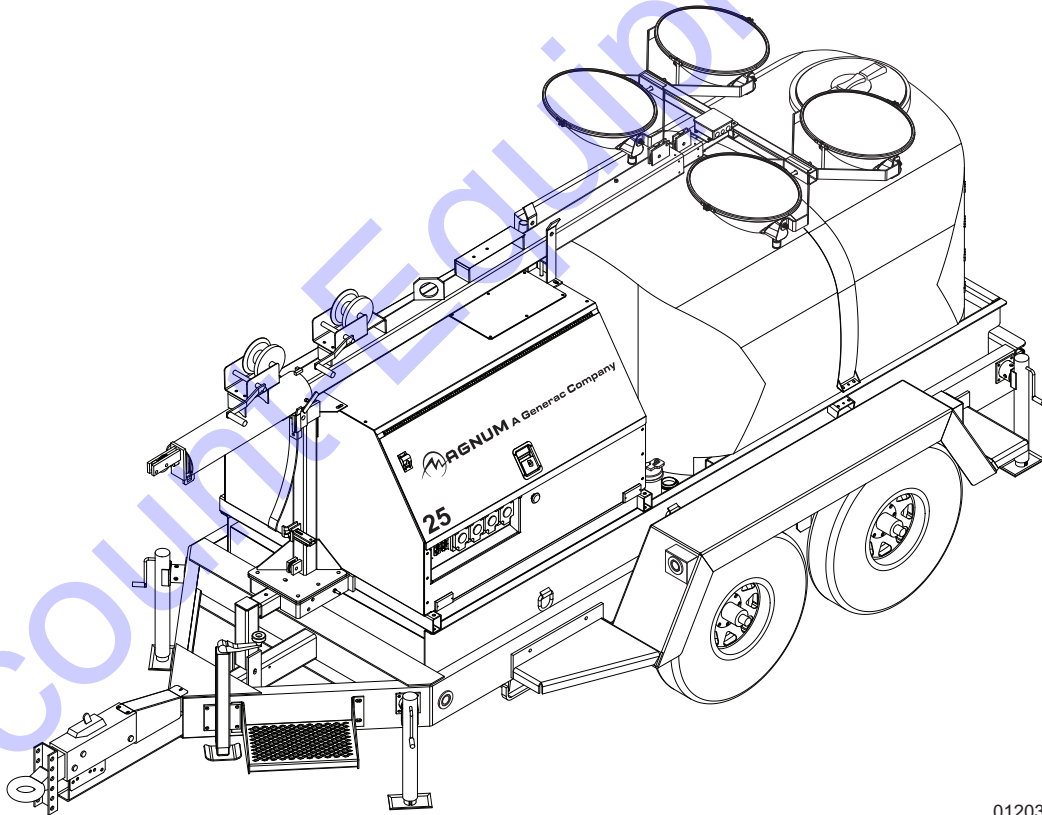




MAGNUM™

A Generac Company

COMBINATION LIGHT TOWER GENERATOR & WATER TRAILER MTT25 • MTT25CAN OPERATING MANUAL



01203



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INTRODUCTION

This manual provides information and procedures to safely operate and maintain the Magnum Power Products LLC unit. For your own safety and protection from physical injury, carefully read, understand, and observe the safety instructions described in this manual. Keep a copy of this manual with the unit at all times. *The information contained in this manual was based on machines in production at the time of publication. Magnum Power Products LLC reserves the right to change any portion of this information without notice.*

Read all of the manuals included with the unit. Each manual details specific information regarding items such as setup, use and service requirements. An engine operator's manual provides detailed operation and maintenance procedures for the engine. Additional copies of the engine operator's manual are available from the engine manufacturer.

DO NOT MODIFY or use this equipment for any application other than which it was designed for.

Magnum Power Products LLC recommends that a trained and licensed professional perform all electrical wiring and testing functions. Installation should be in compliance with the National Electrical Code (NEC), state and local regulations and Occupational Safety and Health Association (OSHA) guidelines.

Engine Make: _____

Engine Serial Number: _____

Engine Model Number: _____

Generator Make: _____

Generator Model Number: _____

Generator Serial Number: _____

Unit Model Number: _____

Unit Serial Number: _____

▲ WARNING

CALIFORNIA PROPOSITION 65 WARNING: Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects and other reproductive harm.

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SAFETY NOTES



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

This manual contains DANGERS, WARNINGS, CAUTIONS, NOTICES and NOTES which must be followed to prevent the possibility of improper service, damage to the equipment, personal injury or death. The following formatting options will apply when calling the readers attention to the DANGERS, WARNINGS, CAUTIONS, NOTICES and NOTES.

▲ 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.

▲ CAUTION

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

NOTICE

Indicates a hazardous situation which, if not avoided, could result in property or equipment damage.

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

OPERATING SAFETY



Before using the unit, be sure to read and understand all of the instructions. This equipment was designed for specific applications; **DO NOT** modify or use this equipment for any application other than which it was designed for. Equipment operated improperly or by untrained personnel can be dangerous. Read the operating instructions and familiarize yourself with the location and proper use of all instruments and controls. Inexperienced operators should receive instruction from someone familiar with the equipment before being allowed to operate or set up the unit. The following points should be practiced at all times:

- The area immediately surrounding the unit should be dry, clean, and free of debris.
- Position and operate the unit on a firm, level surface.
- **NEVER** start a unit in need of repair.
- **ALWAYS** lower the mast when not in use, or if high winds or electrical storms are expected in the area.
- Make certain the unit is securely fastened to a good earthen ground. Follow the National Electrical Code (NEC), state and local regulations.
- **NEVER** operate the unit on a combustible surface.
- The mast extends up to 31.5 ft (9.6m). **ALWAYS** make sure the area above the unit is open and clear of overhead wires and obstructions.
- Keep area around the unit clear of people while raising and lowering the mast.
- Keep all body parts, clothing, and other loose items clear of winch and cable during operation and while in tension.
- Bulbs become extremely hot during use. Allow bulb and light fixture to cool 10-15 minutes before handling.
- **NEVER** raise, lower or turn the mast while the unit is operating.

- If for any reason any part of the mast hangs up or winch cable develops slack while raising or lowering the mast, **STOP** immediately and contact an authorized service representative.
- **NEVER** remove safety pin or pull mast locking pin while the mast is up.
- **NEVER** use the unit if insulation on electrical cord is cut or worn through.
- **NEVER** operate the lights without protective lens cover in place or with a lens cover that is cracked or damaged.
- Only use mild soap and water to clean the lens covers. Other chemicals may have an adverse effect on the glass.
- **NEVER** operate a unit while tired, distracted, or under the influence of drugs or alcohol.
- **NEVER** use water in the supply tank for human consumption.
- **ALWAYS** keep the water tank cover in place. Stay out of tank.
- **DO NOT** drive over the hoses while they are pressurized or while the pump is running.
- **NEVER** leave the unit unattended while the pump is running.

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 warnings 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 unless exhaust hoses are used. Diesel engine exhaust contains carbon monoxide, a deadly, odorless and colorless gas which, if inhaled, can cause nausea, fainting or death. Make sure engine exhaust cannot seep into closed rooms or ventilation equipment.
- **DO NOT** operate the unit on a combustible surface.
- **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.
- **DO NOT** touch or lean against hot exhaust pipes or engine cylinders.
- **DO NOT** clean air filter with gasoline or other types of low flash point solvents.
- **DO NOT** remove engine coolant cap while engine is hot.
- **DO NOT** operate the unit without a functional exhaust system. Prolonged exposure to sound levels in excess of 85 dB(A) can cause permanent hearing loss. Wear hearing protection when working around a running engine.
- Keep area around exhaust pipes and air ducts free of debris to reduce the chance of an accidental fire.
- Batteries contain sulfuric acid which can cause severe injury or death. Sulfuric acid can cause eye damage, burn flesh or eat holes in clothing. Protective eye wear and clothing are necessary when working on or around the battery. Always disconnect the negative (-) battery cable from the corresponding terminal before performing any service on the engine or other components.
- Shut the engine down if any of the following conditions exist during operation:
 1. Noticeable change in engine speed.
 2. Loss of electrical output and/or pumping output.
 3. Equipment connected to the generator overheats.
 4. Sparking occurs.
 5. Engine misfires or there is excessive engine/generator vibration.
 6. Protective covers are loose or missing.
 7. If the ambient air temperature is above 120°F (49°C).

SERVICE SAFETY



This unit uses high voltage circuits capable of causing serious injury or death. Only a qualified and licensed electrician should troubleshoot or repair electrical problems occurring in this equipment.

- Before servicing, make sure the Control Power switch and circuit breakers are in the OFF (O) position, and the negative terminal on the battery is disconnected. **NEVER** perform even routine service (oil/filter changes, cleaning, etc.) unless all electrical components are shut down.
- **NEVER** allow water to accumulate around the base of the unit. If water is present, **DO NOT** service.
- **ALWAYS** use extreme caution when servicing the unit in damp conditions. **NEVER** service the unit if your skin or clothing is wet. **DO NOT** allow water to collect/accumulate around the base of the unit. If water is present, **DO NOT** service. If the unit is stored outside, check the engine and generator for any moisture and dry the unit before use.
- **NEVER** wash the unit with high pressure hoses or power washers.
- Open the main circuit breaker before disconnecting battery cables.
- Keep all body parts, clothing, and other loose items away from moving parts on the unit.
- Make sure slings, chains, hooks, ramps, jacks, and other types of lifting devices are attached securely and have enough weight-bearing capacity to lift or hold the unit safely. Always remain aware of the position of other people around when lifting the unit.
- **NEVER** start the unit under load. The circuit breakers must be in the OFF (O) position when starting the unit in Manual mode. The circuit breakers can be in the ON (I) position only when started in the Auto mode. A transfer switch must be used in the Auto mode to deflect the load upon startup.
- **ALWAYS** disconnect the negative (-) battery cable from the corresponding terminal before performing any service on the engine, generator or any other components. Remove the negative (-) battery cable from the corresponding terminal if the unit is to be stored or transported.
- Replace all guards and safety devices immediately after servicing.
- Wear heavy leather gloves when handling winch cables. Never let cables slip through bare hands.

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.

- Check that the hitch and coupling on the towing vehicle are rated equal to, or greater than, the trailer's Gross Vehicle Weight Rating (GVWR).
- Check tires on trailer for tread wear, inflation, and condition.
- **NEVER** tow trailer using defective parts. Inspect the hitch and coupling for wear or damage.
- Make sure the trailer hitch and the coupling are compatible. Make sure the coupling is securely fastened to the vehicle.
- Connect safety chains in a crossing pattern under the tongue and **ATTACH THE BREAKAWAY CABLE TO THE REAR BUMPER OF THE TOWING VEHICLE**. Do not attach the cable to the trailer hitch.
- Make sure directional and brake lights on the trailer are connected and working properly.
- Check that all lug nuts holding wheels on are tight and none are missing.
- Maximum recommended speed for highway towing is 45 mph (72 km/h). Recommended off-road towing speed is not to exceed 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. If you have not pulled a trailer before, practice turning, stopping, and backing up in an area away from heavy traffic.

- Towing the unit with water in the tank will adversely affect handling of towing vehicle, specifically maneuvering corners, accelerating, and braking. Ensure operator has experience with towing unit.
- Maximum recommended towing speeds for the unit are as follows:
 - With the tank empty, improved road: 55 mph (89 km/h)
 - With the tank full, improved road: 45 mph (72 km/h)
 - With the tank 1/2 full, improved road: 45 mph (72 km/h)
 - Any towing on unimproved roads:..... 20 mph (32 km/h) or less
- Reduce speed when the tank is filled with water. The tank is not baffled. There will be a noticeable water surge in the tank under heavy braking.
- Before towing the trailer, check that the weight of the trailer is equal across all tires. Adjust the angle of the trailer tongue to keep the trailer as level as possible. A large angle between the trailer and tow vehicle will cause more weight to be carried by one axle, which could cause premature wear on the tires and axles and cause potentially unsafe operating conditions.
- The trailer is equipped with hydraulic surge brakes or electric surge brakes. Check the operation of the brakes by braking the vehicle at a slow speed before entering traffic. Both the trailer and the vehicle should brake smoothly. If the trailer seems to be pushing, check the level in the surge brake fluid reservoir.
- 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 trailer is towed.

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 Magnum Power 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 dealer, or Magnum Power 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>.

SAFETY SYMBOL SUMMARY

This equipment has been supplied with numerous safety and operating decals. These decals provide important operating instructions and warn of dangers and hazards. Replace any missing or hard-to-read decals and use care when washing or cleaning the unit. Decal placement and part numbers can be found in the parts manual. Below is a summary of the intended meanings for the symbols used on the decals.

	Safety alert symbol; used to alert you to potential personal injury hazards.		Asphyxiation hazard; operate in well ventilated area.
	Hot surface(s) nearby.		Dangerous voltage may be present.
	Belt/entanglement hazard; keep body parts clear of this area.		Anchor/tie down point.
	Fan hazard; keep body parts clear of this area.		Isolate generator to prevent electrocution hazard.
	Crush hazard; keep body parts clear of this area.		Use clean diesel fuel only.
	Ultraviolet radiation hazard; operate only with lens intact.		Burn/scald hazard; pressurized steam.
	Stop engine before fueling.		Read and understand the supplied operator's manual before operating unit.
	Fire/explosion hazard; keep open flames away from unit.		Unit electrical ground.
	Never change switch position while engine is running.		Stop engine before making connections.
	Engine running.		Remove negative battery cable before performing any service on unit.
	Do not stand on this surface.		Do not step on this surface.
	Do not drink the water.		Do not lift.
	Stand clear while mast is being operated.		Stay out of tank.

00199

SPECIFICATIONS (1 OF 2)

MAGNUM MODEL

MTT25

MTT25CAN

Engine

Make/Brand.....	Isuzu	Isuzu
Model	4LE1NYGV-01	4LE1NYGV-03G
.....	4LE1NYGV-03E	
EPA Tier	4i	4i
Horsepower - prime hp (kW)	32.1 (23.9)	32.1 (23.9)
Horsepower - standby hp (kW)	35.3 (26.3)	35.3 (26.3)
Operating Speed rpm	1800	1800
Displacement in³ (L)	134 (2.2)	134 (2.2)
Cylinders - qty	4	4
Fuel Consumption - 100% prime gph (Lph)	1.80 (6.81)	1.80 (6.81)
Battery Type - Group Number	24	24
Battery Voltage (Quantity per Unit)	12V (1)	12V (1)
Battery Rating	720 CCA	720 CCA

Generator

Make/Brand.....	Marathon Electric.....	Marathon Electric
Model	282NSL1505	282NSL1505
Type, Insulation	Brushless, H	Brushless, H

Generator Set (Engine/Generator)

3Ø - Standby kW (kVA)	20 (25)	20 (25)
Amps - 3Ø Standby - 480V (208V) A	30 (69)	30 (69)
3Ø - Prime kW (kVA)	18 (23)	18 (23)
Amps - 3Ø Prime - 480V (208V) A	28 (64)	28 (64)
1Ø - Standby kW (kVA)	16.0 (16.0)	16.0 (16.0)
Amps - 1Ø Standby - 240V A	67	67
1Ø - Prime kW (kVA)	15.0 (15.0)	15.0 (15.0)
Amps - 1Ø Prime - 240V A	63	63
Frequency Hz	60	60
Power Factor.....	1 (1Ø), 0.8 (3Ø)	1 (1Ø), 0.8 (3Ø)

Pump

Make/Model	SHURFlo	SHURFlo
Flow Rate gpm (Lpm)	3.3 (12.5)	3.3 (12.5)
Flow Rate at Hose Bibb gpm (Lpm)	3.0 (11.4)	3.0 (11.4)

Weights

Dry Weight lbs (kg)	5220 (2368)	5220 (2368)
Operating Weight lbs (kg)	10960 (4971)	10960 (4971)

Capacities

Fuel Tank Volume gal (L)	246 (931)	246 (931)
Usable Fuel Volume gal (L)	229 (867)	229 (867)
Water Tank Volume gal (L)	500 (1895)	500 (1895)
Maximum Run Time hrs	127	127

Lighting

Lighting Type.....	Metal Halide	Metal Halide
Ballast Type.....	Coil & Core	Coil & Core
Lumens	440,000	440,000
Coverage acres (m²)	5 - 7 (20,234 - 28,328)	5 - 7 (20,234 - 28,328)

AC Distribution

Circuit Breaker Size	90	90
Voltage Selection	3 Position Switch (lockable).....	3 Position Switch (lockable)
Voltage Regulation	+/-1%	+/-1%
Voltages Available 1Ø	120, 139, 208, 220, 240, 277	120, 139, 208, 220, 240, 277
Voltages Available 3Ø	208, 220, 440, 480	208, 220, 440, 480

Specifications are subject to change without notice.

SPECIFICATIONS (2 OF 2)

MAGNUM MODEL

MTT25

MTT25CAN

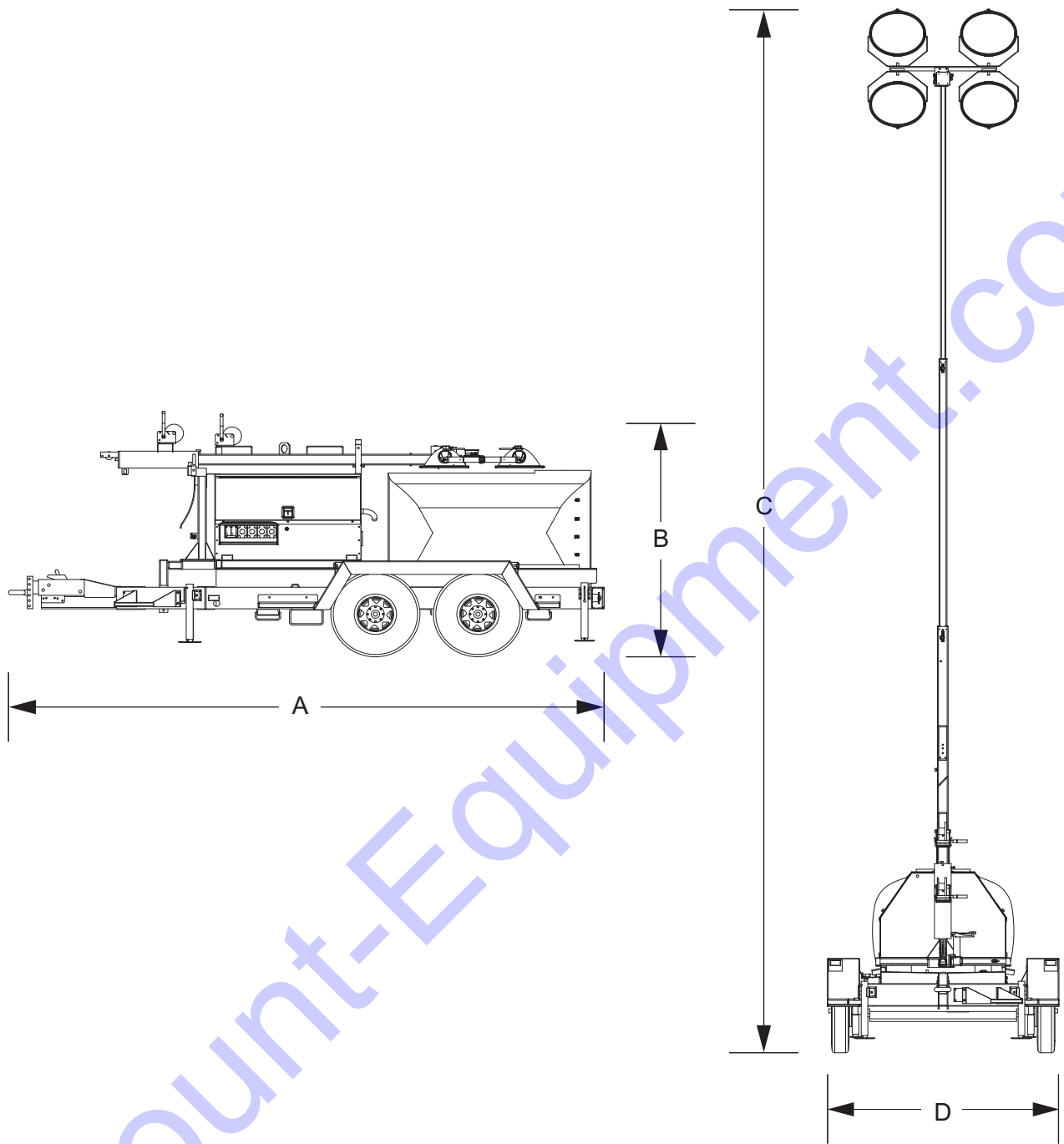
Trailer

Number of Axles.....	2.....	2.....
Capacity - Axle Rating lbs (kg)	6000 (2722)	6000 (2722)
Tire Size in	16.....	16.....
Brakes.....	Surge.....	Surge.....
Hitch - Standard	3" Ring.....	3" Ring.....
Maximum Tire Pressure psi	75.....	75.....

