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Monitor and Control Panel  
MCP Series  
200-RV and 500-RV  
Installation and operation  
Manual



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## PART 1: Installation

**NOTE:** Read this manual completely prior to starting any installation.

**WARNING!** All power sources **MUST** be de-energized during all installation procedures. Failure to comply with this will void all warranty and could lead to serious injury or death.

Thank you for purchasing one of our monitor and control systems. We have done our best to engineer and manufacture a reliable and cost effective system that will provide you with years of trouble free service. We are always working to improve our systems and reserve the right to change our specifications toward these ends. Please contact us with any questions or comments you may have.

All software, including display screens, is copyright Elwood Controls, LLC. It remains the property of Elwood Controls, LLC and is licensed for use by the end user of this product only. All rights reserved.

### **DISCLAIMER**

Elwood Controls, LLC accepts no responsibility for damages arising from any circumstances involving system malfunction. The system should be tested thoroughly upon completion of installation and periodically to assure the user of proper function. Contact our technical support department when system operation is impaired.

The functionality of the GSM-LINK is directly dependant on the GSM network to which it is connected. Coverage area should be carefully considered when selecting a GSM network for service. Elwood Controls, LLC accepts no responsibility for damages arising from malfunction of the GSM-LINK.

## Installing the MCP

In figure 1 below the cutout dimensions are shown and a full scale template is included for use when making the cutout. On the following page all of the dimensional information is provided for the MCP, it should be referred to for depth clearance required prior to cutting an installation opening.

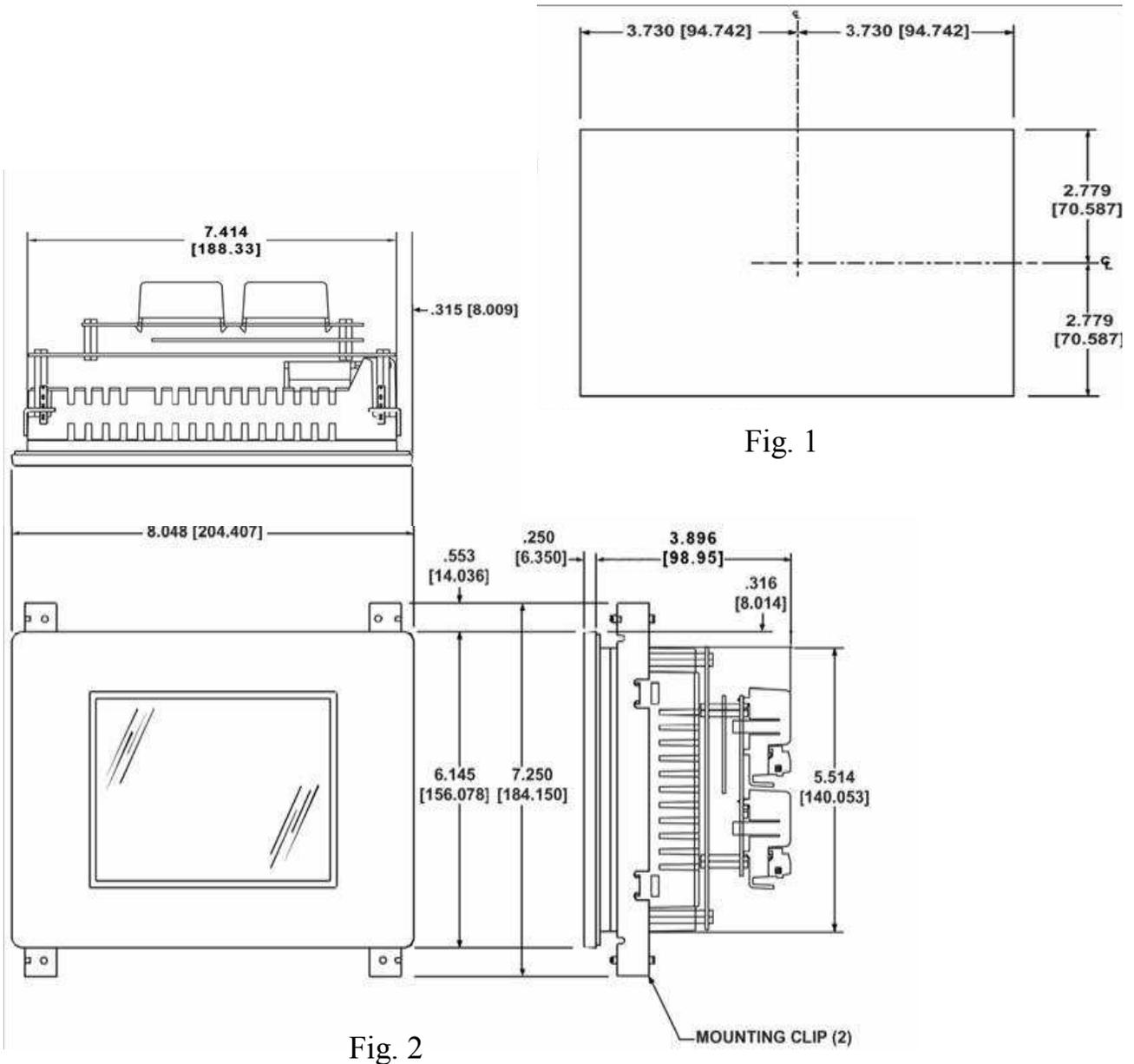


Fig. 1

Fig. 2

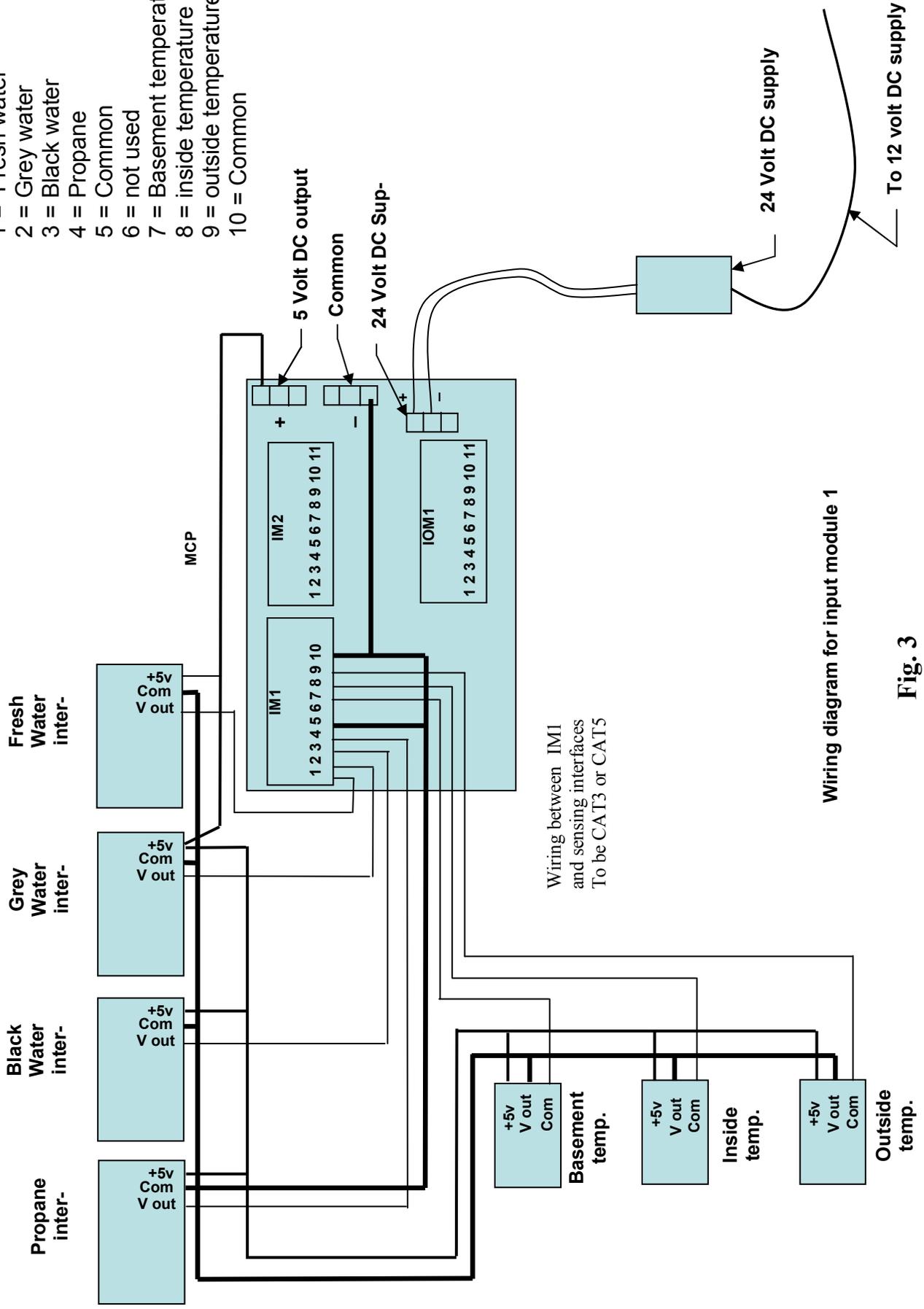
If your installation is a retro-fit in an already manufactured unit you may want to consider a location for the MCP based on how you will route your wiring prior to making a cutout. In some case it may be difficult or impossible to run wiring to a certain location.

The MCP-200-RV and MCP-500-RV use 24 volts DC for operation. Your MCP will require a model PS1224-15, 12 Volt DC to 24V DC power supply. This power supply should be wired according to the diagram in Appendix A upon completion of all other component installation and wiring.

The wiring between the sensing interfaces and MCP is shown on the following two pages. Refer to these diagrams for wire running and termination information. The wiring between all sensing interfaces and the MCP can be Cat. 5 which will provide four sets of twisted pairs.

IM1 Terminal Assignment

- 1 = Fresh water
- 2 = Grey water
- 3 = Black water
- 4 = Propane
- 5 = Common
- 6 = not used
- 7 = Basement temperature
- 8 = inside temperature
- 9 = outside temperature
- 10 = Common



