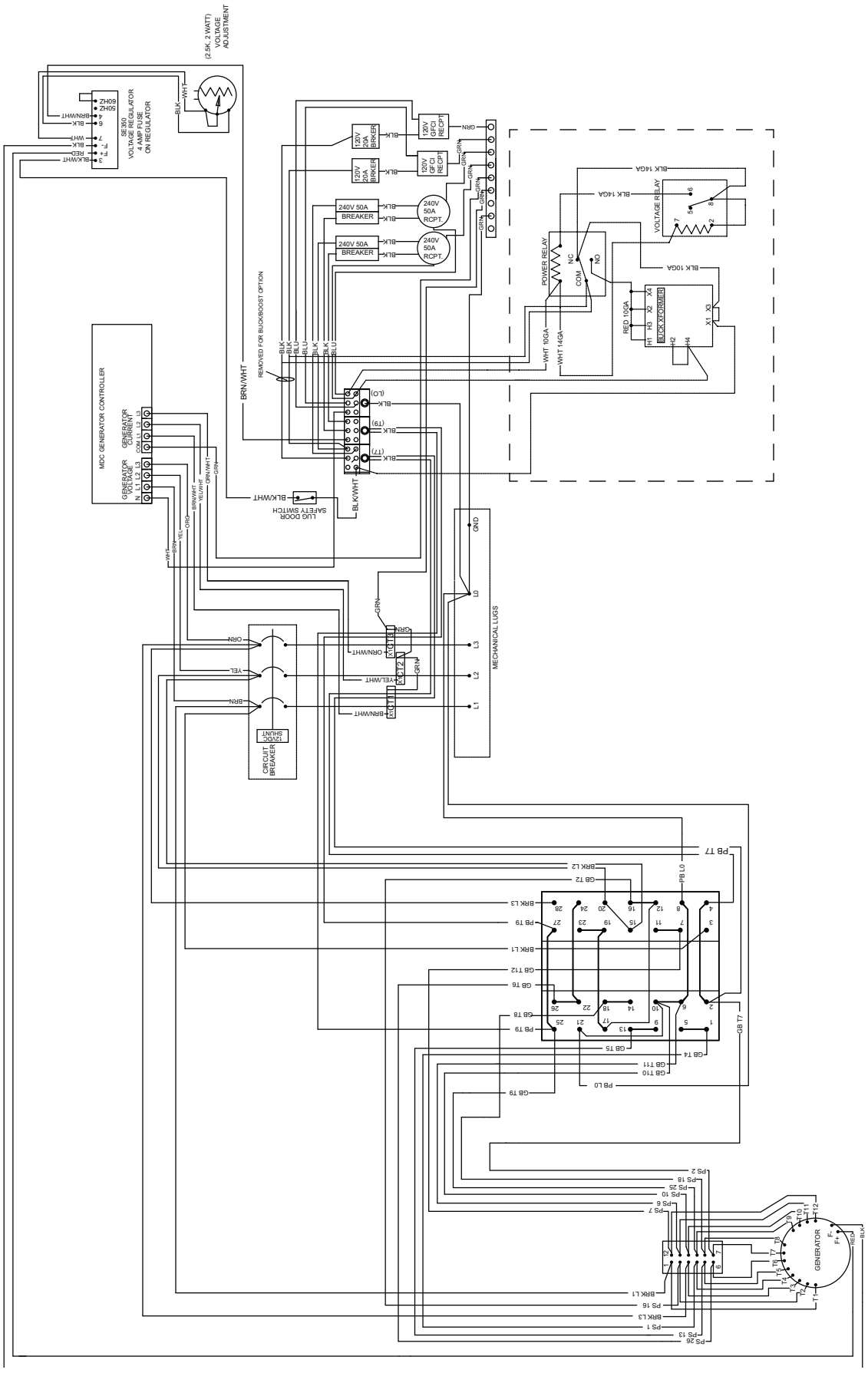
Trailer Wiring Diagram



Electric Brake