Specifications are subject to change without notice.

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UNIT DIMENSIONS



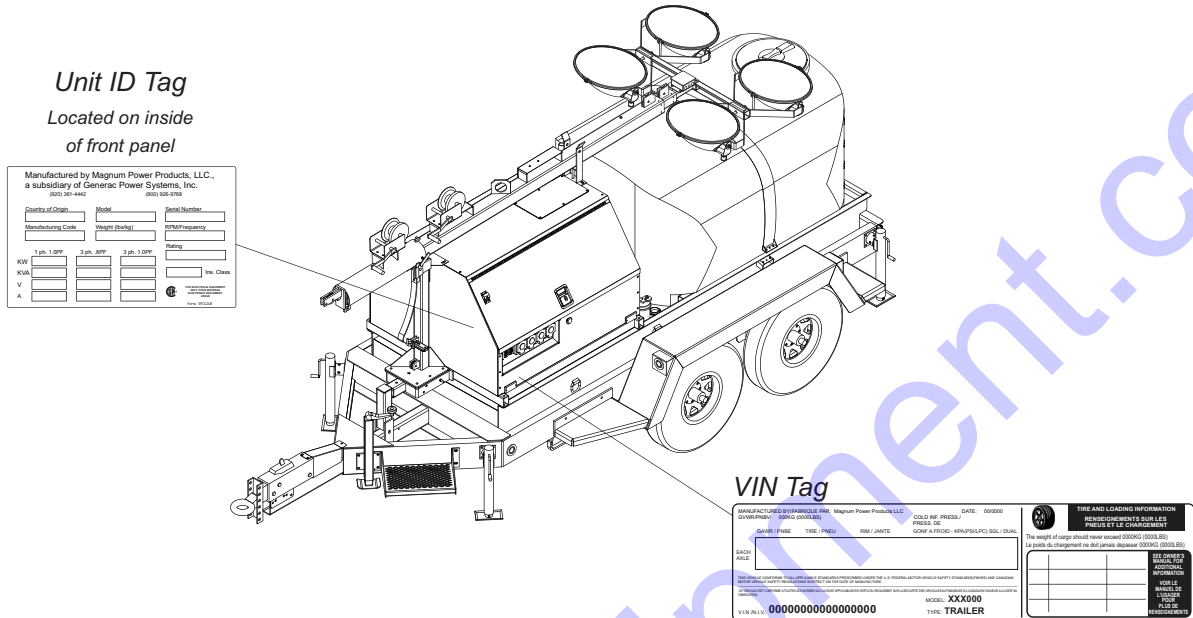
00217

	A	B	C	D
MTT25, 25CAN	210 in (5.3 m)	83 in (2.1 m)	31.5 (9.6)	86 in (2.18 m)

Specifications are subject to change without notice.

UNIT SERIAL NUMBER LOCATIONS

Refer to the illustration to locate the unit ID tag and Vehicle Identification Number (VIN) tag on the unit. Important information, such as the unit serial number, model number, VIN and tire loading information are found on these tags. Record the information from these tags so it is available if the tags are lost or damaged. When ordering parts or requesting assistance, you may be asked to provide this information.



Unit ID Tag
 Located on inside
 of front panel

Manufactured by Magnum Power Products, LLC.,
 a subsidiary of Generac Power Systems, Inc.
 (800) 561-4462 (800) 526-9708

Quantity of Output	Model	Serial Number
Manufacturing Code	Weight (lbs/kg)	RTM/Frequency
1 ph. 1.0PF	2 ph. 80PF	3 ph. 1.0PF
KW		
KVA		
V		
A		

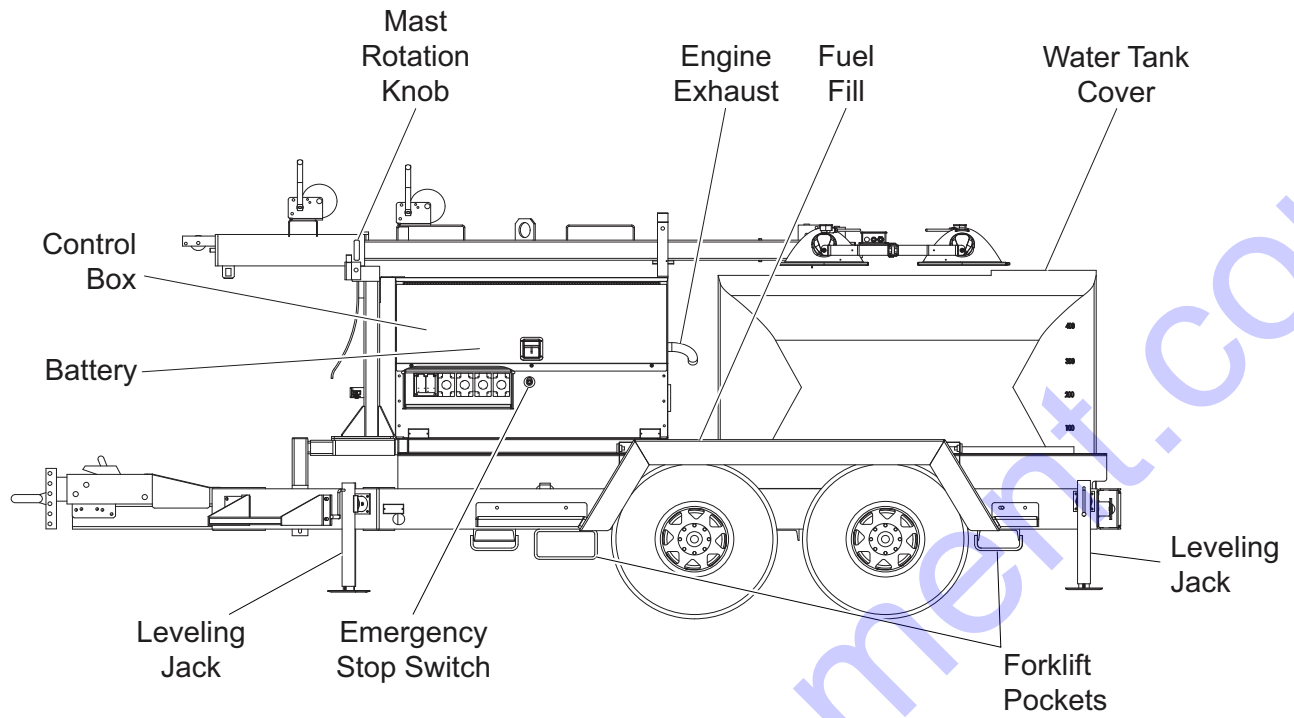
INVTAG

VIN Tag

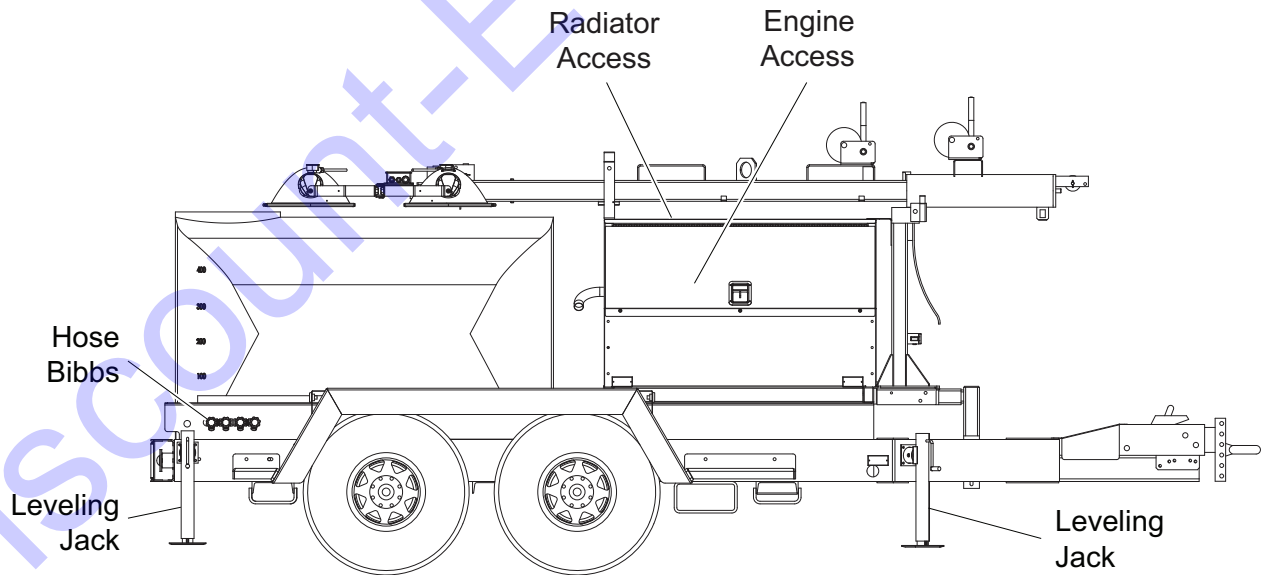
MANUFACTURED BY (MAGNUM) (800) Magnum Power Products, LLC. DATE: 000000 OWNER/PROV. (800) (000000) COLD HP PRESS. PRESS. OF GOLF A FT/DC: KW/PS/FLCI SGL / DUAL	TIRE AND LOADING INFORMATION RECOMMENDATIONS SUN LIST POUNDS (S) IF CHANGING TIRE
MAKE (P/MS) TIRE (P/MS) RBW / JANTE EACH WHEEL VIN: INVTAG: 000000000000000000 MODEL: XX000 TYPE: TRAILER	The weight of cargo should never exceed (GROSS) (0000.00) lbs. poids de chargement ne doit jamais dépasser (GROSS) (0000.00) lbs. BE CAREFUL PRENEZ GARDE NE PAS EXCÉDER LE PDS RECOMMANDÉ

00914

COMPONENT LOCATIONS



LEFT SIDE



RIGHT SIDE

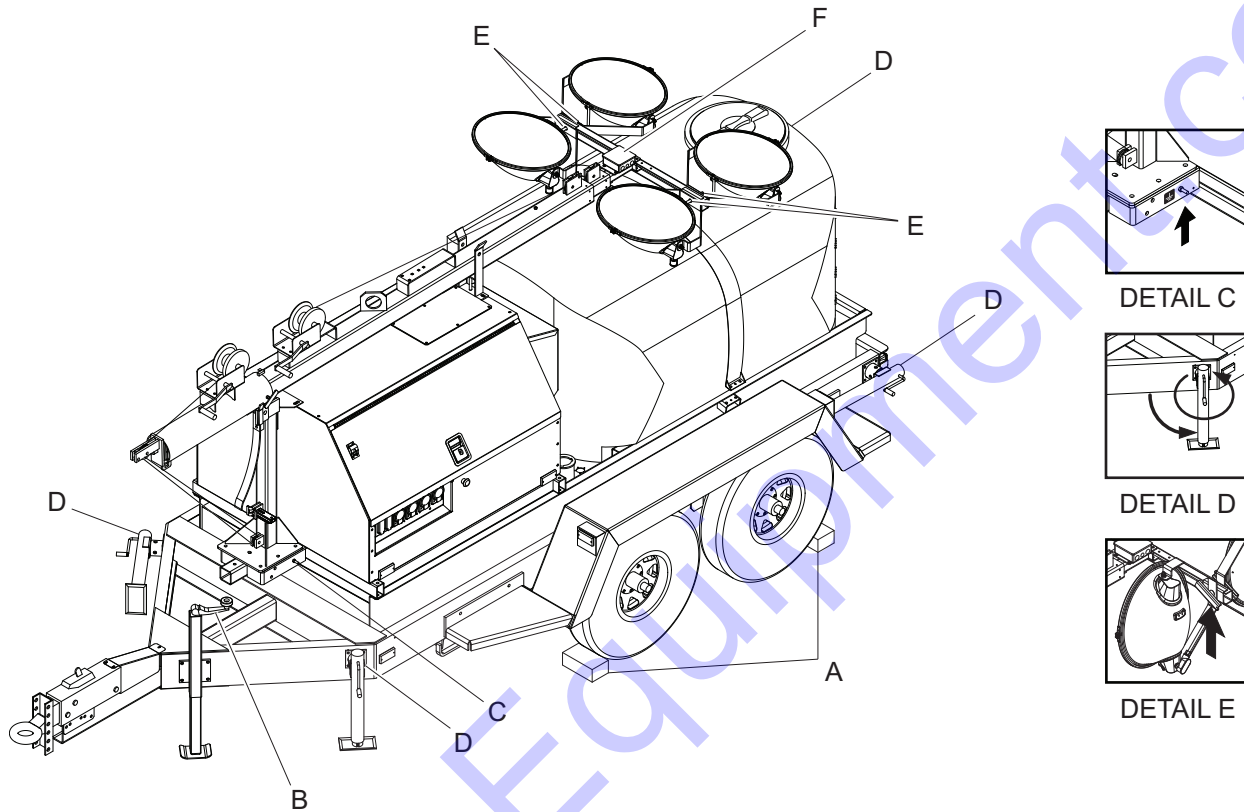
00113

LIGHT TOWER SET UP

1. For maximum light coverage, locate the unit at ground level or in a spot higher than the area being illuminated by the lamps.

▲ WARNING

The mast extends up to 31.5 ft (9.6 m). Make sure the area above the unit is open and clear of overhead wires and obstructions. Do not set up the unit if high winds or storms capable of producing lightning are expected in the area.



00160

2. Place the unit on firm ground that is relatively flat, then block the wheels to keep it from moving (A). This will make it easier to level the unit.
3. Turn the tongue jack handle clockwise to raise the trailer tongue off of the towing vehicle (B).
4. Connect a good earthen ground to the grounding stud on the frame of the trailer at the base of the mast post (C).

Note: Refer to local regulations for proper grounding requirements.

5. Pull the locking pins on the four leveling jacks (D), rotate them so the jack feet are toward the ground, and insert the locking pins again to secure the jacks. Adjust all four jacks by turning their handles clockwise until they are firmly in contact with the ground and the unit is as level as possible.
6. Before raising the mast, it may be necessary to adjust the lamps. The lamps may be adjusted up, down, left or right by loosening the wing nuts on the trunnion (E) and aiming them in the desired direction. Tighten the hardware completely and make sure the lamps are connected to the junction box (F).

RAISING THE MAST

1. Set up and level the unit. Refer to “*Light Tower Set Up*” on page 15.

▲ WARNING

The unit must be leveled before raising the mast. Failure to level the unit will severely reduce the stability and could allow the unit to tip and fall.

2. Remove mast cradle locking pin from mast cradle (A).
3. Check the mast cables for excessive wear or damage. Make sure the cables are properly centered in each pulley (B). Check the electrical cord for damage.

▲ WARNING

Do not start the unit if insulation on the electrical cord is cut or worn through. Bare wires in contact with the mast or frame may energize the unit and cause electrocution. Repair or replace a damaged cord.

4. Make sure the area around the unit is clear before raising the mast to the vertical position.
5. Remove the safety pin from the mast lock bar (C). Using the handle for the lower mast winch (D), raise the mast until it is vertical and the tab on the mast is positioned into the mast lock. The mast lock bar should snap into place automatically. Secure the lock with the safety pin (E).

6. After the mast is up and locked into place, use the upper mast winch (F) to telescope the mast to the desired height. Extend the mast slowly, making sure the electrical cord is extending at the top sections of the mast. If, for any reason, the winch cable begins to develop slack or any of the mast sections get stuck, **STOP IMMEDIATELY** and contact an authorized service center.

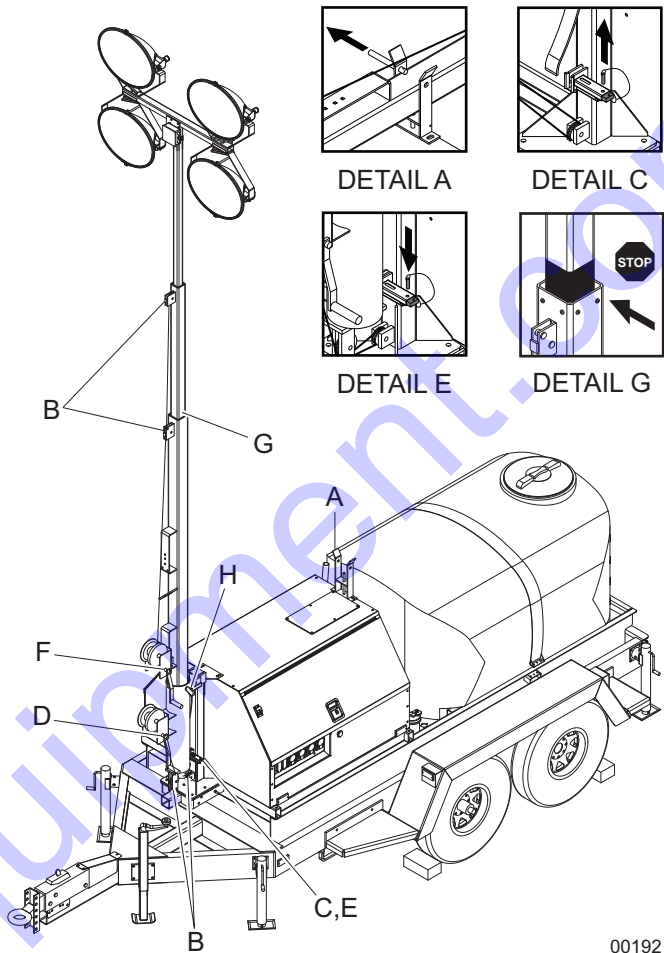
▲ CAUTION

Do not extend the mast beyond the colored mark on the middle mast tube (G).

7. Rotate the mast by loosening the mast rotation knob at the bottom of the mast (H). Turn the mast until the lights face in the desired direction and then tighten the mast rotation knob to secure the mast in position.

▲ WARNING

Never raise or lower the mast while the unit is operating. Never remove the safety pin or release the mast lock while the mast is up. Releasing the lock will cause the mast to fall.



