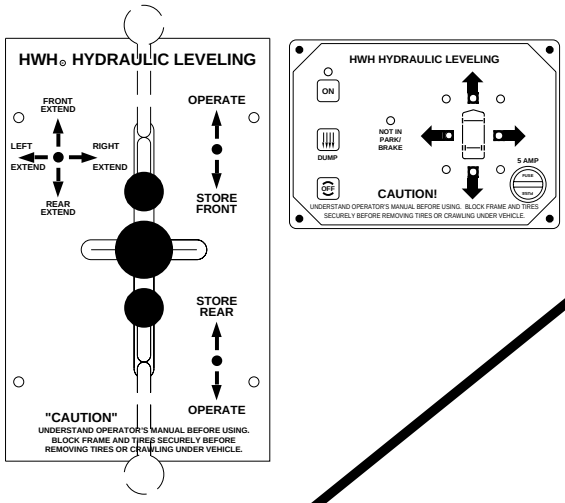
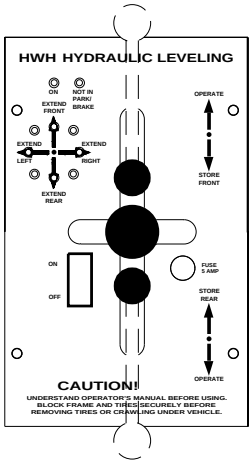
SERVICE MANUAL

HWH® JOYSTICK-CONTROLLED 200/210 SERIES LEVELING SYSTEM

FEATURING:

Joystick BI-AXIS® Control
Kick-Down or Straight-Acting Jacks
(With or Without Air Dump)





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

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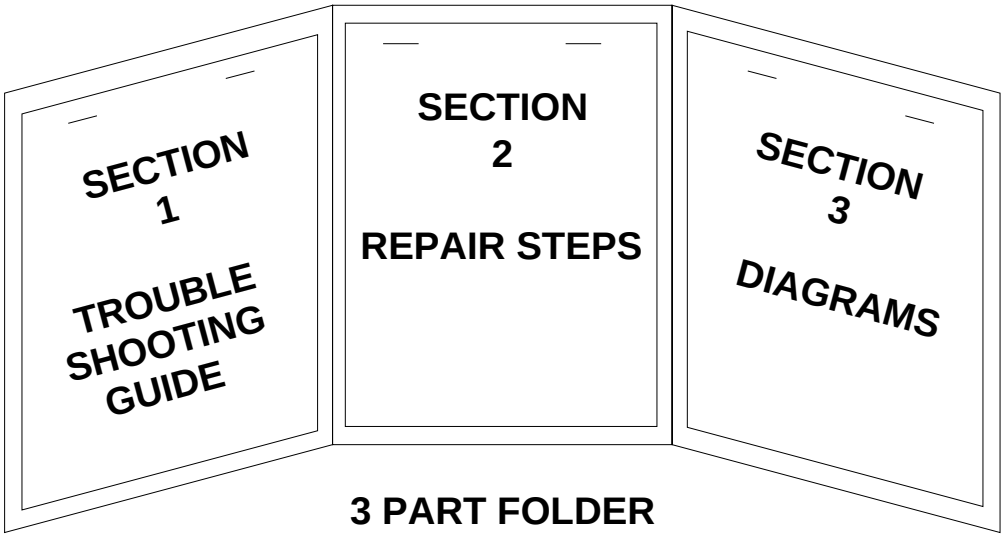
SECTION 1



3 PART FOLDER

HOW TO USE MANUAL

This manual is written in three sections. Section 1 is the Trouble Shooting Guide. Section 2 is the Repair Steps. Section 3 is the Diagrams. Begin diagnosis of the system with Section 1, the Trouble Shooting Guide. This will give the correct operation and function of the system. When a malfunction is encountered, the Trouble Shooting Steps will direct you to the proper Repair Steps in Section 2, the Repair Steps. The Repair Steps are broken into 3 columns, Problem, Solution, and Diagram. In the proper part under Problems, find the symptom you have encountered. The testing and repair for that problem is in the Solution (center) column. Diagrams for a particular Problem and Solution are in the Diagram (right hand) column. This column will direct you to the proper diagram in Section 3, Diagrams, for a more detailed view.

NOTE: SECTION 1 is broken into three sections. HYDRAULIC OPERATION 200/210, ELECTRICAL OPERATION 200 SERIES AND ELECTRICAL OPERATION 210 SERIES. The 200 and 210 series are the same hydraulically but electrically have some differences. Make sure you are in the proper section for the system you are working on.

Before beginning your repair, it is IMPORTANT to read the CAUTIONS and NOTES AND CHECKS in the first section, TROUBLE SHOOTING GUIDE. In many cases this will save time and mistakes when trouble shooting a system.

This Repair Manual is offered as a guide only. It is impossible to anticipate every problem or combination of problems. This manual is written in sequential order of the proper operation of the system. The Trouble Shooting Steps must be followed in order to give correct diagnosis of the problem(s). For any problems encountered that are not addressed in this manual, contact HWH Corporation for assistance.

NOTE: Diagrams in this manual are of typical systems. There may be plumbing or harness differences. In most cases this should not effect trouble shooting procedures.

PROCEED WITH TROUBLE SHOOTING GUIDE

TROUBLE SHOOTING

WARNING!

BLOCK FRAME AND TIRES SECURELY BEFORE CRAWLING UNDER VEHICLE. DO NOT USE THE 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.

WHEN ROUTING OR REROUTING HYDRAULIC HOSES AND WIRES, BE SURE THEY ARE NOT EXPOSED TO ENGINE EXHAUST OR ANY HIGH TEMPERATURE COMPONENTS OF THE VEHICLE.

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

NEVER PLACE HAND OR OTHER PARTS OF THE BODY NEAR HYDRAULIC LEAKS. OIL MAY CUT AND PENETRATE THE SKIN CAUSING INJURY OR DEATH.

SAFETY CLASSES ARE TO BE WORN TO PROTECT EYES FROM DIRT, METAL CHIPS, OIL LEAKS, ECT. FOLLOW ALL OTHER SHOP SAFETY PRACTICES.

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 THE JACKS.

NOTES AND CHECKS

Read and check before proceeding with Trouble Shooting Steps.

NOTE: HWH CORPORATION ASSUMES NO LIABILITY FOR DAMAGES OR INJURIES RESULTING FROM THE INSTALLATION OR REPAIR OF THIS PRODUCT.

1. The Trouble Shooting Guide must be followed in order. Problems checked for in one step are assumed correct and not checked again in following steps.

2. Check that the oil reservoir is full with the jacks in the fully retracted position.

3. Most coaches have more than one battery; one for the engine and the other(s) for the coach. The engine battery supplies power for the light panel and hydraulic pump. DO NOT use the coach batteries to supply power to the pump. Batteries under no load should read 12.6 volts. Batteries must maintain good voltage under load. Batteries must be in good condition with no weak cells. An alternator, converter or battery charger will not supply enough power for the system to operate properly.

4. Proper grounding of all components is critical. See the electrical circuit for specific grounds required. Faulty grounds, especially for the light panel, solenoid manifold or the pump assembly, may cause improper or erratic operation.

This manual is intended for use by experienced mechanics with knowledge of hydraulic and automotive electrical systems. People with little or no experience with HWH leveling systems should contact HWH technical service (800-321-3494) before beginning. Special attention should be given to all cautions, wiring, and hydraulic diagrams.

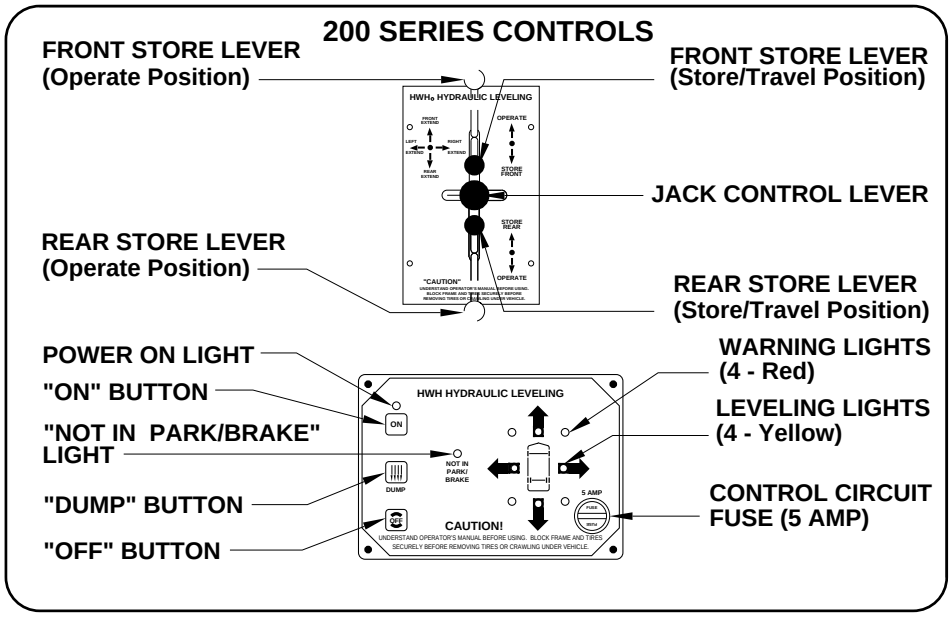
Suggested tools for trouble shooting the HWH leveling systems:

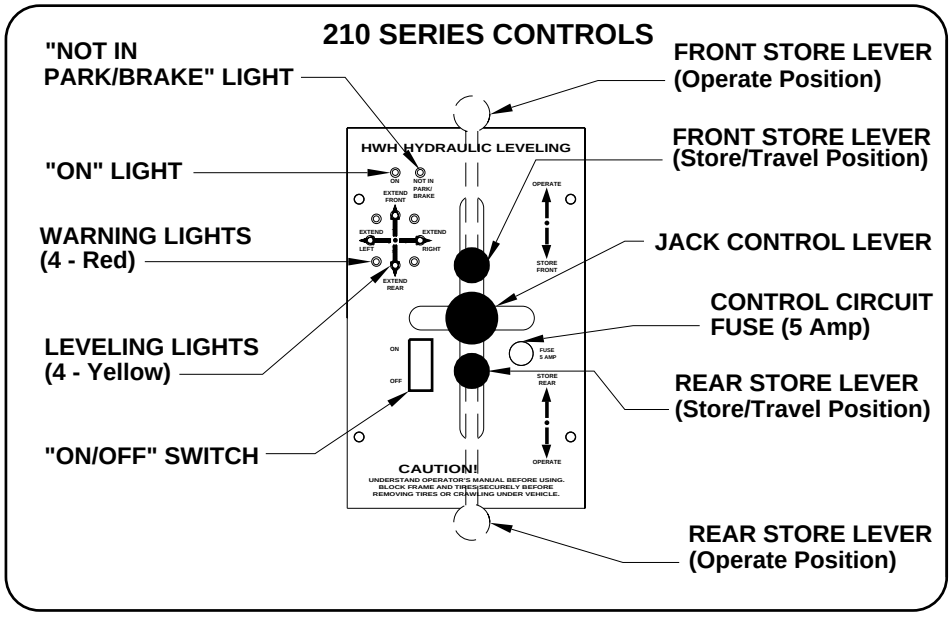
- JUMPER WIRES (UP TO 10 GAUGE)
- PRESSURE GAUGE (3500 PSI MIN.)
- MULTI-METER
- 12 VOLT TEST LIGHT

Tightening of hose ends: If tightening a new hose end, make the hose end snug (finger tight) on the fitting, then tighten the hose end 1/3 turn (2 FLATS). If tightening an existing hose end, tighten the hose end to snug plus 1/4 turn (1 FLAT).

PROCEED WITH THE TROUBLE SHOOTING STEPS ON THE FOLLOWING PAGE

TROUBLE SHOOTING STEPS





HYDRAULIC OPERATION 200/210 SERIES

NOTE: If the system is not functioning electrically, proceed to the ELECTRICAL OPERATION section for 200 and 210 series.

Move the Front and Rear Store Levers to the OPERATE position.

Turn the system ON.

1. For Kick-Down Jacks. Move the Jack Control Lever to the EXTEND FRONT position to kick the two front jacks to the vertical position. Move the Jack Control Lever to the EXTEND REAR position to kick the two rear jacks to the vertical position. If any jack(s) will not go to the vertical position see Part 1 of the REPAIR STEPS.

2. Push the Jack Control Lever to the FRONT, REAR, RIGHT and LEFT EXTEND positions. Two jacks should extend for each position. The jacks should extend to the ground and lift the vehicle. If this is not so, see Part 2 of the REPAIR STEPS.

CAUTION: If the vehicle is equipped with Kick-Down jacks do not lift the rear of the vehicle too high. The vehicle will roll forward or backwards if too much weight is removed from the rear tires.

3. Move the FRONT STORE LEVER then the REAR STORE LEVER to the Store/Travel position. If the jacks do not fully retract, see Part 3 of the REPAIR STEPS.

TROUBLE SHOOTING STEPS

ELECTRICAL OPERATION - 200 SERIES

4. With the ignition off no lights on the light panel should be on. If this is not so see Part 4 of the REPAIR STEPS.

5. With the ignition in the "ACC" or "ON" position and the Light Panel off, no lights on the light panel should be on. If this is not so see Part 5 of the REPAIR STEPS.

6. Push the "ON" button. The Power On light should be on. One Yellow Leveling Light may be on. If this is not correct or other lights are on, see Part 6 of the REPAIR STEPS.

7. Move the STORE LEVERS to the Operate Position. Push the JACK CONTROL LEVER to the four EXTEND positions to check the correct function of the jacks. The pump should run when the JACK CONTROL LEVER is pushed to all four positions. The pump should turn off when the JACK CONTROL LEVER returns to the center position. The red Warning Lights should come on as their respective jacks go to the vertical position (Kick-Down Jacks) or have extended between 1 and 2 inches (Straight-Acting Jacks). The Master Warning Light should be on. If the vehicle is equipped with Straight-Acting Jacks, there should be a buzzer that is on, if the ignition is in the "ON" position. If any of this is not so, see Part 7 of the REPAIR STEPS.

8. Air dump check. The "DUMP" button is a momentary button. The "DUMP" button will only work with the panel on. Push and hold the "DUMP' button, the air should exhaust from the vehicles suspension. Release the "DUMP" button. The vehicle should return to the proper ride height. If any of this does not happen, see Part 8 of the REPAIR STEPS.

NOTE: The vehicle engine will have to be running for the vehicle to return to ride height.

9. Level sensing unit check. Extend the jacks to the ground and put the coach in a level position. All yellow lights should be out. If a yellow light is on, adjust the sensing unit. Check that the sensing unit is positioned properly and mounted to a solid surface. If the sensing unit cannot be adjusted, yellow lights never come on or more than one yellow light comes on at a time, see Part 9 of the REPAIR STEPS.

10. Move the STORE LEVERS to the STORE position. As the jacks retract to the stored position, their respective red warning lights should go out and the master warning indicators should turn off when all four red warning lights are out. If this is not so, see Part 10 of the REPAIR STEPS.

ELECTRICAL OPERATION - 210 SERIES

11. With the ignition off no lights on the light panel should be on. If this is not so see Part 11 of the REPAIR STEPS.

12. With the ignition in the "ACC" or "ON" position and the Light Panel off, there should be no lights on unless a jack is in the vertical position or extended. The four red warning lights will work if the panel is off and the ignition is on. If the lights are not working properly, see Part 12 of the REPAIR STEPS.

13. Push the ON/OFF rocker switch to the "ON" postion. The Power On Light should be on. One Yellow Level Light may be on. If this is not correct, or other lights are on, see Part 13 of the REPAIR STEPS.

14. Move the STORE LEVERS to the Operate Position. Push the JACK CONTROL LEVER to the four EXTEND positions to check the correct function of the jacks. The pump should run when the JACK CONTROL LEVER is pushed to all four positions. The pump should turn off when the JACK CONTROL LEVER returns to the center position. The red Warning Lights should come on as their respective jacks go to the vertical position (Kick-Down Jacks) or have extended between 1 and 2 inches (Straight-Acting Jacks). The Master Warning Light should be on. If the vehicle is equipped with Straight-Acting Jacks, there should be a buzzer that is on, if the ignition is in the "ON" position. If any of this is not so, see Part 14 of the REPAIR STEPS.

15. Air dump check. The "DUMP" switch is a momentary switch. The "DUMP" switch will only work with the panel on. Push and hold the "DUMP' switch, the air should exhaust from the vehicles suspension. Release the "DUMP" switch The vehicle should return to the proper ride height. If any of this does not happen, see Part 15 of the REPAIR STEPS.

NOTE: The vehicle engine will have to be running for the vehicle to return to ride height.

16. Level sensing unit check. Extend the jacks to the ground and put the coach in a level position. All yellow lights should be out. If a yellow light is on, adjust the sensing unit. Check that the sensing unit is positioned properly and mounted to a solid surface. If the sensing unit cannot be adjusted, yellow lights never come on or more than one yellow light comes on at a time, see Part 16 of the REPAIR STEPS.

17. Move the STORE LEVERS to the STORE position. As the jacks retract to the stored position, their respective red warning lights should go out and the master warning indicators should turn off when all four red warning lights are out. If this is not so, see Part 17 of the REPAIR STEPS.

NOTE: A test harness for the 210 system is available from HWH. Due to the design of the system and the type of connector plugs used, some tests are hard to perform with out this test harness. Contact HWH Customer Service to obtain a test harness.