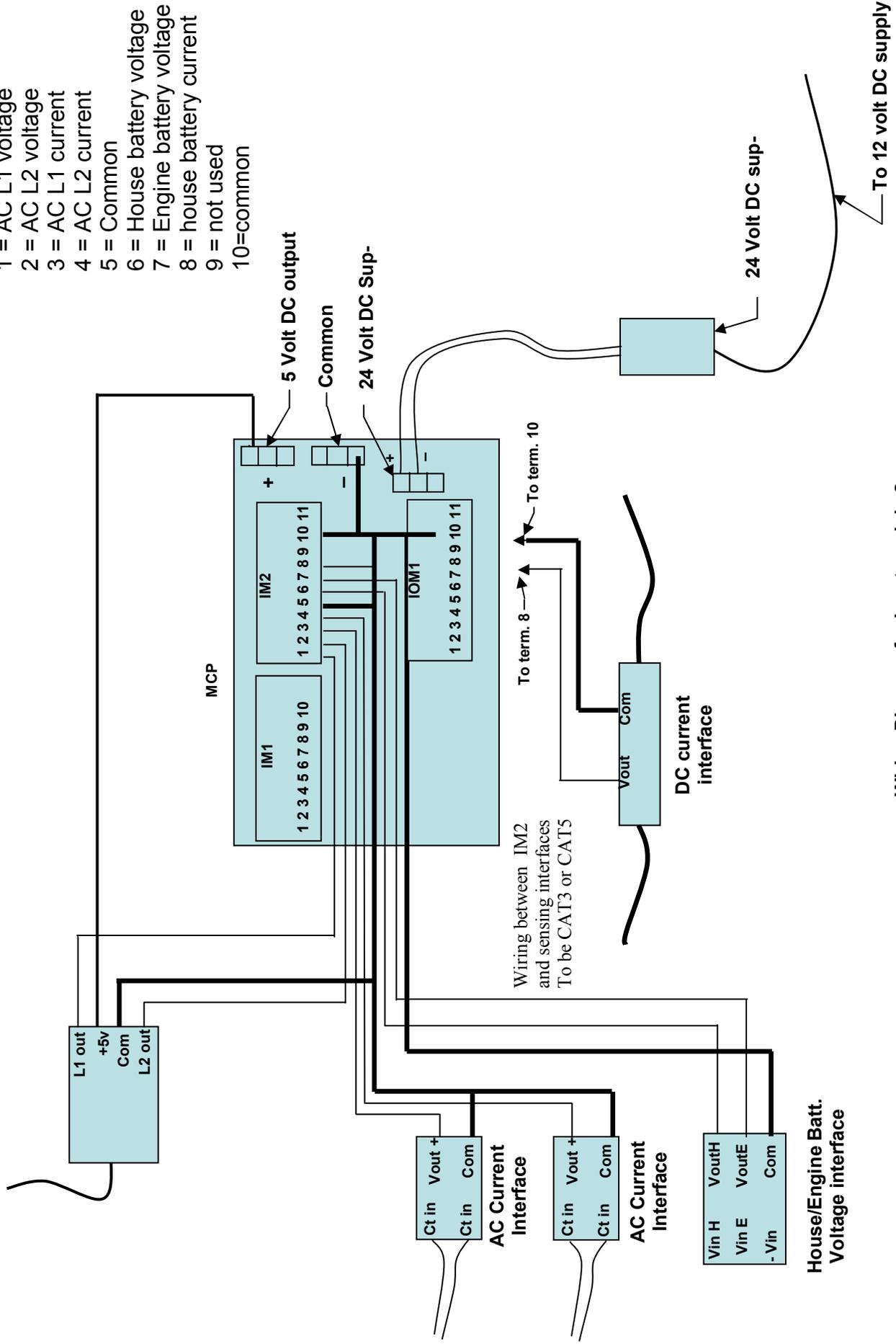
Wiring between IM1 and sensing interfaces To be CAT3 or CAT5

Wiring diagram for input module 1

Fig. 3

IM2 Terminal assignment

- 1 = AC L1 voltage
- 2 = AC L2 voltage
- 3 = AC L1 current
- 4 = AC L2 current
- 5 = Common
- 6 = House battery voltage
- 7 = Engine battery voltage
- 8 = house battery current
- 9 = not used
- 10 = common



Wiring Diagram for Input module 2

Fig. 4

# Installing Sensing Interfaces

## Tank Sensing TSI-10 and Pickup Tube

The tank sensing interface TSI-10 is available with sensing tubes with either flange or hub mounting provisions. The hub mount is used where a threaded hub has been welded or glued into the tank.

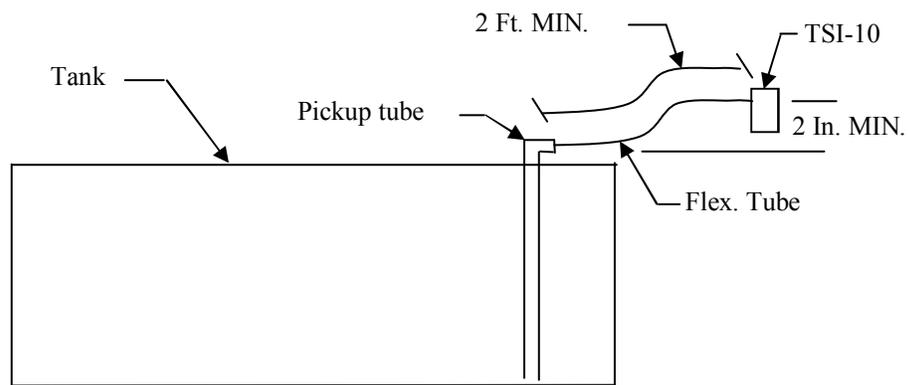
The tubes supplied with your system should match your application and were cut at the factory and calibrated in the MCP for each tank. They will be marked to indicate which tank they should be installed in.

**NOTE:** When installing the pickup tubes in the tanks the tanks should be emptied of fluid. If there is fluid in the pickup tube prior to connecting the flexible tubing to the interface then the system will not indicate proper tank levels.

If you are installing a hub mounted pickup tube apply thread sealant to the fitting prior to installing the tube.

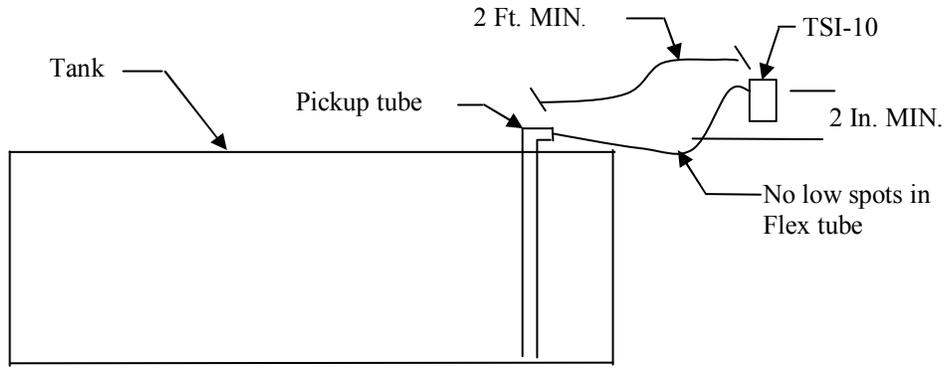
If a flange mounted pickup tube is being used it will be necessary to drill a 1" hole in the top of the tank and six screw holes to secure the flange. The flange must be sealed to the tank with silicon then screwed down.

Once the pickup tubes are installed the sensing interfaces can be mounted in a location near them. The flexible tubing should not be cut less than 24 inches in length and the interfaces must be mounted at least 2 inches above the pickup tube connection See Fig. 5 below.



**LIKE THIS**

**Fig. 5**

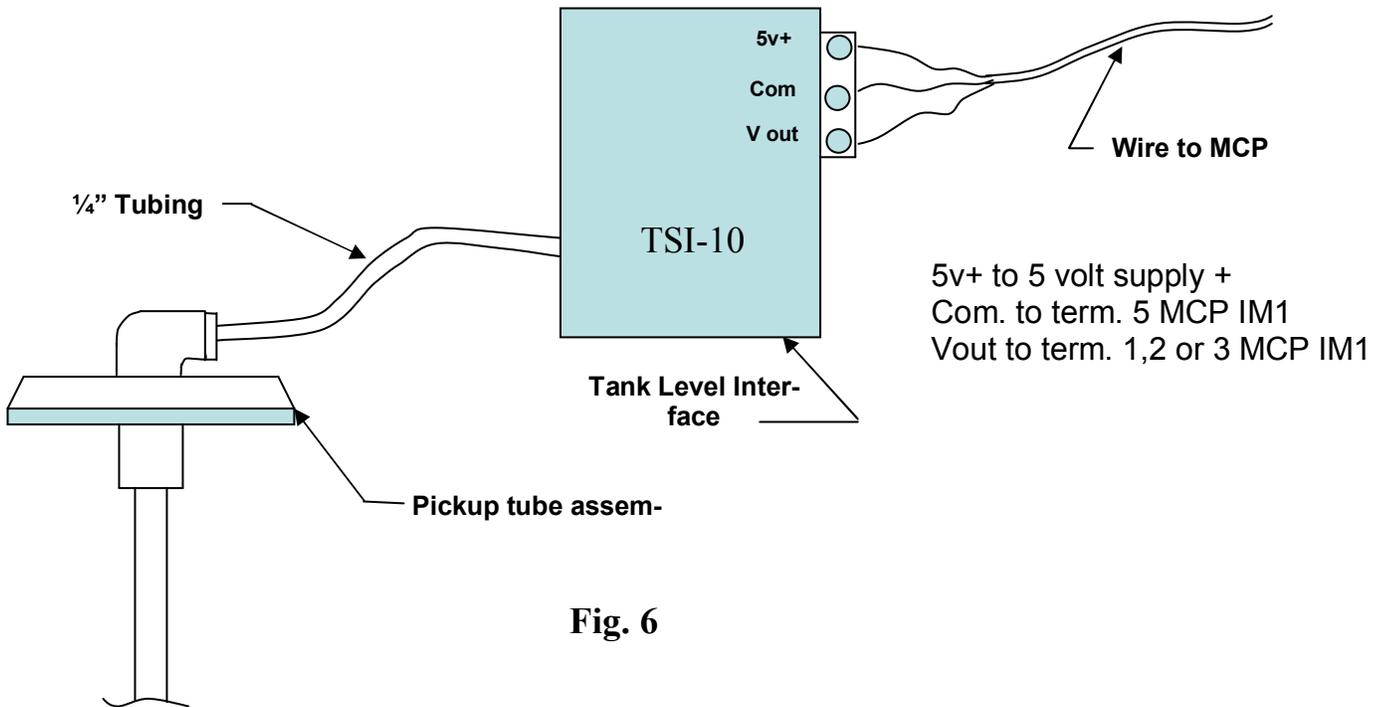


**NOT LIKE THIS**

**Fig. 5 cont.**

Figure 6 below shows the wiring connection details for the TSI-10. Where multiple TSI-10 are installed near each other the Common (Com) and 5Volt supply (5V+) can be jumped from one to the other as shown in fig. 3.

**NOTE: Terminal locations may be different than shown and will be marked accordingly on the TSI-10. Follow terminal to terminal convention as indicated .**



**Fig. 6**

# Propane Sensing Interface PSI-90

**WARNING!** Propane tanks and gauges must only be worked on by certified propane equipment technicians. NEVER try to install a gauge in an existing tank, death or serious injury can occur.

The propane sensing interface PSI-90 requires the input from a propane tank gauge sending unit. If your tank does not have a gauge then you must consult a propane gas company if you want this feature. In most cases tanks with gauges already installed but without electric sending units can be fitted with them with ease. If you have problems obtaining an electric sending unit please call or email us for assistance.

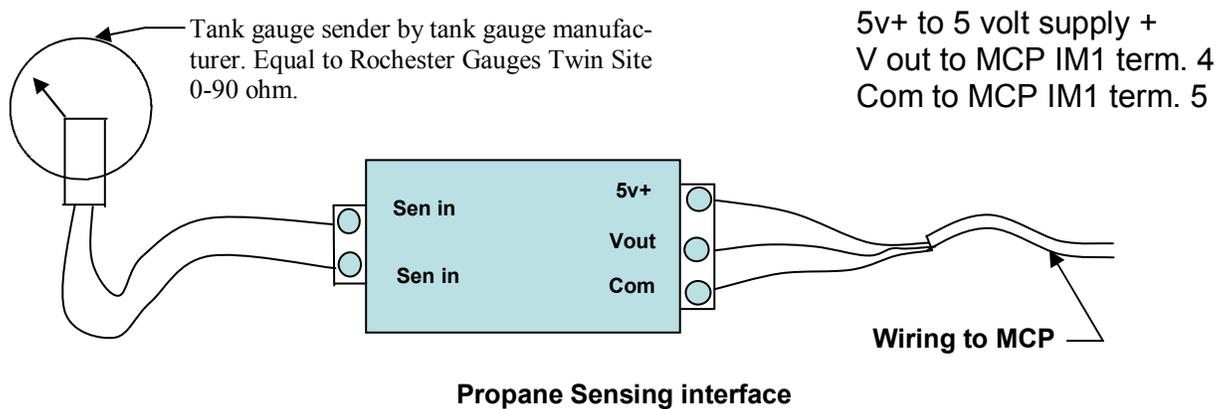


Fig. 7

# Temperature Sensing Interface TMSI-F1

The temperature sensing interface TMSI-F1 is a very simple to install sensor. The diagram in figure 8 below shows the wiring. Placement should be considered for early freeze detection. In the Basement area The sensor should be place low, where the temperature will indicate a loss of heat first.

