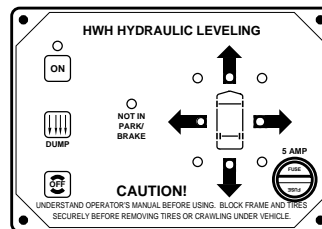
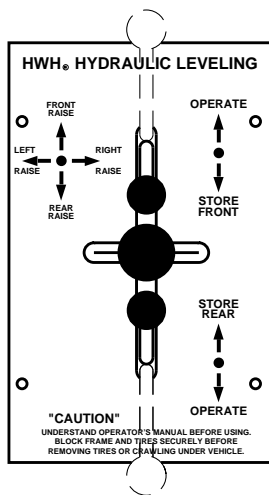




# OPERATOR'S MANUAL

## HWH® JOYSTICK-CONTROLLED 200 SERIES LEVELING SYSTEM and SPACEMAKER® ROOM EXTENSION SYSTEM

**FEATURING:**  
*Joystick BI-AXIS® Leveling Control*  
*Hydraulic Leveling*  
*Straight-Acting Jacks*  
*Suspension Air Dump*  
*Level-Out Floor Room Extension (With Synchronizing Cylinder)*



**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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# OPERATOR'S MANUAL

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## 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 VEHICLE WHILE LEVELING SYSTEM AND ROOM EXTENSION 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

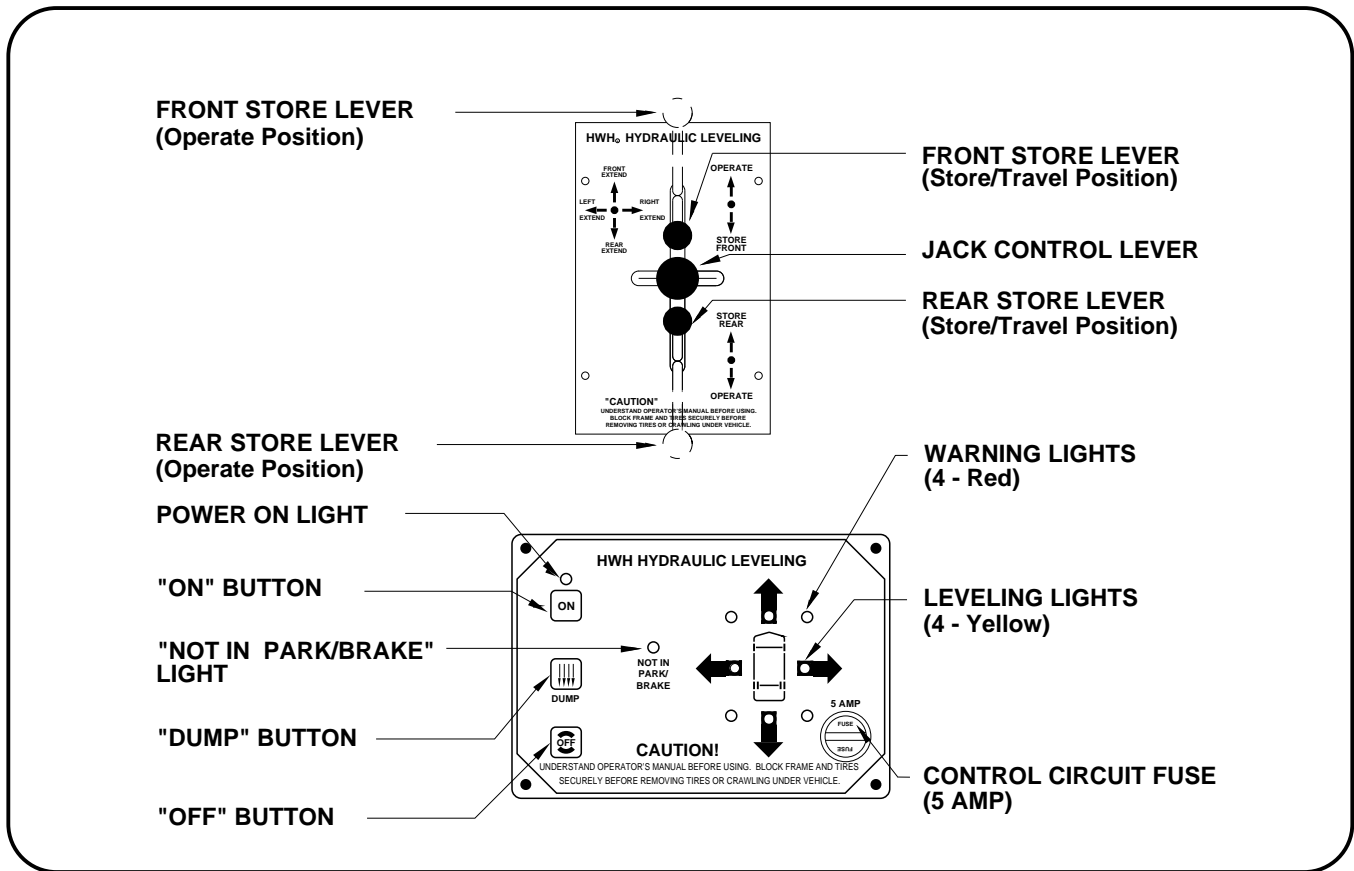
HWH CORPORATION strives to maintain the highest level of customer satisfaction. Therefore, if you discover a defect or problem, please do the following:

**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



# 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. It does not control power to the master "JACKS DOWN" warning light or buzzer.

**"OFF" BUTTON :** This button turns off power to the leveling system but not the master WARNING light and buzzer.

**STORE LEVERS :** These two levers are used to retract the jacks into the STORE/TRAVEL position. They must be in the operate position for leveling.

**JACK CONTROL LEVER :** Jacks are extended in pairs by pushing the jack control lever to one of the EXTEND positions. This movement of the lever activates the pump and directs hydraulic fluid to the jacks. When the lever is released it will return to the neutral (center) position, turning off the pump and stopping jacks in position.

**"DUMP" BUTTON :** This button will dump air from the suspension system only when the panel is on.

## INDICATOR LIGHTS

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

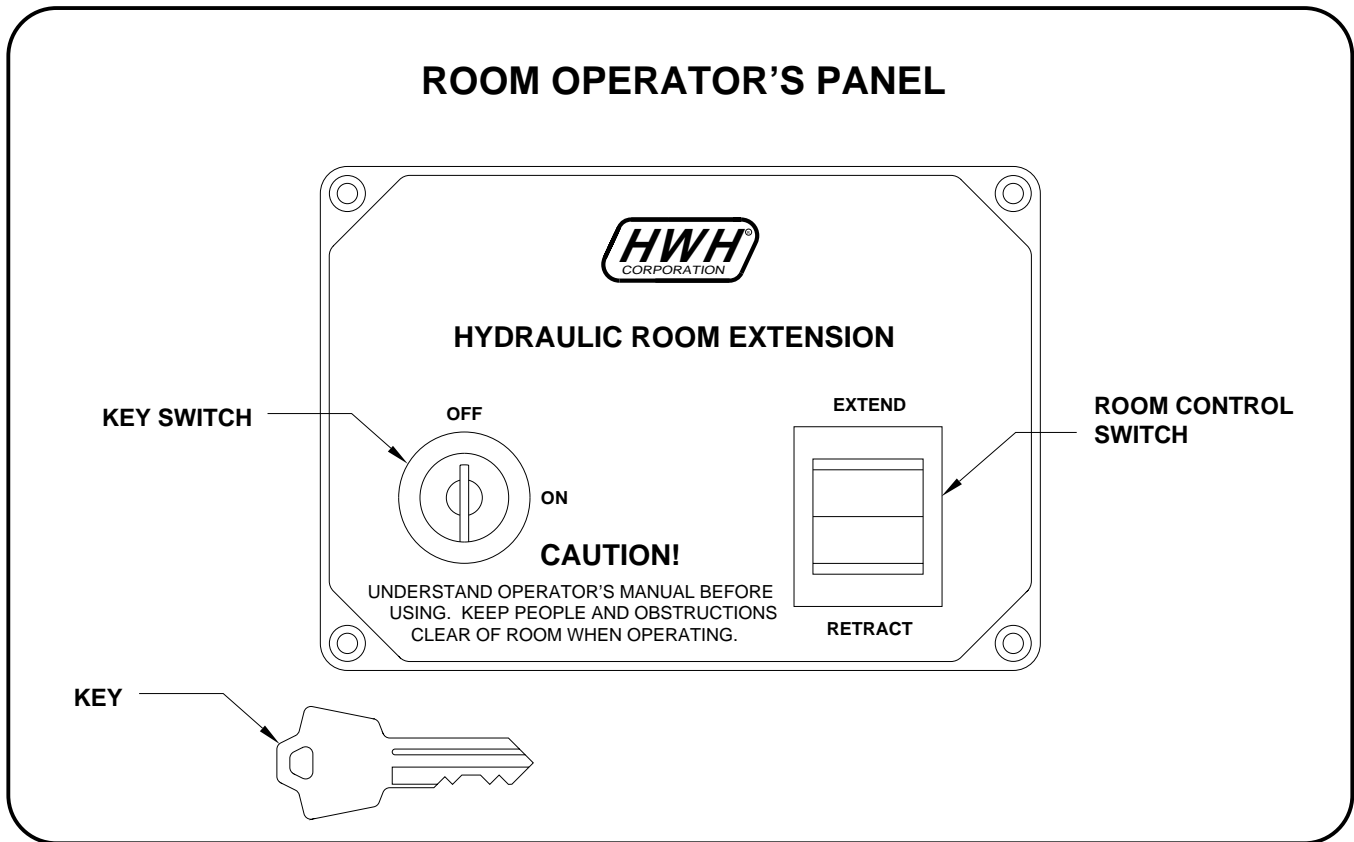
**"NOT IN PARK/BRAKE" LIGHT :** This indicator light is on when the "ON" button is pushed, but the hand/auto park brake is not set. The panel will not turn on.

**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 should be on at a time. The vehicle is level when all yellow lights are out.

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

## CONTROL IDENTIFICATION



## CONTROL FUNCTIONS

**KEY SWITCH:** The KEY SWITCH controls power to the ROOM CONTROL SWITCH. When the KEY SWITCH is in the "ON" position the room can be operated, provided the jacks are extended and the leveling system is off. The key cannot be removed. When the KEY SWITCH is in the "OFF" position the room cannot be operated, and the key can be removed.

**ROOM CONTROL SWITCH:** The ROOM CONTROL SWITCH is a two position momentary switch. Pressing the switch in the EXTEND position will extend the room. Pressing the switch in the RETRACT position will retract the room. Releasing the ROOM CONTROL SWITCH will halt the operation of the room.

# OPERATING PROCEDURES

## SITE SELECTION

Maintain adequate clearance in all directions for vehicle, room extensions, awnings, doors, steps ect. Vehicle may move in any direction due to jack extending or retracting,

settling of jacks or vehicle, equipment malfunction etc. If parking on soft ground or asphalt paving, wood blocks or pads should be placed under the jacks.

## ROOM EXTENSION PROCEDURES

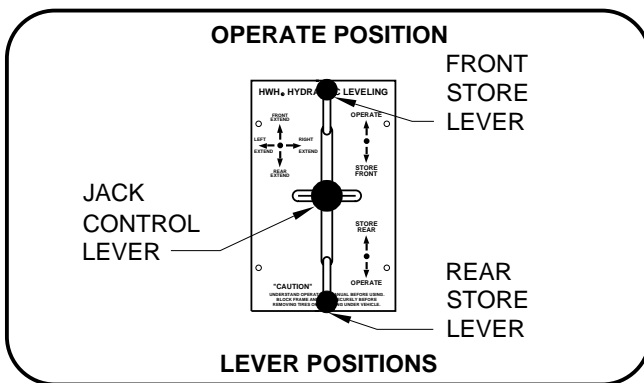
**IMPORTANT:** If the vehicle is equipped with a room extension read this section carefully.

