

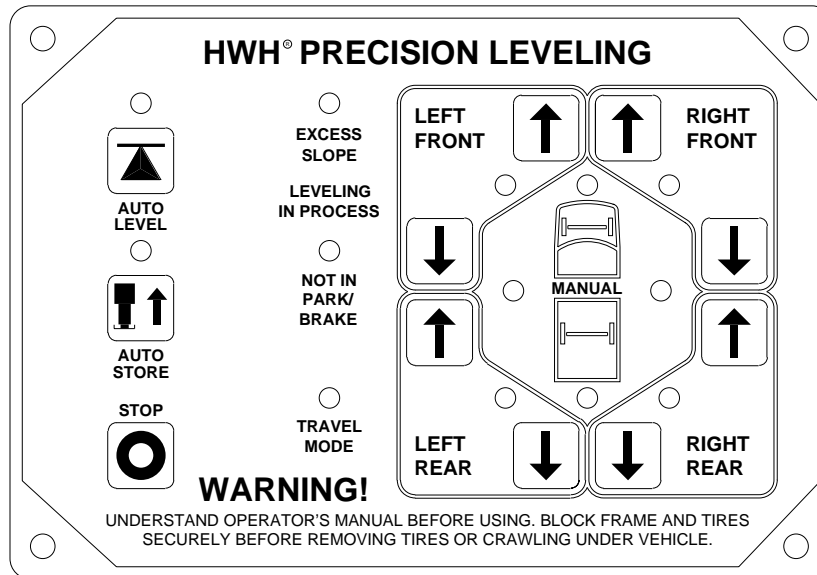


# OPERATOR'S MANUAL

## HWH® COMPUTER-CONTROLLED 2000 SERIES PRECISION LEVELING SYSTEM

### FEATURING:

*Touch Panel Leveling Control  
Four Straight-Acting Power Extend/Power Retract Jacks  
Auxiliary Hand Pump*



### HWH CORPORATION

(On I-80, Exit 267 South)

2096 Moscow Road | Moscow, Iowa 52760

Ph: 800/321-3494 (or) 563/724-3396 | Fax: 563/724-3408

[www.hwh.com](http://www.hwh.com)

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# OPERATING MANUAL

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## WARNING !

**READ THE ENTIRE OPERATOR'S MANUAL BEFORE OPERATING.**

**BLOCK FRAME AND TIRES SECURELY BEFORE CRAWLING UNDER VEHICLE. DO NOT USE LEVELING JACKS OR AIR SUSPENSION TO SUPPORT VEHICLE WHILE UNDER VEHICLE OR CHANGING TIRES. VEHICLE MAY DROP AND/OR MOVE FORWARD OR BACKWARD WITHOUT WARNING CAUSING INJURY OR DEATH.**

**KEEP ALL PEOPLE CLEAR OF VEHICLE WHILE LEVELING SYSTEM, ROOM EXTENSIONS AND OTHER MOVABLE MECHANISMS ARE BEING OPERATED.**

**NEVER PLACE HANDS OR OTHER PARTS OF THE BODY NEAR HYDRAULIC LEAKS. OIL MAY PENETRATE SKIN CAUSING INJURY OR DEATH.**

**WEAR SAFETY GLASSES WHEN INSPECTING OR SERVICING THE SYSTEM TO PROTECT EYES FROM DIRT, METAL CHIPS, OIL LEAKS, ETC. FOLLOW ALL OTHER APPLICABLE SHOP SAFETY PRACTICES.**

**IMPORTANT: IF COACH IS EQUIPPED WITH A ROOM EXTENSION, READ ROOM EXTENSION SECTION BEFORE OPERATING LEVELING SYSTEM.**

## HOW TO OBTAIN WARRANTY SERVICE

### THIS IS NOT TO BE INTERPRETED AS A STATEMENT OF WARRANTY

HWH CORPORATION strives to maintain the highest level of customer satisfaction. Therefore, if you discover a defect or problem, please do the following:

**FIRST:** Notify the dealership where you purchased the vehicle or had the leveling system installed. Dealership management people are in the best position to resolve the problem quickly. If the dealer has difficulty solving the problem, he should immediately contact the Customer Service Department, at HWH CORPORATION.

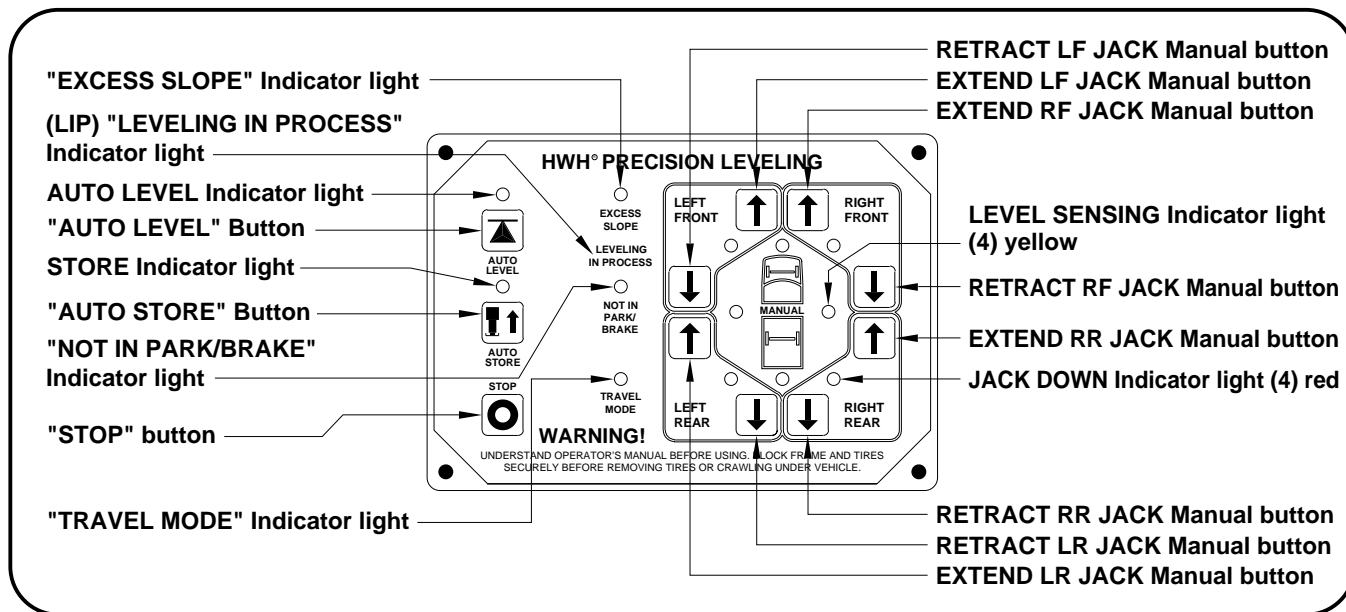
**SECOND:** If your dealer cannot or will not solve the problem, notify the Customer Service Department:  
HWH CORPORATION 2096 Moscow Rd. Moscow IA. 52760  
(563) 724-3396 OR (800) 321-3494. Give your name and address, coach manufacturer and model year, date the coach was purchased, or the date of system installation,

description of the problem, and where you can be reached during business hours (8:00 a.m. till 5:00 p.m. c.s.t.). HWH CORPORATION personnel will contact you to determine whether or not your claim is valid. If it is, HWH CORPORATION will authorize repair or replacement of the defective part, either by appointment at the factory or by the authorization of an independent service facility, to be determined by HWH CORPORATION. All warranty repairs must be performed by an independent service facility authorized by HWH CORPORATION, or at the HWH CORPORATION factory, unless prior written approval has been obtained from proper HWH CORPORATION personnel.

# CONTROL IDENTIFICATION

## 2000 SERIES PRECISION LEVELING SYSTEM

### COMPUTER-CONTROL



## CONTROL FUNCTIONS

### AUTO CONTROL BUTTONS

**"AUTO LEVEL" (▲) BUTTON:** This is the on button and automatic operation button.

**"STOP" BUTTON:** Push the "STOP" button to stop automatic hydraulic operation.

**"AUTO STORE" BUTTON:** The store indicator light is above the "AUTO STORE" button. This button is used to automatically retract the jacks.

### MANUAL CONTROL BUTTONS

**EXTEND BUTTONS (UP ARROWS):** These buttons will extend the jacks to lift the vehicle.

**RETRACT BUTTONS (DOWN ARROWS):** These buttons will retract the jacks to lower the vehicle.

SEE MANUAL LEVELING PROCEDURE.

### INDICATOR LIGHTS

**AUTO LEVEL INDICATOR LIGHT:** (BLUE) This light indicates that the panel is active in the auto level or maintain mode.

### INDICATOR LIGHTS

**AUTO STORE LIGHT:** (BLUE) This light indicates that the system is in STORE mode.

**"EXCESS SLOPE" LIGHT:** (RED) This indicator will light when the leveling system cannot level the vehicle.

**"LEVELING IN PROCESS" LIGHT:** (BLUE) This light will flash during the automatic leveling process.

**"NOT IN PARK/BRAKE" LIGHT:** (RED) This light indicates the park brake is not set. The system will not function.

**"TRAVEL MODE" LIGHT:** (GREEN) This LED, indicates the leveling system is in the travel mode. All jack down warning lights should be off.

**LEVELING LIGHTS:** The four yellow indicating lights are level sensing indicators. When a yellow light is on, it indicates that its side, end, or corner of the vehicle is low. The front and rear lights should not be on at the same time. Because of the level sensor arrangement, both side lights can be on at the same time.

**JACK DOWN LIGHTS:** The four red lights surrounding the yellow level indicators are jacks down WARNING lights. They are functional when the Master Power switch is on. When a jack is extended approximately 1 inch, it's warning light will come on.

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# OPERATING PROCEDURES

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## GENERAL INSTRUCTIONS

Maintain adequate clearance in all directions for vehicle, room extensions, awnings, doors, steps, etc. Vehicle may move in any direction due to jacks extending or retracting, settling of the jacks or the vehicle, equipment malfunction, etc..

If parking on soft ground or asphalt paving, wood blocks or pads must be placed under the jacks.

**NOTE: This vehicle may be equipped with equipment interfaces that prevent operation of the leveling system. Refer to the vehicle manufacturer for information concerning equipment interfaces.**

Press the "STOP" button and turn the master power switch "OFF" at any time to stop the operation of the system.

**WARNING: DO NOT MOVE THE VEHICLE IF ONE OR MORE JACKS ARE EXTENDED TO THE GROUND.**

The HWH or OEM supplied master power switch must be on for the leveling system to operate. Refer to the vehicle manufacturer for information about a master power switch.

## PREPARATION FOR TRAVEL

Before traveling, the red jack warning lights must be off and the "TRAVEL MODE" light, if so equipped, must be on. If lights are not correct for travel, retract jack as described in the JACK RETRACTION Section.

If the jacks are retracted but a red "WARNING" light is lit or the green "TRAVEL MODE" light is not lit, the system needs to be serviced.

Any room extension should be fully retracted before traveling.

**WARNING: DO NOT MOVE THE VEHICLE WHILE THE LEVELING JACKS ARE STILL IN CONTACT WITH THE GROUND OR IN THE EXTEND POSITION. THIS**

**VEHICLE IS EQUIPPED WITH STRAIGHT-ACTING JACKS. MOVING THE VEHICLE WITH THE LEVELING JACKS EXTENDED CAN CAUSE SEVERE DAMAGE TO THE JACKS AND OR THE VEHICLE AND CREATE A DRIVING HAZARD. DO NOT RELY SOLELY UPON WARNING LIGHTS. IT IS THE OPERATOR'S RESPONSIBILITY TO CHECK THAT ALL JACKS ARE FULLY RETRACTED INTO THE STORE/TRAVEL POSITION.**

Any time the "AUTO LEVEL" button has been pushed, push the "STORE" button before traveling.

If the jacks cannot be retracted according to the JACK RETRACTION Section, retract the jacks according to the MANUAL JACK RETRACTION Section. The system should then be checked.

## PUMP RUN TIME

The system monitors how long the pump runs in manual touch panel operation, automatic leveling and automatic store operation. The system uses a timer that counts pump on and off time. If total pump on time reaches 20 minutes, the system will shut the pump off and flash the four touch panel red warning lights along with the red HWH master warning light for 20 minutes after those 20 minutes, the system can again be operated.

The system system does not monitor pump run time for the manual pump run toggle switch.

**Do not run the pump more than 20 minutes without allowing the pump motor to cool. Ambient temperature will affect cooling time. Operator discretion is required to avoid damaging the pump motor.**

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# OPERATING PROCEDURES

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## AUTOMATIC LEVELING PROCEDURE

1. Place transmission in the recommended position for parking and set the park brake. The engine and ignition key can be turned off.
2. Turn on power for the leveling system. Refer to the vehicle manufacturer for this procedure.
3. At this time, the operator may want to check the jacks and place a pad under each jack if the ground will not support the vehicle.

**WARNING: PRIOR TO PUSHING THE "AUTO LEVEL" BUTTON THE OPERATOR MUST BE SURE THAT ALL PERSONS AND OBJECTS ARE CLEAR OF THE VEHICLE.**

4. Push the "AUTO LEVEL" button. The "AUTO LEVEL" light will come on steady. The "LEVELING IN PROCESS" light will start to flash. The automatic leveling procedure will begin. The leveling procedure is two stages; a basic leveling and stabilizing procedure, then a precision leveling procedure. Both procedures are done automatically after pushing the "AUTO LEVEL" button one time.