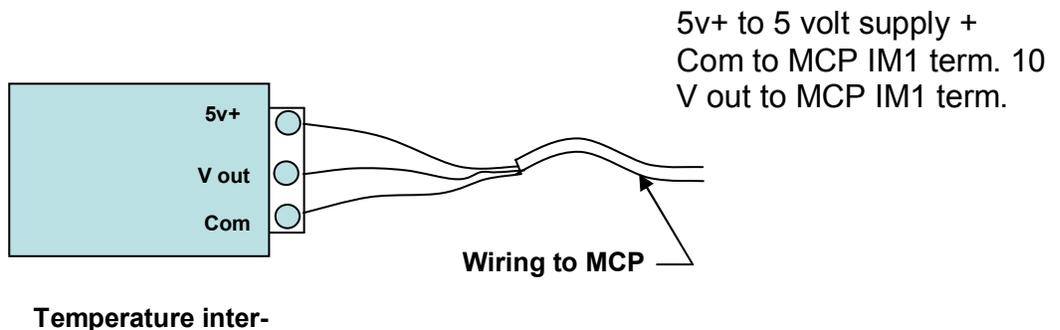


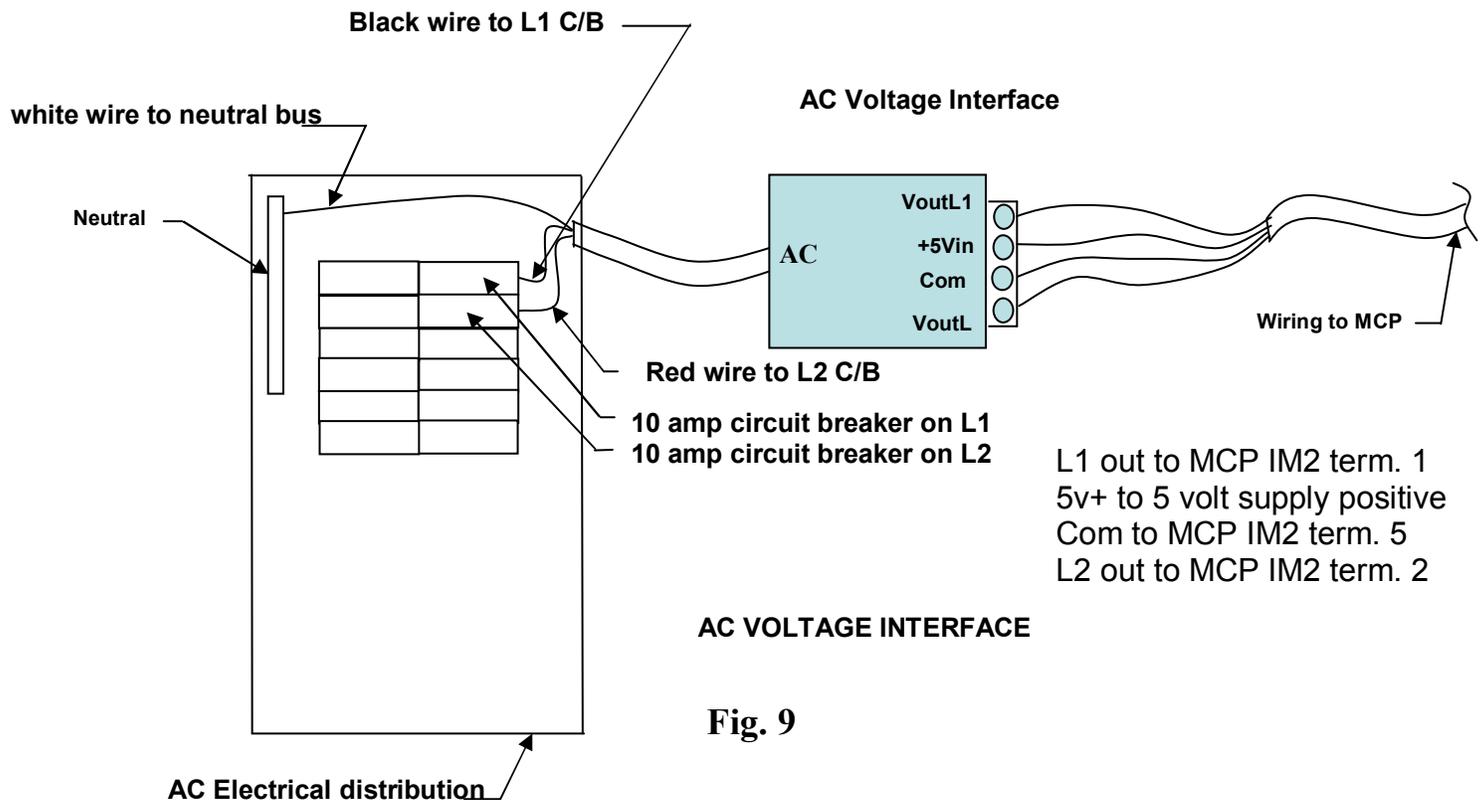
Fig. 8

## AC Voltage Sensing ACVSI-120

**WARNING!** Shock hazards exist. Only a qualified electrical technician shall install the ACVSI-120

**WARNING!** Prior to installing the ACVSI-120 Disconnect all power sources. Open the Generator supply circuit breaker, disconnect the main power cord and turn off any on board inverters.

The ACVSI-120 is the sensing interface that senses the AC line voltage. Both line 1 and Line 2 are monitored. The sensing wires that connect to the circuit breakers in the main distribution panel will have up to 240 volts on them and must be as short as possible. The ACVSI-120 must be mounted right next to the main distribution panel and is supplied with only 3 feet of 300 volt class insulation. The conductors must be terminated on 10 amp circuit breakers as shown in Fig. 9 below. The output of the ACVSI-120 is optically isolated from the AC source so there is no electrical connection at all between the AC and DC sides of the interface..



**Fig. 9**

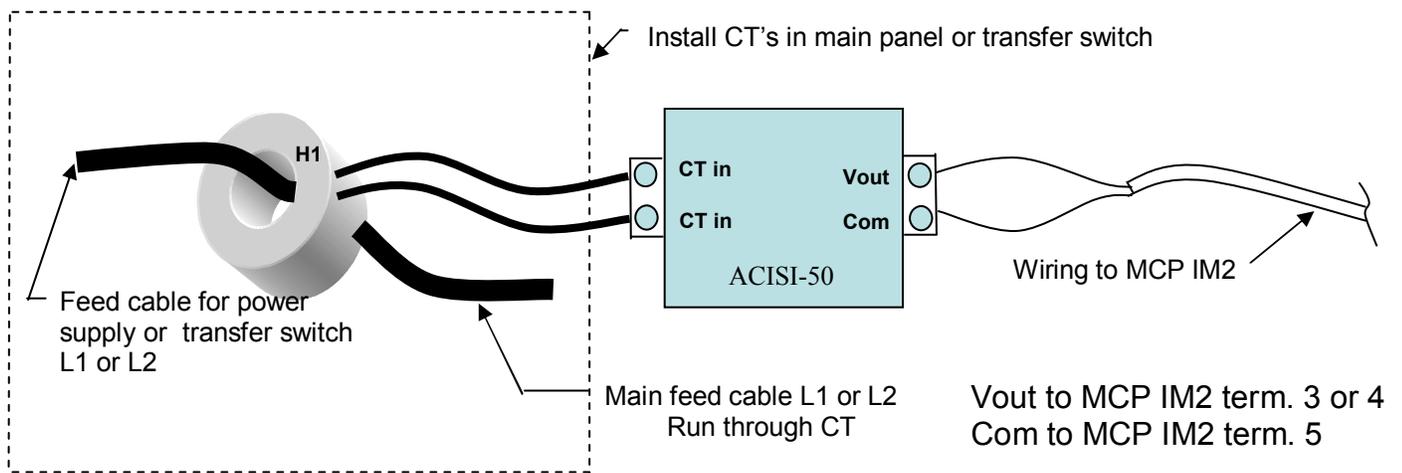
## AC Current Sensing ACISI- 50

**CAUTION!** Current Transformer (CT) will generate very high secondary voltage when not loaded. The wire leads from the CT must not be disconnected from the interface module while current is flowing in the primary (the wire running through the donut).

**WARNING!** Shock hazards exist. Only a qualified electrical technician shall install the ACISI-50

**WARNING!** Prior to installing the ACISI-50 Disconnect all power sources. Open the Generator supply circuit breaker, disconnect the main power cord and turn off any on board inverters.

To install the donut CT's the L1 and L2 conductors will have to be disconnected from their terminals in the main panel, run through the center of the CT as indicated in Fig. 10 below and re-terminated. The CT's must be tie wrapped inside the electrical enclosure to minimize damage due to vibration. The secondary leads connect directly to the CT in terminals of the interface unit, polarity does not matter in this installation.



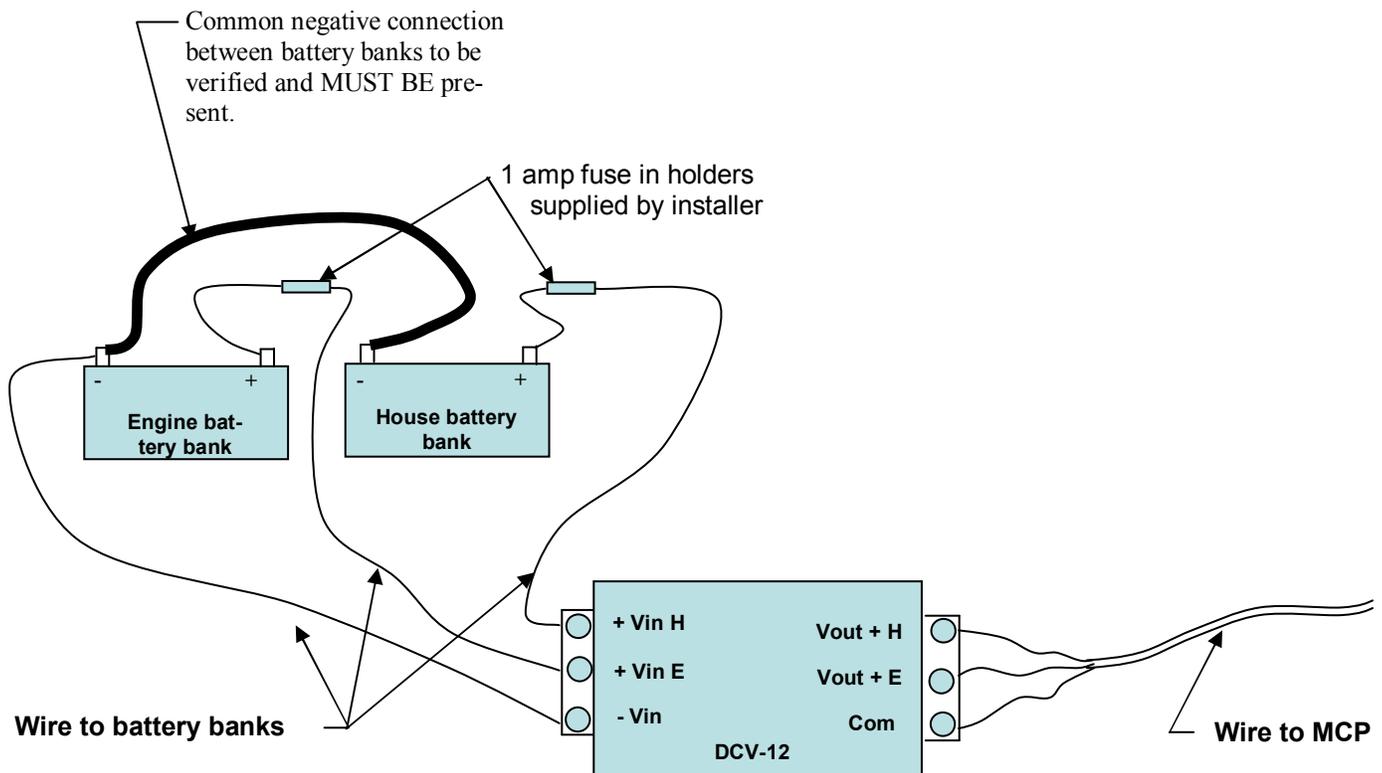
**Fig. 10**

## DC Voltage Sensing DCV-12

**WARNING!** The DCV-12 is intended to be installed in systems with common negatives. If your battery banks do not use common negatives **DO NOT** run two wires from  $-V_{in}$  to each of the negative terminals.