Wiring Harness

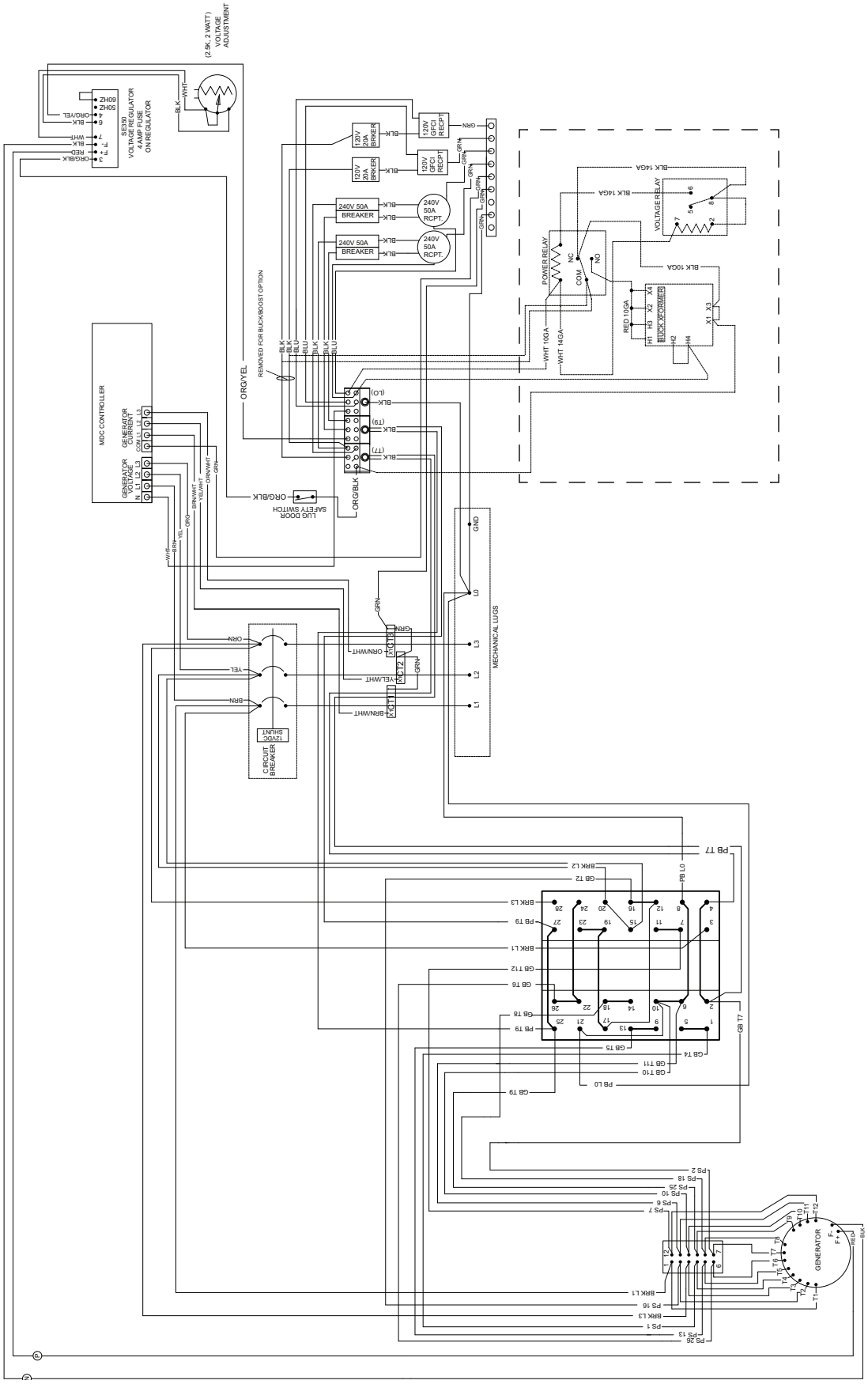


AC Wiring Diagram