### **PRECISION / AUTO LEVELING SEQUENCE:**

The system will first automatically extend the jacks to level the vehicle and then extend any remaining jacks for stabilizing. The system will level the vehicle side to side first if needed, then front to rear, if needed.

After the system has finished leveling and stabilizing, it will begin the precision leveling sequence. The precision leveling procedure may take a few minutes to accomplish the desired level position. During precision leveling, the pump will cycle between loading up and freewheeling. One or two jacks will extend a very small amount during each cycle. Each cycle will be about 10 seconds. When the level sensor tolerances are satisfied, the system will stop leveling. The pump will shut off. All indicator lights on the HWH touch panel will shut off except the "AUTO LEVEL" light. The "AUTO LEVEL" light will remain on steady. The system is now in a monitoring mode. The system will remain in the monitoring mode until the "STOP" button is pushed or power to the system is turned off.

**NOTE: When the system is in the monitoring mode, only the "STORE" and "STOP" buttons will function.**

**MONITORING MODE:** Due to settling, wind or other factors, the vehicle may go "out of level" after an automatic leveling procedure is complete. The system goes into monitoring mode after a successful automatic leveling procedure. If the processor determines the vehicle has gone out of level according to the level sensing units, the system will relevel the vehicle using a precision leveling sequence. The monitoring mode will continue until the "STOP" button is pushed or power is removed from the system.

**"EXCESS SLOPE" SITUATIONS:** In the event the jacks are unable to level the coach during the "basic" leveling procedure, the "EXCESS SLOPE" light will come on. Excess slope is one or two jacks fully extended without turning the yellow level light out. The system will not stabilize the vehicle if the "EXCESS SLOPE" light comes on. One or more jacks may NOT be extended. The system will shut off leaving the "EXCESS SLOPE" light on.

The "EXCESS SLOPE" light will also come on if the system does not see the power unit pressure switch within 15 seconds while cycling during the precision leveling sequence.

The "EXCESS SLOPE" light will remain on if there is power to the control box, until the jacks have been fully retracted using the "STORE" button, turning the red warning lights out. Move the vehicle to a more level position or level the vehicle as close as possible according to the MANUAL LEVELING section. Manual leveling will operate when the EXCESS SLOPE light is on.

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# OPERATING PROCEDURES

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## JACK RETRACTION

**WARNING:** THE OPERATOR MUST BE SURE THAT THERE ARE NO OBJECTS UNDER THE VEHICLE AND THAT ALL PEOPLE ARE CLEAR OF THE VEHICLE.

1. Power must be on for the leveling system to store the jacks. Refer to the vehicle manufacturer for this procedure.
2. Push the "STORE" button. The STORE indicator light will run while the jacks retract. The pump will continue to run for 10 seconds after the last red warning light goes out. The solenoid valves will remain on for 10 seconds after the pump shuts off. The processor must also see the system pressure switch before the pump will shut off.

If any warning light remains on or the process does not see the system pressure switch, the pump will continue to run with the solenoid valves remaining on up to 20 minutes from when the "STORE" button was pushed. It is recommended to push the touch panel "STOP" button if the pump runs for more than 1 minute after the jacks are fully retracted.

**NOTE:** The "STORE" button will function with the AUTO LEVEL light on or off. If the AUTO LEVEL light is on when the "STORE" button is pushed, there will be a short delay before the store procedure starts with the pump running.

**IMPORTANT:** If power to the system is interrupted after starting a store procedure the store procedure should be reinitiated and the jacks should be completely retracted with all four red WARNING lights out prior to traveling.

**WARNING:** DO NOT MOVE THE VEHICLE WHILE THE LEVELING JACKS ARE STILL IN CONTACT WITH THE GROUND OR IN THE EXTEND POSITION. THIS VEHICLE IS EQUIPPED WITH STRAIGHT-ACTING JACKS. MOVING THE VEHICLE WITH THE LEVELING JACKS EXTENDED CAN CAUSE SEVERE DAMAGE TO THE JACKS AND OR THE VEHICLE AND CREATE A DRIVING HAZARD. DO NOT RELY SOLELY UPON WARNING LIGHTS. IT IS THE OPERATOR'S RESPONSIBILITY TO CHECK THAT ALL JACKS ARE FULLY RETRACTED INTO THE STORE/TRAVEL POSITION.

3. The vehicle can be moved as soon as the red warning lights are out, the jacks are in the STORE/TRAVEL position and the green "TRAVEL" light is on.

**IMPORTANT:** If a red warning light and buzzer come on while traveling, the jacks should be checked as soon as a safe parking location is found.

4. If jacks cannot be retracted by the above procedure see OPERATING PROCEDURES - PUMP RUN TOGGLE SWITCH or OPERATING PROCEDURES - AUXILIARY HAND PUMP.

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# OPERATING PROCEDURES

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## MANUAL LEVELING

If parking on soft ground or asphalt paving, a wood block or pad should be placed under each jack.

**IMPORTANT: Overheating and excessive current drain will result if raise arrows are operated for an extended period of time.**

1. Turn power on to the leveling system. Refer to the vehicle manufacturer for this procedure.
2. Use the UP ARROW buttons on the right side of the touch panel to extend the jacks. Two UP ARROW buttons can be pushed at the same time while leveling the vehicle manually.

3. A lit yellow LEVEL light indicates that the side, end or corner of the vehicle is low. Extend jacks as needed to put out all the yellow lights. Always give a side yellow level light priority when leveling the vehicle. If the ground is too uneven, the jacks may not have enough stroke to level the vehicle. The vehicle may have to be moved.

**NOTE: If both side level lights are on, manual leveling is not recommended.**

4. After the vehicle is level, the jacks not used for leveling may be extended until they touch the ground. This provides additional stability against wind and activity in the vehicle. Jacks used to stabilize the vehicle should lift the vehicle about 3/4 inch.

5. Turn power off to the system when not in use.

# OPERATING PROCEDURES

## PUMP RUN TOGGLE SWITCH

### WARNING!

KEEP AWAY FROM WHEELS, DO NOT CRAWL UNDER THE VEHICLE, KEEP A SAFE. DISTANCE IN FRONT AND REAR OF THE VEHICLE. THE VEHICLE MAY DROP AND / OR MOVE FORWARD OR BACKWARD WITHOUT WARNING AS THE VALVE RELEASE IS OPERATED.

#### EXTENDING JACKS

Use valve release cam to open and close valves.

Open valves #1 and #2 on the jack manifold for the jacks that are to be extended.

**NOTE:** It is best if jacks are extended in pairs; both front, both rear, right front and right rear or left front and left rear.

Locate the PUMP RUN toggle switch on the pump manifold bracket.

Open the #5 valve on the pump manifold. Push the pump toggle switch to PUMP RUN. When the jacks are extended as needed, release the pump toggle switch and close the #5 valve.

Close the #1 and #2 valves for the jacks that were extended.

**IMPORTANT:** DO NOT hold the pump toggle switch to "PUMP RUN" for more than 4 minutes without allowing the pump motor to cool.

#### RETRACTING JACKS

**WARNING:** Do not crawl under the vehicle to open jack manifold valves. Allow ample room for the vehicle to move in any direction when a jack manifold valve is opened. Open the valve release cams slowly to keep the vehicle from dropping rapidly. Vehicle will drop when the #3 jack manifold valve is opened.

Opening the #3 jack manifold valve slowly will allow the vehicle to drop slowly.

Alternate between all four jacks to lower the vehicle in as level a position as is possible. When there is no weight on a jack, the #3 valve can be opened completely.

**IMPORTANT:** If the vehicle is on a severely unlevel surface, do not allow the vehicle to drop more than 1 to 2 inches before moving to a different jack.

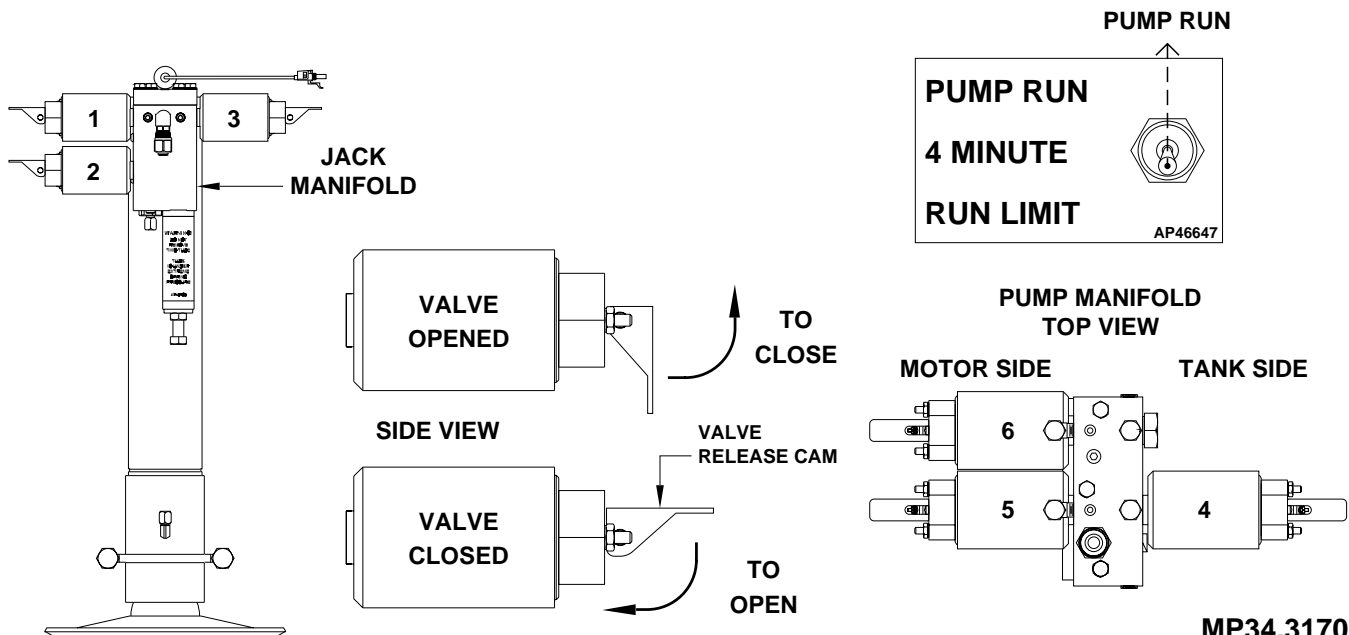
With the weight of the vehicle off all the jacks, make sure the #3 jack manifold valve is completely open for all jacks.

Go to the pump/manifold assembly and open the #4 manifold valve.

Push and hold the pump run toggle switch to "RUN" until all four jacks are completely retracted.

Release the pump run switch and close the #4 valve.

Close the #3 valve at each of the jack manifolds.



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# OPERATING PROCEDURES

## AUXILIARY HAND PUMP

**WARNING!** KEEP AWAY FROM WHEELS, DO NOT CRAWL UNDER THE VEHICLE, KEEP A SAFE DISTANCE IN FRONT AND REAR OF THE VEHICLE. THE VEHICLE MAY DROP AND / OR MOVE FORWARD OR BACKWARD WITHOUT WARNING AS THE VALVE RELEASE IS OPERATED.

### AUXILIARY HAND PUMP OPERATION

The auxiliary hand pump can be used to extend or retract the jacks anytime the pump will not function.

The auxiliary hand pump is a two stage pump that will produce enough pressure to extend the jacks and lift the vehicle as well as retract the jacks. When operating the auxiliary pump to lift the vehicle or when the jacks are fully retracted, the pump handle will seem to "snap" as the pump goes to the second stage. The pumping action will be easier at first as the second stage starts to create more pressure.

**NOTE: The hand pump will swivel to any position which will ease the operation of the hand pump.**

To operate the auxiliary hand pump, open the appropriate solenoid valve(s). Insert the hand pump handle into the handle receptacle and move the handle in an up and down motion.

### EXTENDING JACKS

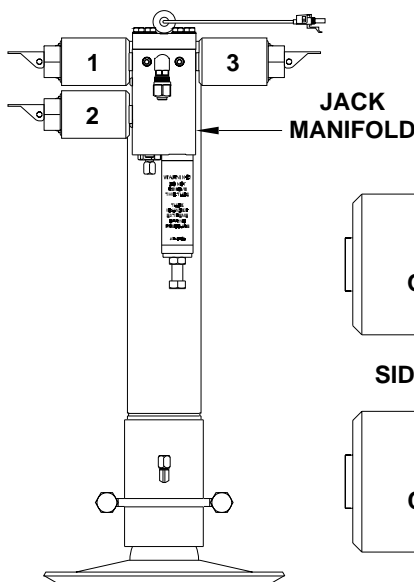
Use valve release cam to open and close valves.

Open valves #1 and #2 on the jack manifold for the jacks that are to be extended.

**NOTE: It is best if jacks are extended in pairs; both front, both rear, right front and right rear or left front and left rear.**

Open the #5 valve on the pump manifold. Operate the hand pump in an up and down motion. When the jacks are extended as needed, close the #5 valve.

