



OPERATOR'S MANUAL

HWH COMPUTER-CONTROLLED LEVELING SYSTEM

600 SERIES

SPACEMAKER ROOM EXTENSION SYSTEM

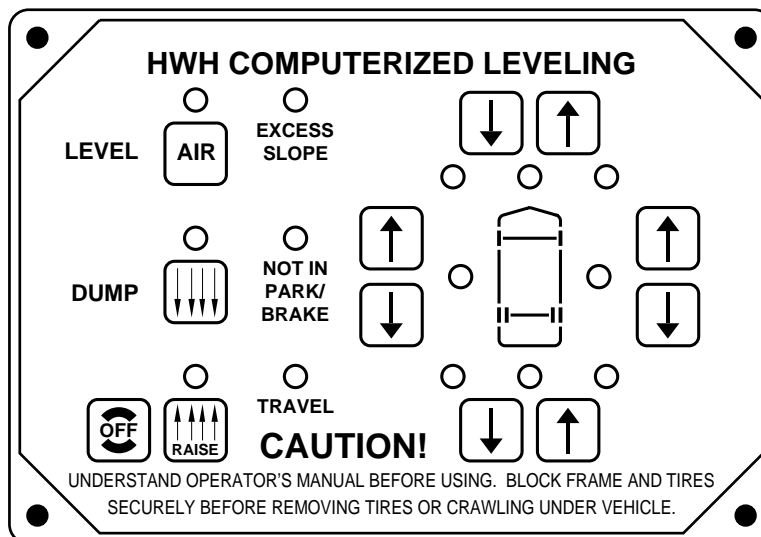
FEATURING:

TOUCH PANEL LEVELING CONTROL

FOUR POINT AIR LEVELING

***DUAL CYLINDER ROOM EXTENSION
(WITH SYNCHRONIZING CYLINDER)***

***DUAL CYLINDER GENERATOR SLIDE
(WITH SYNCHRONIZING CYLINDER)***



HWH CORPORATION

(ON I-80, EXIT 267 SOUTH)

2096 MOSCOW ROAD

MOSCOW, IOWA 52760

(800) 321-3494 / (563) 724-3396

INTERNET: <http://www.hwhcorp.com>

OPERATOR'S MANUAL

HWH LEVELING SYSTEM AIR LEVELING ONLY

CAUTION !

READ THE ENTIRE OPERATOR 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.

DO NOT OPERATE LEVELING SYSTEM OR USE THE RAISE OR DUMP BUTTONS WHEN TRAVELING AT SPEEDS IN EXCESS OF 5 MPH.

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

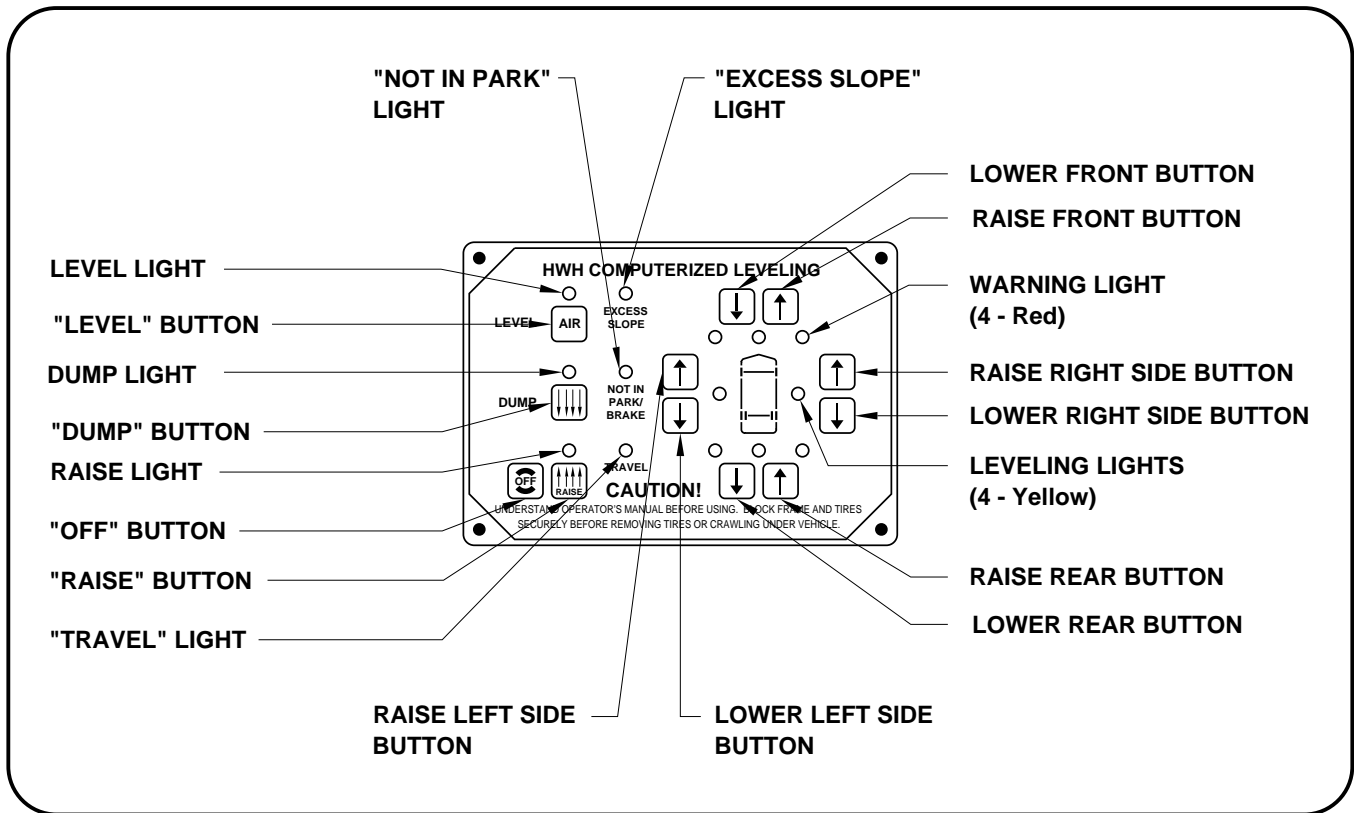
HWH CORPORATION strives to maintain the highest level of customer satisfaction. Therefore, if you discover a defect or problem, please do the following:

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

"LEVEL" BUTTON: This button is the system on button and automatic operation button.

"OFF" BUTTON: This button will turn the system OFF but does NOT control power to the "DUMP" or "RAISE" buttons.

"DUMP" BUTTON: This button will lower the whole vehicle by exhausting air from the suspension system.

"RAISE" BUTTON: This button will raise the whole vehicle by adding air to the suspension system.

UP ARROWS (RAISE BUTTONS): These momentary buttons are used for manually operating the air leveling systems. Sides or ends of the vehicle will raise while these buttons are pushed.

DOWN ARROWS (LOWER BUTTONS): These momentary buttons are used to manually operate the air leveling systems. Sides or ends of the vehicle will lower while these buttons are pushed.

INDICATOR LIGHTS

LEVEL LIGHT: This light will be on when the system is on, and flash during automatic leveling.

DUMP LIGHT: This light will flash when the "DUMP" button is being pushed.

RAISE LIGHT: This light will flash when the "RAISE" button is being pushed.

"EXCESS SLOPE" LIGHT: This light will be on if the leveling system can NOT level the coach.

"TRAVEL" LIGHT: This light will be on if the leveling system is off and the ignition is in the "ON" or "ACC" position. See "PREPARATION FOR TRAVEL".

WARNING LIGHTS: These lights will function only with the ignition key is in the "ON" or "ACC" position. They will be on if the system is on.

LEVELING LIGHTS: One or two yellow lights can be on indicating the side, end or corner of the coach is low.

"NOT IN PARK/BRAKE" LIGHT: This light will be on if the "AIR" button is pushed and the park brake is not set if the ignition switch is in the "ON" position.

OPERATING PROCEDURES

GENERAL INSTRUCTIONS

Press the "OFF" button at any time to stop the operation of the system.

NOTE: If the ignition switch is "ON", the vehicle's air suspension may return to travel height.

IMPORTANT: The bypass valves must be closed (turned clockwise) for the air leveling system to function.

If the ignition is in the "ON" position and the hand/auto brake is not set, the "NOT IN PARK" light will come on and the system

will not operate when the "AIR" button is pressed. The "NOT IN PARK" light will remain on only while the "AIR" button is pressed.

The "DUMP" and "RAISE" buttons will function with the system and park brake off if the ignition is "ON". See "AIR DUMP AND RAISE FUNCTIONS".

CAUTION: DO NOT MOVE THE COACH WHEN THE AIR BAG WARNING LIGHTS ARE ON.

PREPARATION FOR TRAVEL

Start the vehicle's engine and allow air pressure to build to the recommended level for traveling.

Before traveling, the red AIR BAG warning lights must be off and the "TRAVEL" light must be on. If the vehicle will not return to the proper ride height for traveling, see the BYPASS VALVE SECTION.

CAUTION: DO NOT RELY SOLELY ON WARNING INDICATORS. IT IS THE OPERATOR'S RESPONSIBILITY TO CHECK THAT THE VEHICLE IS AT THE PROPER RIDE HEIGHT BEFORE MOVING THE VEHICLE.

AIR OPERATION AUTOMATIC AIR LEVELING

1. Set the hand/auto brake in the recommended position for parking. Leave the engine running to provide air for leveling.

NOTE: If the ignition key is not in the "ON" position, the leveling system cannot be turned on. Once the system is on, the ignition key may be turned off.

2. Press the "AIR" button once to enter the air mode. The AIR indicator light and the four AIR BAG warning lights will glow steady.

3. Press the "AIR" button a second time. The AIR indicator light will start flashing and the air leveling will begin.

4. When all four yellow LEVEL SENSING lights are out the leveling is complete. The AIR indicator light will stop flashing and turn steady red. The processor is now in a SLEEP MODE for 30 minutes. The vehicle's engine may now be turned off.