The DCV-12 includes sensing for both house and engine battery banks. In most installations the negative sides of each bank are connected together to form a common negative so the negative  $-V_{in}$  wire can be run to either the house or engine battery negative. If your installation does not use a common negative you will not be able to monitor two battery banks. Although this is extremely uncommon it must be verified prior to installation.

A fuse of 1 amp must also be installed in both wires connected to the positive battery terminals as shown in Fig. 11. The wire between the terminal and the fuse holder must be as short as possible.



DC Voltage interface wiring

Vout + H to MCP IM2 Term. 6  
Vout + E to MCP IM2 Term. 7  
Com to MCP IM2 Term. 10

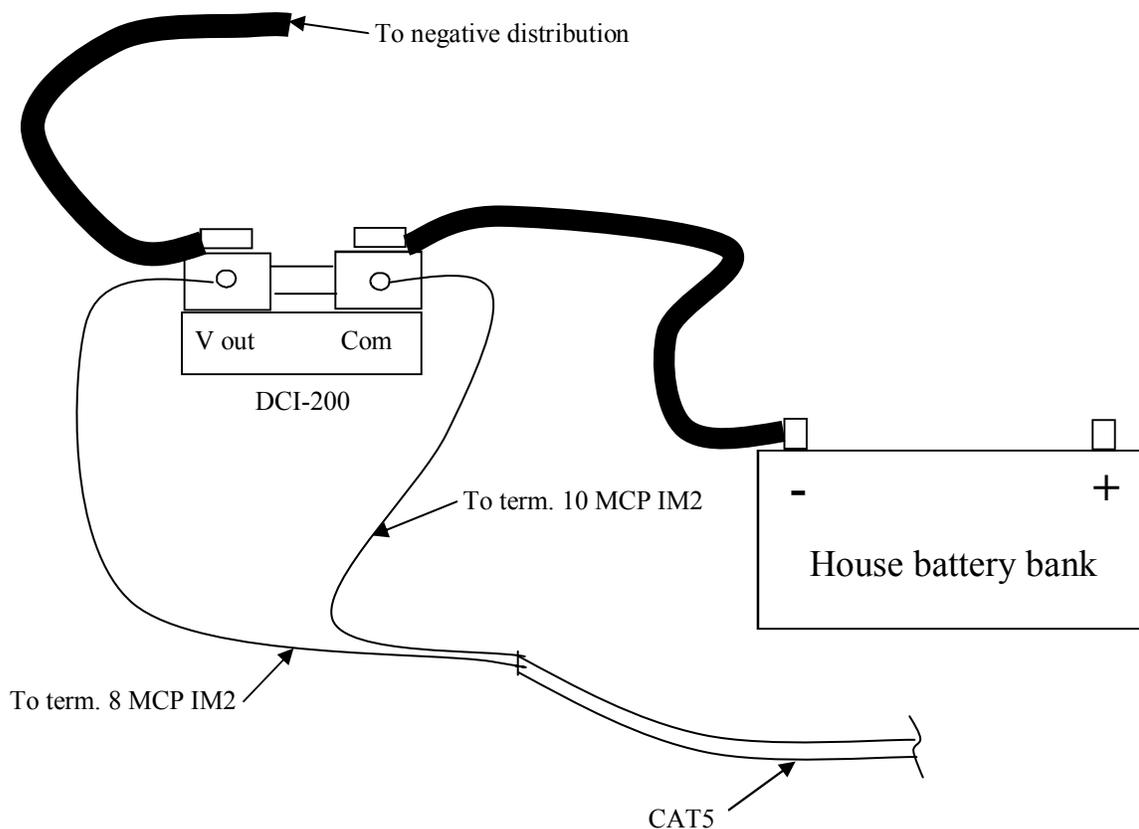
Fig. 11

## DC Current Sensing DCI-200

**WARNING!** Turn off all DC loads prior to installing the DCI-200.

**WARNING!** The DCI-200 is only capable of supplying 160 amps of continuous load. If more load current is required contact the factory for larger capacity shunts.

The DCI-200 is a DC shunt that is capable of 200 amps for short periods of time and should be sufficient for most installations. It is wired into the negative side of the house battery bank as shown in figure 12. The existing negative cable will have to be cut and ring terminals installed or a short piece of cable will have to be added. If cable is added it **MUST BE** the same wire gauge as the existing cable.



**Fig. 12**

## MCP-500-RV Control Functions

The MCP-500-RV is very similar to the MCP-200-RV in all of its monitoring capabilities so the input modules IM1 and IM2 get wire exactly as shown for the MCP-200-RV. On the MCP-500-RV two additional input/output modules (IOM) are provided for wiring the control functions. IOM1 and IOM2 are shown in figure 13 with there respective wiring arrangements.

Three warning labels should have been included with the MCP-500-RV, if you did not receive these warning labels contact the factory before installing any of the automatic control features.



### WARNING

Power sources to this equipment are controlled automatically! Secure control sources prior to servicing!

These warning labels must be placed on the face of the generator control panel, on the face of the automatic transfer switch and on the face of the electrical distribution panel prior to installation of the GSM-2 or the LSM-2.

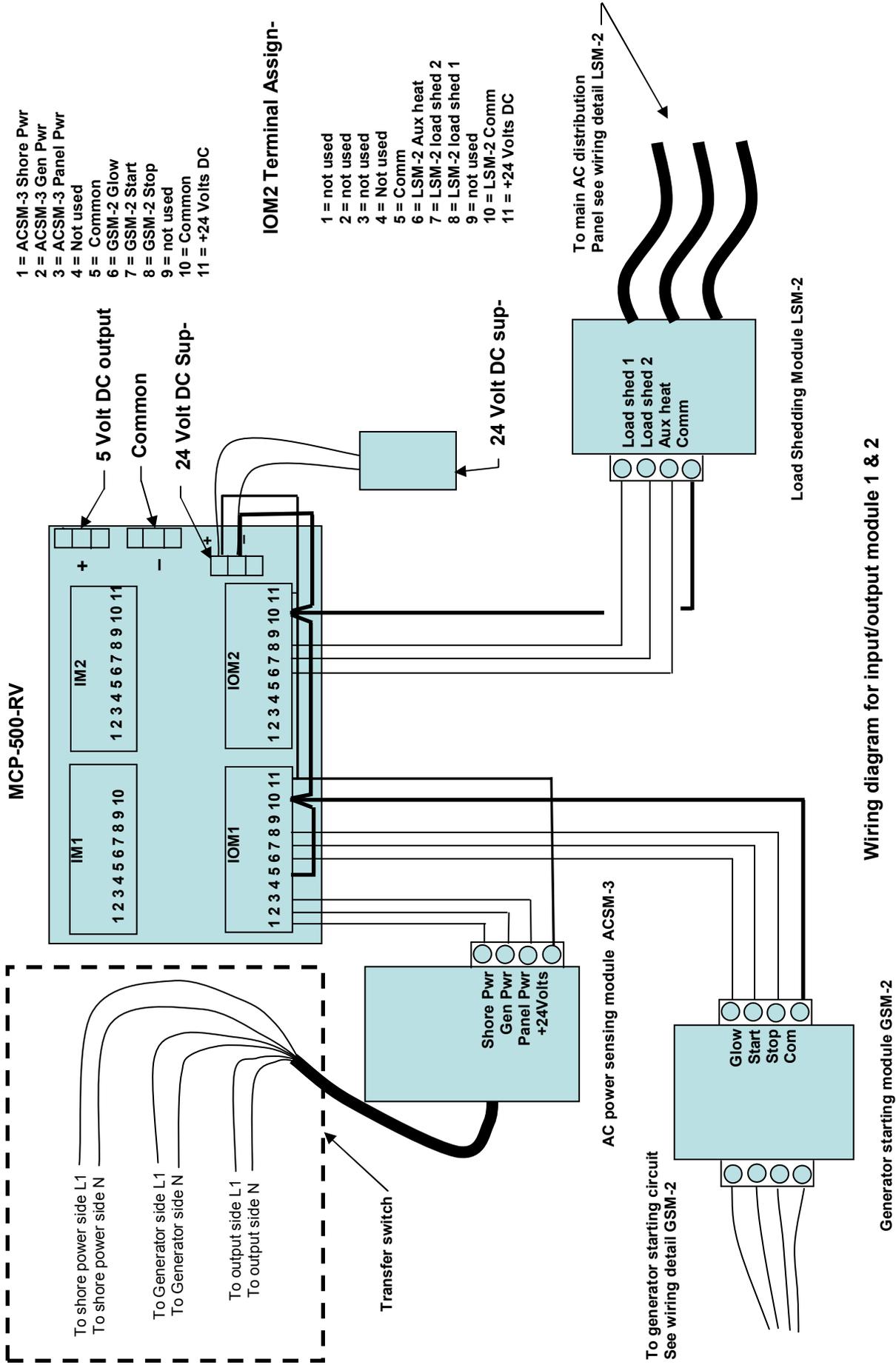
Wiring the control features of the MCP-500-RV requires installation of control modules ACSM-3, GSM-2 and LSM-2 as shown on the following pages.

**IOM1 Terminal Assign-**

- 1 = ACSM-3 Shore Pwr
- 2 = ACSM-3 Gen Pwr
- 3 = ACSM-3 Panel Pwr
- 4 = Not used
- 5 = Common
- 6 = GSM-2 Glow
- 7 = GSM-2 Start
- 8 = GSM-2 Stop
- 9 = not used
- 10 = Common
- 11 = +24 Volts DC

**IOM2 Terminal Assign-**

- 1 = not used
- 2 = not used
- 3 = not used
- 4 = Not used
- 5 = Comm
- 6 = LSM-2 Aux heat
- 7 = LSM-2 load shed 2
- 8 = LSM-2 load shed 1
- 9 = not used
- 10 = LSM-2 Comm
- 11 = +24 Volts DC



**Wiring diagram for input/output module 1 & 2**

**FIG. 13**

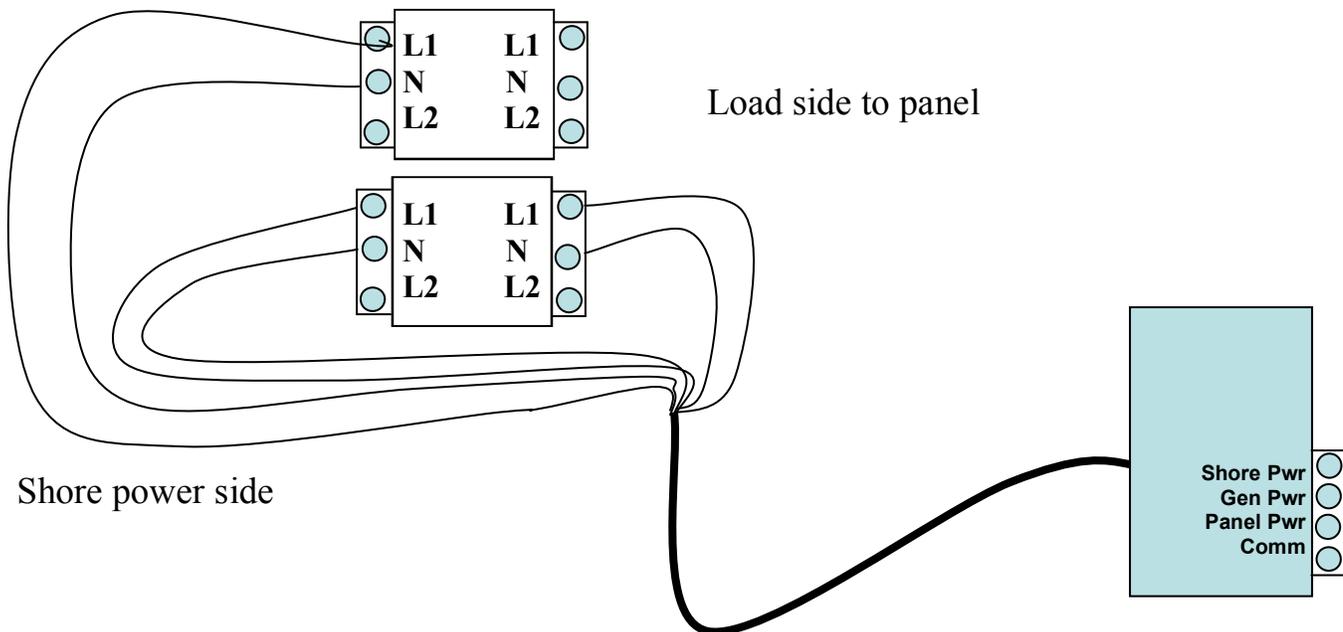
## AC power sensing module ACSM-3

**WARNING!** Shock hazard exists, only a certified/ licensed electrical technician shall install the ACSM-3

**WARNING!** Prior to installing the ACSM-3 Disconnect all power sources. Open the Generator supply circuit breaker, disconnect the main power cord and turn off any on board inverters.