Close the #1 and #2 valves for the jacks that were extended.



### RETRACTING JACKS

**WARNING:** Do not crawl under the vehicle to open jack manifold valves. Allow ample room for the vehicle to move in any direction when a jack manifold valve is opened. Open the valve release cams slowly to keep the vehicle from dropping rapidly. Vehicle will drop when the #3 jack manifold valve is opened.

Opening the #3 jack manifold valve slowly will allow the vehicle to drop slowly.

Alternate between all four jacks to lower the vehicle in as level a position as is possible. When there is no weight on a jack, the #3 valve can be opened completely.

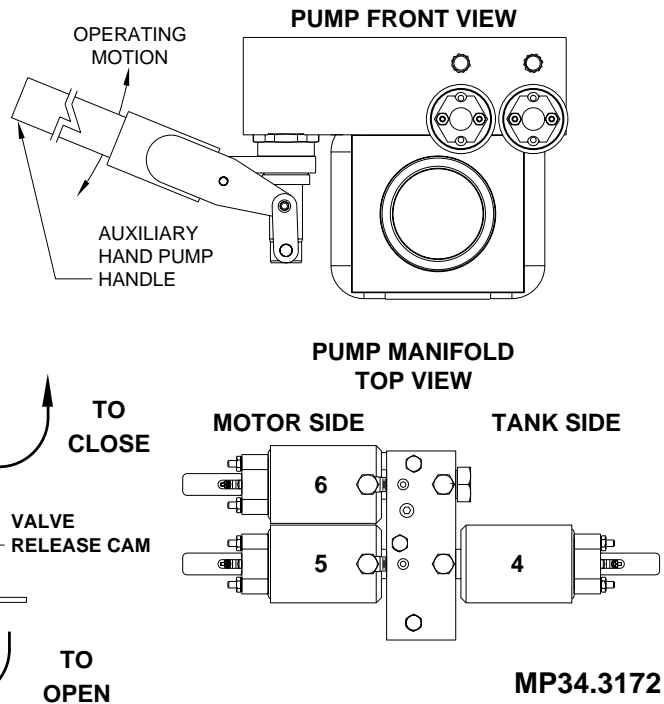
**IMPORTANT: If the vehicle is on a severely unlevel surface, do not allow the vehicle to drop more than 1 to 2 inches before moving to a different jack.**

With the weight of the vehicle off all the jacks, make sure the #3 jack manifold valve is completely open for all jacks.

Go to the pump / manifold assembly and open the #4 manifold valve.

Pump the auxiliary hand pump until all four jacks are completely retracted.

Close the #4 manifold valve and the #3 valve at each jack manifold.





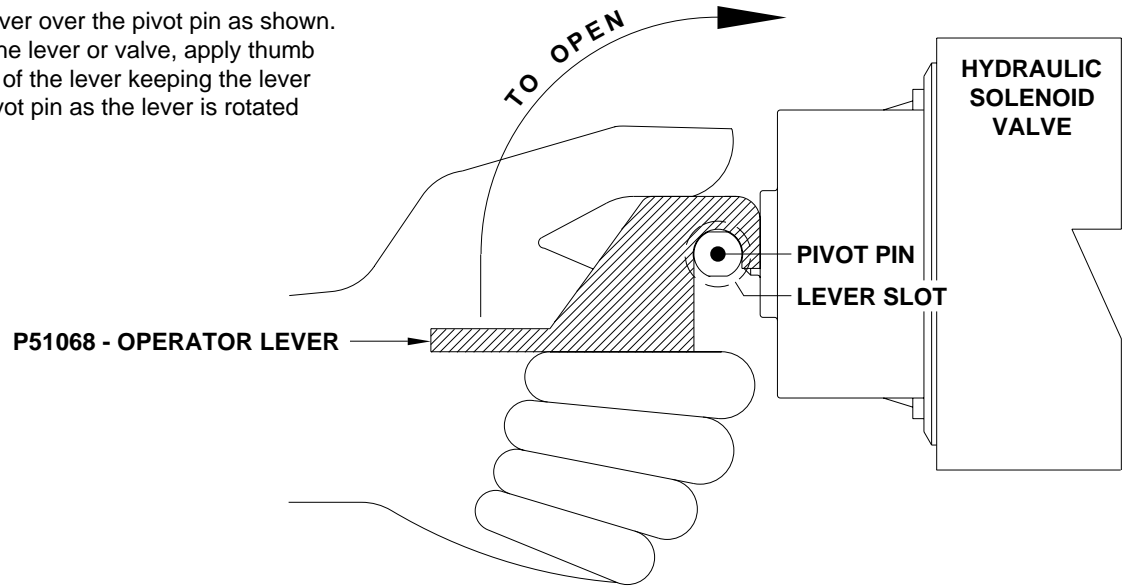
**READ**  
INSTRUCTIONS  
THOROUGHLY  
**BEFORE**  
PROCEEDING

# INSTRUCTION SHEET

## USING THE HWH® REMOVABLE HYDRAULIC SOLENOID VALVE OPERATOR LEVER

### USE OF REMOVABLE OPERATOR LEVER

Place the operator lever over the pivot pin as shown. To avoid damaging the lever or valve, apply thumb pressure at the base of the lever keeping the lever slot seated on the pivot pin as the lever is rotated to open the valve.



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# MAINTENANCE

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## OIL LEVEL

All maintenance should be done as part of the normal servicing of the coach.

The oil level should be checked when the vehicle is first purchased and then once every two years. More often if there is an oil leak in the system.

All jacks should be completely retracted before checking the oil level. The oil reservoir is part of the pump / manifold assembly. The oil level is checked and filled through the breather cap. Clear any dirt away from the breather / filler cap before removing. The oil level should be within one inch of the top of the reservoir. Most breather caps have a dipstick.

**NOTE: Overfilling the tank can cause leakage of oil through the breather cap.**

**FLUID:** HWH Specialty Hydraulic Oil is recommended. In an emergency Dexron automatic transmission fluid can be used.

**NOTE:** Dexron automatic transmission fluid contains red dye and can cause staining should a leak occur. **DO NOT USE** brake fluid or hydraulic jack fluid. Use of these can damage seals.

## ELECTRICAL SYSTEM

The batteries should be in good condition and fully charged. Weak batteries can cause erratic operation. Battery cable terminals and battery posts and connections should be kept clean.

All electrical connections, especially ground connections, should be clean, tight, free from corrosion and protected from weathering.

## JACKS

There are very few user serviceable parts on the jacks. The jacks require very little maintenance. If the jacks are extremely dirty with caked on mud they should be washed.

If extremely dirty, the jack rods should NOT be wiped. The jack rods do not need to be oiled or sprayed with anything. See ML47149 for proper maintenance of all jacks.

## VISUAL INSPECTION

Periodically inspect the system for oil leaks and damaged or missing parts, such as pivot bolts or springs. Check the hydraulic lines and wiring for damage and wear. Check that the jacks do not interfere with any parts of the vehicle when they are in the "STORE" position.

The system will operate better if kept clean and free from caked on dirt.

## OPERATIONAL CHECK

Review the OPERATOR MANUAL. Run the system according to the SYSTEM OPERATION Section. Note any abnormal operation.

Check that all lights work according to the "INDICATOR LIGHT" Section. Correct function of the red "WARNING" light is important.

Review the "JACK RETRACTION" Section. Make sure the jacks will fully retract to the "STORE" position. Jacks should not interfere with any of the coach when in the "STORE" position.

Check operation of the auxiliary hand pump.

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## MAINTENANCE

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### NOT IN PARK/BRAKE CHECK

**WARNING: WHEN MAKING THIS CHECK, BLOCK THE COACH WHEELS SECURELY SO THE COACH CANNOT ROLL FORWARD OR BACKWARD.**

Set the park/brake. Turn power on to the leveling system. Push the "AUTO LEVEL" button. Release the parking brake and confirm that the "PARK/BRAKE" indicator light comes on. Reset the parking brake. The "PARK/BRAKE" indicator light should go out. Switch the ignition to "OFF".

If any of the above checks or inspections reveal a problem or if there are other problems or questions, consult the vehicle manufacturer, or HWH CORPORATION for service or repair.

### WINTER WEATHER DRIVING

Anti-icing / deicing agents when splashed on your vehicle, continue to absorb moisture from the air even after they have dried. This can facilitate corrosion of metallic components, such as HWH jacks.

To help reduce the corrosion of jacks after exposure to anti-icing / deicing agents, thoroughly wash jacks with warm soapy water.

# SENSING UNIT ADJUSTMENT PRECISION LEVELING SYSTEM

**IMPORTANT: THE VEHICLE MUST BE ON A LEVEL SURFACE WHEN ADJUSTING THE SENSING UNIT. IF THERE IS A SLOPE; THE FRONT SHOULD BE LOWER THAN THE REAR.**

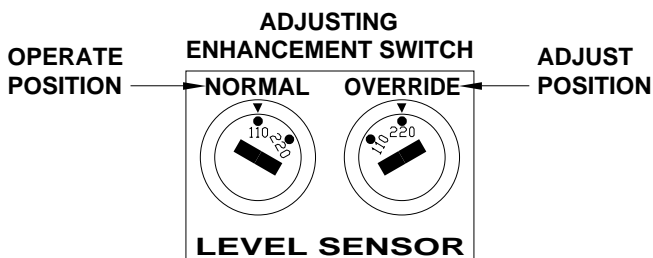
## SENSING UNIT INFORMATION

Power must be on for the leveling system to be able to adjust the level sensing unit. Refer to the vehicle manufacturer for this procedure.

There are three level sensing units. There is one sensing unit for side to side leveling at the front of the vehicle, one for side to side leveling at the rear of the vehicle and one for front to rear leveling located at the rear of the vehicle. The rear side to side level sensor and the front to rear level sensor at the rear of the vehicle have a precision bubble level fastened to the base of the sensing unit.

The central control module has a sensing unit adjustment switch on the side of the box. This switch must be in the "NORMAL" position while adjusting the sensing units. Refer to the vehicle manufacturer for location of the central control module.

**IMPORTANT: The adjustment switch must be kept in the "NORMAL" position for proper system operation. Only move the switch if adjusting the level sensing units.**



## ADJUSTING A SENSING UNIT

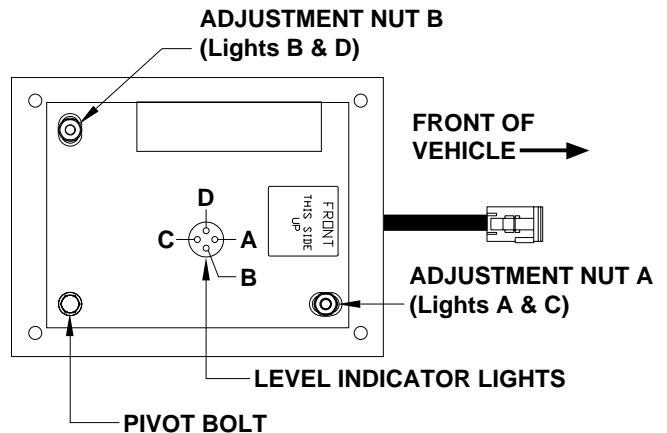
Turn adjustment nuts A and B to turn a level light off.

If level light A is on, turn adjustment nut A counterclockwise.  
If level light B is on, turn adjustment nut B clockwise.  
If level light C is on, turn adjustment nut A clockwise.  
If level light D is on, turn adjustment nut B counterclockwise.

When a level light is on, turn the appropriate adjustment nut slowly until the light goes out. Note the position of the wrench. Continue to turn the same adjustment nut very slowly the same direction until the opposite light comes on. Now turn the adjustment nut in the opposite direction one half the distance the wrench moved between turning the original light off and turning the opposite light on. Ensure both lights are off.

**EXAMPLE:** Level light (A) is on. Slowly turn adjusting nut (A) counterclockwise. When light (A) goes out, note the position of the wrench. Now continue turning adjusting nut (A) counterclockwise very slowly until level light (C) (opposite light) comes on. Figure the distance the wrench moved between level light (A) going out and level light (C) coming on. Now turn adjusting nut (A) clockwise 1/2 that distance. Ensure both lights are off.

## SENSING UNIT ASSEMBLY - TOP VIEW



Only use adjustment nuts A and B to adjust the sensing units. NEVER turn the pivot bolt when adjusting the sensing units.

