Cinnabar

10836 WEST LOYOLA DRIVE
LOS ALTOS HILLS, CALIFORNIA 94022

GMC Motorhome Electro Level II Air Suspension
Pressure Limitation and Leakdown Modification

The purpose of this modification is to limit the maximum potential air pressure to 120 psi and to solve leakdown in Electro Level II air suspensions. 120 psi is the same limit electronically imposed in all earlier suspensions, and it will make an Electro Level II suspension perform similarly to an Electro Level I suspension in the RAISE position.

The limit will only be imposed in the RAISE position or when a ground short or other malfunction occurs. When the RAISE position is in use, the motorhome will raise until the operator manually terminates compressor operation or this modification limits its output to 120 psi. If 120 psi does not produce sufficient raise to level the vehicle on the campsite, the operator should reduce load, reorient the vehicle, select another campsite, or accept an unlevel coach. However, an unlevel coach should not be accepted if the vehicle is equipped with an absorption (LP-Gas) refrigerator that is in operation in any gas or electric mode.

Whenever a GMC Motorhome is raised or lowered while parked, all brakes should be released and the transmission should be set in PARK. Rear wheel rotation is inherent in the raising and lowering function, and an inability to achieve a level coach may be the result of a parking brake impeding the RAISE or LOWER function. The parking brake should be set after an acceptable coach level has been attained.

The new "HOLD" solenoid valves provided in this modification will solve Electro Level II suspension leakdown that often begins to occur as the compressors age. The original equipment solenoid valves are not legitimate two-way valves. They will self-open and exhaust air from the air bags whenever compressor head pressure is not contained. This can be easily demonstrated by disconnecting the thin white tubing from a compressor's dryer when the motorhome is parked in HOLD. Even though the original equipment valves are closed in HOLD, air bag pressure will force them open and lower the motorhome. The new valves are legitimate two-way -- Dual Purpose -- valves and they will not self-open in the GMC Motorhome's normal operating pressure range of 0-120 psi.

Parts

Each modification kit will be tailored to the coach and its owner's preferences with respect to gauging and indicator lights. Gauges and compressor "ON" indicator lights are recommended, but their specifications and location are a matter of personal preference. Also, our module installation recommendation for Transmode Models (e.g. Royale and Birchaven) will not fit in the GMC Motorhome's (Palm Beach, Eleganza, Kingsley) Electro Level II compressor cupboard. In GMC interior models, we recommend installing the pressure limiting switches and gauges on the back wall of the compressor cupboard.

Installation

1. First, refer to the installation photographs supplied for your model. The indicator light photograph is supplied as an example only. If desired, you can purchase similar indicator lights at your local Radio Shack store. Other lights are available at automotive supply houses. They are simply called 12 VDC indicator lights.

2. Lay out the parts supplied and plan their assembly sequence so that each compressor feeds a solenoid valve port #1 and each solenoid valve port #2 feeds the appropriate air bag.

3. If you remove the micro switch from a pressure switch's transducer, remove the transducer's adjustable plunger and set it aside because it can easily fall out and become lost. (Micro switch removal makes cupboard wall mounting easier in GMC interior models.)

4. Place blocks or jacks under each tandem axle mount and exhaust both air bags. Remove the compressors from the motorhome. Keep track of Left vs. Right wiring.

5. Remove existing HOLD solenoid valves and their mounting bracket. Temporarily assemble the new solenoid valves and locate them on the compressor platform so there is ample clearance for compressor operation movement. Mark the valve locations on the compressor platform. Disassemble the compressors from the platform and the platform from its isolation base. Make a template of the bottom of each solenoid valve and use it to locate and drill mounting holes in the compressor platform.

6. Check solenoid valve mounting using screws supplied with the original equipment solenoid valves.

7. Reassemble compressors onto the platform.

8. Assemble the solenoid valve assemblies using LOCTITE PST or other similar thread sealant. Check orientation of all parts immediately because LOCTITE PST cures quickly and no part movement should be made after cure has occurred.

9. Mount solenoid valve assemblies on the compressor platform using screws supplied with the original equipment solenoid valves.