SECTION 2

REPAIR MANUAL

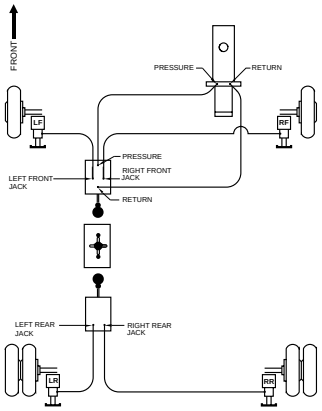
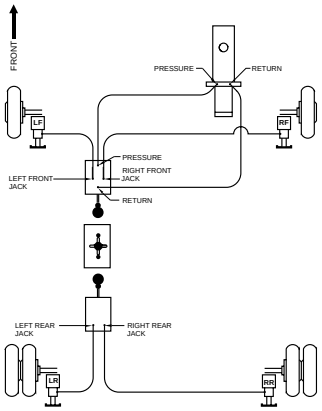
HWH JOY STICK - CONTROLLED LEVELING SYSTEMS 200/210 SERIES

FEATURING:

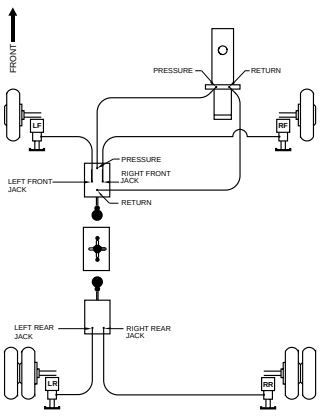
JOY STICK BI - AXIS CONTROL
KICK - DOWN JACKS
STRAIGHT - ACTING JACKS
MANUAL AIR DUMP

BEGIN WITH SECTION 1

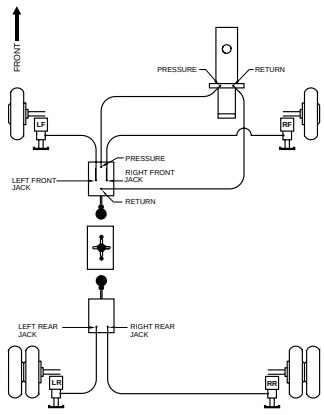
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 1 When the Jack Control Lever is moved to the FRONT or REAR EXTEND positions: **a: The jacks will not go vertical. The pump runs under no load.**	Remove the return line from the pump and direct the line into a container. Try to extend the jacks. There should be no fluid flowing from the return line. If fluid flows from the return line, the valve is the problem. Check that the bezel or light plate is positioned properly. If the plate is out of position, it can keep a STORE LEVER from being in the Operate Position properly. If the plate is positioned properly, replace the valve If no fluid flows from the return line the pump should be replaced.	 **REFER TO MP65**
b: One or more jacks will not go vertical. The pump runs under load.	Remove he pressure line from the pump and attach a pressure gauge to the pump fitting. Run the pump. Pump pressure should be between 3200 and 3600 PSI. If the pump pressure is bad, replace the pump. If the pump pressure is OK, remove the line from the jack(s) that will not kick down. Try to Extend the jack(s). If there is a good flow of fluid, the problem is at the jack. Check that the jack can be pulled vertical easily. Check that the roller bearings are free. Check that the actuator cables, rods and horizontal stops are in place. Make sure hoses or wires are not restricting the movement of the jack. If everything is OK, replace the actuator. If no fluid is flowing from the hose at the jack, remove that hose from the valve and retry. If no fluid comes out of the valve the valve is the problem. If fluid flows from the valve the hose is the problem. If no jacks will go vertical and no fluid is coming out of the valve, remove the pressure line from the valve and retry. If fluid flows from the valve, check that the hoses are connected to the correct outputs at the valve. If no fluid comes from the hose, the hose or fittings are the problem. **NOTE: Any fitting (especially 90DEG fittings) may not be made properly and will not flow fluid.**	 **REFER TO MP65**
c: One front or rear jack will go vertical, extend to the ground and lift the vehicle more than 1 to 1-1/2" before the other jack goes vertical or goes vertical and starts to extend. NOTE: This is for 6000# and 9000# jacks only.	As long as one jack does not lift the vehicle more than approximately 1-1/2 inches, that is within the tolerance of the actuator. Make sure the jacks swing freely and are not abstructed from moving. Apply some oil where the springs pivot around the jack. Adjust the horizontal adjustment of the slow jack, so it hangs slightly lower than the other jack. Make sure the valve cover plate is mounted correctly over the valve. Moving the Jack Control Lever closer to one side of the slot can direct more fluid to one jack.	**6000# JACK REFER TO MP65.3030** **9000# JACK REFER TO MP65.3035** **16000# JACK REFER TO MP65.3040**

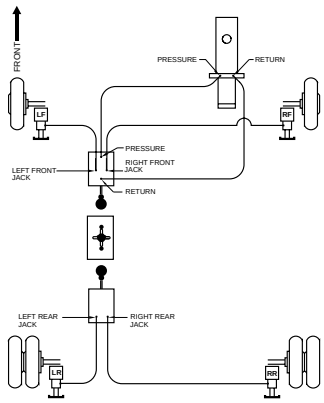
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 1 Continued	There is no way to determine which actuator is the problem without a pressure gauge. Replace the slow actuator first. If that does not fix the problem, replace the fast actuator with the actuator that was removed. If a pressure gauge is available, tee the gauge between the hose and actuator at the jack on the jack that is faster. Starting from fully retracted, operate the jacks. Watch the jack and gauge closely. The pressure should be greater than 1050 PSI, but never exceed 1300 PSI. as the jack swings vertical, just before the foot of the jack starts to extend. If the actuator being checked is within the above limits, replace the other actuator.	**6000# JACK** **REFER TO MP65.3030** **9000# JACK** **REFER TO MP65.3035** **16000# JACK** **REFER TO MP65.3040**
d: The foot of a jack extends but the jack will not go vertical.	Check that rollers or actuator cables or rods are not missing. Check that horizontal stops are in the proper location. If everything is OK, replace the actuator.	
e: A jack swings vertical but will not extend.	Do this test with the jack in the vertical position. On a 9000# jack, take the tube between the actuator and the jack loose at the jack. On a 16,000# or 6000# jack loosen the actuator from the jack. Leave the hose attached. Try to extend the jack. If fluid comes out of the tube or from between the actuator and jack, replace the complete jack. If no fluid comes out, replace the actuator.	
Part 2 When the Jack Control Lever is pushed to an extend position: **a: The wrong jacks extend.**	The hoses are not connected to the correct output at the valve. Refer to the Hydraulic Line Connection Diagram for correct connection information.	 **REFER TO MP65**
b: For Straight-Acting Jacks. The jacks will not extend, the pump runs under no load.	Remove the return line from the pump and direct it into a container. Try to extend the jacks. If fluid flows from the return line. The valve is the problem. Check that the bezel or light plate is positioned on the valve properly. If the plate is positioned incorrectly, it can keep a STORE LEVER from being in the Operate Position properly. If the plate is positioned properly, replace the valve. If no fluid flows from the return line, replace the pump.	
c: For Straight-Acting Jacks. One or more jacks will not extend, the pump is running under load.	If no jacks will extend, remove the pressure line from the pump and attach a pressure gauge to the pump fitting. Run the pump. Pump pressure should be between 3200 and 3600 PSI. If the pump pressure is bad, replace the pump. If pump pressure is OK, reattach the pressure line to the pump. Make sure there is fluid flowing to the valve. The pressure line or fittings may have a problem.	

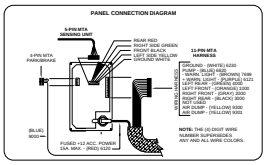
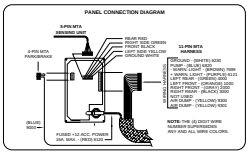
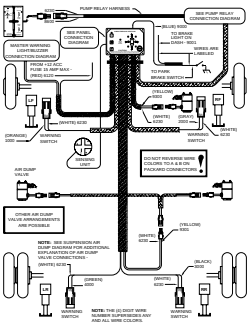
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 2 Continued	If one or more jacks will extend and lift the vehicle, there should be enough pressure to extend all of the jacks. Make sure the tank is full of fluid with the jacks fully retracted. Remove the line from the jack(s) that will not extend. Try to extend the jacks. If there is a good flow of fluid to the jack, replace the jack cylinder. If there is no fluid flow from the hose, remove the hose at the valve. If there is flow out at the valve, the problem is the hose. If there is no flow from the valve, replace the valve. **NOTE: Any fittings (especially 90DEG fittings) may not be made properly and will not flow fluid.**	 **REFER TO MP65**
d: One or more jacks will extend to the ground but will not lift the vehicle.	Check the fluid level in the tank. Remove the pressure line from the pump and attach a pressure gauge to the pump fitting. Run the pump. Pump pressure should be between 3200 and 3600 PSI. If pump pressure is bad, replace the pump. If pump pressure is OK, check the return line. If fluid is flowing from the return line while trying to extend a jack, the problem is the valve. Make sure the bezel or light plate is positioned properly. If the plate is OK, replace the valve. If fluid is not flowing through the return line, check the pressure in the line at the jack. The problem is probably the jack or the cylinder.	
e: The jacks will not lift the vehicle far enough to level it.	The jacks may have reached full extension. The following are the measurements for jack extension: 6000# Short KICK-DOWN AP7129 - 7 INCHES 6000# Tall KICK-DOWN AP7164 - 8 INCHES 9000# Short KICK-DOWN AP7001 - 8-1/2 INCHES 9000# Tall KICK-DOWN AP7002 - 9 INCHES 16000# KICK-DOWN AP2381 - 8 INCHES The following are suggested ground clearances with jacks vertical but not extended: 6000# KICK-DOWN - 2" to 4" 9000# KICK-DOWN - 3" to 4-1/2" 16000# KICK-DOWN - 2" to 4" All Straight-Acting jacks have a stroke of either 13 inches or 16 inches with a retracted clearance of 8 inches. Vehicles with air suspension will have several more inches of clearance with the air bags full. Make sure the pump has pump pressure between 3200 and 3600 PSI. Make sure the jack capacity is enough to handle the axle weights of the vehicle.	
f: When one jack has extended fully the other jack will not extend any more.	One jack may not have the capacity to lift the vehicle any further by itself. This is not a problem. The system is designed to always use two jacks for lifting. One jack lifting by itself may twist the vehicle.	

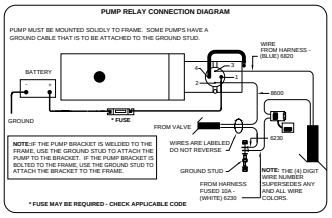
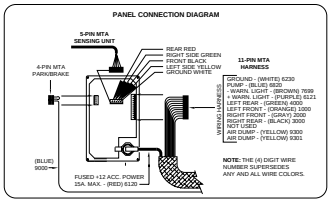
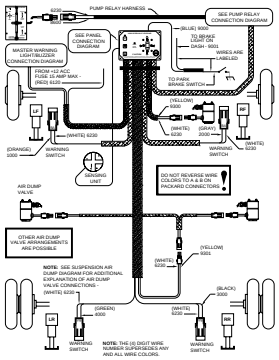
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 2 Continued **g: A jack will retract by itself after being extended to the ground.**	An excessive visible oil leak for that jack can allow the jack to retract. If there is no major oil leak, the valve is leaking internally and should be replaced. **NOTE: If a jack is retracting less than 1/2" the problem is thermal contraction of the fluid. There is no repair for this. The jacks need to be extended to lift the vehicle at least 3/4" when stabilizing the vehicle.**	
Part 3 After moving the STORE LEVERS to the Store/Travel position: **Kick-Down Jacks** **a: A jack will not retract at all.**	**CAUTION: The vehicle should be properly supported before performing tasks which require being under the vehicle. Releasing fluid from the jacks will cause the vehicle to drop and possibly move forward or backward causing injury or death.** Take the hose loose at the jack. If the foot retracts into the jack and swings to the horizontal position, the problem is in the hose or the valve. Extend the jack. Remove the hose for that jack at the valve. If the jack retracts, the valve should be replaced. If the jack does not retract, the hose is the problem. Check for kinks. If the jack does not retract with the hose removed. The problem is the jack cylinder or the actuator. On a 9000# jack, loosen the tube between the jack and the actuator. On 6000# and 16000# jacks, loosen the actuator from the jack. If the cylinder retracts, replace the actuator. If the cylinder stays extended, replace the complete jack.	 **REFER TO MP65** **6000# JACK** **REFER TO MP65.3030** **9000# JACK** **REFER TO MP65.3035** **16000# JACK** **REFER TO MP65.3040**
b: The foot of the jack retracts but the jack will not swing to the horizontal position.	Make sure the jack can pivot. Check if springs, rollers, actuator cables and rods are OK. If these things are OK, replace the actuator. **NOTE: Lubricating jack cylinder rods or actuator rods is not necessary. Lubricating rods may improve operation temporarily but will not fix the problem.**	**6000# JACK** **REFER TO MP65.3030** **9000# JACK** **REFER TO MP65.3035** **16000# JACK** **REFER TO MP65.3040**
c: The jack starts to retract, swings to the horizontal position but the foot will not retract fully into the cylinder.	Check the hose for a kink at the jack. Loosen the actuator tube on 9000# jacks or loosen the actuator on the 6000# or 16000# jacks. If the foot finishes retracting, replace the actuator. If the foot stays extended, replace the complete jack.	**6000# JACK** **REFER TO MP65.3030** **9000# JACK** **REFER TO MP65.3035** **16000# JACK** **REFER TO MP65.3040**
d: Stright-Acting jacks. A jack will not retract at all or will not fully retract.	Take the hose loose at the jack, if it doesn't retract, replace the cylinder. If it does retract, loosen the hose for that jack at the valve. If the jack retracts, replace the valve. If the jack does not retract, the problem is the hose.	**REFER TO MP65**

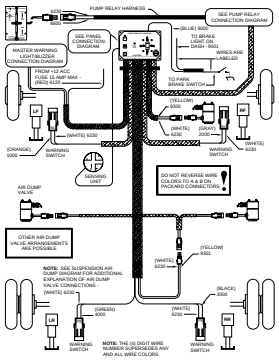
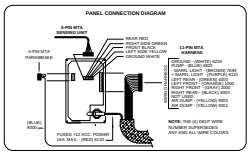
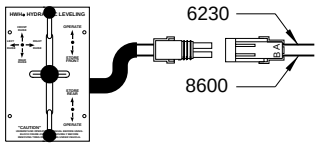
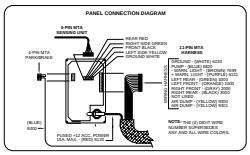
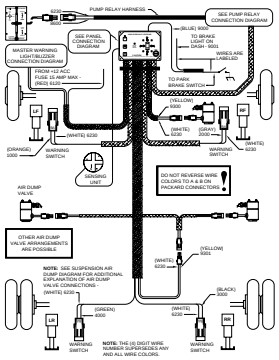
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 3 Continued **Any Jack** **e: A jack retracts slowly.**	For Kick-Down jacks refer to Part 3a and for Straight-Acting jacks refer to Part 3d.	
f: no jacks will retract.	Take the return line loose from the pump. Try to retract. If the jacks retract the problem is the pump or pump fitting for the return line. If the jacks do not retract, take the return line loose at the valve. If the jacks retract the return line is the problem. If the jacks still will not retract, refer to Part 3a for Kick-Down jacks and Part 3d for Straight-Acting jacks.	**REFER TO MP65**
ELECTRICAL DIAGNOSTICS - 200 SERIES		
Part 4 With the ignition switch off: **a: A light on the light panel is on.**	There should be no power to the Light Panel. Trace the 6120 (RED) wire to it's source. It should be connected to the "ACC" side of the ignition switch.	 **REFER TO MP85.1520**
Part 5 With the ignition in the "ON" or "ACC" position: **a: The Power On Light is lit.**	Push the "OFF" button. If the light does not go out, replace the light panel.	
b: Lights other than the Power On Light are on.	No lights should be on, replace the panel.	
c: The panel is off but the master warning light and buzzer, if so equipped, is on. No jacks are vertical or extended.	Push the "ON" button. One or more red warning lights should be on. If no red warning lights on the panel are on, remove the 7699 (BROWN) wire from the MTA plug (9 or 11 pin). If the light goes out, replace the light panel. If the light does not go out, the 7699 (BROWN) wire is shorted to ground. If a red warning light on the panel is on, the master warning light and buzzer should be on. Unplug the warning switch for the warning light that is on. If the light goes out replace the warning switch. **NOTE: If it is a new system check that the wires are in the plugs in the correct position. The white wire should be in the A side of the plug and the black (or colored) wire should be in the B side of the plug.**	 **REFER TO MP85.1520**  **REFER TO MP85.1515**

