

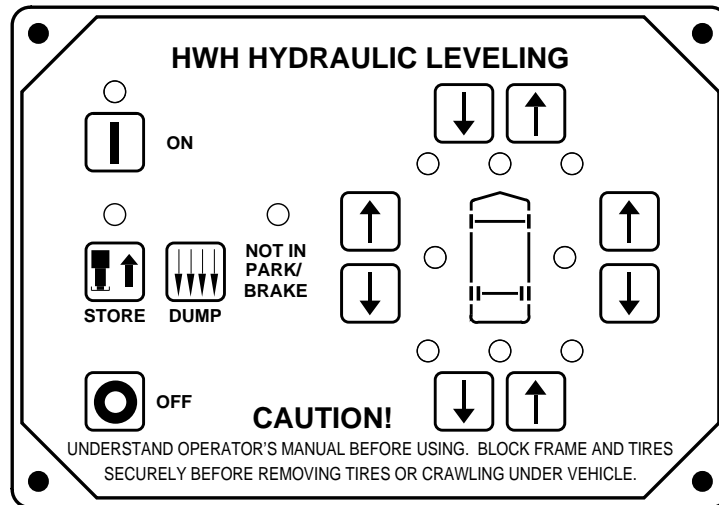


OPERATOR'S MANUAL

HWH TOUCH PANEL-CONTROLLED 310 SERIES LEVELING SYSTEM

FEATURING:

*Touch Panel Control
Hydraulic Leveling
Straight-Acting Jacks
Suspension Air Dump*



HWH CORPORATION

(On I-80, Exit 267 South)

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www.hwh.com

AP10044 - U.S.
AP10268 - Europe

ML10044/MP05.3004/THD-S
28AUG02

OPERATOR'S MANUAL

CAUTION !

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 THE VEHICLE WHILE LEVELING SYSTEM AND ROOM EXTENSIONS ARE BEING OPERATED.

KICK-DOWN JACKS MAY ABRUPTLY SWING UP WHEN THE FOOT OF THE JACK CLEARS THE GROUND OR WHEN THE JACK REACHES FULL EXTENSION.

NEVER PLACE HANDS OR OTHER PARTS OF THE BODY NEAR HYDRAULIC LEAKS. OIL MAY PENETRATE THE 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.

IF THE VEHICLE IS EQUIPPED WITH KICK-DOWN STYLE JACKS, DO NOT OVER EXTEND THE REAR JACKS. IF THE WEIGHT OF THE VEHICLE IS REMOVED FROM ONE OR BOTH REAR WHEELS, THE VEHICLE MAY ROLL FORWARD OR BACKWARD OFF OF THE JACKS.

NOTE: KEEP THE CONTROL VALVE LEVERS IN THE STORE POSITION WHEN JACKS ARE NOT IN USE.

IMPORTANT: IF VEHICLE 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

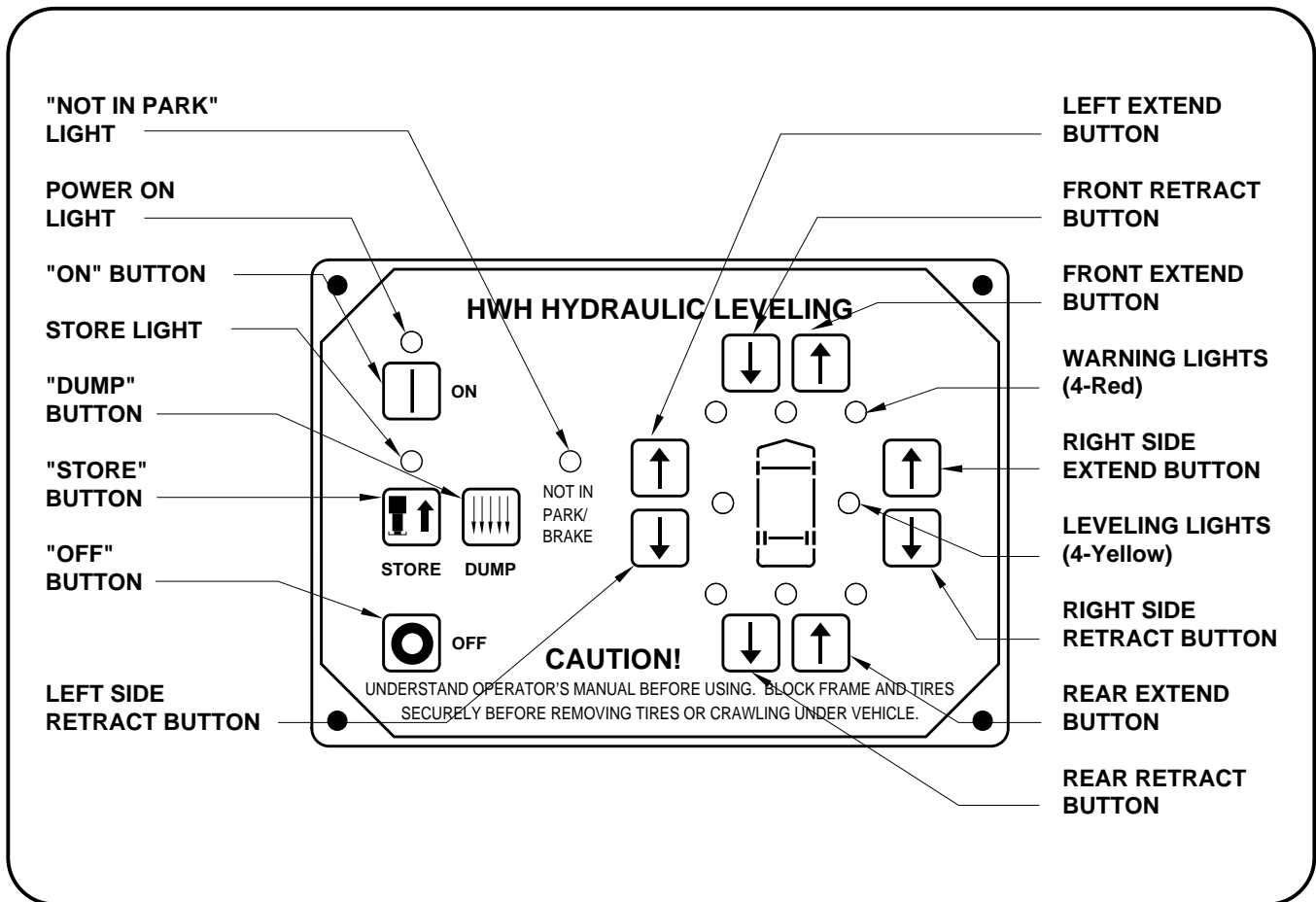
HWH CORPORATION strives to maintain the highest level of customer satisfaction. Therefore, if you discover a defect or problem, please do the following:

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



CONTROL FUNCTIONS

CONTROL BUTTONS

"ON" BUTTON : This is the "ON" button for the leveling system. It provides control power to operate the electrical relay on the pump, the leveling lights and the 4 red warning lights.

"OFF" BUTTON : This button turns off control power to the leveling system.

"STORE" BUTTON : This button will retract all four jacks at the same time.

EXTEND BUTTONS (UP ARROWS) : These buttons will extend their respective jack pairs to lift the vehicle.

RETRACT BUTTONS (DOWN ARROWS) : These buttons will retract their respective jack pairs to lower the vehicle.

"DUMP BUTTON" : This is a momentary button. Air will be exhausted from the vehicle suspension while this button is being pushed. It will only work with the system on.

INDICATOR LIGHTS

POWER ON LIGHT : This light indicates the system is on.

STORE INDICATOR LIGHT : This light will be on when the system is in the store mode.

NOT IN PARK/BRAKE LIGHT : This indicator light is on when the panel is on, but the hand/auto park brake is not set.