The ACSM-3 senses voltages from the generator and shore power so the processor knows if power is available at these points. It also senses if that power is going out to the distribution panel. Should a fault occur in the transfer switch so power can not get to the distribution panel the processor will override the automatic control and shut the generator down. This keeps the generator from running if no power is being used. The most convenient place to sense these conditions is in the automatic transfer switch (ATS). Most ATS's use two three pole contactors as shown in figure 14 which allow easy termination of the ACSM-3's wires.

Generator side



**Fig. 14**

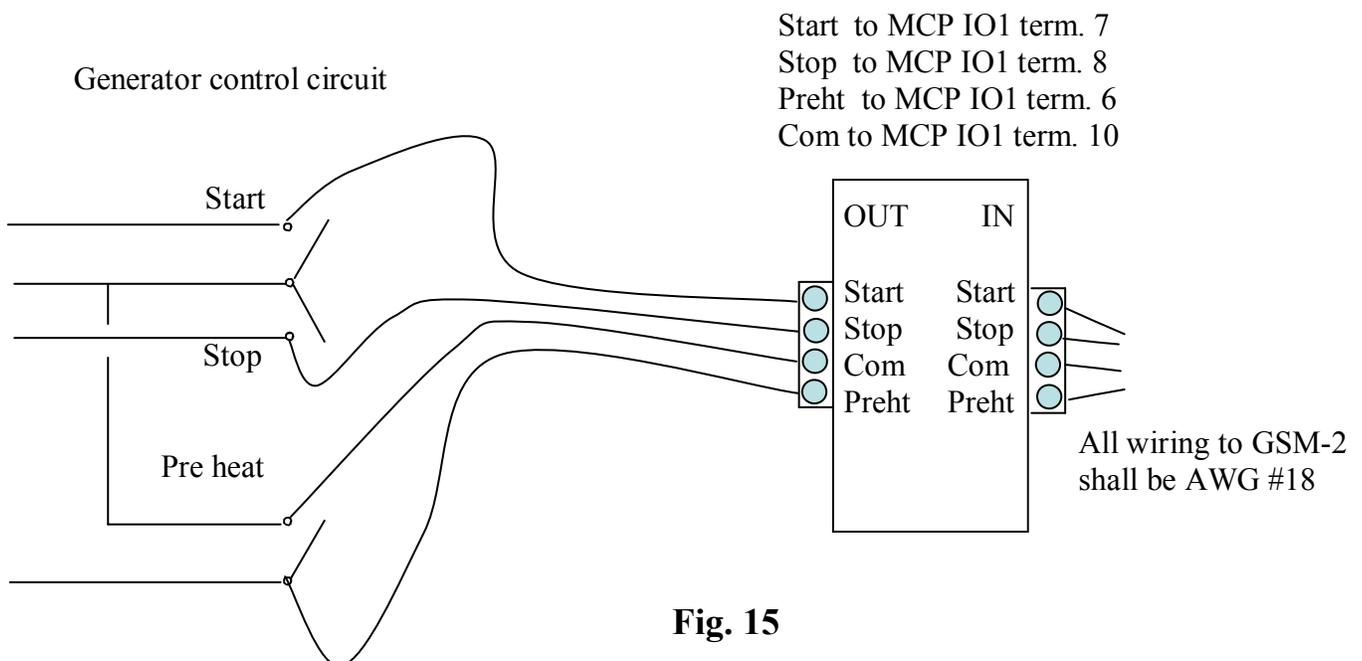
## Generator Starting Module GSM-2

**WARNING!** The generator must be equipped with automatic shut down controls if the GSM-2 is to be used. Verify with the generator manufacturer that these safe guards are in place prior to installation.

**WARNING!** The outputs of the MCP-500-RV must not be connected directly to the generator starting circuit. The GSM-2 must be used as an interface or serious damage to the MCP will result and void all warranties.

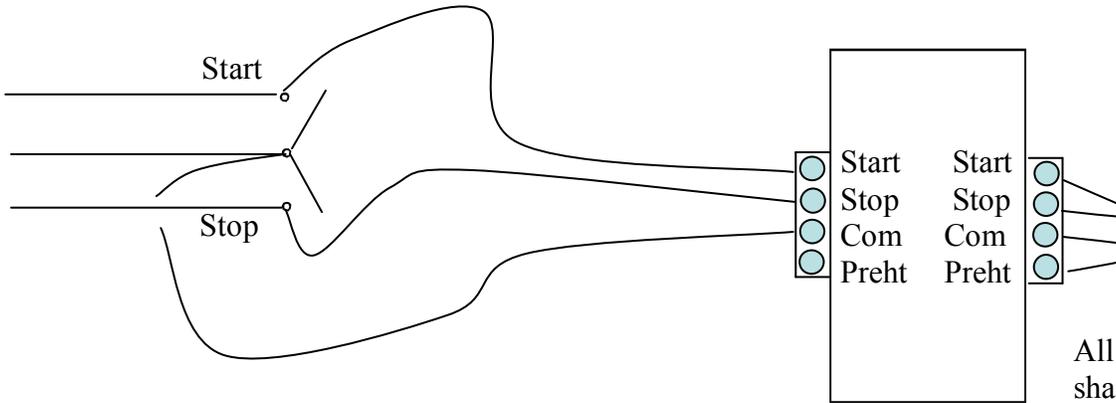
Although most generators installed in RV's come equipped with automatic protection circuits to shut them down in the event of such conditions as over temperature, low oil pressure etc. some may not. Generators must not be operated automatically without these protection provisions.

The GSM-2 is a relay that is used to interface the output circuits of the MCP-500-RV with the generator starting circuit. It is set up to work with Onan type starting circuits that use momentary contact switches to preheat, start and stop the generator. For control of diesel generators that require preheating connect the GSM-2 as shown in figure 15. When a gas, propane or diesel generator that does not require preheating to start, connect the GSM-2 as shown in figure 16.



Generator control circuit

Start to MCP IO1 term. 7  
Stop to MCP IO1 term. 8  
Com to MCP IO1 term. 10



All wiring to GSM-2 shall be AWG #18 or #16

**Fig. 16**

## Load Shedding Module LSM - 2

**WARNING!** Shock hazards exist, only a qualified electrical technician shall install the LSM -3

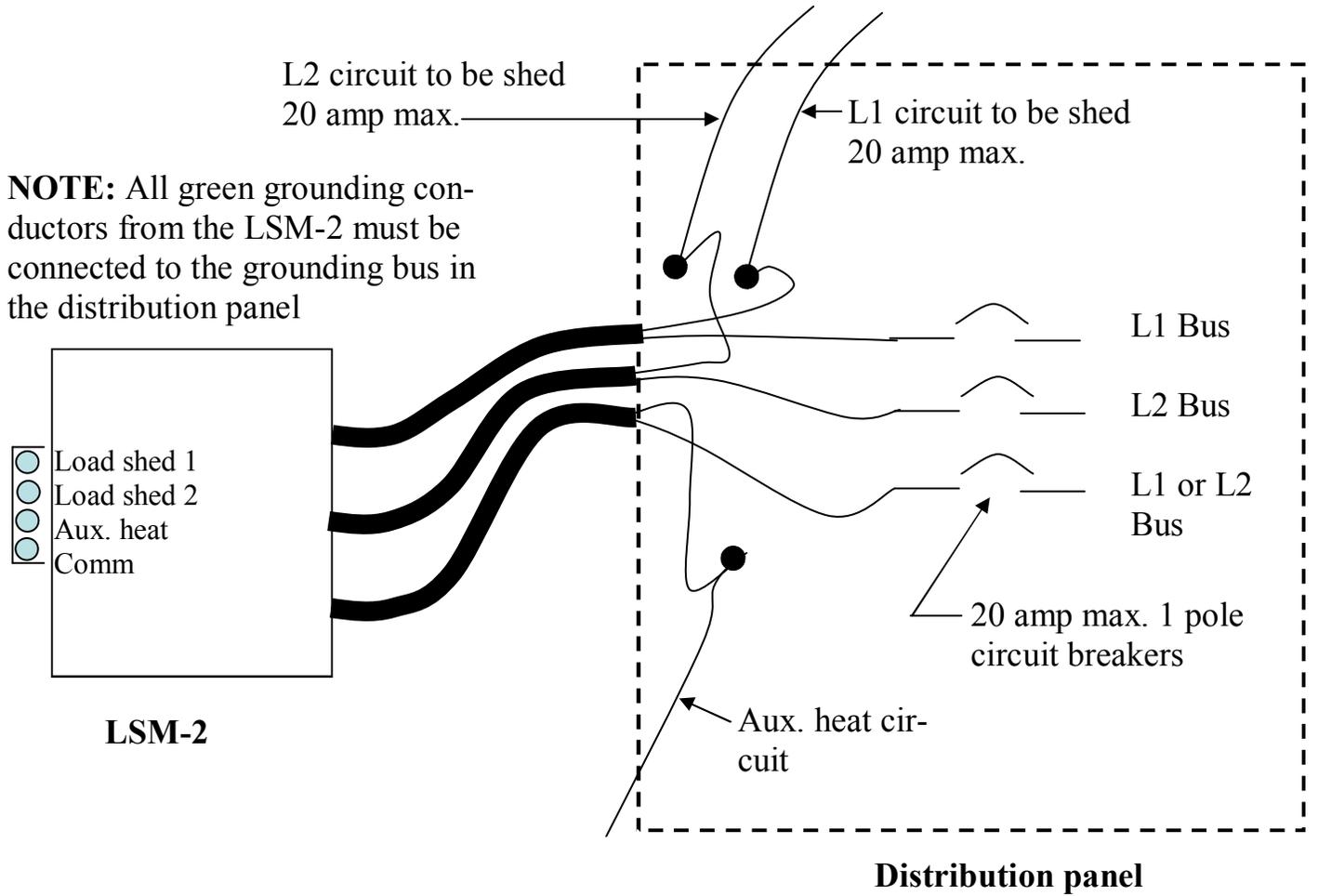
**WARNING!** Prior to installing the LSM-2 Disconnect all power sources. Open the Generator supply circuit breaker, disconnect the main power cord and turn off any on board inverters.

**WARNING!** The outputs of the MCP-500-RV must not be connected directly to the generator starting circuit. The LSM-2 must be used as an interface or serious damage to the MCP will result and void all warranties.