After 30 minutes the processor will recheck the vehicle level, make any corrections required, and return to the SLEEP MODE. This will continue until the system is turned off by pushing the "OFF" button or the transmission is taken out of the parking position and the park brake is released.

EXCESS SLOPE

If the system was unable to level the vehicle, one or two yellow LEVEL SENSING indicator lights will remain on and the "EXCESS

SLOPE" light will come on. The system will remain on but will not go into SLEEP MODE.

MANUAL AIR LEVELING

1. Place the hand/auto brake in the recommended position for parking. The engine should be running to provide air for leveling.

2. Press the "AIR" button. The "AIR" indicator light will glow steady.

3. Individual RAISE and LOWER buttons (UP and DOWN ARROWS) will add or dump air from suspension air bags to raise or lower coach for leveling. These are momentary buttons. The function will stop when the button is released.

NOTE: The "RAISE" and "DUMP" buttons can be used at this time, but the system will shut off after the button is released.

The yellow LEVEL lights indicate a side, end, or corner of the coach is low. Lower the opposite side or end of the coach to achieve leveling. If a level position cannot be achieved by dumping air, raise the coach according to lit yellow "LEVEL" lights.

IMPORTANT: Always give preference to any side light before leveling the coach front to rear.

4. Turn ignition switch "OFF". Turn the system off.

OPERATING PROCEDURES

AIR DUMP AND RAISE FUNCTIONS

The "DUMP" and "RAISE" functions are provided for operator convenience for purposes such as dumping air suspension when parked in the wind, or raising or lowering the vehicle to avoid obstacles. The "DUMP" and "RAISE" buttons will function with the system on or off.

IMPORTANT: "DUMP" and "RAISE" functions will automatically turn off when the button is released. If the ignition is in the "ON" position the suspension will return to travel height.

CAUTION: REREAD CAUTIONS ON THE FIRST PAGE OF THIS MANUAL. THE VEHICLE MAY DROP OR RAISE AND/OR MOVE FORWARD OR BACKWARD WITHOUT WARNING CAUSING INJURY OR DEATH.

DO NOT OPERATE THE VEHICLE OVER 5 M.P.H. UNLESS AIR SUSPENSION IS AT THE PROPER HEIGHT FOR TRAVEL.

1. Leave the engine running if the "RAISE" function is to be used. The park brake does not have to be set and the system does not have to be on to use the "RAISE" or "DUMP" functions.

2. Press and hold the "RAISE" or "DUMP" button as desired to raise or lower the vehicle. The system will remain in the "RAISE" or "DUMP" mode as long as the button is held down. When the button is released the system will automatically turn off. If the ignition is in the "ON" position the suspension will return to travel height.

3. If desired for clearing an obstacle, the vehicle may be moved while in the "RAISE" or "DUMP" mode for a short distance at a slow speed. Remember the vehicle will return to travel height when the "RAISE" or "DUMP" button is released and the leveling system is off.

BYPASS VALVE OPERATION

(FOR TEMPORARY BYPASS OF LEVELING SYSTEM)

In case of a malfunction of the leveling system, opening these valves will in most cases allow the vehicle suspension to return to the proper ride height for traveling.

CAUTION: THE VEHICLE WILL RAISE OR LOWER AS THE VALVES ARE OPENED. DO NOT CRAWL UNDER THE VEHICLE TO ACCESS THE VALVES. MAKE SURE THERE IS AMPLE ROOM TO OPEN THE VALVES SAFELY.

1. Locate the BYPASS valve T-handles. Refer to the AIR SOLENOID MANIFOLD page in the Diagram Section. There is usually one Air Solenoid Manifold for each axle on the vehicle.

2. Turn each T-handle counter-clockwise approximately two turns. Make sure there is ample clearance when opening the valves. Leave the valves open until the leveling system is repaired.

3. Check that the vehicle has returned to the proper ride height before moving the vehicle.

NOTE: The leveling system will not function properly if a bypass valve is opened.

Call HWH Customer Service, 1-800-321-3494, Monday through Friday, 8:00 a.m. to 5:00 p.m. Central time, for technical assistance.

OPERATIONAL CHECK

Review the operator's manual and check that all functions and lights work correctly.

"NOT IN PARK/BRAKE" Check: Set hand/auto park brake. Set the transmission in the recommended position for parking the vehicle. Turn the ignition on. Push the "AIR" button on the touch panel. Release the hand/auto park brake.

CAUTION: THE VEHICLE MAY MOVE FORWARD OR BACKWARD WHEN THE PARK IS RELEASED.

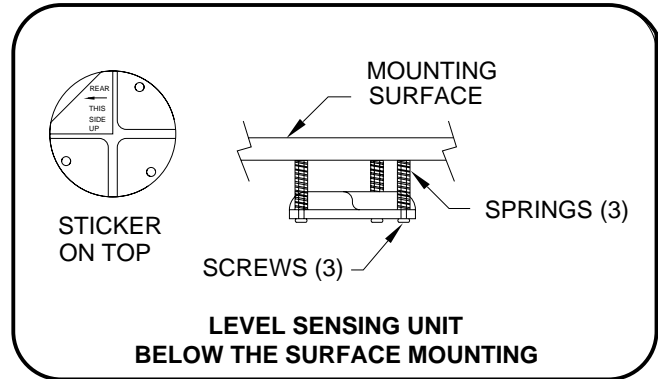
Check that the "NOT IN PARK/BRAKE" light comes ON. Re-apply the park brake. The "NOT IN PARK/BRAKE" light should go out.

NOTE: If any checks reveal any problems or if there are other problems or questions, consult a qualified rv repair center, your vehicle or coach manufacturer or HWH Corporation for service or assistance.

OPERATING PROCEDURES

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 has settled down in the level position.



OPERATING PROCEDURES

ROOM EXTENSION AND GENERATOR SLIDE EXTEND PROCEDURE

CAUTION: OPERATING THE ROOM OR GENERATOR SLIDE 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. Remove any locking devices from the room extension or generator slide.

CAUTION: KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF THE ROOM EXTENSION OR GENERATOR SLIDE.

NOTE: Make sure there is adequate clearance to fully extend the room extension or generator slide.

2. Turn the ignition switch to "ACCESSORY"

NOTE: To operate the room extension or generator slide the ignition key must be in the "ON" or "ACC" position. The leveling system does not have to be on and the vehicle does not have to be level. The park brake must be set.

3. Push the ROOM EXTENSION or GENERATOR SLIDE MASTER SWITCH to the "ON" position. Refer to the CONTROL IDENTIFICATION page.

4. To extend the room extension or generator slide, press and hold the ROOM EXTENSION or GENERATOR SLIDE CONTROL SWITCH in the "EXTEND" position. When the room extension or generator slide is fully extended, release the CONTROL SWITCH.

IMPORTANT: Do not hold the CONTROL SWITCH in the "EXTEND" position for more than ten seconds after the room extension or generator slide is fully extended or stops moving. **IF EITHER SIDE OF THE ROOM EXTENSION OR GENERATOR SLIDE STOPS MOVING, RELEASE THE CONTROL SWITCH IMMEDIATELY.**

NOTE: Releasing the CONTROL SWITCH will halt the operation of the room extension or generator slide.

5. Push the ROOM EXTENSION OR GENERATOR SLIDE MASTER SWITCH to the "OFF" position.

6. Turn off the ignition switch.

ROOM EXTENSION AND GENERATOR SLIDE RETRACT PROCEDURE

CAUTION: KEEP PEOPLE AND OBSTRUCTIONS CLEAR OF THE ROOM EXTENSION OR GENERATOR SLIDE.

1. Turn the ignition switch to "ACCESSORY".

2. Push the ROOM EXTENSION or GENERATOR SLIDE MASTER SWITCH to the "ON" position.

NOTE: To retract the room extension or generator slide the ignition key must be in the "ON" or "ACC" position and the park brake must be set.

3. To retract the room extension or generator slide press and hold the CONTROL SWITCH in the "RETRACT" position. When the room extension or generator slide is fully retracted, release the CONTROL SWITCH.

IMPORTANT: Do not hold the ROOM EXTENSION or GENERATOR SLIDE CONTROL SWITCH in the "RETRACT" position for more than ten seconds after the room extension or generator slide is fully retracted or stops moving. **IF EITHER SIDE OF THE ROOM EXTENSION OR GENERATOR SLIDE STOPS MOVING, RELEASE THE CONTROL SWITCH IMMEDIATELY.**

NOTE: Releasing the CONTROL SWITCH will halt the operation of the room extension or generator slide.

4. Push the ROOM EXTENSION or GENERATOR SLIDE MASTER SWITCH to the "OFF" position.

5. Turn the ignition switch off.

6. If the room extension or generator slide will not retract see the MANUAL ROOM RETRACT PROCEDURE.

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

MANUAL ROOM RETRACT PROCEDURE (WITH SOLENOID VALVES WITH VALVE RELEASE "T" HANDLES)

(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 retract device and information for connecting the device to the room.

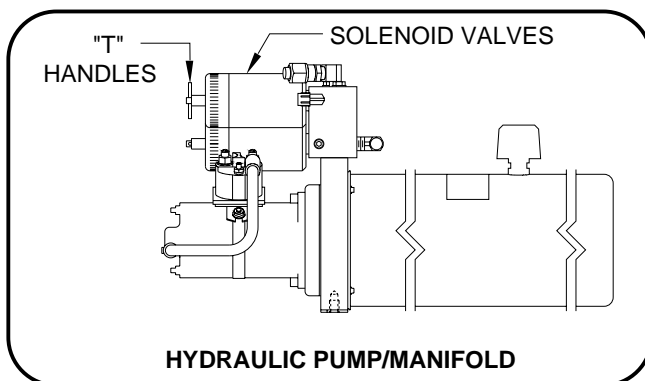
IMPORTANT: If the vehicle is not equipped with a winch, DO NOT use other pulling devices to retract the room. Follow steps 2 and 3 and try pushing the room in. Contact the vehicle manufacturer or HWH Customer Service at 1-800-321-3494 or 563-724-3396 for assistance.