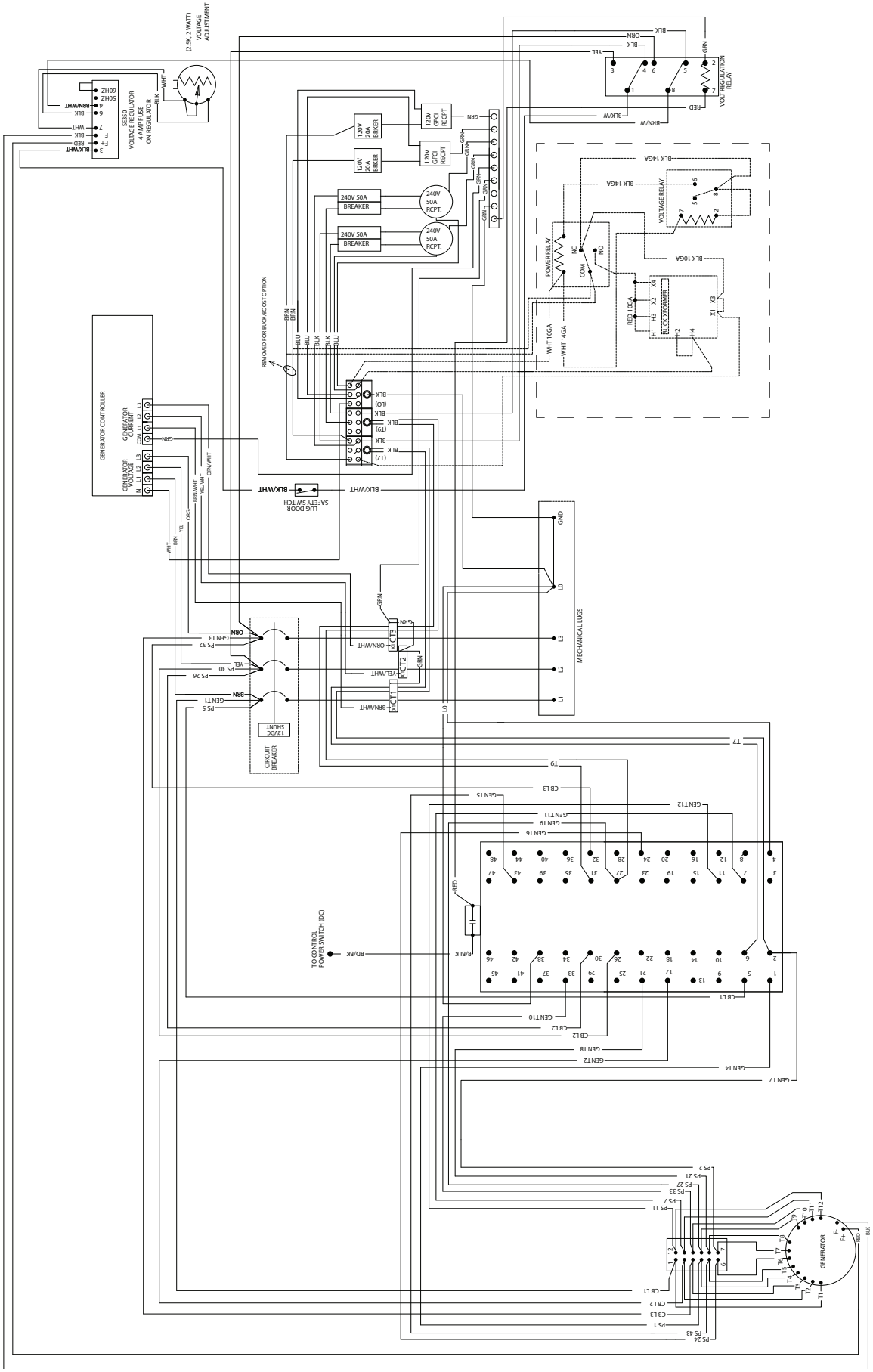


AC Wiring Diagram - MMG45FHK

