

# Electrical System

## GENERAL

The main electric system is 120/208 volt, 200 amp, three phase, 60 hz. In addition there is an auxiliary 12 volt DC system and an interior 12 volt lighting system. All circuits are inspected and tested in accordance with Underwriters Laboratory (UL) and the National Electrical Code (NEC). No attempt should be made to alter this wiring system. The circuit breakers in the main panel box are manual re-set type. If the circuit breakers continue to trip, the electrical system requires service.

### **!WARNING!**

#### **W6. Power Sources**

Use care when working around any power sources. Ensure lock outs are in place before proceeding. Failure to use caution may result in **DEATH, SHOCK, FIRE, OR EQUIPMENT FAILURE AND/OR DAMAGE.**

### **CAUTION!**

#### **C10. Electrical connections to outside power sources**

**ALL** initial electrical connections to outside power sources and any electrical system service should be completed by a competent licensed electrician.

## ELECTRICAL PROCEDURES

### **!WARNING!**

#### **W3. Shorelines and Generator Lines**

Shorelines and generator lines are heavy! Use proper lifting techniques to avoid injury.

### **!WARNING!**

#### **W6. Power Sources**

Use care when working around any power sources. Ensure lock outs are in place before proceeding. Failure to use caution may result in **DEATH, SHOCK, FIRE, OR EQUIPMENT FAILURE AND/OR DAMAGE.**

### **!WARNING!**

#### **W7. Electric-Shock Hazard**

This unit is supplied with high electric voltage and current. This voltage and current **could cause** serious injury or **DEATH!** Always use care when working around the electrical system. Turn the **POWER OFF AND LOCK OUT** prior to performing any maintenance on the electrical equipment.

It is recommended that all initial electrical connections to the outside power source be done by a competent licensed electrician. **BEFORE** turning on any breakers or electrical equipment inside the unit, personnel **MUST** check the phase sequence meter located in the main power panel for proper hook-up.

When checking the circuit breakers, refer to the electrical system section of this manual. Circuit breakers are either automatic or manual re-set type. If circuit breakers continue to trip, have the electrical system serviced.

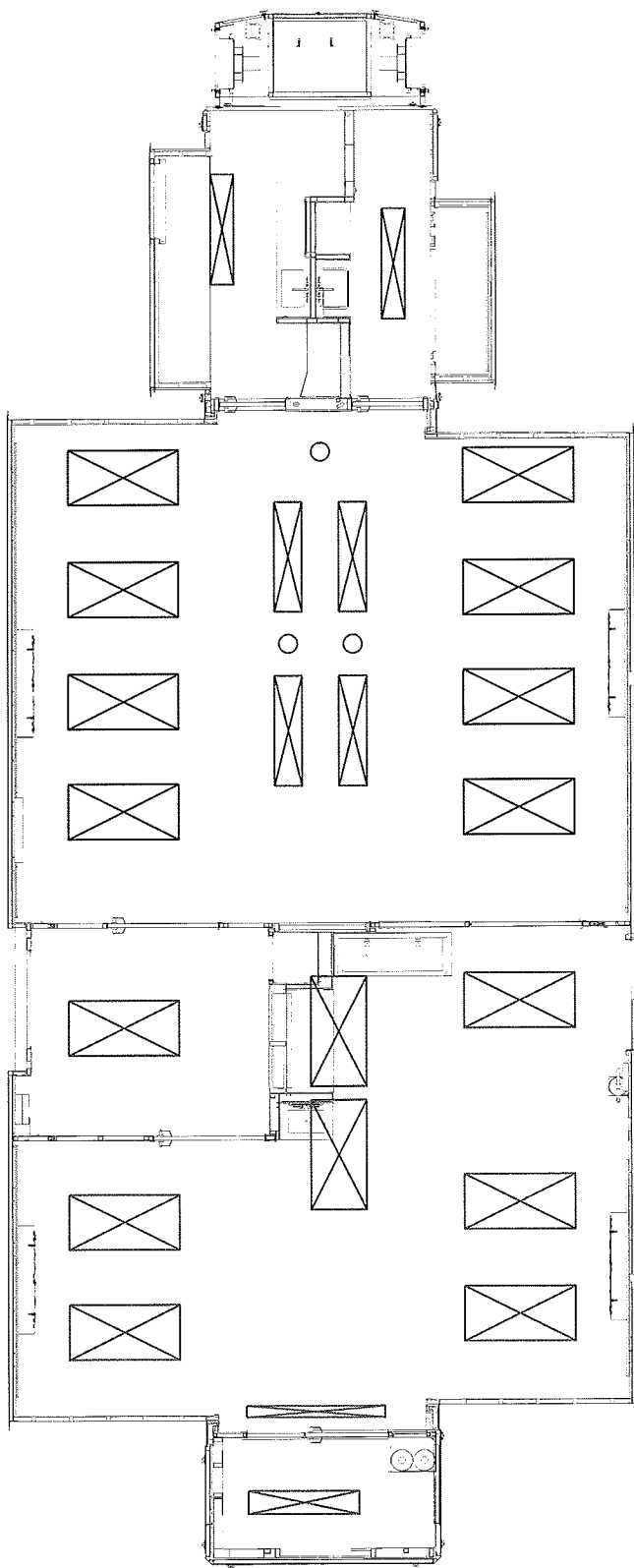
All circuits are tested and inspected in accordance with Underwriter's Laboratory and the National Electrical Code - National Fire Protection Association (N.F.P.A. # 70). No attempt should be made to alter the wiring system.