LEVELING LIGHTS : If a yellow LEVELING LIGHT is on, that indicates a side or end of the vehicle is low. Extend the appropriate jack pairs to put out the yellow light. Only one yellow leveling light can be on at a time. The vehicle is level when all yellow lights are out.

"WARNING LIGHTS" : A red "WARNING" light will be on when-ever the corresponding jack is extended 2 inches or more, provided the ignition switch is in the "ACC" or "ON" position and the system is on. Some vehicles are equipped with a dash mounted master "JACKS DOWN" light which will be on when one or more jacks are extended 2 or more inches, provided the ignition switch is "ON".

"WARNING BUZZER" : A buzzer will sound if a jack is extended 2 inches or more and the ignition switch is in the "ON" position.

OPERATING PROCEDURES

SITE SELECTION

Park with the front of the vehicle facing downhill if possible. Care must be taken not to raise the rear of the vehicle too high or the vehicle may roll forward or backward off the

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

ROOM EXTENSION PROCEDURES

IMPORTANT: If the vehicle is equipped with a room extension read this section carefully.

If the vehicle is equipped with kick down jacks, the wheels MUST be blocked securely. DO NOT operate any room extension until the leveling and stabilizing procedure is complete. DO NOT retract the leveling system until all room extensions are retracted. NEVER operate the leveling system when any room extensions are extended.

Refer to the vehicle owner's manual for proper operation of room extensions.

IMPORTANT: Do not use a room extension support when the vehicle is supported by the leveling system.

LEVELING PROCEDURE

1. Place gear selector in the parking position, apply park brake and block tires securely.

NOTE: If the hand/auto park brake is not set, the "NOT IN PARK/BRAKE" light will come on when the "ON" button is pushed. The panel will turn on, but the system will not operate.

2. Place the ignition switch in the "ACC." position. The vehicle's engine must be off. Running the engine during or after leveling may inflate the air suspension, lifting the vehicle out of level.

3. Push the "ON" button on the touch panel. The POWER ON light will be lit. Place pads under the jacks, if necessary, at this time.

4. Push and hold the "DUMP" button until all air is exhausted from the vehicles suspension system.

5. A lit yellow LEVEL light indicates that the end, side, or corner is low. Push the EXTEND (up arrow) button to extend jack pairs according to a lit yellow light.

ALWAYS LEVEL THE VEHICLE FROM SIDE TO SIDE, IF NEEDED, BEFORE LEVELING THE VEHICLE FROM FRONT TO REAR. Only one yellow LEVEL light can be on at one time. Extend jack pairs accordingly until all yellow lights are out. It may take several movements from side to front or side to rear to raise a low corner. If the ground is too uneven, the jack may not have enough stroke to level the vehicle. The vehicle may have to be moved.

6. After the vehicle is level, the jacks not used for leveling may be extended until they are firmly on the ground. This provides additional stability against wind and activity in the vehicle. Do this by pushing the front and/or rear EXTEND buttons as needed to extend any remaining jacks. Jacks extended to stabilize the vehicle should lift the vehicle at least 3/4 inch. Do not use the right or left EXTEND buttons.

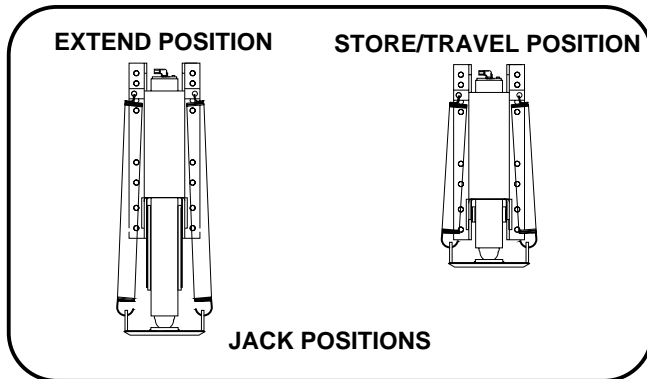
7. Push the "OFF" button on the touch panel.

8. Turn the ignition switch off.

NOTE: The leveling system should be cycled once a month or whenever the vehicle is used, to keep the system in operating condition.

OPERATING PROCEDURES

RETRACT PROCEDURES



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

NOTE: Retract room extensions before retracting the leveling system.

1. Start the coach engine to build air in the suspension system. Press the "I" button and store the jacks immediately. Do not move the vehicle until the vehicle is at the proper ride height for traveling.

2. Press the "STORE" button. As each jack retracts, its red WARNING light will go out. The system will automatically shut down approximately two minutes after the four individual red WARNING lights are out.

IMPORTANT: DO NOT interrupt power to the leveling system while it is in the STORE mode. DO NOT push the "OFF" button or turn the ignition key. The system must be allowed to completely finish the STORE mode. If any one red WARNING light does not go out the system will continue to store. Push the "OFF" button and have the system serviced.

CAUTION: 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 AND THE VEHICLE IS AT THE PROPER RIDE HEIGHT FOR TRAVELING.

3. The vehicle can be moved as soon as the suspension air bags are inflated and the vehicle has returned to the proper travel height, providing the jacks are in the STORE/TRAVEL position.

NOTE: If jacks cannot be retracted by the above procedure see MANUAL JACK RETRACTION Section.

MANUAL JACK RETRACTION

NOTE: Use the valve release "T" handles for retracting only if the "STORE" button on the control panel will not retract the jacks for travel.

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

1. Locate the 4 valve release "T" handles on the solenoid valves. The solenoid valves are located on the pump/valve assembly.

2. Allow clearance for vehicle to lower.

3. Retract the rear jacks by opening the two outer valves. Slowly turn the "T" handles counter clockwise. The handles may turn

easily at first but as an internal spring is compressed, turning may become more difficult. The valves need only to be opened enough to retract the jack.

4. Retract the front jacks by opening the two center valves as described in Step 3.

5. Check that all four jacks are now retracted.

6. Close the valves by turning the release handles clockwise.

Once the internal spring tension has been released, the handles will turn free for several turns. Once the "T" handles are snug, DO NOT tighten the handles past this point as internal damage may occur to the solenoid.

7. The system should now be repaired before using again.

MAINTENANCE

OIL LEVEL

It is important that the four leveling jacks and all HWH room extensions are fully retracted before checking the oil level. To check the oil supply, remove the breather cap from the top of the hydraulic reservoir. The oil level should be approximately one inch below the top of the reservoir when adequately filled.

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

from corrosion. Weak batteries can cause erratic operation. Battery cable terminals, battery posts and connections should be kept clean and protected from corrosion.

UNUSUAL CONDITIONS

If driving conditions are unusually muddy, the jacks may become caked or clogged with mud. This condition may hamper the proper operation of the leveling system. This problem may be prevented or remedied by cleaning off each leveling jack if they become excessively muddy.

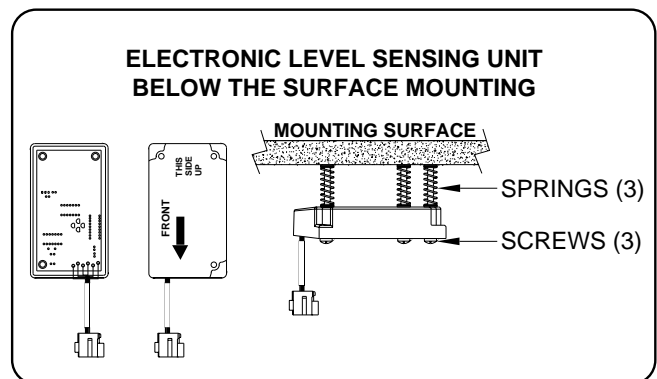
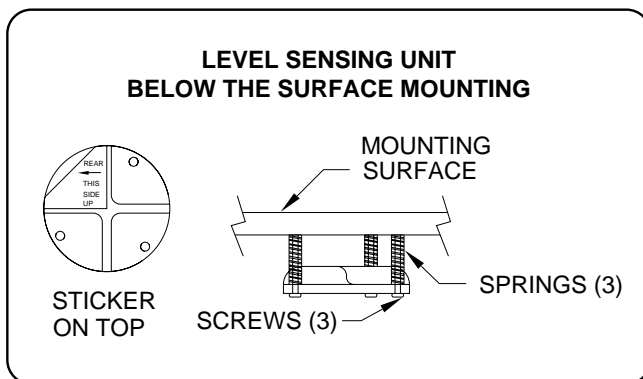
Do not move the vehicle while the leveling jacks are still in contact with the ground. Place the system in the store mode and then visually check to see if the leveling jacks have returned to the STORE/TRAVEL position.