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

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.

**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 while the "ON" button is pushed. The panel will not turn on if the park brake is not set.

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 light plate. The POWER ON light will be lit.

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

5. Move the FRONT and REAR STORE LEVERS to the OPERATE POSITION. Nothing should happen at this time. Place pads under jacks if necessary at this time.

**NOTE:** The respective RED WARNING LIGHT will come on when a jack is extended 2 or more inches.

6. A lit yellow LEVEL light indicates that the end, side or corner of the vehicle is low. Only one yellow LEVEL light should be lit at a time. If a corner of the vehicle is low a side LEVEL light will be on by itself.

Move the JACK CONTROL LEVER to the EXTEND position to extend jack pairs corresponding to a lit yellow light. 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 jacks may not have enough stroke to level the vehicle. The vehicle may have to be moved.

7. 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. Do this by pushing the jack control lever to the rear and/or front as needed to extend any remaining jacks. Do not use the right or the left extend positions. Jacks used to stabilize the vehicle should lift the vehicle 3/4" to 1" after touching the ground.

8. Push the "OFF" button on the light panel.

9. 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.

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# OPERATING PROCEDURES

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## ROOM EXTEND PROCEDURE

**NOTE:** The park brake must be set before a room can be extended or retracted.

**CAUTION:** OPERATING THE ROOM WITH ANY ROOM-LOCKING DEVICES LOCKED OR THE MANUAL-RETRACT WINCH ATTACHED CAN CAUSE PERSONAL INJURY AND VEHICLE DAMAGE. IT IS THE OPERATOR'S RESPONSIBILITY TO ENSURE THAT ALL ROOM-LOCKING DEVICES AND THE MANUAL RETRACT WINCH ARE DISENGAGED BEFORE OPERATING THE ROOM.

1. It is recommended to level the vehicle using the hydraulic leveling system before operating the room extension.

2. Unlock all room-locking devices.

**NOTE:** If the MANUAL RETRACT WINCH is attached to the room remove it before extending the room.

**CAUTION:** KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF ROOM WHEN OPERATING.

**NOTE:** Make sure there is adequate clearance to fully extend the room.

3. To extend the room, press and hold the ROOM CONTROL SWITCH in the "EXTEND" position until the room is fully extended.

**NOTE:** Hold the switch to "EXTEND" three or four seconds after the room is fully extended. This assures proper pressurization of the cylinders. **During normal operation of the room, do not reverse direction of the room until the room is fully extended. If necessary, the direction of the room may be reversed, but watch for binding of the room. If the direction of the room has been reversed, DO NOT re-extend the room until the room has been fully retracted.**

**IMPORTANT:** Do not hold the ROOM CONTROL SWITCH in the "EXTEND" position for more than ten seconds after the room is fully extended or stops moving. **If either side of the room stops moving, release the room control switch immediately. DO NOT force the room. DO NOT reverse direction of the room, contact HWH Customer Service for assistance 1-800-321-3494.**

**NOTE:** Releasing the ROOM CONTROL SWITCH will halt the operation of the room.

## ROOM RETRACT PROCEDURE

**NOTE:** The park brake must be set before a room can be extended or retracted.

**CAUTION:** KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF ROOM WHEN OPERATING.

1. It is recommended to retract the room(s) before retracting the jacks.

2. To retract the room press and hold the ROOM CONTROL SWITCH in the "RETRACT" position until the room is fully retracted.

**NOTE:** Hold the switch to "RETRACT" three or four seconds after the room is fully retracted. This assures proper pressurization of the cylinders. **During normal operation of the room, do not reverse direction of the room until the room is fully retracted. If necessary, the direction of the room may be reversed, but watch for binding of the room. If the direction of the room has been reversed, DO NOT retract the room until the room has been fully extended.**

**IMPORTANT:** Do not hold the ROOM CONTROL SWITCH in the "RETRACT" position for more than ten seconds after the room is fully retracted or stops moving. **If either side of the room stops moving, release the room control switch immediately. DO NOT force the room. DO NOT reverse direction of the room, contact HWH Customer Service for assistance 1-800-321-3494.**

**NOTE:** Releasing the ROOM CONTROL SWITCH will halt the operation of the room.

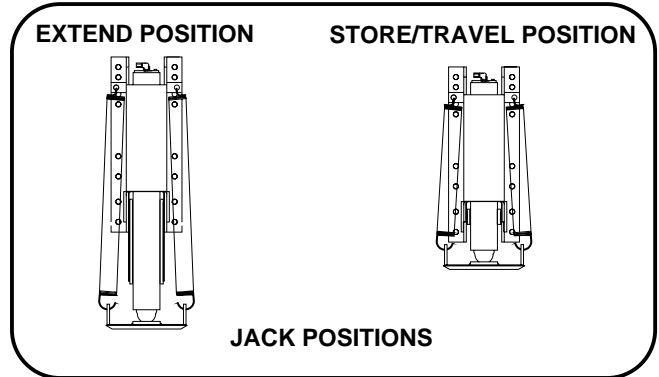
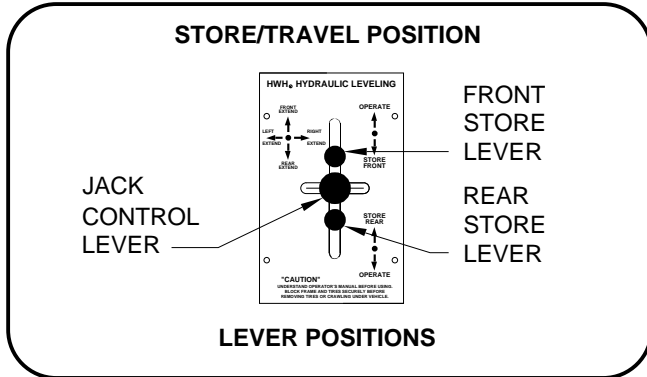
3. Engage all room-locking devices.

4. If the room will not retract see the MANUAL ROOM RETRACT PROCEDURE.

**IMPORTANT:** Room-locking devices should be locked while traveling.

# OPERATING PROCEDURES

## RETRACT PROCEDURES



**CAUTION:** MAKE SURE THAT PEOPLE AND EQUIPMENT ARE CLEAR OF THE VEHICLE.

**IMPORTANT:** Always retract the front jacks first.

**NOTE:** Neither the Ignition nor the Light Panel have to be ON to retract the jacks.

1. Move the front STORE lever to the STORE/TRAVEL position. Wait several seconds, then move the rear STORE lever to the STORE/TRAVEL position.

**NOTE:** Moving the levers to STORE slowly will allow the vehicle to lower slowly.

**CAUTION:** THE STORE LEVERS SHOULD BE KEPT IN THE "STORE" POSITION WHILE TRAVELING TO KEEP THE JACKS IN THE STORE/TRAVEL POSITION.

2. Visually check that all jacks are in the STORE/TRAVEL position. With the ignition switch in the "ON" or "ACC" position, and the system turned on, the red WARNING lights, the master "JACKS DOWN" light and the buzzer will be off.

**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. Start the vehicle engine and let air pressure build up in the suspension. Do not move the vehicle until the vehicle is at the proper ride height for traveling.

4. Push the "OFF" button on the light panel. Turn ignition off or proceed to travel.

# MANUAL ROOM AND GENERATOR SLIDE RETRACT PROCEDURE (WITH SOLENOID VALVES WITH VALVE RELEASE NUTS)

(USE ONLY WHEN THE ROOM WILL NOT RETRACT WITH THE ROOM CONTROL SWITCH)

## OVERVIEW

The room can be retracted manually if a hydraulic or electric failure prevents the room from being retracted using the CONTROL SWITCH. For normal retract sequence see the ROOM SLIDE RETRACT PROCEDURES. Refer to the vehicle manufacturer for storage location of the winch and information for connecting the winch to the room.

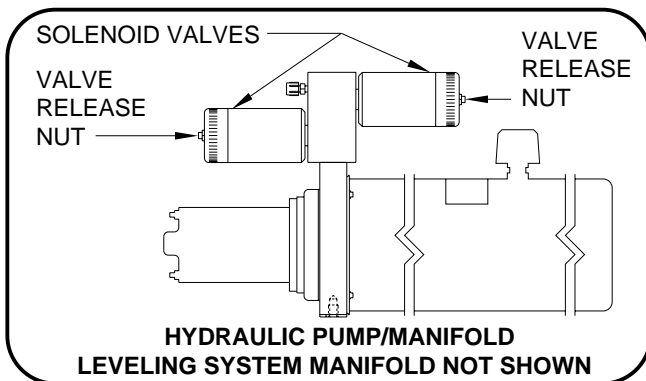
**IMPORTANT:** If the vehicle is not equipped with a winch, DO NOT use other pulling devices to retract the room. Follow steps 2 and 3 and try pushing the room in. Contact the vehicle manufacturer or HWH Customer Service at 1-800-321-3494 or 563-724-3396 for assistance.

**CAUTION:** THE MANUAL RETRACT WINCH IS EQUIPPED FOR MANUALLY RETRACTING THE ROOM ONLY. IT IS NOT TO BE USED FOR LIFTING OR ANY OTHER APPLICATION. HIGH FORCES ARE CREATED WHEN USING A WINCH, CREATING POTENTIAL SAFETY HAZARDS. FAILURE TO FOLLOW ALL CAUTIONS AND INSTRUCTIONS MAY CAUSE FAILURE OF THE MANUAL RETRACT WINCH OR CONNECTIONS RESULTING IN DAMAGE OR PERSONAL INJURY. MAINTAIN FIRM GRIP ON THE WINCH HANDLE AT ALL TIMES. NEVER RELEASE THE HANDLE WHEN RATCHET LEVER IS IN THE OFF POSITION AND THE WINCH IS LOADED. THE WINCH HANDLE COULD SPIN VIOLENTLY AND CAUSE PERSONAL INJURY. CHECK THE WINCH AND STRAPS FOR DAMAGE OR WEAR, AND CHECK FOR PROPER RATCHET OPERATION ON EACH USE OF THE WINCH. DO NOT USE IF DAMAGED OR WORN.

1. Retract jacks following the LEVELING SYSTEM RETRACT PROCEDURE.

**NOTE :** When manually retracting the room, make sure the jacks are retracted before retracting the room.

2. Locate the HYDRAULIC PUMP/MANIFOLD unit.



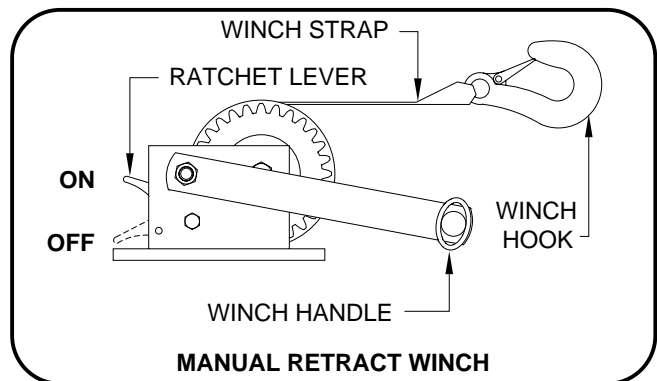
3. Open the Solenoid Valves by slowly turning the valve release nuts counter clockwise using the 1/4" nut driver supplied.