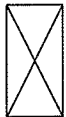

### **!WARNING!**

#### **W8. Ground Rods Installation**

This unit is supplied with high electric voltage and current. This voltage and current **COULD CAUSE** serious injury or **DEATH!** Always use care when working around the electrical system. To insure the provision of an adequate ground at all times the grounding rods **MUST** be installed before the generator is started or the shore-power is connected.

It is recommended that the safety ground is connected to approved metal rods driven into the earth at the designated width apart and to the designated depth as required by local code. As an alternate ground connection, an existing approved grounding location can be used if it meets the local code requirements. The safety ground **MUST** be maintained until the unit is shut down for movement to a new location. The last connection that should be removed is the safety ground.



-  3 Tube, T5/HO Fixture, 24 x 48      Level: 0 or 100%
-  1 Tube, T5 Fixture, 60      Level: 0 or 100%
-  2 Tube, T5/HO Fixture, 12 x 48      Level: 0 or 100%
-  4 Tube, T5/HO Fixture, 24 x 48      Level: 0 or 50 or 100%
-  Round Recessed      Level: 0 to 100%



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### Lighting Layout, 1018

RELEASE LEVEL: PROD	REVISION: A
DRAWN BY: JRM	CHANGED BY: TLG
DATE DRAWN: 11/10/2009	SHEET: 1 OF 1
PLATFORM: COM53	MMU TYPE: MSU

### **Start-up - General Note**

The tractor should be disconnected from the trailer prior to implementing start-up procedures. The tractor should be approximately 4'-0" away from the front of the trailer, for proper cord length configuration.

1. Locate ground rods and ground plug and cord. Ground plug is a single pole plug painted green in color.
2. Locate the shore power connection cord. The assembly has plugs on one (1) end only with raw cables on the opposite. These cables are approximately 75'-0" long. This is your shore power connection cord.
3. Locate the generator power connection and remote generator cord. The 25' generator cord has plugs on both ends of the cord and is connected to the generator plug on the front of the unit and to the generator itself. The remote generator cord is also plugged into the square box at the front of the unit and the corresponding plug on the generator. Refer to Section 3 page 4.
4. Plug ground rod plug into single pole receiver on the passenger side of the front of the trailer. The opposite end of the cable must be attached to the ground rod NOTE: The ground cable must be connected to an earth ground. Refer to Section 3 Page 6.
5. Plug the shore-power plug into shore-power station, located in electrical box near the front of the unit. NOTE: It is the responsibility of the user to ensure proper connections to the shore-power source including that the earth ground must be connected. Refer to Section 3 Page 6.

**NOTE:** The configuration of your unit may vary. Tractor may be supplied without integrated generator. In this configuration the tractor may be moved away to make room for the trailer to be placed at the same location for proper cord length configuration.