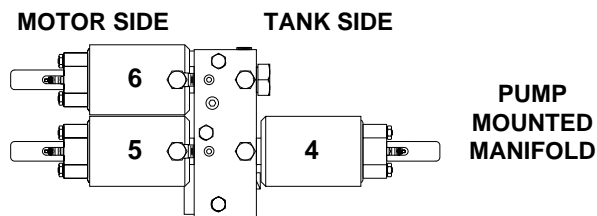
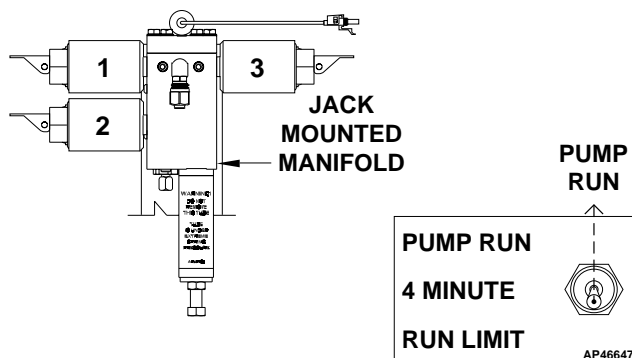
# SENSING UNIT ADJUSTMENT

## PRECISION LEVELING SYSTEM

### LEVELING THE VEHICLE AND ADJUSTING THE SENSING UNIT

**Adjust the rear sensing unit with the side to side bubble level first.** Open the number 1 and number 2 solenoid valves on both rear jacks. Open the number 5 valve on the pump manifold. Hold the pump run switch to "PUMP RUN" until both rear jacks are firmly on the ground. Using the bubble level on the rear side to side level sensing unit, determine the low side of the vehicle. Close both solenoid valves for the rear jack on the high side of the vehicle. Use the pump run switch to extend the low jack to center the side to side bubble as close as possible. Close both jack solenoid valves. Again, determine the low side according to the rear side to side bubble level. **The bubble must be centered exactly between the lines.** If minor adjustment is needed to center the bubble, use the manual precision leveling process to extend the jack on the low side.

**MANUAL PRECISION LEVELING:** Open jack manifold valve number 1 for the jack(s) that need to be extended. Open pump manifold valve number 5. Both valves should remain open during this procedure. Push and hold the pump run switch during the manual precision leveling procedure. The jack(s) with the open number 1 valve will extend slightly. After approximately 4 seconds, open the number six pump manifold valve. After approximately 4 seconds, close the number 6 valve. The pump will load up with the number 6 valve closed and unload with the number 6 valve open. The jack(s) will move slightly each time the number six valve is closed. Repeat the 4 seconds closed with 4 seconds opened sequence until the jacks are extended as necessary.



When the bubble is precisely centered between the lines of the bubble level, adjust the side to side sensing unit until all four yellow lights are out. This process is described on the previous page. Close all rear jack manifold valves when the rear side to side sensing unit adjustment is complete.

**Adjust the rear sensing unit with the front to rear bubble level.** When the rear side to side level sensing unit is adjusted, open the number 1 and 2 jack manifold valves for both front jacks. Open the number 5 pump manifold valve. Use the pump run switch to extend the front jacks until they are both firmly on the ground. Check the rear sensing unit front to rear bubble level. Get the bubble level centered as close as possible with the front of the vehicle slightly low. Close the number 2 valve on both front jack manifolds and use the Manual Precision Leveling procedure to precisely center the bubble between the lines of the front to rear bubble level. When the bubble is precisely centered, adjust the front to rear sensing unit until all level lights are out. Close all valves when finished.

When the front to rear level sensor is adjusted, recheck the side to side bubble level on the rear side to side level sensing unit.

**If the bubble is not centered,** use the manual precision leveling procedure to center the bubble. Adjust the rear side to side level sensing unit as necessary to turn any lit level lights out.

**If the bubble is still centered,** check the rear side to side level sensor level lights. Adjust as necessary so all lit level lights are out.

Alternate checking both rear sensing units until both bubble levels are precisely centered and all level lights on both rear level sensors are off. Precision level and adjust sensing units as necessary.

When both rear sensing units are properly adjusted, adjust the front level sensing unit so all four level lights are off.

**IMPORTANT: ONCE THE REAR SIDE TO SIDE BUBBLE LEVEL AND THE FRONT TO REAR BUBBLE LEVEL ARE PRECISELY CENTERED DO NOT EXTEND OR RETRACT ANY JACKS UNTIL ALL THREE LEVEL SENSING UNITS ARE ADJUSTED.**

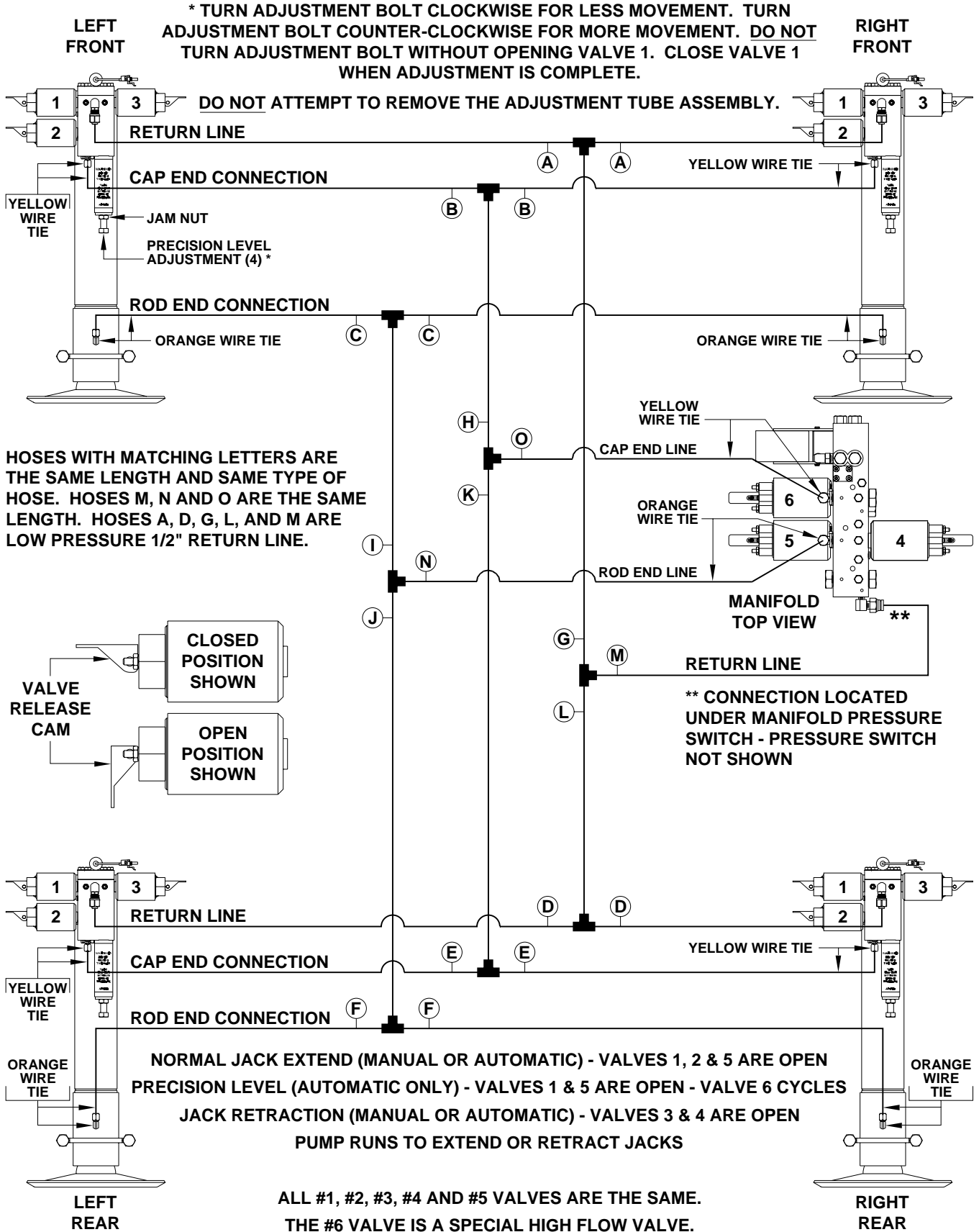
When all adjustments are complete, close all jack manifold and pump manifold valves. Move the control box ADJUSTING ENHANCEMENT SWITCH to the OPERATE POSITION (NORMAL).

Move the vehicle to an out of level position and try automatic leveling. Repeat adjustments as necessary.