00192

RAISING THE MAST WITH ELECTRIC WINCH OPTION

1. Set up and level the unit. Refer to “*Light Tower Set Up*” on page 15.

▲ WARNING

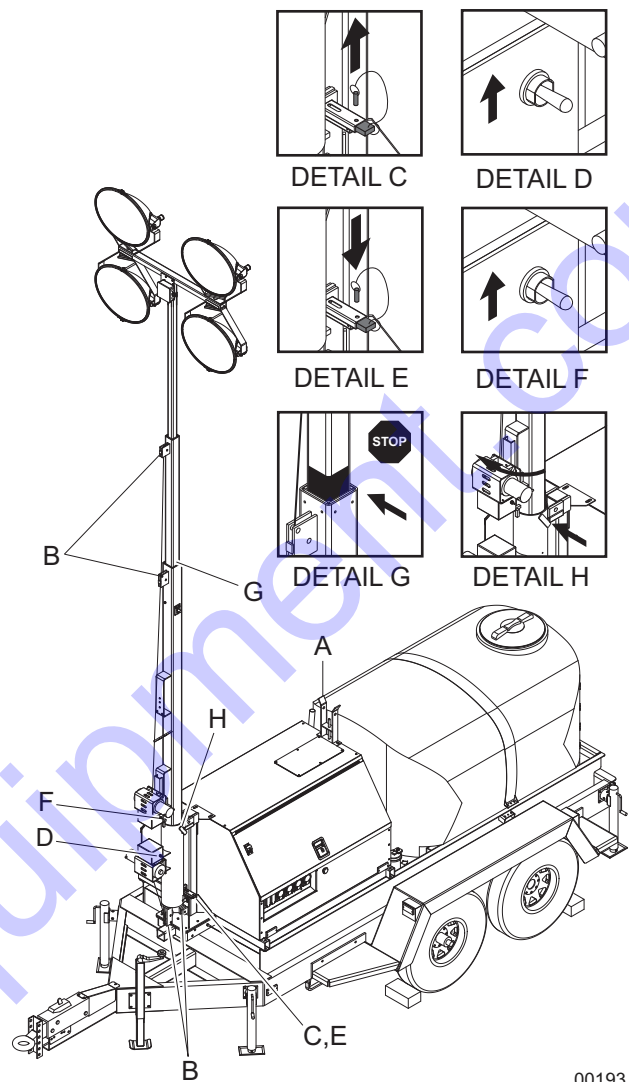
The unit must be leveled before raising the mast. Failure to level the unit will severely reduce the stability and could allow the unit to tip and fall.

2. Remove mast cradle locking pin from mast cradle (A).
3. Check the mast cables for excessive wear or damage. Make sure the cables are properly centered in each pulley (B). Check the electrical cord for damage.

▲ WARNING

Do not start the unit if insulation on the electrical cord is cut or worn through. Bare wires in contact with the mast or frame may energize the unit and cause electrocution. Repair or replace a damaged cord.

4. Make sure the area around the unit is clear before raising the mast to the vertical position.
5. Remove the safety pin from the mast lock bar (C). Press the lower winch control switch (D) upward to raise the mast into the vertical position. Hold the switch until the mast lock is engaged. The mast lock bar should snap into place automatically. Secure the lock with the safety pin (E).



00193

Note: A limit switch on the mast tube will disconnect power to the lower electric winch to prevent deadheading the winch.

6. Press and hold the upper winch control switch (F) upward to telescope the mast to the desired height. Extend the mast, making sure that the coiled electrical cord is extending at the top sections of the mast. If, for any reason, the winch cable begins to develop slack or any of the mast sections get stuck, **STOP IMMEDIATELY** and contact an authorized service center.

▲ CAUTION

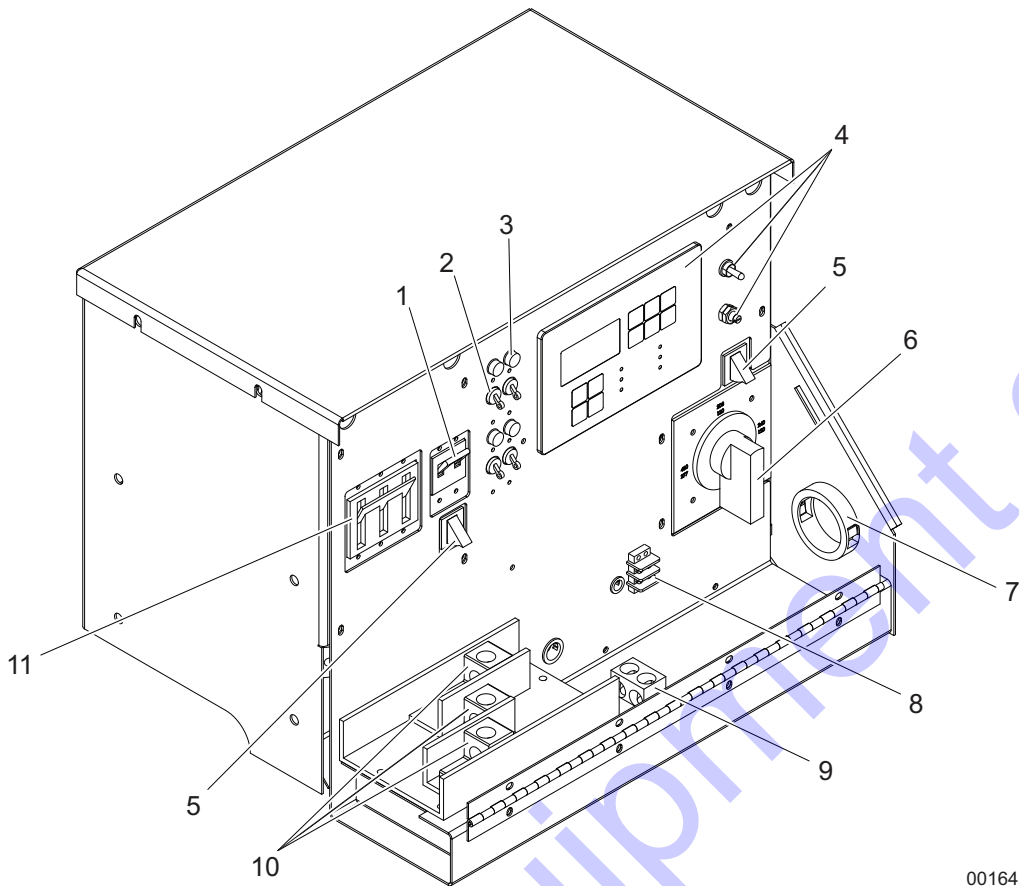
Do not extend the mast beyond the colored mark on the middle mast tube (G). A limit switch on the main mast section will disconnect power to the upper electric winch to prevent overextending the mast.

7. Rotate the mast by loosening the mast rotation knob at the bottom of the mast (H). Turn the mast until the lights face in the desired direction and then tighten the mast rotation knob to secure the mast in position.

▲ WARNING

Never raise or lower the mast while the unit is operating. Never remove the safety pin or release the mast lock while the mast is up. Releasing the lock will cause the mast to fall.

MAIN CONTROL PANEL



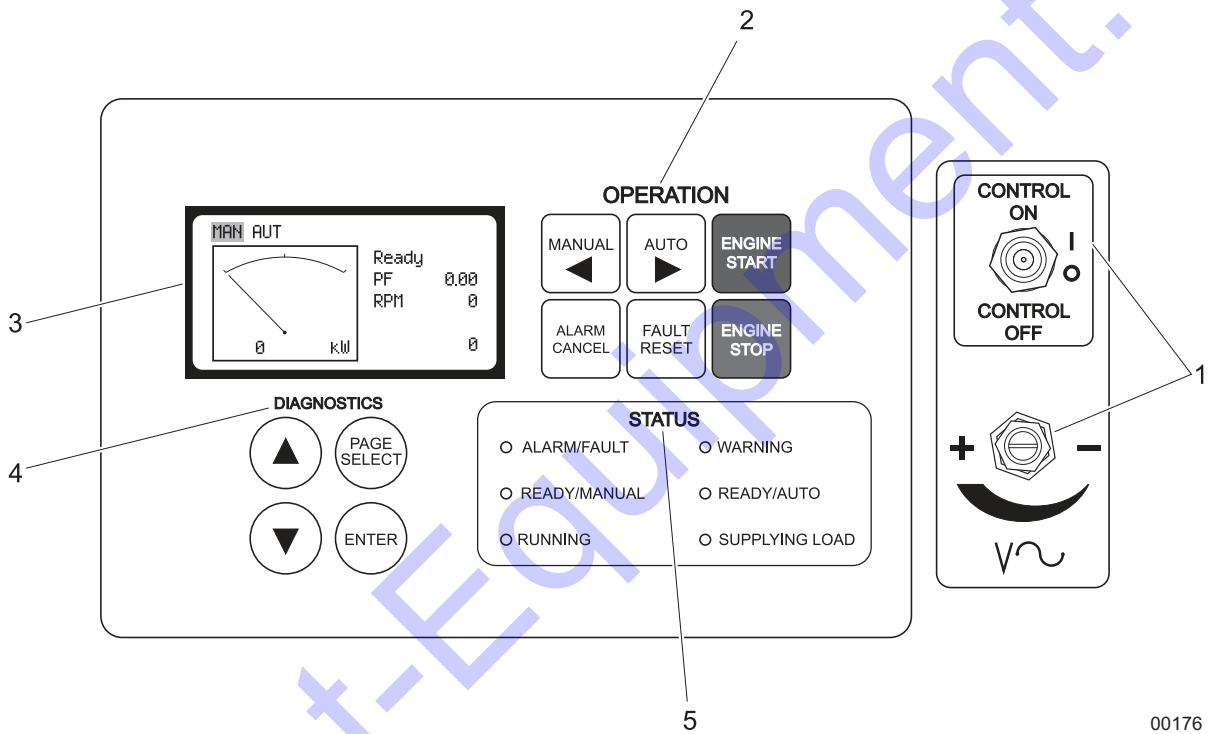
00164

1. **RECEPTACLE PANEL MAIN CIRCUIT BREAKER (100A):** This breaker disconnects power to the receptacle panel.
2. **INDIVIDUAL CIRCUIT BREAKERS:** One breaker is supplied for each light.
3. **BALLAST INDICATOR LIGHTS:** Indicates power from the ballast to each light.
4. **ENGINE CONTROL PANEL:** Refer to "*Magnum Digital Controller (MDC)*" on page 19.
5. **LUG DOOR SAFETY SWITCHES:** These switches will shut down the unit if the lug door is opened when the unit is running.
6. **VOLTAGE SELECTOR SWITCH:** This switch will change the generator output between three phase and single phase power. For more information, refer to "*Voltage Selector Switch*" on page 25.
7. **CABLE ACCESS:** Allows for entry of load cables to the connection lugs with the lug box door closed.
8. **REMOTE START TERMINAL BLOCK:** Allows connections for remote starting of the unit.
9. **GENERATOR GROUND CONNECTION LUG:** This is for connecting a good earthen ground per any local, state or National Electrical Code (NEC) guidelines before starting the unit.
10. **GENERATOR OUTPUT CONNECTION LUGS:** These allow appropriate loads to be wired directly to the generator.
11. **MAIN CIRCUIT BREAKER (90A):** This breaker will disconnect power to the connection lugs.

MAGNUM DIGITAL CONTROLLER (MDC)

The Magnum Digital Controller (MDC) is an enhanced digital controller used to start, stop and monitor the operation of the generator and the engine. The controller constantly monitors vital generator and engine functions for a number of preprogrammed 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 shutdown; to resume operation, the fault condition must be resolved. The controller has the ability to provide the display readout in English and Spanish; other languages are available. A print out of the screen is also available. This 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.

The MDC panel consists of five sections: the Control Power switch and Fine Voltage Adjustment screw, the Operation keypad, the LCD window, the Diagnostics keypad, and the Status Light Emitting Diodes (LED's).



00176

DIGITAL CONTROLLER FEATURES AND FUNCTIONS

1. The Control Power Switch and Fine Voltage Adjustment Screw

- **Control Power Switch:** This toggle switch powers up the control panel.
- **Fine Voltage Adjustment Screw:** This screw may be adjusted to set the generator output voltage after the voltage selector switch has been changed from one phase to another. This adjustment **MUST** be accomplished within 45 seconds of startup, during the "V Detect", so that the unit does not experience a shutdown alarm for "over or under voltage". For more information, refer to "[Fine Voltage Adjustment](#)" on page 33.

2. The Operation Keypad

- **Engine Start:** Press the green Engine Start button to start the unit. The unit must be in the "MAN" mode in the upper left corner of the LCD window and the Ready/Manual LED lit in the Status portion of the controller.
- **Engine Stop:** Press the red Engine Stop button to shut down the unit and start the stop value timer.
- **Manual ◀:** Press this button to change from the Automatic (Remote) mode to Manual mode.
- **Auto ▶:** Press this button to change from Manual mode to Automatic (Remote) mode.
- **Alarm Cancel:** When an alarm is activated, press this button to silence and cancel the alarm.
- **Fault Reset:** Press this button to clear the fault from the LCD window after the fault has been corrected.

3. The Liquid Crystal Display (LCD)

- This window will toggle between the Generator screen and the Engine screen upon startup of the unit. By viewing these screens, the operator will be able to monitor both the engine and generator status while the unit is running.

4. The Diagnostics Keypad

- **▲**: Press this button to scroll up within the LCD window.
- **▼**: Press this button to scroll down within the LCD window.
- **Page Select**: Pressing this button will select the next display screen.
- **Enter**: Pressing this button will place you inside the particular display to review the unit's preprogrammed setpoints or parameters.

5. The Status Light Emitting Diodes (LED's)

- These six LED's will illuminate to display the current operational status of the unit:
 - **Alarm/Fault**: Indicates active or inactive alarms, but not reset shutdown 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 to the generator.

GENERATOR MONITORING

Generator information is shown on the Liquid Crystal Display (LCD) window in a toggling manner with the engine information after the first 60 seconds of operation, then every five seconds. The Generator screen will show frequency, line to neutral voltage, line to line voltage and amperage.

Note: When loading the generator, it is important to observe the amperage to determine the load balance on each line of the generator. Minor load unbalances, usually 10% or less, will not cause any particular problems. Every effort should be made to distribute the load equally between all lines.

- **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 the AC output amperage produced by the generator.

GENERATOR SCREEN

Gen freq			60.0Hz
L1N	120V	L12	208V
L2N	120V	L23	208V
L3N	120V	L31	208V
A	226	222	223

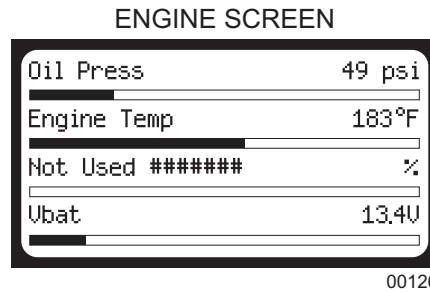
00133

ENGINE MONITORING

Engine information is shown on the Liquid Crystal Display (LCD) window in a toggling manner with the generator information after the first 60 seconds of operation and then every five seconds. The Engine screen will show oil pressure, engine coolant temperature, and battery voltage.

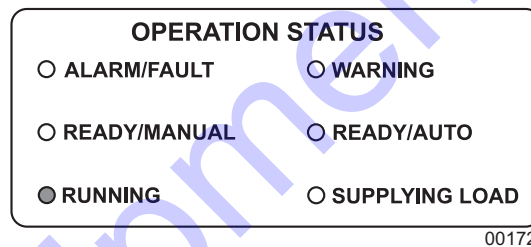
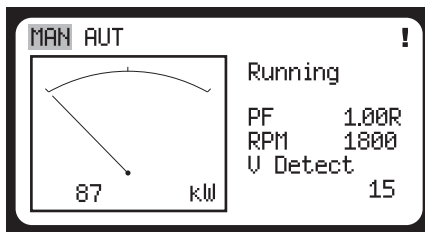
- **Oil Press**: Displays engine oil pressure. The display registers oil pressure between 0-100 psi (0-689 kPa). Normal operating pressure is between 35-80 psi (241-552 kPa).
- **Engine Temp**: Displays the temperature of the engine's coolant. If the coolant temperature exceeds the maximum water temperature of 230°F (110°C) the engine will automatically shut down. Zero will be displayed until a minimum temperature of 100°F (38°C) is reached.

- **Vbat:** Displays the engine battery voltage. A normal reading is 13-14V on 12 volt systems and 24-26V on 24 volt systems (with the engine running).

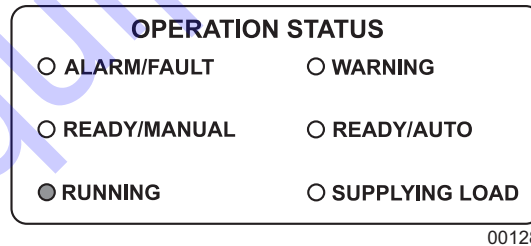
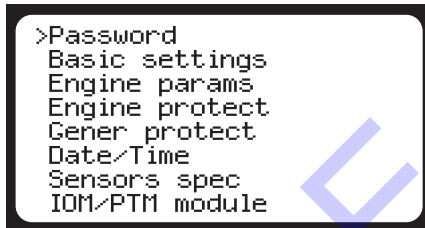


Additional information may be viewed while the unit is in Manual or Auto mode. By pressing the Page Select button, the operator will select one of the following screens: Running screen, Password screen, or History screen. In each of these page selections, the operator may press the ▲ or ▼ buttons to display additional information as follows:

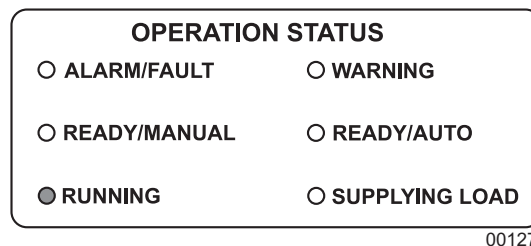
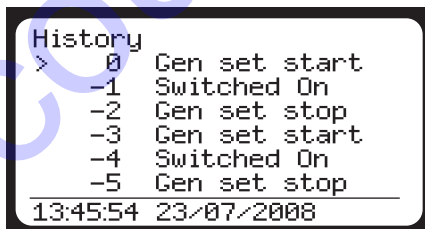
- **Running Screen:** The operator may press the ▲ or ▼ buttons to display the Alarm List screen, Run Hours screen, Engine screen and Generator screen.



- **Password Screen:** The operator may press the ▲ or ▼ buttons to move the cursor (>) up or down a list of text.



- **History Screen:** The operator may press the ▲ or ▼ buttons to move the cursor (>) up or down a list of recent alarm or shutdown codes. Pressing the Enter button at a particular selection (>) will allow the operator to scroll to the right in the LCD window to view the unit's operating parameters at the time of the alarm or shutdown. The history of alarms or codes is saved in the digital controller. The most recent alarm or code is the first to be listed, with the time/date of the alarm or code at the bottom of the screen. The controller stores up to 117 codes. When full, the controller will automatically remove the oldest file. These codes will not be lost when the Control Power switch is powered off.



Note: To view the display screen longer, push the Page Select button until you reach the Ready screen. Then press the ▲ or ▼ buttons to navigate to the screens you want. The screens will display for approximately 45 seconds.

MDC INFORMATION DISPLAYS, FUNCTIONS, AND RESET

The Magnum Digital Controller (MDC) constantly monitors vital generator and engine functions for a number of operation, alarm, and fault conditions. When a fault condition occurs, the engine will shut down automatically and the Liquid Crystal Display (LCD) window will show the fault that has caused the shutdown. To resume operation, the fault condition must be resolved. To reset the controller and resume operation, press FAULT RESET.

The operation of the MDC is divided into the following sections:

MAGNUM DIGITAL CONTROLLER (MDC) – OPERATIONAL STATUS

The Magnum Digital Controller (MDC) displays the operational status of the unit using the following codes:

No.	Engine State	Description
1	AfterCool	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	The unit is running at nominal speed and GCB OPEN/CLOSE is closed.
7	Not Ready	The unit is not ready to start.
8	Pause	Pause between start attempts.
9	Prestart	Prestart sequence in process, prestart output is closed.
10	Ready	The unit is ready to run.
11	Running	The unit is running at nominal speed.
12	Shutdown	Shutdown alarm is activated.
13	Starting	Starting speed is reached and the <i>idle timer</i> is running.
14	Stop	Stop.

No.	Electrical State	Description
1	StabilTO	Stabilization timeout.