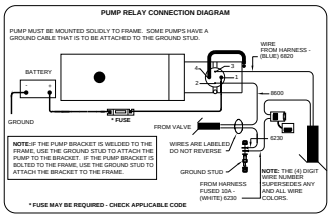
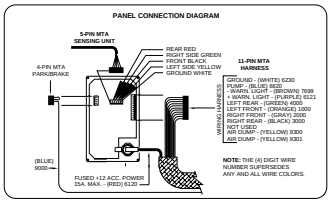
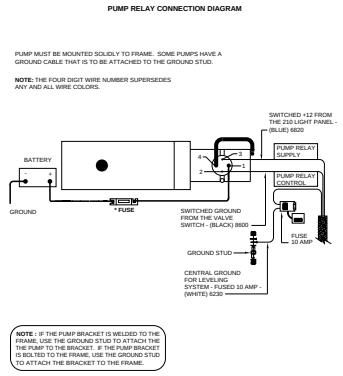
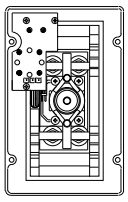
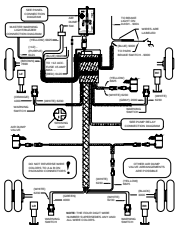
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 5 Continued	If replacing the switch does not fix the problem and the vehicle has Straight Acting jacks, there could be a problem with the magnet in the jack. If the warning light does not go out when the switch is unplugged, remove the correct numbered (or colored) wire from the MTA plug (9 or 11 pin). If the light goes out, the wire is shorted to ground. If the light does not go out, replace the light panel.	
Part 6 **With the ignition on, push the "ON" button on the light panel:** **a: The Power On light will not come on. No other lights come on.**	Turn the ignition OFF. Check the 5AMP fuse in the light panel. **If the fuse is OK,** turn the ignition to "ACC" or "ON" and check the 6120 (RED) wire for +12 volts at the fuse. If +12 volts is not present, trace the 6120 (RED) wire to it's source and repair. If the 6120 (RED) wire is fused and the fuse is blown, the 6120 (RED) wire is probably shorted to ground. If +12 volts is present on the 6120 (RED) wire at the 5AMP fuse, make sure connections are good, tight and not corroded. Make sure there is a good ground on the 6230 (WHITE) wire in the (9 or 11 pin) MTA plug. Make sure the 6230 (WHITE) wire is pushed in the connector properly. If there is good voltage and ground to the panel, replace the panel. **If the 5AMP fuse in the panel is blown,** replace the fuse. Turn the ignition to "ON" or "ACC". If the fuse blows right away, check the 6121 (PURPLE) wire going to the Master Warning Light. That wire may be shorted to ground. Some systems may not use that wire. If that wire is not used or is not shorted, replace the panel. If the fuse does not blow when the ignition is turned ON, push the "ON" button. If the fuse does not blow, continue operating the system. If the fuse blows, the problem is the pump relay, the 6820 (BLUE) wire or the panel. Remove the 6820 (BLUE) wire from the pump relay. Replace the fuse. If the fuse does not blow replace the relay. If the fuse blows, remove the 6820 (BLUE) wire from the (9 or 11 pin) MTA plug. Replace the fuse. Push the "ON" button. If the fuse does not blow, the 6820 (BLUE) wire is shorted to ground. If the fuse blows, replace the light panel.	  **REFER TO MP85.1520**
b: The NOT IN PARK/BRAKE light comes on when the "ON" button is pushed. No other lights come on. The NOT IN PARK/ Brake light goes out when the "ON" button is released.	Make sure the park brake is set. If not, set the brake and retry. If the park brake is set, check the 9000 (BLUE) wire in the 4 pin MTA plug at the panel for a ground. If there is no ground, the 9000 (BLUE) wire or the park brake switch is the problem. If there is a ground on the 9000 (BLUE) wire, make sure that wire and the small jumper wire is pushed into the MTA connector properly. Check voltage at the panel between the 6120 (RED) wire and the 9000 (BLUE) wire while pushing the "ON" button. If the voltage is less than 9 volts, the panel will not turn on. Check all connections on both wires, a poor ground on the 9000 (BLUE) wire can cause low voltage for the panel. At least +9 volts is needed to turn the panel on. If the voltage is greater than 9 volts, replace the panel.	 **REFER TO MP85.1515**

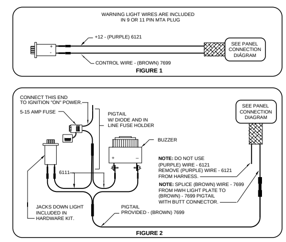
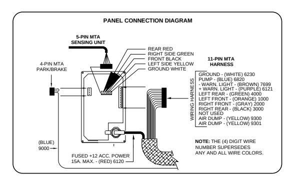
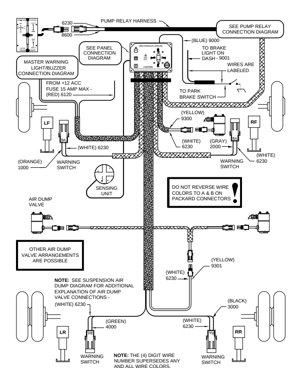
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 6 Continued **c: A red warning light is on, no jacks are vertical or extended.**	Unplug the warning switch for the jack warning light that is on. If the light goes out, replace the warning switch. **NOTE:** If it is a new system check that the white wire is in the A side of the plug and that the black (colored) wire is in the B side of the plug. If the light comes on after replacing the warning switch, if it is a straight acting jack the magnet in the jack may be the problem. If the warning light does not go out after unplugging the warning switch, the black numbered wire (or colored wire) in the harness is the problem. Remove the correct wire from the (9 or 11 pin) MTA plug. If the light goes out, the wire is shorted to ground. If the warning light still does not go out, replace the light panel.	 **REFER TO MP85.1515**
d: More than one yellow level light is on or opposing yellow lights are on.	Unplug the sensing unit from the light panel. If the yellow lights remain on, replace the light panel. If the yellow lights go out, use a test light to ground the four pins on the panel one at a time. If a yellow light does not come on, or more than one yellow light comes on or the correct yellow light does not come on, replace the panel. If the lights work correctly, replace the sensing unit.	 **REFER TO MP85.1520**
e: The pump runs when the "ON" button is pushed.	The valve switch completes a ground circuit to operate the pump. Remove the bezel plate from the valve. Make sure the valve is clean. Screws, coins, nails, any metal object down inside the valve can short the jack control lever to the valve switch plate. This would start the pump. If the valve is clean, the 8600 (BLACK) wire going to the pump relay is shorted to ground or the valve switch plate is grounded. Unplug the two wire plug at the valve, if the pump continues to run the 8600 (BLACK) wire is shorted to ground. If the pump does not run, replace the valve.	 **REFER TO MP85.1515**
Part 7 **When the JACK CONTROL LEVER is moved to the EXTEND positions to operate the jacks:** **a: The Power "ON" Light goes out and the panel is off when the JACK CONTROL LEVER is moved to an EXTEND position.**	Use a test light to check between the +12 connection to the fuse holder on the panel and the park brake wire at the panel. Turn the system ON and retry. If the test light dims briefly when the JACK CONTROL LEVER is moved, the problem is a weak ground on the park brake wire or a voltage problem on the 6120 (RED) wire. Connect the test light to good ground and check the 6120 (RED) wire at the fuse holder while retrying the system. If the test light dims, the problem is with the 6120 (RED) wire. Check the 6120 (RED) wire and all connections to the ignition power source. If the light doesn't dim, the problem is the 9000 (BLUE) wire for the park brake. The problem could be the wire, wire connections or the park brake switch itself.	 **REFER TO MP85.1520**  **REFER TO MP85.1515**

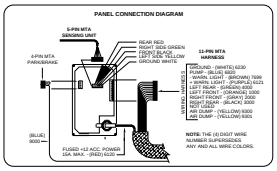
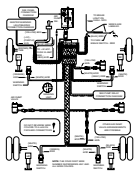
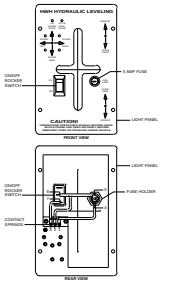
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 7 Continued **b: The pump will not run.**	With the light panel turned on, check for +12 volts at terminals 1 and 3 of the pump relay. Terminal 1 is battery power. If there is no power to terminal 1, the problem is the connections or the cable. **NOTE: Make sure all connections of the relay and pump motor are clean, tight and free of corrosion. Connections may look good but corrosion that cannot be seen may be causing problems.** If there is no power at terminal 3, check for power on the 6820 (BLUE) wire at the light panel in the (9 or 11 pin) MTA plug. If there is power at the panel, the problem is the 6820 (BLUE) wire. If there is no power at the panel, replace the panel. **If there is power at terminals 1 and 3 at the pump relay,** ground terminal 2 of the pump relay. If the pump does not run, check terminal 4 of the pump relay while terminal 2 is grounded. If there is no power on terminal 4, replace the relay. If there is power on terminal 4, check the pump motor terminal. If power is present, check the mounting of the pump. This supplies the ground for the pump motor. If the mounting is OK, replace the pump (or pump motor). If there is power on relay terminal 4 but not the motor terminal, the problem is the short cable or the connections. **If the pump runs when terminal 2 is grounded,** the problem is the 8600 wire, the 6230 wire, the connections for these wires or the valve. Unplug the pump relay harness at the valve. With the system on, ground the 8600 wire. If the pump doesn't run the 8600 wire is the problem. If the pump runs, jump the 6230 pin to the 8600 pin in the plug. If the pump does not run, the 6230 wire is the problem. If the pump runs, the switch plate in the valve is the problem.	  **FOR 200 SERIES REFER TO MP85.1520**  **FOR 210 SERIES REFER TO MP85.2015**
c: The pump will not run in all four positions.	There is only one switch plate. If the pump will not run in all four positions the JACK CONTROL LEVER is probably obstructed. Check that the valve switch plate is not bent, corroded or covered with something that may insulate the plate from the lever. Make sure the bezel plate is positioned properly and is not raised above the plastic valve box. If the lever can not travel far enough, the slots in the bezel plate can be extended.	 **REFER TO MP85.201G**
d: The pump continues to run when the lever is released.	Push the "OFF" button. If the pump continues to run, the relay is stuck and should be replaced. If the pump runs with the panel on, without moving the JACK CONTROL LEVER, refer to part 6e of the REPAIR STEPS.	
e: The red warning light does not come on when the jack is vertical or extended 1-1/2 to 2 inches.	Unplug the warning switch at the jack. Ground the pin in the B side of the harness plug. If the warning light comes on, the warning switch or the ground wire in the A side of the plug is bad. Short the A and B pins together. If the warning light comes on, replace the warning switch. If the light does not come on, repair the ground wire in the A side of the plug.	 **REFER TO MP85.2005**

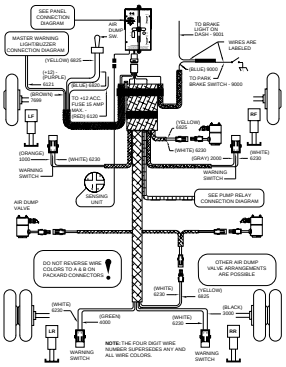
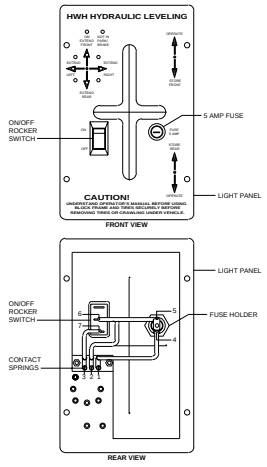
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 7 Continued	If the warning light does not come on when the pin in the B side of the plug is grounded, go to the light panel ground the correct pin for the light that will not come on. If the light comes on, the wire in the harness is the problem. If the light does not come on, replace the light panel.	
f: The Master Warning Light or Buzzer does not come on.	If the vehicle has straight acting jacks, the vehicle should have a Buzzer along with the Master Warning Light. If the vehicle has a buzzer, the light panel is supplied power from the accessory side of the ignition switch. The buzzer and the master warning light are supplied power from the ON side of the ignition switch. If only a master warning light is used, power for the warning light is supplied by the light panel. The ground side of the master warning indicators is switched to turn the indicator ON or OFF. If there is no ground on the 7699 (BROWN) wire to the indicators, the problem is the wire or the panel. If there is no power to the indicators, the problem is the 6121 (PURPLE) wire from the panel OR if the indicators are wired from the ignition, the problem is the wire or the power source. If there is power and ground to the indicators, the indicator not working should be replaced.	 **REFER TO MP85.9999**
Part 8 Air Dump check: **a: Air will not dump when the "DUMP" button is pushed.**	The light panel must be on for the "DUMP" button to work. There should be a dump valve for each height control valve. A few systems may have just one valve for the front and one for the rear. The valves are normally closed valves. The valve opens when +12 and ground are supplied to the coil of the valve. The +12 voltage is switched, the ground should be constant. There is a separate control wire for the front and rear dump valves. The 9300 (YELLOW) wire should go to the front. The 9301 (YELLOW) wire should go to the rear. Check for power at the proper pins on the light panel while pushing the "DUMP" button. If either pin has no power, replace the panel. If both pins have +12 power, check for +12 power at the dump valves. If +12 volts and ground is present at the valve, but the valve will not open, the valve is the problem. Make sure the air outlet is not plugged. Replace the valve if necessary.	 **REFER TO MP85.1520**
b: The vehicle will not return to ride height when the "DUMP" button is released. (The vehicle engine must be running)	There should be no power to the dump valves unless the "DUMP" button is being pushed. If there is power on the 9300 (YELLOW) or 9301 (YELLOW) wire when the button is not being pushed, replace the light panel. If there is no power to the dump valves but a valve will not close, replace the valve. If the valves are closed but the vehicle will not return to ride height, the problem is the air suspension.	 **REFER TO MP85.1515**

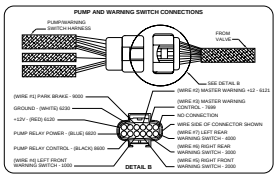
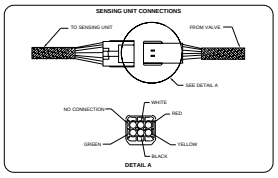
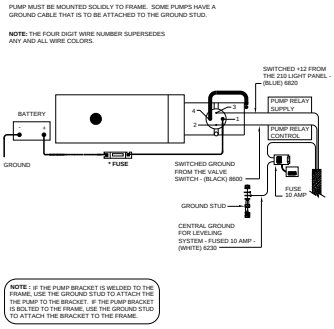
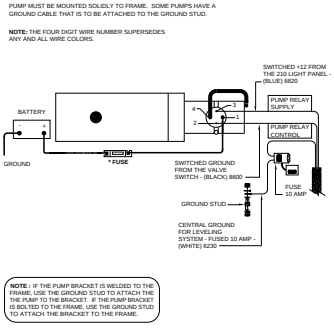
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 9 **The yellow level indicator lights are not working properly:**		
a: As soon as a yellow light goes out, an opposing light comes on.	If the sensing unit can not be adjusted to get all of the yellow lights out at once, the sensing unit may be to sensitive and should be replaced.	
b: A yellow light can not be made to come on or opposing yellow lights are on.	The light panel must be on. Use a test light to ground each of the four pins for the yellow lights. The pin for the white wire supplies the ground for the sensing unit. One yellow light should come on for each pin when it is grounded. If a yellow light does not come on or more than one yellow light or the wrong yellow light comes on, replace the light panel. If the yellow light work properly replace the sensing unit.	
c: More than one yellow light is on at a time.	If opposing yellow lights are on, refer to part 9b. If a side and a front light or a side and a rear light are on, replace the light panel.	
d: No yellow lights will come on.	Connect a test light to the fuse holder check for +12 power. Check the ground pin for the sensing unit. If there is no ground, replace the light panel. If there is ground on that pin, refer to part 9b to complete the test.	 **REFER TO MP85.1520**
Part 10 **The warning lights will not go out with the jacks retracted:**	See Part 6c of the REPAIR STEPS.	
ELECTRICAL DIAGNOSTICS - 210 SERIES		
Part 11 **With the ignition switch off:**		
a: A light on the light panel is on.	There should be no power to the light panel. Trace the wire to it's source. It should be connected to the "ACC" side of the ignition switch.	 **REFER TO MP85.2005**
Part 12 **With the ignition in the "ON" or "ACC" position:**		
a: The "ON" light or yellow level lights are lit.	If the ON/OFF rocker switch is off, remove and replace the panel. The three contact springs may not be positioned properly. DO NOT "wiggle" the panel when installing. Push it straight down and apply the mounting screws. If this does not fix it, replace the panel. If the rocker switch is on, turn it off. If the lights stay on, replace the panel.	 **REFER TO MP85.201D**

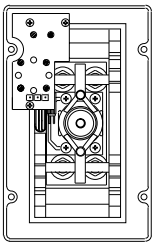
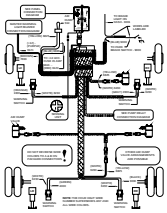
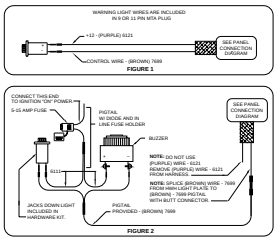
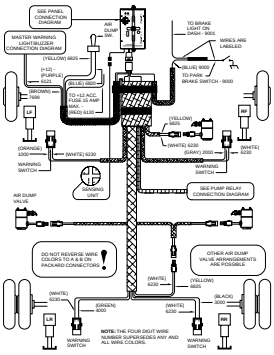
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 12 Continued **b: A red warning light is on. No jacks are vertical or extended.** **NOTE: The 4 red warning lights will work with the ignition on and the panel off for the 210 system only.**	Unplug the warning switch for the red warning light that is lit. If the light goes out, replace the switch. If the light still does not go out, there may be a problem with the magnet in a Straight-Acting jack. Make sure the wires are in the correct A and B positions in the plug. If the warning light does not go out with the switch unplugged, the black (colored) wire in the harness is shorted to ground.	 **REFER TO MP85.2005**
Part 13 **With the ignition on and the ON/ OFF rocker switch in the "ON" position:** **a: The "ON" light will not come on. No other lights are on.**	Check the 5AMP fuse in the light panel. **If the 5AMP fuse is blown,** turn the ignition off and replace the fuse. Turn the ignition on. If the fuse blows the problem is the light plate in the valve or the 7699 (BROWN) wire going to the Master Warning Light. If the 7699 (BROWN) wire is not being used, replace the light board with pigtail (or complete valve). If the fuse does not blow, push the rocker switch to "ON". If the fuse blows, the problem is the light board, the 6820 (BLUE) wire or the pump relay. Turn the panel off, replace the fuse and remove the 6820 (BLUE) wire from the pump relay. Turn the panel on. If the fuse does not blow, replace the pump relay. If the fuse blows, the 6820 (BLUE) wire is shorted to ground or the light board is bad. With the rocker switch off, the 6820 (BLUE) wire disconnected from the pump relay and the harness unplugged from the valve, check for continuity to ground on the 6820 (BLUE) wire. If there is a ground, fix the 6820 (BLUE) wire. If there is no ground on the 6820 (BLUE) wire, replace the light board (or complete valve). **If the fuse is not blown,** check that the four mounting screws for the valve are tight. If the screws are loose or stripped out, the three springs on the light panel may not be contacting the light board in the valve properly. Unplug the harness from the valve. Check for +12 power and ground on the appropriate pins in the harness plug. The +12 volt wire is 6120 (RED) and the ground is 6230 (WHITE). Be careful not to short against other pins. If there is no power or ground, fix the wire or problems with the source of the power or ground. If there is power and ground, remove the light panel. Make sure the three contact springs are OK. With a good fuse in place check for continuity between terminals 4 and 5. No continuity would be a bad fuse holder. Check for continuity between spring 1 and terminal 6. If there is no continuity, there is a problem with the fuse holder or these connections. With the rocker switch ON, check for continuity between terminals 6 and 7. No continuity means the switch is bad. With the rocker switch ON, there should be continuity between springs 1,2 and 3. If there is no continuity, replace the light panel. If the light panel is OK and there is power and ground to the valve, the light board is bad and should be replaced.	**FOR THE 5AMP FUSE REFER TO MP85.201D** **FOR THE LIGHT PLATE REFER TO MP85.201G** **FOR THE 7699 WIRE REFER TO MP85.9999** **FOR THE 6820 WIRE REFER TO MP85.2015** **FOR THE 6120 WIRE REFER TO MP85.2017** **FOR EVERYTHING ELSE REFER TO MP85.201D**  **REFER TO MP85.201D**