**IMPORTANT:** Only open the valves enough to retract the room. DO NOT turn the release nuts more than 4 and 1/2 turns. Turning the nuts more could damage the valves.

**NOTE:** Prior to APRIL 2002 a 1/4" Nut Driver was sent with the Operators Manual. As of APRIL 2002 the 1/4" Nut Driver has been incorporated into the Breather Cap. See the back page of this manual for further info.

**NOTE:** The room may move slightly as the SOLENOID VALVES are opened and internal pressure is released.

4. Locate the MANUAL RETRACT WINCH and connect it to the room according to the vehicle manufacturer's instructions. To extend the WINCH STRAP firmly grasp WINCH HANDLE, place RATCHET LEVER in its OFF position, and slowly rotate the WINCH HANDLE counter clockwise, keeping a firm grip on the handle. When enough WINCH STRAP is extended, place the RATCHET LEVER in its ON position and slowly rotate the WINCH HANDLE clockwise until the RATCHET LEVER locks.



5. Slowly winch the room in by turning the WINCH HANDLE clockwise. The RATCHET LEVER should produce a loud, sharp, clicking noise.

**NOTE:** Winching the room in quickly will raise pressure in the hydraulic fluid and make winching more difficult.

**CAUTION:** OPERATE THE MANUAL RETRACT WINCH BY HAND POWER ONLY. IF THE WINCH CANNOT BE CRANKED EASILY WITH ONE HAND IT IS PROBABLY OVERLOADED. IF WINCHING BECOMES TOO DIFFICULT STOP AND CHECK FOR OBSTRUCTIONS OR RESTRICTIONS ON THE ROOM AND ROOM EXTENSION MECHANISM.

6. When the room is fully retracted, engage the room locking devices. Leave the retract winch engaged and the solenoid valves open.

**CAUTION:** THE ROOM EXTENSION SOLENOID VALVE RELEASE NUTS MUST BE IN THE OPEN POSITION WHEN THE MANUAL RETRACT WINCH IS ENGAGED.

7. The system should be repaired before using again.

**NOTE:** After repairs are made, when closing the VALVE RELEASE NUTS, do not over tighten the nuts.

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# 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.

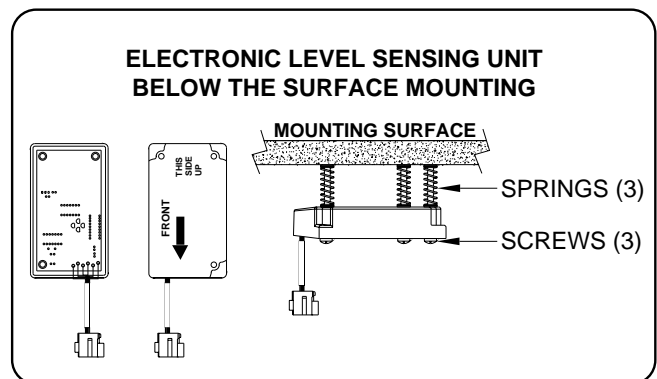
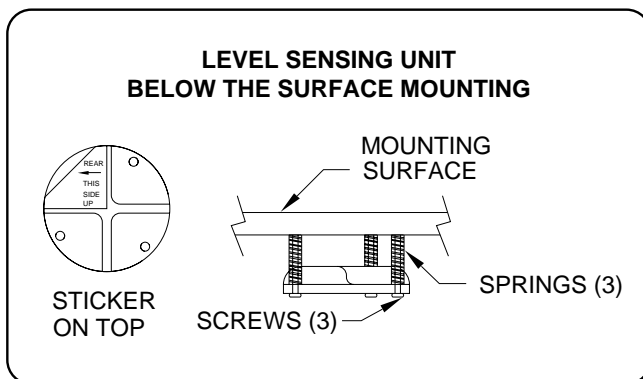
Do not move the vehicle while the leveling jacks are still in contact with the ground. Place the system in the store mode and then visually check to see if the leveling jacks have returned to the STORE/TRAVEL position.

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.



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# TROUBLE SHOOTING

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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 systems as well as an understanding of the leveling system's hydraulic 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 the control valve.
- C. Thermal contraction of fluid, jacks not lifting enough when stabilizing the vehicle.
- D. AIR SUSPENSION reinflation - running vehicle during leveling or leaks in the air suspension.
- E. Bezel plate not installed properly - interferes with "STORE" levers.

**2. JACKS WILL NOT RETRACT COMPLETELY.**

- A. Jack clogged with mud or ice.
- B. Main rod bent or scored.
- C. Valve plunger is not completely depressed by valve handle.
- D. Spring weak or broken.
- E. Hydraulic line pinched.

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

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

**4. PUMP WILL NOT ACTIVATE.**

- A. Grounding switch on valve not working.
- B. Pump relay not functioning.
- C. Pump not grounded.

**5. HYDRAULIC PUMP ACTIVATES WITHOUT USE OF CONTROL VALVE HANDLES.**

- A. Grounding switch at valve shorted.
- B. Pump relay stuck.
- C. Relay control wire shorted to ground.

**6. HYDRAULIC PUMP ACTIVATES, BUT THE JACKS WILL NOT EXTEND.**

- A. Store levers not in the operate position.
- B. Oil supply is low in reservoir.
- C. Pump is not developing pressure.
- D. Broken hydraulic line.

**7. LEVELING LIGHTS (YELLOW) ARE NOT FUNCTIONING PROPERLY.**

- A. Yellow lights will not go out when vehicle is level: adjust sensing unit.
- B. If two or more yellow lights are on replace PC board or check level sensing unit.

**8. WARNING LIGHTS (RED) ARE 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 PC board.

**9. AIR WILL NOT DUMP FROM SUSPENSION.**

- A. Bad touch panel.
- B. Air dump solenoid is bad.

**10. SUSPENSION WILL NOT INFLATE.**

- A. Bad touch panel.
- B. Air dump solenoid stuck open.

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# TROUBLE SHOOTING ROOM EXTENSION

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The following is a list of problems, and possible solutions, which might occur to the room extension systems.

**NOTE :** Only qualified technicians should install or repair room systems. A knowledge of hydraulic, welding, the vehicle's suspension and electrical systems is required. In addition, an understanding of the room extension system's hydraulics and electronics is required.

**1. HYDRAULIC PUMP WILL NOT ACTIVATE WHEN ROOM CONTROL SWITCH IS PRESSED.**

- A. KEY SWITCH is in the "OFF" POSITION.
- B. The PARK BRAKE is not set.
- C. FUSE is blown.
- D. PUMP RELAY and/or HYDRAULIC PUMP are not properly grounded.
- E. 12 VOLT power to pump relay not present.
- F. Faulty wire, electrical connection, KEY SWITCH, ROOM CONTROL SWITCH, PUMP RELAY, or PUMP MOTOR.

**2. HYDRAULIC PUMP ACTIVATES, BUT ROOM WILL NOT EXTEND.**

- A. EXTEND SOLENOID VALVE is not properly grounded.
- B. Reservoir oil supply is low.
- C. Hydraulic line is pinched or broken.
- D. Faulty wire, electrical connection, ROOM CONTROL SWITCH , EXTEND SOLENOID VALVE, HYDRAULIC PUMP, or HYDRAULIC CYLINDER.

**3. HYDRAULIC PUMP ACTIVATES, BUT ROOM WILL NOT RETRACT.**

- A. RETRACT SOLENOID VALVE IS NOT properly grounded.
- B. Reservoir oil supply is low.
- C. Hydraulic line is pinched or broken.
- D. Faulty wire, electrical connection, ROOM CONTROL SWITCH , RETRACT SOLENOID VALVE, HYDRAULIC PUMP, or HYDRAULIC CYLINDER.

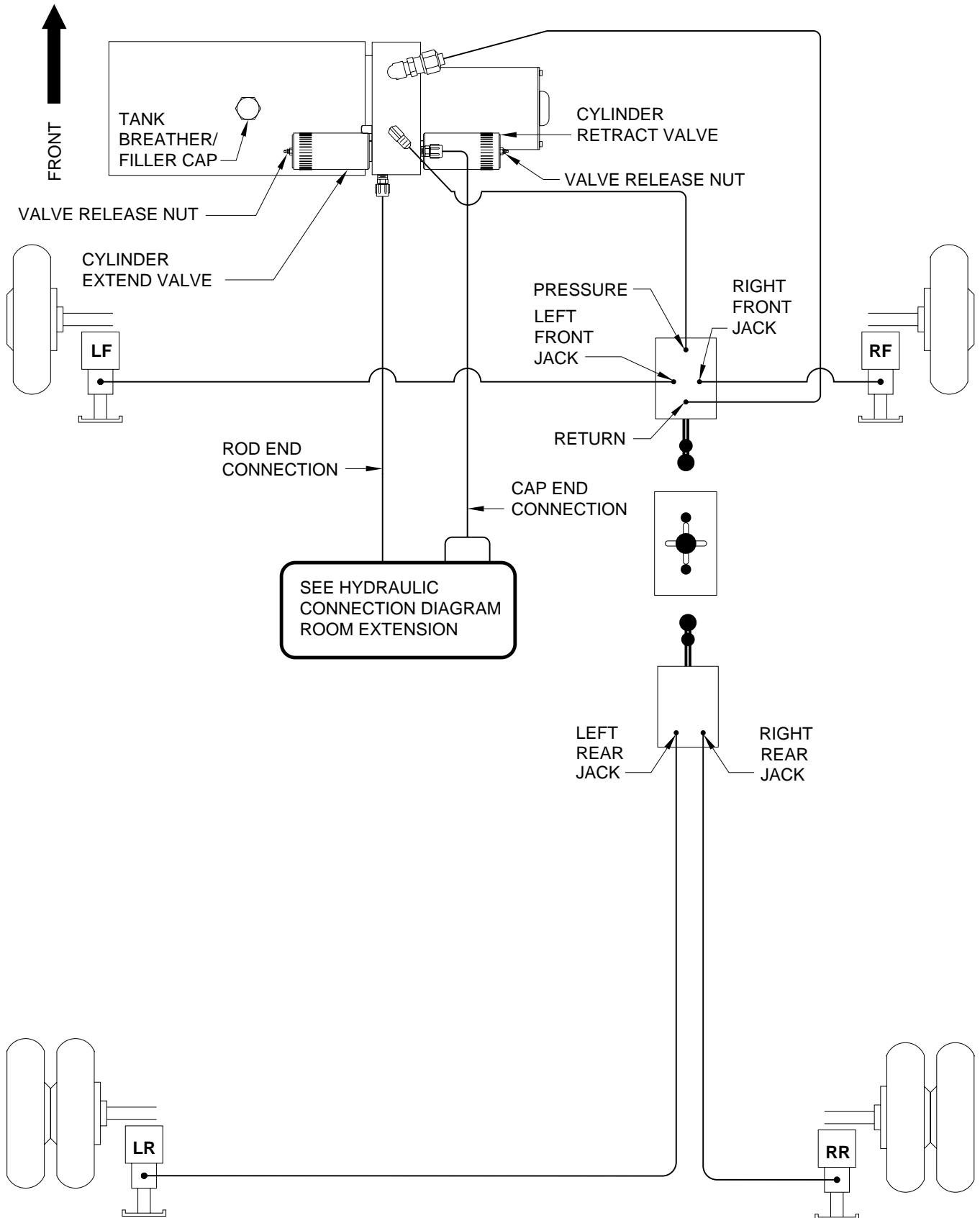
**4. ROOM CREEPS OUT AFTER CLOSING.**

- A. "T" HANDLE on EXTEND SOLENOID VALVE is not closed completely.
- B. EXTEND SOLENOID VALVE has an internal leak.
- C. HYDRAULIC CYLINDER has an internal leak.
- D. The MANIFOLD CHECK VALVE is leaking.