MAGNUM DIGITAL CONTROLLER (MDC) - ALARM MANAGEMENT

The Magnum Digital Controller (MDC) is capable of displaying the following alarms:

No.	Type	Description
1	Sensor fail (FLS)	Sensor fail is detected when measured value is 6% out of the selected characteristic. Sensor fail is indicated by ##### symbol instead of measured value.
2	Warning (WRN)	When warning comes up, refer to list of alarms.
3	Shutdown (SD)	When the shutdown alarm comes up, the digital controller opens outputs GCB CLOSE/OPEN, FUEL, SOLENOID, STARTER and PRESTART to stop the engine immediately.

MAGNUM DIGITAL CONTROLLER (MDC) - LIST OF ALARMS

Shutdown and warning fault conditions and the displayed message are described in the following table:

No.	Events Specification	Protection Type	Information on Binary Output Available	Description
1	AnInIOM Sd	SD	YES	Shutdown alarm configurable on the input of IG-IOM/IGS-PTM.
2	AnInIOM Wrn	WRN	YES	Warning alarm configurable on the input of IG-IOM/IGS-PTM.
3	Battery Flat (low battery)	SD	YES	If the controller switches off during starting sequence due to bad battery condition, it doesn't try to start again and activates this protection.
4	Binary Input	CONFIG.	YES	Configurable Warning/Shutdown alarms on the inputs of IL-NT.
5	ChrgAlternFail	WRN	YES	Failure of the alternator to charge the battery.
6	EmergencyStop	SD	NO	If the red <i>emergency stop</i> switch is pushed or opened, shutdown is immediately activated.
7	Engine Temp Sd	SD	NO	Water temperature is greater than <i>Sd Water Temp</i> setpoint.
8	Engine Temp Wrn	WRN	YES	Water temperature is greater than <i>Wrn Water Temp</i> setpoint.
9	Fgen<, >	SD	YES	The generator frequency is out of limits given by <i>Gen >f</i> and <i>Gen <f</i> setpoints.
10	GCB fail	SD	NO	Failure of the generator circuit breaker.
11	Igen unbl	SD	NO	The generator current is unbalanced.
12	Low BackupBatt	WRN	NO	RTC backup battery is flat (low).
13	Oil Press Sd	SD	NO	Oil pressure is smaller than <i>Sd Oil Press</i> setpoint.
14	Oil Press Wrn	WRN	YES	Oil pressure is smaller than <i>Wrn Oil Press</i> setpoint.
15	Overload	SD	YES	The load is greater than the value given by <i>Overload</i> setpoint.
16	Overspeed	SD	YES	The protection comes active if the speed is greater than <i>Overspeed</i> setpoint.
17	ParamFail	NONE	NO	Wrong checksum of parameters. Happens typically after downloading new firmware or changing of the parameter. The controller stays in INIT mode. Check all parameters, write at least one new parameter.
18	PickupFault	SD	NO	Failure of the magnetic pick up sensor for speed measurement.
19	Sd IOM fail	SD	NO	Shutdown alarm in case of lost connection to IOM/IGS-PTM module.
20	SprinklActive	WRN	NO	The protection is active if the output <i>Sprinkler</i> is closed.
21	Start failed	SD	YES	Unit did not start.
22	Stop fail	SD	YES	Unit did not stop.
23	Vbat	WRN	YES	Battery voltage is out of limits given by <i>Batt Undervolt</i> setpoints.
24	Underspeed	SD	YES	During starting of the engine, when the RPM reaches the value of <i>Starting RPM</i> setpoint, the starter is switched off and the speed of the engine can drop under <i>Start RPM</i> again. Then the <i>Underspeed</i> protection becomes active. Protection evaluation starts 5 seconds after startup.

No.	Events Specification	Protection Type	Information on Binary Output Available	Description
25	Vgen<, >	SD	YES	The generator voltage is out of limits given by <i>Gen <V</i> and <i>Gen >V</i> setpoints.
26	Vgen unbal	SD	NO	The generator voltage is unbalanced more than the value of <i>Volt unbal</i> setpoint.
27	WrnMaintenance	WRN	NO	The period for servicing is set by the <i>WrnMaintenance</i> setpoint. The protection comes active if the running hours of the engine reach this value.

MAGNUM DIGITAL CONTROLLER (MDC) – HISTORY

The Magnum Digital Controller (MDC) stores a record of each important event in the history file of the controller. The history file seats 117 records. When the history file is full, the oldest records are removed.

No.	Record Structure Abbreviation	Historical Value
1	AIM1	IG-IOM, IGS-PTM analog input 1 value (when configured IG-IOM, IGS-PTM)
2	Date	Date of historical event in format DD/MM/YY
3	OilP	IL-NT analog input 1 value (default: oil pressure)
4	Vg2	Generator voltage L2
5	RPM	Engine speed
6	Ig2	Generator current L2
7	Ubat	Battery voltage
8	EngT	IL-NT analog input 2 value (default: water temperature)

ADJUSTING THE DISPLAY BACKLIGHTING

The backlighting on the Liquid Crystal Display (LCD) window may be adjusted by the operator whenever the Magnum Digital Controller (MDC) is powered up.

1. Press and hold ENTER and press ▲ or ▼ to increase or decrease the brightness as needed.
2. Release ENTER when the desired brightness is attained.

GENERATOR OUTPUT CONNECTION LUGS

The unit is equipped with connection lugs, located behind a door below the controller face. The lugs provide connection points for attachment of external loads to the generator. A large decal on the inside of the connection lug door details the proper connections for selected voltages.

⚠ WARNING

It is **HIGHLY RECOMMENDED** that only a trained and licensed electrician perform any wiring and related connections to the generator. Installation should be in compliance with the National Electrical Code (NEC), state and local regulations. Failure to follow proper installation requirements may result in equipment or property damage, personal injury or death.

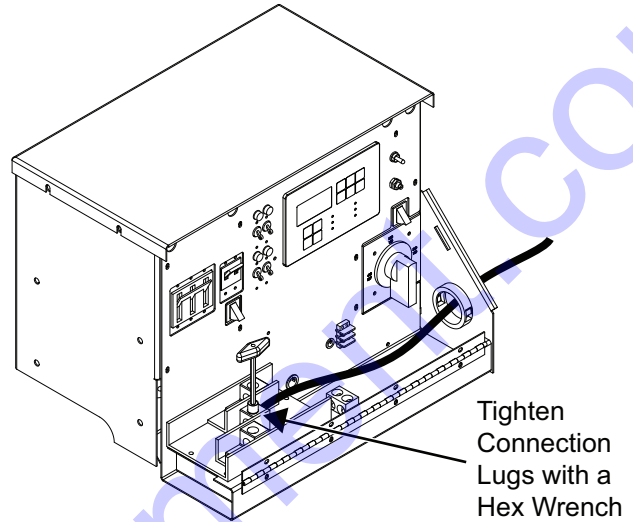
⚠ WARNING

Before any connections are made to the generator, make sure that the main circuit breaker and the Control Power switch are in the OFF (O) position. Potentially lethal voltages may be present at the generator connection lugs.

⚠ DANGER

IMPROPER OR INCORRECT CONNECTIONS TO A BUILDING'S ELECTRICAL SYSTEM CAN CAUSE POTENTIALLY LETHAL VOLTAGE TO BACKFEED INTO UTILITY LINES. THIS MAY RESULT IN INJURY OR ELECTROCUTION TO UTILITY WORKERS NEARBY. MAKE SURE THE GENERATOR IS SUPPLYING POWER TO AN ISOLATED OBJECT OR BUILDING THAT IS NOT CONNECTED TO ANY UTILITY LINES.

Connections to the lugs should be made by running the power cables through the circular plastic bushing on the lower right side of the control box. **DO NOT** make any connections directly to the lugs without routing the cables through this bushing. The lug door is equipped with safety interlock switches that will automatically trip the main circuit breaker and disable the voltage regulator when the lug door is opened. Use a hex-wrench to tighten the cable connections.



⚠ WARNING

Never attempt to disable or modify the lug door safety switches. Equipment damage, personal injury or death may result.

A ground connection is located next to the connection lugs. The unit **MUST** be connected to a good earthen ground for proper operating safety. **INSTALLATION SHOULD BE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), STATE AND LOCAL REGULATIONS.**

00134

VOLTAGE SELECTOR SWITCH

The voltage selector switch mechanically changes the connections between the generator output leads and the connection lugs on the main control panel. Voltage ranges are selected by rotating the handle on the switch to the desired voltage.

NOTICE

NEVER change the voltage selector switch while the engine is running or the controller is on. If the engine is running or starts while the setting is changed, severe arcing will occur causing damage to the switch and generator windings.

The voltage selector switch is equipped with a lockout mechanism. Once the proper voltage has been selected, insert a padlock through the lockout hole(s). By locking the handle in place, unauthorized changing of the voltage setting is prevented.

277/480V 3-PHASE

<p style="font-size: small; text-align: center;">Switch styles vary by model.</p>		<p>L1-L2 = 480V L1-N = 277V N = \perp</p> <p>L2-L3 = 480V L2-N = 277V</p> <p>L3-L1 = 480V L3-N = 277V</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th colspan="3" style="text-align: center; background-color: #f2f2f2;">VOLTAGES AT RECEPTACLES</th> </tr> <tr> <th style="text-align: center; background-color: #f2f2f2;">RECEPTACLE</th> <th style="text-align: center; background-color: #f2f2f2;">L-L</th> <th style="text-align: center; background-color: #f2f2f2;">L-N</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">GFCI</td> <td style="text-align: center;">-</td> <td style="text-align: center; background-color: #cccccc;">139V</td> </tr> <tr> <td style="text-align: center;">GFCI w/Buck</td> <td style="text-align: center;">-</td> <td style="text-align: center;">120V</td> </tr> <tr> <td style="text-align: center;">Twist-locks</td> <td style="text-align: center;">240V</td> <td style="text-align: center; background-color: #cccccc;">139V</td> </tr> </tbody> </table>	VOLTAGES AT RECEPTACLES			RECEPTACLE	L-L	L-N	GFCI	-	139V	GFCI w/Buck	-	120V	Twist-locks	240V	139V
VOLTAGES AT RECEPTACLES																	
RECEPTACLE	L-L	L-N															
GFCI	-	139V															
GFCI w/Buck	-	120V															
Twist-locks	240V	139V															

= Not recommended for normal use

00083

120/208V 3-PHASE

Switch styles vary by model.

L1-L2 = 208V L1-N = 120V N = \perp

L2-L3 = 208V L2-N = 120V

L3-L1 = 208V L3-N = 120V

VOLTAGES AT RECEPTACLES		
RECEPTACLE	L-L	L-N
GFCI	-	120V
GFCI w/Buck	-	120V
Twist-locks	208V	120V

00085

120/240V 3-PHASE

Switch styles vary by model.

L1-L2 = 240V L1-N = 120V N = \perp

L2-L3 = 240V L2-N = 208V

L3-L1 = 240V L3-N = 120V

VOLTAGES AT RECEPTACLES		
RECEPTACLE	L-L	L-N
GFCI	-	120V
GFCI w/Buck	-	120V
Twist-locks	120V	0/120V

4 Position Voltage Selector Switch Option

00086

= Not recommended for normal use

120/240V 1-PHASE

Switch styles vary by model.

L1-L2 = - L1-N = 120V N = \perp

L2-L3 = - L2-N = -

L3-L1 = 240V L3-N = 120V

VOLTAGES AT RECEPTACLES		
RECEPTACLE	L-L	L-N
GFCI	-	120V
GFCI w/Buck	-	120V
Twist-locks	240V	120V

00087

PRESTART CHECKLIST

Before starting the unit, all items in the prestart checklist must be completed. This checklist applies to both manual and remote starting of the unit.

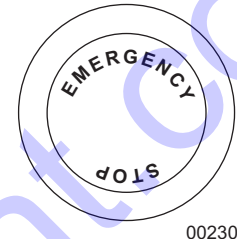
- Read and understand **ALL** safety sections at the beginning of this manual.
- Ensure all maintenance procedures are up to date. For more information, refer to *“General Maintenance” on page 38* and *“Basic Maintenance Schedule - Isuzu Engine” on page 40*.
- The unit must be level.
- The unit must be dry. Check for any water inside, on, or near the unit; dry if needed.
- Ensure the unit is properly grounded to a good earthen ground. Installation should be in compliance with the National Electrical Code (NEC), state and local regulations.
- Switch the Control Power switch to the OFF (O) position.
- Switch all circuit breakers to the OFF (O) position.
- Inspect all electrical cords; repair or replace any that are cut, worn, or bare.
- Ensure all winch cables are in good condition and centered on each pulley. Do not use if cables are kinked or beginning to unravel.
- Check oil, coolant, and fuel levels. For more information, refer to *“General Maintenance” on page 38*.
- Ensure battery connections are secure.
- Turn the battery disconnect switch on, if equipped.
- Check the engine fan belt tension and condition.

- Check the engine fan belt guard.
- Check the engine exhaust system for loose or rusted components.
- Ensure all covers are in place and secure.
- Ensure all electrical connections at the connection lugs, if equipped, are tight and wired correctly.
- Ensure the voltage selector switch is set to the desired voltage and locked.
- Ensure the emergency stop switch is pulled out.

EMERGENCY STOP SWITCH

The unit is equipped with one emergency stop switch. For location of the emergency stop switch, refer to *“Component Locations” on page 14*. The red switch 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 red button in until it locks down. This will trip the main circuit breaker which will open 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.



00230

The switch will remain locked until it is pulled out.

NOTICE

Use the emergency stop switch only when the unit must be shut down immediately. For any other shut down, refer to *“Shutting Down the Unit” on page 34*.

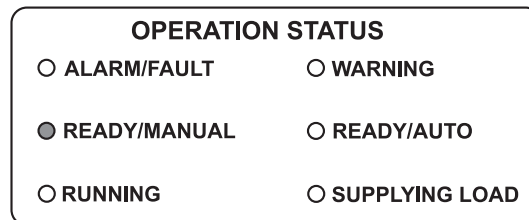
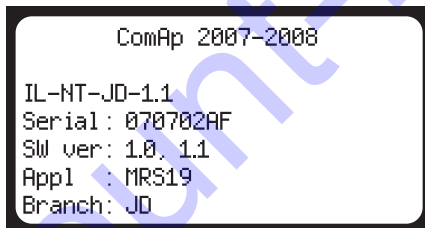
MANUAL STARTING OF THE UNIT

1. Move the Control Power switch to the ON (I) position.

⚠ DANGER

CARBON MONOXIDE: USING A GENERATOR INDOORS CAN KILL YOU IN MINUTES.

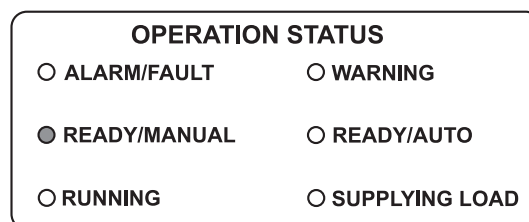
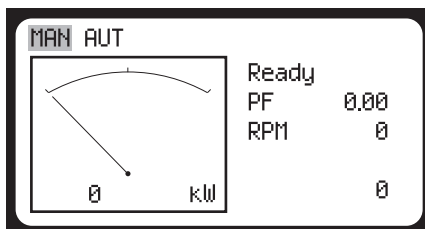
2. The Liquid Crystal Display (LCD) window will quickly display system information, all Light Emitting Diodes (LED's) will flash.



00174

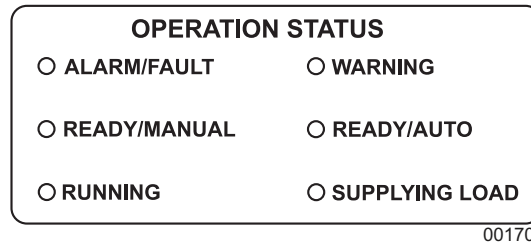
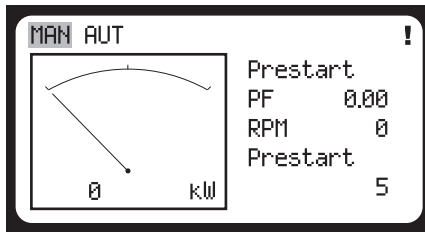
3. The Ready screen will be displayed and the LCD window will indicate Manual mode. The Ready/Manual LED will be lit.

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



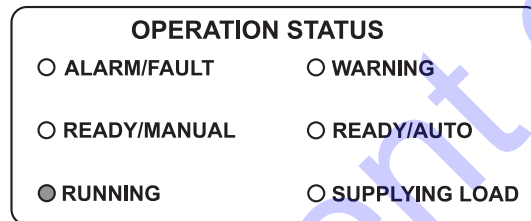
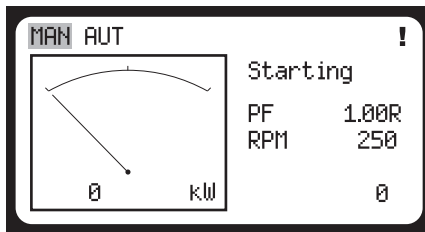
00171

4. Press ENGINE START. The Prestart screen will be displayed (if equipped) and a countdown will begin from 20 seconds to 0.



00170

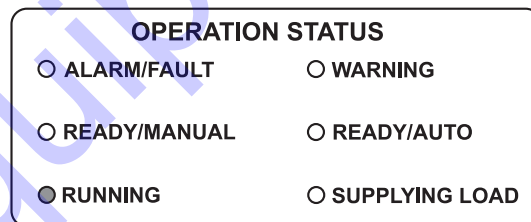
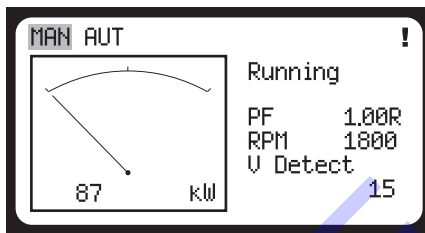
5. The Starting screen will be displayed. The engine will crank and start running.



00173

6. The Running screen will display.

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



00172

7. The LCD window will then toggle from the Running screen to the Generator screen and then to the Engine screen.

GENERATOR SCREEN

Gen freq	60.0Hz		
L1N	120V	L12	208V
L2N	120V	L23	208V
L3N	120V	L31	208V
A	226	222	223

ENGINE SCREEN

Oil Press	49 psi
Engine Temp	183°F
Not Used #####	%
Ubat	13.4V

00169

8. If the engine does not start after the first cranking 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 LCD window will show "SD START FAIL". The starting sequence may be repeated after the starter has had a minimum of two minutes to cool. Press FAULT RESET to clear the controller. To start the unit, press ENGINE START.
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 (38°C).

11. Check the unit for excessive noise or vibration and any coolant, oil, or fuel leaks before applying any loads.
12. Check that the AC output voltage is correct. The output voltage can be fine adjusted by using the fine voltage adjustment screw (rheostat). Refer to *"Fine Voltage Adjustment" on page 33*.
13. Check that 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 attached and secured correctly, switch the main circuit breaker to the ON (I) position and then add any loads attached to the receptacle panel receptacles by switching the respective circuit breaker to the ON (I) position. You will notice a slight change in engine sound when a load is applied to the unit.

AUTO (REMOTE) STARTING OF THE UNIT

The Auto button is used when the unit is started from a location other than the control panel by using a transfer switch. Auto (remote start) is the normal setting when the unit is being used as a standby power supply. Before putting the unit in the Auto mode, review the *"Prestart Checklist" on page 26* and *"Manual Starting of the Unit" on page 27*. Also 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. Refer to *"Transfer Switch" on page 32*. Then continue with the steps described below:

1. Perform a manual start of the unit at least once to verify that 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 "AUT" 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 Magnum Digital Controller (MDC) 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 the unit is in Auto mode. The LCD window should have "AUT" highlighted in the upper left corner.
5. Close the main circuit breaker (set to the ON (I) position).
6. Secure the unit by closing and locking all access doors.
7. The unit is now ready for remote starting.