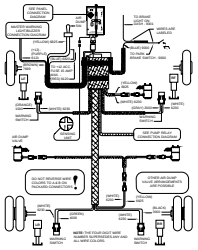
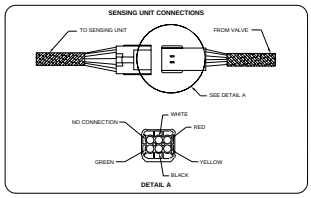
REPAIR STEPS

PROBLEM	SOLUTION	FIGURES
Part 13 Continued **b: The park brake light is lit.**	Make sure the park brake is set. Unplug the harness from the valve. Check for a ground on the 9000 (BLUE) wire in the harness. If there is a ground, replace the light board. If there is no ground the problem is the park brake switch, the 9000 (BLUE) wire or the connections for the 9000 (BLUE) wire.	 **REFER TO MP85.2017**
c: More than one yellow level light is lit.	If a front and a side light or a rear and a side light are on replace the light board. If opposing lights are on, unplug the sensing unit. If any yellow lights remain on, replace the light board. There are five wires in the plug from the valve, one white and four colored wires. Ground the pins for the colored wires one at a time. One light should light for each pin. If the lights work correctly replace the sensing unit. If the lights do not work correctly, replace the light board.	 **REFER TO MP85.2017**
d: The pump runs. The Jack Control Lever is in the center position.	The 6820 (BLUE) wire supplies +12 volts to the pump relay when the panel is turned on. If the 8600 (BLACK) wire is grounded, the pump will run. Remove the light panel. Make sure the valve switch plate contact ring is not touching any part of the valve. Make sure nothing is shorting the switch plate contact ring to the Jack Control Lever on the switch plate mounting screws. If this is OK, unplug the harness from the valve and disconnect the 8600 (BLACK) wire from the pump relay. Check for continuity between the 8600 (BLACK) wire and ground. Fix the 8600 (BLACK) wire if it is shorted to ground. If not replace the valve.	 **REFER TO MP85.2015**
Part 14 When the Jack Control Lever is moved to the four extend positions: **a: The pump does not run when the Jack Control Lever is pushed to any position.**	With the panel on, check for +12 volts on terminal 3 of the pump relay. If power is not present, the problem is the 6820 (BLUE) wire or the light board in the valve. If there is +12 volts on terminal 3, check for +12 volts on terminal 1 from the battery. If no voltage is present, check the connections, cable, battery and fuse if one is used. If voltage is present at terminals 1 and 3, apply a ground to terminal 2. If the pump runs, the problem is the 8600 (BLACK) wire or the valve switch plate assembly or connections. If the pump does not run, check terminal 4 for +12 volts while terminal 2 is grounded. If voltage is present, check the cable to the pump motor and it's connections. Make sure they are tight and free from corrosion. Make sure the pump has a good frame connection, the motor is internally grounded. If this is all OK, replace the pump motor. If there is voltage on terminals 1 and 3, and terminal 2 is grounded and there is no voltage at terminal 4, replace the pump relay. **NOTE: If checking voltage levels, this must be done with the pump running.**	 **REFER TO MP85.2015**

REPAIR STEPS

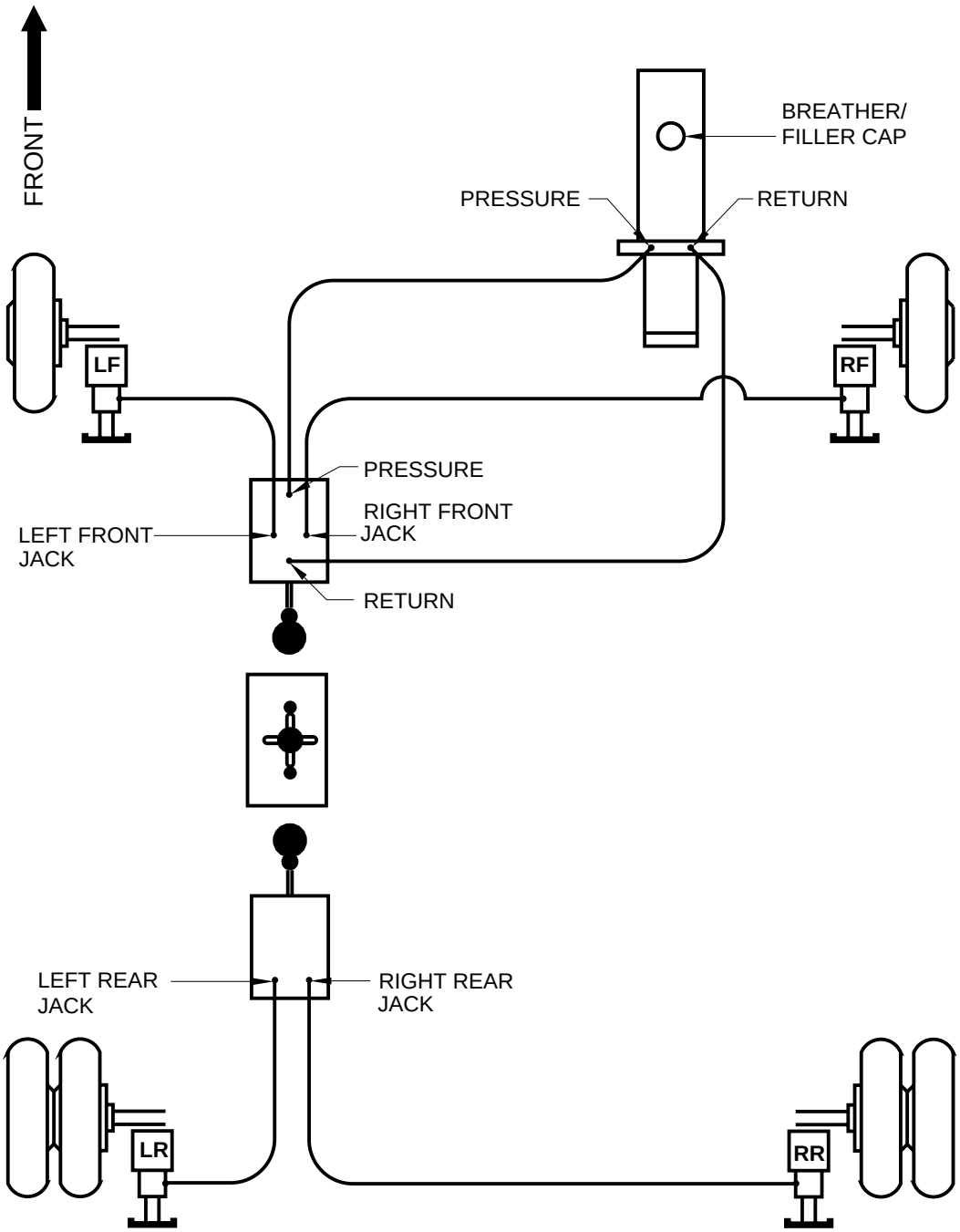
PROBLEM	SOLUTION	FIGURES
Part 14 Continued **b: The pump runs but not in all four positions.**	The problem has to be at the valve switch plate. Make sure the light panel is properly positioned on the valve. Check for a substance which could insulate the Jack Control Lever from the valve switch plate. Over spray from glue or paint could cause a problem. If cleaning the switch plate does not help, the valve will have to be replaced.	 **REFER TO MP85.201G**
c: The pump will not shut off.	Turn the panel OFF. If the pump continues to run, the pump relay is stuck and should be replaced. If the pump stops, refer to part 13d of the REPAIR STEPS, there is a problem with the 8600 (BLACK) wire or the switch plate assembly.	
d: A red light will not come on when a jack is vertical or extended approximately 1-1/2 inches.	Unplug the warning switch for the light that does not work. Short the two pins in the harness plug together. If the light comes on, replace the warning switch. If the light does not come on, apply a ground to the pin in the B side of the plug for the colored or black wire. If the light comes on, there is a problem with the ground wire in the A side of the plug. If the light does not come on, the problem is the colored or black wire in the harness or the light board in the valve.	 **REFER TO MP85.2005**
e: The Master Warning Indicators do not come on.	The Master Warning Light and Buzzer, if so equipped, should come on if any one red warning light on the light panel is on. If only a Master Warning Light is used, power for the light is supplied by the light board on the 6121 (PURPLE) wire. Check for +12 voltage on the 6121 (PURPLE) wire and ground on the 7699 (BROWN) wire when a red warning light is on. If voltage or ground is not present the problem is the wire or the light board. If voltage and ground is present, replace the warning light. If a Buzzer is being used with the Master Warning Light, +12 voltage for the light and buzzer is being supplied from a separate, fused pigtail connected to the "ON" side of the ignition. If power is not present with the ignition on, check the fuse and connections for the pigtail to the ignition "ON" power source.	 **REFER TO MP85.9999**
Part 15 Air Dump check: **a: Air will not dump when the DUMP switch is pushed.**	The light panel must be on and the park brake must be set for the Dump switch to work. There should be a dump valve for each height control valve. A few systems may have just one valve for the front and one valve for the rear. The valves are normally closed valves. The valve opens when +12 voltage and ground is supplied to the coil of the valve. The +12 voltage is switched and the ground is constant. Check for +12 voltage on the 6820 (BLUE) wire at the Dump switch. If voltage is not present and the pump runs to operate the jacks, the problem is in the 6820 (BLUE) wire going to the DUMP switch. If voltage is present on the 6820 (BLUE) wire at the switch, check for voltage on the 6825 (YELLOW) wire at the switch while pushing the switch to DUMP. If voltage is present at the switch, check for voltage and ground at the dump valves while pushing the switch if voltage is present, replace the valve. If voltage or ground is not present, the problem is the wiring.	 **REFER TO MP85.2005**

REPAIR STEPS

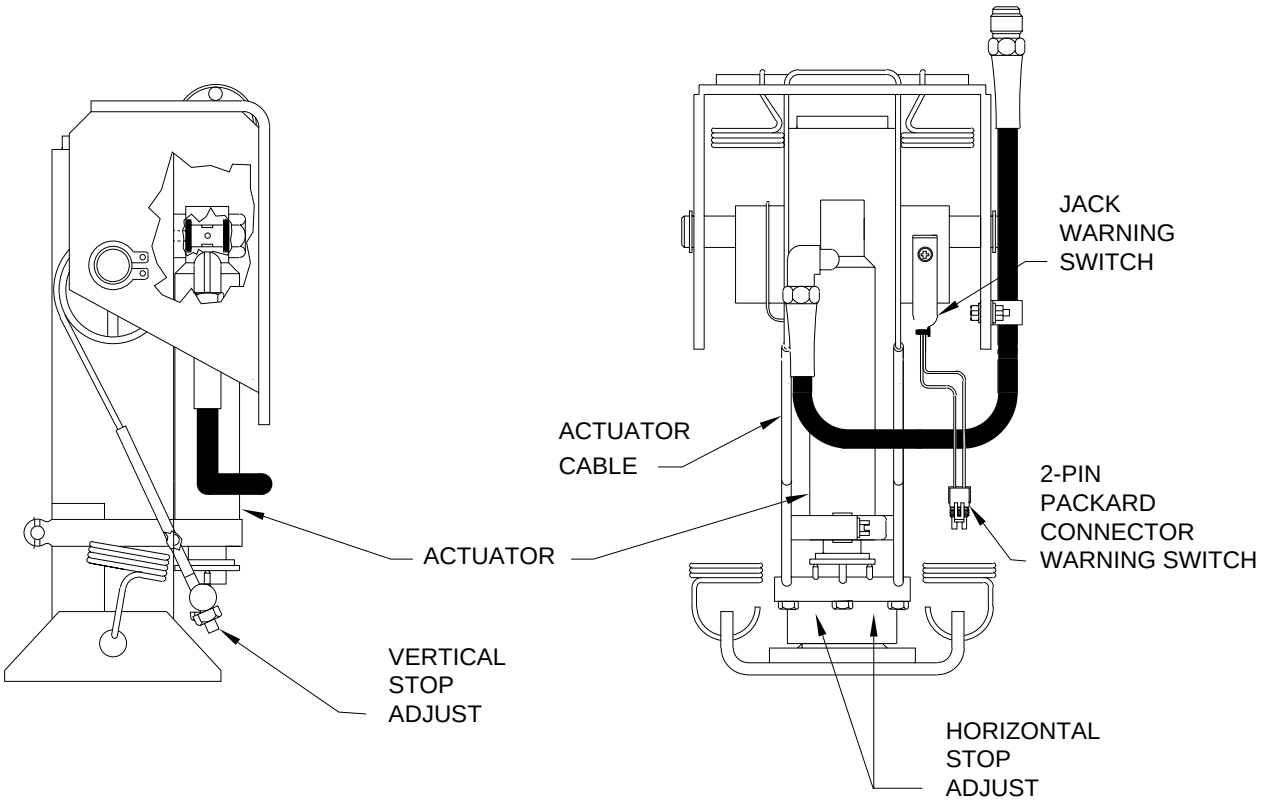
PROBLEM	SOLUTION	FIGURES
Part 15 Continued **b: The vehicle will not return to ride height. (The vehicle engine should be running).**	If the panel is on, check for voltage on the 6825 (YELLOW) wire. If voltage is present replace the DUMP switch. If there is no voltage on the 6825 (YELLOW) wire but one or more dump valves will not close, replace the valves that will not close. If the panel is off and there is power to the 6825 (YELLOW) wire, there is a problem with the light board.	 **REFER TO MP85.2005**
Part 16 **a: A soon as a yellow light goes out an opposing light comes on.**	If the sensing unit can not be adjusted to get all of the yellow lights out at once, the sensing unit may be to sensitive and should be replaced.	
b: A yellow light can not be made to come on or opposing yellow lights are on.	The light panel must be on. Unplug the sensing unit. There are 5 pins in the plug from the valve. There is a different colored wire for each pin. The white wire is a common ground each other wire controls one yellow light. Use a test light to ground each pin except the pin for the white wire. Only one light should come on for each pin. If the panel works correctly replace the sensing unit. If a light will not come on or more than one light comes on for a pin, replace the light board.	 **REFER TO MP85.2017**
c: More than one yellow light is on at a time.	If opposing lights are on, refer to Part 16b. If a side and a front light or a side and a rear light are on, replace the light board.	
d: No yellow lights will come on.	Unplug the sensing unit. In the plug from the valve, check for continuity between ground and the pin for the white wire. If there is no ground, replace the light board. If there is ground, refer to Part 16b to complete the tests.	**REFER TO MP85.2017**
Part 17 **The warning lights will not go out with the jacks retracted.**	See Part 12b of the REPAIR STEPS.	

HYDRAULIC LINE
CONNECTION DIAGRAM
200/210/225 SERIES BI-AXIS VALVE

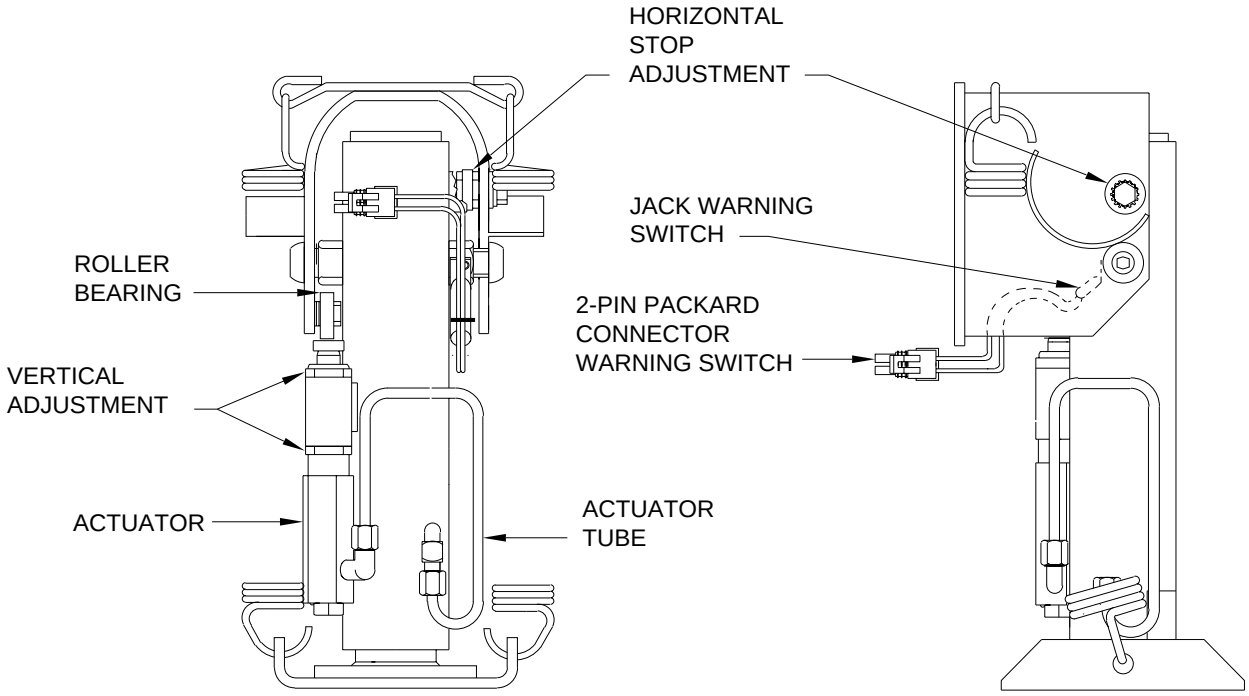
NOTE: Hose fittings at the pump will come directly out of the pump or if equipped with a room manifold, out of the top of the room manifold.