# HYDRAULIC LINE CONNECTION DIAGRAM

## PRECISION LEVELING SYSTEM

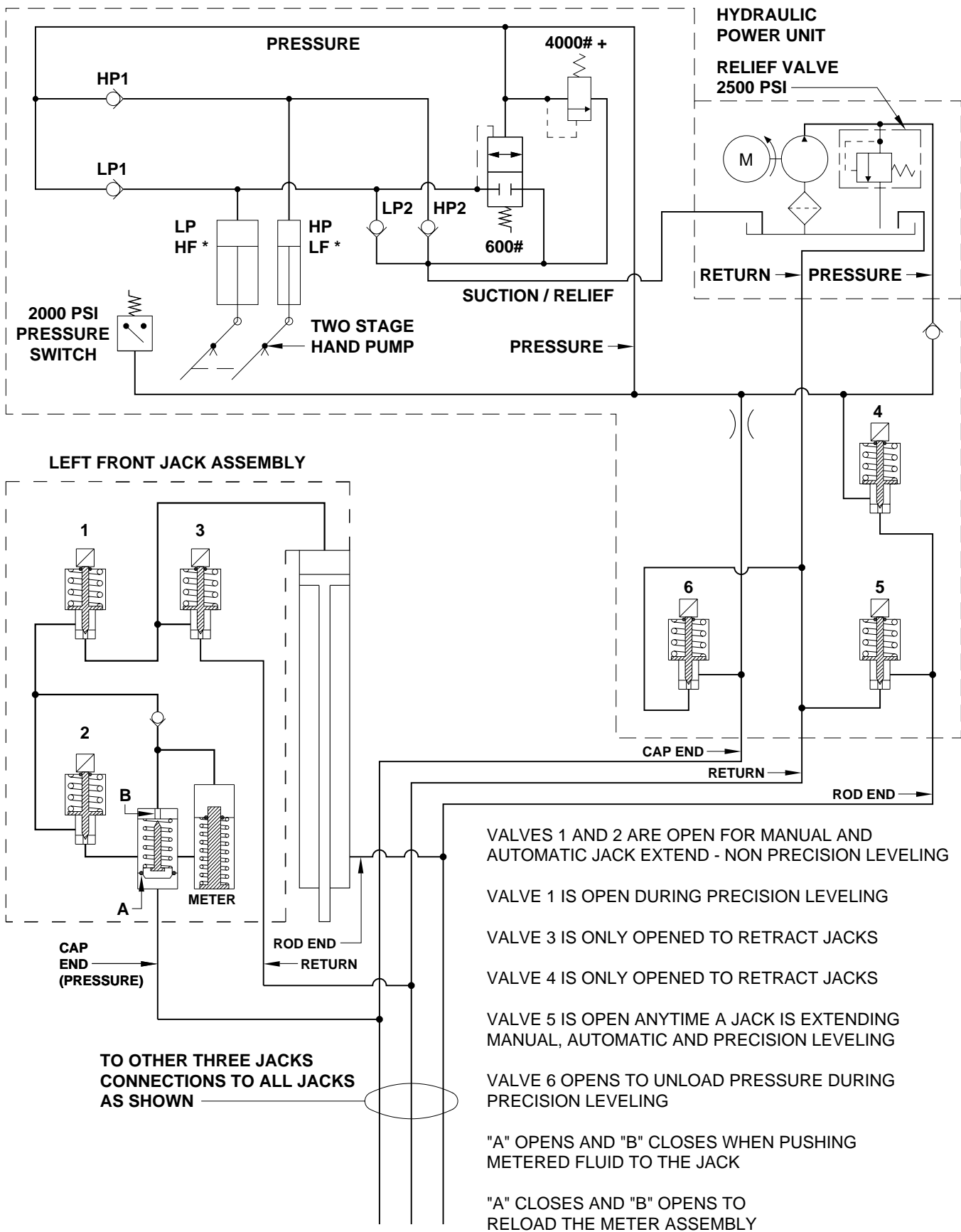
### WITH STRAIGHT-ACTING, POWER-EXTEND/POWER-RETRACT JACKS



# HYDRAULIC SCHEMATIC DIAGRAM

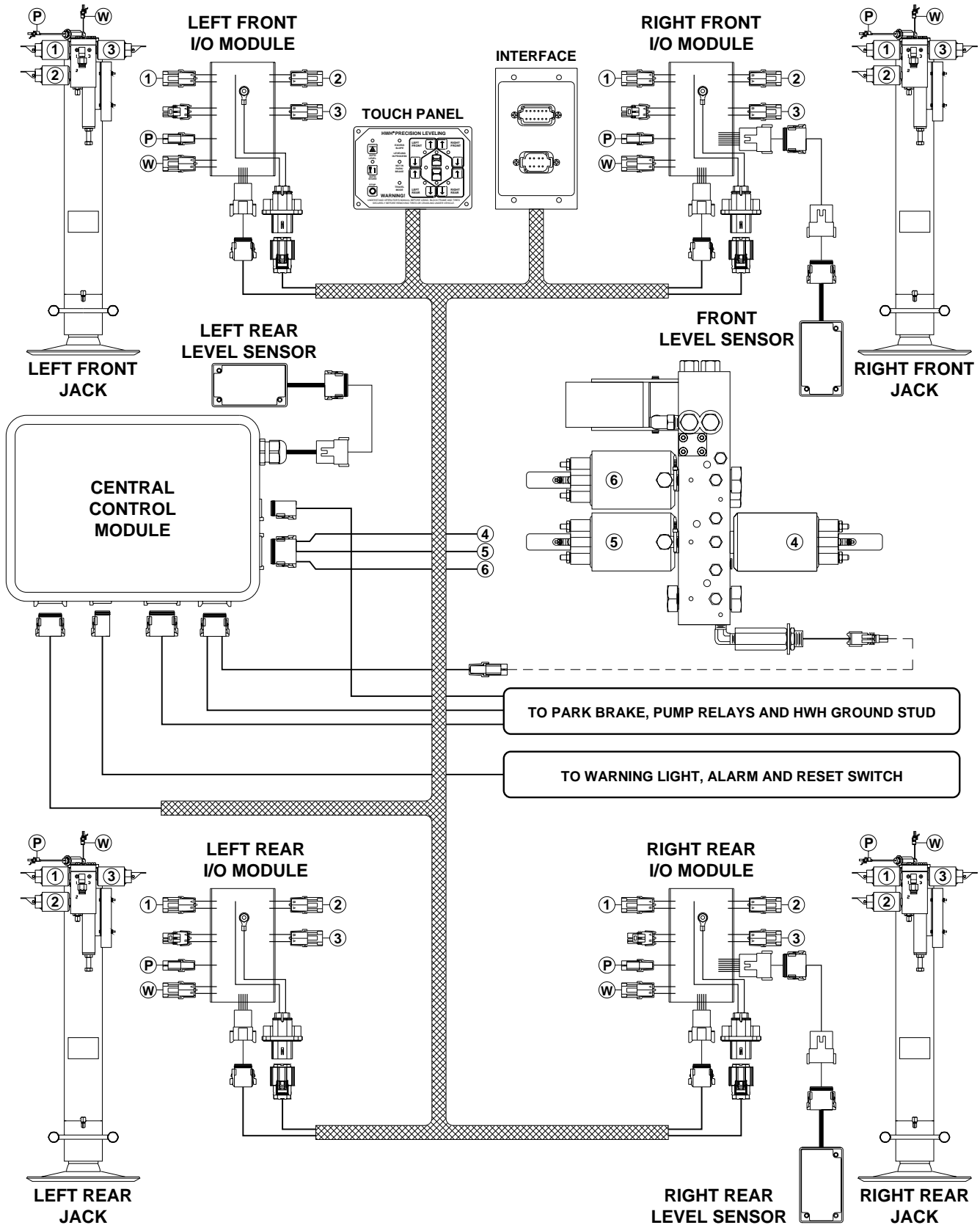
## PRECISION LEVELING WITH HAND PUMP

### 4 - POWER EXTEND / POWER RETRACT JACKS





**ELECTRICAL CONNECTION DIAGRAM**  
**CENTRAL CONTROL MODULE**  
**HARNESS ROUTING PAGE 1 OF 5**

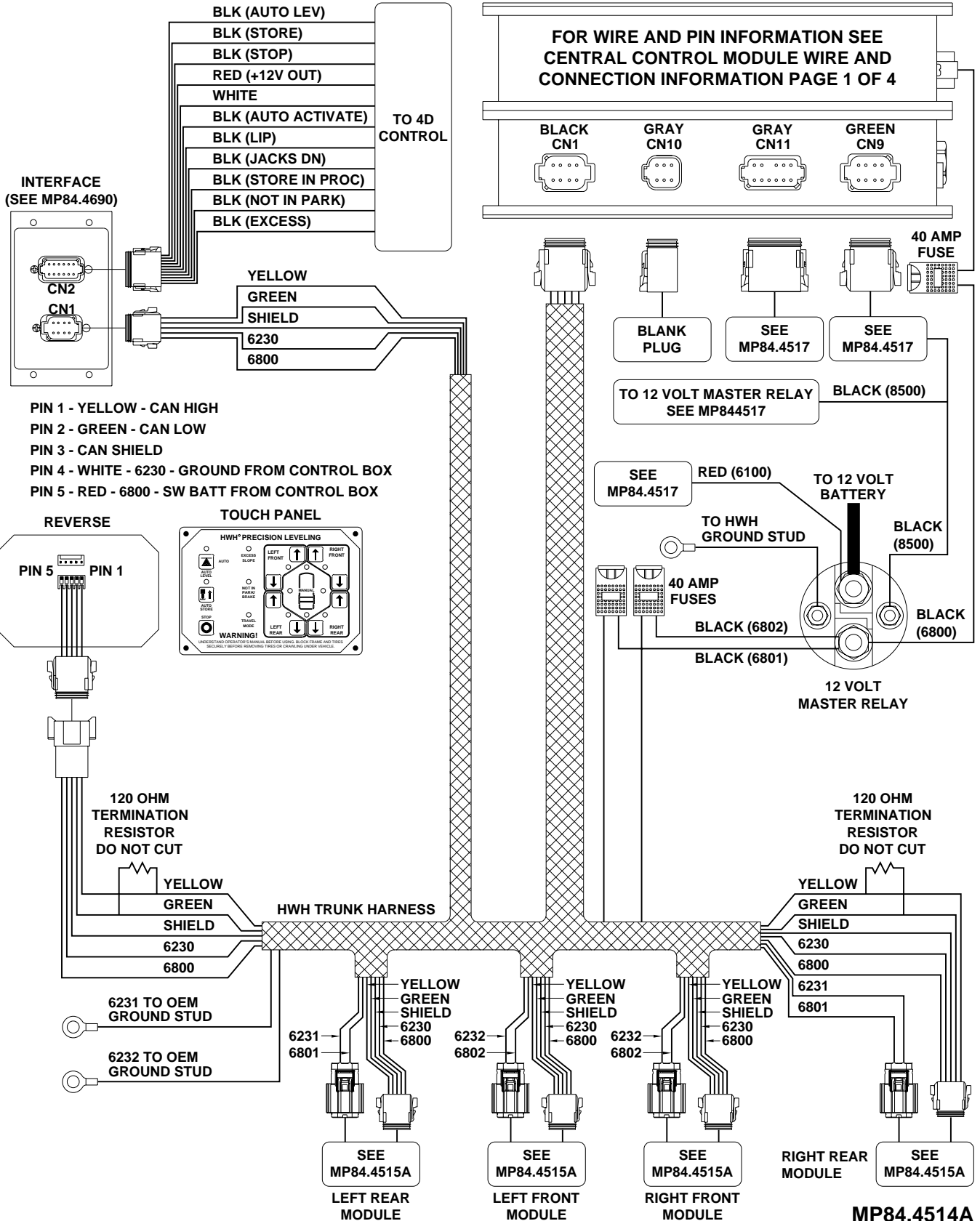


# ELECTRICAL CONNECTION DIAGRAM

## CENTRAL CONTROL MODULE

### HARNESS ROUTING PAGE 2 OF 5

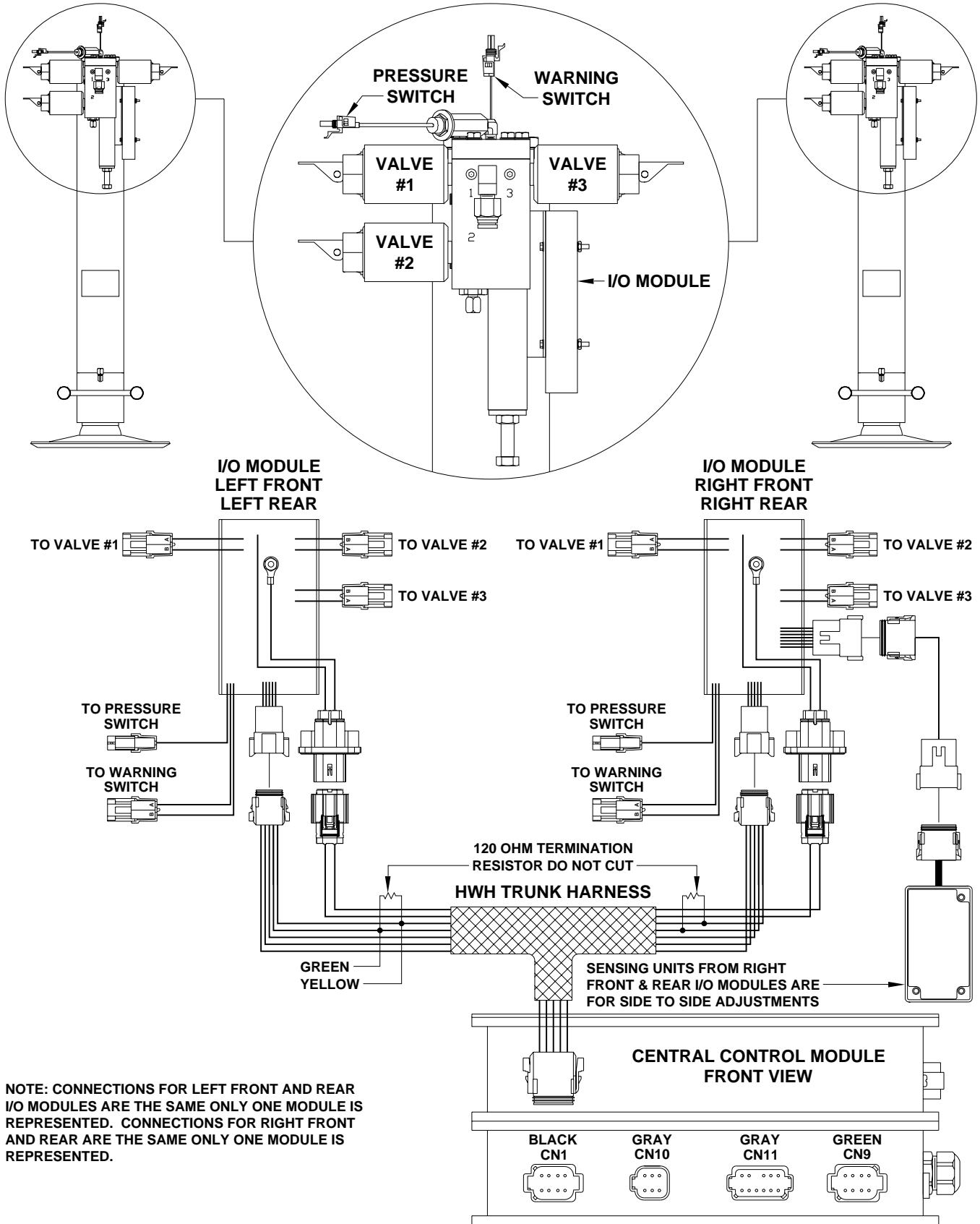
#### CENTRAL CONTROL MODULE FRONT VIEW



# ELECTRICAL CONNECTION DIAGRAM

## CENTRAL CONTROL MODULE

### HARNESS ROUTING PAGE 3 OF 5



NOTE: CONNECTIONS FOR LEFT FRONT AND REAR I/O MODULES ARE THE SAME ONLY ONE MODULE IS REPRESENTED. CONNECTIONS FOR RIGHT FRONT AND REAR ARE THE SAME ONLY ONE MODULE IS REPRESENTED.