AUTOMATIC SHUTDOWN

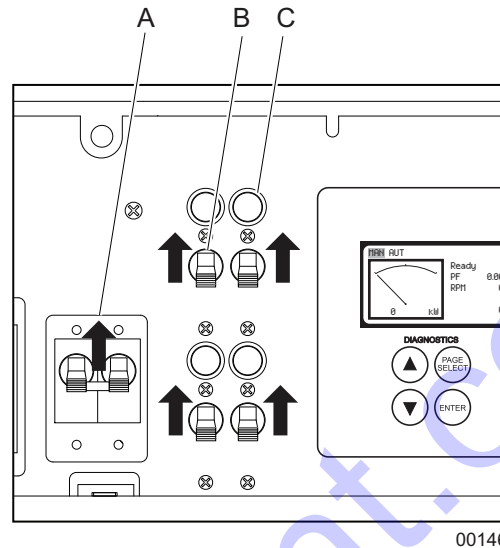
This unit is equipped with a low oil pressure and high coolant temperature automatic shutdown system. This system will automatically shut off the fuel supply to stop the engine if oil pressure drops too low or the engine exceeds normal operating temperature. Return the Control Power switch to the OFF (O) position to reset the unit after you have determined the cause of the shutdown.

LIGHT OPERATION

▲ WARNING

NEVER operate the lights without the protective lens cover, or with a lens cover that is cracked or damaged. The bulbs in the light fixtures produce high temperatures and operate under pressure. A broken or missing lens cover could cause the bulbs to shatter, causing injury.

1. Once the engine is up to temperature and running smoothly, switch the main circuit breaker (A) to the ON (I) position.
2. Switch the lights and receptacle panel main circuit breaker to the ON (I) position.
3. With the main circuit breaker on, switch each individual circuit breaker for the lights (B) to the ON (I) position, one at a time.



4. The ballast indicator lights (C) will come on and continue to get brighter as the lights warm up, and then remain on. This confirms that power is coming from the ballasts to the lights.
5. If an indicator light does not come on, the ballast may need to be serviced. If the indicator light comes on and stays lit, but the related light is not illuminated, check the bulb or the mast wiring. Refer to *"Troubleshooting the Lights" on page 45*.
6. The lights require a warm up period of 5-15 minutes before they reach full output. If the lights are shut down, they require a cool down period of approximately 10 minutes before they can be switched on again.
7. The light tower uses four 1000W bulbs. When checking or replacing the bulbs, wipe them with a clean cloth to avoid leaving any grease, oil residue or fingerprints on the glass. Any residue can create a hot spot on the bulb, causing premature bulb failure.

⚠ CAUTION

Bulbs become extremely hot when in use. Allow bulb fixture to cool 10-15 minutes before handling or lowering the mast.

VOLTAGE REGULATION

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 Magnum Power Products LLC for additional information before attempting to adjust the voltage regulator.

DERATING FOR ALTITUDE

All units are subject to derating for altitude and temperature; this will reduce the available power for operating tools and accessories connected to the receptacles. Typical reductions in performance are 2-4% for every 1000 ft (305 m) of elevation and 1% per 10°F (5.6°C) increase in ambient air temperature over 72°F (22°C).

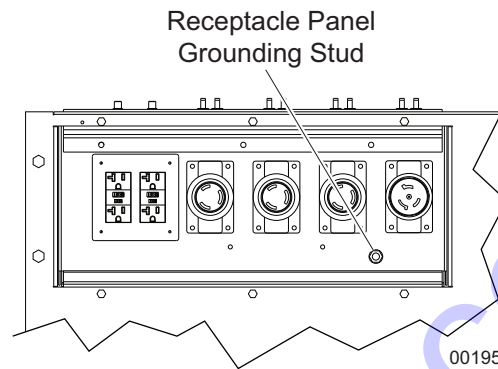
WET STACKING

The unit is powered by a diesel engine. Diesel engines are susceptible to wet stacking if lightly loaded. Wet stacking occurs when an engine is run at less than 30% of its full load capacity, causing unburned fuel to accumulate in the exhaust system. Wet stacking can be detected by continuous black exhaust when the unit is under a constant load. It can also cause fouling of injectors and buildup on engine valves. Diesel engines operate properly when applied loads are between 30% and 100% capacity. Appropriate generator sizing is determined by the anticipated load. If the unit is in a wet stack condition, load the unit heavily for five hours or until the exhaust is clear.

RECEPTACLE PANEL

The receptacle panel is equipped with six receptacles for running accessories or tools from the generator. Power is supplied to the receptacles any time the engine is running and the main circuit breaker and the receptacle panel main circuit breaker are switched to the ON (I) position. Each receptacle has an individual circuit breaker, located inside the cabinet under a flip-up cover. Each circuit breaker corresponds with each receptacle located below it on the receptacle panel.

1. 240V/30A Twist-lock
2. 120V/20A GFCI
3. 240V/50A Twist-lock



Should the main breaker, or any of the individual circuit breakers trip, remove some of the load to the receptacles before turning them back on.

With all of the lights off, the full generator output may be used with the receptacles.

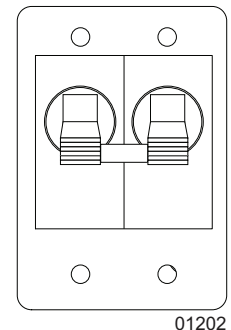
Note: To ensure proper grounding, anytime the generator is providing power to any equipment or load panels that do not have a grounded plug, a ground wire **MUST BE** added between the equipment and the grounding stud on the receptacle panel per the National Electrical Code (NEC), state and local regulations.

MAIN CIRCUIT BREAKER

The main circuit breaker is located on the main control panel. When the breaker is in the OFF (O) position, power is interrupted between the connection lugs and the generator. Once the connections have been made to the connection lugs and the unit has been started and allowed to reach normal operating temperature, the breaker may be switched to the ON (I) position.

The main circuit breaker will be tripped, disconnecting power to the connection lugs if any of the following items occur while the unit is running:

1. Overload of the generator circuits to the connection lugs (208/120V only).
2. The door covering the connection lugs is opened.
3. If the emergency stop switch is activated.



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

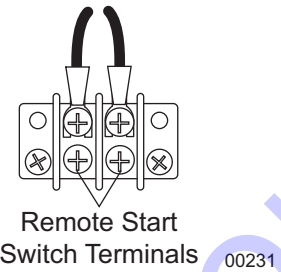
NOTICE

The main circuit breaker interrupts power to the connection lugs only. The receptacle panel receptacles have power even if the main circuit breaker is in the OFF (O) position. To disconnect power to these receptacles, use the individual circuit breakers located near each receptacle.

REMOTE START TERMINAL BLOCK

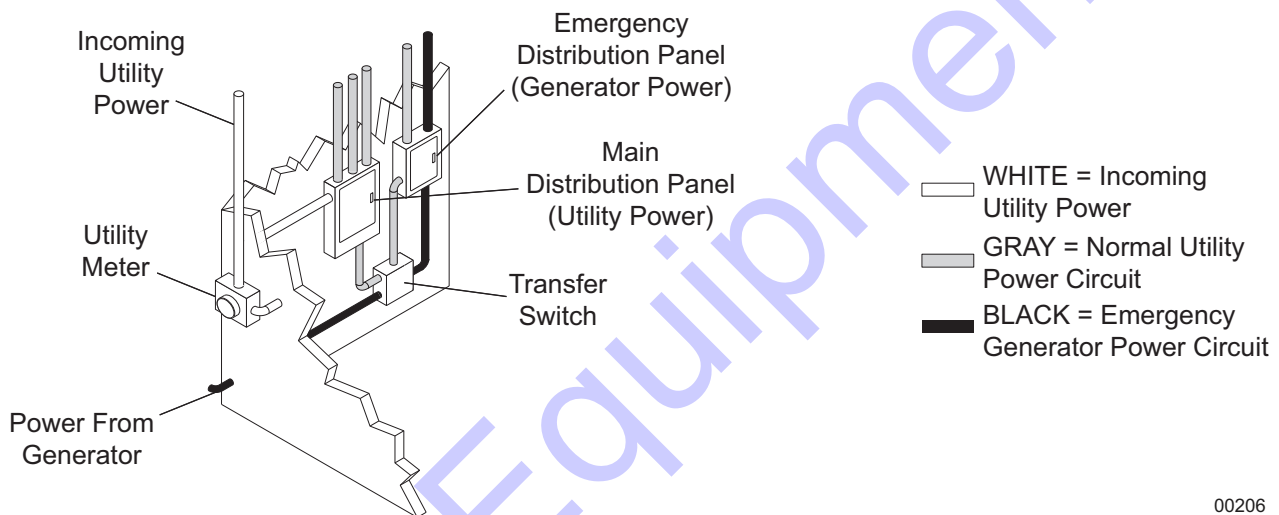
The remote start terminal block provides a connection for installation of a remote start switch which will allow the unit to be started by a remote dry-contact closure switch. For location of the remote start terminal block, refer to *“Main Control Panel” on page 18*

Before entering Auto mode, verify that the contacts on any remote switch linked to the unit are **OPEN**. If the contacts on a remote switch are closed, the engine will crank and start when Auto mode is entered. Attach the switch leads to the two unused terminals on the unit’s remote start terminal block. For additional information, refer to *“Auto (Remote) Starting of the Unit” on page 29*.



TRANSFER SWITCH

When the unit is used as a standby power supply, it must be equipped with a transfer switch which 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.



⚠ DANGER

FAILURE TO ISOLATE THE GENERATOR FROM THE NORMAL POWER UTILITY CAN CAUSE POTENTIALLY LETHAL VOLTAGE TO BACKFEED INTO THE UTILITY LINES. THIS MAY RESULT IN INJURY OR ELECTROCUTION OF UTILITY WORKERS NEARBY. MAKE SURE THE GENERATOR IS ISOLATED BY A TRANSFER SWITCH FROM ANY LOCAL UTILITY LINES. THIS ALSO APPLIES IF THE GENERATOR IS BEING USED AS A BACKUP TO SOME OTHER TYPE OF POWER SUPPLY.

Installation of a transfer switch or other type of remote starting device is the responsibility of the user. Installation of such devices must be performed by following all directions supplied by the manufacturer of the switch. If attaching the unit to a power supply normally serviced by a utility company, notify the utility company and check state and local regulations. Familiarize yourself with all instructions and warning labels supplied with the switch.

⚠ WARNING

ONLY a licensed electrician should perform wiring and related connections to the generator. Installation should be in compliance with the National Electrical Code (NEC), state and local regulations. Failure to follow these procedures could result in property damage, personal injury or death. Before any connections are attempted, make sure the main circuit breaker and the Control Power switch are in the OFF (O) position and that the negative (-) battery cable has been disconnected from the battery.

NOTICE

When using the unit as a standby or substitute power supply, make sure the output voltage and phase rotation of the generator match those of the local power utility. Improper voltage or phase rotation may cause equipment damage or malfunction.

AUTO EXERCISE TIMER

Units installed in a standby application should be exercised regularly to maintain operating condition and to ensure responsiveness in an emergency situation. The following procedure demonstrates how to run (exercise) the unit on a time schedule:

1. Press PAGE SELECT button until "Password" appears at the top of the screen.
2. Press ▼ until "Date/Time" is selected and press ENTER.
3. Press ▼ until "Timer1 Repeat" is selected and press ENTER.
4. Choose the day or days the unit should run and press ENTER.
5. Press ▼ until "Timer1 ON Time" is selected and press ENTER.
6. Adjust the desired time to start running and press ENTER.
7. Press ▼ until "Timer1Duration" is selected and press ENTER.
8. Adjust the time period to the length of time the unit should run after starting and press ENTER.
9. Press PAGE SELECT three times to return to the Main menu.
10. Press AUTO button to switch modes to automatic.

Note: The controller must be in Auto mode to run at the programmed time. Use a trickle battery charger or solargizer to prevent the controller from draining the battery while in Auto mode.

FINE VOLTAGE ADJUSTMENT

Upon startup of the unit, the Running screen will display "V Detect" and will countdown from 45 seconds to zero. This is a safety feature of the controller to protect the generator from over or under voltage upon startup.

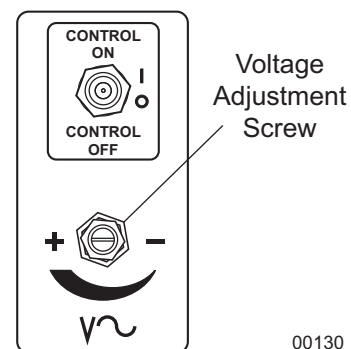
"V Detect" is a 45 second time delay and count down process before the MDC records the generator nominal output voltage. This nominal generator voltage is then compared to the current set point voltage of the voltage selector switch. If the nominal voltage recorded by the controller is greater than or lower than the current set point voltage of the voltage selector switch setting by 10% or more, the controller will shut the generator down automatically. The display will read: "Wrn Gen L1 <V", "Wrn Gen L2 <V", "Wrn Gen L3 <V" or "Sd Gen L1 <V", "Sd Gen L2 <V", "Sd Gen L3 <V". This means the controller warned (Wrn) or shut down (Sd) the unit due to an output voltage irregularity.

The output voltage of the generator may be adjusted after the generator is running by using the fine voltage adjustment screw, located directly below the Control Power switch on the control panel. This screw turns a rheostat that will provide an increase (+) or a decrease (-) in the generator output voltage as displayed on the Generator screen on the LCD window. If the voltage is increased or decreased too fast or too slow, the unit will automatically shut down. This adjustment needs to be made within the 45 second delay and countdown to zero period.

To adjust the output voltage, check the output voltage on the Generator screen. Look at the "L1N" voltage or the "L12" voltage on the screen. The generator nominal output voltage should be within 10% of the voltage rating on the voltage selector switch. Use a flat head screwdriver to 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 shown on the Generator screen must be within $\pm 10\%$ of the 208/120V position (188-228V line to line/108-132V line to neutral).

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



SHUTTING DOWN THE UNIT

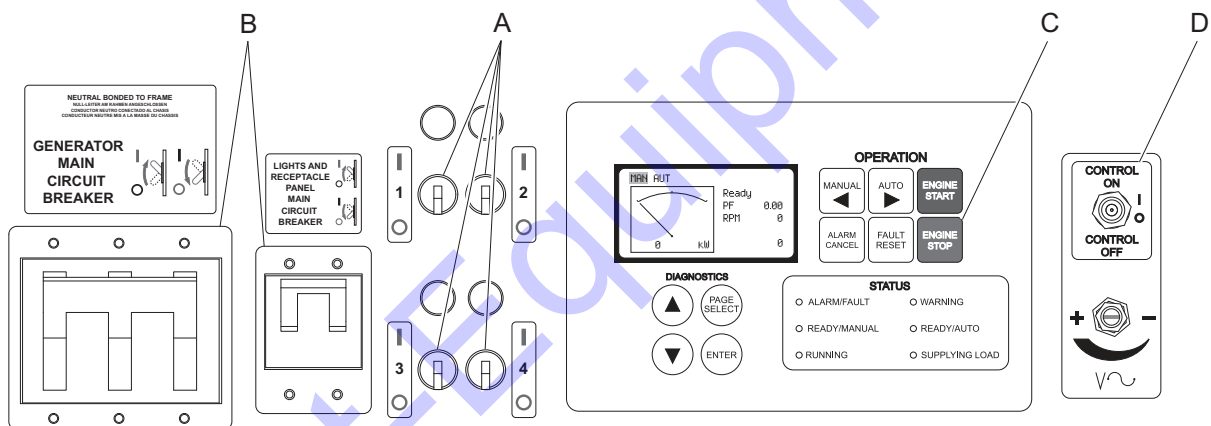
Check with personnel using power supplied by the unit and let them know the power is going to be turned off. Make sure the power shut down will not create any hazards by accidentally turning off equipment that needs to be kept on (pumps, compressors, lights, etc.).

When you have finished using the unit, proceed with shut down as follows:

1. Remove any loads from the generator output connection lugs and receptacle panel.
2. Switch the individual circuit breakers for each light (A) to the OFF (O) position.
3. Switch the generator main circuit breaker and receptacle panel main circuit breaker (B) to the OFF (O) position.
4. Push ENGINE STOP (C). Pressing the red Engine Stop button will result in the unit going into the shutdown cycle and starting a 15 second shutdown timer called stop value. If the unit does not shut down within 15 seconds, a stop fail alarm will be displayed on the Liquid Crystal Display (LCD) window.
5. Turn the Control Power switch (D) to the OFF (O) position.

⚠ CAUTION

Always switch all circuit breakers to the OFF (O) position to prevent starting the generator under load.



00200

Note: For extended storage time, disconnect the battery. For extended storage requirements, refer to the engine operator's manual.

USING THE WATER SUPPLY

⚠ CAUTION

NEVER use water in the supply tank for human consumption, even if the water is potable. The tank is made to store water for washing or domestic purposes only, drinking water from the tank could result in immediate or long term harm.

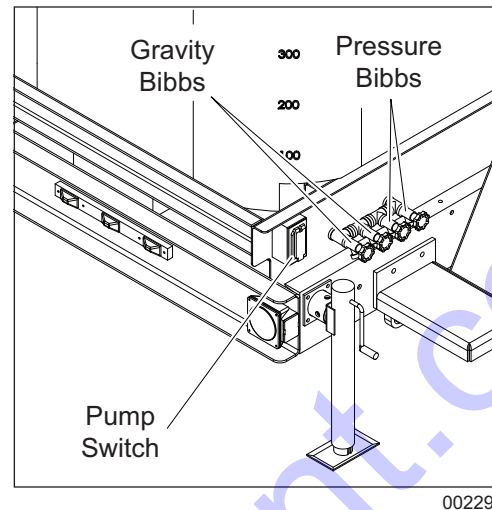
The unit comes equipped with a 500 gallon (1,895 L) water tank and a manifold with four hose bibbs. This allows the water tank to be connected to a trailer or RV for water to be used in non-potable applications. Two bibbs are for gravity feed only and two bibbs are pressurized by the onboard pump; the pump only operates when the engine is running.

TO USE THE PRESSURIZED WATER SUPPLY BIBB(S):

1. Connect a hose from one of the pressure hose bibbs to the end location (trailer, RV, etc.).
2. Start the engine on the unit.
3. Switch the main circuit breaker to the ON (I) position.
4. Open the pressure hose bibb(s).
5. Switch the pump on; it will stop automatically when the water pressure reaches 35 psi (241 kPa).

TO USE THE GRAVITY WATER SUPPLY BIBB(S):

1. Connect a hose from one of the gravity hose bibbs to the end location.
2. Open the gravity hose bibb(s).



NOTICE

Drain the tank when the temperature is expected to drop below 32°F (0°C) or if the unit is to be stored for a long period of time.

TO REFILL THE WATER TANK:

1. Close all hose bibbs.
2. Remove the tank cover; leave the smaller inspection cap in the center of the cover in place.
3. Fill the tank from a water source.

LOWERING THE MAST - MANUAL

1. Shut down the lights and engine, refer to *"Shutting Down the Unit" on page 34*. Allow the lights to cool 10-15 minutes before lowering the mast.
2. If the unit is going to be moved, it is recommended that the mast is turned so the lights face the rear of the unit. To rotate the mast:
 - A. Loosen the mast rotation knob.
 - B. Rotate the mast until the white arrows are aligned and the metal stop tabs are touching.
 - C. Tighten the mast rotation knob.

Note: For transportation, Magnum Power Products LLC strongly recommends the lights be removed from the mast and stowed. Refer to *"Removing the Lights for Transportation" on page 37*.

3. Turn the upper mast winch handle counterclockwise to collapse the mast to its lowest position. Ensure the electrical cord does not get caught in, or pinched by, the mast while it is being lowered.