**5. ROOM CREEPS IN AFTER BEING EXTENDED.**

- A. "T" HANDLE on RETRACT SOLENOID VALVE is not closed completely.
- B. RETRACT SOLENOID VALVE has an internal leak.

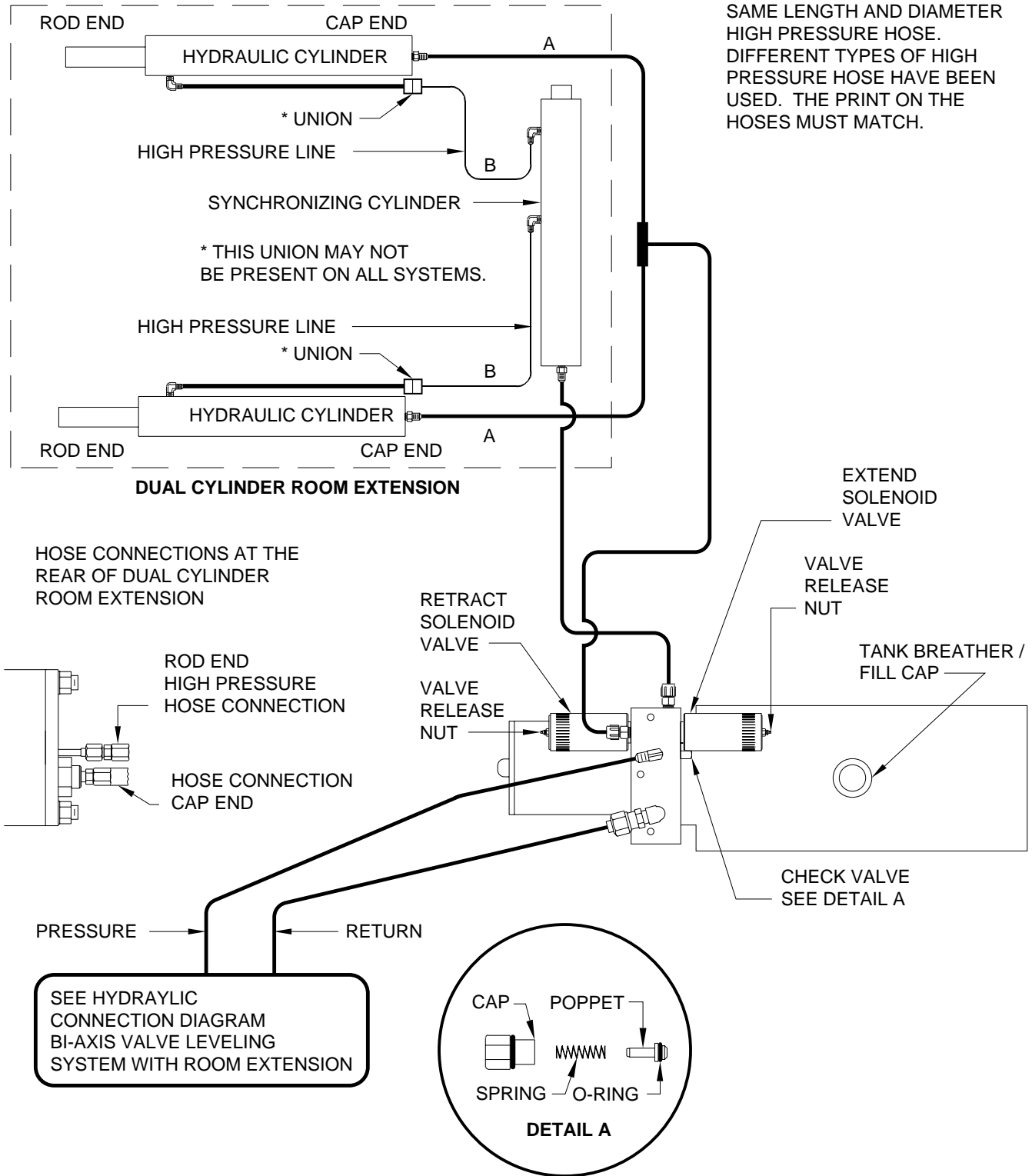
# HYDRAULIC CONNECTION DIAGRAM BI-AXIS VALVE LEVELING SYSTEM WITH ROOM EXTENSIONS



# HYDRAULIC CONNECTION DIAGRAM DUAL CYLINDER ROOM EXTENSION (WITH SYNCHRONIZING CYLINDER)

THE LINES (A) BETWEEN THE CAP END OF THE HYDRAULIC CYLINDER AND THE TEE MUST BE THE SAME LENGTH AND DIAMETER.

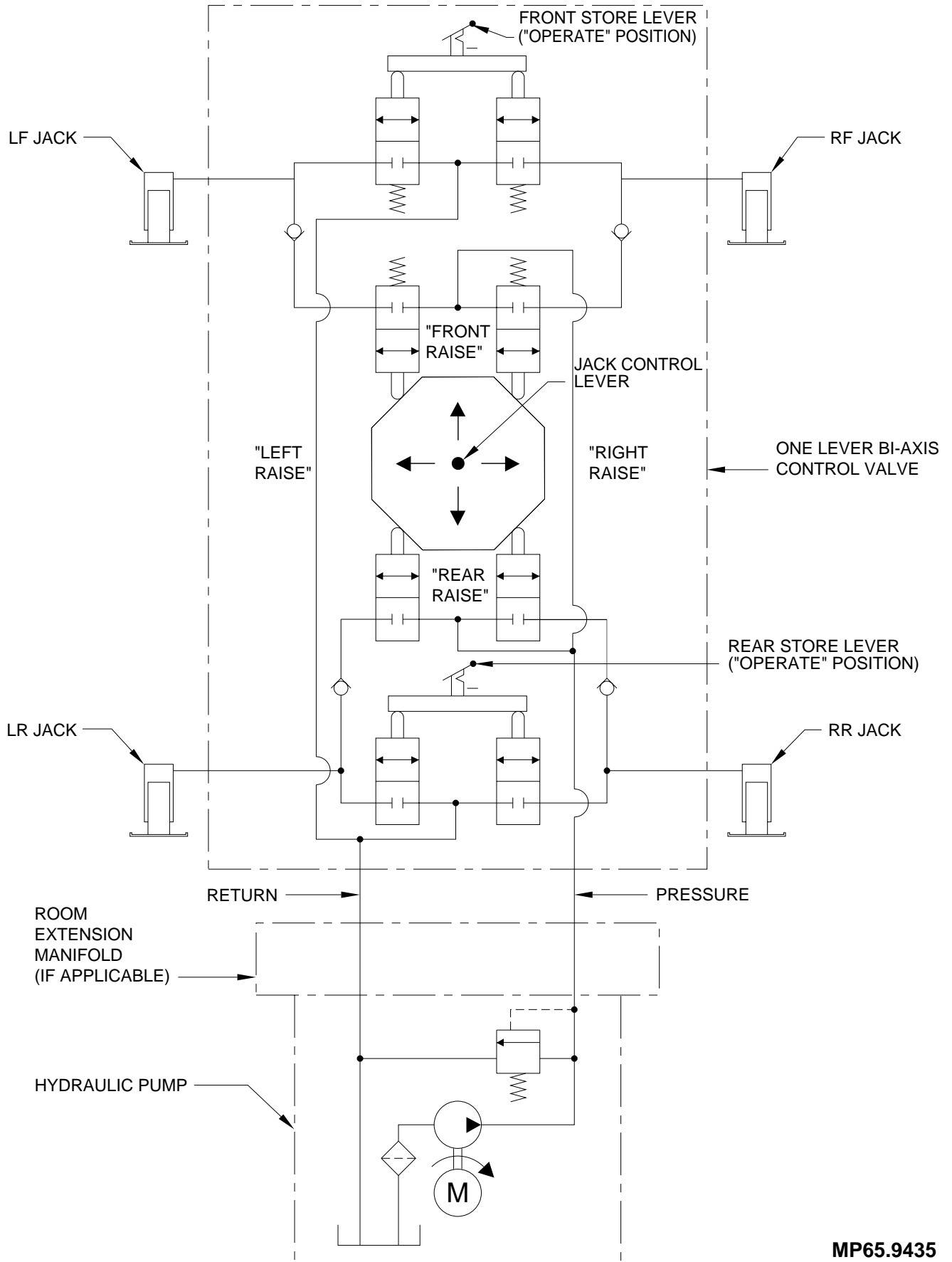
THE LINES (B) BETWEEN THE ROD END OF THE HYDRAULIC CYLINDERS AND THE SYNCHRONIZING CYLINDER MUST BE THE SAME LENGTH AND DIAMETER HIGH PRESSURE HOSE. DIFFERENT TYPES OF HIGH PRESSURE HOSE HAVE BEEN USED. THE PRINT ON THE HOSES MUST MATCH.