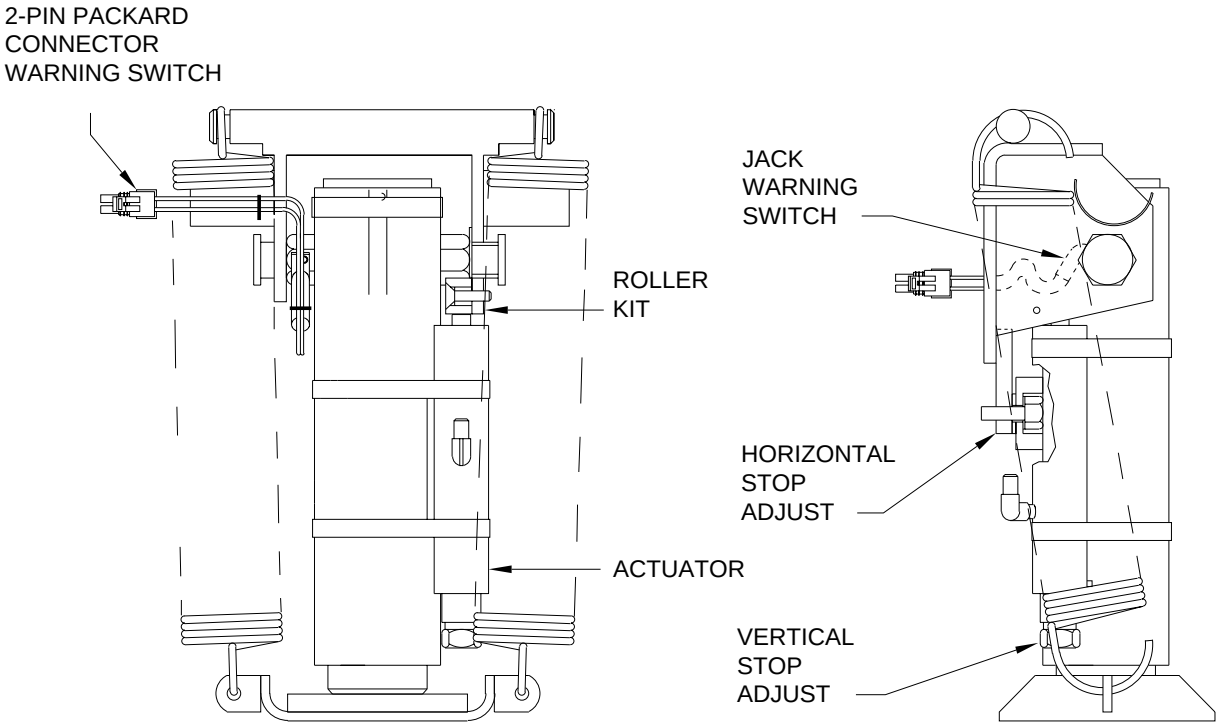
6000# KICK-DOWN JACK FOR ALL MANUAL LEVELING SYSTEMS WITH 2-WIRE WARNING SWITCH



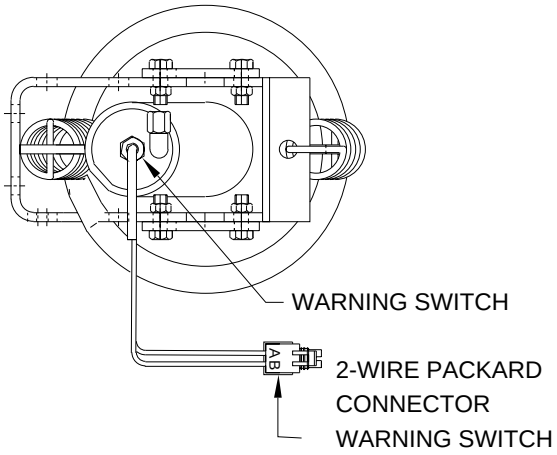
9000# KICK-DOWN JACK FOR ALL MANUAL LEVELING SYSTEMS WITH 2-WIRE WARNING SWITCH

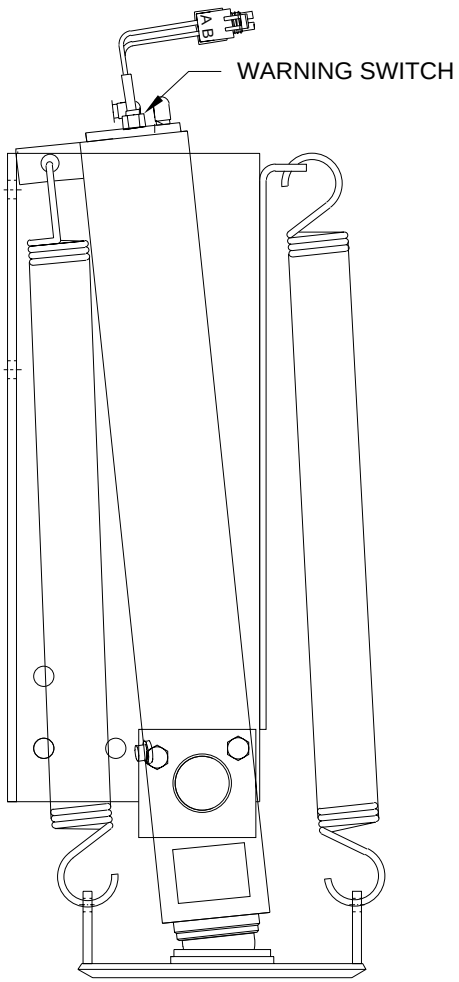


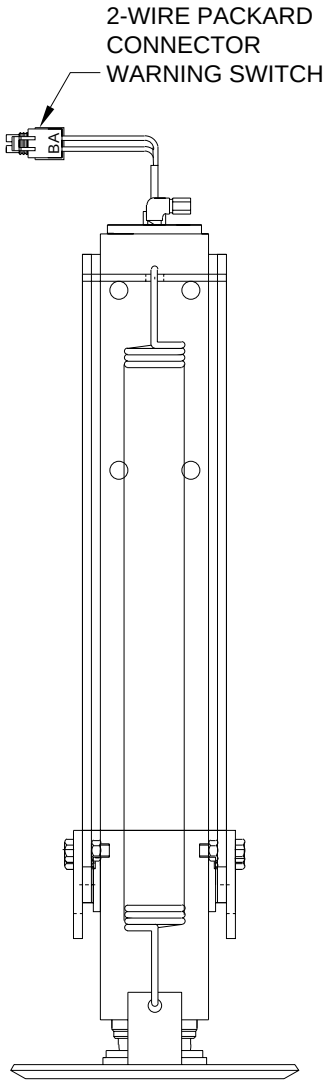
16000# KICK-DOWN JACK FOR ALL MANUAL LEVELING SYSTEMS WITH 2-WIRE WARNING SWITCH



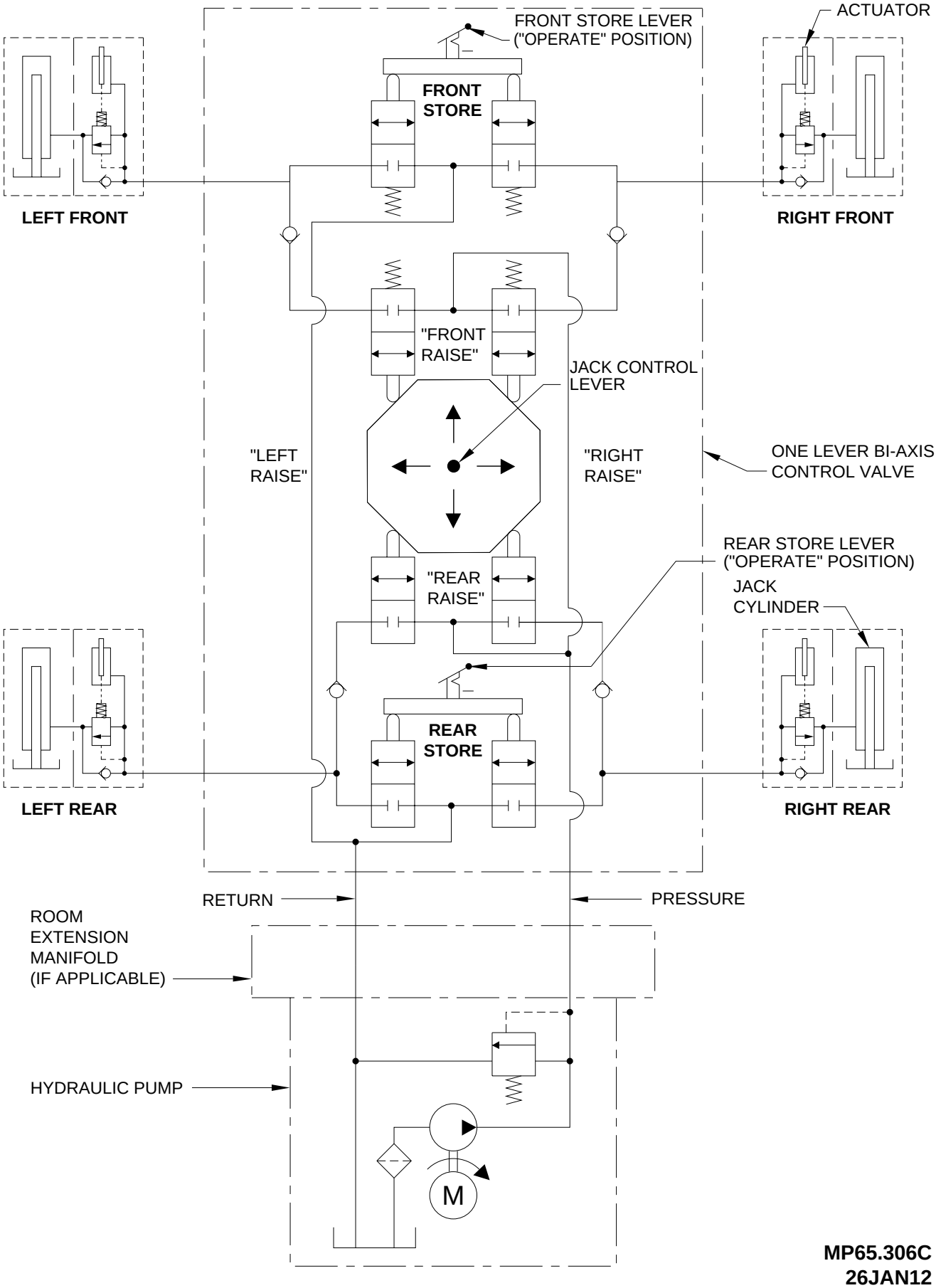
STRAIGHT-ACTING JACK FOR ALL MANUAL LEVELING SYSTEMS
WITH 2-WIRE WARNING SWITCH
RETURN SPRINGS SIDE / SIDE