▲ CAUTION

STOP IMMEDIATELY if the mast hangs up or the winch cable begins to develop slack. Excess slack in the cable could cause the mast to collapse, which could result in personal injury or equipment damage. Contact an authorized service center.

4. Release the mast lock by pulling the safety pin on the mast lock and pulling the lock bar free. Turn the handle of the lower mast winch counterclockwise until the mast rests in the transport cradle.

Note: *If the mast lock bar does not pull free, activate the lower winch slightly to relieve pressure on the mast bar.*

5. After the mast is completely down, insert the mast cradle locking pin and secure it with the safety pin.

LOWERING THE MAST - ELECTRIC WINCH OPTION

ELECTRONICALLY LOWERING THE MAST

1. Shut down the lights and engine, refer to *“Shutting Down the Unit” on page 34*. Allow the lights to cool 10-15 minutes before lowering the mast.
2. If the unit is going to be moved, it is recommended that the mast is turned so the lights face the rear of the unit. To rotate the mast:
 - A. Loosen the mast rotation knob.
 - B. Rotate the mast until the white arrows are aligned and the metal stop tabs are touching.
 - C. Tighten the mast rotation knob.

Note: *For transportation, Magnum Power Products LLC strongly recommends the lights be removed from the mast and stowed. Refer to *“Removing the Lights for Transportation” on page 37*.*

3. Press and hold the upper winch control switch downward to collapse the mast to its lowest position. Ensure the electrical cord does not get caught in, or pinched by, the mast while it is being lowered.

Note: *Some electric winch models are equipped with an anti-backlash safety limit switch. This switch will disconnect power to the winch if excess cable slack is detected, preventing accidental lowering of the mast.*

▲ CAUTION

STOP IMMEDIATELY if the mast hangs up or the winch cable begins to develop slack. Excess slack in the cable could cause the mast to collapse, which could result in personal injury or equipment damage. Contact an authorized service center.

4. Release the mast lock by pulling the safety pin on the mast lock and pulling the lock bar free. Lower the mast by holding the lower winch control switch to the right until the mast is resting in the transport cradle.

Note: *If the mast lock bar does not pull free, activate the lower winch slightly to relieve pressure on the mast bar.*

5. After the mast is completely down, insert the mast cradle locking pin and secure it with the safety pin.

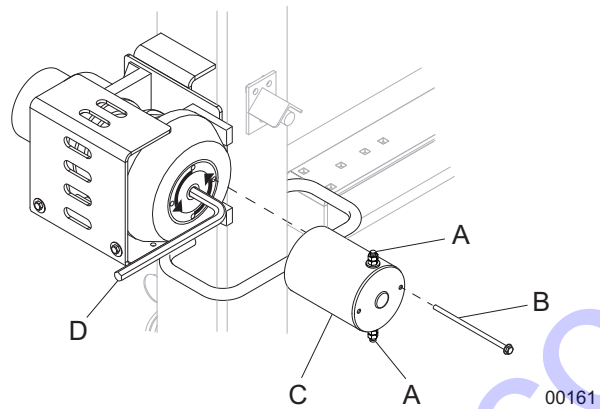
Note: *If the generator is not operational, and the batteries do not have enough power to lower the mast, it may be necessary to lower the mast manually.*

MANUALLY LOWERING THE MAST

NOTICE

Do not use this procedure unless it is absolutely necessary. Continuous use of this procedure could damage the planetary gear brake of the winch. This procedure will not work if the planetary gear brake is damaged.

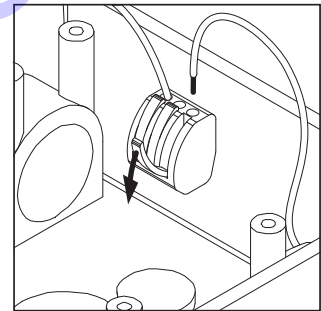
1. Remove the power cables from the two terminals on the winch motor assembly (A).
2. Remove the two flange head screws (B) securing the winch motor assembly to the winch. Retain the screws for reassembly.
3. Carefully remove the motor assembly (C), making sure the two pieces do not separate.
4. Insert a 3/8 in. hex key (D) into the sleeve bearing.
5. Rotate the wrench counter-clockwise to lower the mast. If any slack is observed in the cable, stop immediately and remove the slack.



6. When the mast is completely down, reinstall the winch motor assembly, securing it with the screws retained in step 2.

REMOVING THE LIGHTS FOR TRANSPORTATION

1. On units equipped with quick disconnect fittings for the lights, disconnect the power cords from the junction box at the top of the mast. Replace the dust caps on the junction box. On hard wired units, remove the junction box cover, located on the top of the mast, and disconnect **ONLY** the mast light wires from the connectors. To release the mast light wires from the connectors, flip the locking levers down and pull out the appropriate wires.
2. Remove the lights from the mast by removing the wing nut that holds the light fixture bracket to the cross tube. Attach the lights to the storage brackets (if equipped) located on the mast tube on either side of the central lift point.



00232

TOWING THE UNIT

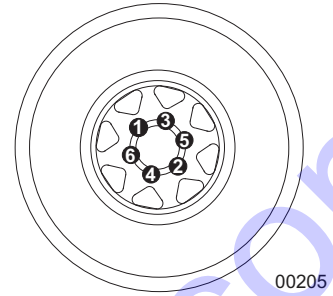
Once the engine is shut down and the mast and lights are properly stowed, follow these steps to prepare the unit for towing.

1. Raise the four leveling jacks completely and remove the locking pins to rotate them up into the travel position. Replace the locking pins.
2. Use the tongue jack to raise or lower the trailer onto the hitch of the towing vehicle. Lock the hitch coupling and attach the safety chains or cables to the vehicle. Raise the tongue jack completely.

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. To ensure proper operation of the jacks, lube the grease fittings located on the leveling jacks. Refer to [“Jack Maintenance” on page 42](#). For maintenance interval information, refer to Basic Maintenance Schedules beginning on [page 40](#).
4. Connect any trailer wiring to the tow vehicle. Check for proper operation of the directional and brake lights.
5. Make sure the mast cradle locking pin is in place.
6. Make sure the doors are properly latched.
7. If the unit is going to be driven over rough ground, remove the bulbs from the light fixtures.

8. Check for proper inflation of the trailer tires. For maximum tire pressures, refer to Specifications beginning on [page 10](#).
9. Check the wheel lugs. Tighten or replace any lugs that are loose or missing. If a tire has been removed for axle service or replaced, tighten the lugs, in the order shown, 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).

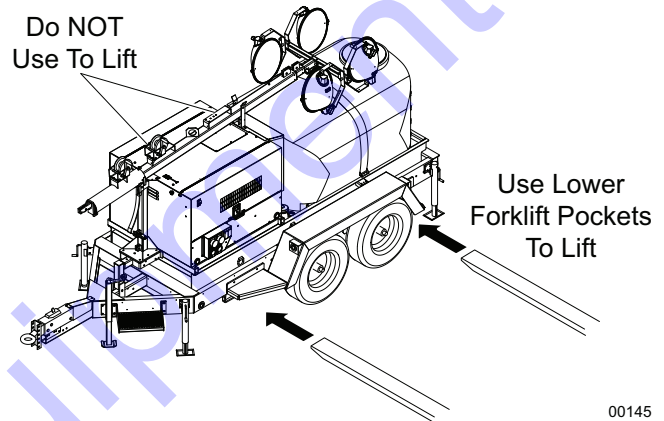


Note: After the first road use, re-torque the lug nuts in sequence.

10. Maximum recommended speed for highway towing is 45 mph (72 km/h). Recommended off-road towing speed is not to exceed 10 mph (16 km/h) or less, depending on the terrain.

LIFTING THE UNIT

⚠ WARNING
WATER TANK MUST BE EMPTY BEFORE LIFTING THE UNIT. Only lift a combination unit using the lower forklift pockets, do not use the central lift point or mast mounted forklift pockets. Failure to comply may result in damage to equipment and/or serious personal injury.



Make sure the equipment being used to lift the unit has sufficient capacity. For approximate weights, refer to [“Specifications \(1 of 2\)” on page 10](#). Make sure the mast cradle locking pin is in place. Always remain aware of people and objects around the unit while moving. Use the lower forklift pockets with care. Approach the unit as perpendicular as possible to avoid any damage to the unit. Make sure any obstructions are clear of the forklift tines before lifting.

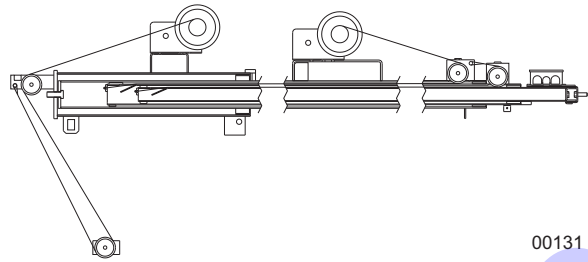
GENERAL MAINTENANCE

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

- Verify the Control Power switch is turned to the OFF (O) position.
- Verify the circuit breakers are turned to the OFF (O) position.
- Activate (push in) the emergency stop switch.
- Disconnect the negative (-) terminal on the battery.
- Attach a “Do Not Start” sign to the control panel. This will notify everyone that the unit is being serviced and will reduce the chance of someone inadvertently trying to start the unit.
- Never wash the unit with a high pressure hose or with any kind of power washer.
- Never 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.
- If the unit is stored outside, check for water inside the cabinet and generator before each use. 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.

- Check that winch cables are in good condition and are centered on each pulley. **DO NOT** use a cable that is kinked or starting to unravel.
- Check that the safety pins for the mast lock rod and mast lock bar are present and secured with a chain. Check that the spring located in the mast lock bar is not broken or missing. Check the operation of the mast lock bar.
- Check the wheel lugs. Refer to *“Removing the Lights for Transportation” on page 37.*
- Check the coolant level daily. Refer to the engine operator’s manual for coolant recommendations and proper mixture.
 - Coolant is checked visually by inspecting the level in coolant overflow jug located near the radiator.
 - Normal operating level is between the full and add markings on the overflow jug known as normal range.
 - **WHEN ENGINE IS STOPPED AND COMPLETELY COOL**, coolant may be added directly to the coolant overflow jug.
- Check the oil level daily. Refer to 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 the full and add markings on the dipstick.
 - Add oil only if oil level is below the add mark on the bottom of the cross-hatch pattern on the dipstick. **DO NOT OVERFILL** crankcase.
- Check the fuel level.
- If the unit is connected to a remote start or transfer switch, make sure the remote switch is also off and tagged.

PROPER MAST CABLE ROUTING



00131

Note: If the engine was run out of fuel or the fuel tank was drained, it may be necessary to bleed the fuel lines. Refer to the engine operator’s manual supplied with the unit.

BASIC MAINTENANCE SCHEDULE - ISUZU ENGINE

NOTICE

Refer to 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.

Use the schedule in the following table as a guide for regular maintenance intervals.

Item	Daily	250 Hours	500 Hours	1000 Hours
Check Oil Level	◆			
Check Coolant Level	◆			
Check Fuel Level	◆			
Drain Fuel Filter	◆			
Check Tire Pressure	◆			
Check All Electrical Connections	◆			
Clean Battery	◆			
Check Fan Belt Tension (Replace If Necessary)	◆			
Inspect Radiator Fins For Debris, Clean As Required	◆			
Preheating Condition Check	◆			
Check Engine Starting Conditions And Noise Conditions	◆			
Check Exhaust Smoke Condition	◆			
Inspect Light Tower Winch For Proper Operation	◆			
Replace Engine Oil*		◆		
Replace Fuel Filter Element		◆		
Clean Water Sedimenter Element		◆		
Electromagnetic Pump Filter Replacement Or Cleaning		◆		
Check Fan Belt Tension (Replace If Necessary)			◆	
Oil Filter Element Replacement*			◆	
Replace Air Filter Element			◆	
Lubricate Leveling Jacks			◆	
Replace Heated Fuel Filter (If Equipped)				◆
Inspect Engine Starting Battery				◆

* Change the oil and oil filter after the first 50 hours (break-in period, one time)

RESETTING THE TIME TO SERVICE REMINDER

The Magnum Digital Controller (MDC) will display "WrnMaintenance" 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 Time to Service reminder needs to be reset to the 250 hour interval. The following procedure demonstrates how to reset the running hours to 250:

1. With the unit shut down, power up the controller with the Control Power switch. The Initialization screen will be displayed. The controller will toggle automatically to the Ready screen.
2. Press PAGE SELECT. The next screen will display lines of text; starting with Password, which will have a cursor (>) in front of it, then Basic Settings, Engine Params, Engine Protect, etc.
3. Press ▼ to move the cursor (>) down to Engine Protect.

4. Press ENTER. "WrnMaintenance" will appear at the top left of the screen. The current service time hour setting (0) will be one line below it on the right side.
5. Press ENTER. The current run time in hours will now appear on the left side of the screen, directly under "WrnMaintenance."
6. Press ▲ and reset the current run time hour setting to 250. If you pass the 250 time interval, press ▼ to get back to the 250 time interval.
7. Press ENTER to save the current run time hour setting.
8. Move the Control Power switch to the OFF (O) position.

WINCH USE, OPERATION & MAINTENANCE - MANUAL

PRIOR TO USE

- Inspect rope or cable and replace if damaged.
- Check mounting hardware for proper tightness and re-torque if necessary.
- Gears, ratchet pivot point and shaft bushings must be kept lubricated with a thin oil or grease.

OPERATION

Take Line/Load In

1. The cable must be securely fastened to the object being lifted and to the winch drum.
2. Always be sure that the cable and cable attachments are not damaged and are strong enough for the load. Ensure there is an adequate safety factor of at least three times the maximum load for all components used.
3. Referring to the "Cable In/Cable Out" decal on the winch, turn handle according to the specified direction to lift. The ratchet **MUST** make a loud clicking sound while pulling line in.

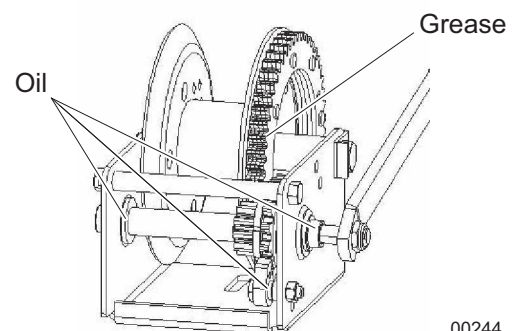
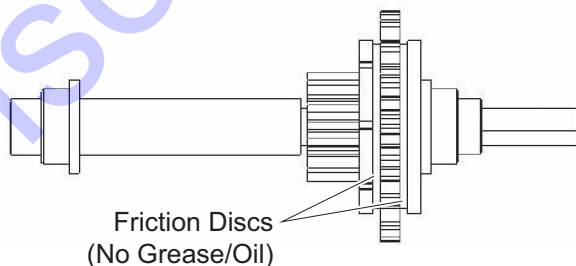
Let Line/Load Out

1. Referring to the "Cable In/Cable Out" decal on the winch, turn handle according to the specified direction to lower. No clicking will be heard because the brake system is activated.

MAINTENANCE

The following procedures should be performed at least annually:

1. The gears and bushings of the winch must be kept lubricated. Apply a thin film of grease to the gear teeth, and oil the bushings as needed.
2. The ratchet pawl pivot point must be kept lubricated with a thin oil.
3. Do not get oil or grease on the friction discs.



00244

WINCH USE, OPERATION & MAINTENANCE - ELECTRIC

- Keep the winch free of dirt, oil, grease, water and other substances.
- Check all mounting bolts and make sure they are tightened to the recommended torque values. Replace any damaged fasteners.
- Periodically check all connections to be sure they are tight and free of corrosion.
- Check the cable for visible damage every time the winch is operated. Examples of damage are: cuts, knots, mashed or frayed portions, and broken strands. Replace cable immediately if damaged. Failure to replace a damaged cable could result in breakage.
- Regularly check the brake for slippage or drift. This is detected visually when winch is under load. If winch drum continues to turn after controls are released, the brake may need to be replaced.
- Periodically clean and grease the brake assembly. This will ensure proper performance and extend the life of the winch. If winch seems to labor or get excessively hot during the lowering of loads, the brake will need to be serviced or replaced.
- Check motor brushes periodically and replace when necessary.

Note: Only the motor brushes and brake assembly require periodic replacement.

WINCH PREVENTIVE MAINTENANCE SCHEDULE

Maintenance Activity	After First Operation	Before Each Use	Semi-Annually Or After Each 25 Hours Of Operation
Check Fasteners	◆		◆
Check Electrical Connections	◆		◆
Clean And Grease Brake Assembly			◆
Check Motor Brushes			◆
Visually Check Winch And Control	◆	◆	◆

WINCH MECHANICAL BRAKE

The mechanical brake generates heat when loads are lowered and the wire cable is powered out. Care must be taken to avoid overheating the mechanical brake.

Whine or chatter associated with a new mechanical brake is normal and typically disappears with use.

Overheating the mechanical brake may result in permanent damage to, or failure of, the brake. Replace any damaged brake components before resuming use of the winch.

JACK MAINTENANCE

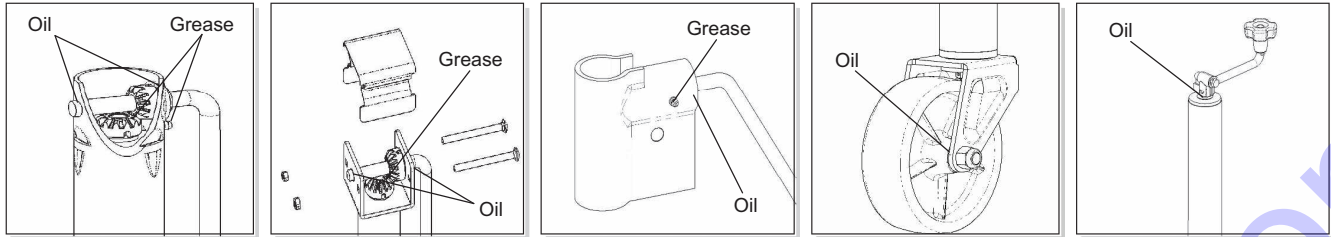
The following procedures should be performed at least annually.

SIDE-WIND MODELS

- The internal gearing and bushings of the jack 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 found 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 also be lubricated with the same lightweight oil.

TOP-WIND MODELS

- Apply a lightweight oil to the screw stem.



TRAILER WHEEL BEARINGS

The trailer axles are equipped with a grease zerk fitting to allow lubrication of the wheel bearings without the need 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 zerk 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.

LOWER RADIATOR HOSE HEATER OPTION - USE AND MAINTENANCE

▲ CAUTION

Improper use of the lower radiator hose heater could result in damage to the engine or personal injury. Do not modify the location of the lower radiator hose heater.

The following points should be followed when operating a unit equipped with a lower radiator hose heater.

- Ensure the cooling system is full of the proper mixture of water and engine coolant before each heater use.
- The heater is designed for all-night operation, however, 2-5 hours of heating just prior to starting is usually sufficient for proper engine starting.
- The unit must be level to maintain proper orientation of the heater while it is in operation.
- Use only an undamaged, outdoor rated, three-prong grounded 120VAC extension cord with a minimum amperage rating of 10A. Connect the cord to a properly grounded 120VAC, GFCI receptacle.
- Before starting the engine, unplug the extension cord from the power first, then unplug the heater cordset from the extension cord.

TROUBLESHOOTING AUTOMATIC SHUTDOWN CONDITIONS

▲ WARNING

Allow engine to cool before performing any troubleshooting procedures. Contacting the engine when it is hot will cause personal injury.

LOW OIL PRESSURE SHUTDOWN

1. Check the level of the engine oil with the dipstick. The engine controller will shut the engine down when the oil pressure is less than 20 psi (138 kPa). Add oil if required.
2. Visually inspect the engine for oil leaks.
3. If the 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 5 psi (34 kPa) within five seconds.
4. Check the oil pressure sender. To identify corrective action, refer to the troubleshooting section of the engine operator's manual provided with the unit.