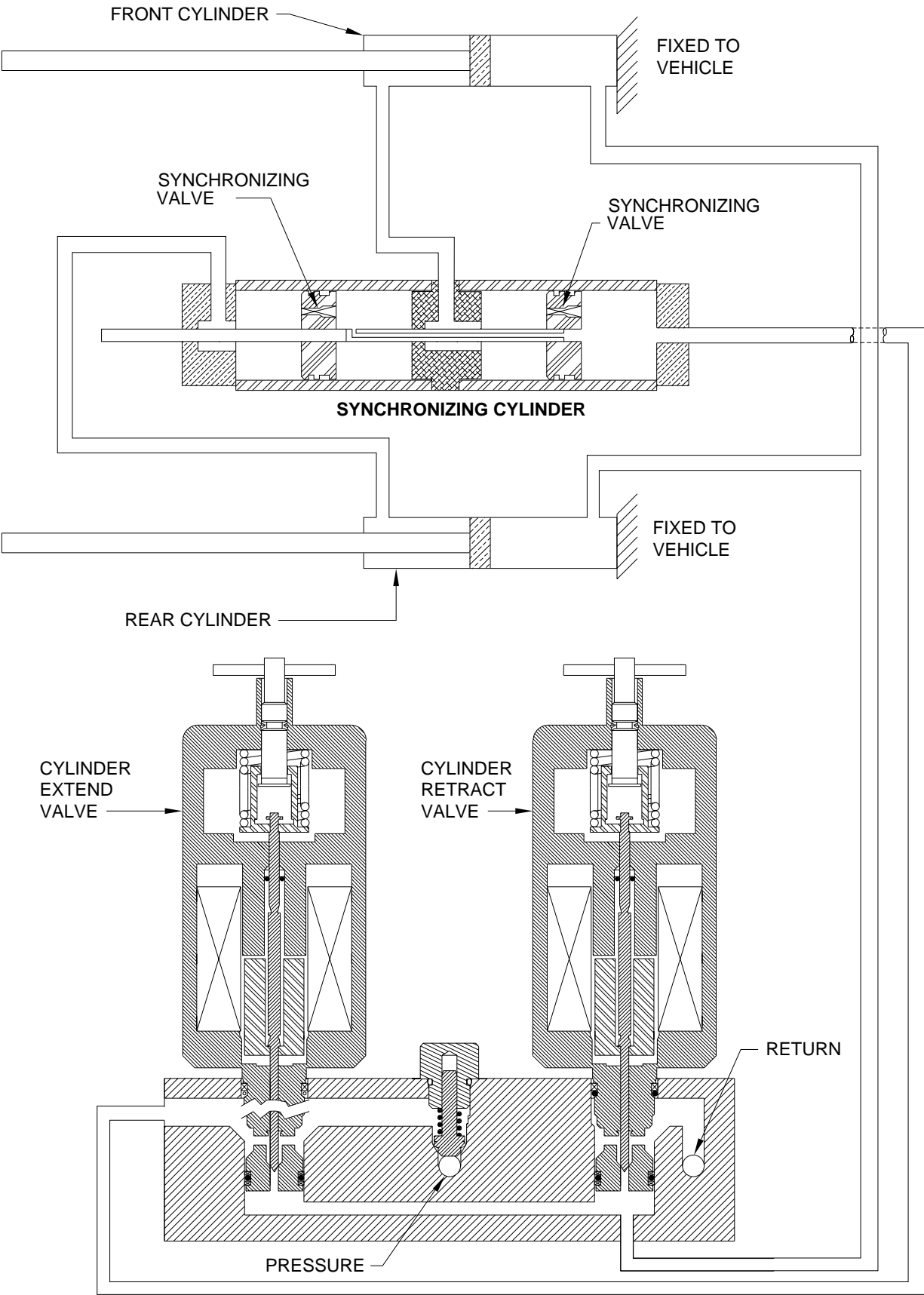
# HYDRAULIC SCHEMATIC DIAGRAM

## 200/210/225 SERIES JOY STICK BI-AXIS LEVELING SYSTEM

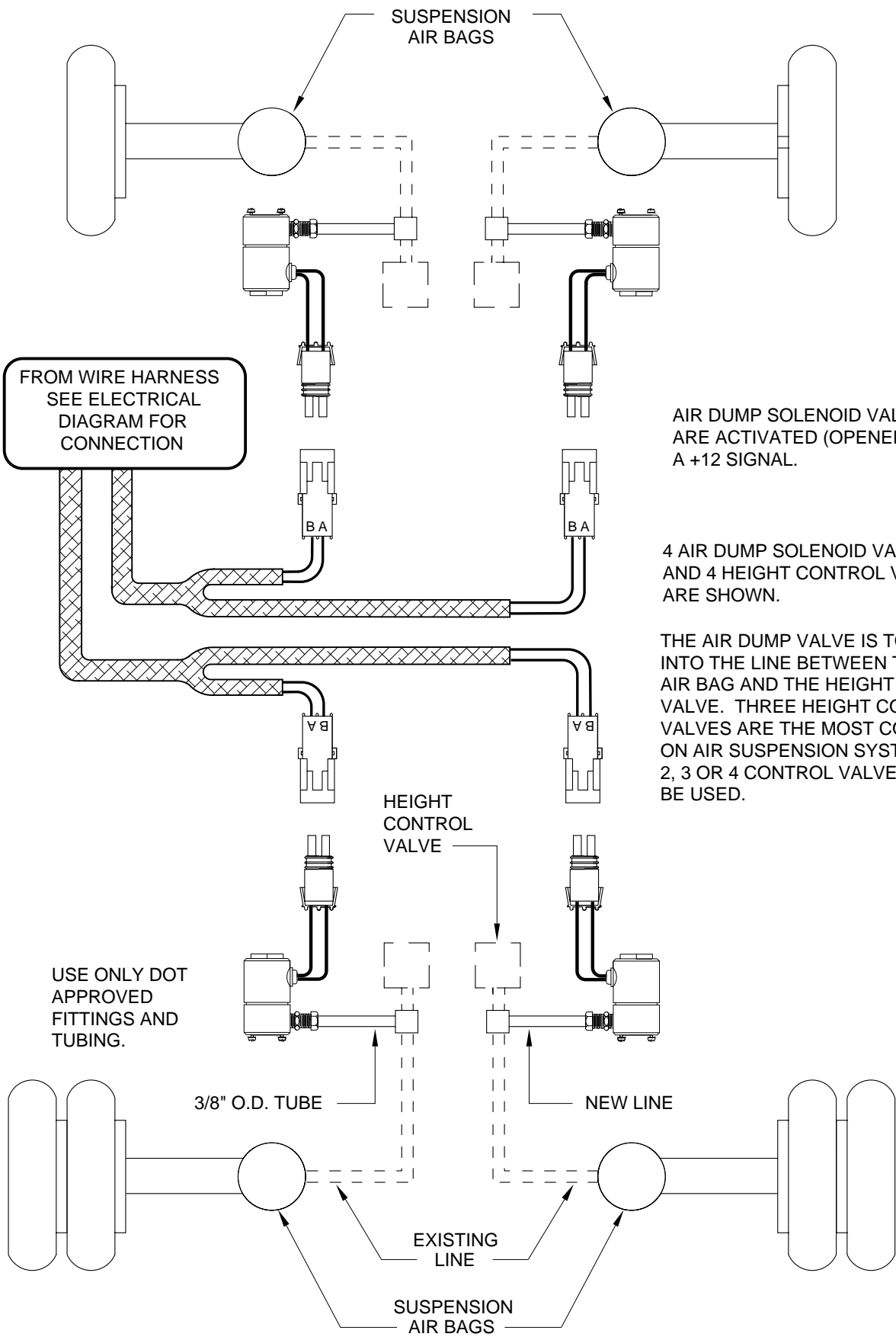
### WITH STRAIGHT-ACTING JACKS



**HYDRAULIC FLOW DIAGRAM  
VERTICAL ARM OR DUAL CYLINDER ROOM EXTENSION  
WITH SYNCHRONIZING CYLINDER  
STATIONARY POSITION**



# AIR LINE CONNECTION DIAGRAM



FROM WIRE HARNESS  
SEE ELECTRICAL  
DIAGRAM FOR  
CONNECTION

AIR DUMP SOLENOID VALVES  
ARE ACTIVATED (OPENED) BY  
A +12 SIGNAL.

4 AIR DUMP SOLENOID VALVES  
AND 4 HEIGHT CONTROL VALVES  
ARE SHOWN.

THE AIR DUMP VALVE IS TO TEE  
INTO THE LINE BETWEEN THE  
AIR BAG AND THE HEIGHT CONTROL  
VALVE. THREE HEIGHT CONTROL  
VALVES ARE THE MOST COMMON  
ON AIR SUSPENSION SYSTEMS.  
2, 3 OR 4 CONTROL VALVES MAY  
BE USED.

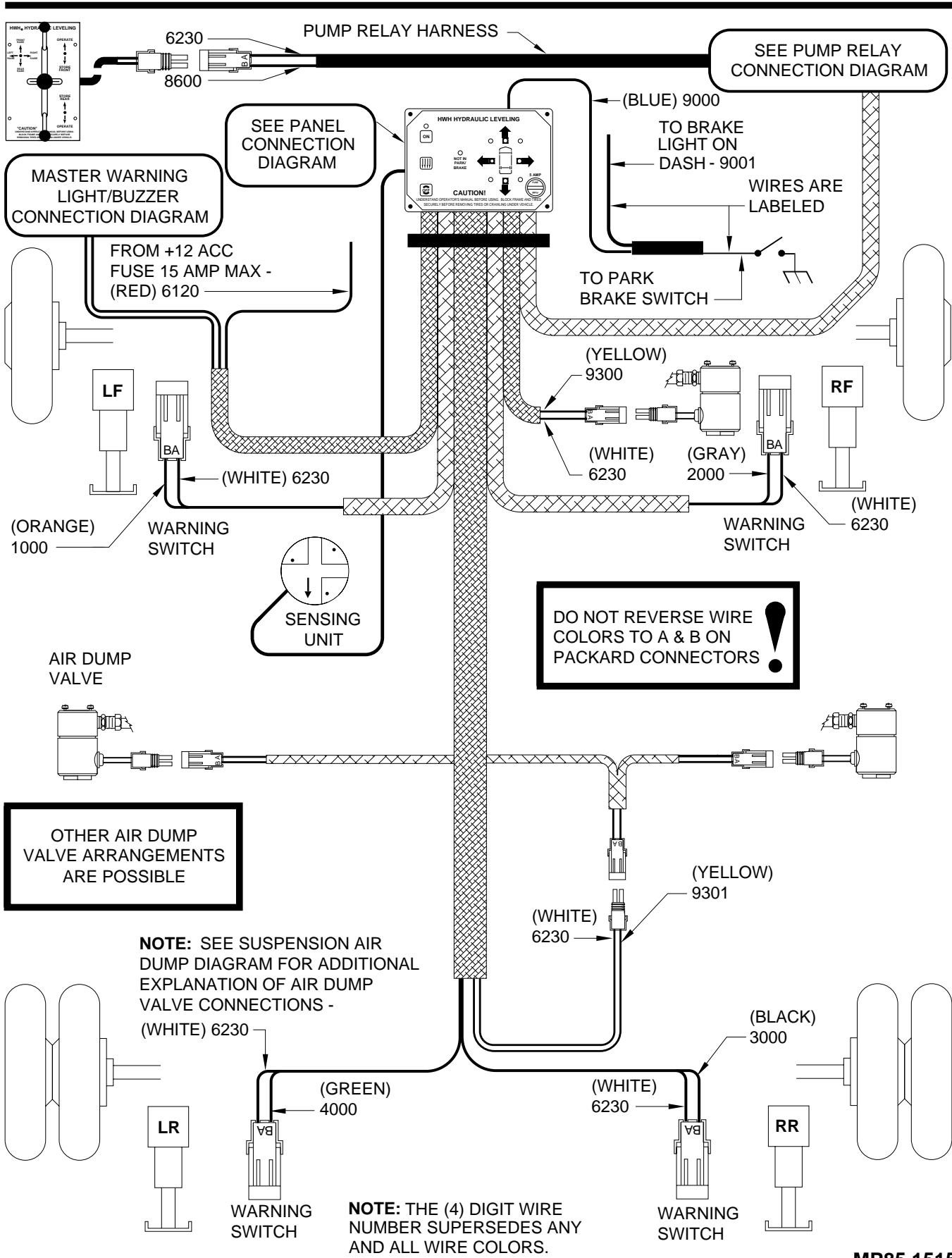
USE ONLY DOT  
APPROVED  
FITTINGS AND  
TUBING.