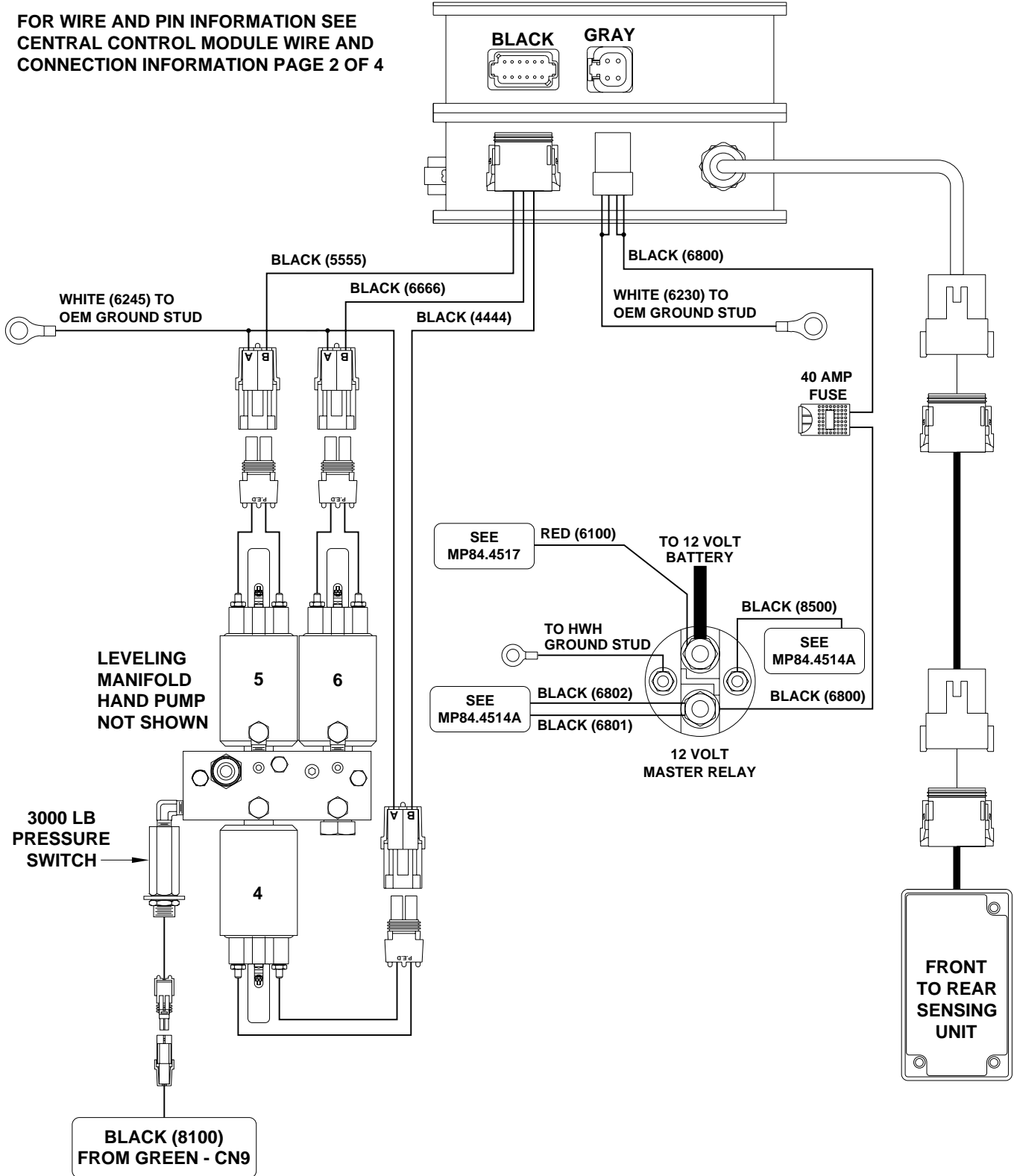
# ELECTRICAL CONNECTION DIAGRAM

## CENTRAL CONTROL MODULE

### HARNESS ROUTING PAGE 4 OF 5

FOR WIRE AND PIN INFORMATION SEE  
CENTRAL CONTROL MODULE WIRE AND  
CONNECTION INFORMATION PAGE 2 OF 4

CENTRAL CONTROL MODULE - END VIEW

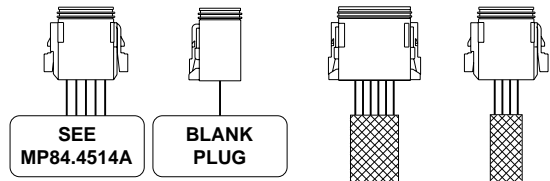
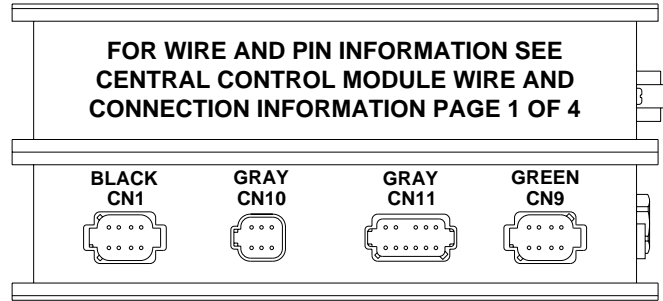


# ELECTRICAL CONNECTION DIAGRAM

## CENTRAL CONTROL MODULE

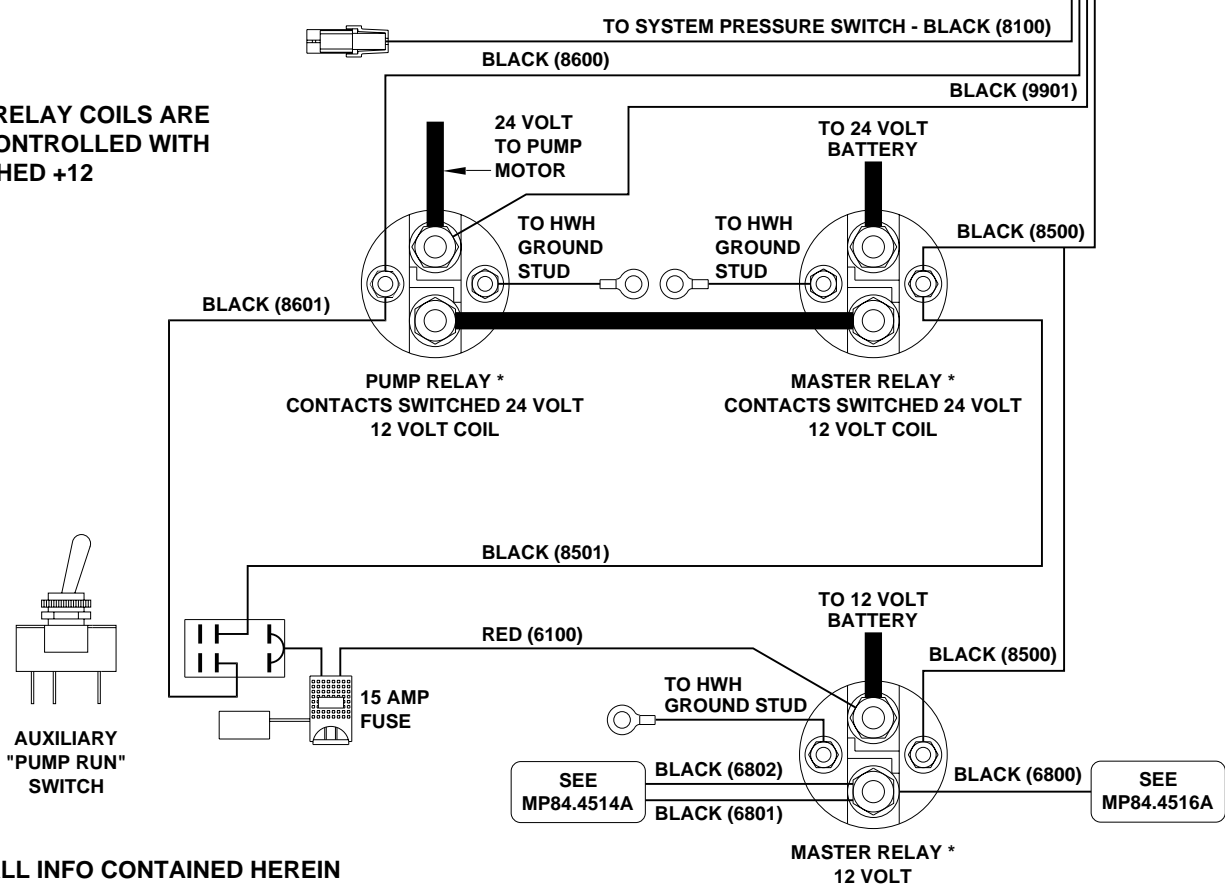
### HARNESS ROUTING PAGE 5 OF 5

CENTRAL CONTROL MODULE  
FRONT VIEW



- TO 12 VOLT BATTERY - RED (6100)
- TO 12 VOLT IGNITION - RED (6110)
- TO 12 VOLT ACCESSORY - RED (6120)
- TO PARK BRAKE - BLACK (9000)
- TO OEM GROUND STUD - WHITE (6230)

\* ALL 3 RELAY COILS ARE  
ARE CONTROLLED WITH  
SWITCHED +12



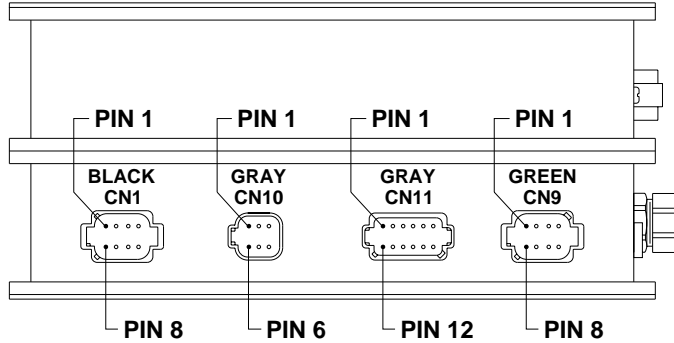
NOTE: ALL INFO CONTAINED HEREIN  
MAY OR MAY NOT BE CORRECT.

# ELECTRICAL CONNECTION DIAGRAM

## CENTRAL CONTROL MODULE

**LED - FUSE - WIRE AND CONNECTION INFORMATION - PAGE 1 OF 4**

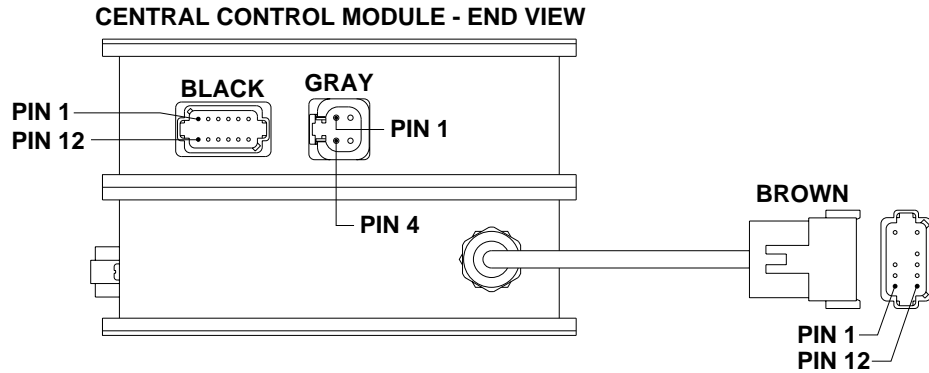
CENTRAL CONTROL MODULE  
FRONT VIEW



PIN #	WIRE COLOR	WIRE NUMBER	WIRE DESCRIPTION AND FUNCTION
<b>CN1</b>			<b>8 PIN BLACK CONNECTOR</b>
1 AND 2			NO CONNECTION
3	RED	6800	SWITCHED +12
4	WHITE	6230	GROUND
5			CAN SHIELD
6			NO CONNECTION
7	GREEN		CAN LOW
8	YELLOW		CAN HIGH
<b>CN10</b>			<b>6 PIN GRAY CONNECTOR - NOT USED</b>
<b>CN11</b>			<b>12 PIN GRAY CONNECTOR</b>
1	RED	6100	+12 IGNITION
2 THRU 4			NO CONNECTION
5	RED	6100	+12 ACCESSORY
6	RED	6100	+12 BATTERY
7	WHITE	6230	GROUND
8 THRU 10			NO CONNECTION
11	BLACK	9000	PARK BRAKE SIGNAL SWITCHED GROUND
12	RED	6100	+12 BATTERY
<b>CN9</b>			<b>8 PIN GREEN CONNECTOR</b>
1	BLACK	8500	MASTER RELAY CONTROL SWITCHED +12
2	BLACK	8100	SWITCHED GROUND FROM 3000 LB PRESSURE SWITCH
3			NO CONNECTION
4	BLACK	8600	PUMP RELAY CONTROL SWITCHED +12
5			NO CONNECTION
6	BLACK	9901	PUMP MONITOR - SWITCHED +12 FROM PUMP RELAY
7 AND 8			NO CONNECTION