In wet or icy weather leveling jacks may become encrusted with ice. This may cause the leveling system to function improperly. To eliminate this problem, periodically check the leveling jacks and break loose any ice which may be causing improper operation.

NOTE: All major components of the system can be replaced with rebuilt parts or can be sent to HWH CORPORATION to be rebuilt, when the system is out of warranty.

LEVEL SENSING UNIT ADJUSTMENT

Level the vehicle by placing a circular bubble level in the center of the freezer floor or location within the vehicle that is to be level. With the vehicle level, adjust the sensing unit until all yellow lights are off. This is done by drawing up the corresponding screw if the sensing unit is mounted below the surface as shown or backing out the corresponding screw if the sensing unit is mounted above the surface. Bump the sensing unit to see that it is settled tight against all three screw heads and still indicates that the unit is level.



TROUBLE SHOOTING

The following is a list of problems, and possible solutions, which might occur to the leveling system.

NOTE: Only qualified technicians should install or repair leveling systems on vehicles. A knowledge of hydraulics, welding, the vehicle's suspension and electrical system, as well as an understanding of the leveling system's hydraulics and electronics is required.

1. JACK RETRACTS AFTER COACH IS LEVEL.

- A. Hose or jack has external leak.
- B. Fluid is leaking back to reservoir through solenoid valve.

2. LEVELING JACKS WILL NOT RETRACT COMPLETELY.

- A. Jack clogged with mud or ice.
- B. Main rod bent or scored.
- C. Springs weak or broken.
- D. Hydraulic line pinched.

3. IGNITION SWITCH ON, BUT NO POWER TO PUMP AND/OR LIGHTS.

- A. Park brake not set.
- B. 12 volts from main power source not present.
- C. Faulty control box.
- D. Faulty wire or electrical connection.

4. PUMP WILL NOT ACTIVATE

- A. Bad touch panel.
- B. Bad control box.
- C. Pump relay not functioning.
- D. Pump not grounded.

5. HYDRAULIC PUMP ACTIVATES, BUT THE JACKS WILL NOT EXTEND.

- A. Bad solenoid valve.
- B. Bad manifold pressure switch.
- C. Oil supply low in reservoir.
- D. Pump is not developing pressure.

5. CONTINUED

- E. Broken hydraulic line.
- F. Bad control box.
- G. Bad shuttle valve.

6. LEVELING LIGHTS (YELLOW) NOT FUNCTIONING PROPERLY.

- A. Yellow lights will not go out when vehicle is level: adjust sensing unit.
- B. If more than two yellow lights are on, replace the sensing unit.

7. WARNING LIGHTS (RED) NOT FUNCTIONING PROPERLY.

- A. Light will not come on: check for broken wire at warning switch on the jack.
- B. Lights will not go out bad warning switch or wires are shorted to ground.
- C. Check the touch panel.

8. AIR WILL NOT DUMP FROM SUSPENSION

- A. Bad control box.
- B. Bad touch panel.
- C. Air dump solenoid valve bad.

9. SUSPENSION WILL NOT INFLATE

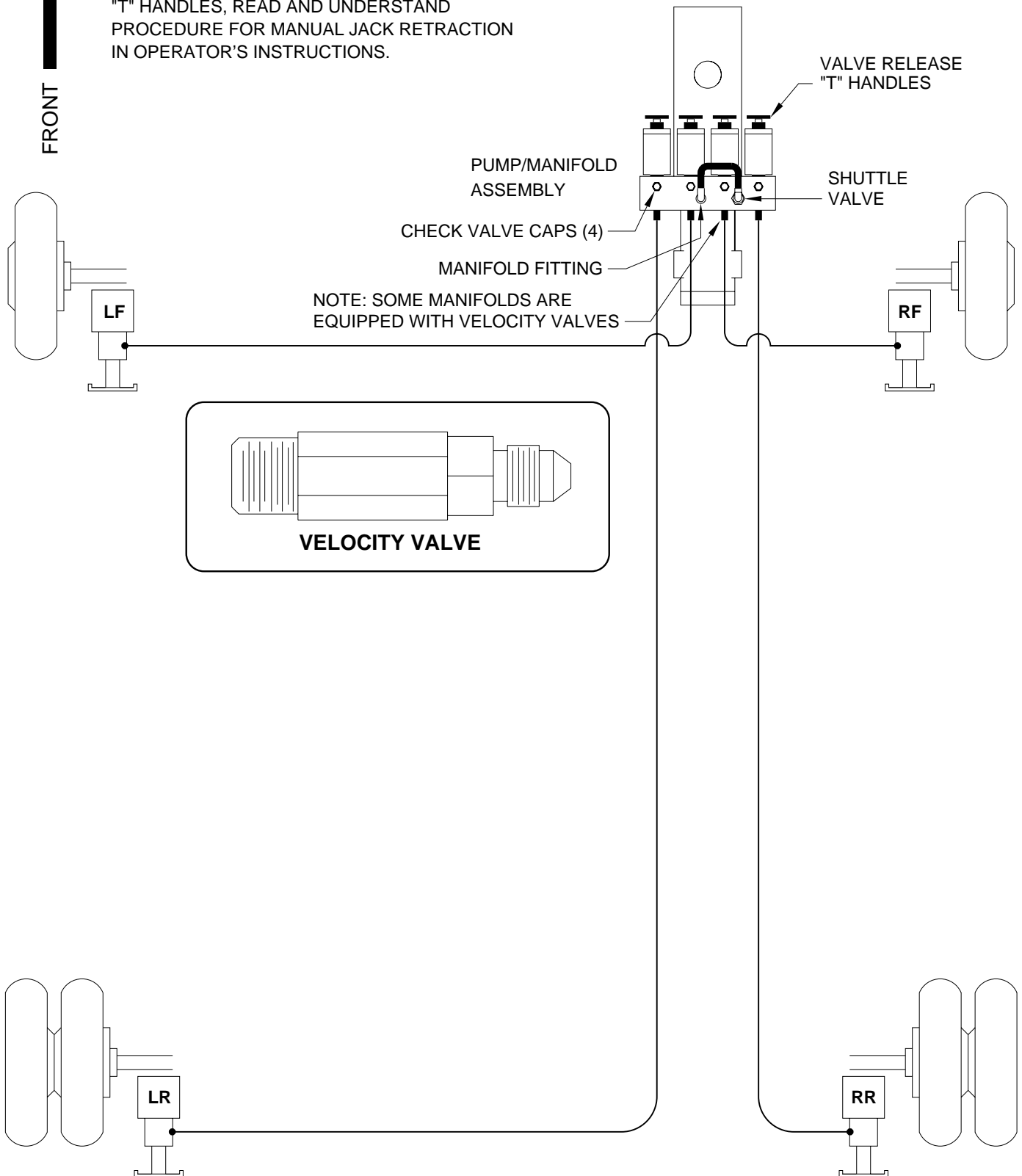
- A. Bad control box.
- B. Air dump solenoid stuck open.