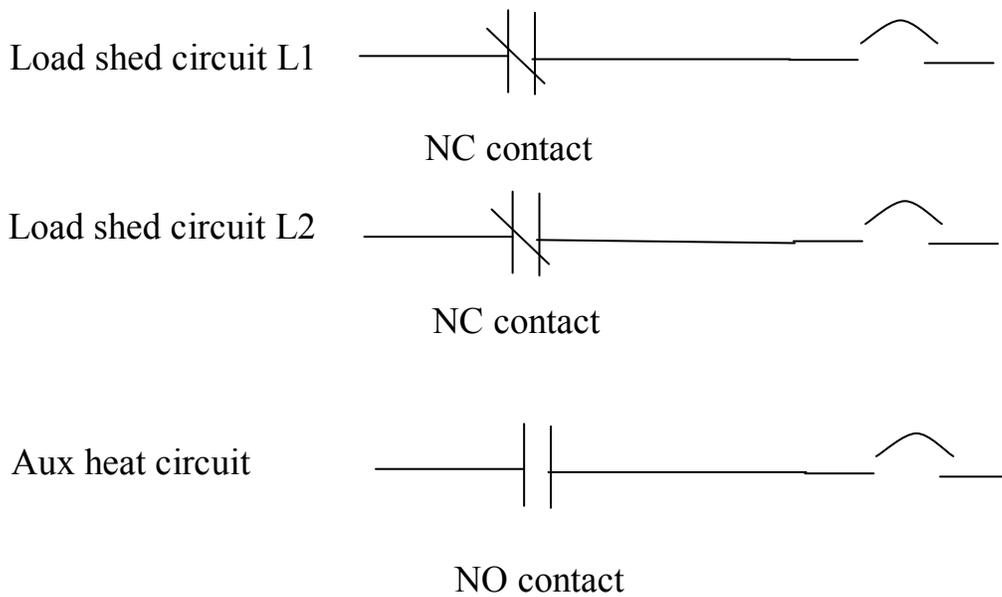
The LSM-2 is used as a switching interface between the MCP-500-RV and the electrical distribution system. It also includes the auxiliary heat switching circuit. Careful consideration must be given to the circuits that will be shed when an overload condition occurs. The LSM-3 has provisions to shed two circuits, one should be selected from the Line 1 side, the other from the Line 2 side, of the distribution system.

If for example there are three air conditioning units one of these might be selected as a load to shed because the other two would probably be able to keep up with the cooling demand for a short period. Or if there are only two, the unit in the bedroom might be selected because the space is not inhabited during periods of high electrical demand such as when the cloths washer or dryer are running. Figure 17 shows a typical wiring arrangement for the LSM-2

Figure 18 shows the load shed and auxiliary heat circuits as they are wired. The LSM-2 has a set of normally closed contacts for each of the load shedding circuits that open when a load shed condition occurs. The auxiliary heat circuit is a normally open contact that closes if the temperature in the basement falls below 32 degrees



**Fig. 17**

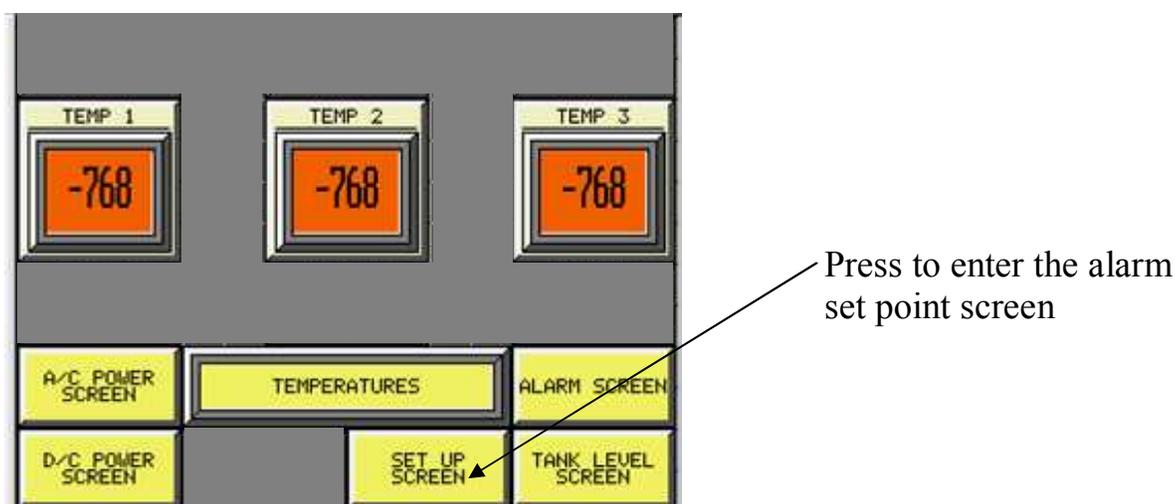


**Fig. 18**

## PART 2: Operation MCP-200 and MCP-500

### Tank Level Setup and Alarm set points

Once the system has been installed the tanks level sensors may need to be zeroed. When the system is setup at the factory the sensors are all labeled according to the tank they will be install in. These sensors all have an offset voltage associated with them that is zeroed during setup and testing at the factory. If these sensors get switched or a sensor needs to be replaced in the future then they will have to be re-zeroed. To zero the tank sensors enter the “ALARM SET POINTS” screen through the temperature screen.



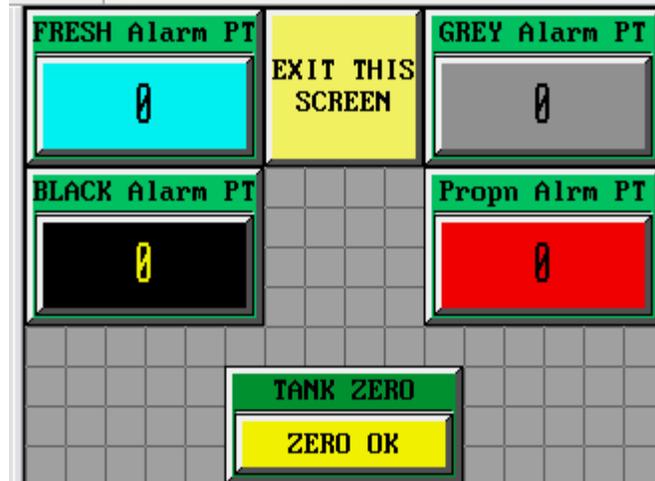
Temperature screen



Pass Code Screen

Before you can enter the alarm set point screen you need to enter a pass code, the pass code is **1234**. This pass code is provided so someone doesn't inadvertently re zero or change your alarm set points.

Enter the pass code by pressing the numbers 1,2,3 and 4 then press enter. The alarm set point screen will be displayed.

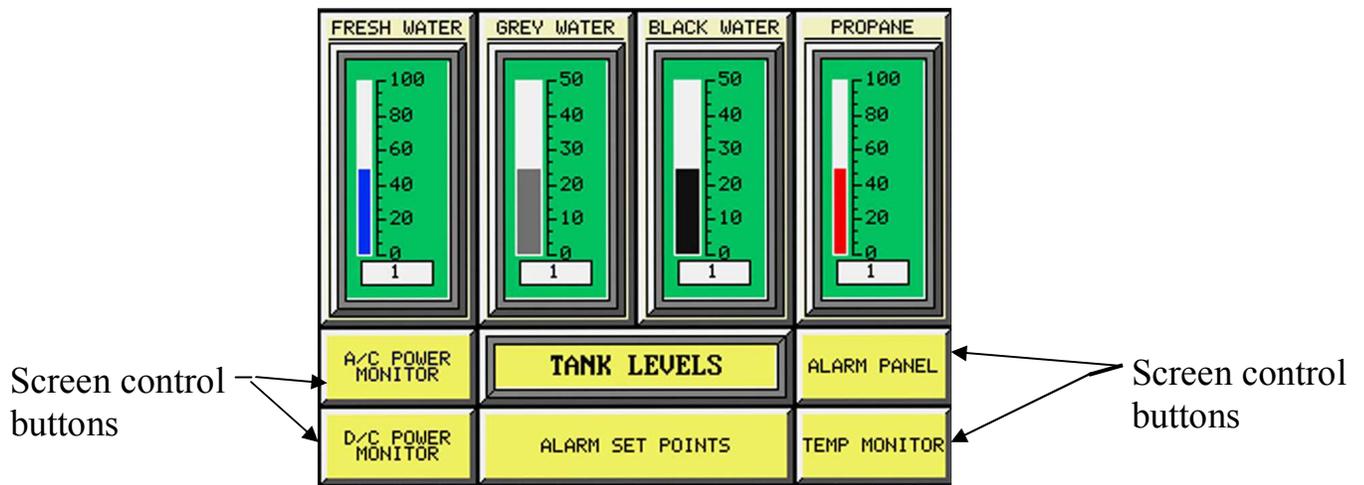


**Alarm Set Point Screen**

In the Alarm Set Point screen press the tank zero button to zero the tanks. The tanks must be empty to zero them, if they are not empty the scaling of the tank levels will be incorrect. To change the alarm set points press the button that corresponds to the tank alarm. A numeric entry screen similar to the one used to enter the pass code will be displayed. Press the numbers that are desired for the tank alarm point and press enter. For example in the screen above the fresh water alarm point was set to 20 by pressing 2 then 0 then enter.

The MCP-200-RV is a very user friendly and simple to use system. Once the power is supplied to the processor the program starts processing information obtained from the sensing interfaces and displays this information on one of the display screens. To switch from one screen to another all you have to do is touch the block on the screen with the name of the screen you want to view. Below the tank level screen is represented. The four small squares in the lower left and right corners are the screen changing buttons. You just press on the button with the label of the screen you want to see and the screen changes.

The program is continuously monitoring the tank levels and when an alarm condition occurs it automatically changes to the Alarm Panel screen