WARNING: 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.

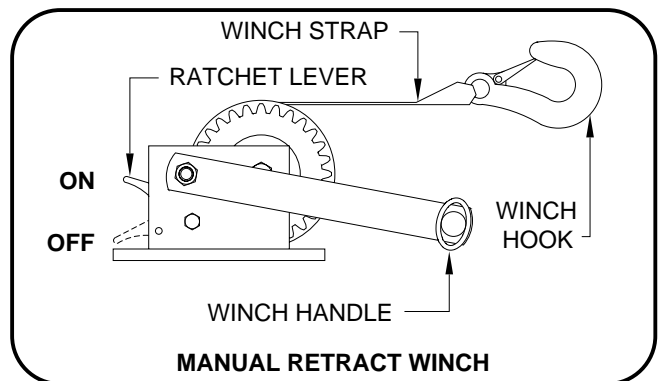


3. Open the SOLENOID VALVES by turning the "T" HANDLES counterclockwise.

NOTE : The "T" HANDLE may turn easily at first but will become more difficult to turn as an internal spring is compressed. Be sure to open both valves completely (about six turns of the "T" HANDLE).

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 counterclockwise, 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.

WARNING: OPERATE THE MANUAL RETRACT WINCH BY HAND POWER ONLY. IF THE WINCH CANNOT BE CRANKED EASILY WITH ONE HAND IT IS PROBABLY OVER-LOADED. 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 in place.

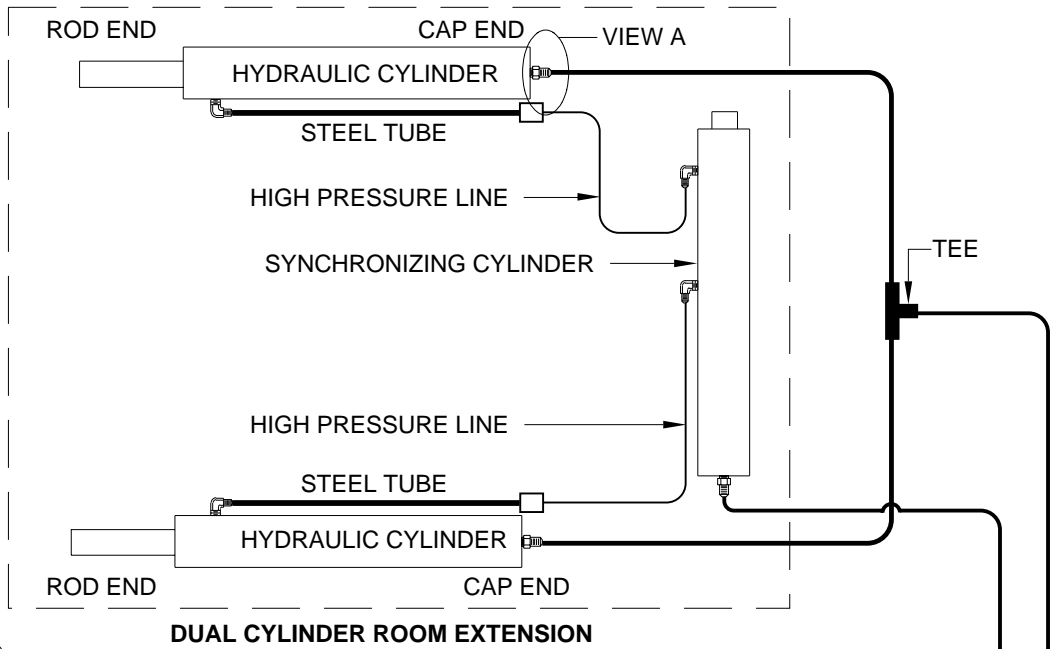
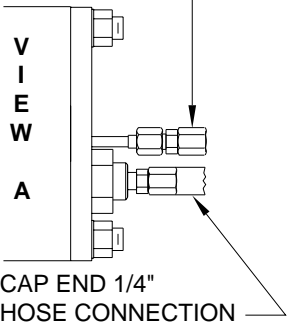
WARNING: THE ROOM EXTENSION SOLENOID VALVE "T" HANDLES MUST BE IN THE OPEN POSITION WHEN THE MANUAL RETRACT WINCH IS ENGAGED.

7. The system should be repaired before using again.

HYDRAULIC CONNECTION DIAGRAM TWO DUAL CYLINDER ROOM EXTENSIONS WITH SYNCHRONIZING CYLINDERS

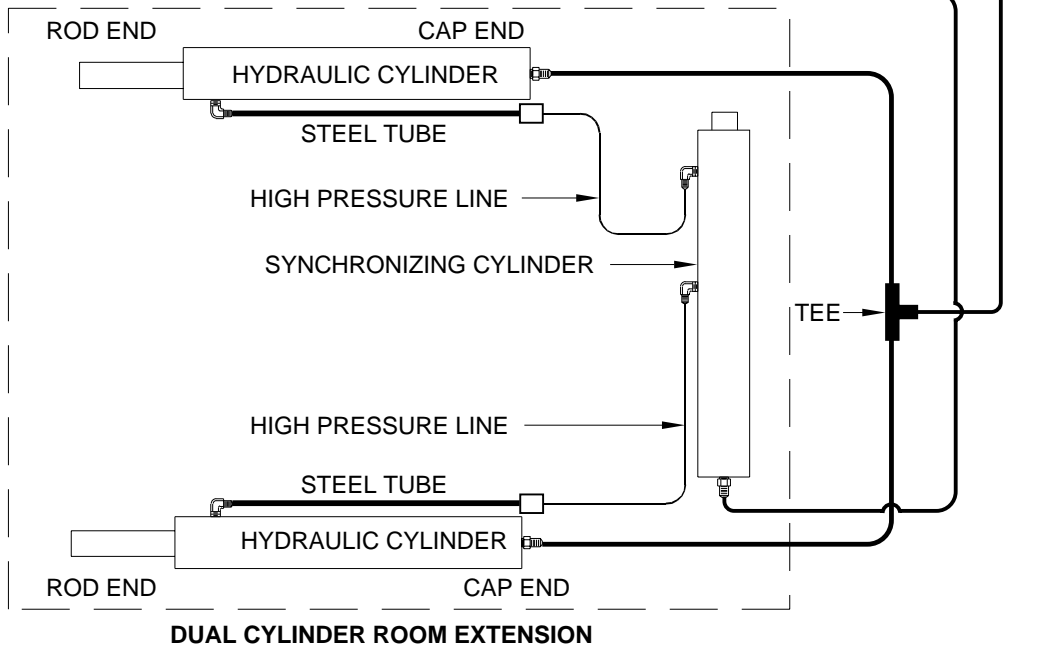
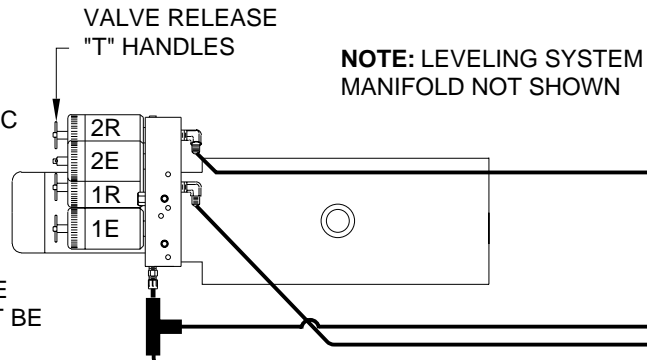
NOTE: HOSE CONNECTIONS FOR ROOM CYLINDERS ARE MADE AT THE END OF THE ROOM EXTENSION TUBES.