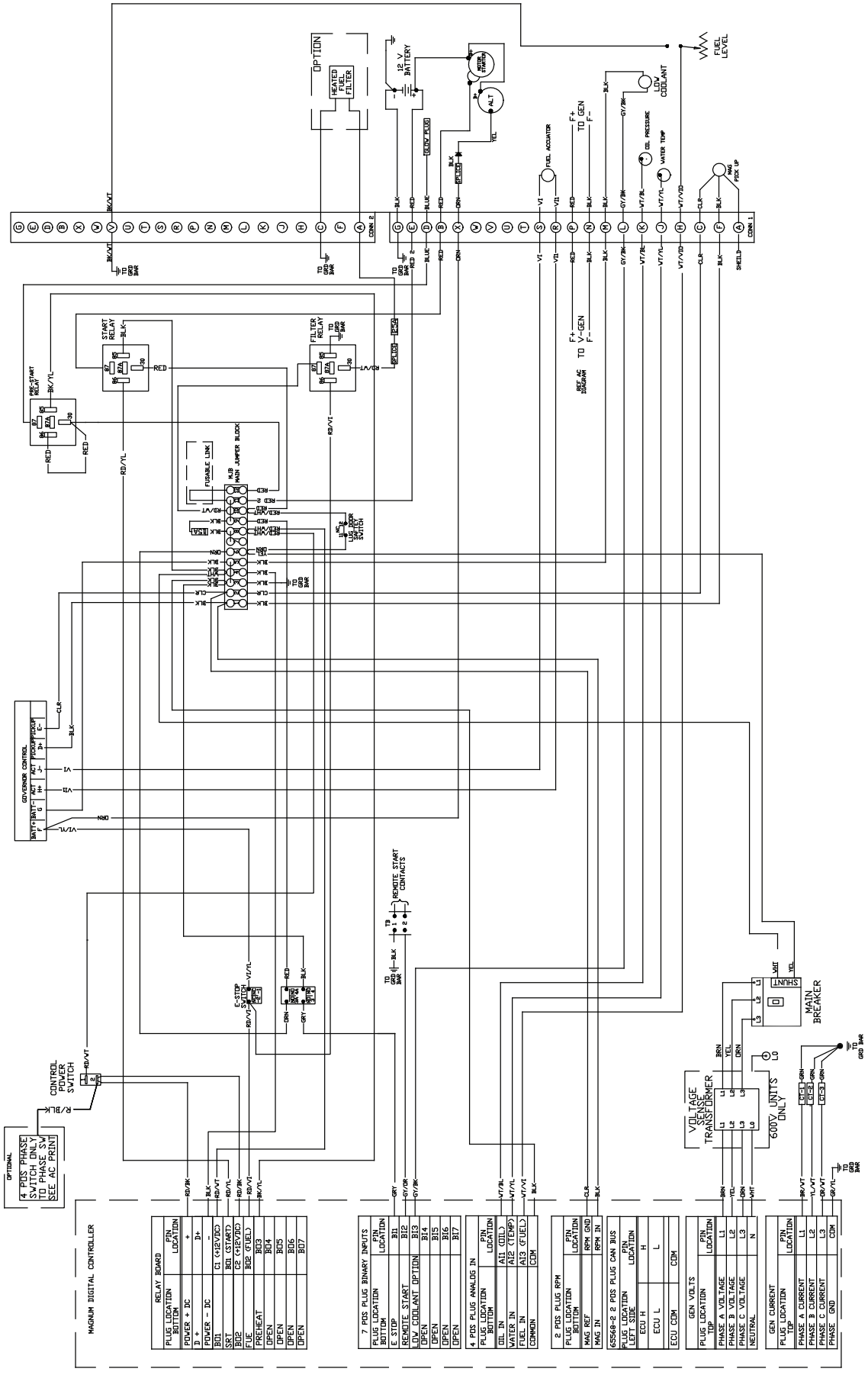
After Serial Number 0800545