## **SHORE-POWER CONNECTIONS**

The unit is designed to operate from a source of 208 volt, 60 Hz, 3-phase, AC power. A plug on the front of the unit is used to connect the unit to the local source. The shoreline cable is connected to a Python Connector at one end of the 75' cord and has a plug designed to mate with the connector box at the unit. The other end, which will be connected to shore-power, has 5 bare wires. A certified electrician must perform this procedure. The shoreline connector box is located on the front of the unit on the roadside under the air conditioning unit. A ground rod will need to be placed in this procedure, detailed in Section 4 Page 21.

### **!WARNING!**

#### **W3. Shorelines and Generator Lines**

Shorelines and generator lines are heavy! Use proper lifting techniques to avoid injury.

### **!WARNING!**

#### **W6. Power Sources**

Use care when working around any power sources. Ensure lock outs are in place before proceeding. Failure to use caution may result in **DEATH, SHOCK, FIRE, OR EQUIPMENT FAILURE AND/OR DAMAGE.**

### **!WARNING!**

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It is recommended that all initial electrical connections to the outside power source be done by a competent licensed electrician. **BEFORE** turning on any breakers or electrical equipment inside the unit, personnel **MUST** check the phase sequence meter located in the main power panel for proper hook-up.

When checking the circuit breakers, refer to the electrical system section of this manual. Circuit breakers are either automatic or manual re-set type. If circuit breakers continue to trip, have the electrical system serviced.

All circuits are tested and inspected in accordance with Underwriter's Laboratory and the National Electrical Code - National Fire Protection Association (N.F.P.A. # 70). No attempt should be made to alter the wiring system.

**!WARNING!**

**W8. Ground Rods Installation**

This unit is supplied with high electric voltage and current. This voltage and current **COULD CAUSE** serious injury or **DEATH!** Always use care when working around the electrical system. To insure the provision of an adequate ground at all times the grounding rods **MUST** be installed before the generator is started or the shore-power is connected.

It is recommended that the safety ground is connected to approved metal rods driven into the earth at the designated width apart and to the designated depth as required by local code. As an alternate ground connection, an existing approved grounding location can be used if it meets the local code requirements. The safety ground **MUST** be maintained until the unit is shut down for movement to a new location. The last connection that should be removed is the safety ground.

## **TRANSFER SWITCH**

A transfer switch is located in the front of the Soiled Utility Room. It selects power from either the 208 volt local source or the 208 volt generator. The switch is automatic and does not require any manual intervention.

### **!WARNING!**

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## **PHASE SEQUENCE INDICATOR**

The phase sequence indicator consists of a red and green light on the transfer switch panel box. The red light indicates an incorrect phase and the green indicates a correct phase.

### **CAUTION!**

#### **C11. Phase Agreement Check**

Failure to perform a phase agreement check each time the unit is connected to a new source may result in equipment damage.

To perform a phase agreement check:

1. Connect the shoreline power or Generator Set power.
2. Check the phase indicator light. If the green light is on, phase is correct. If the red light is on, the phase is incorrect! The wiring of the source receptacle must be corrected by an electrician.



## AUXILIARY 12 VOLT DC SYSTEM

The auxiliary 12 volt DC system is powered by the unit batteries located in the #5 curbside compartment. This battery is automatically recharged from the battery charger in the #3 roadside compartment. The battery charger is powered by the breaker in the sub-breaker panel labeled "BATTERY CHARGER."

The system supplies power to the:

1. Compartment belly box lights (roadside)
2. Patient Care Stations (PCS) # 1 / 4 12 Volt Outlet
3. Compartment belly box lights (rear)
4. Patient Care Stations (PCS) #2 / 3
5. Compartment belly box lights (curbside)
6. Tank Monitor
7. Nurse's refrigerator
8. Radio / CD Player
9. Toilet
10. Patient Care Station (PCS) #5 / Nurse's 12-Volt outlet
11. Spare
12. Clocks

### **CAUTION!**

#### **C12. Belly Box Lights or Emergency Light Packs**

**DO NOT** leave belly box lights on for extended periods of time. Ensure all emergency light battery packs are off or disconnected when unit is not connected to a power source.  
When left on they could cause the batteries to run down or fail.