HYDRAULIC LINE CONNECTION DIAGRAM LEVELING SYSTEM

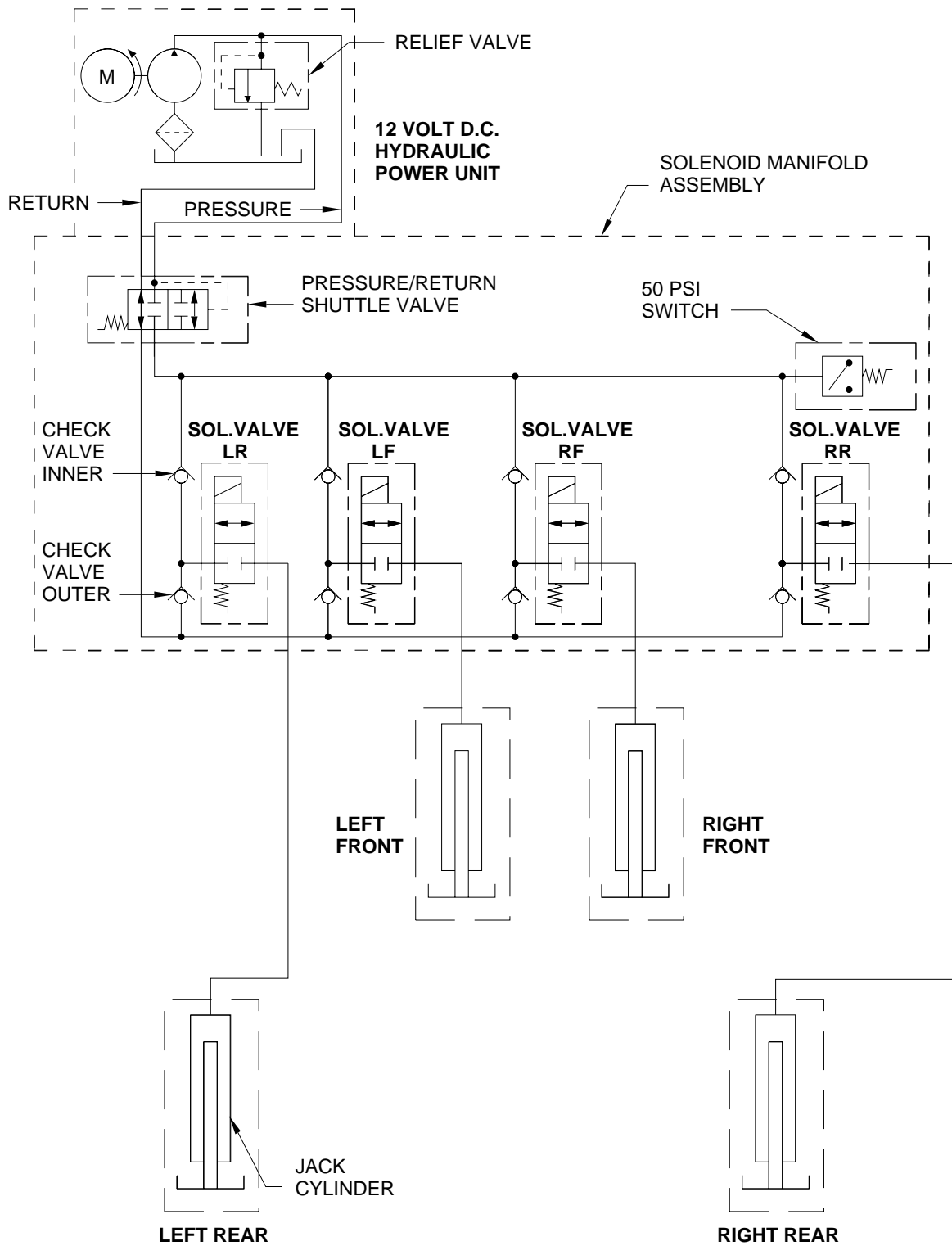


FRONT

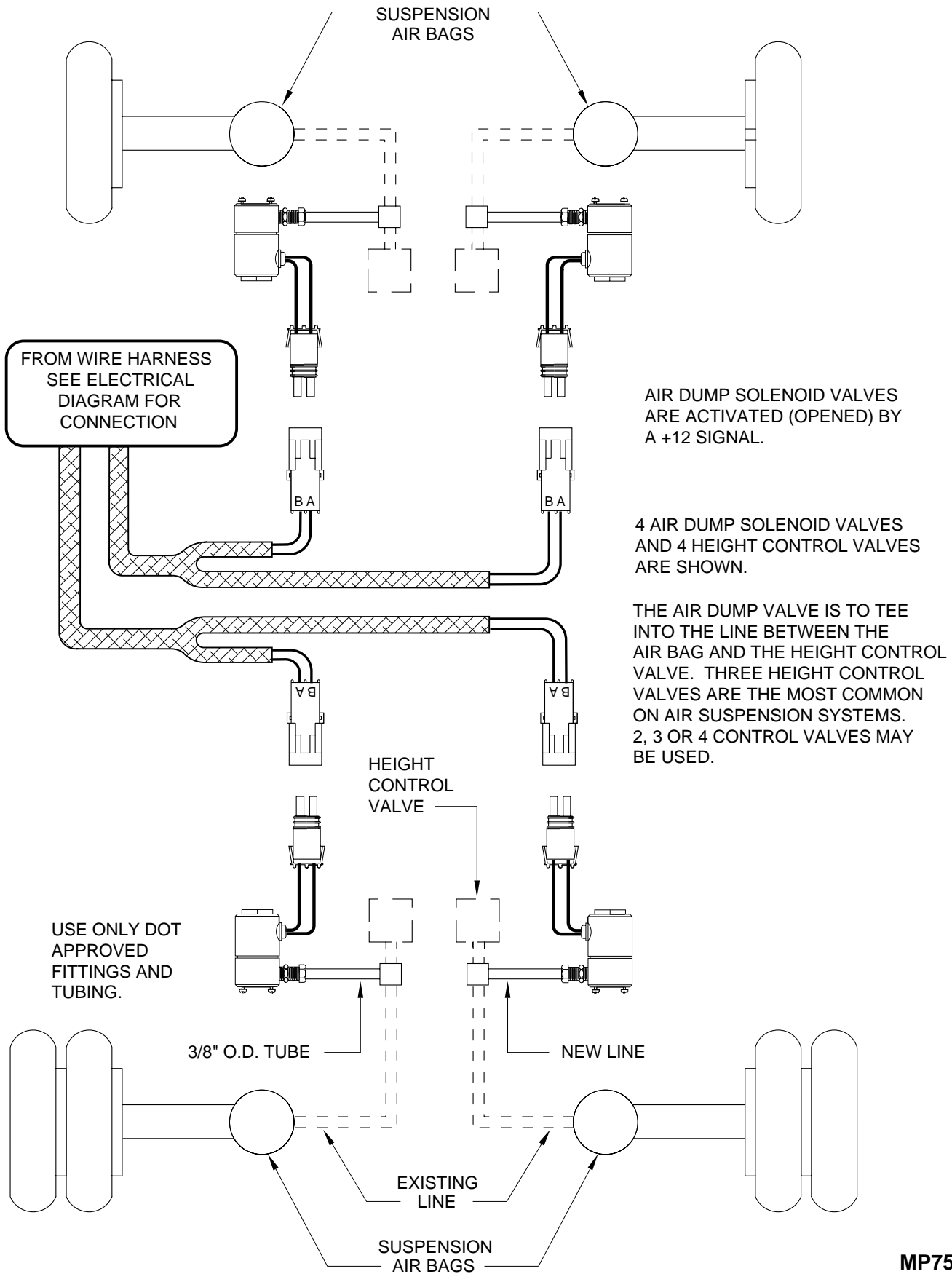
NOTE: BEFORE OPERATING VALVE RELEASE "T" HANDLES, READ AND UNDERSTAND PROCEDURE FOR MANUAL JACK RETRACTION IN OPERATOR'S INSTRUCTIONS.