HIGH COOLANT TEMPERATURE SHUTDOWN

1. Check the coolant level in the overflow jug.
2. Restart the engine and read the coolant temperature to verify a high coolant temperature shutdown. Stop the engine immediately if the coolant temperature is 230°F (110°C) or more.
3. **ALLOW THE ENGINE TO COOL.** Add coolant to the overflow jug if it is low and then check the level of coolant in the radiator. To access the radiator cap, you must remove the access panel from the top of the enclosure directly above the radiator. Add coolant until it is 3/4 in. (1.9 cm) below the filler neck. Secure the radiator cap back and access panel into their original position.
4. Check the radiator shroud and ducting for blockage and remove any foreign matter.
5. Inspect coolant hoses, engine block and water pump for visible leaks.
6. Check the tension of the serpentine drive belt for the water pump.
7. If no other problems are found, remove the load on the generator and restart the engine. Check the coolant temperature and shut the engine down immediately if it starts to overheat. For additional information on engine overheating, consult the engine operator's manual.

OVERCRANK SHUTDOWN

1. Check the fuel level in the tank.
2. Check for proper operation of the fuel pump.
3. Check the air filter for blockage.
4. If the engine will not start, consult the engine operator's manual for additional information on troubleshooting starting problems.

OVERSPEED OR UNDERSPEED SHUTDOWN

1. Disconnect all loads and restart the unit. Read the frequency (Hz) on the LCD 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. Refer to the engine operator's manual for throttle adjustments on mechanical governed units and see the electronic governor manual for electronically controlled units.

TROUBLESHOOTING THE LIGHTS

⚠ DANGER

THIS UNIT USES HIGH VOLTAGE CIRCUITS CAPABLE OF CAUSING SERIOUS INJURY OR DEATH. ONLY A QUALIFIED ELECTRICIAN SHOULD TROUBLESHOOT OR REPAIR ELECTRICAL PROBLEMS OCCURRING IN THIS EQUIPMENT.

MAST LIGHTS OFF BUT BALLAST INDICATORS ON CONTROL PANEL ARE ON

1. Mast light is too hot. Allow light to cool 10-15 minutes before restarting.
2. Faulty bulb connection. Check that the bulb is tight in the socket.
3. Bulb broken. Check for broken arc tube or outer bulb jacket, broken or loose components in bulb envelope or blackening/deposits inside tube.
4. Check the connections inside the mast junction box and each mast light housing/socket.
5. Check the mast electrical cord for damage and check the cord connections inside the control box.

MAST LIGHTS OFF AND BALLAST INDICATORS ON CONTROL PANEL ARE OFF

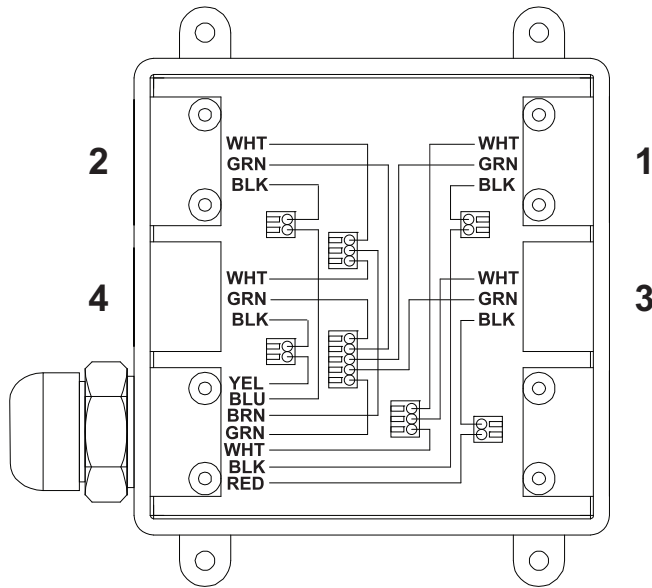
1. Check the connections inside the control box and inside each ballast box.
2. Generator output incorrect. Check the incoming voltage to the ballast by checking the available voltage on the duplex receptacle. Incoming voltage should be 120V +/- 5V. If voltage is incorrect, the engine speed may need to be adjusted or generator may require service.
3. Low transformer output. The voltage from the transformer should read approximately 400VAC as the light "strikes" (induces an arc), then drop and slowly rise back up to stabilize at 240-260VAC. On quick disconnect models, measure across the junction box terminals when the light is unplugged. On hard wired models, remove the mast junction box cover and insert the wire probes into the connector blocks for the light and ground. If proper voltage is not achieved, perform capacitor check to determine if the capacitor or coil needs to be replaced.

MAST LIGHTS ON BUT THE LIGHT OUTPUT IS LOW

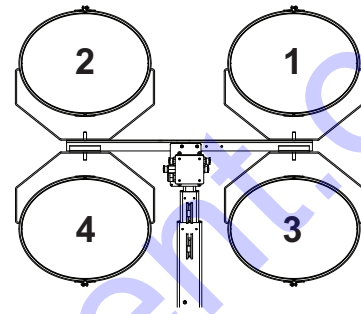
1. Fixture or lens are dirty. Clean reflective surface inside fixture and both inside and outside surface of glass lens. Use mild soap and water to clean lens. Other chemicals may have an adverse effect on the glass.
2. Bulb worn due to normal use. Replace bulb.
3. Check the mast coil cord, mast junction box and mast light connections.
4. Generator output incorrect. Check the incoming voltage to the ballast. Incoming voltage should be 120V +/- 5V. If the voltage is incorrect, the engine speed may need to be adjusted or the generator may require service.
5. Low transformer output. The voltage from the transformer should read approximately 400VAC as the light "strikes" (induces an arc), then drop and slowly rise back up to stabilize at 240-260VAC. On quick disconnect models, measure across the junction box terminals when the light is unplugged. On hard wired models, remove the mast junction box cover and insert the wire probes into the connector blocks for the light and ground. If proper voltage is not achieved, perform capacitor check to determine if the capacitor or coil needs to be replaced.

MAST LIGHT CONNECTIONS

MAST JUNCTION BOX WIRING 4-LIGHT

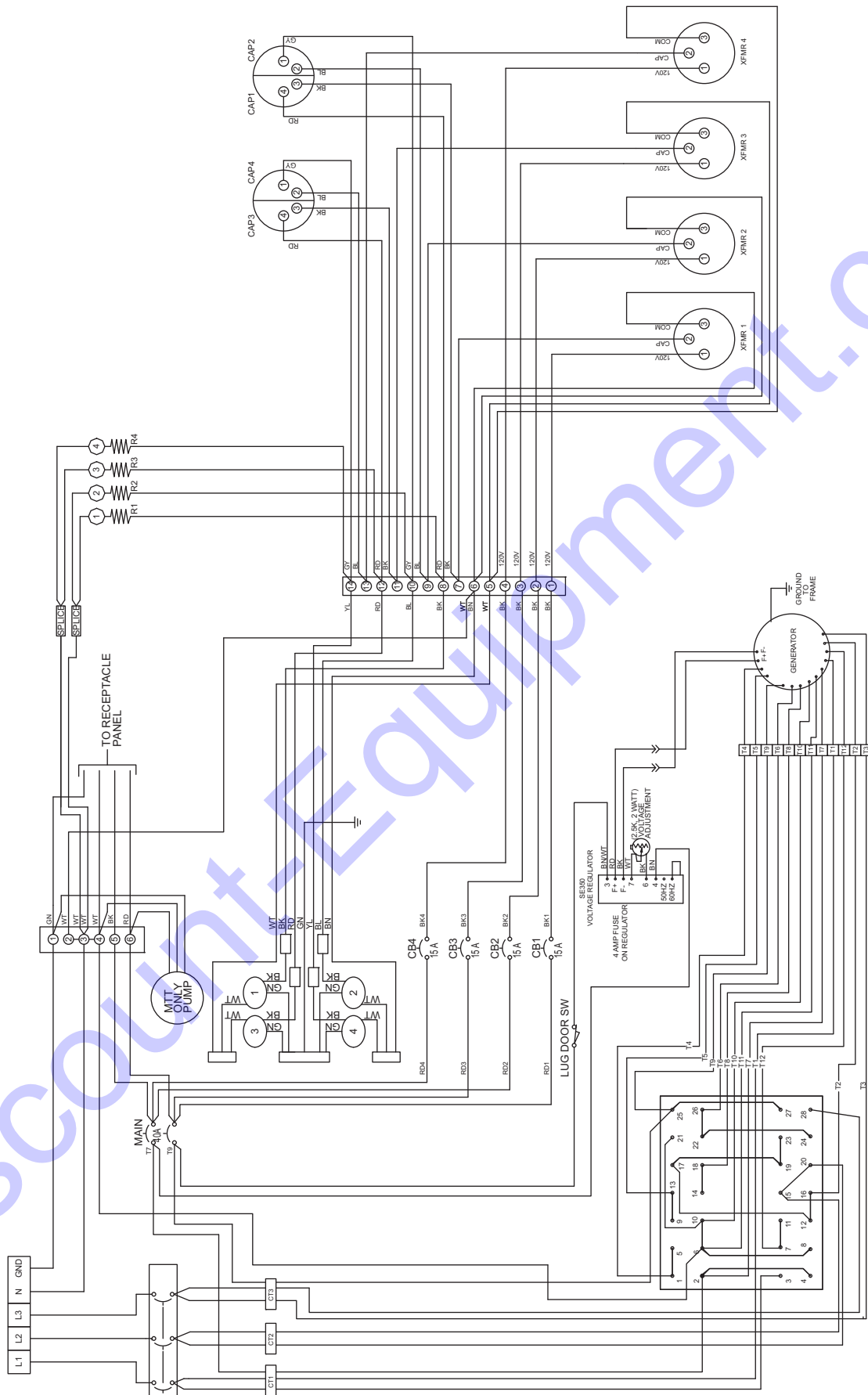


MAST LIGHT CONNECTIONS 4-LIGHT



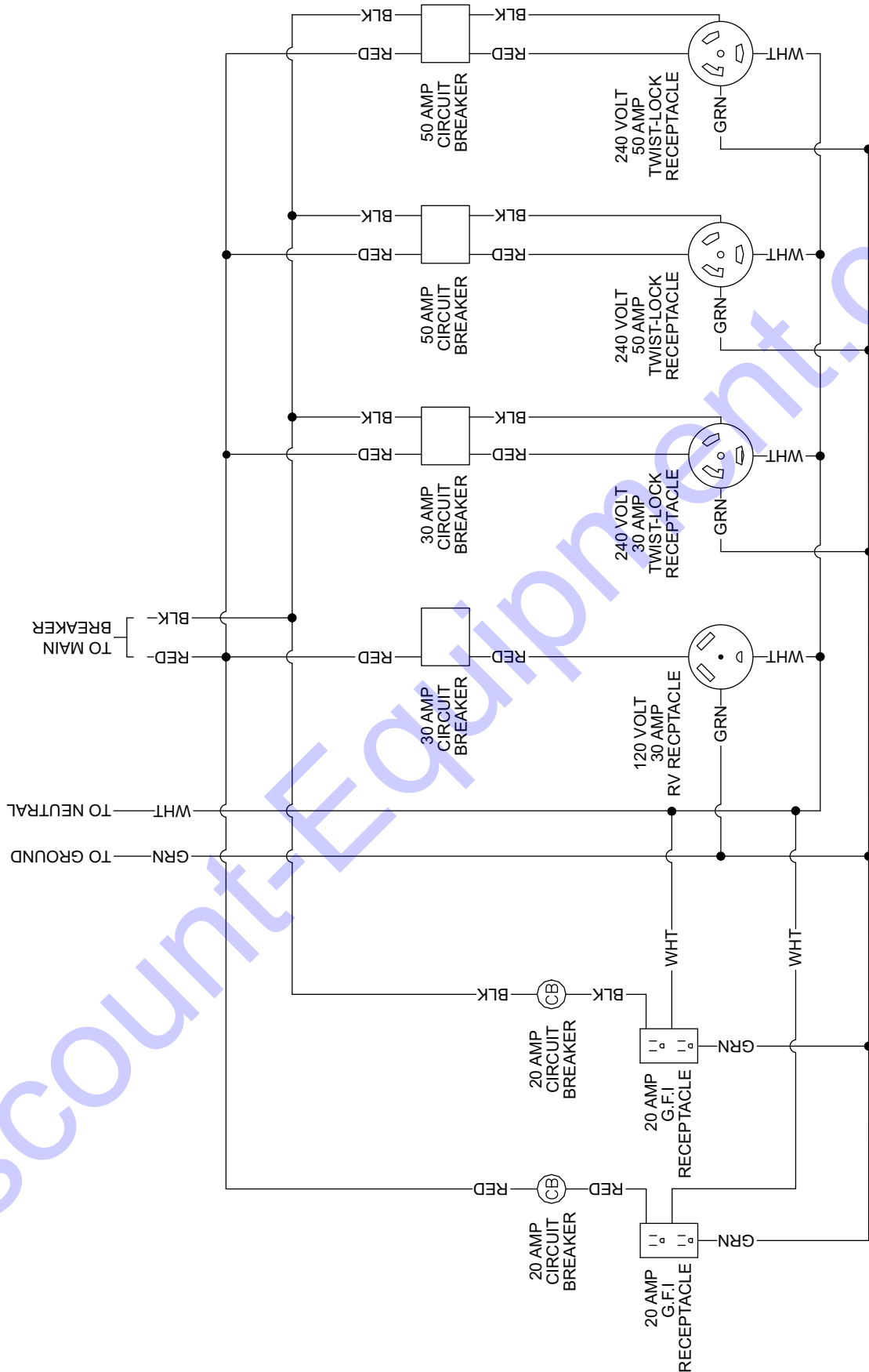
00175

AC WIRING DIAGRAM



90380_B_06.23.14

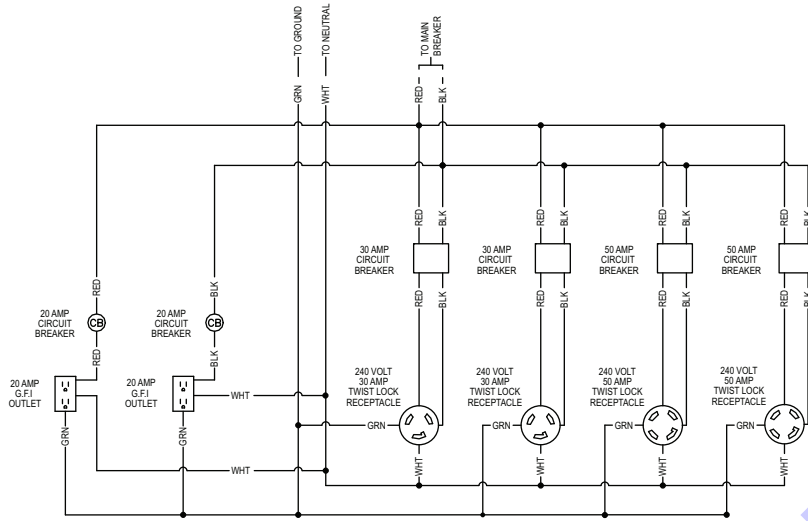
AC WIRING DIAGRAM - RECEPTACLE PANEL



(2x5-20R, 1xTT-30, 1xL14-30R, 2x14-50)

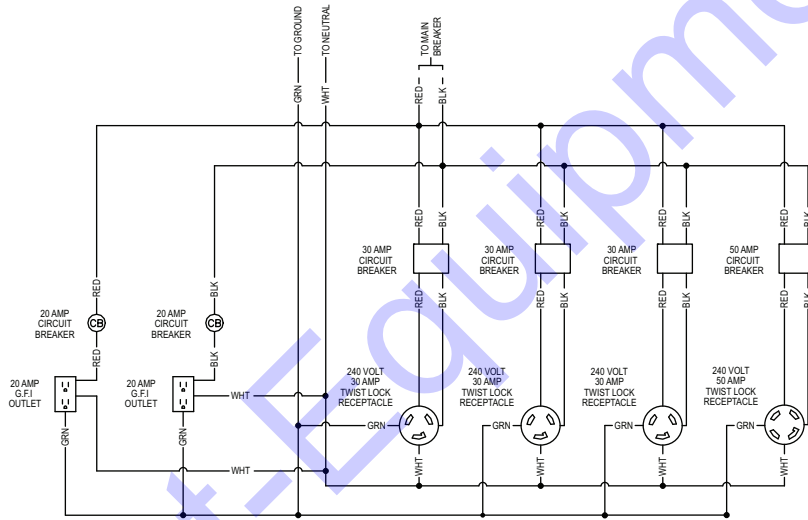
90317_ORG_07.06.11

AC WIRING DIAGRAM - RECEPTACLE PANEL OPTIONS (1 OF 2)



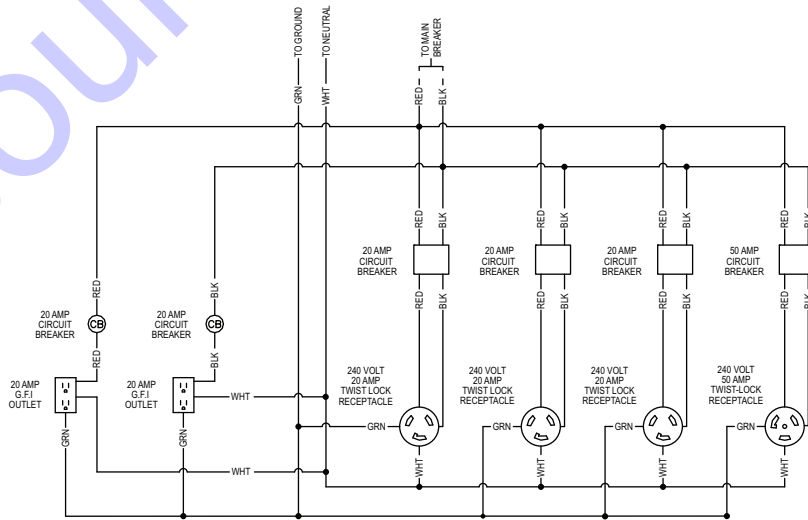
Receptacle Panel (2x5-20R, 2xL6-30R, 2xL14-50)

90315_ORG_10.14.11



Receptacle Panel (2x5-20R, 3xL6-30R, 1xL14-50)

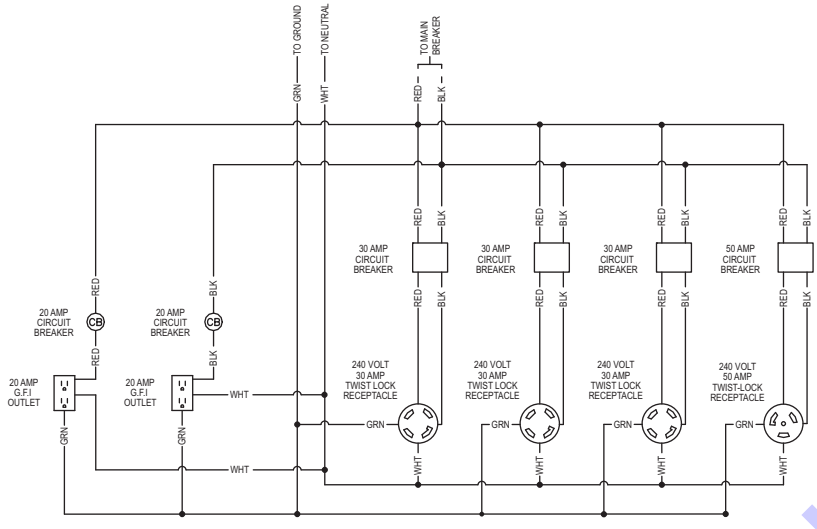
90318_ORG_07.06.11



Receptacle Panel (2x5-20R, 3xL6-20R, 1x50A)