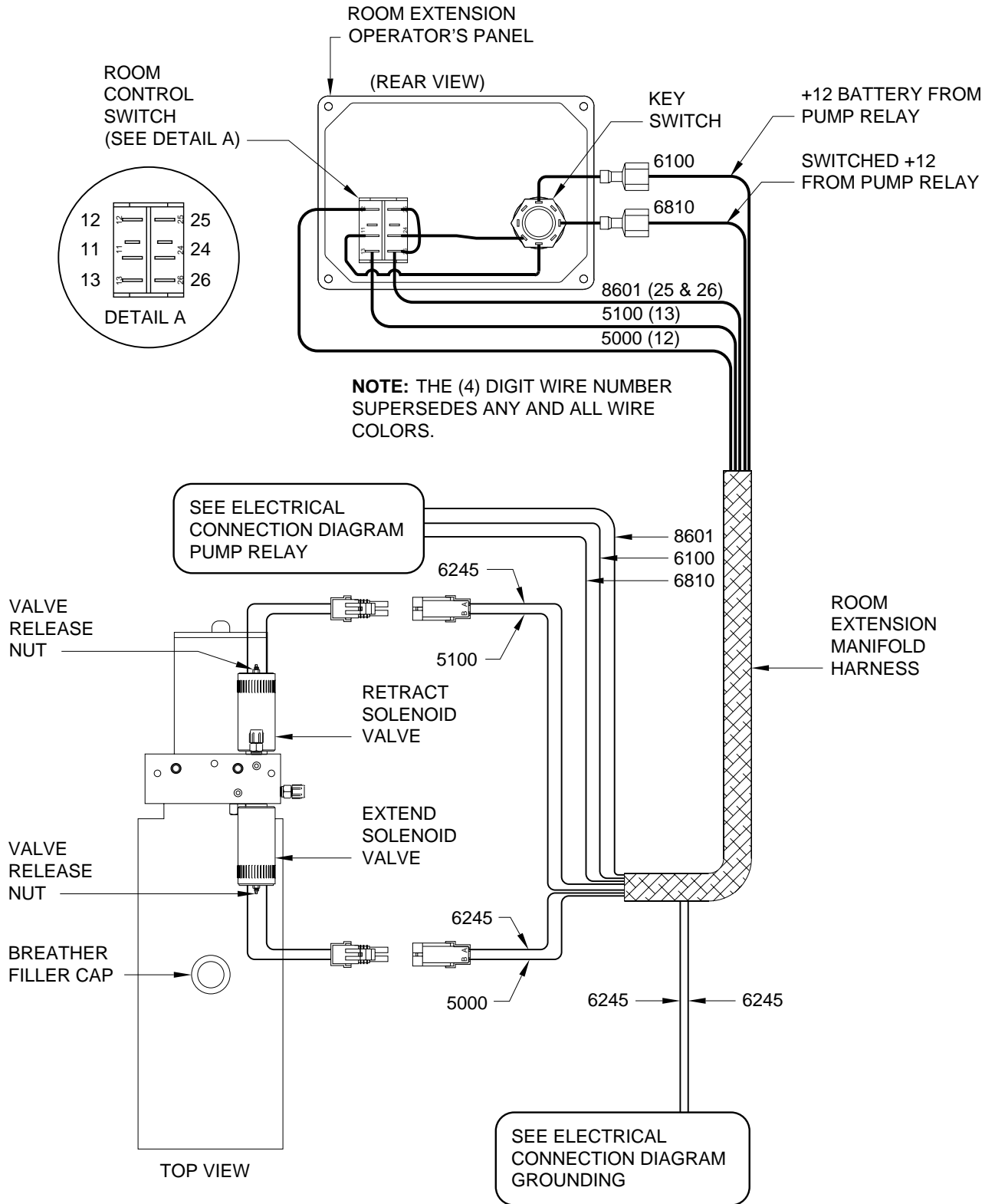
# ELECTRICAL CONNECTION DIAGRAM

## 200 SERIES BI-AXIS VALVE

### WITH SUSPENSION AIR DUMP



# ELECTRICAL CONNECTION DIAGRAM ROOM EXTENSION SYSTEM

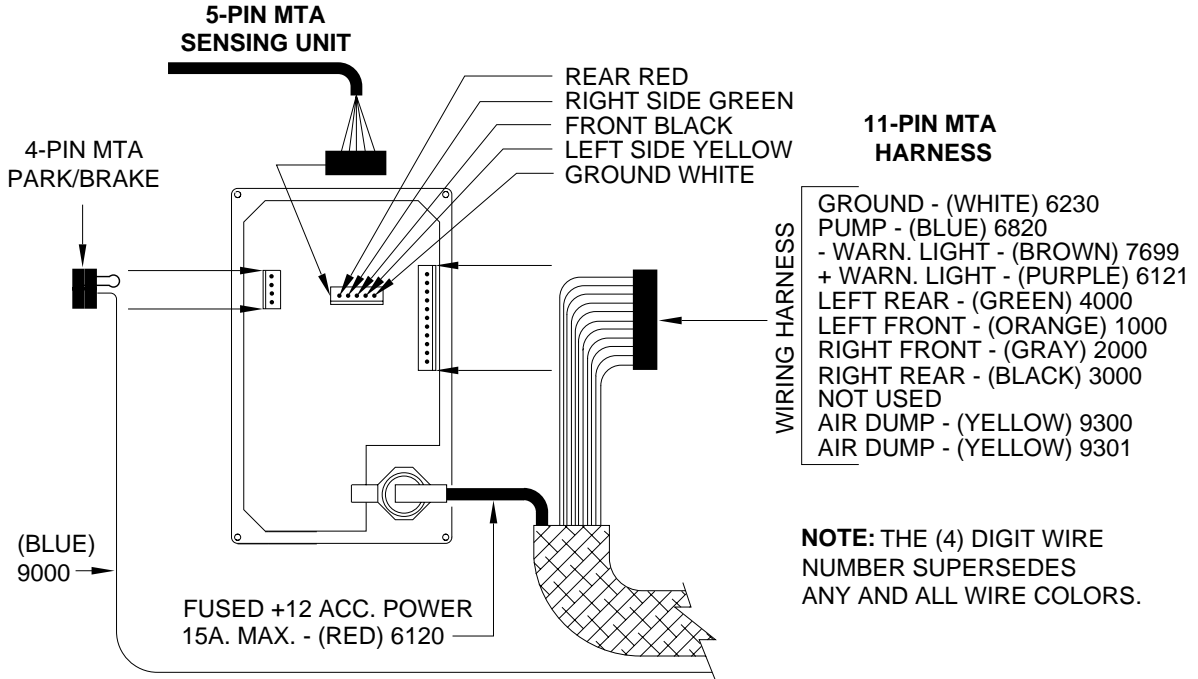


# ELECTRICAL CONNECTION DIAGRAM

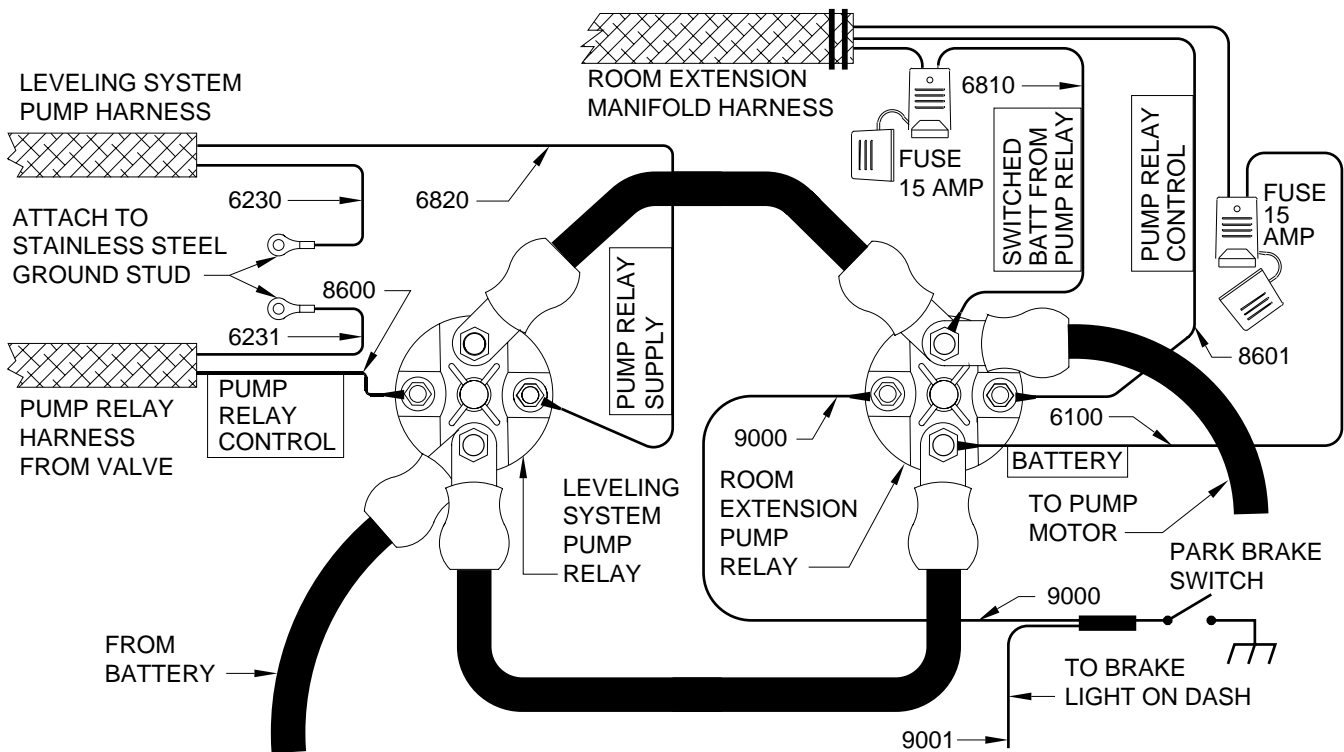
## PANEL CONNECTIONS AND PUMP RELAYS

### 200 SERIES LEVELING SYSTEM WITH ONE ROOM EXTENSION WITH SUSPENSION AIR DUMP

**PANEL CONNECTION DIAGRAM**



**PUMP RELAY CONNECTION DIAGRAM**

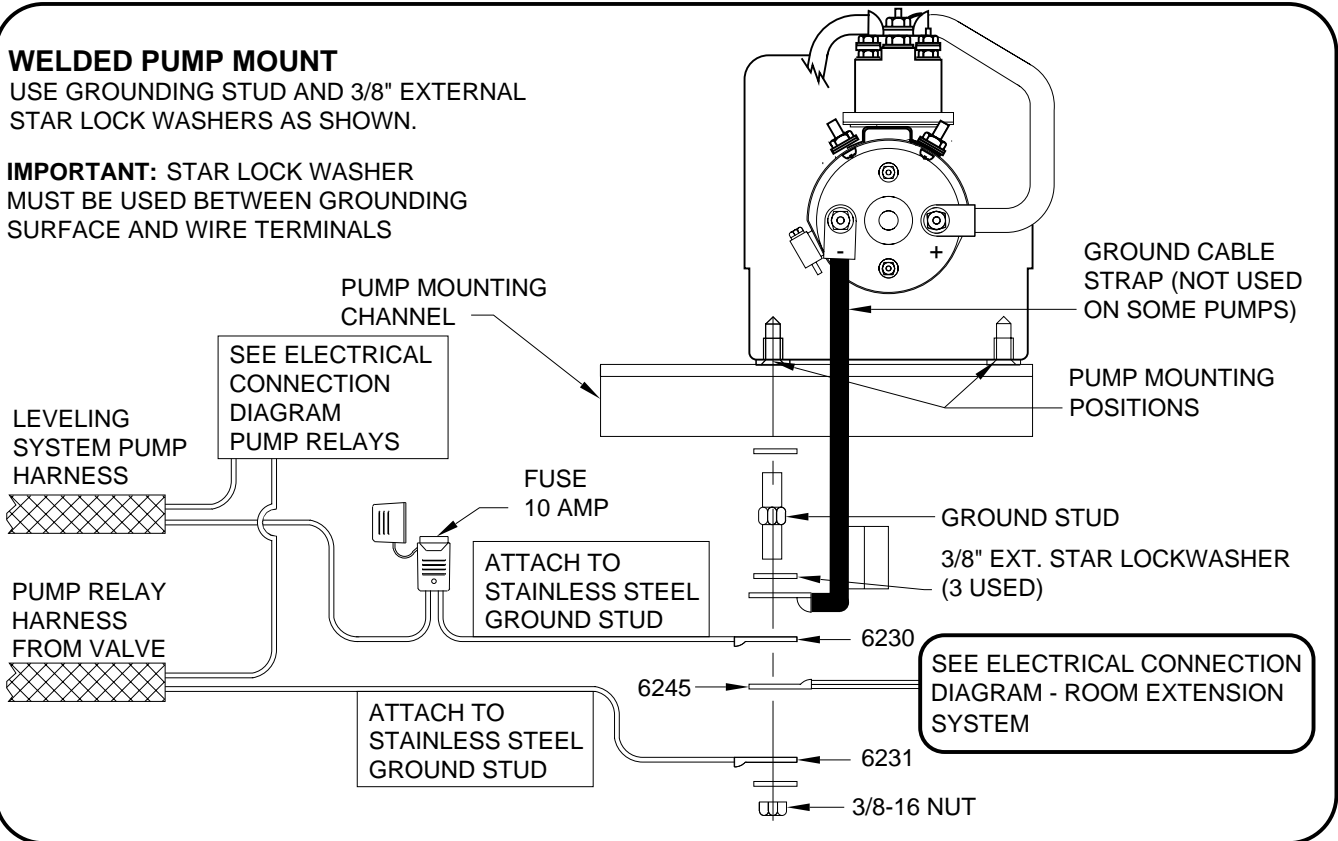


# 200 LEVELING SYSTEM ONE ROOM EXTENSION GROUNDING INSTRUCTIONS

## WELDED PUMP MOUNT

USE GROUNDING STUD AND 3/8" EXTERNAL STAR LOCK WASHERS AS SHOWN.