## EMERGENCY PANEL

Description	AWG	Ckt. #				Ckt. #	AWG	Description
LOFT DATA OUTLET	12	1				2	12	OUTLETS PCS #1
MED GAS	12	3				4	12	OUTLETS PCS #2/DESK
LIGHT CONTROL PNL	12	5				6	12	OUTLETS PCS #3
X-RAY ILLUMINATOR	12	7				8	12	OUTLETS PCS #4
VEST, O.S., EXIT LTS	12	9				10	12	OUTLETS PCS #5
NURSE CALL	12	11				12	12	OUTLETS NURSE
OUTLET -RS CEIL	12	15				14	12	LED LIGHTS
OR LIGHT	12	17				16	12	FIRE/SECURITY
LASER OUTLET	12	19				18	6	MAIN
						20	6	



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FILENAME: 302004806-1018.dwg

### 120/240V 60HZ EMERGENCY PANEL CIRCUITS UNIT 1018

RELEASE LEVEL: PRODUCTION	REVISION: 0
DRAWN BY: KLS	CHANGED BY: ---
DATE DRAWN: 11/11/2009	SHEET: 3 OF 7
PLATFORM: S3COM	MMU TYPE: MSU

# MAIN PANEL

Description	AWG	Ckt. #	A	B	C	Ckt. #	AWG	Description
FRONT HVAC	2	1	100A			2	12	FAN - CLEAN/SOIL RM
	2	3	100A			4	12	FAN - BATH RM
	2	5	100A			6	12	HUMIDIFIER -FRNT
WATER HTR -N.S.	12	7	20A			8	12	HUMIDIFIER -REAR
	12	9	20A			10	12	IR SINK
WATER HTR -FRNT		11	100A			12	4	STERILIZER
	12	13	20A			14	4	
	6	15	60A			16	4	
REAR HVAC	6	17	60A			18		BASEBOARD HEAT
	6	19	60A			20	12	
STERILIZER 1	12	21	20A			22	12	OUTLETS -BATH
STERILIZER 2	12	23	20A			24	12	LTS -CLN/SLD/BATH
ULTRASONIC CLNR	12	25	20A			26	12	REFRIG. - NURSE
OUTLETS -BELLY	12	27	20A			30	12	BATTERY CHRG
WATER PUMPS	12	29	20A			32	12	OUTLETS -EXT
EXPNDBL LTS -CS	12	31	20A			34	6	UPS
		33	20A			36	6	
OUTLETS -N.S.	12	35	20A			38	12	EXPNDBL LTS -RS
OUTLETS - PCS #5	12	37	20A			40	12	VAC PUMPS
OUTLETS - PCS #2/3	12	39	20A			42	12	OUTLETS -CLN/SLD
OUTLETS - PCS #1/4	12	41	20A					



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FILENAME: 302004806-1018.dwg

**208/120V 60HZ  
 MAIN PANEL CIRCUITS  
 UNIT 1018**

RELEASE LEVEL: PRODUCTION	REVISION: 0
DRAWN BY: KLS	CHANGED BY: --
DATE DRAWN: 11/11/2009	SHEET: 1 OF 7
PLATFORM: 53'COM	MMU TYPE: MSU

### HVAC PANEL

Description	AWG	Ckt. #	A B C			Ckt. #	AWG	Description
EVAP BLOWER	10	1	30A			2	10	CONDENSER FANS
	10	3	30A			4	10	
	10	5	30A			6	10	
	6	7	50A			8	6	
COMPRESSORS	6	9	50A			10	6	HEAT
	6	11	50A			12	6	



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208/120V 60HZ  
 HVAC PANEL CIRCUITS  
 UNIT 1018

RELEASE LEVEL: PRODUCTION	REVISION: 0
DRAWN BY: KLS	CHANGED BY: --
DATE DRAWN: 11/11/2009	SHEET: 5 OF 7
PLATFORM: S3COM	MMU TYPE: MSU

### 12VDC PANEL

Description	AWG	Ckt. #	
LIGHTS - RS BELLY	12	1	15A ○ ○
PCS 1/4 12V OUTLET	10	2	30A ○ ○
LIGHTS - REAR BELLY	12	3	15A ○ ○
PCS 2/3 12V OUTLET	10	4	30A ○ ○
LIGHTS - RS BELLY	12	5	15A ○ ○
TANK MONITOR	12	6	10A ○ ○
NURSE'S REFRIG.	12	7	10A ○ ○
RADIOS / CD	12	8	10A ○ ○
TOILET	12	9	10A ○ ○
PCS 5/NURSE OUTLT	10	10	30A ○ ○
SPARE	12	11	10A ○ ○
CLOCK	12	12	10A ○ ○