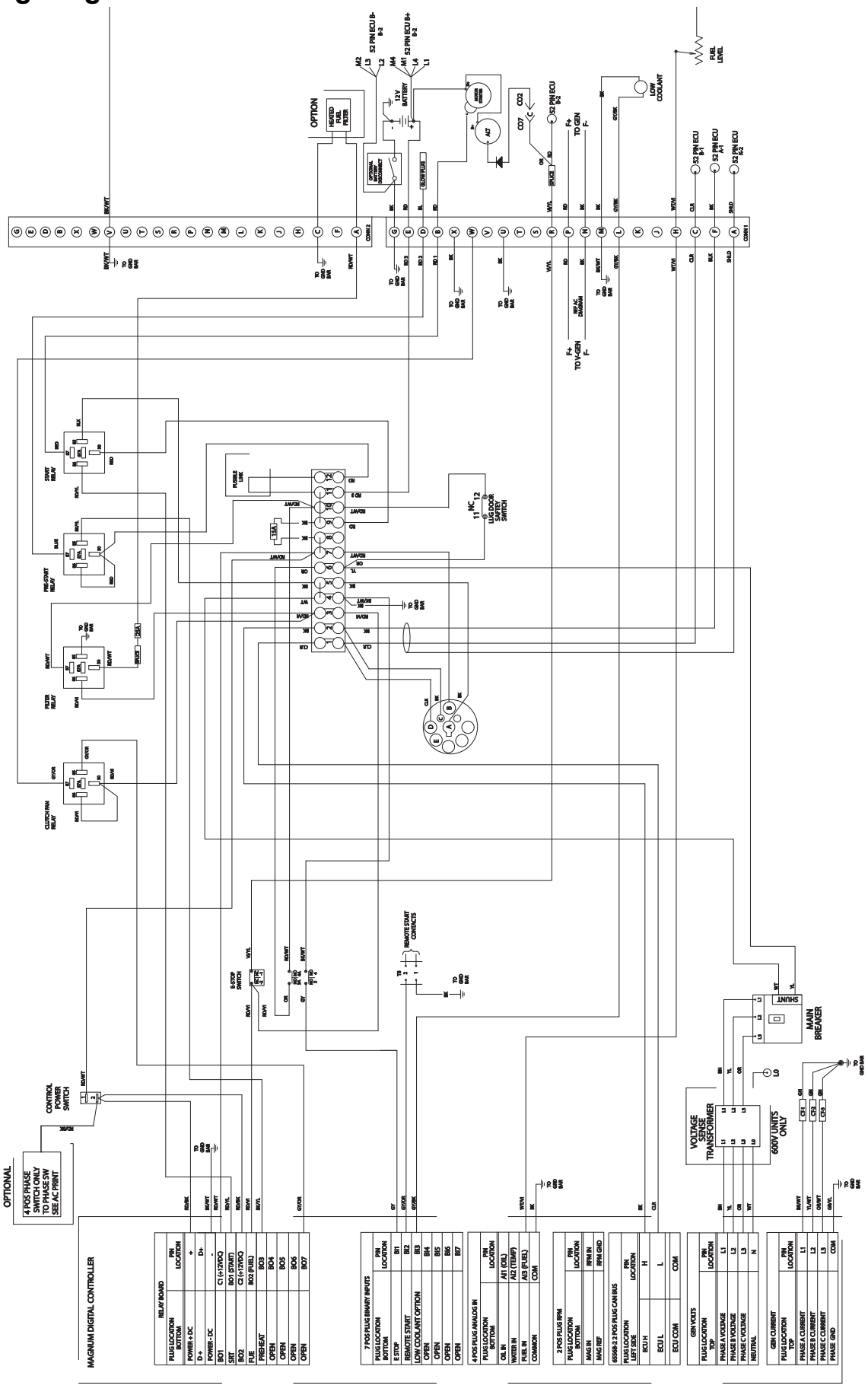
AC Wiring Diagram - 4-Position Voltage Selector Switch