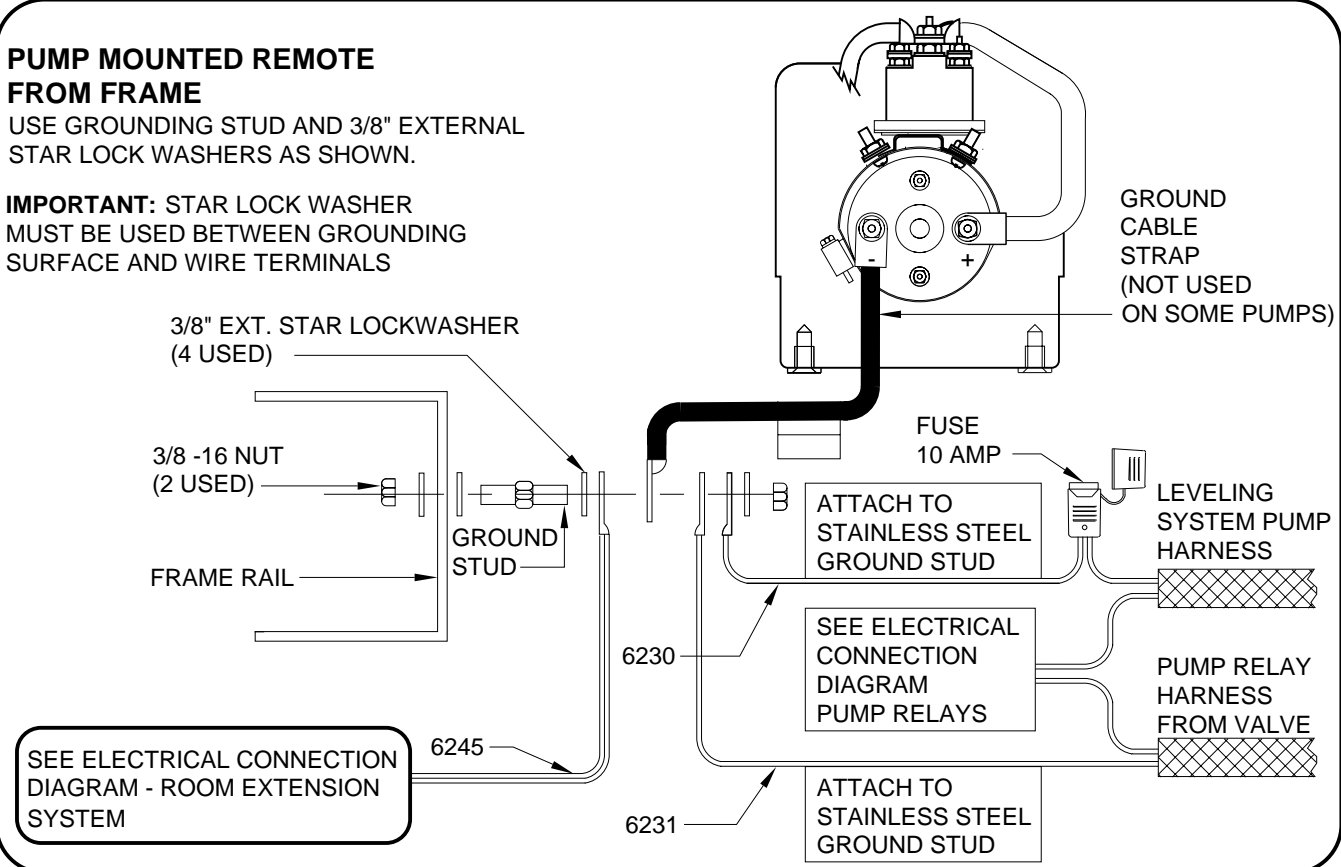
**IMPORTANT:** STAR LOCK WASHER MUST BE USED BETWEEN GROUNDING SURFACE AND WIRE TERMINALS



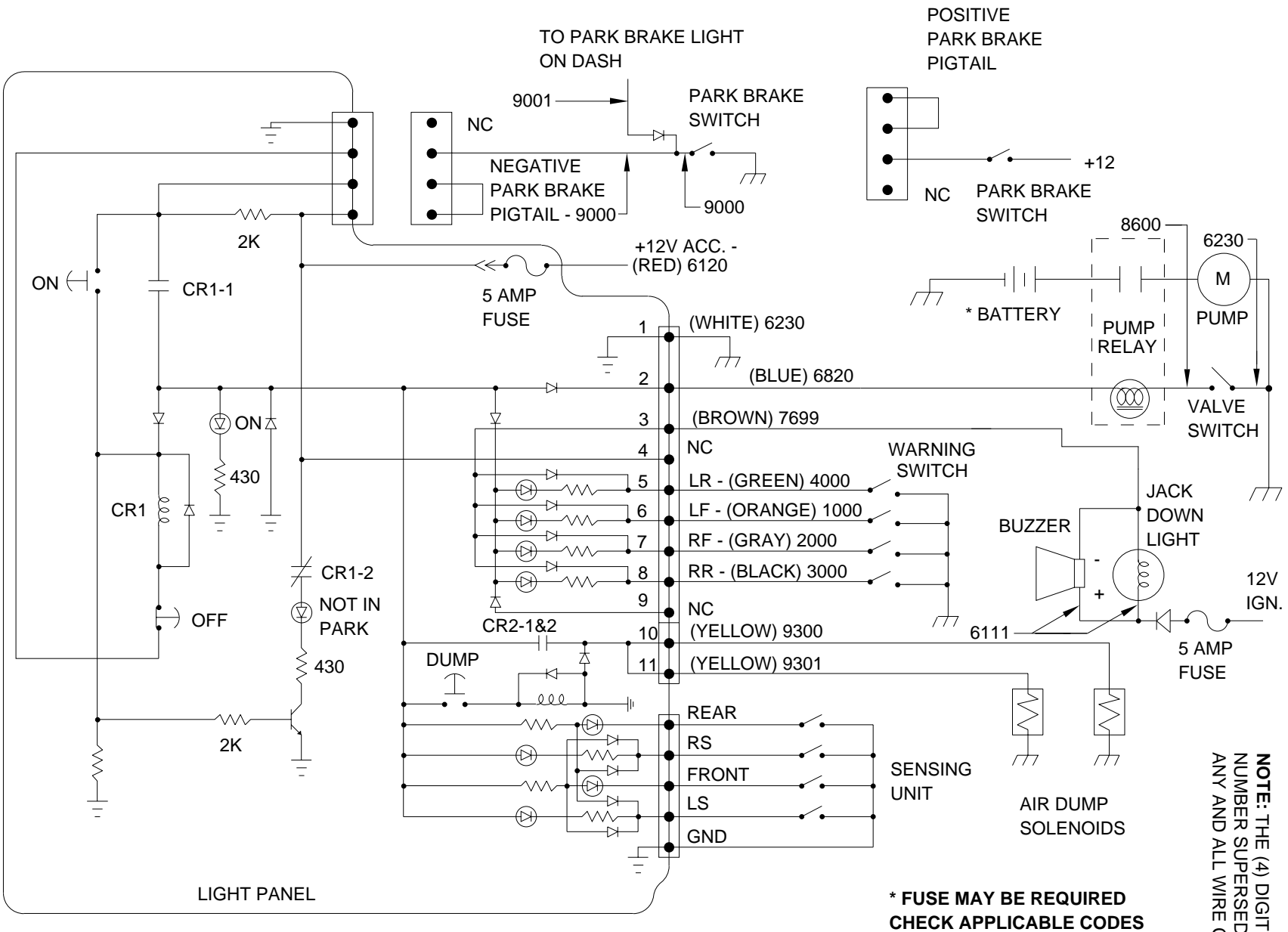
## PUMP MOUNTED REMOTE FROM FRAME

USE GROUNDING STUD AND 3/8" EXTERNAL STAR LOCK WASHERS AS SHOWN.

**IMPORTANT:** STAR LOCK WASHER MUST BE USED BETWEEN GROUNDING SURFACE AND WIRE TERMINALS



# ELECTRICAL SCHEMATIC 200 SERIES LEVELING SYSTEM LIGHT PANEL STRAIGHT-ACTING JACKS WITH AIR DUMP FEATURE

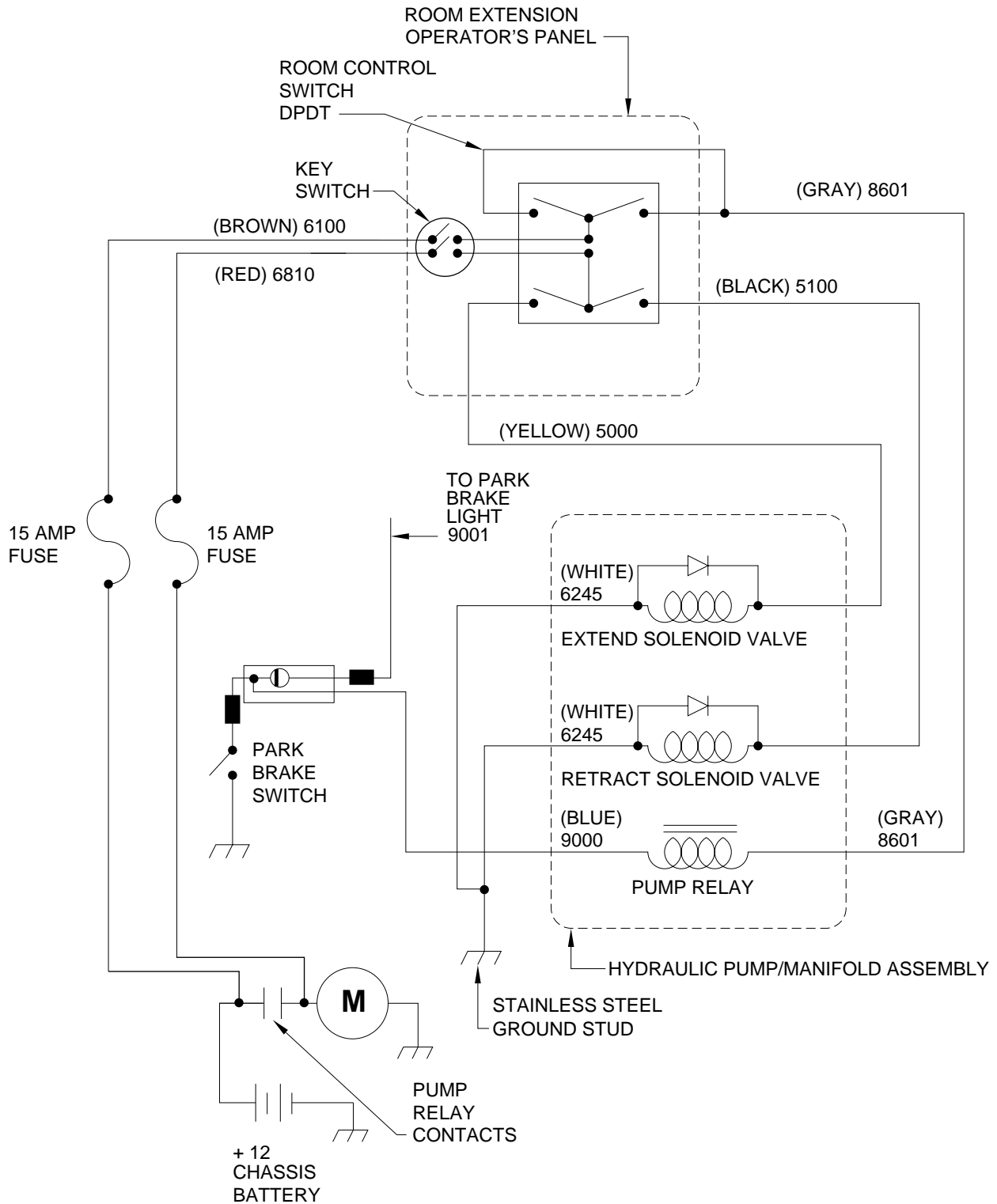


NOTE: THE (4) DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.