ROD END 3/16" HIGH PRESSURE HOSE CONNECTION

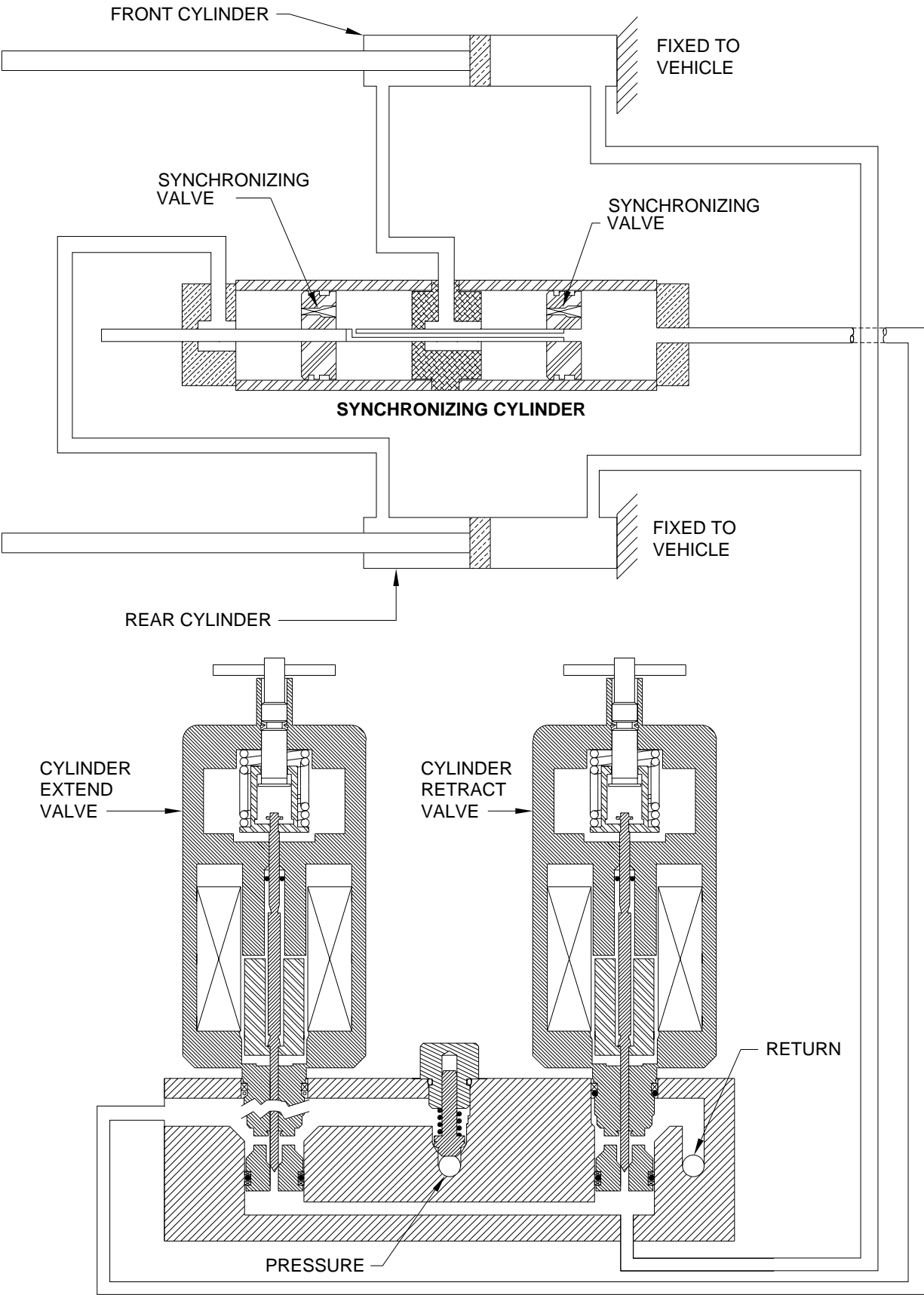


IMPORTANT: THE HOSES BETWEEN THE STEEL TUBES (ROD END) OF THE HYDRAULIC CYLINDERS AND THE SYNCHRONIZING CYLINDER MUST BE THE SAME LENGTH AND DIAMETER. THESE HOSES MUST BE HIGH PRESSURE HOSES.

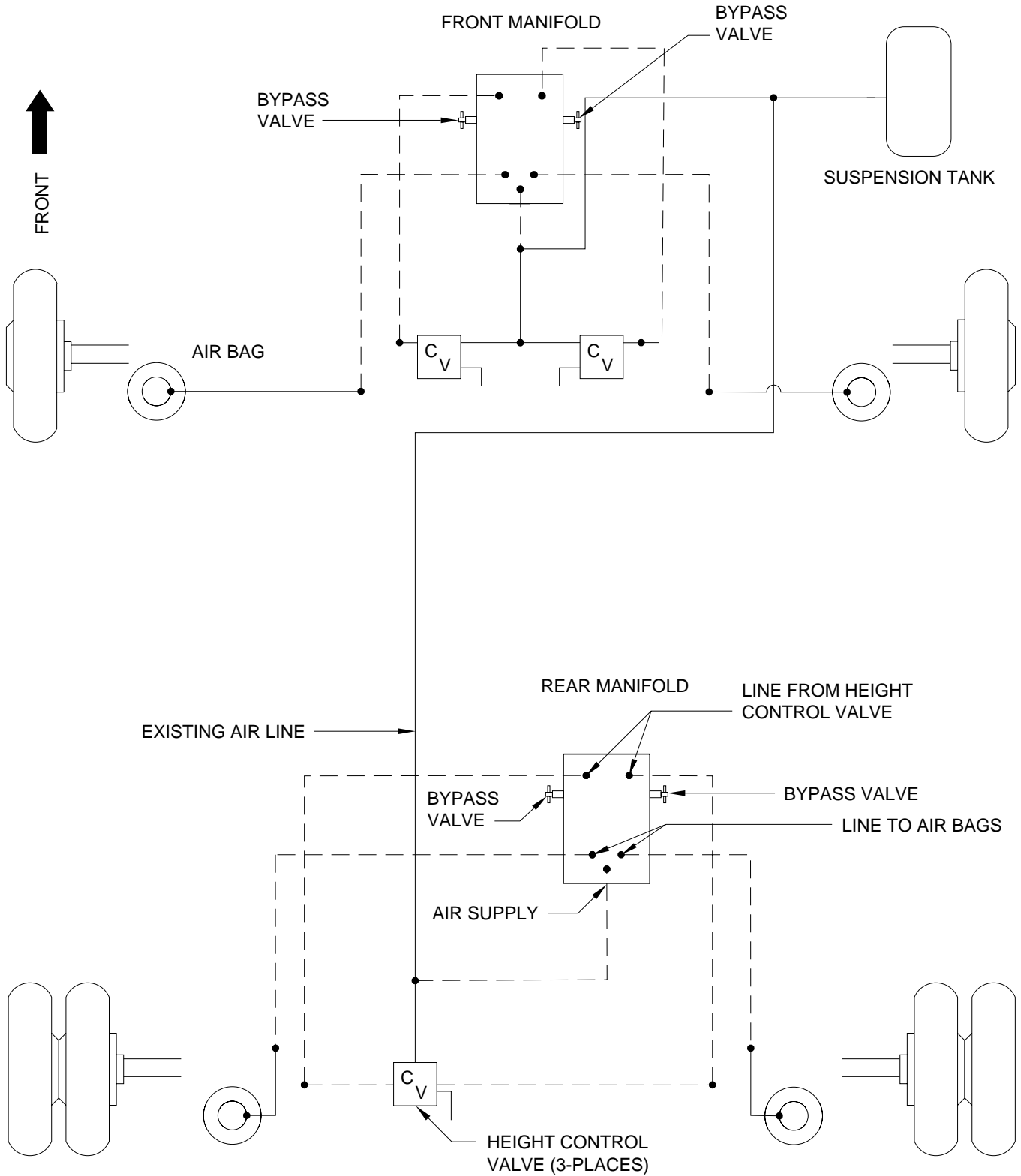
THE HOSES BETWEEN THE CAP END OF THE HYDRAULIC CYLINDERS AND THE TEE MUST BE THE SAME LENGTH AND DIAMETER.