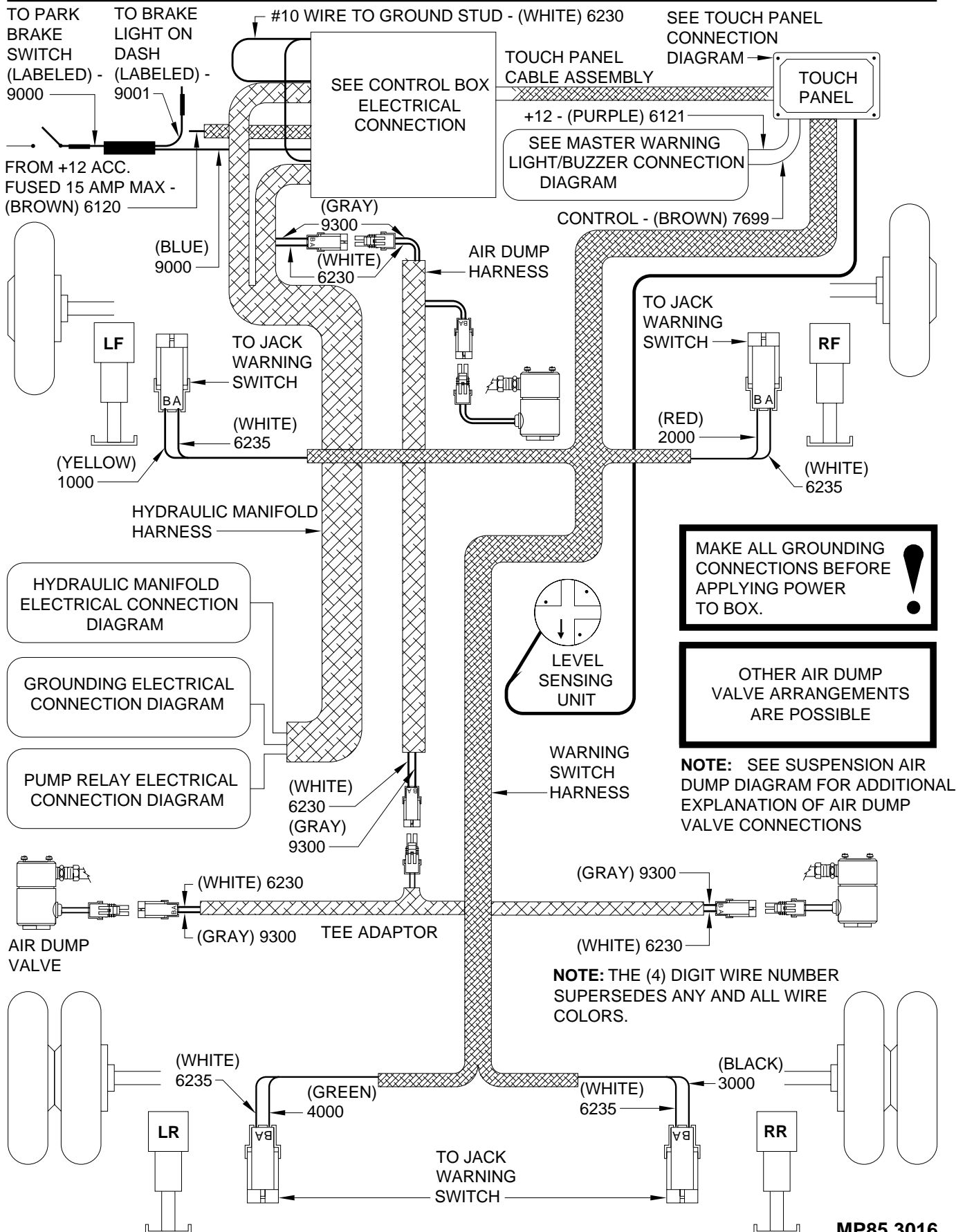
HYDRAULIC SCHEMATIC
305/310/325 SERIES LEVELING SYSTEM
WITH STRAIGHT-ACTING JACKS



AIR LINE CONNECTION DIAGRAM



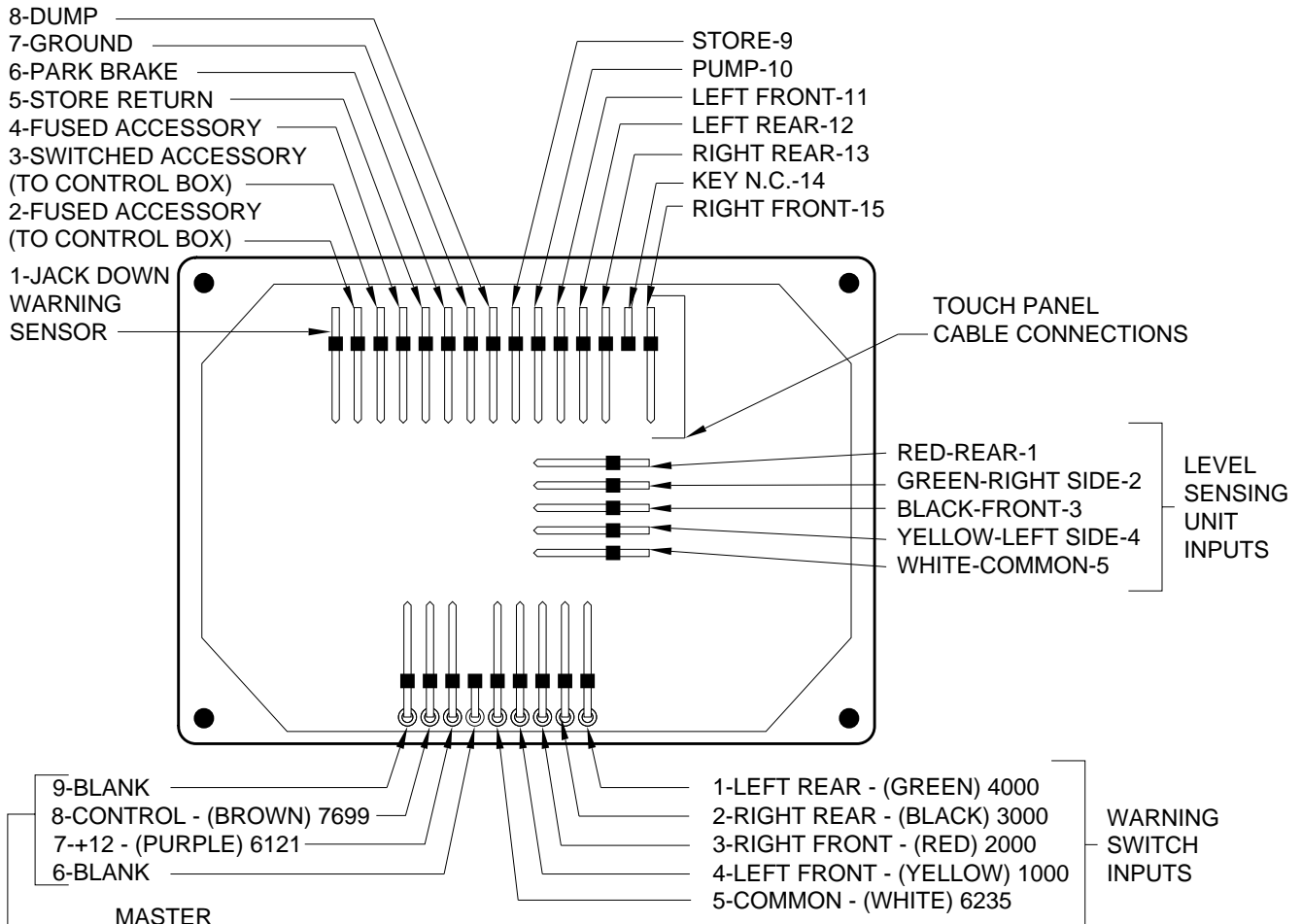
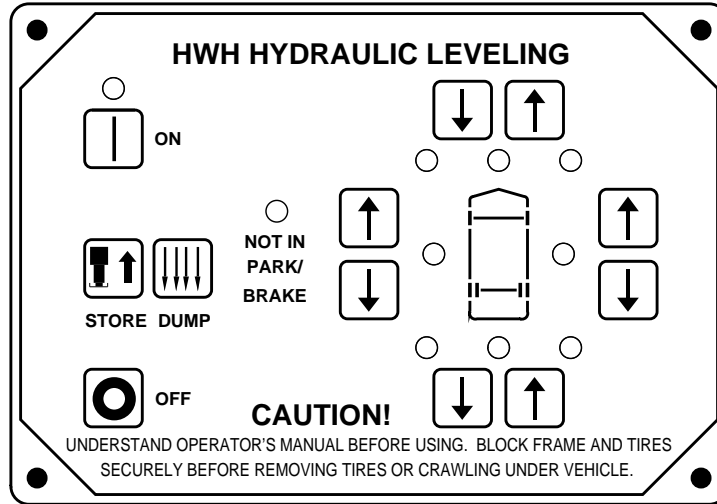
310 LEVELING SYSTEM ELECTRICAL CONNECTION DIAGRAM WITH SUSPENSION AIR DUMP