\* FUSE MAY BE REQUIRED CHECK APPLICABLE CODES

# ELECTRICAL SCHEMATIC ROOM EXTENSION SYSTEM

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



# MASTER LIGHT/BUZZER CONNECTION DIAGRAM MANUAL LEVELING SYSTEMS

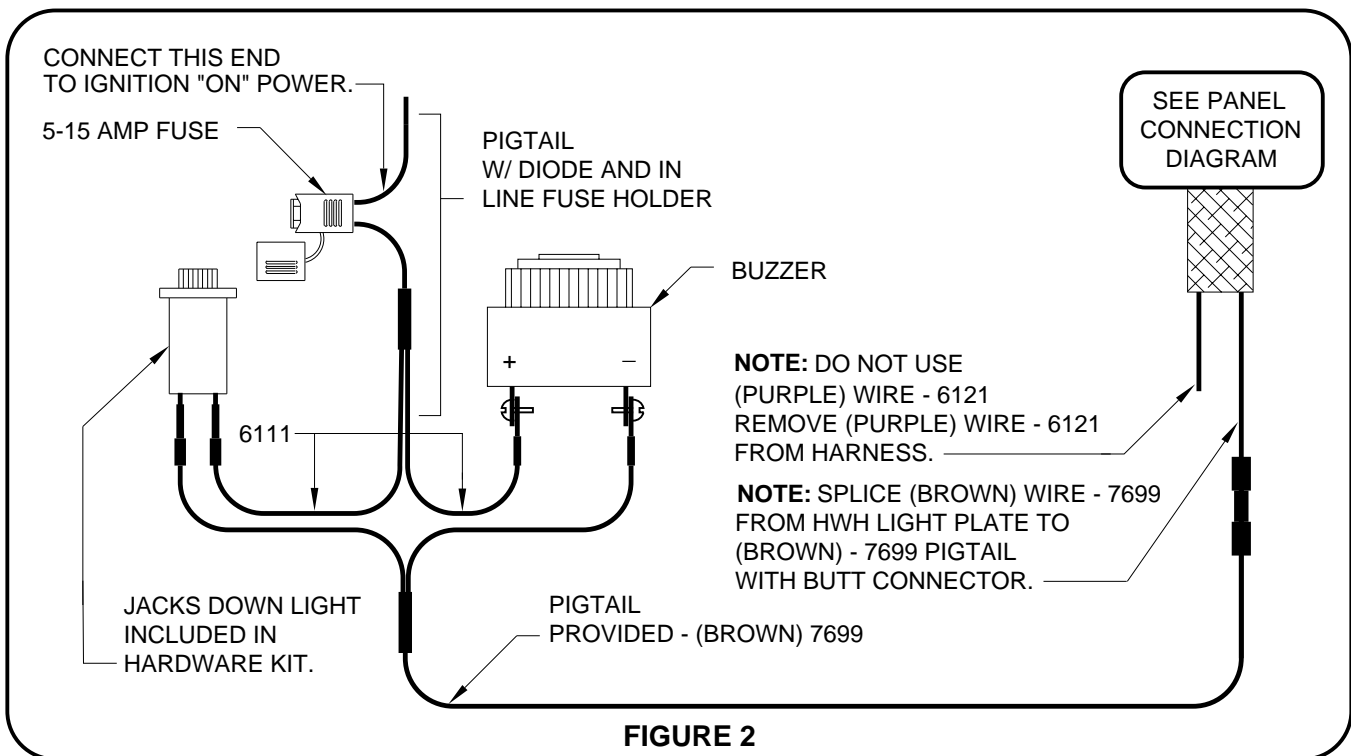
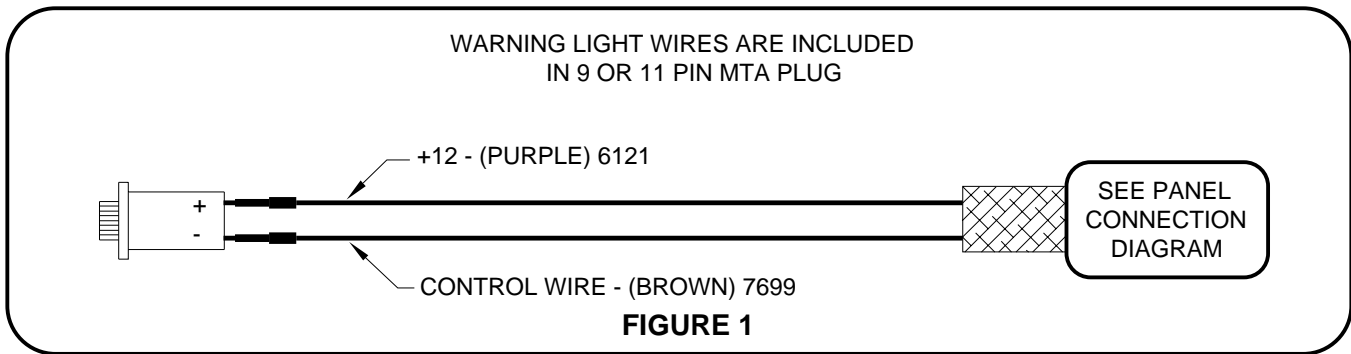
A MASTER WARNING INDICATOR SHOULD ALWAYS BE USED. WHEN THE LEVELING SYSTEM HAS STRAIGHT-ACTING JACKS A WARNING BUZZER MUST BE USED.

WHEN ONLY A RED MASTER WARNING LIGHT IS USED THE 12+ POWER FOR THE LIGHT COMES THROUGH THE CONTROL 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 PANEL, THE SYSTEM MAY BE OPERATED IN ACCESSORY WITHOUT THE BUZZER SOUNDING. THE NEGATIVE SIGNAL FOR THE WARNING INDICATORS MUST ALWAYS COME FROM THE CONTROL PANEL.

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

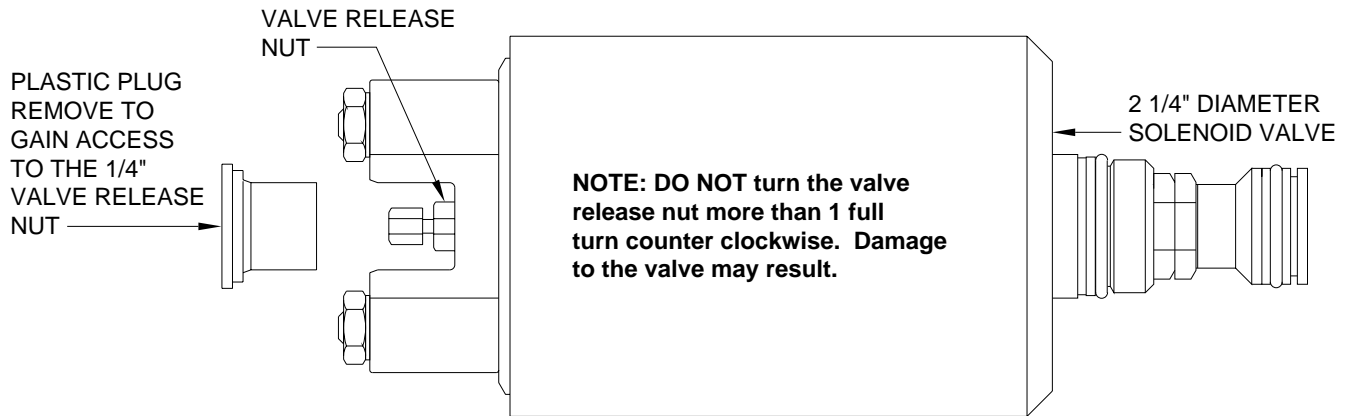
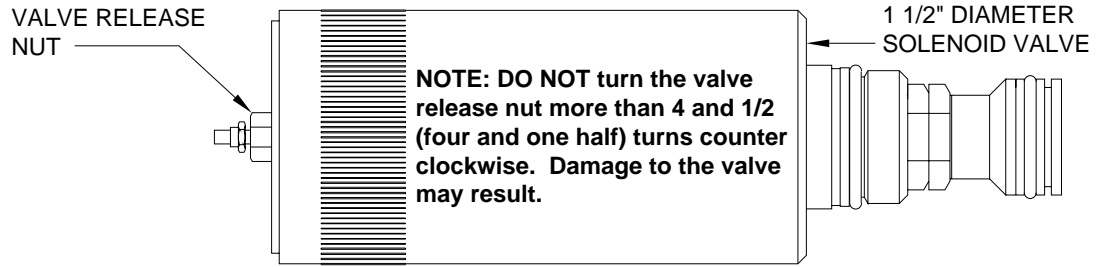
**NOTE:** THE (4) DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.



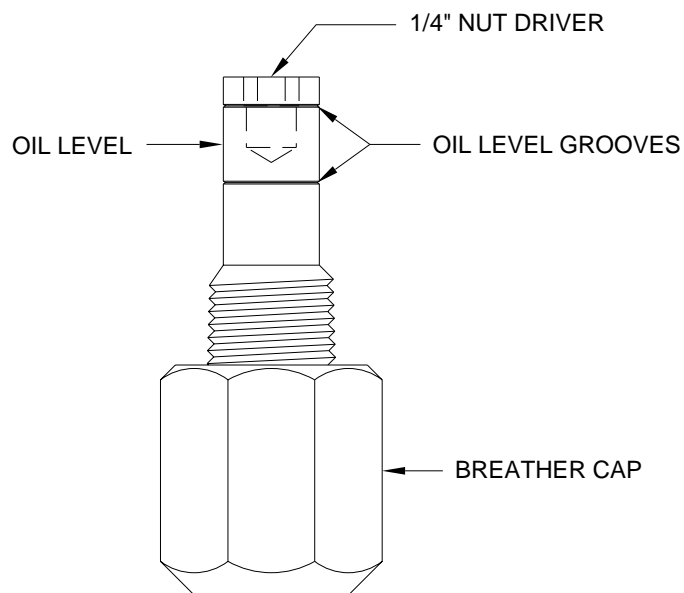




# BREATHER CAP - DIPSTICK - 1/4" NUT DRIVER



**NOTE: THE BREATHER CAP IS LOCATED ON THE TOP SIDE OF THE POWER UNIT RESERVOIR.**



**IMPORTANT: PRIOR TO REMOVING THE BREATHER CAP, EITHER TO CHECK THE OIL LEVEL OR TO USE THE 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.**