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

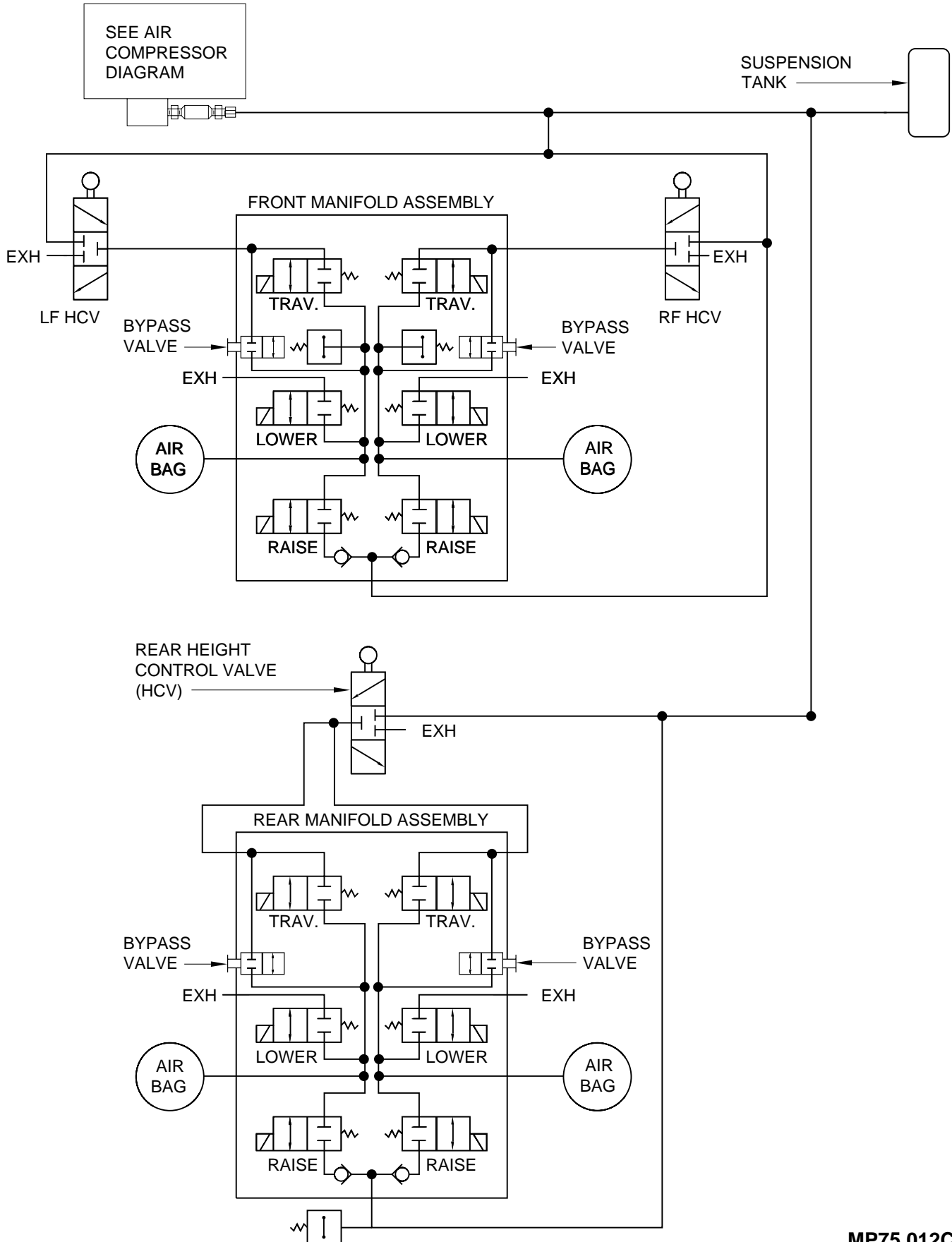


AIR LINE CONNECTION DIAGRAM

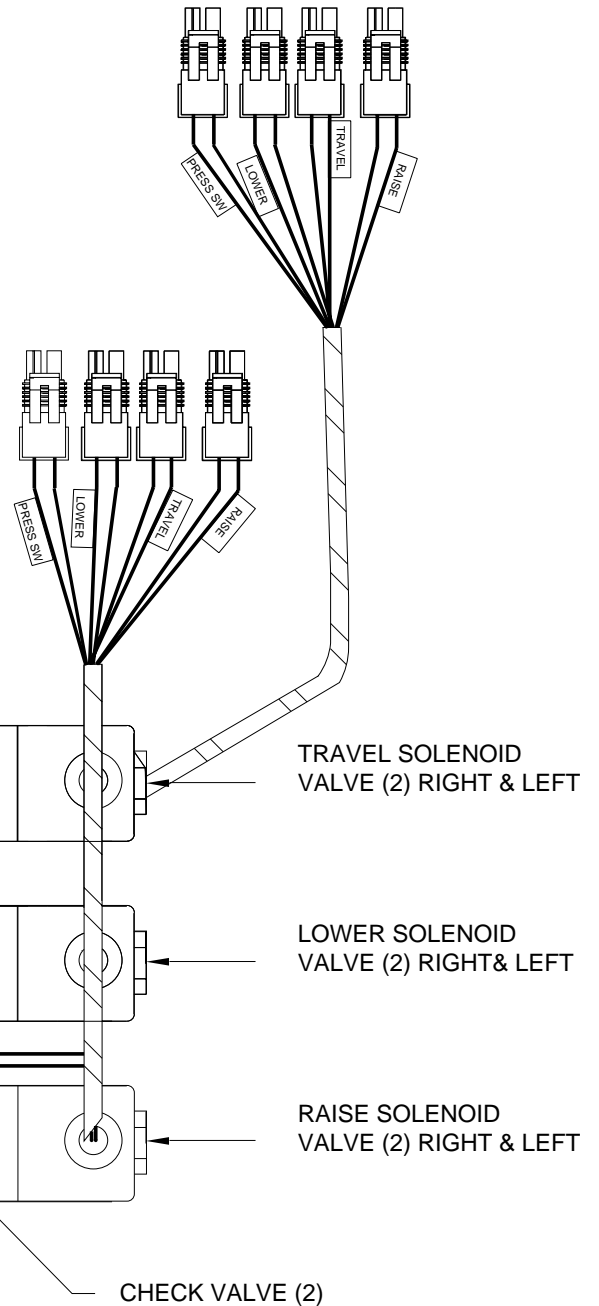
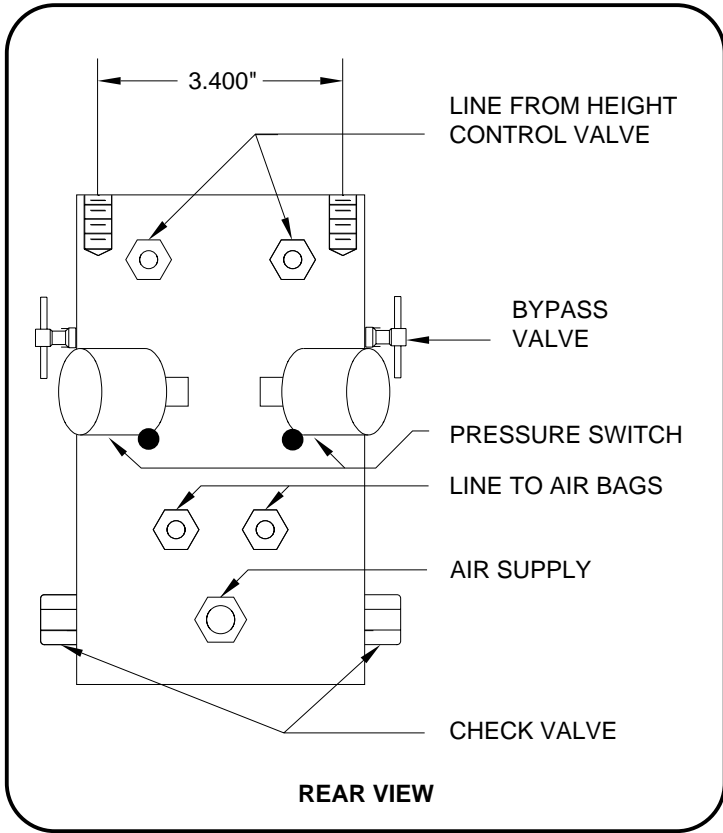


MANIFOLDS ARE MOUNTED TO MAIN CROSS MEMBERS. LEAVE AMPLE CLEARANCE FOR CONNECTION OF HOSES TO FITTINGS.

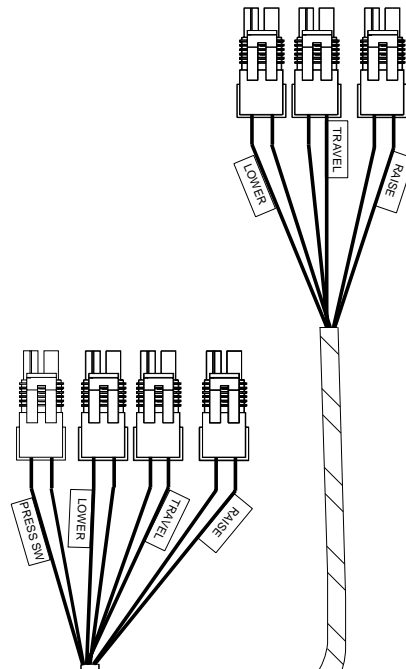
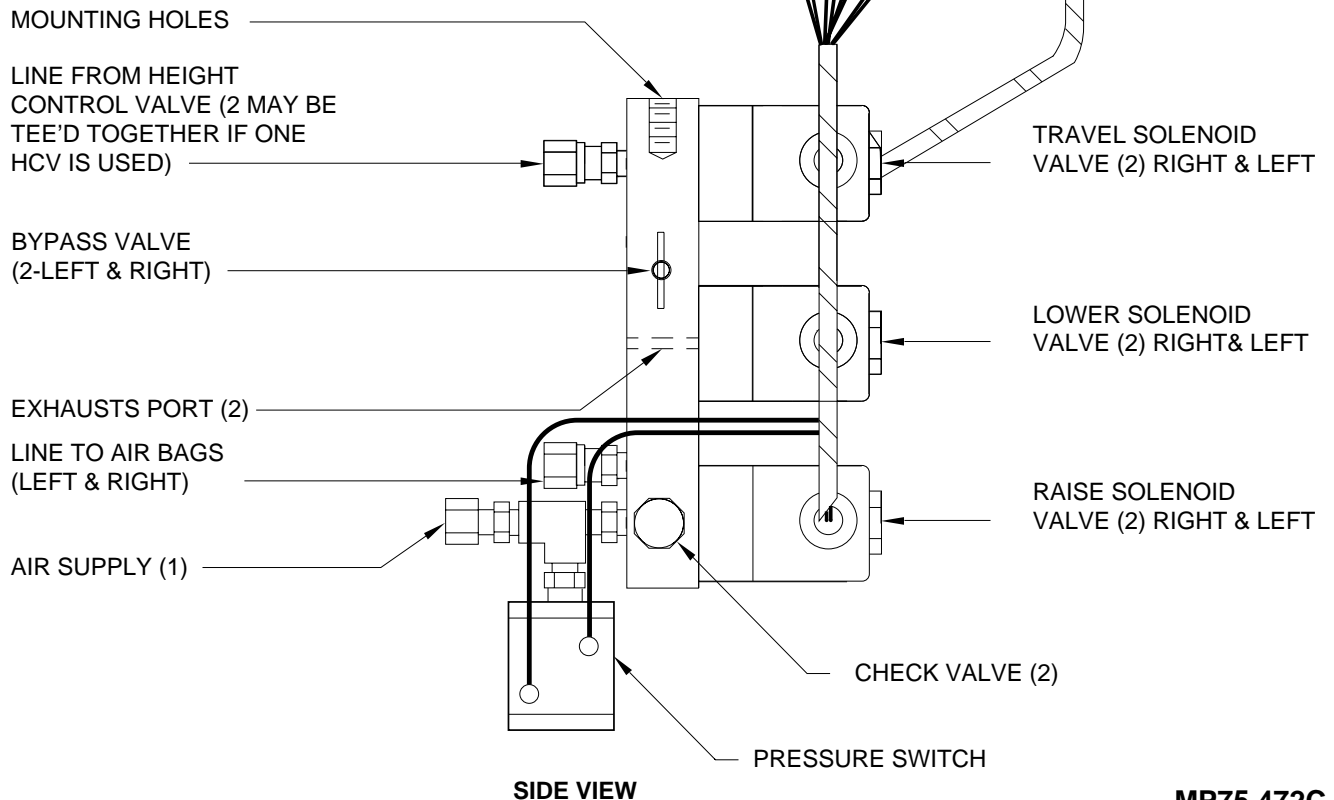
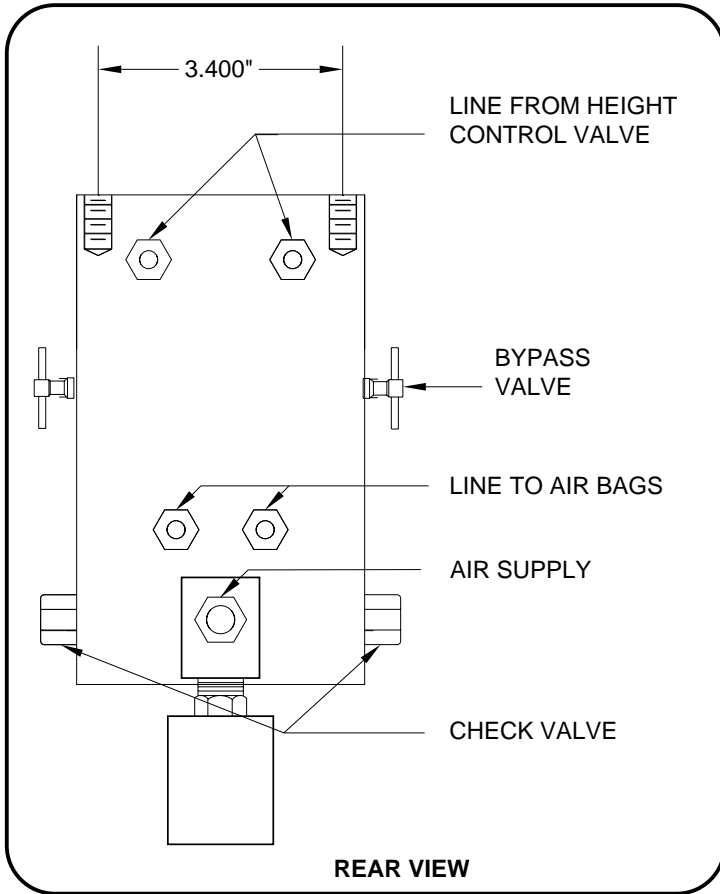
AIR LEVEL SCHEMATIC 4-POINT LEVELING PRESSURE SWITCHES FRONT AND REAR