### DC DISCONNECT PANEL

Description	AMP
SYSTEMS DC FUSE	70
PATIENT LIFT	100

### HYDRAULIC SYSTEM

Description	AMP
SYSTEM PENDANT	15



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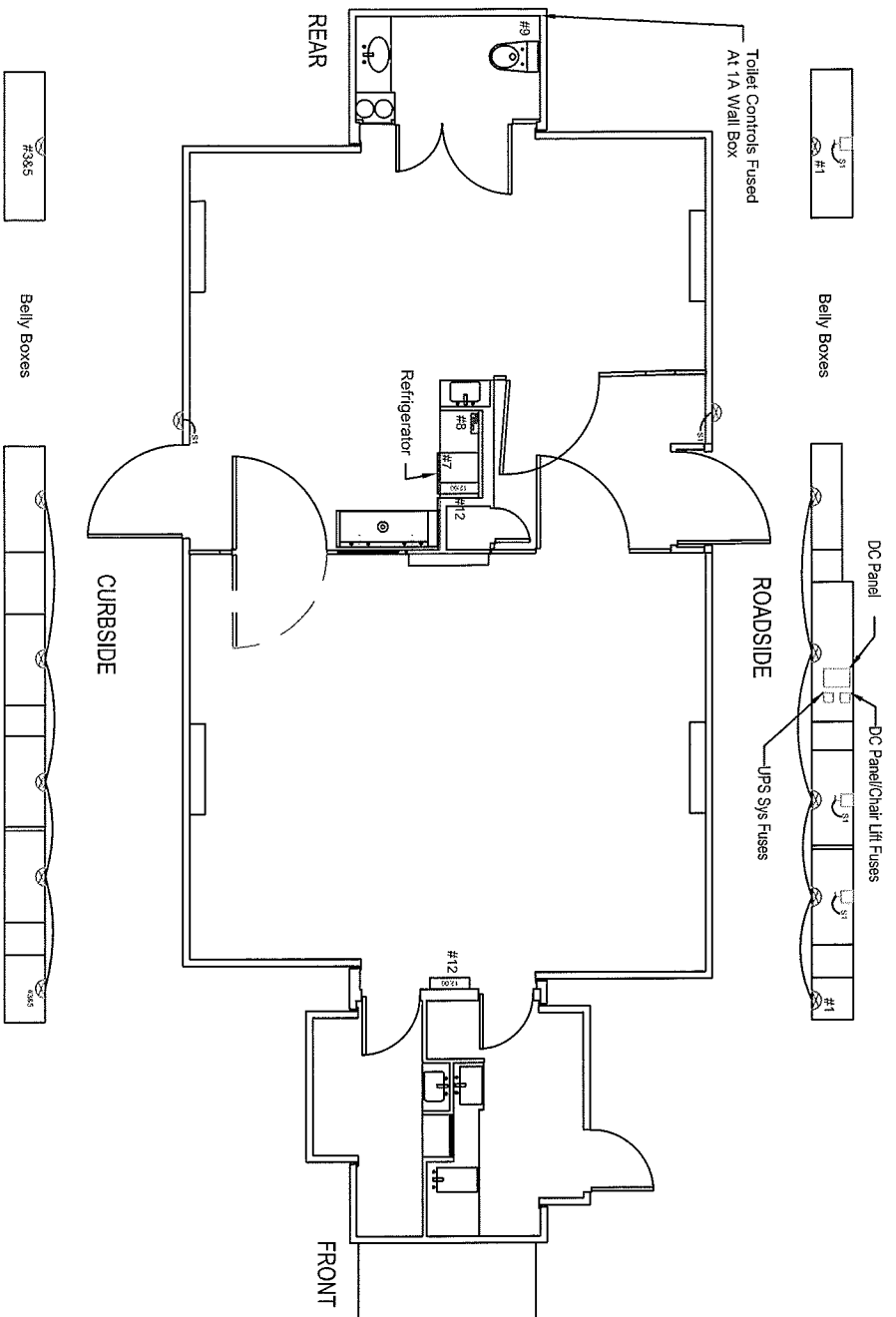
FILENAME: 302004806-1018.dwg