# ELECTRICAL CONNECTION DIAGRAM CENTRAL CONTROL MODULE

## LED - FUSE - WIRE AND CONNECTION INFORMATION - PAGE 2 OF 4



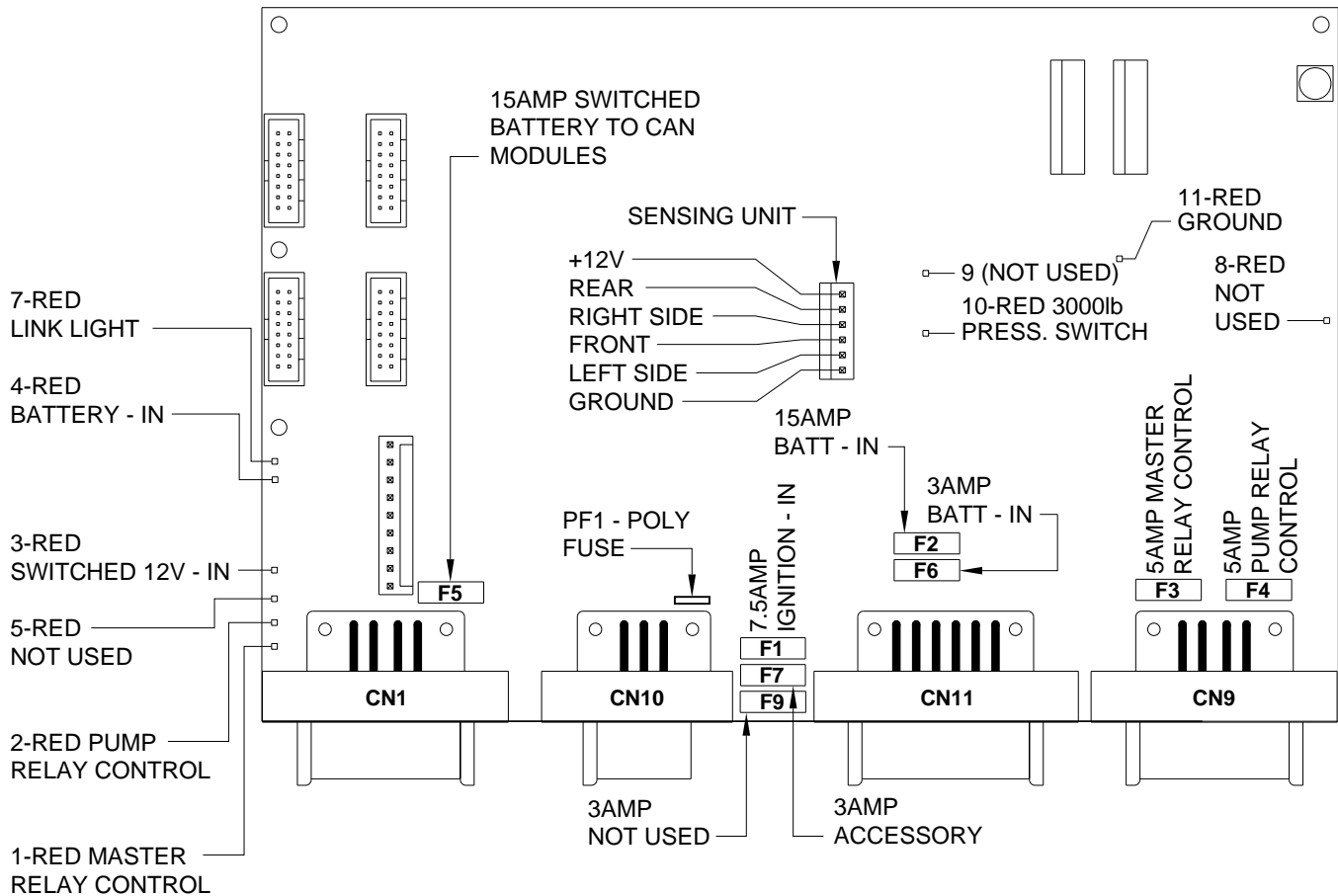
PIN #	WIRE COLOR	WIRE NUMBER	WIRE DESCRIPTION AND FUNCTION
<b>BLACK CONNECTOR</b>			<b>12 PIN BLACK CONNECTOR</b>
1	BLACK	5555	SWITCHED +12 FOR VALVE #5
2	BLACK	4444	SWITCHED +12 FOR VALVE #4
3	BLACK	6666	SWITCHED +12 FOR VALVE #6
4 THRU 8			NO CONNECTION
9			NO CONNECTION
10			NO CONNECTION
11 THRU 12			NO CONNECTION
<b>GRAY</b>			<b>4 PIN GRAY CONNECTOR</b>
1	BLACK	6800	SWITCHED +12 FROM MASTER RELAY
2	BLACK	6800	SWITCHED +12 FROM MASTER RELAY
3	WHITE	6230	GROUND FROM GROUND STUD
4	WHITE	6230	GROUND FROM GROUND STUD
<b>BROWN CONNECTOR</b>			<b>12 PIN BROWN CONNECTOR</b>
1			NO CONNECTION
2	BLUE		SET MODE
3			NO CONNECTION
4 & 5			NO CONNECTION
6	WHITE		GROUND
7	RED		POWER
8			NO CONNECTION
9	YELLOW		LEFT SIDE SENSE - SWITCHED GROUND
10	BLACK		FRONT SENSE - SWITCHED GROUND
11	GREEN		RIGHT SIDE SENSE - SWITCHED GROUND
12	ORANGE		REAR SENSE - SWITCHED GROUND

# ELECTRICAL CONNECTION DIAGRAM

## CENTRAL CONTROL MODULE

### LED - FUSE - WIRE AND CONNECTION INFORMATION - PAGE 3 OF 4

#### CENTRAL CONTROL MOTHER BOARD



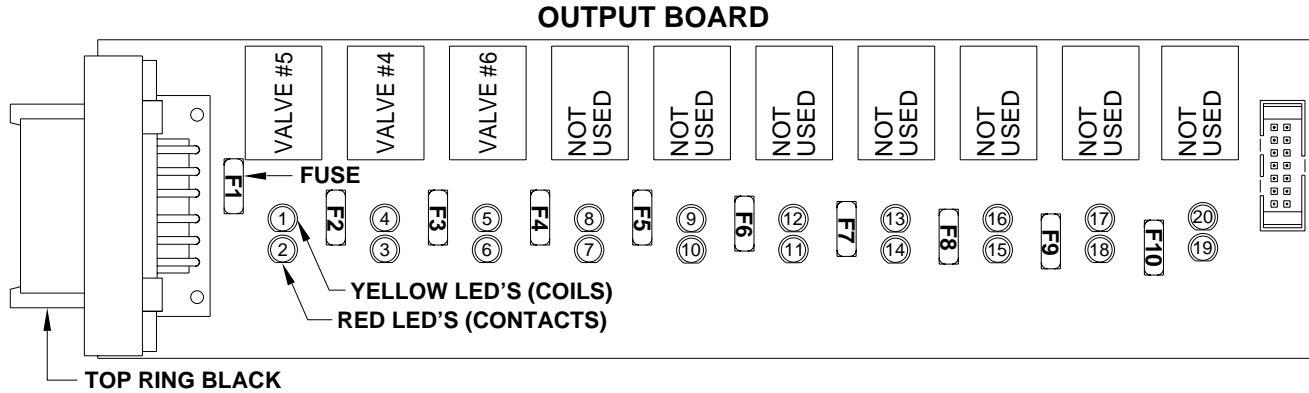
LED	DESCRIPTION	CN AND PIN	FUSE DESCRIPTION
1-RED	MASTER RELAY CONTROL	CN 9 - PIN 1	PF1 - POLY FUSE - POWER TO MASTER WARNING LIGHT AND RESET SWITCH F1 - 7.5AMP IGNITION - IN F2 - 15AMP BATTERY - IN F3 - 5AMP MASTER RELAY CONTROL F4 - 5AMP PUMP RELAY CONTROL F5 - 15AMP SWITCHED BATTERY - IN F6 - 3AMP BATTERY F7 - 3AMP ACCESSORY - IN F9 - 3AMP NOT USED
2-RED	PUMP RELAY CONTROL	CN 9 - PIN 4	
3-RED	SWITCHED 12V FROM MASTER RELAY	CN 1 - PIN 3	
4-RED	BATTERY - IN	CN 11 - PIN 12	
5-RED	NOT USED	NOT USED	
7-RED	LINK LIGHT	CN 1 - PIN 7 & 8	
8-RED	NOT USED	NOT USED	
9-NOT USED	NOT USED	NOT USED	
10-RED	3000 LBS PRESS SWITCH - ON	CN 9 - PIN 2	
11-RED	PARK BRAKE	CN 11 - PIN 11	

NOTE: FOR DETAILED INPUT / OUTPUT INFORMATION ABOUT PIN CONNECTIONS SEE ELECTRICAL CONNECTION DIAGRAM - CENTRAL CONTROL MODULE - WIRE AND CONNECTION INFORMATION PAGE 1 OF 4.



# ELECTRICAL CONNECTION DIAGRAM CENTRAL CONTROL MODULE

## LED - FUSE - WIRE AND CONNECTION INFORMATION - PAGE 4 OF 4



LED	RELAY DESCRIPTION	FUSE	BLACK
1-YELLOW	VALVE #5 - COIL		
2-RED	VALVE #5. - CONTACT	F1-15 AMP	PIN 1
3-RED	VALVE #4 - CONTACT	F2-15 AMP	PIN 2
4-YELLOW	VALVE #4 - COIL		
5-YELLOW	VALVE #6 - COIL		
6-RED	VALVE #6 - CONTACT	F3-15 AMP	PIN 3
7-RED	NOT USED	F4-15 AMP	PIN 4
8-YELLOW	NOT USED		
9-YELLOW	NOT USED		
10-RED	NOT USED	F5-15 AMP	PIN 5
11-RED	NOT USED	F6-15 AMP	PIN 6
12-YELLOW	NOT USED		
13-YELLOW	NOT USED		
14-RED	NOT USED	F7-15 AMP	PIN 7
15-RED	NOT USED	F8-15 AMP	PIN 8
16-YELLOW	NOT USED		
17-YELLOW	NOT USED		
18-RED	NOT USED	F9-15 AMP	PIN 9
19-RED	NOT USED	F10-15 AMP	PIN 10
20-YELLOW	NOT USED		

**NOTE: FOR DETAILED INPUT / OUTPUT INFORMATION ABOUT PIN CONNECTIONS SEE ELECTRICAL CONNECTION DIAGRAM - CONTROL MODULE CONNECTION INFORMATION - PAGE 2 OF 4.**

**NOTE: A LIT YELLOW LED INDICATES THERE IS A GROUND SIGNAL TO TURN THE CORRESPONDING RELAY ON.**

**A LIT RED LED INDICATES THERE IS VOLTAGE ON IT'S CORRESPONDING CN1 PIN.**

**IF A YELLOW LED IS LIT AND THE CORRESPONDING RED LED IS OFF, EITHER IT'S FUSE IS BLOWN OR THE RELAY IS BAD.**

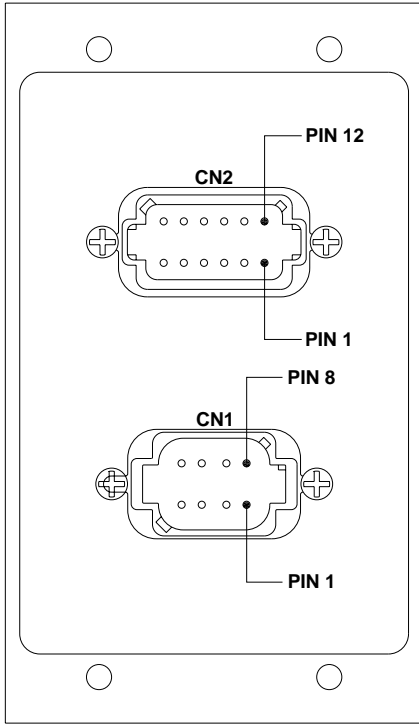
**IF THE YELLOW LEDS ARE WORKING BUT NO RED LED IS COMING ON THERE MAY BE PROBLEM WITH INPUT VOLTAGE FROM THE 4-PIN CONNECTOR.**

**IF A YELLOW LED IS NOT LIT, THIS INDICATES A POSSIBLE PROBLEM WITH THE MODULE.**

# ELECTRICAL CONNECTION DIAGRAM

## 4D INTERFACE BOX

### LED - FUSE - WIRE AND CONNECTION INFORMATION



**CN2** ————— **12 PIN BLACK CONNECTOR**

- 1 - - - - - BLACK - AUTO LEVEL
- 2 - - - - - BLACK - STORE
- 3 - - - - - BLACK - STOP
- 4 - - - - - NO CONNECTION
- 5 - - - - - RED +12V OUT
- 6 - - - - - WHITE - GROUND
- 7 - - - - - BLACK - AUTO ACTIVATE
- 8 - - - - - BLACK (LIP) LEVEL IN PROCESS
- 9 - - - - - BLACK - JACKS DOWN
- 10 - - - - - BLACK - STORE IN PROCESS
- 11 - - - - - BLACK - NOT IN PARK
- 12 - - - - - BLACK - EXCESS SLOPE

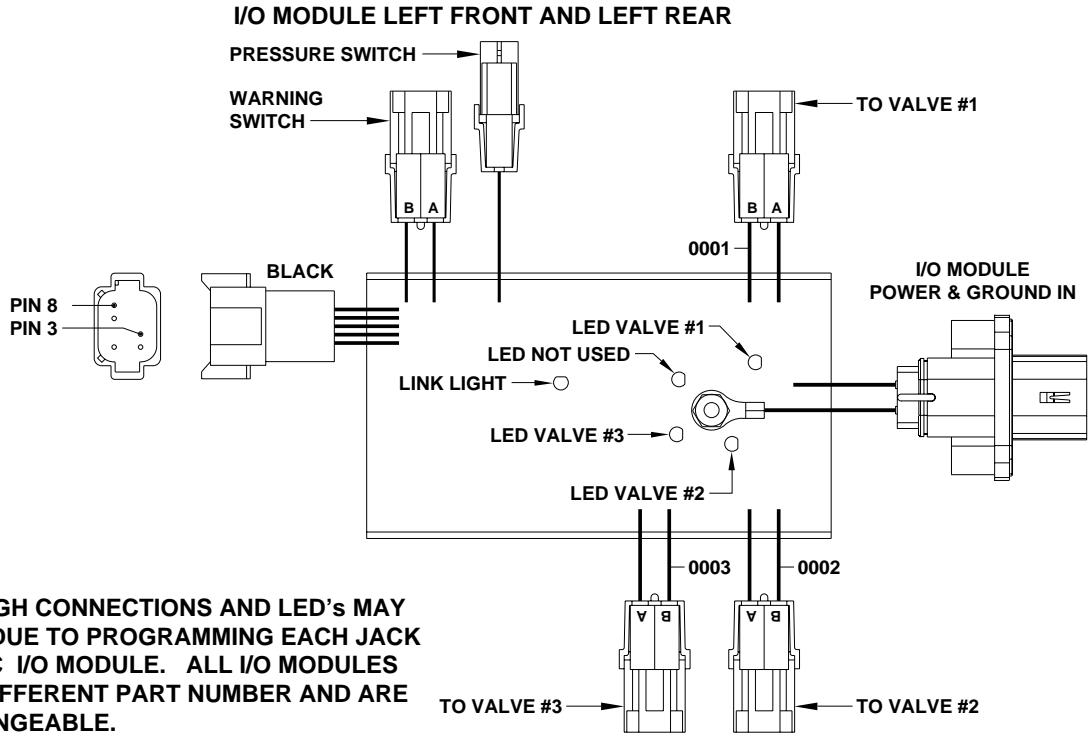
**CN1** ————— **8 PIN BLACK CONNECTOR**

- 1 AND 2 - - - - - NO CONNECTION
- 3 - - - - - RED - - - - - 6800 - - - - - SWITCHED +12
- 4 - - - - - WHITE - - - - - 6230 - - - - - GROUND
- 5 - - - - - - - - - - - - - - - CAN SHIELD
- 6 - - - - - - - - - - - - - - - NO CONNECTION
- 7 - - - - - GREEN - - - - - - - - - CAN LOW
- 8 - - - - - YELLOW - - - - - - - - - CAN HIGH