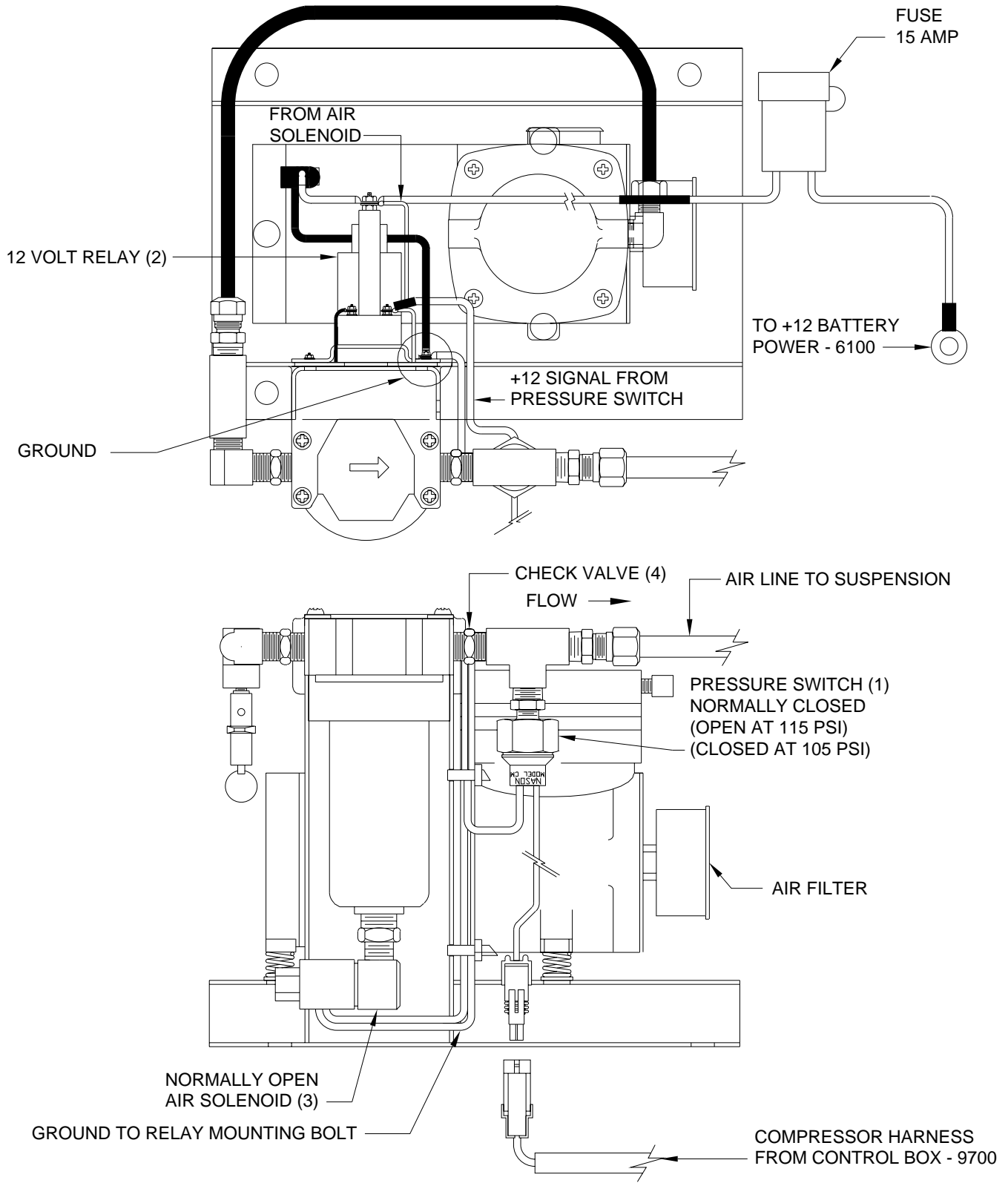
AIR SOLENOID MANIFOLD 6 VALVE WITH TWO PRESSURE SWITCHES AND BY-PASS VALVES



AIR SOLENOID MANIFOLD 6 VALVE WITH ONE PRESSURE SWITCH AND BY-PASS VALVES

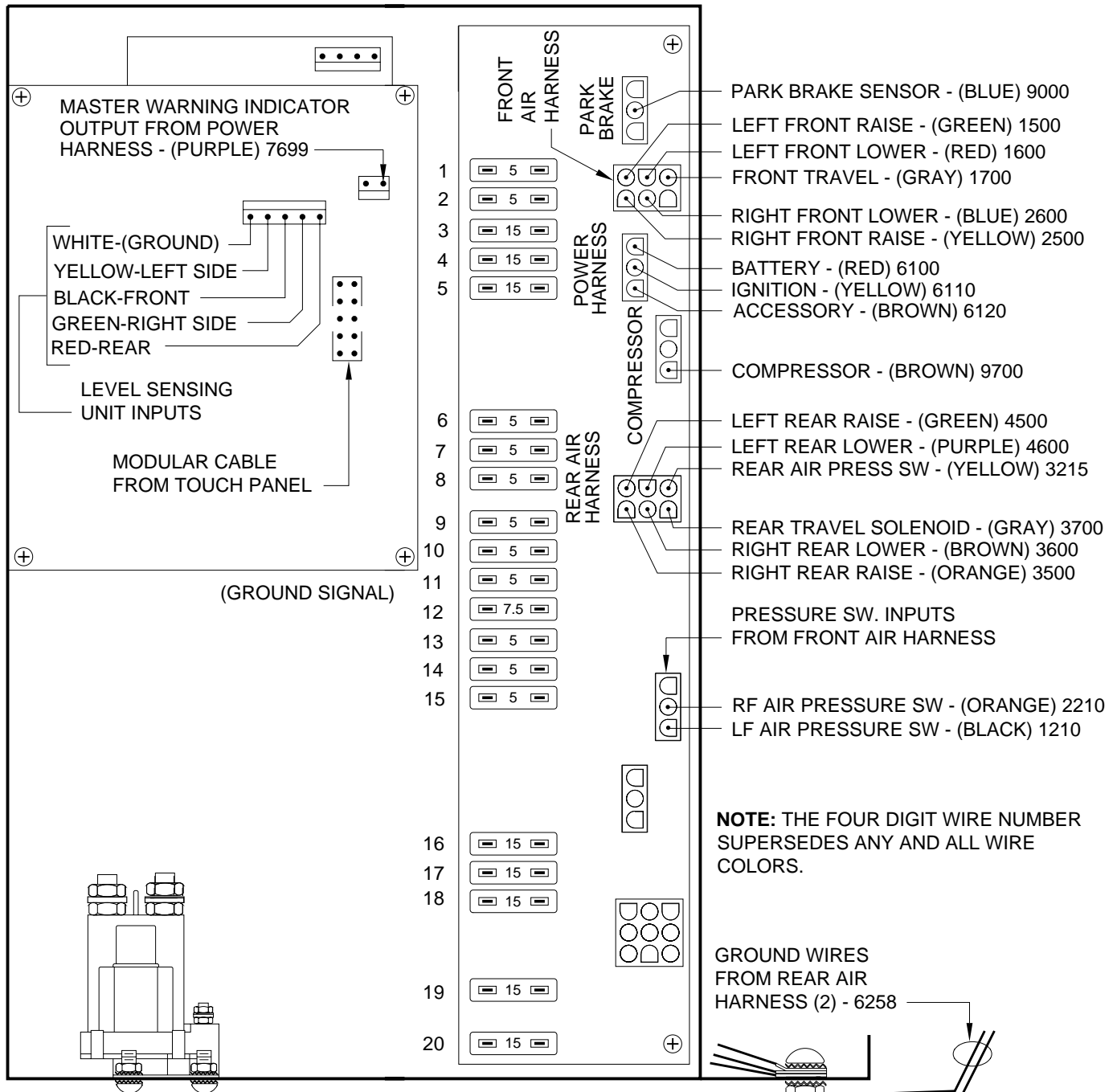


AIR COMPRESSOR DIAGRAM



The control box sends a +12 signal to the normally closed pressure switch (1). If the pressure is low, the 12 volt relay (2) will energize and the compressor will run. The normally open air solenoid (3) will close allowing the compressor to build pressure. When the pressure builds to 115 psi the pressure switch will open, stopping the air compressor. The normally open air solenoid (3) will open, allowing internal pressure & moisture to bleed off. The check valve (4) will keep the suspension air from bleeding back to the compressor. As air pressure drops below 105 psi the compressor will start.