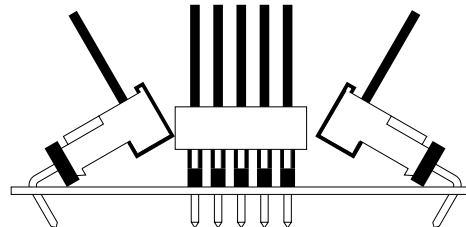
CONNECTION DIAGRAM

310 SERIES LEVELING SYSTEM TOUCH PANEL

WITH SUSPENSION AIR DUMP



NOTE: ALL WIRE CONNECTIONS WILL POINT AWAY FROM THE PANEL WHEN PLUGGED IN.



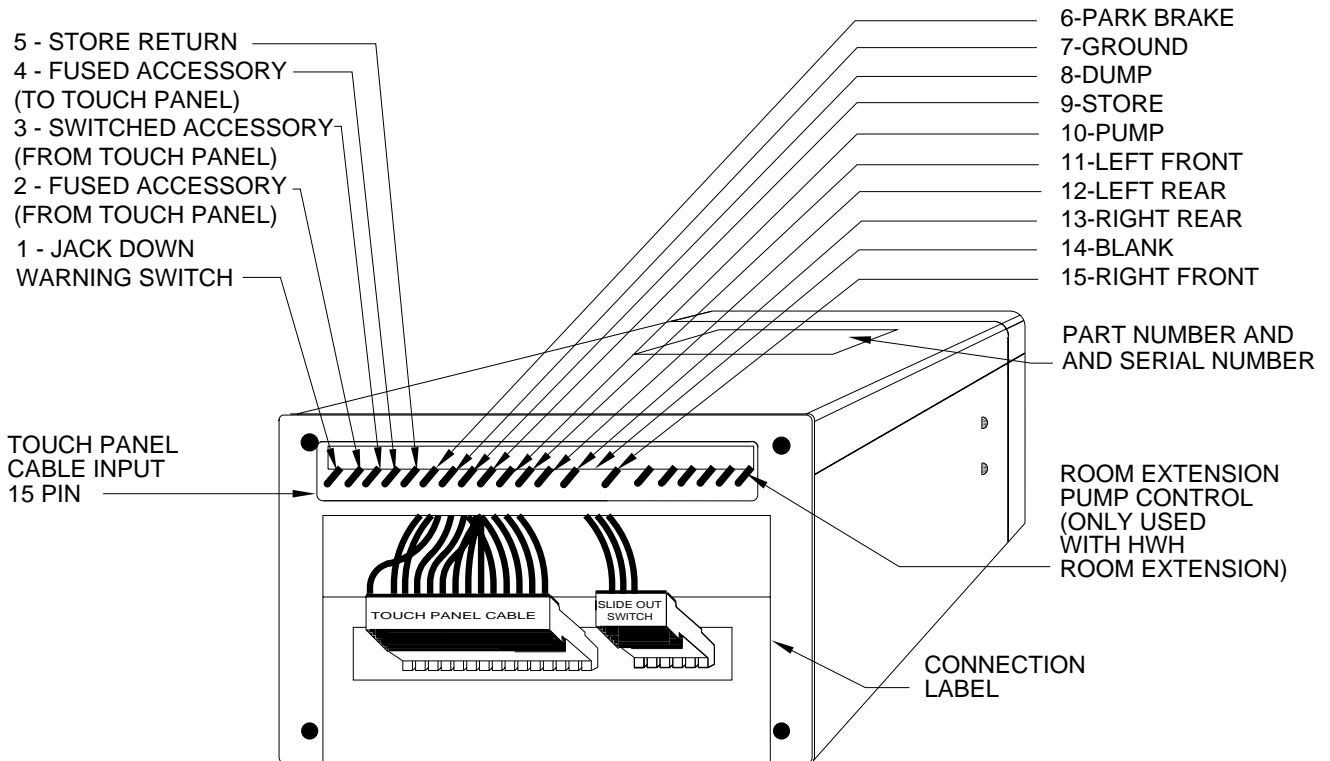
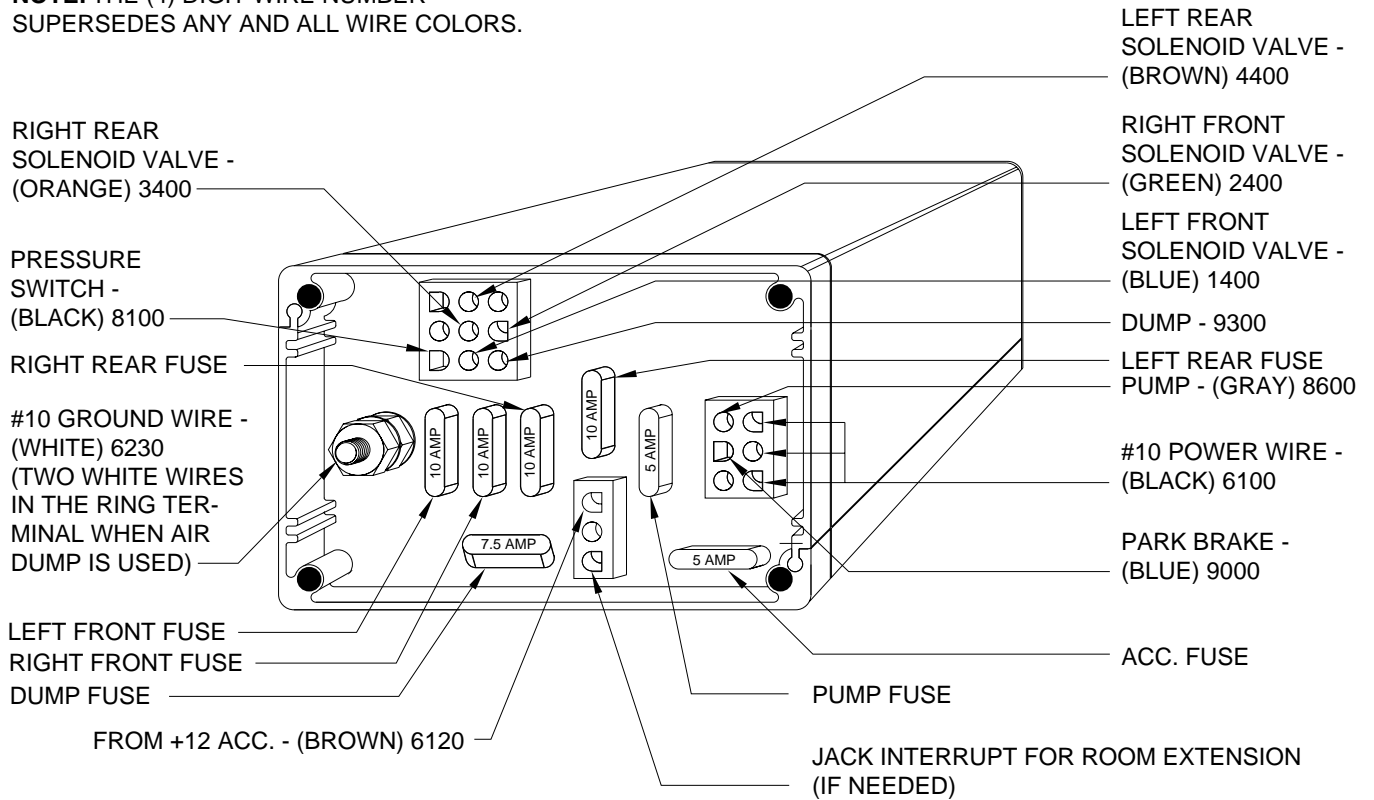
NOTE: THE (4) DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.