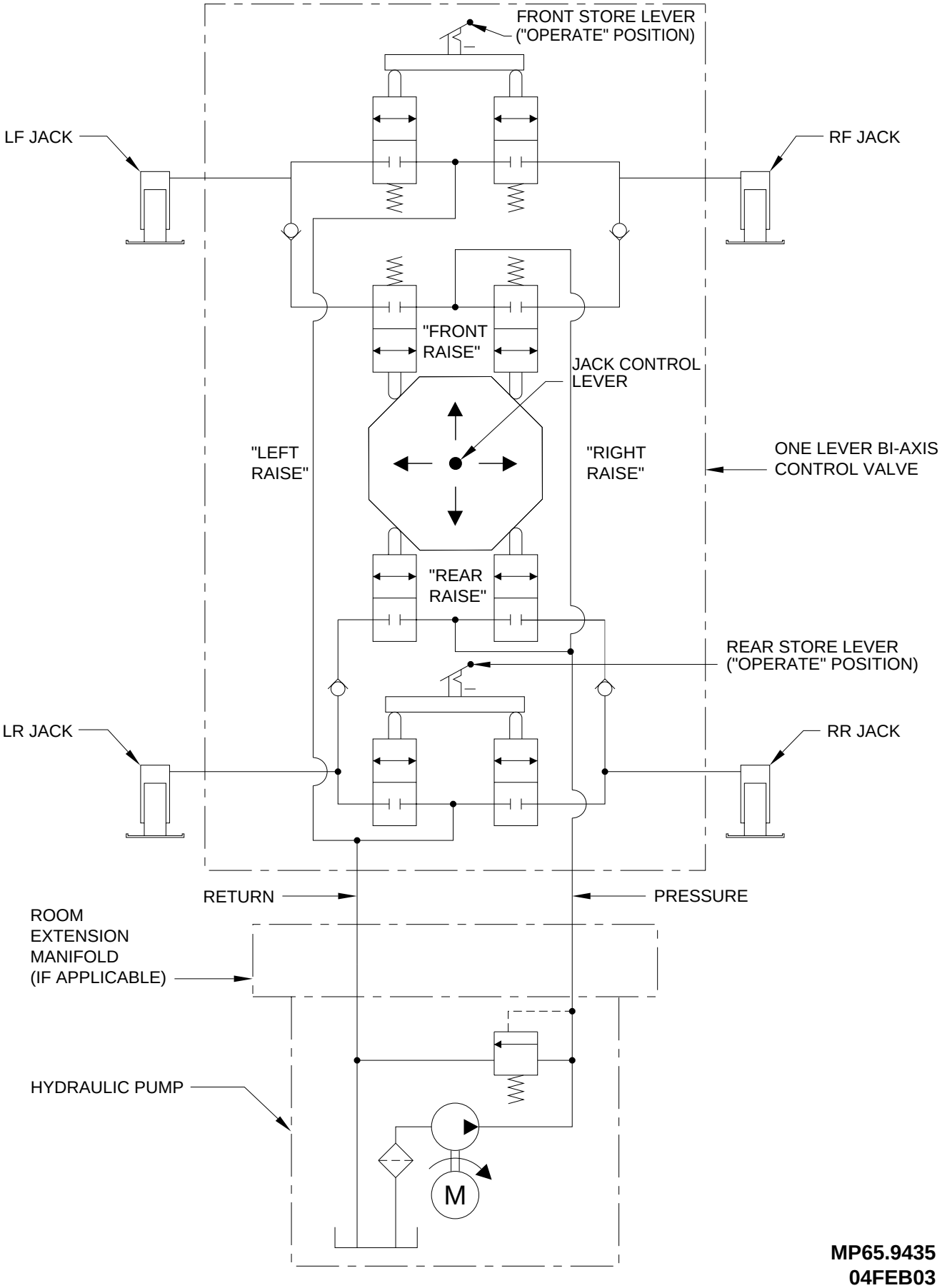




HYDRAULIC SCHEMATIC DIAGRAM
200/210/225 SERIES JOY STICK BI-AXIS LEVELING SYSTEM
WITH KICK-DOWN JACKS

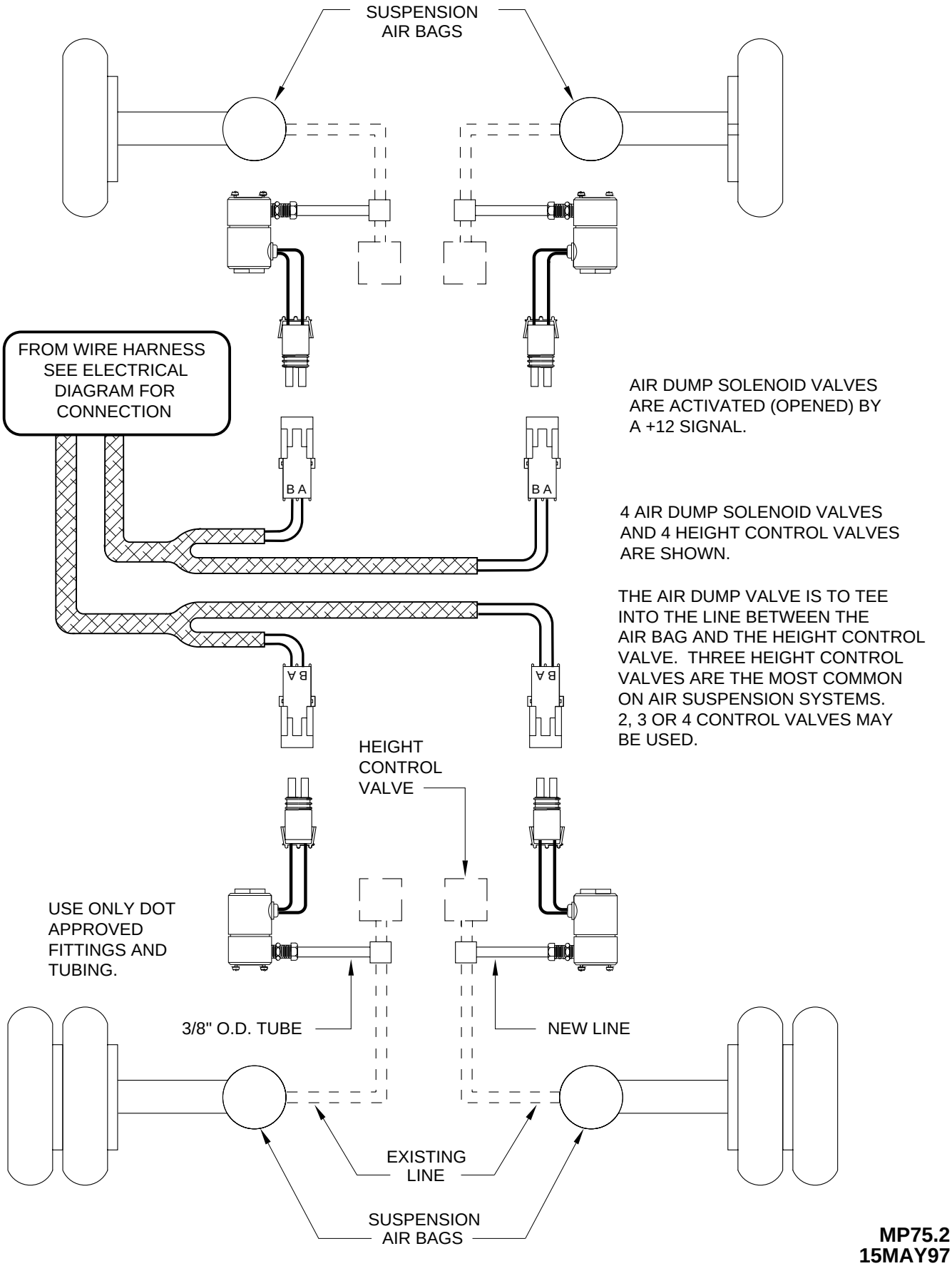


HYDRAULIC SCHEMATIC DIAGRAM
200/210/225 SERIES JOY STICK BI-AXIS LEVELING SYSTEM
WITH STRAIGHT-ACTING JACKS



MP65.9435
04FEB03

AIR LINE CONNECTION DIAGRAM

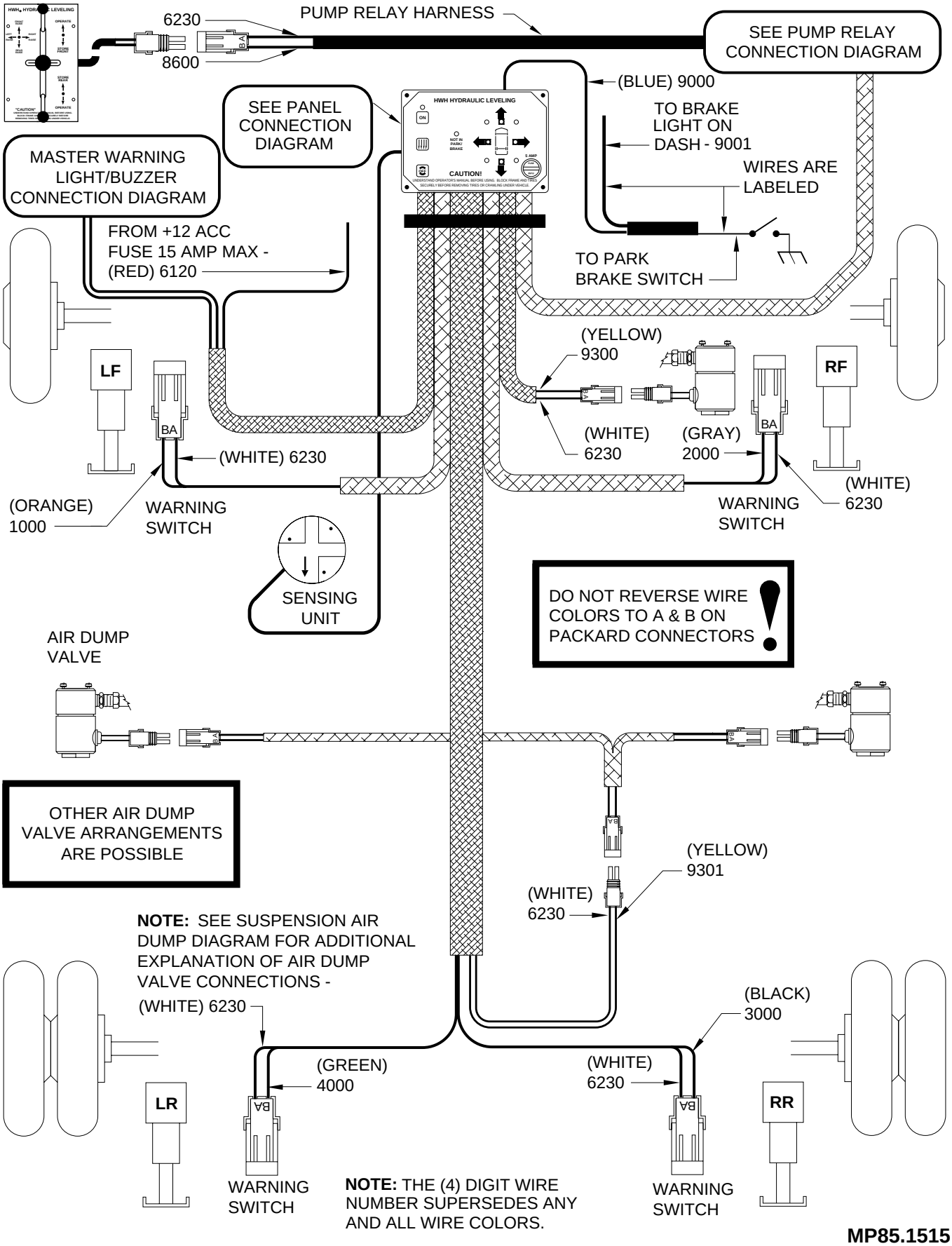


AIR DUMP SOLENOID VALVES ARE ACTIVATED (OPENED) BY A +12 SIGNAL.

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.

ELECTRICAL CONNECTION DIAGRAM
200 SERIES BI-AXIS VALVE
WITH SUSPENSION AIR DUMP

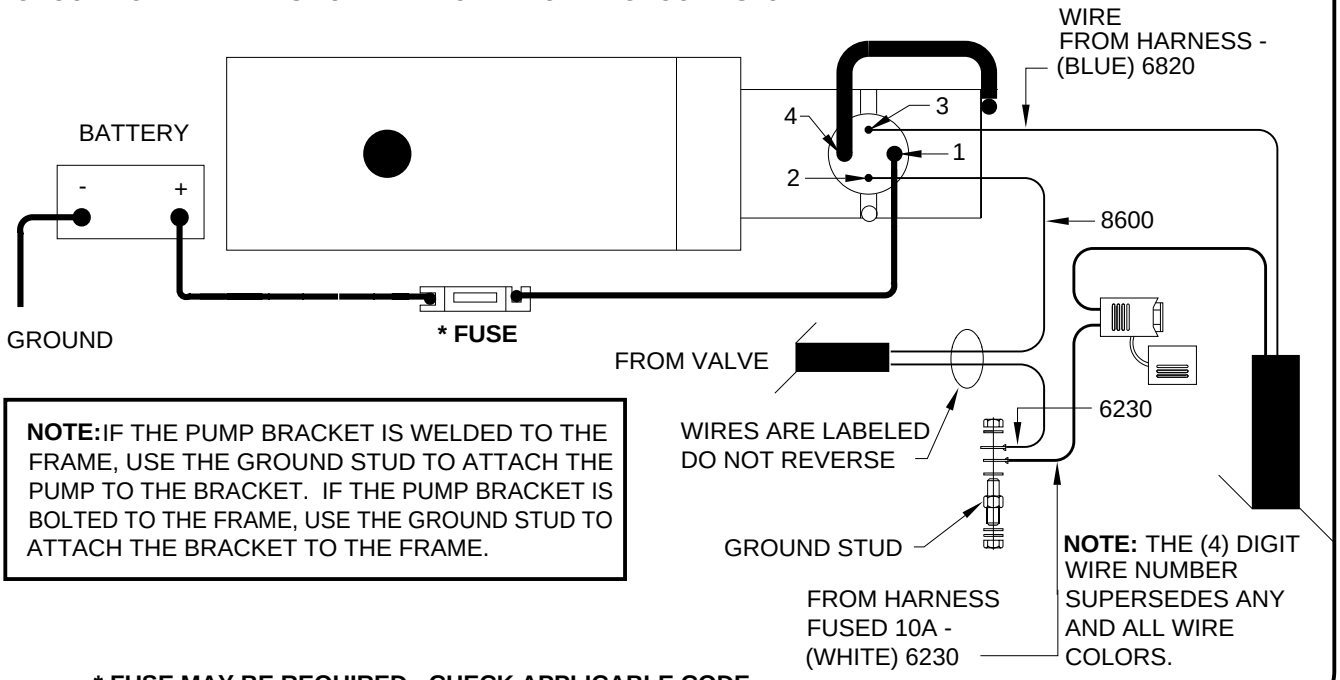


MP85.1515
02JAN01

ELECTRICAL CONNECTION DIAGRAM
200 LEVELING SYSTEM
BI-AXIS VALVE
WITH SUSPENSION AIR DUMP

PUMP RELAY CONNECTION DIAGRAM

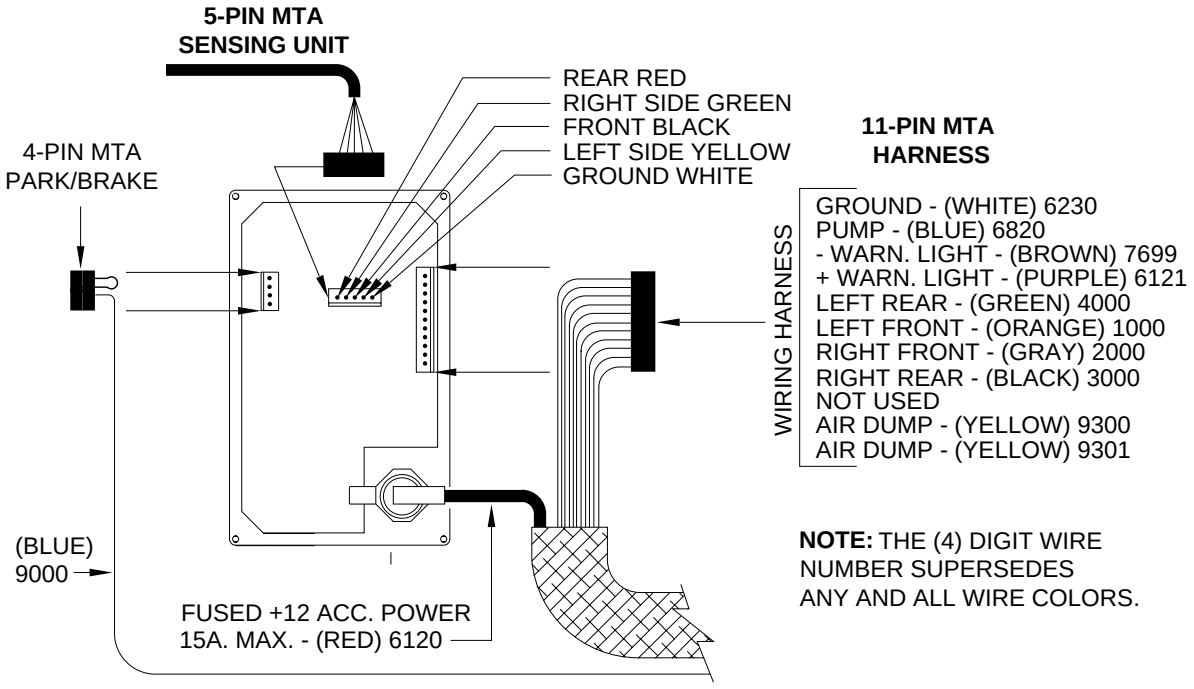
PUMP MUST BE MOUNTED SOLIDLY TO FRAME. SOME PUMPS HAVE A GROUND CABLE THAT IS TO BE ATTACHED TO THE GROUND STUD.



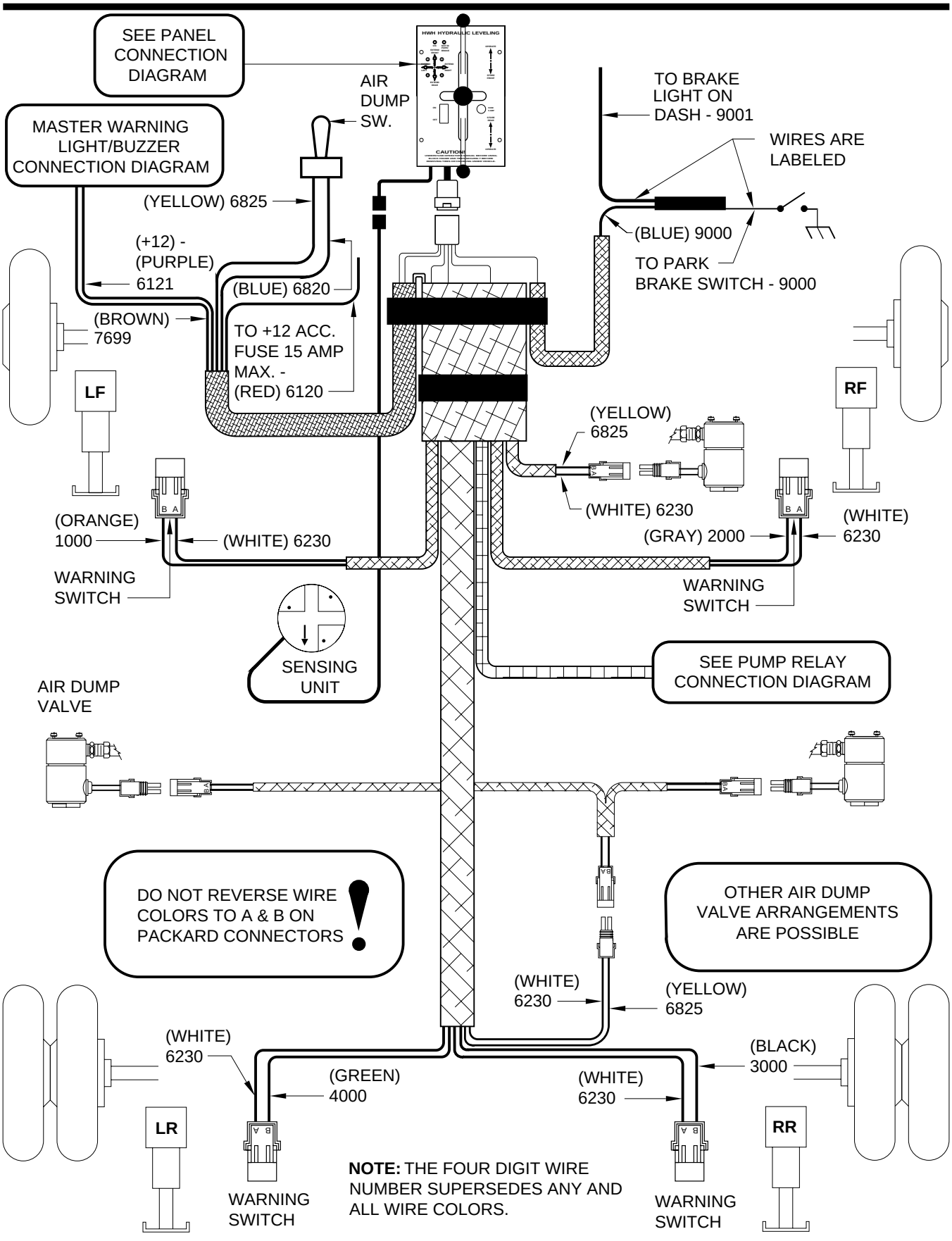
NOTE: IF THE PUMP BRACKET IS WELDED TO THE FRAME, USE THE GROUND STUD TO ATTACH THE PUMP TO THE BRACKET. IF THE PUMP BRACKET IS BOLTED TO THE FRAME, USE THE GROUND STUD TO ATTACH THE BRACKET TO THE FRAME.

*** FUSE MAY BE REQUIRED - CHECK APPLICABLE CODE**

PANEL CONNECTION DIAGRAM



ELECTRICAL CONNECTION DIAGRAM
210 SERIES BI-AXIS VALVE

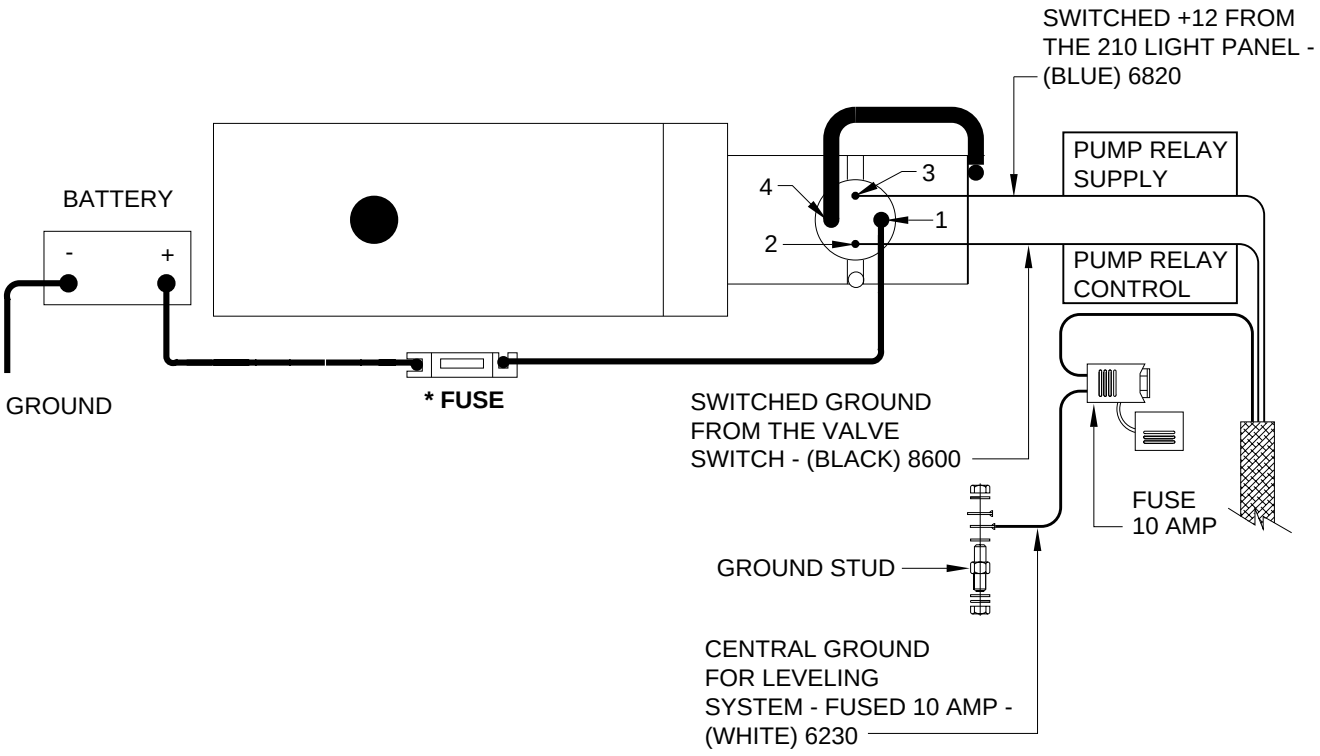


ELECTRICAL CONNECTION DIAGRAM
200/210/225 SERIES BI - AXIS VALVE
PUMP RELAY

PUMP RELAY CONNECTION DIAGRAM

PUMP MUST BE MOUNTED SOLIDLY TO FRAME. SOME PUMPS HAVE A GROUND CABLE THAT IS TO BE ATTACHED TO THE GROUND STUD.