CONNECTION DIAGRAM 600 SERIES CONTROL BOX WITH 4-POINT AIR LEVELING



FUSE DESIGNATION

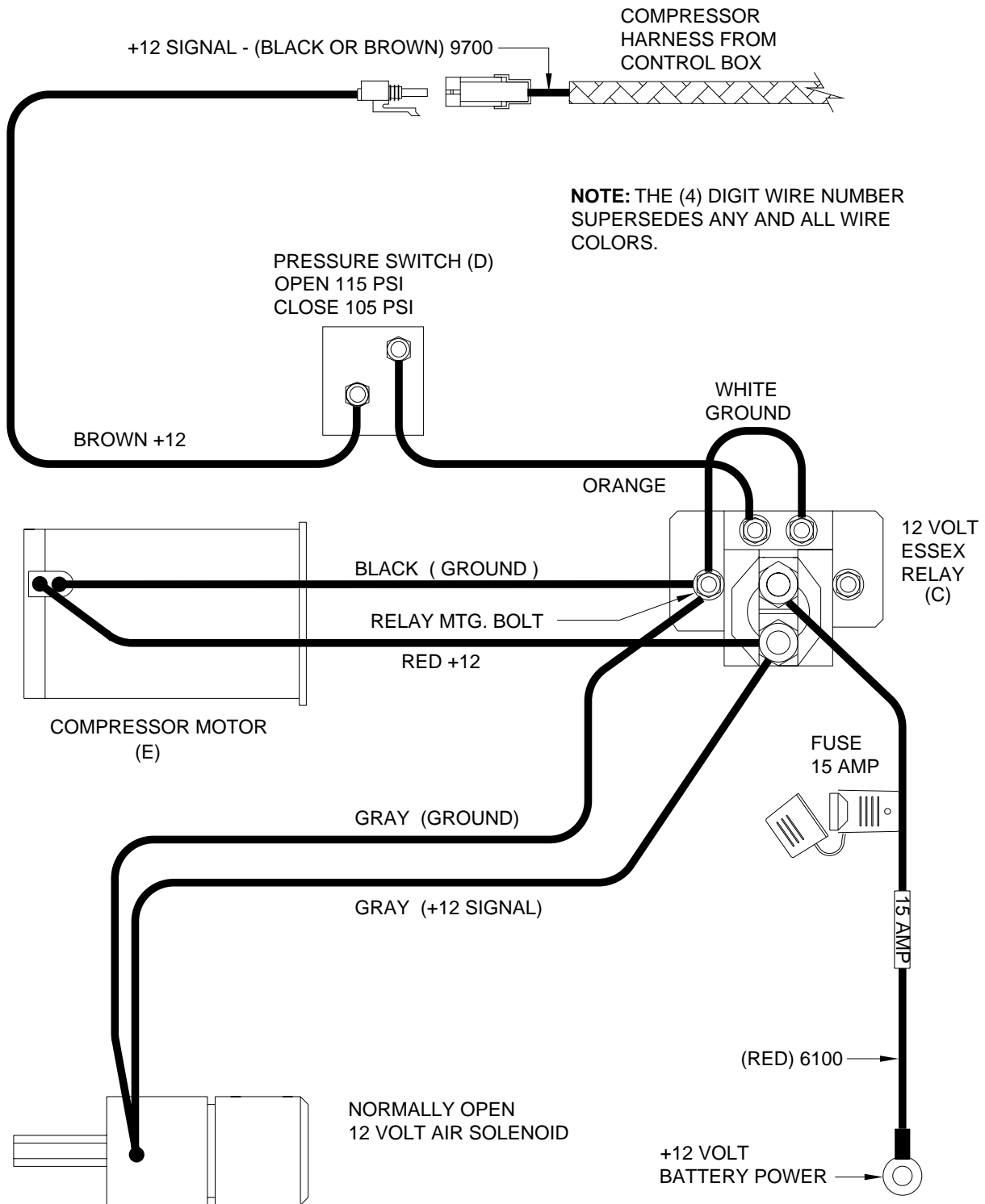
1 RIGHT FRONT LOWER	12 TRAVEL
2 RIGHT FRONT RAISE	13 N/A
3 BATTERY	14 N/A
4 IGNITION	15 N/A
5 ACC	16 N/A
6 RIGHT REAR LOWER	17 N/A
7 LEFT REAR LOWER	18 N/A
8 LEFT REAR RAISE	19 N/A
9 RIGHT REAR RAISE	20 N/A
10 LEFT FRONT RAISE	
11 LEFT FRONT LOWER	

#10 WIRE GROUND TO FRAME RAIL

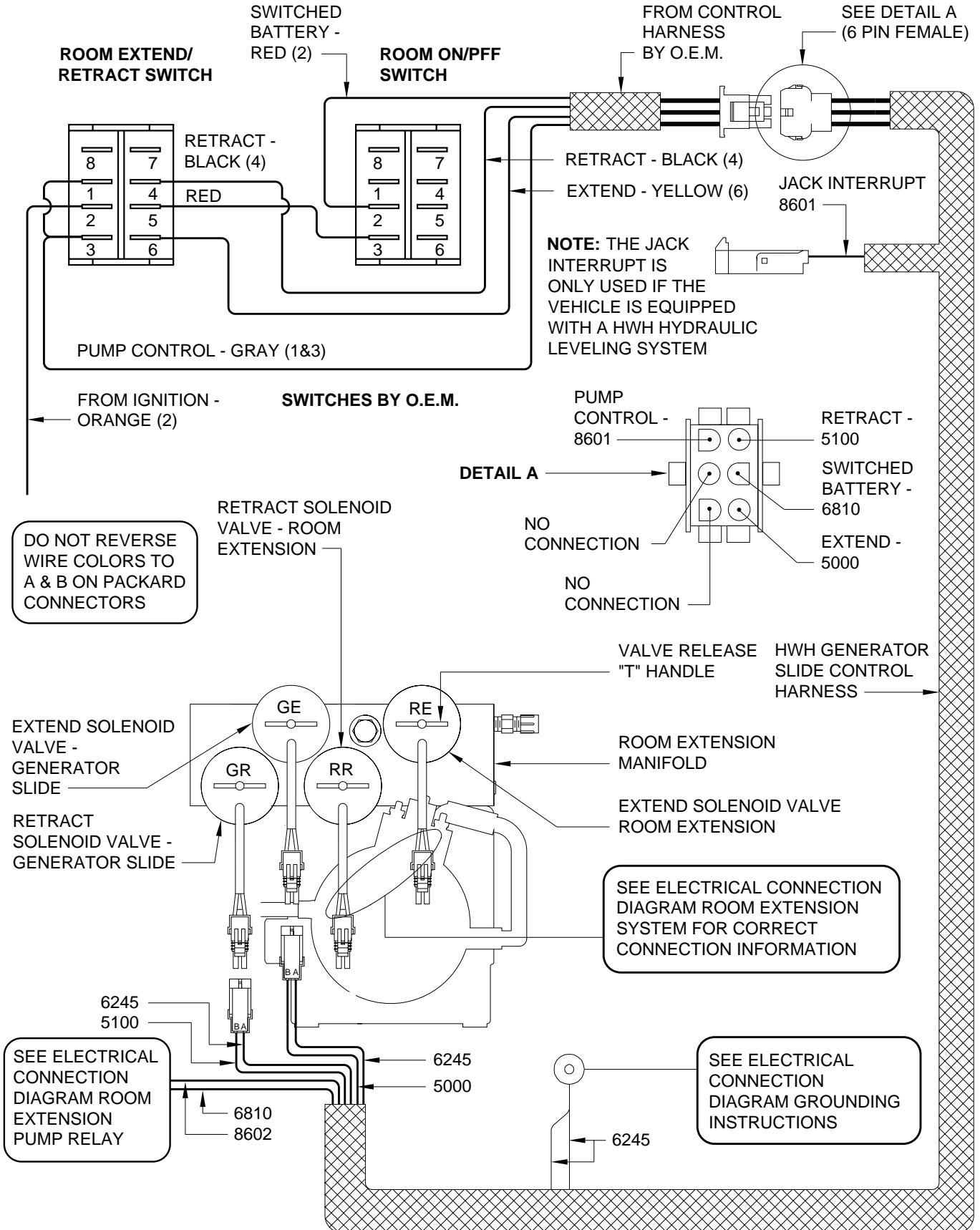
GROUND WIRES FROM FRONT AIR HARNESS (2) - 6254

NOTE: THE FOUR DIGIT WIRE NUMBER SUPERSEDES ANY AND ALL WIRE COLORS.