ELECTRICAL CONNECTION DIAGRAM

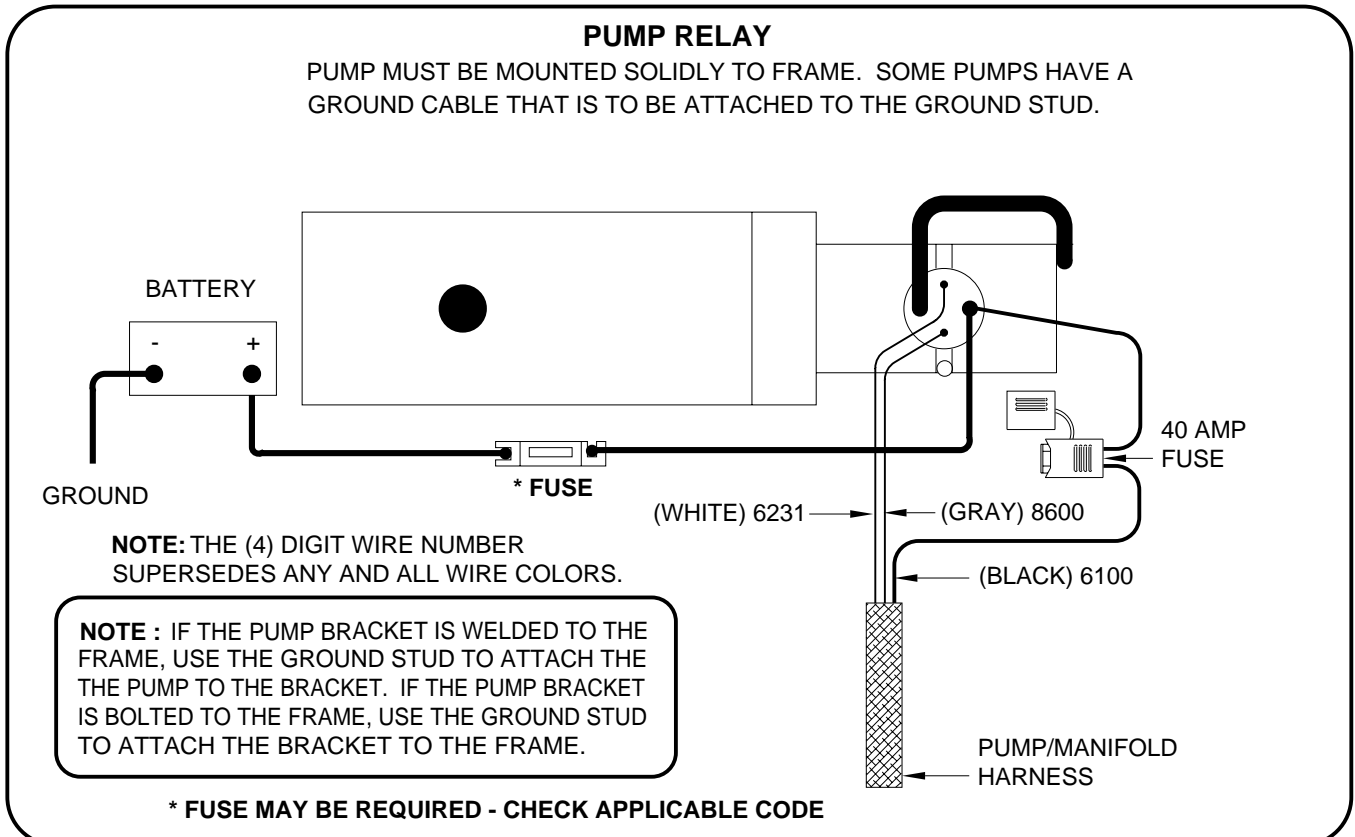
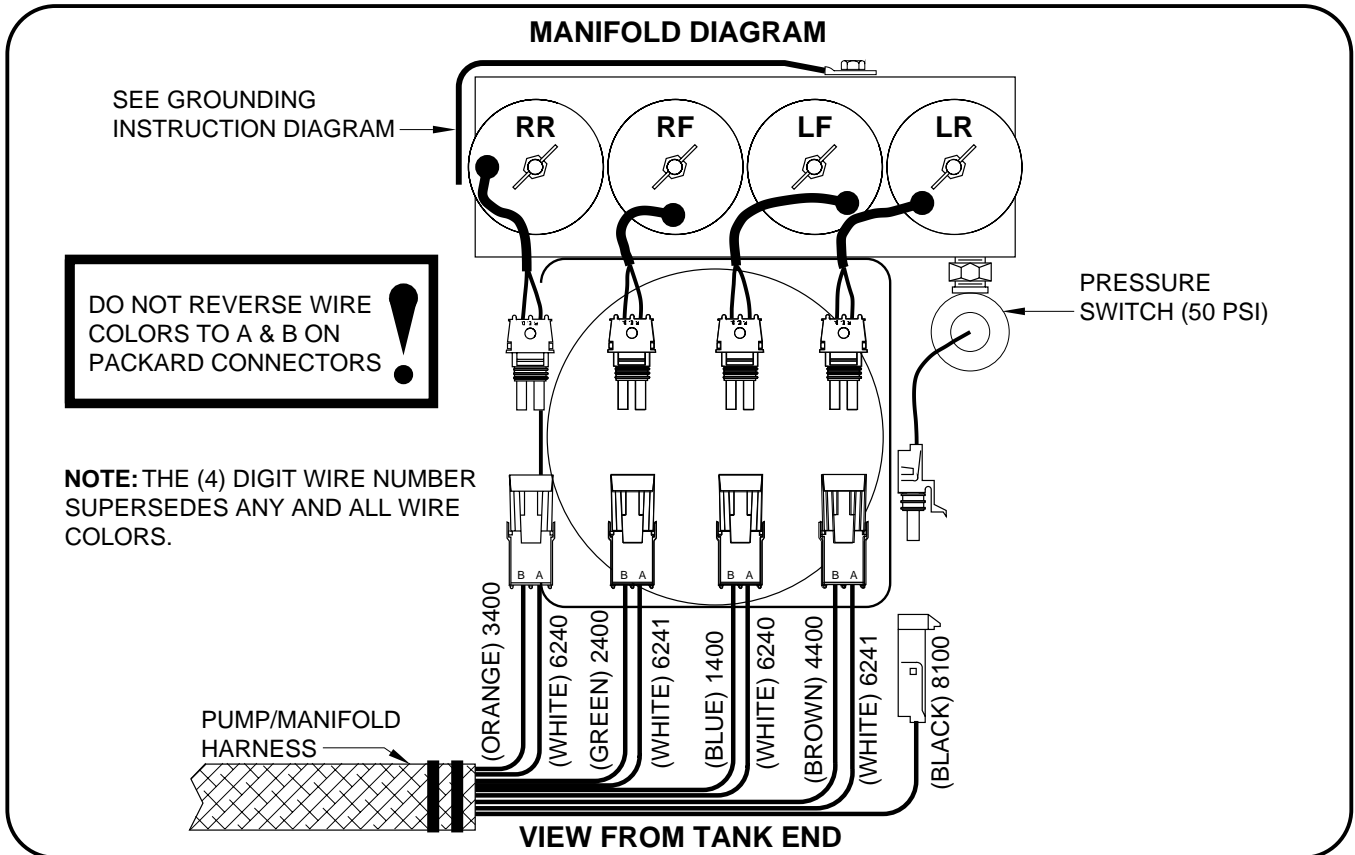
CONTROL BOX

310 SERIES LEVELING SYSTEM WITH SUSPENSION AIR DUMP

NOTE: THE (4) DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.