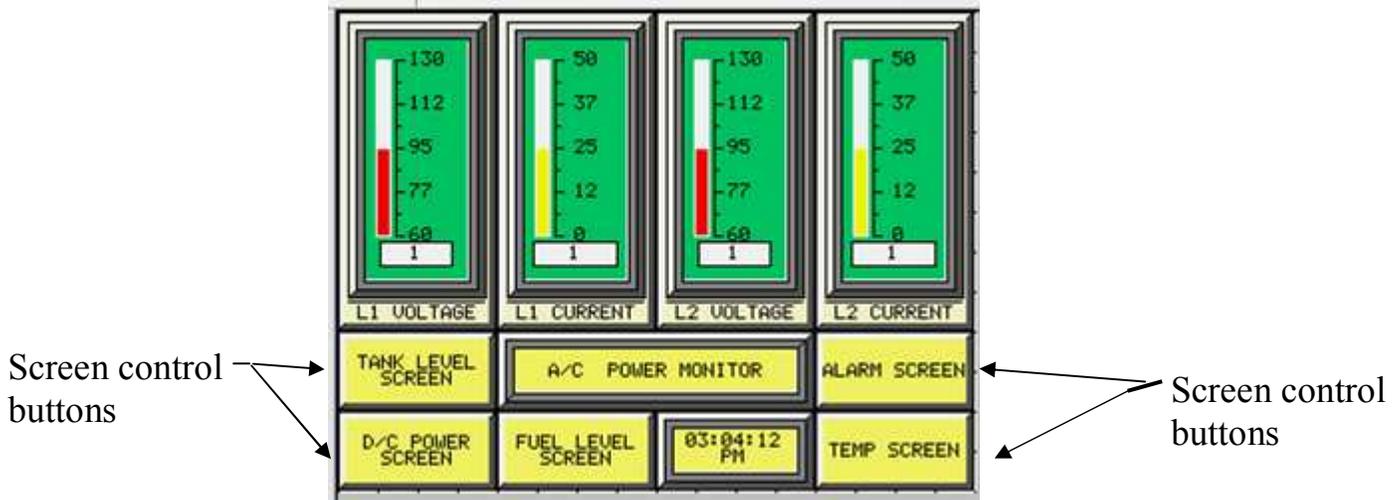


### Tank Levels

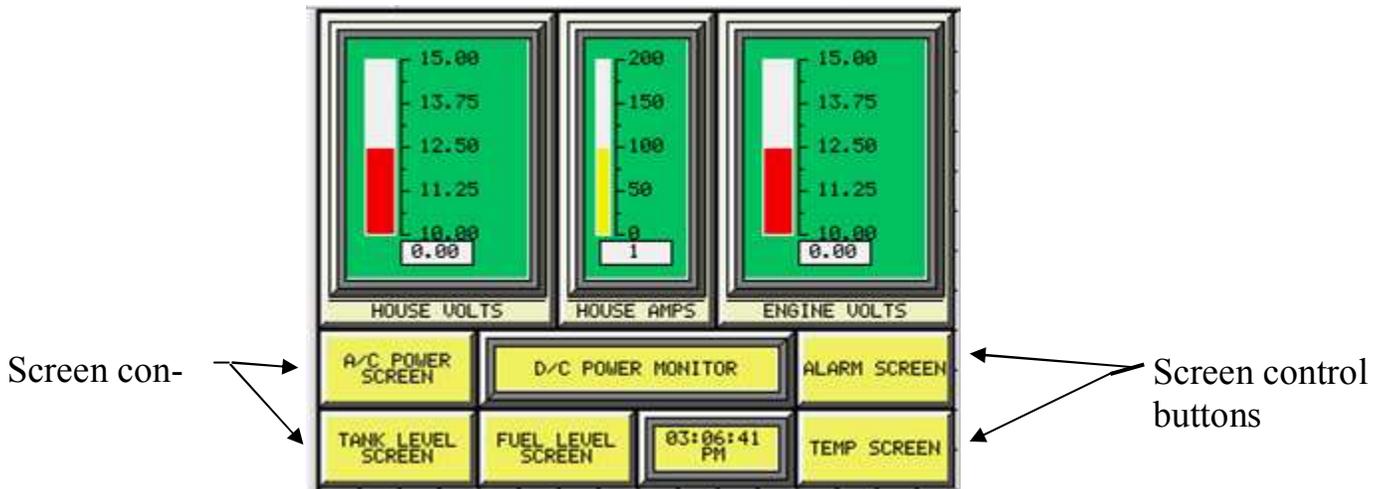
For example if you want to go to the A/C power monitor screen from the Tank Level screen you press on A/C power monitor and the AC POWER MONITOR screen will appear on the panel.

The AC power Monitor screen displays the AC voltage of Line 1 and Line 2 as well as the load current on those power feeds. If you are using a 30 amp or 20 amp cord for shore power, voltage and current will only be displayed on one of these lines.

The program is continuously monitoring the voltage and current levels and when an alarm condition occurs (either low AC voltage or high AC current) it automatically changes the screen to the alarm panel.



### AC Power Monitor

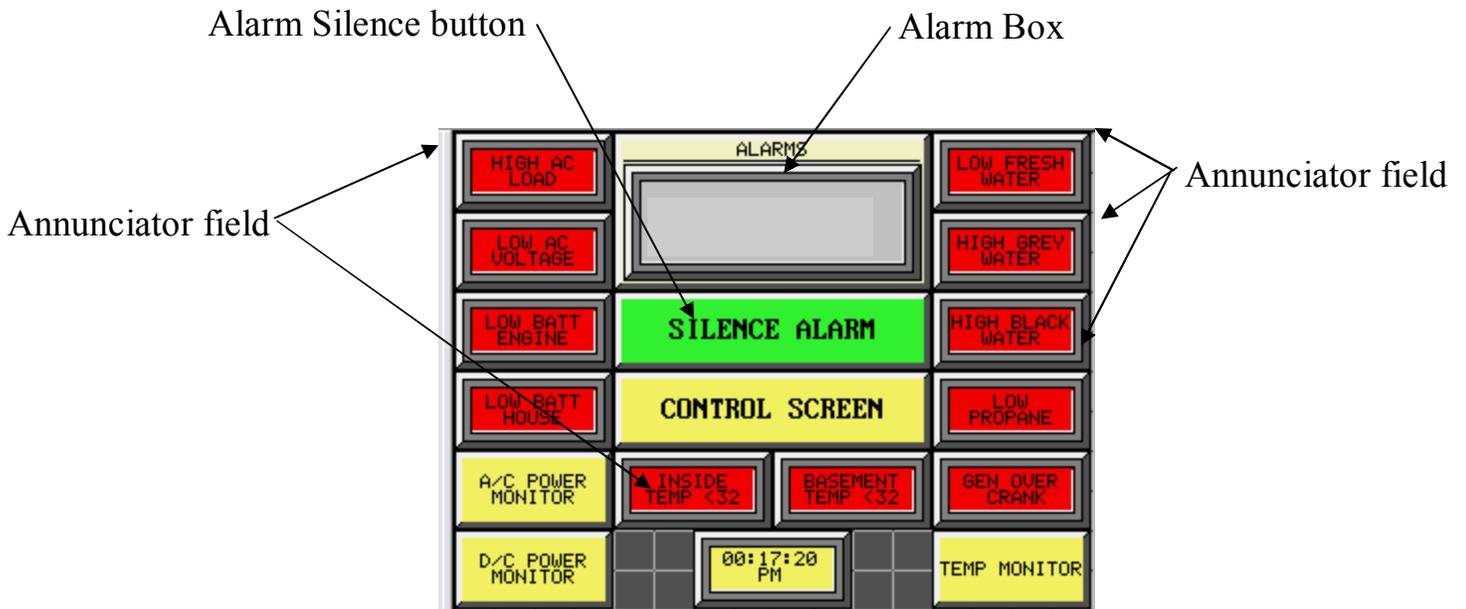


### DC Power Monitor

The DC Power Monitor Displays the house and engine battery DC voltages and the house DC current. The program continuously monitors the battery voltages and when a low battery voltage alarm condition occurs it automatically changes to the Alarm Panel screen.

## Temperature Monitor

The Temperature monitor screen displays the inside, outside and basement temperatures. The program continuously monitors the inside and basement temperatures, if they fall below 32 degrees an alarm occurs and it automatically changes to the alarm Panel



**Alarm Panel**

The Alarm Panel screen displays all alarms present. When an alarm is first received it flashes in the Alarms box in the top center of the screen for ten seconds and the alarm beeper sounds. The button just below the alarms box is an alarm silence button to silence the beeper. If the button reads ALARM SILENCED the beeper will not sound, if it reads SILENCE then the beeper will sound on alarm and when a screen change button is pressed.

Once the ten second alarm period has passed the alarm is flagged in the annunciator field of the screen to let you know that an alarm condition is still present.

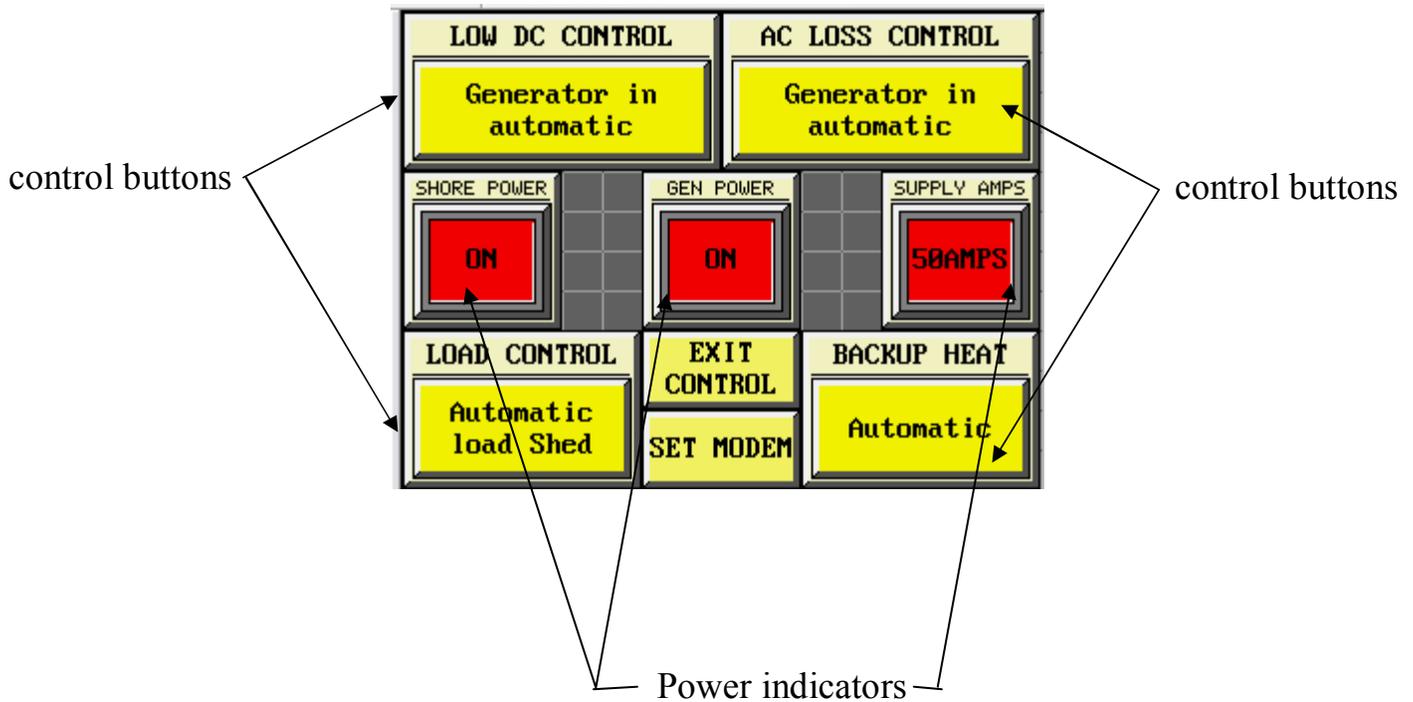
# MCP-500-RV control functions

The control functions of the MCP-500-RV consist of automatic generator starting, load shedding and backup heat . The generator starting feature can be used to automatically start the generator with loss of AC line voltage and or low house battery voltage. The load shedding feature will shed one level of load from line 1 and one level of load from line 2. The backup heat feature can be used to activate a circuit to a heating appliance should the temperature level fall below 32 degrees.

The MCP-500-RV has a screen changing button called CONTROL SCREEN on the alarm screen. Pressing the Control Screen button will change to the Control Screen



**MCP-500 Alarm Panel**



**Control Screen**

The control screen allows selection of the automatic control features. When the control buttons are pushed those control features are selected to operate automatically. If either of the “Generator in Manual” buttons are pressed, they display “Generator in Automatic” and the generator will start automatically with loss of AC power and/or low DC voltage.

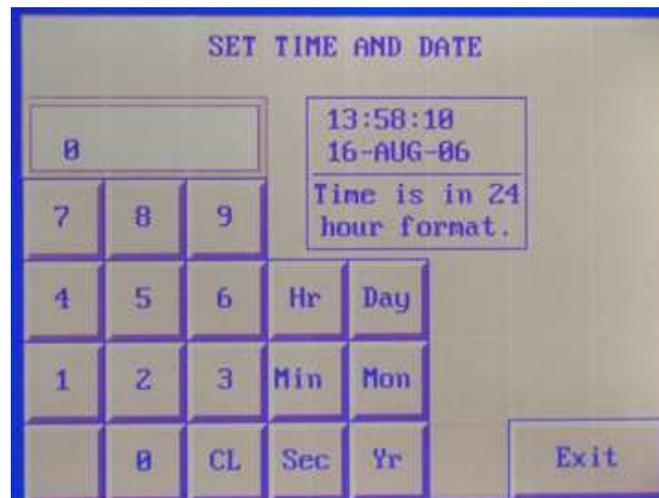
The load control button activates the automatic load shedding, in the above picture this button has been activated and load shedding is on. This feature is useful when the electrical power demand is high and there is a possibility of tripping a main circuit breaker. In big rigs when two big, or even three, air conditioning units are running at the same time as a washer and dryer and then the stove or convection oven is turned on the current could exceed the limits of the shore power supply. If the load shedding were on and this condition occurred the MCP-500 might, depending on how it was wired, turn one air conditioning unit off. When the stove or convection oven is turned off the MCP-500 will automatically turn the air conditioning unit back on. The load shedding feature is dependent on the loads selected to be shed in the event of an overload.