### 12VDC DC PANEL CIRCUITS UNIT 1018

RELEASE LEVEL: PRODUCTION	REVISION: 0
DRAWN BY: KLS	CHANGED BY: --
DATE DRAWN: 11/11/2009	SHEET: 2 OF 7
PLATFORM: 53'COM	MMU TYPE: MSU

### Symbol Key

SYM	Description
	DC Light
	Single Pole Switch
	DC Outlet
	Waste Valve
	Clock
	CD Player/Radio



### 12VDC PANEL

Description	AMPS	Ckt. #	Rating
LIGHTS - RS BELLY	12	1	15A 50 30A
PCS 1/4 12V OUTLET	10	2	15A 50 30A
LIGHTS - REAR BELLY	12	3	15A 50 30A
PCS 2/3 12V OUTLET	10	4	15A 50 30A
LIGHTS - RS BELLY	12	5	15A 50 30A
TANK MONITOR	12	6	10A 50 30A
NURSE'S REFRIG.	12	7	10A 50 30A
RADIOS / CD	12	8	10A 50 30A
TOILET	12	9	10A 50 30A
PCS 5/NURSE OUTLT	10	10	10A 50 30A
SPARE	12	11	10A 50 30A
CLOCK	12	12	10A 50 30A

### Low Voltage Schematic, 1018

RELEASE LEVEL: PROD	REVISION: A
DRAWN BY: JRM	CHANGED BY: TLG
DATE DRAWN: 11/10/2009	SHEET: 1 OF 1
PLATFORM: COM53	MMU TYPE: MSU

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## **DC DISCONNECT SWITCH**

A main battery switch is located in the #4 roadside belly box on a gray NEMA box. It provides a means of switching the batteries off. This switch should be turned off before transport. This switch is useful if the unit is to be without A/C power for an extended period, as it will prevent discharge of the batteries.