ELECTRICAL CONNECTION DIAGRAM AIR COMPRESSOR

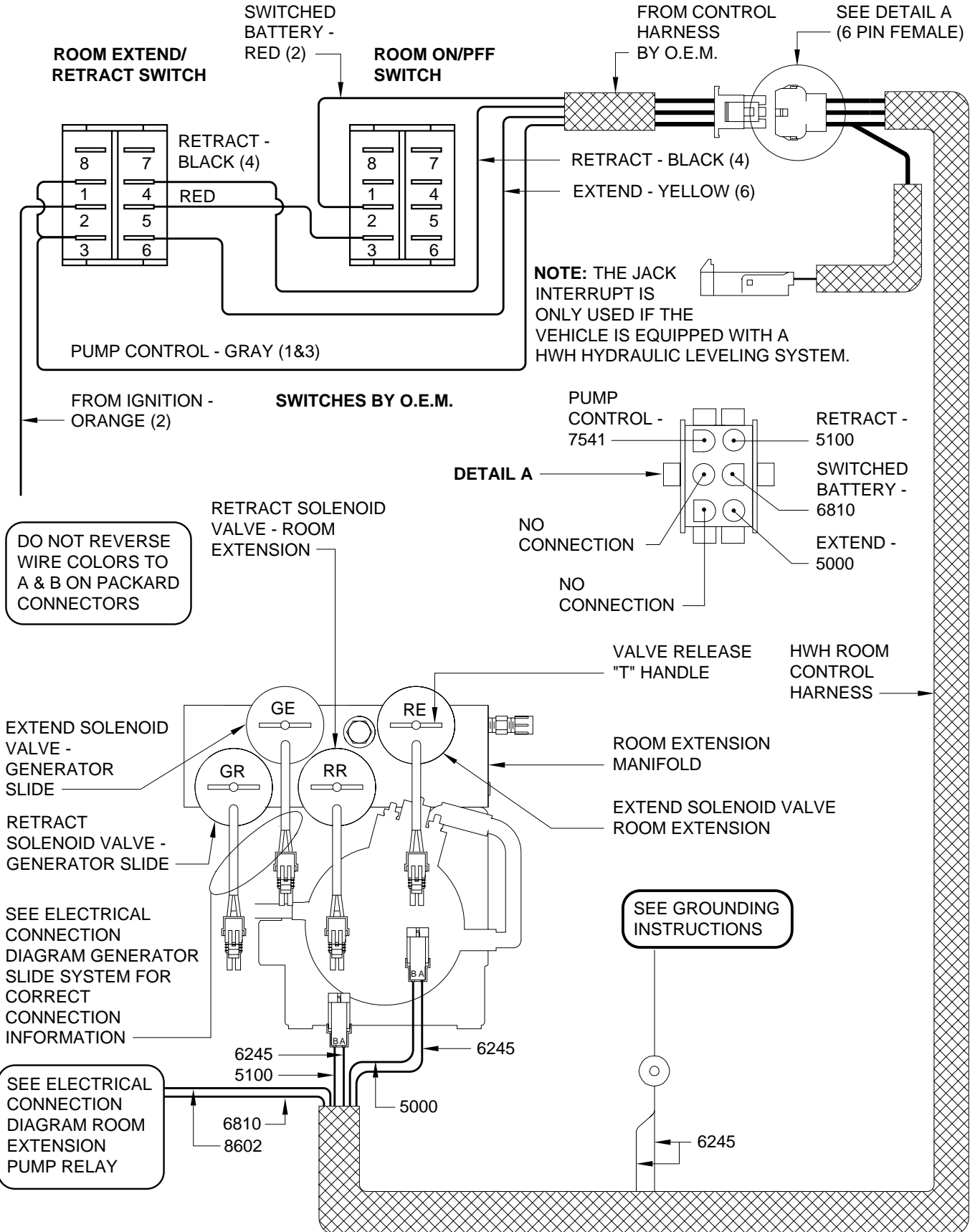


ELECTRICAL CONNECTION DIAGRAM GENERATOR SLIDE SYSTEM



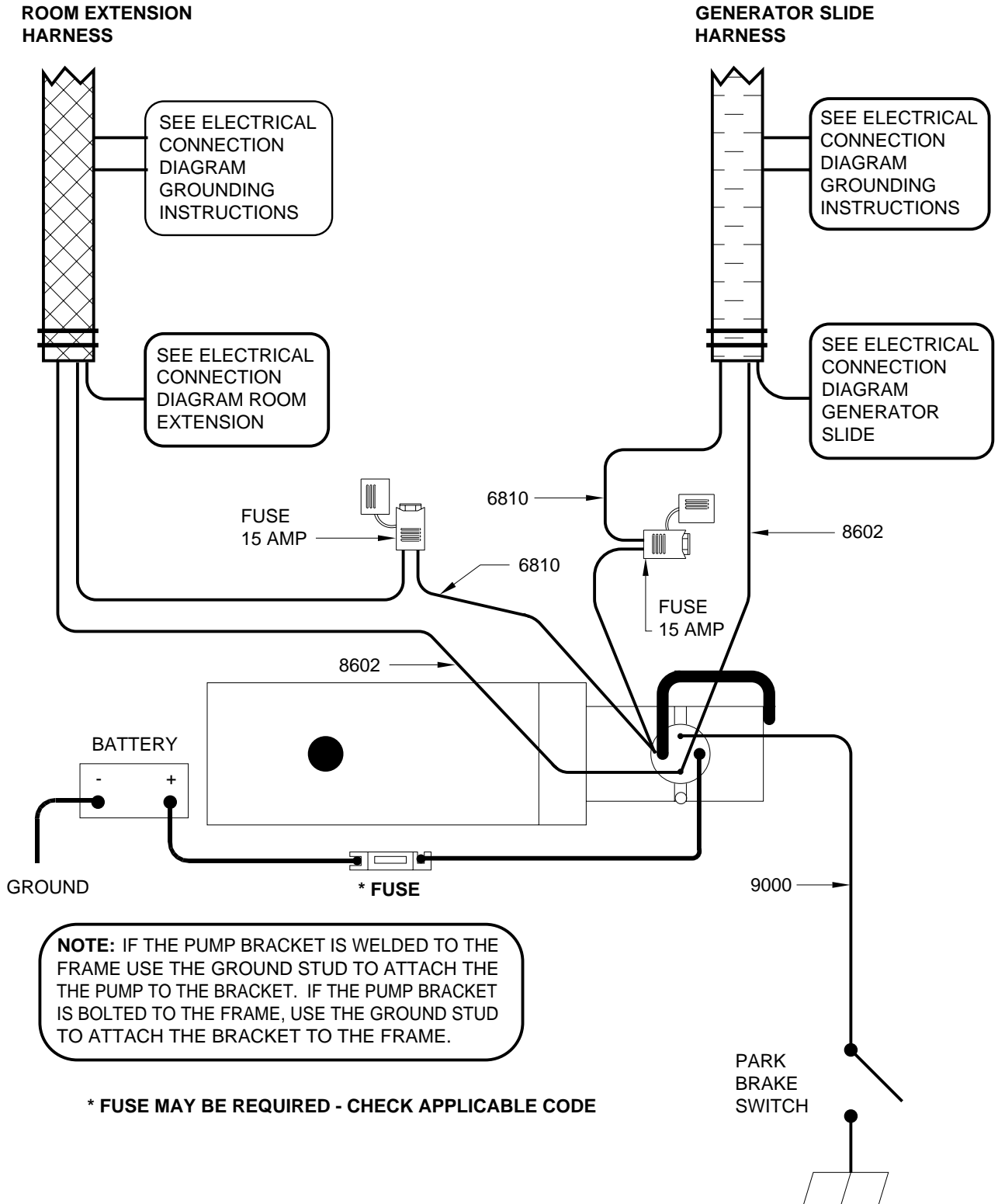
VIEW FROM PUMP END

ELECTRICAL CONNECTION DIAGRAM ROOM EXTENSION SYSTEM

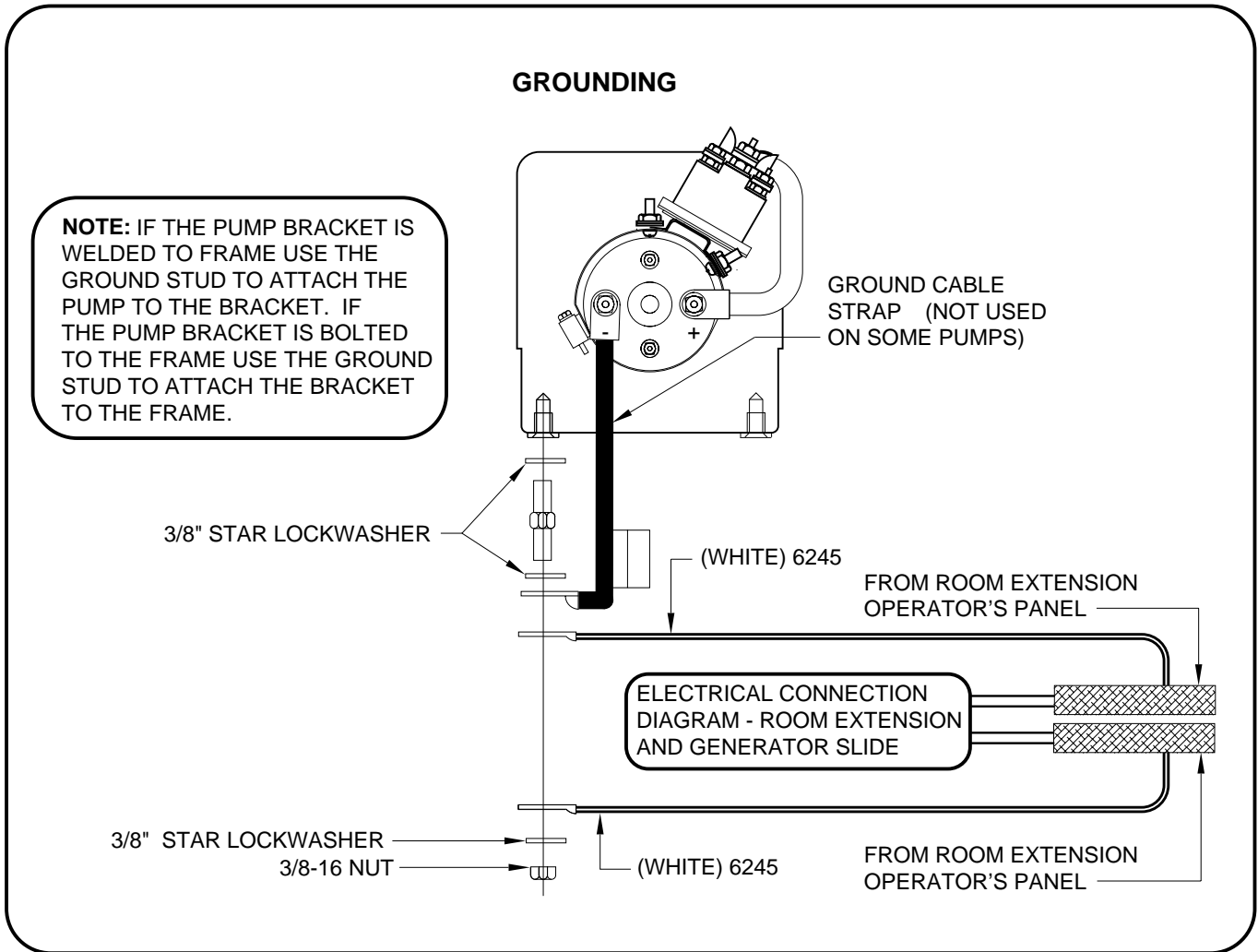


VIEW FROM PUMP END

ELECTRICAL CONNECTION DIAGRAM PUMP RELAY 310 SERIES LEVELING SYSTEM WITH ROOM EXTENSIONS



ELECTRICAL CONNECTION DIAGRAM ROOM EXTENSION GROUNDING INSTRUCTIONS



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