# ELECTRICAL CONNECTION DIAGRAM

## I/O MODULE

### LED AND CONNECTION INFORMATION

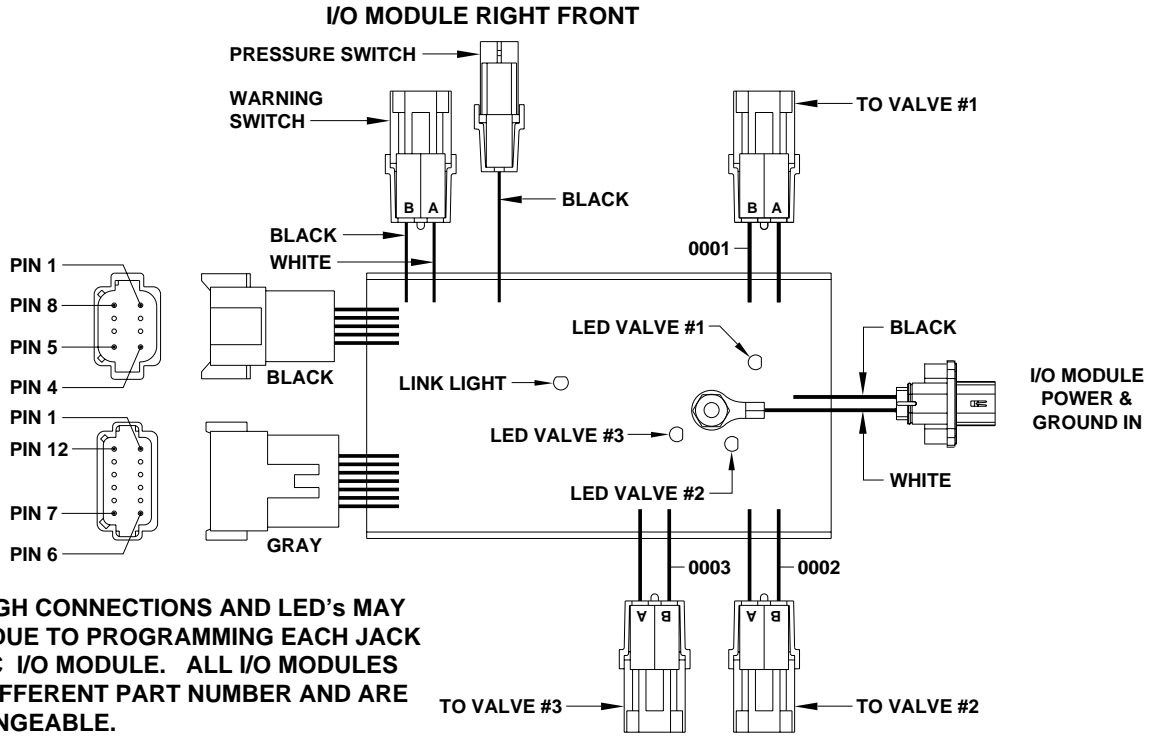


PIN #	WIRE COLOR	WIRE NUMBER	WIRE DESCRIPTION AND FUNCTION
<b>WARNING SWITCH</b>			<b>2 PIN BLACK CONNECTOR</b>
A	---	---	WARNING SWITCH GROUND SUPPLY
B	---	---	WARNING SWITCH SIGNAL - SWITCHED GROUND
<b>PRESSURE SWITCH</b>			<b>1 PIN BLACK CONNECTOR</b>
N/A	---	---	SWITCHED GROUND FROM PRESSURE SWITCH
<b>NOT USED</b>			<b>2 PIN BLACK CONNECTOR</b>
<b>TO VALVES #1, 2, &amp; 3</b>			<b>2 PIN BLACK CONNECTOR</b>
A	---	---	GROUND TO DESIGNATED VALVE
B	---	0001, 0002, OR 0003	+12 TO DESIGNATED VALVE
<b>I/O MODULE POWER &amp; GROUND</b>			<b>2 PIN BLACK CONNECTOR</b>
N/A	---	6231	GROUND TO I/O MODULE
N/A	---	6800	+12 TO I/O MODULE FROM PUMP OR MASTER RELAY
<b>BLACK CONNECTOR</b>			<b>8 PIN BLACK CONNECTOR</b>
1 & 2	---	---	NO CONNECTION
3	---	6800	SWITCHED POWER
4	---	6230	GROUND
5	---	---	CAN SHIELD
6	---	---	NO CONNECTION
7	---	---	CAN LOW
8	---	---	CAN HI

# ELECTRICAL CONNECTION DIAGRAM

## RIGHT FRONT I/O MODULE

### LED AND CONNECTION INFORMATION - PAGE 3 OF 3



PIN #	WIRE COLOR	WIRE NUMBER	WIRE DESCRIPTION AND FUNCTION
<b>WARNING SWITCH</b>			<b>2 PIN BLACK CONNECTOR</b>
A	WHITE		WARNING SWITCH GROUND SUPPLY
B	BLACK		WARNING SWITCH SIGNAL - SWITCHED GROUND
<b>PRESSURE SWITCH</b>			<b>1 PIN BLACK CONNECTOR</b>
N/A	BLACK		SWITCHED GROUND FROM PRESSURE SWITCH
<b>TO VALVES #1, 2, &amp; 3</b>			<b>2 PIN BLACK CONNECTOR</b>
A	WHITE		GROUND TO DESIGNATED VALVE
B	BLACK	0001, 0002, OR 0003	+12 TO DESIGNATED VALVE
<b>I/O MODULE POWER &amp; GROUND</b>			<b>2 PIN BLACK CONNECTOR</b>
N/A	WHITE	6231	GROUND TO I/O MODULE
N/A	BLACK	6801	SWITCHED +12 TO I/O MODULE FROM MASTER RELAY
<b>BLACK CONNECTOR</b>			<b>8 PIN BLACK CONNECTOR</b>
1 & 2			NO CONNECTION
3	RED	6800	SWITCHED +12 POWER
4	WHITE	6230	GROUND
5			CAN SHIELD
6			NO CONNECTION
7	GREEN		CAN LOW
8	YELLOW		CAN HI
<b>BROWN CONNECTOR</b>			<b>12 PIN BROWN CONNECTOR - SEE MP84.6350 FOR HARNESS CONNECTION INFO.</b>
1	BLACK	0600 - (PURPLE)	SET MODE
2	BLACK	0500 - (BLUE)	SET MODE
3	BLACK	0700 - (BROWN)	SET MODE
4 AND 5			NO CONNECTION
6	WHITE	(WHITE)	GROUND
7	RED	6800 - (RED)	+12 POWER
8			NO CONNECTION
9	BLACK	0100 - (YELLOW)	LEFT SIDE SENSE - SWITCHED GROUND
10	BLACK	0200 - (BLACK)	FRONT SENSE - SWITCHED GROUND
11	BLACK	0300 - (GREEN)	RIGHT SIDE SENSE - SWITCHED GROUND
12	BLACK	0400 - (ORANGE)	REAR SENSE - SWITCHED GROUND

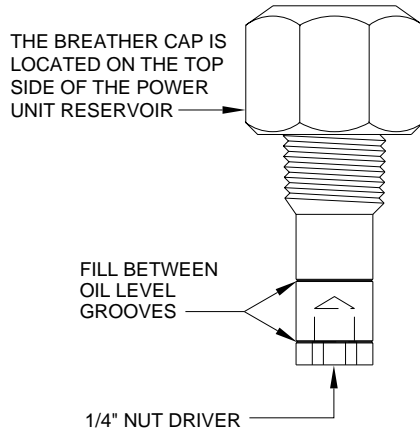
# INFORMATION/INSTRUCTION SHEET

## HYDRAULIC SOLENOID VALVE

### IDENTIFICATION - MANUAL OPERATIONS - REPLACEMENT

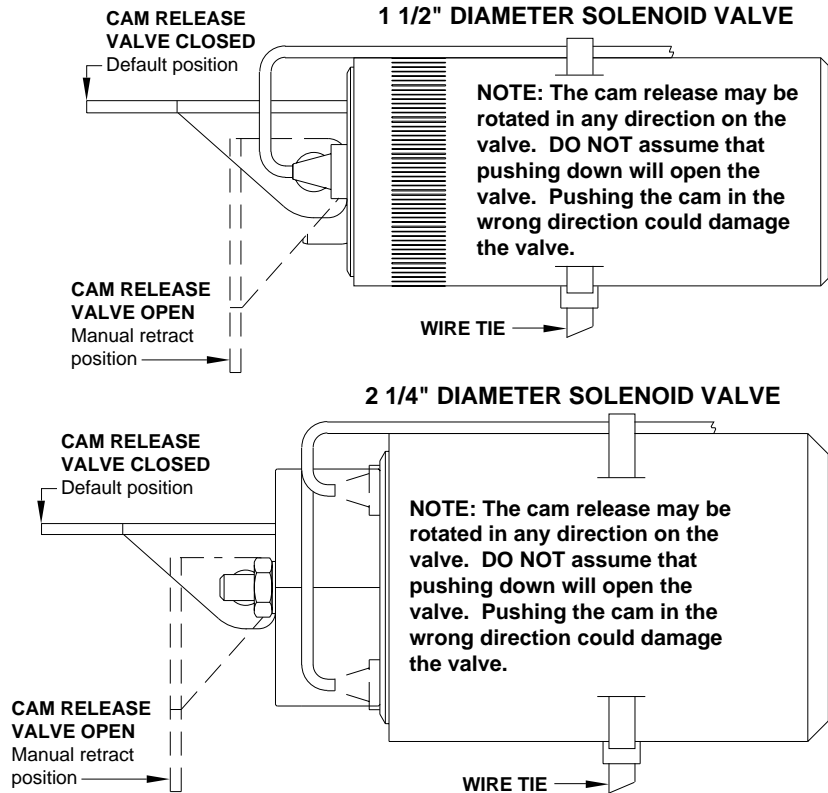
**REPLACEMENT VALVES WILL HAVE A VALVE RELEASE CAM**

#### BREATHER CAP W/NUT DRIVER

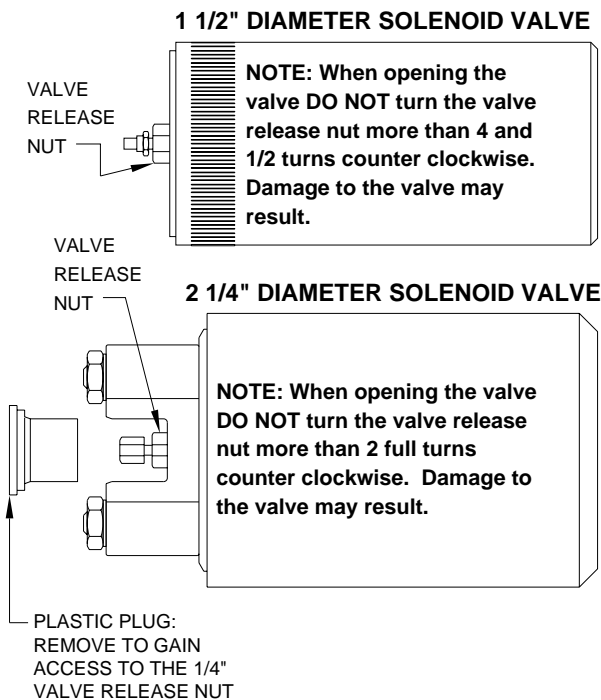


**IMPORTANT: PRIOR TO REMOVING THE BREATHER CAP, EITHER TO CHECK THE OIL LEVEL OR TO USE 1/4" NUT DRIVER, CLEAN ANY DEBRIS FROM THE TOP OF THE RESERVOIR. BEFORE RETURNING THE BREATHER CAP TO THE RESERVOIR, REMOVE ANY PAINT CHIPS OR OTHER DEBRIS FROM THE DIPSTICK INCLUDING DEBRIS INSIDE THE 1/4" NUT DRIVER.**

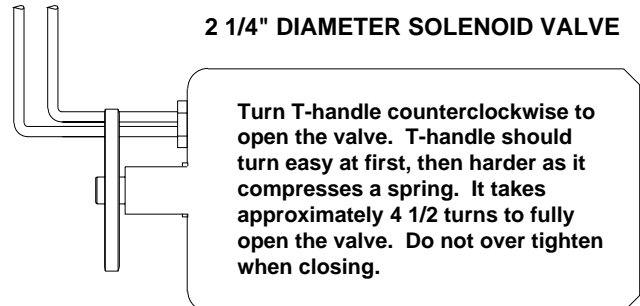
#### SOLENOID VALVES WITH CAM RELEASE



#### SOLENOID VALVES WITH 1/4" NUT RELEASE



#### SOLENOID VALVES WITH T-HANDLE RELEASE



**NOTE: OLD STYLE HEX SHAPED SOLENOID VALVES HAVE NO MANUAL VALVE RELEASE.**