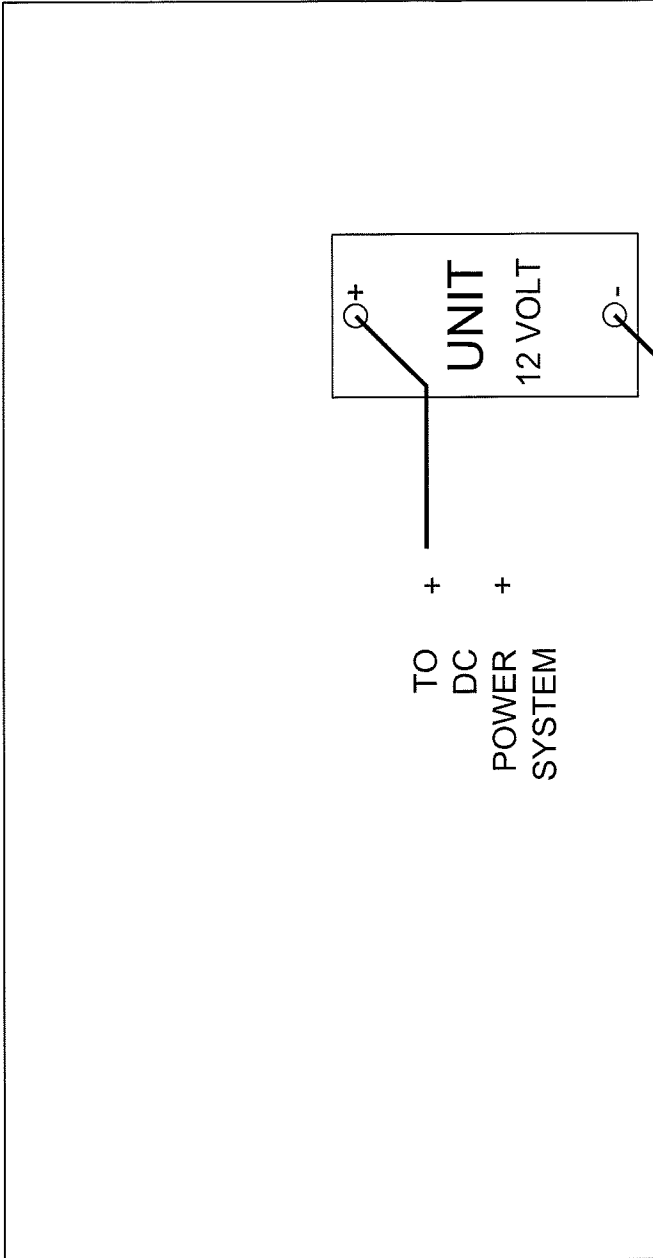
## **BATTERY**

The battery in this unit is located in the #5 curbside compartment.

Battery charger, located in the #3 roadside belly box, should be monitored and maintained to ensure a properly operating 12 Volt system.

During transport, the battery is charged by cables from the tractor. The battery should be plugged in during transport.





CURBSIDE BELLY BOX #5  
FRONT



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Battery Configuration - 1018

RELEASE LEVEL: PROD	REVISION: A
DRAWN BY: JRM	CHANGED BY: TLG
DATE DRAWN: 11/10/2010	SHEET: 1 OF 1
PLATFORM: COM53	MMU TYPE: MSU

## **BATTERY CHARGERS**

There are three methods by which the unit batteries are kept charged.

1. The AC Battery charger supports normal operations.
2. The Transport Battery cable connections will charge the batteries from the tractor during transport.
3. The Solar Battery Charger will primarily maintain the batteries during long term storage..

### **AC Battery Charger**

There is a battery charger located next to the batteries, which monitors battery charge level during set up. The charger is powered by the AC system. The switch to activate the charger is located on the master breaker panel. The switch should remain on while the unit is deployed to ensure proper charging of the batteries. The manual for the battery charger is included in the Appendix portion of this manual.

### **Transport Battery Charging**

During transport, the batteries are charged by cables from the tractor. These should be plugged in during transport.

### **Solar Battery Charger**

A 5 watt solar panel is mounted on the curbside roof of the front HVAC unit to maintain the unit batteries during storage when there are no utility or generator connections. This Solar Battery Charger is not designed to support normal operations when the unit is deployed but remains connected at all times. This solar panel should be kept clean of dirt and dust for optimal access to sun light. A sealed control box requiring no maintenance for this charger is mounted externally near the front mounted 12V transport charging cable connectors. An information sheet for the battery charger is included in the Appendix portion of this manual.

## **LIGHTING**

See the Appendix portion of this manual for an OEM manual describing and illustrating the wiring diagrams for the lighting system.

### **EMERGENCY POWER SHUT DOWN BUTTON (if applicable)**

This feature works with the generator that is mounted on the tractor. If using the other generator set, this is disabled. Depressing the emergency power shut-down button will shut off the generator. The shut-down button is located at the nurses' station. This button **DOES NOT** power down the entire electrical system if the unit is connected to shore-power. To reset, turn button to the right and it will pop out to the "run" position.

## **GROUND ROD**

The grounding rod is used to provide an added margin of electrical safety by establishing an independent electrical ground for the unit. The rod is a solid round shaft of conductive metal as per local code that is generally eight feet long. One end of the rod is pointed and the rod is driven into the earth with a sledge hammer. A grounding cable is attached with a copper clamp to the rod. The other end is plugged into the green outlet found inside the electrical box on the curbside of the unit. These connections create the earth ground for the unit. The ground rod is the first connection made during set-up and the last connection removed during breakdown. When used at a temporary site, the ground rod is usually left in the ground and driven below grade after disconnection. Several ground rods should be carried if the unit is deployed at unsupported sites.

### **WARNING!**

#### **W8. Ground Rod Installation**

This unit is supplied with high electric voltage and current. This voltage and current **COULD CAUSE** serious injury or **DEATH!** Always use care when working around the electrical system. To insure the provision of an adequate ground at all times the grounding rod **MUST** be installed before the generator is started or the shore-power is connected.

It is recommended that the safety ground is connected to approved metal rod driven into the earth to the designated distance as required by local code. As an alternate ground connection, an existing approved grounding location can be used if it meets the local code requirements. The safety ground **MUST** be maintained until the unit is shut down for movement to a new location. The last connection that should be removed is the safety ground.