310 LEVELING SYSTEM HYDRAULIC MANIFOLD-PUMP RELAY ELECTRICAL CONNECTION DIAGRAM



ELECTRICAL CONNECTION DIAGRAM

310 LEVELING SYSTEM POWER UNIT/HARNESS

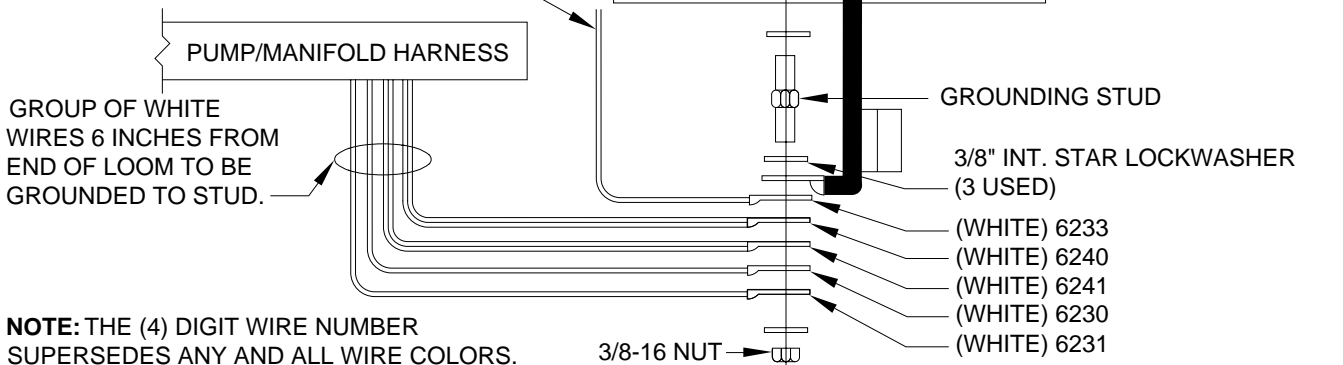
GROUNDING INSTRUCTIONS

WELDED PUMP MOUNT

USE GROUNDING STUD AND 3/8" INTERNAL STAR LOCKWASHERS AS SHOWN.

IMPORTANT: STAR LOCKWASHER MUST BE USED BETWEEN GROUNDING SURFACE AND WIRE TERMINALS

MANIFOLD GROUND
SEE HYDRAULIC MANIFOLD/
PUMP RELAY ELECTRICAL
CONNECTION DIAGRAM



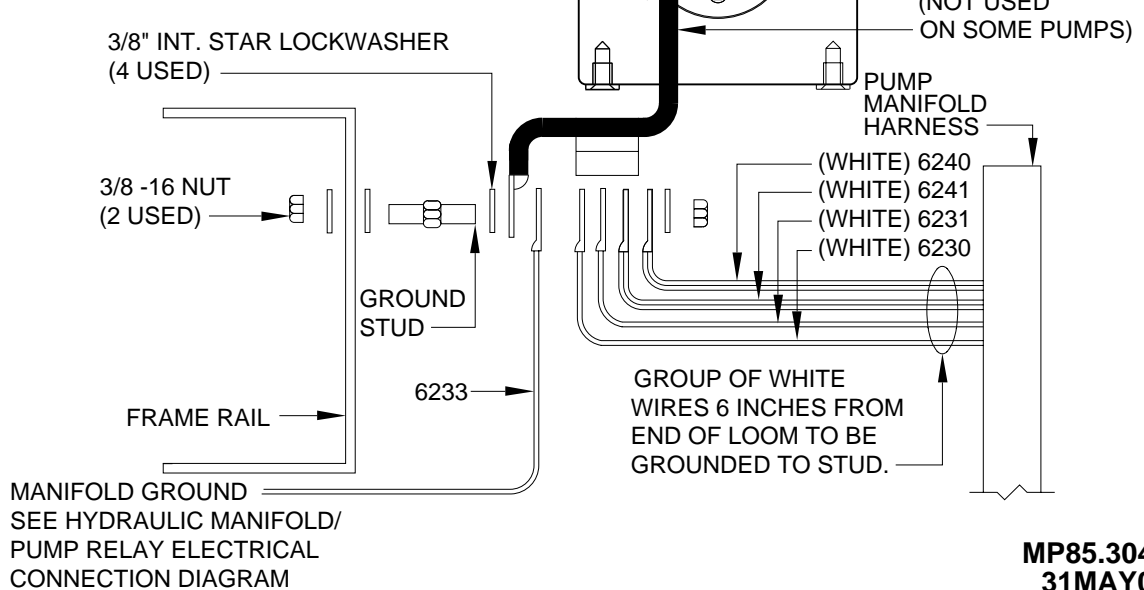
NOTE: THE (4) DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.

PUMP MOUNTED REMOTE FROM FRAME

USE GROUNDING STUD AND 3/8" INTERNAL STAR LOCKWASHERS AS SHOWN.

IMPORTANT: STAR LOCKWASHER MUST BE USED BETWEEN GROUNDING SURFACE AND WIRE TERMINALS.

NOTE: THE (4) DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.



MASTER LIGHT/BUZZER CONNECTION DIAGRAM

MANUAL LEVELING SYSTEMS

310 SERIES

A MASTER WARNING INDICATOR SHOULD ALWAYS BE USED. WHEN THE LEVELING SYSTEM HAS STRAIGHT-ACTING JACKS A WARNING BUZZER MUST BE USED.

WHEN ONLY A RED MASTER WARNING LIGHT IS USED THE +12 POWER FOR THE LIGHT COMES THROUGH THE TOUCH PANEL. (SEE FIGURE 1 BELOW.) WHEN BOTH A RED LIGHT AND WARNING BUZZER ARE USED THE +12 POWER FOR BOTH INDICATORS IS SUPPLIED BY THE IGNITION SWITCH. THE POWER MUST COME FROM THE "ON" SIDE OF THE IGNITION SWITCH, NOT THE "ACC" SIDE. (SEE FIGURE 2 BELOW.)

NOTE: BY SUPPLYING IGNITION POWER TO THE WARNING BUZZER AND LIGHT, AND "ACC" POWER TO THE CONTROL BOX, THE SYSTEM MAY BE OPERATED IN ACCESSORY WITHOUT THE BUZZER SOUNDING. THE NEGATIVE SIGNAL FOR THE WARNING INDICATORS MUST ALWAYS COME FROM THE TOUCH PANEL.

CAUTION: THE PURPLE WIRE IN THE MASTER WARNING LIGHT PIGTAIL IS HOT WHENEVER THE IGNITION IS "ON" OR IN "ACC". THE PURPLE WIRE MUST BE REMOVED FROM THE PIGTAIL WHEN USING DIRECT IGNITION VOLTAGE FOR THE MASTER WARNING INDICATORS.