## SETTING THE COMPUTER'S CALENDER CLOCK

To set the calendar clock press the upper and lower left hand corners of the screen simultaneously and the screen shown in figure 26 will be displayed.



**Fig. 26 Computer Setup Screen**



**Fig. 27 Set Time and Date**

To set the time and date press enter the number for the value you want in the field and then press the field button where you want the value to appear. If you want the month to be set at July you would press the 7 then the MON field button. Even though the time on some of the display screens are on a 12 hour basis the time here has to be entered on a 24 hour basis.

## **CONTACT AND SUPPORT**

Please check our web site [www.ElwoodControls.com](http://www.ElwoodControls.com) for current phone numbers

General information                      *info@ElwoodControls.com*

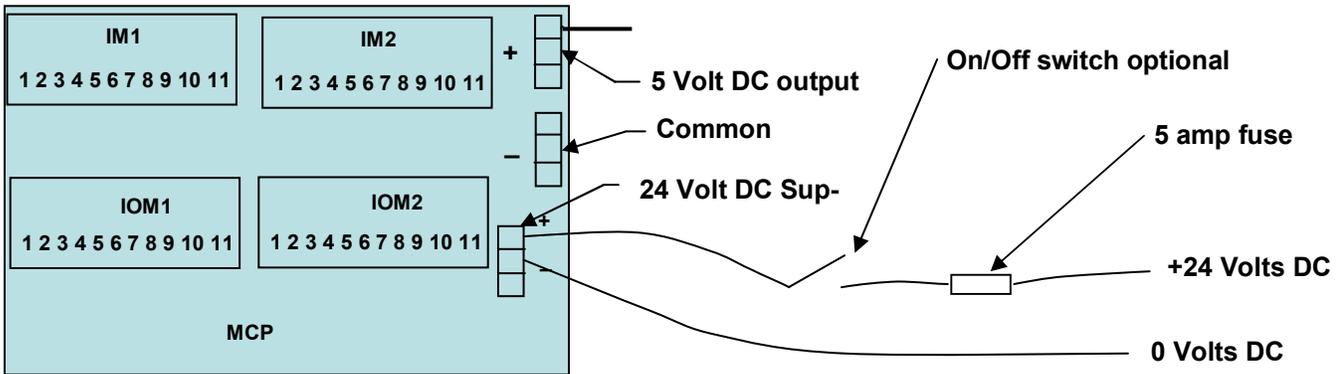
Technical support                        *techsupport@ElwoodControls.com*



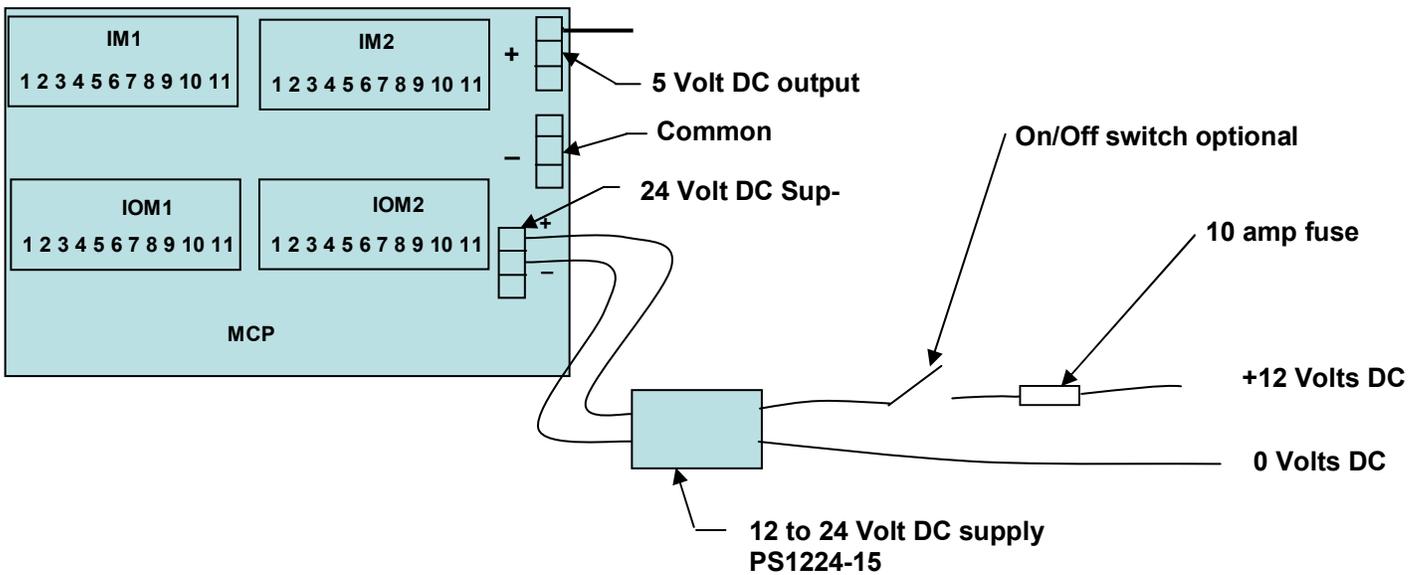
# APPENDIX A

## Power Supply wiring

The MCP-200-RV and MCP-500-RV require a 24Volt DC supply for operation. Some motorcoaches use 24 volts for there DC supply voltage and in these instances the unit can be wired as shown in figure A-1 below. For motorcoaches with 12 volt DC systems a 12 to 24 volt power supply model PS1224-15 is required and wired according to figure A-2.



**Fig. A-1 24 Volt DC Systems**

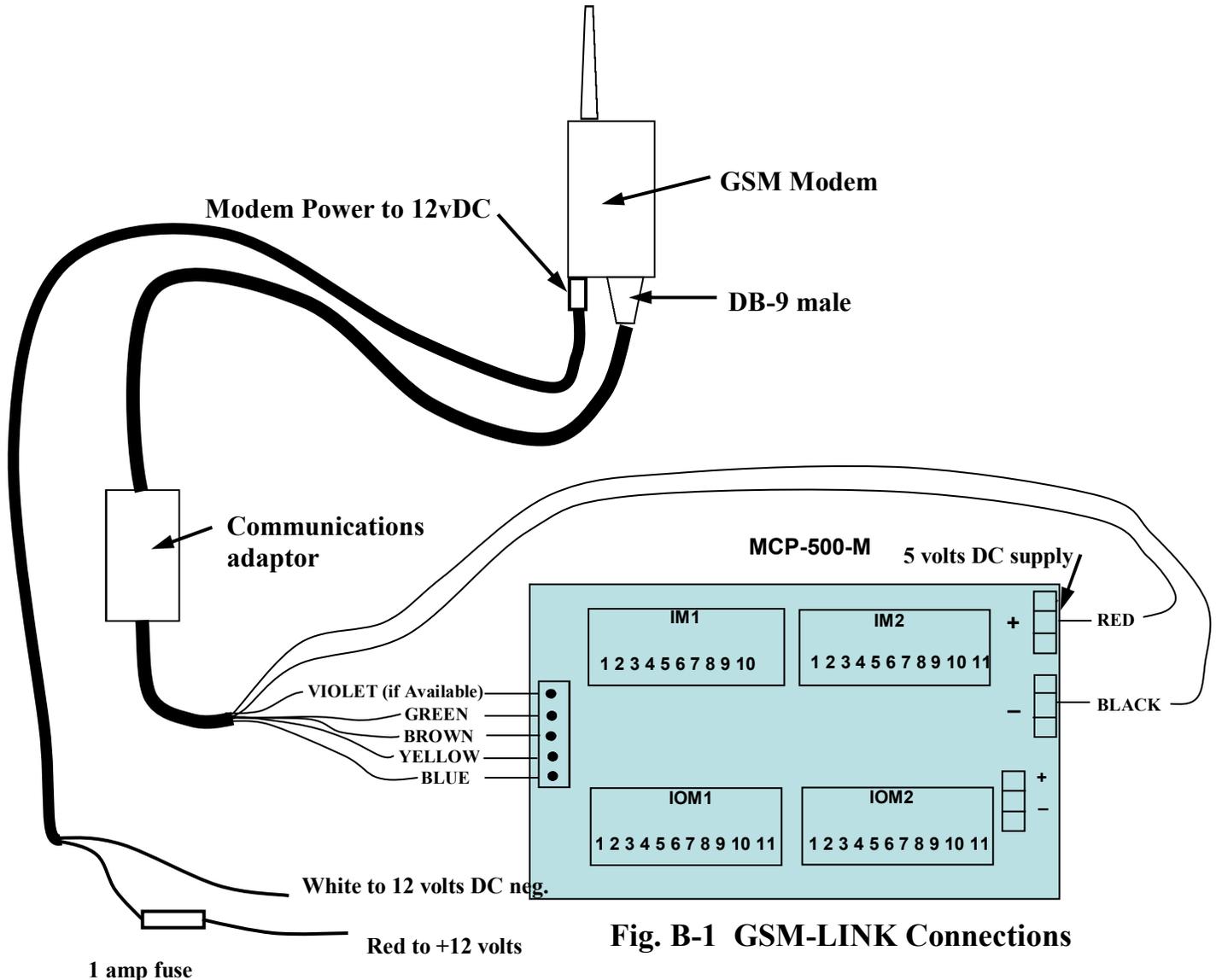


**Fig. A-2 12 Volt DC Systems**

## APPENDIX B GSM-LINK GSM Text Message Modem Installation

A wireless GSM SIM card is required by the end user prior to this feature being functional. We recommend the purchase of a pay as you go GSM SIM card or cell phone with a SIM card. We have used Cingular/ ATT&T, with good results but T mobile or any other GSM network provider will work. Network coverage will affect functionality of the GSM-LINK. An account must be set up with the network provider and minutes purchased to keep the SIM card charged. Text messaging must also be enabled. Because the modem will not be used for voice calls the text messages are usually charged at a much lower rate. Be aware of the expiration time for the minutes, in most cases it is best to purchase a block of time that will not expire for one year.

Behind the antenna you will find a small black tray where the SIM card is to be installed. Using the point of a pen press the yellow button to release the SIM card holder. Place the SIM card in the holder with the copper contacts facing up. Slide the SIM card and tray into the modem with the COPPER CONTACTS facing back, or away from the antenna.



The optional GSM-LINK comes with a communications adaptor and power supply cord as shown in figure B-1 below. The power supply wiring should be connected to a 12 volt DC source as shown with the supplied 1 amp fuse in the positive RED line. The WHITE conductor is the negative. The communication wiring goes to the green, five terminal block on the left side of the MCP (this is the opposite side from the power connections). If a violet wire is not available don't connect anything to the top terminal.

### GSM-LINK GSM Text Message Modem Operation

The modem setup screen is shown in figure B-2 below. It can be accessed on the MCP-200 through a button on the "Alarms Panel" screen and on the MCP-500 through a button on the "Control Panel" screen. This screen is pass code protected and the pass code is **1234**. The phone number field will be blank until the user enters a cell phone number to be text messaged in the event of an alarm. The only alarms that have text messages associated with them are: HIGH BILGE, NO SHORE POWER, LOW DC VOLTAGE, INTRUSION ALARM, HIGH TEMP, LOW TEMP GEN RUNNING, SHORE POWER AVAILABLE. The wiring points for input signals for these alarms is shown in figure 13.



Fig. B-2 GSM-LINK SETUP SCREEN