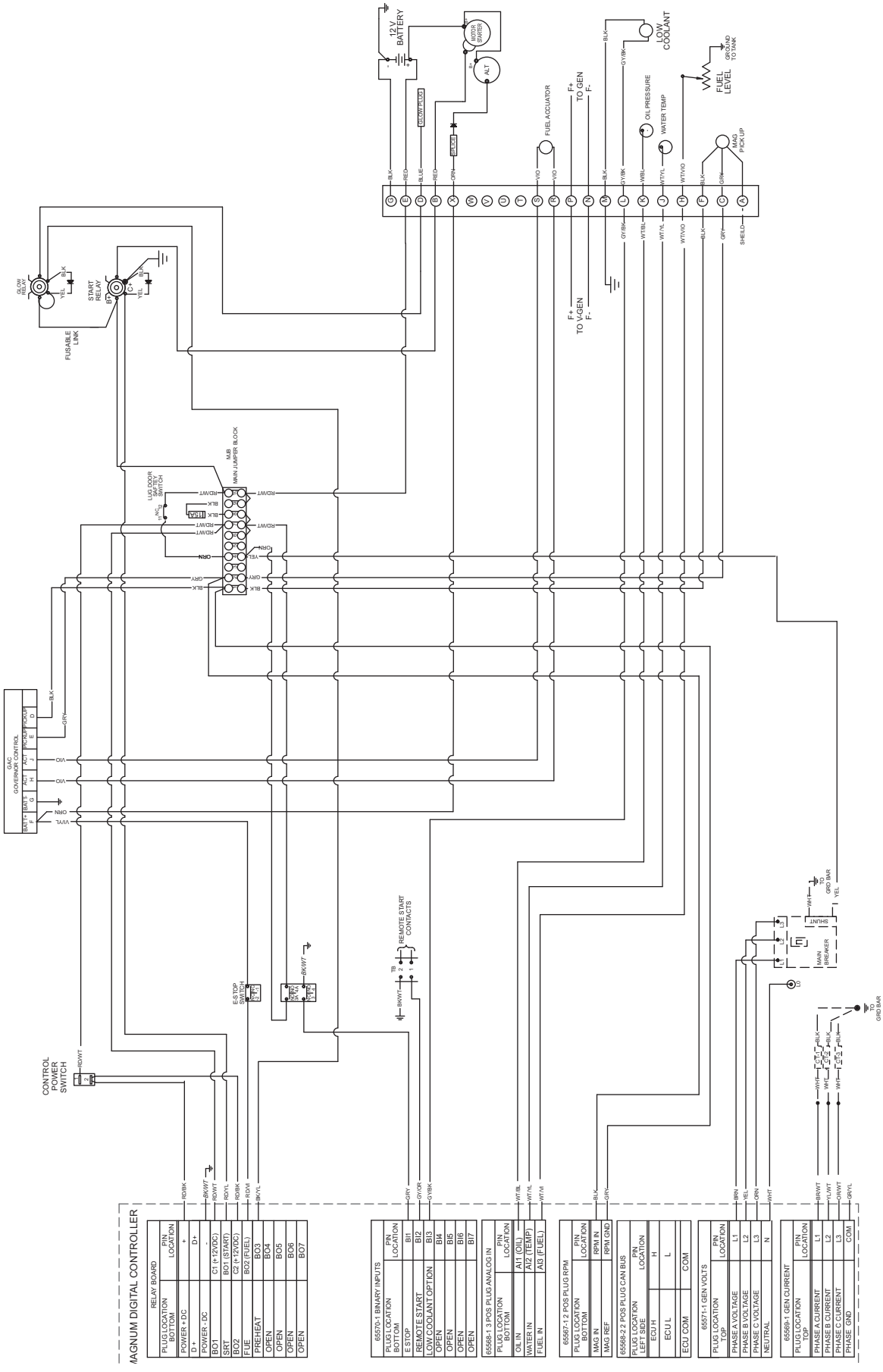
DC Wiring Diagram - MMG35FHD



DC Wiring Diagram - MMG55FHD



DC Wiring Diagram - Kubota, Isuzu



Service Log

OIL GRADE: _____ BRAND: _____

COOLANT MIXTURE: _____ BRAND: _____

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Date	Hours to Service	Oil Level	Coolant Level

Date	Hours to Service	Oil Level	Coolant Level

Part No. 24594 Rev. L 02/14/2019

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