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

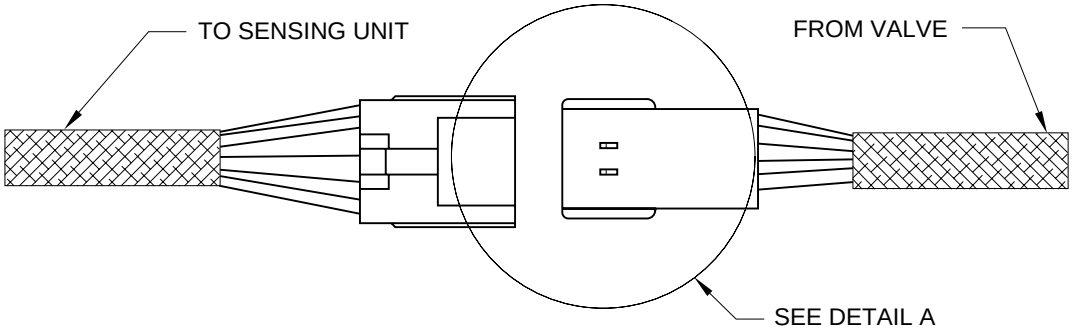


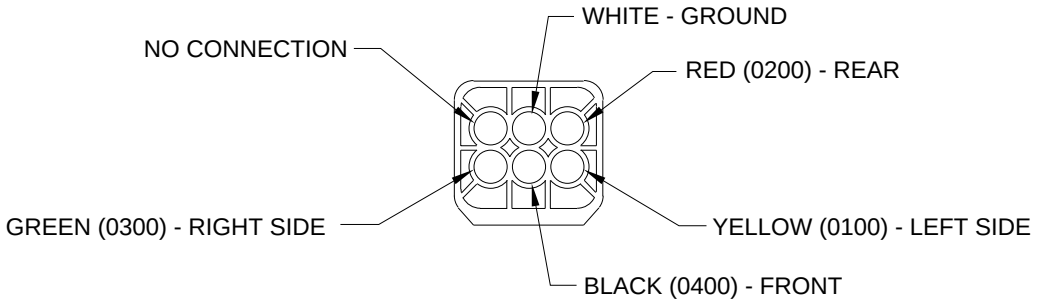
NOTE: IF THE PUMP BRACKET IS WELDED TO THE FRAME, USE THE GROUND STUD TO ATTACH THE THE PUMP TO THE BRACKET. IF THE PUMP BRACKET IS BOLTED TO THE FRAME, USE THE GROUND STUD TO ATTACH THE BRACKET TO THE FRAME.