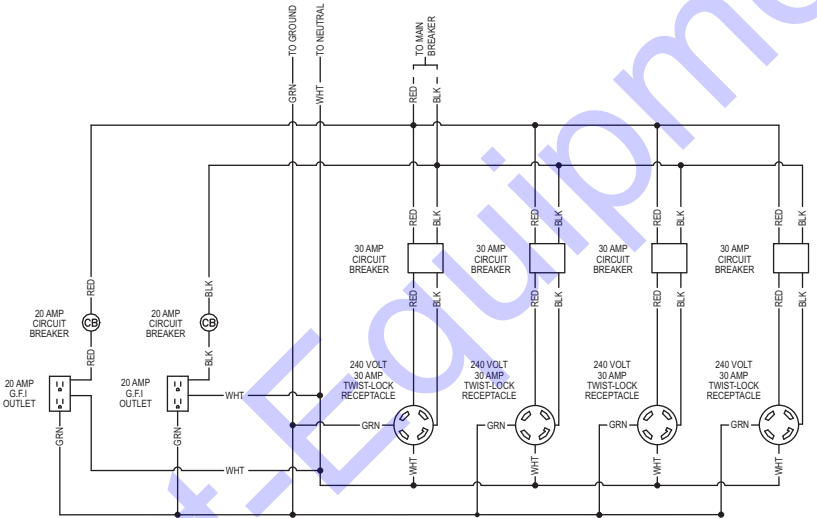
90319_ORG_07.06.11

AC WIRING DIAGRAM - RECEPTACLE PANEL OPTIONS (2 OF 2)



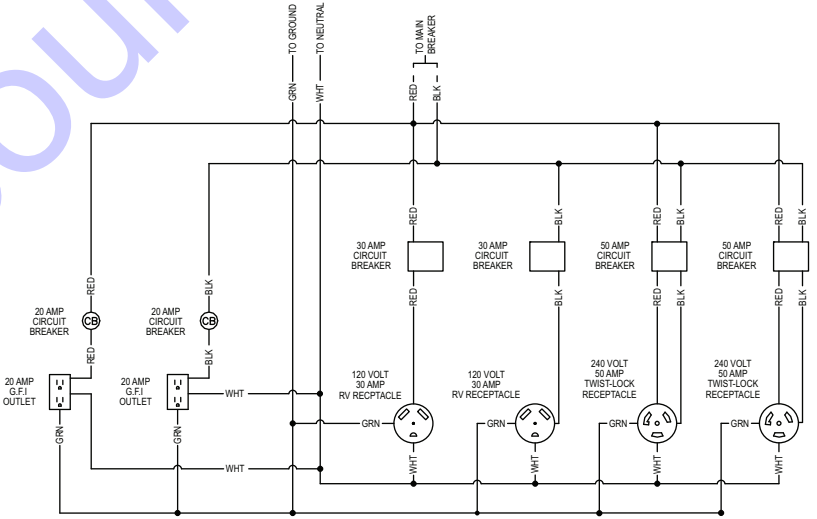
Receptacle Panel (2x5-20R, 3x14-30R, 1x50A)

90320_ORG_07.06.11



Receptacle Panel (2x5-20R, 4x14-30R)

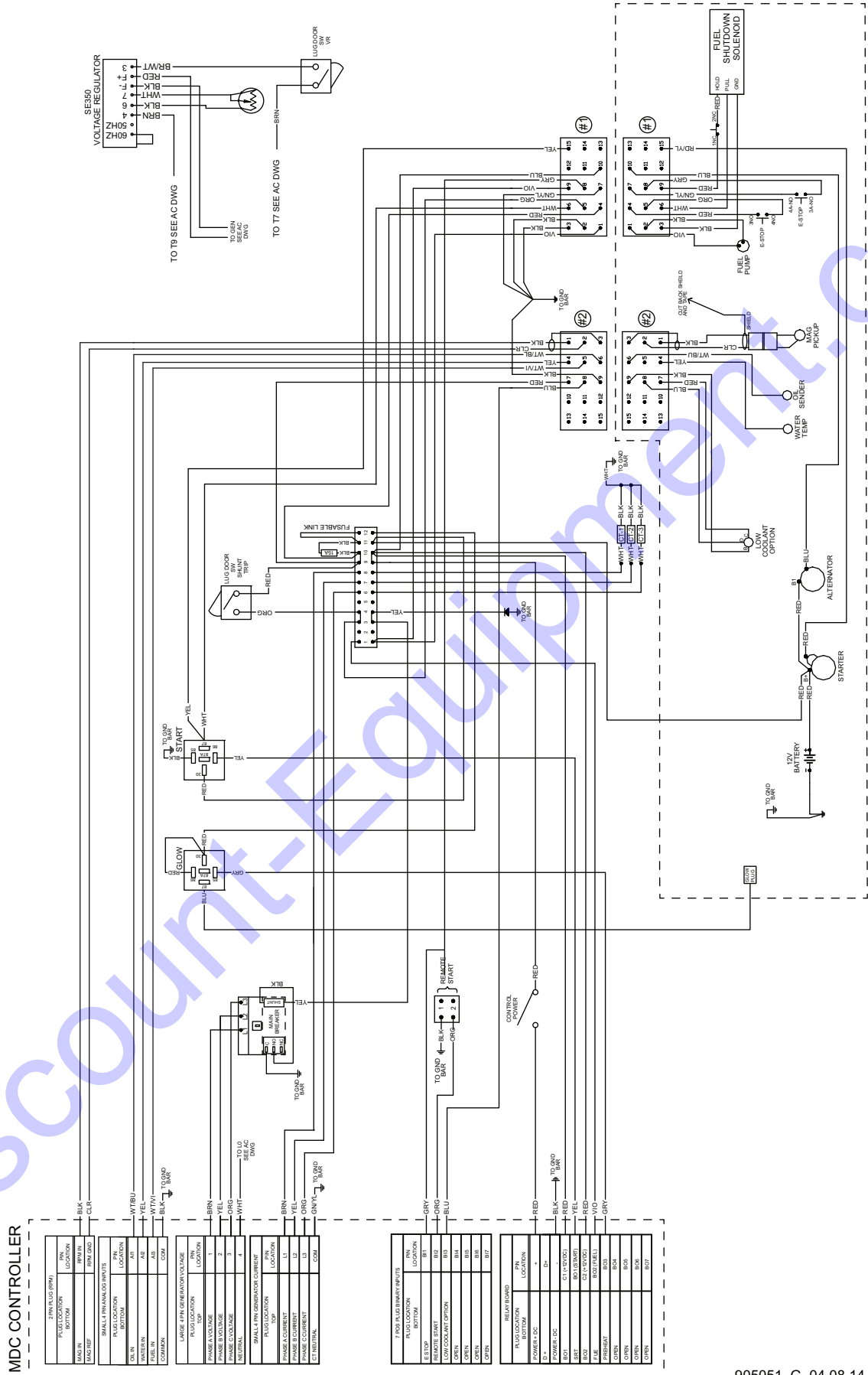
90321_ORG_07.06.11



Receptacle Panel (2x5-20R, 2xTT-30, 2x14-50)

90355_ORG_07.06.11

DC WIRING DIAGRAM



MDC CONTROLLER

2 PIN PLUG (BMA)	
PLUG LOCATION	PNL LOCATION
TOP	TOP
BOTTOM	BOTTOM

SMALL PIN ANALOG INPUTS	
WAZIN	BRN
WAZREF	SPN
WAZGND	BLK
WAZC	CLR

LARGE PIN GENERATOR VOLTAGE	
PLUG LOCATION	PNL LOCATION
TOP	TOP
BOTTOM	BOTTOM

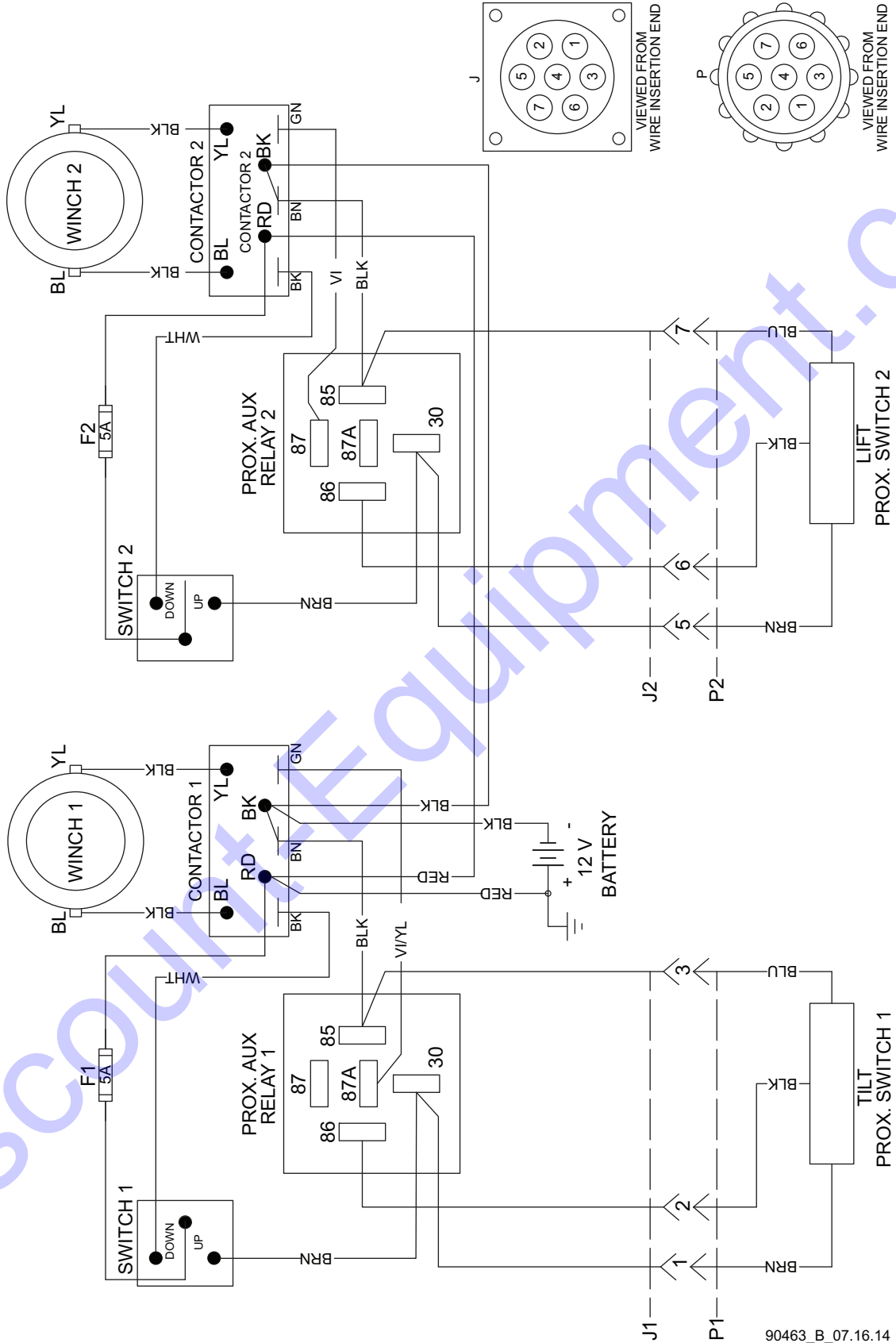
SMALL PIN GENERATOR CURRENT	
PLUG LOCATION	PNL LOCATION
TOP	TOP
BOTTOM	BOTTOM

2 PIN PLUG (BMA) UNITS	
PLUG LOCATION	PNL LOCATION
TOP	TOP
BOTTOM	BOTTOM

RELAY BOARD	
PLUG LOCATION	PNL LOCATION
TOP	TOP
BOTTOM	BOTTOM

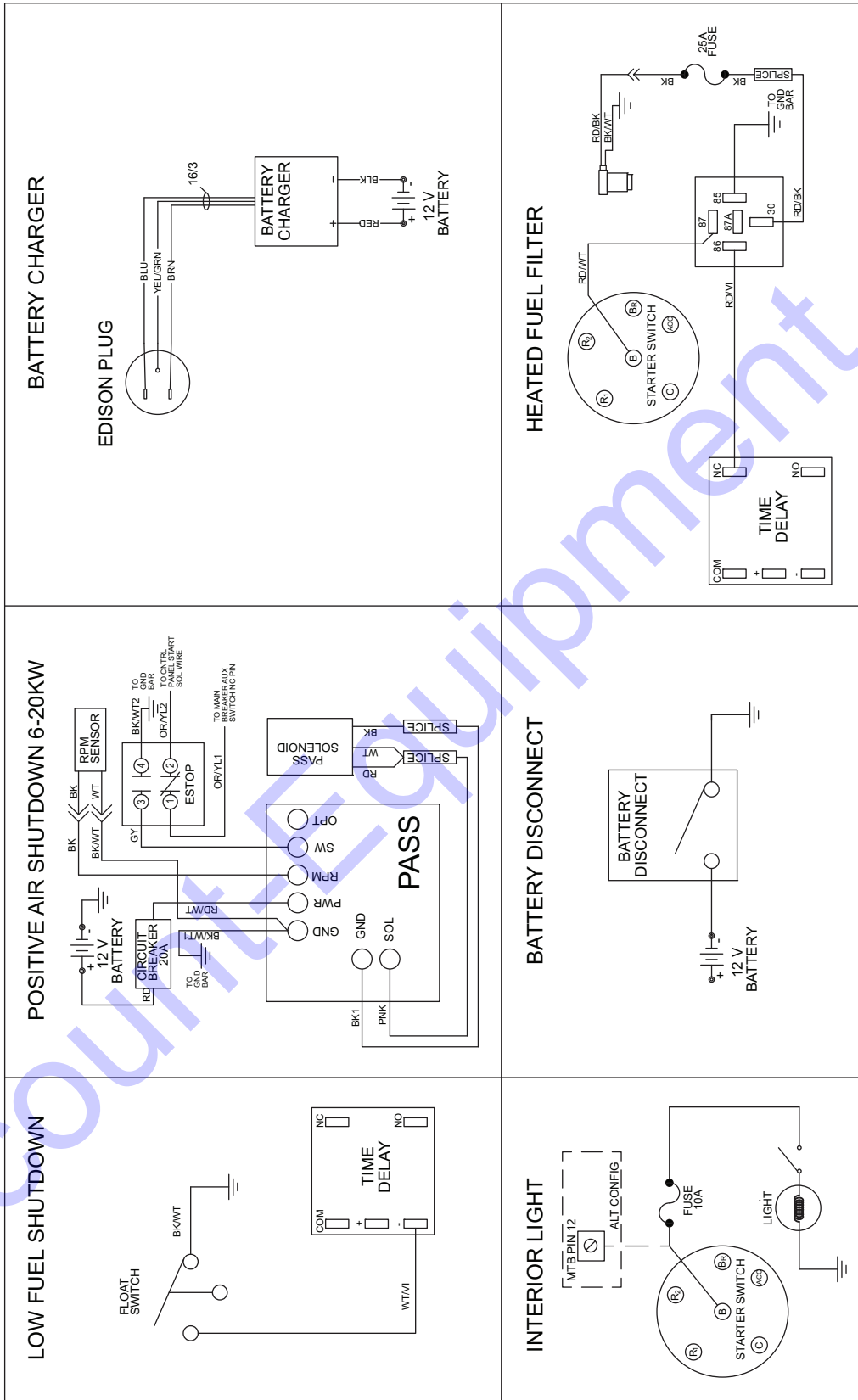
905051_G_04.08.14

DC WIRING DIAGRAM - ELECTRIC WINCH



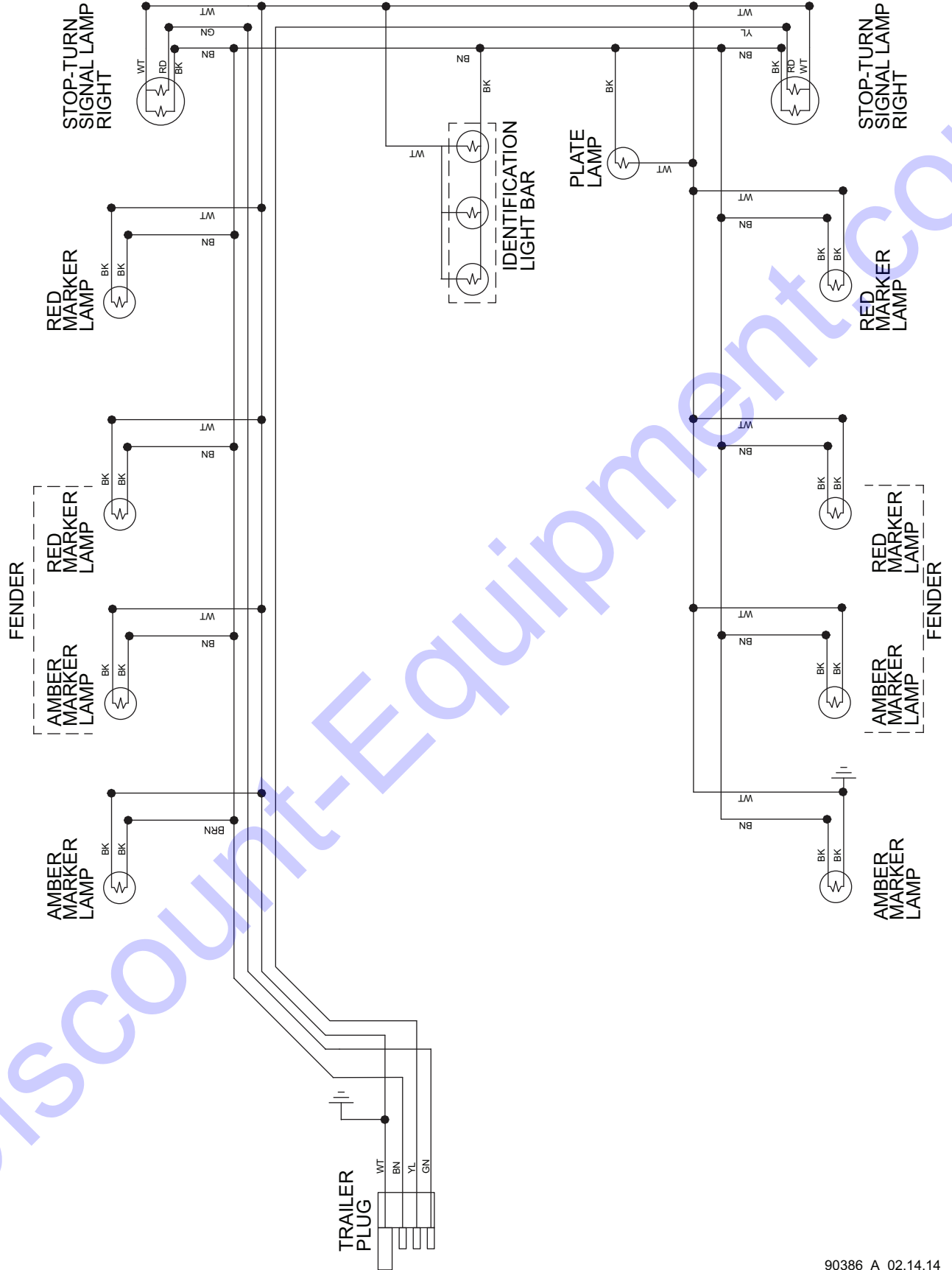
90463_B_07.16.14

DC WIRING DIAGRAMS FOR OPTIONAL EQUIPMENT



90323_K_06.04.14

TRAILER LIGHTS WIRING DIAGRAM



90386_A_02.14.14

SERVICE LOG

OIL GRADE AND TYPE: _____ BRAND: _____

COOLANT MIXTURE: _____ BRAND: _____

Date	Hours to service	Oil level	Coolant level

Date	Hours to service	Oil level	Coolant level





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