*** FUSE MAY BE REQUIRED - CHECK APPLICABLE CODE**

ELECTRICAL CONNECTION DIAGRAM
210 SERIES PANEL CONNECTIONS

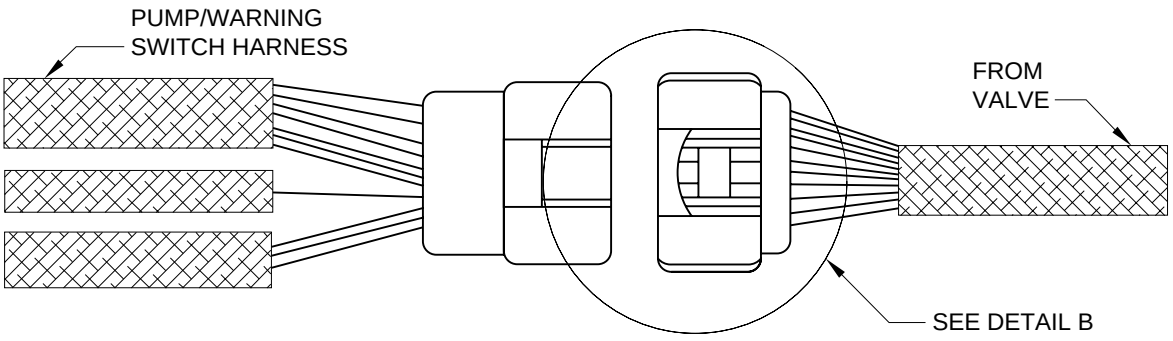
SENSING UNIT CONNECTIONS

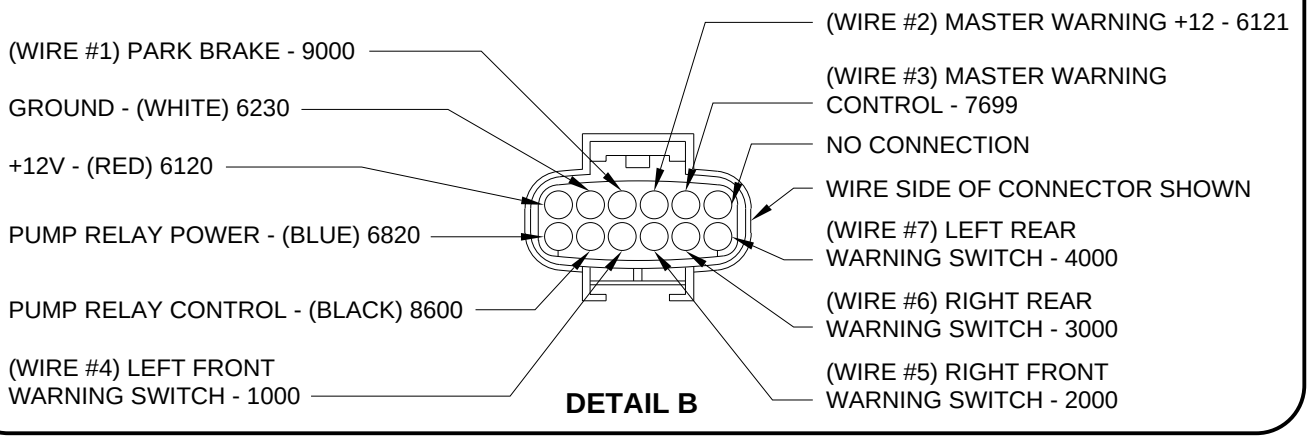




DETAIL A

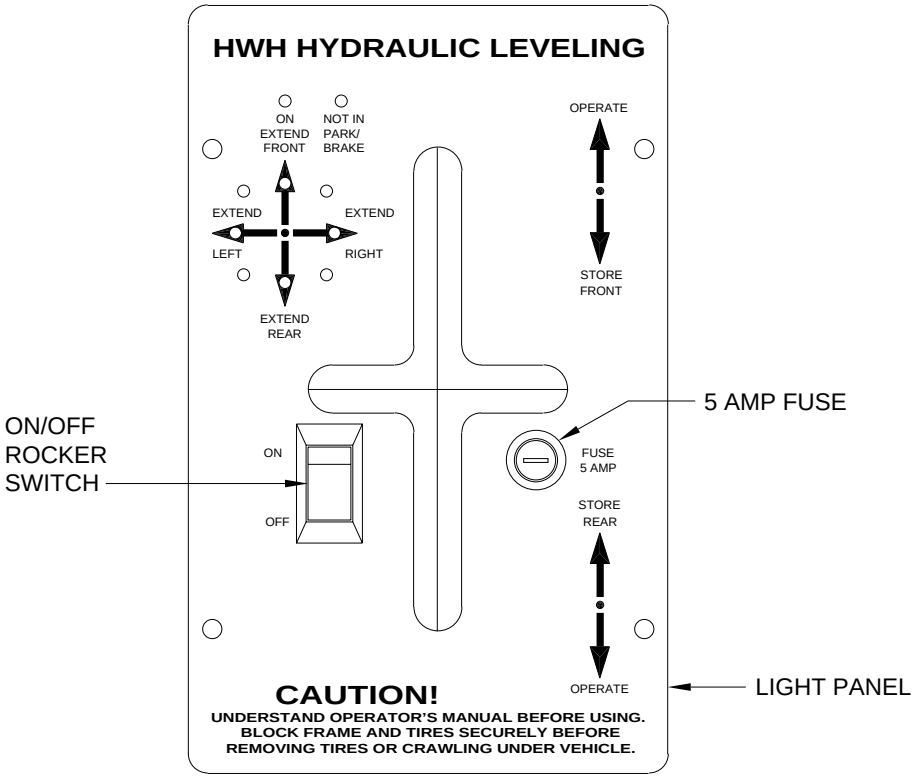
PUMP AND WARNING SWITCH CONNECTIONS



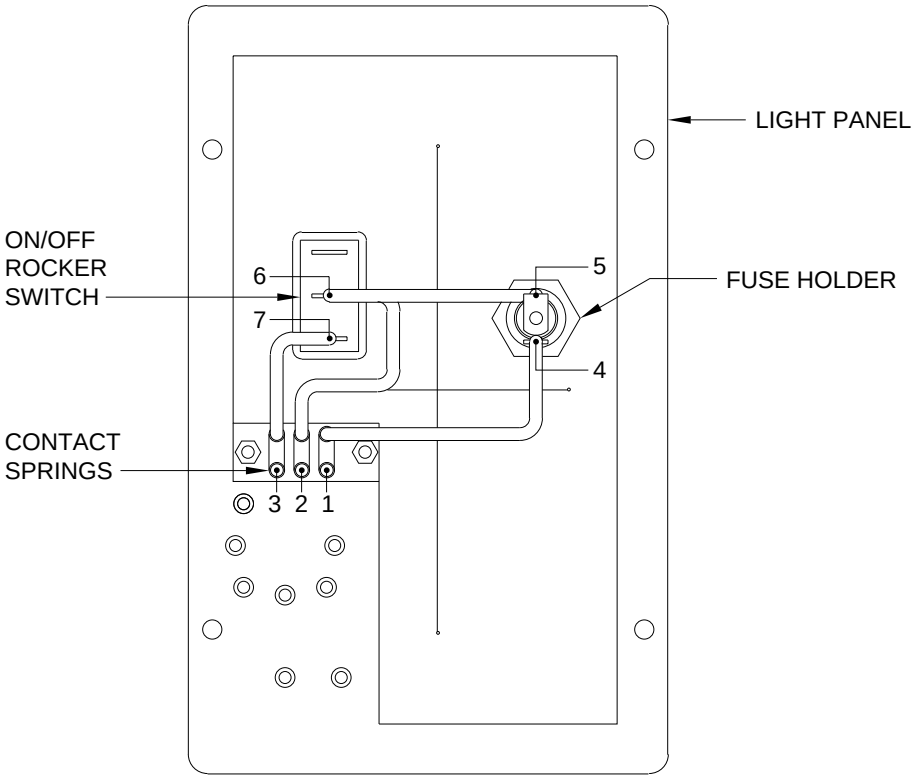


DETAIL B

ELECTRICAL CONNECTION DIAGRAM
210 SERIES LEVELING SYSTEM
LIGHT PANEL

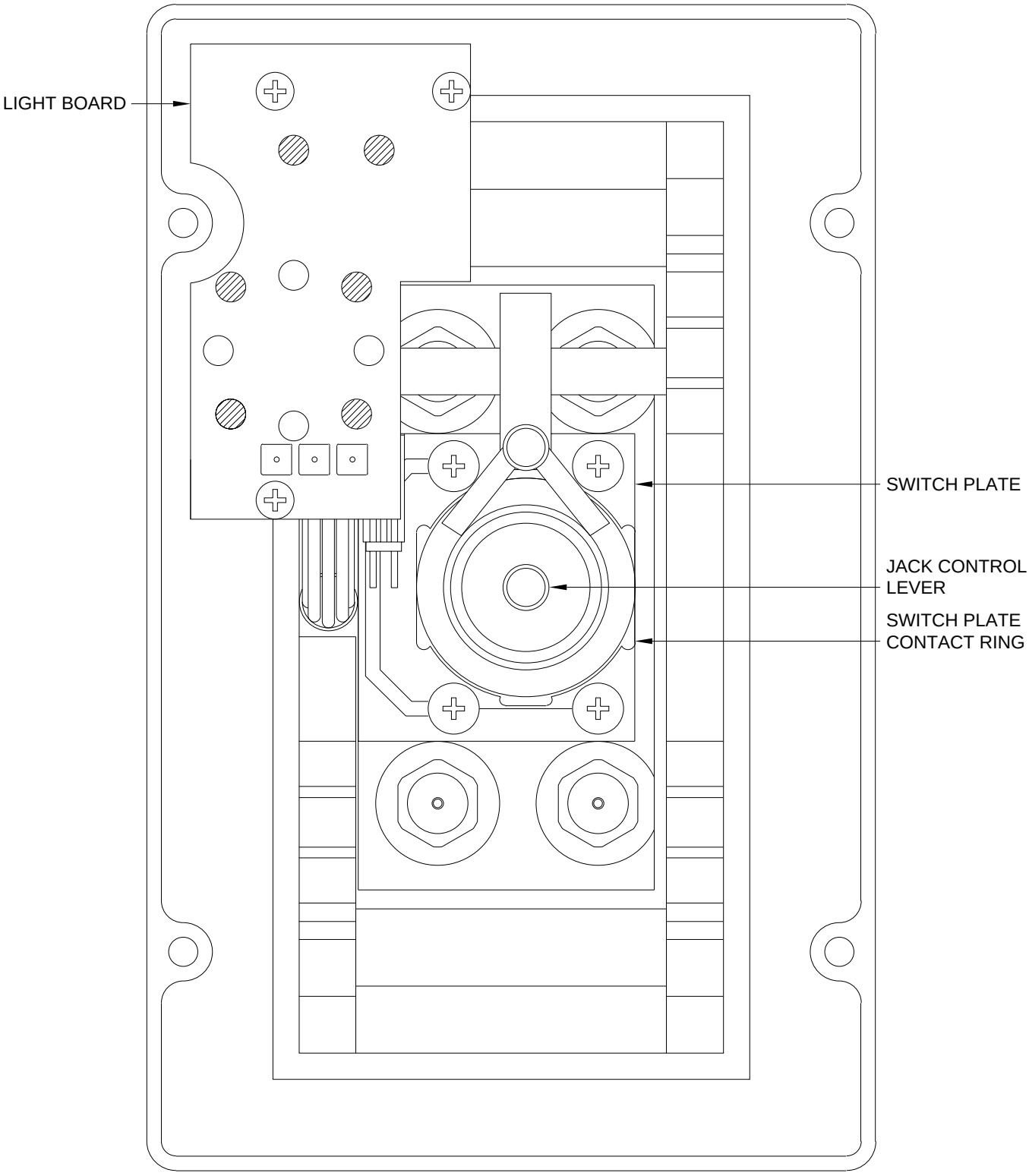


FRONT VIEW



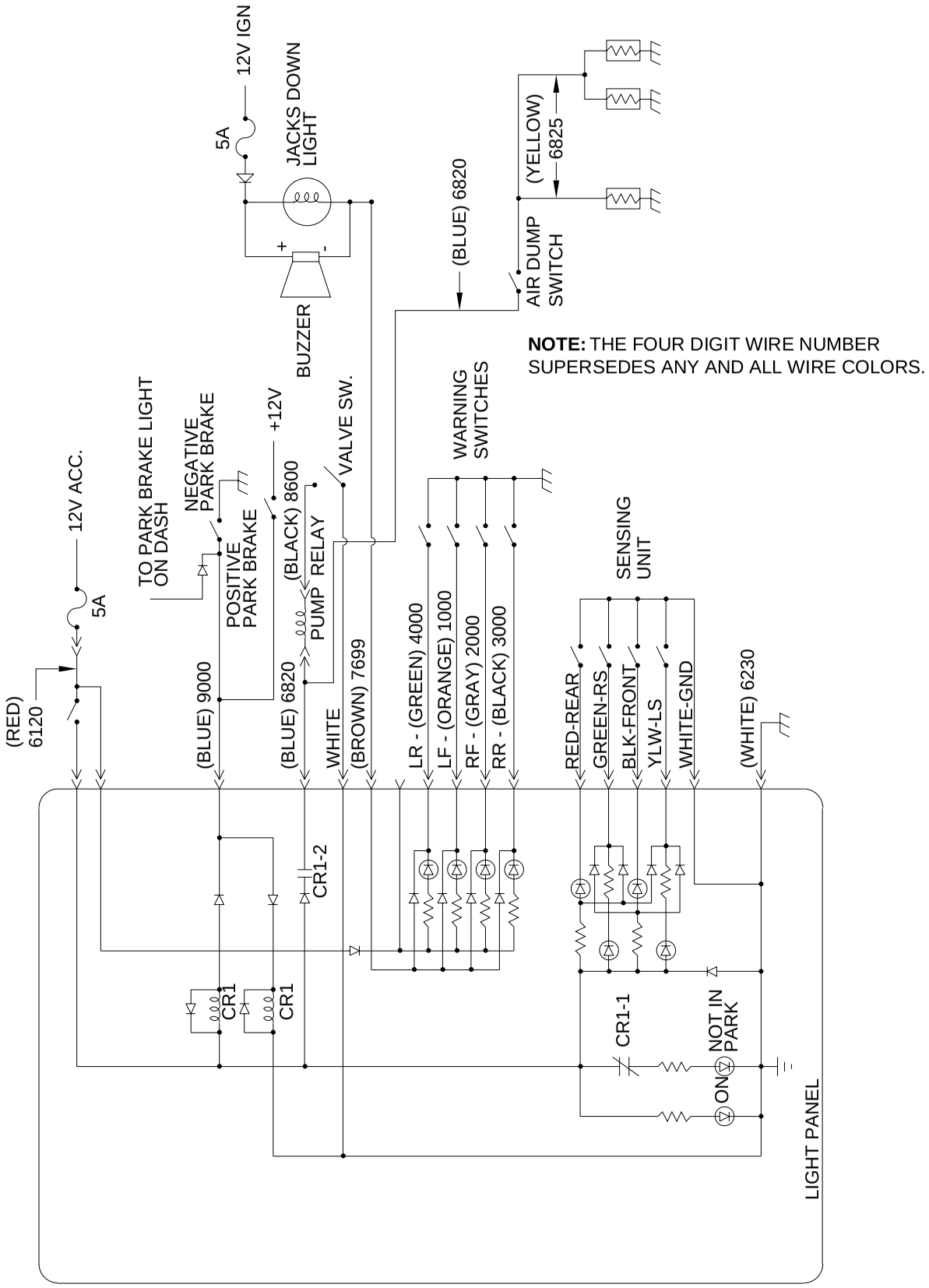
REAR VIEW

ELECTRICAL CONNECTION DIAGRAM
210 SERIES LEVELING SYSTEM
VALVE BOX



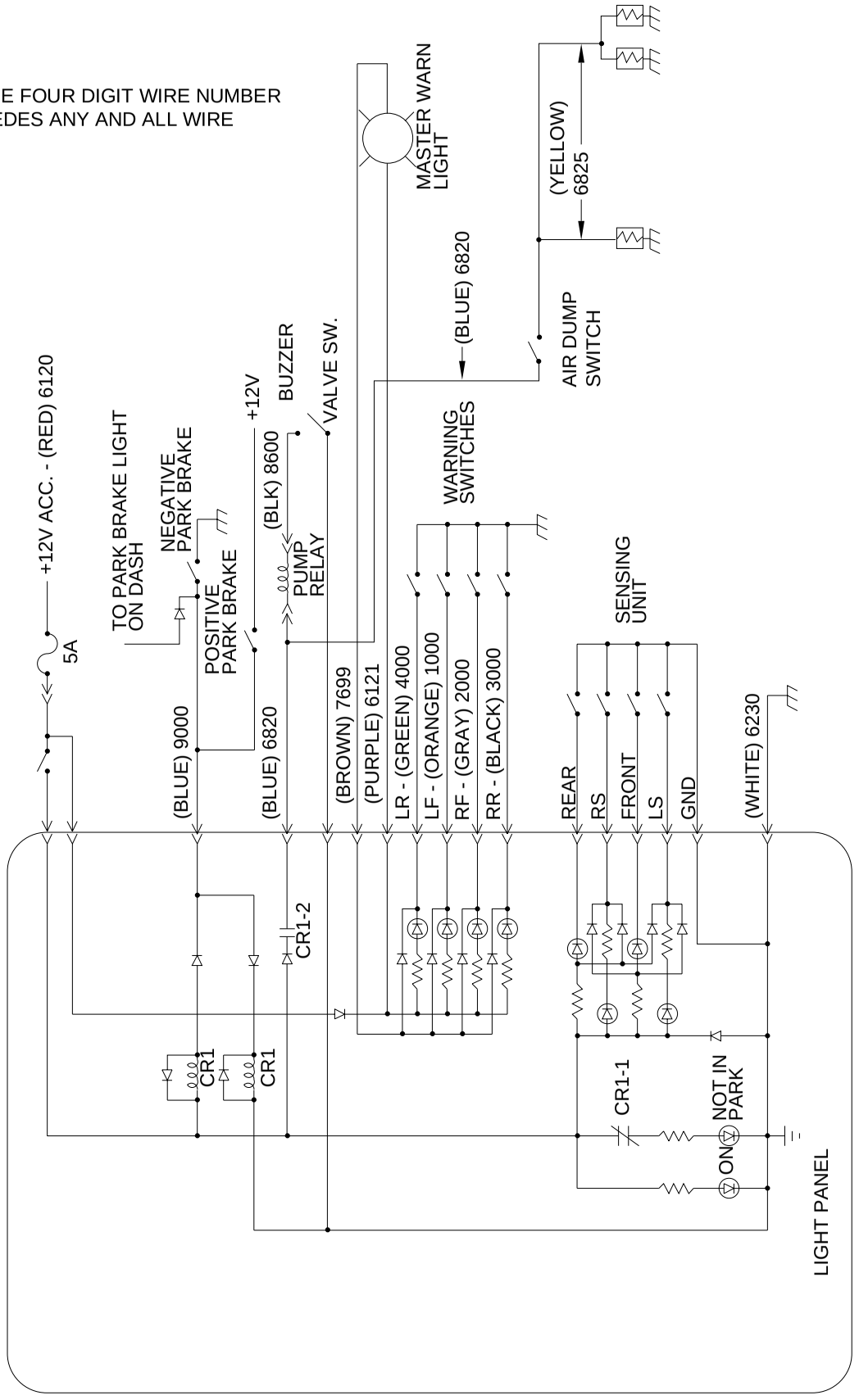
TOP VIEW

ELECTRICAL SCHEMATIC - 210 SERIES
LIGHT PANEL
STRAIGHT - ACTING JACKS WITH AIR DUMP

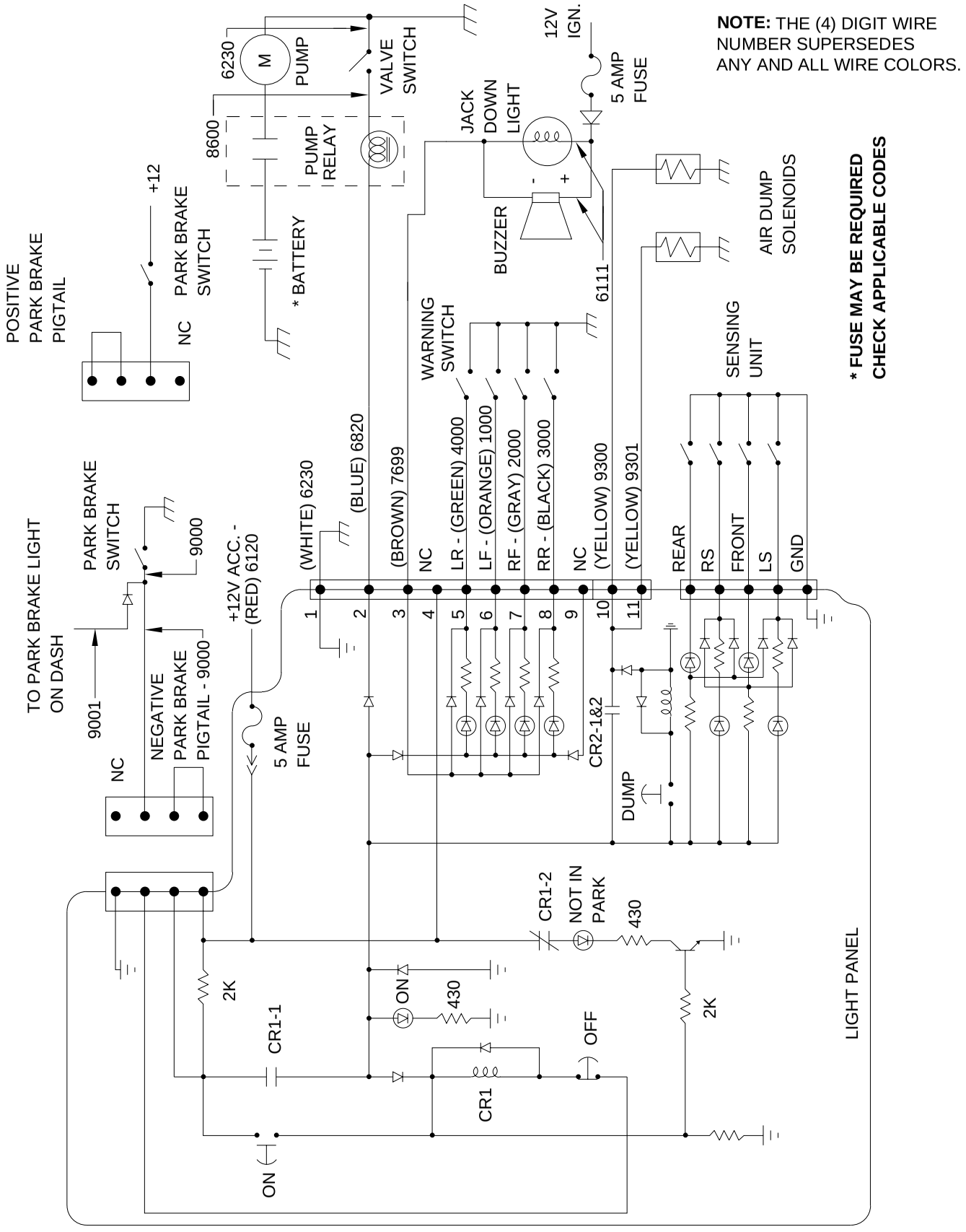


ELECTRICAL SCHEMATIC - 210 SERIES
LIGHT PANEL
KICK-DOWN JACKS WITH AIR DUMP FEATURE

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

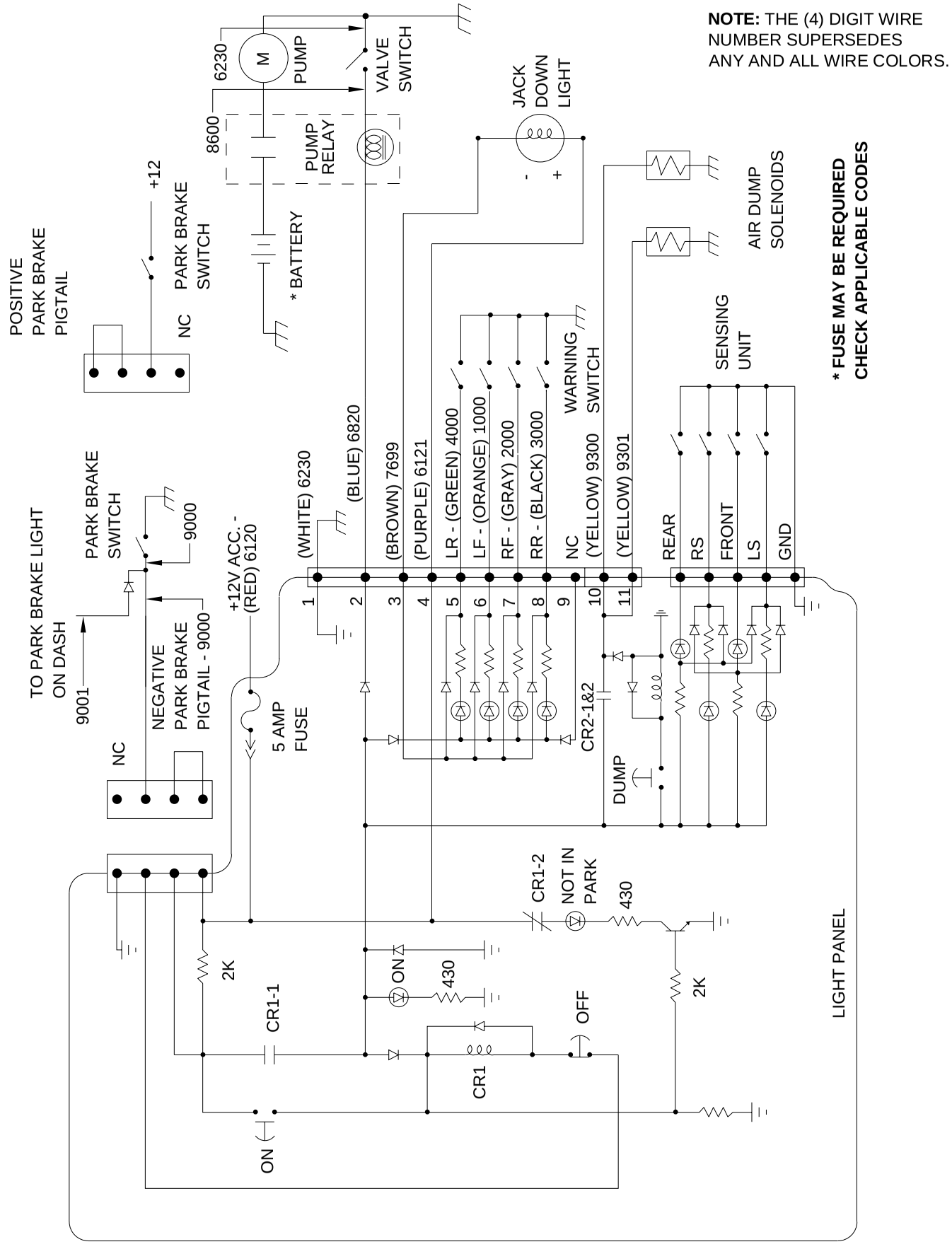


ELECTRICAL SCHEMATIC
200 SERIES LEVELING SYSTEM LIGHT PANEL
STRAIGHT-ACTING JACKS WITH AIR DUMP FEATURE



MP85.9920
02JAN01

ELECTRICAL SCHEMATIC
200 SERIES LEVELING SYSTEM LIGHT PANEL
KICK-DOWN JACKS WITH AIR DUMP FEATURE



MP85.9930
13JAN99

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.

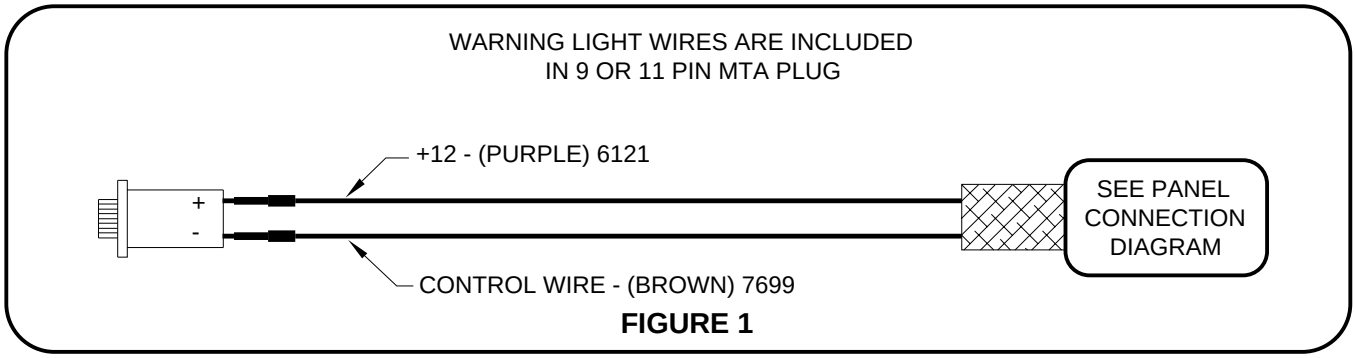


FIGURE 1

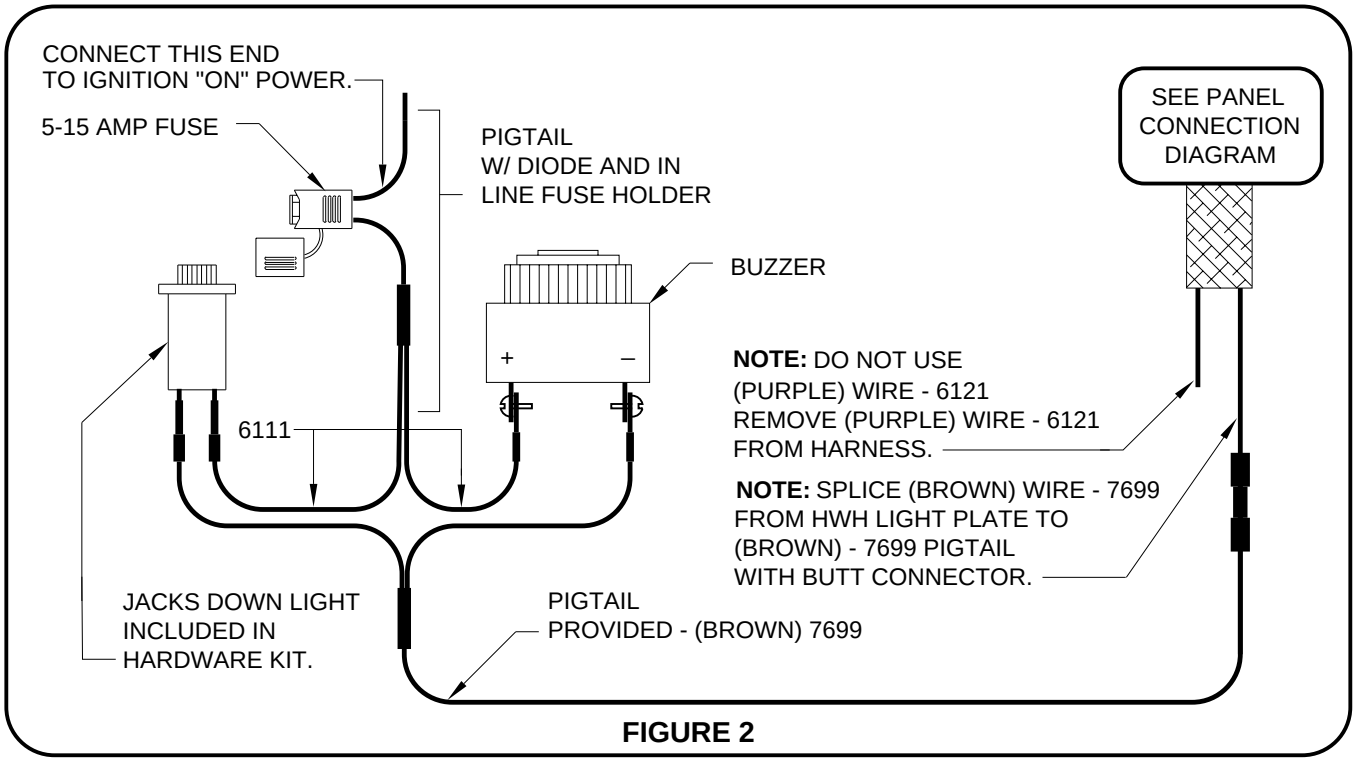


FIGURE 2