10. Reassemble the compressor platform to its isolation base and reinstall the compressors in the motorhome.

11. In GMC interior models, assemble and mount the pressure switch assemblies on the back wall of the compressor cupboard. Before drilling mounting holes make sure the thin white air tubes will reach and that they do not interfere with each other. Interference can be avoided by mounting one higher than the other. Connect the pressure switches to the solenoid valves using 1/4" Nylon Air Brake Tubing (procure locally) as shown in the installation photograph.

12. If not already done in earlier assembly operations, connect the white tube from each dryer to its assigned (Left = Left, Right = Right) pressure switch fitting, and reconnect each air bag tube (Blue = Right, Gray = Left) to its assigned solenoid valve fitting.

Wiring

1. Identify the 18ga TAN wire going to terminal #4 on each compressor control relay. This is the "hot" control wire and is not the "hot" compressor wire.

2. Cut each TAN wire and extend the ends in such a manner that the harness end can be connected to the "COMMON" terminal and the relay-plug end to the "NORM CLOSED" terminal on the appropriate pressure switch. Before attaching the wires, make sure the right TAN wire is going to the right pressure switch and the left TAN wire is going to the left pressure switch.

3. Remove the harness plugs from the original equipment solenoid valves and attach them to the new solenoid valves. Polarity is unimportant in that either solenoid valve wire can be plus and the other minus.

4. Identify the 12ga BROWN wire running between each relay terminal #1 and each compressor. Splice the left indicator light "hot" wire into the left BROWN wire and the right indicator light "hot" wire into the right BROWN wire. Ground the other side of both indicator lights somewhere near their mounting.

5. Optionally, another set of indicator lights can be installed to turn on when the 120 psi limit has been reached. The "hot" wire for each of these lights is connected to the "NORM OPEN" terminal on the appropriate pressure switch. Their other sides are also grounded somewhere near their mounting.

6. Compressor platform ground integrity should be checked. This is particularly important in Transmode Models because the heavy gauge GMC installed ground wire was often not reused by the completed vehicle manufacturer. If ground integrity is at all in question, install a new ground wire even though it may be redundant because poor grounds can cause control system component failures.

7. Preferably, all wire splices and terminal connectors should be soldered. When complete, the pressure switches and the compressor "ON" lights should be wired as shown in red on the attached schematic.

Testing and Adjustment

1. Temporarily, do not connect the solenoid valve harness plugs so the valves will remain closed.

2. Connect all other plugs to their respective receptacles. Have an assistant turn on the motorhome ignition to the Accessory position and briefly switch each RAISE switch on until each pressure gauge reads approximately 120 psi. Adjust the hexagonal screw in each transducer plunger to just trip its micro switch at 120 psi. If your assistant exceeds 120 psi, bleed compressor head pressure down at the Schrader valve in the compressor head, or have your assistant momentarily switch to LOWER. Adjustment will be complete when your assistant can put both Left and Right switches in RAISE and the micro switches will turn their compressors off at 120 psi.

3. Unplug the control (small) plug on each compressor's control relay so the compressors are disabled. Connect the solenoid valve plugs to their respective harness connectors. Direct your assistant to switch the right RAISE switch on. The right HOLD solenoid valve should open. Attach a shop air hose to the Schrader valve on the right compressor. The right air bag should begin to fill. Fill the air bag to approximately 90 psi and remove the shop air hose.

Then have your assistant briefly switch to right LOWER. The right compressor's exhaust solenoid valve should open and the pressure should begin to drop. If everything checks out, repeat this procedure on the left side. (If shop air is unavailable, the compressors can be used to fill their respective air bags, but do it in stages to avoid overworking the compressors.) Reconnect the control plugs on each compressor's control relay.

4. With the motorhome engine running to supply higher voltage to the compressors, test the pressure limitation modification. RAISE each side and verify that the modification turns off the respective compressor at 120 psi. If there is a little relay chatter at shut off, the compressor needs overhaul or the air bag is probably slightly hot dogged and/or someone is moving around in the coach. The pressure switches have only a 2-3 psi deadband and movement in the coach may cause the cones to flex and change the pressure in poorly shaped air bags. Relay chatter will not occur in a coach equipped with good compressors and properly shaped air bags.

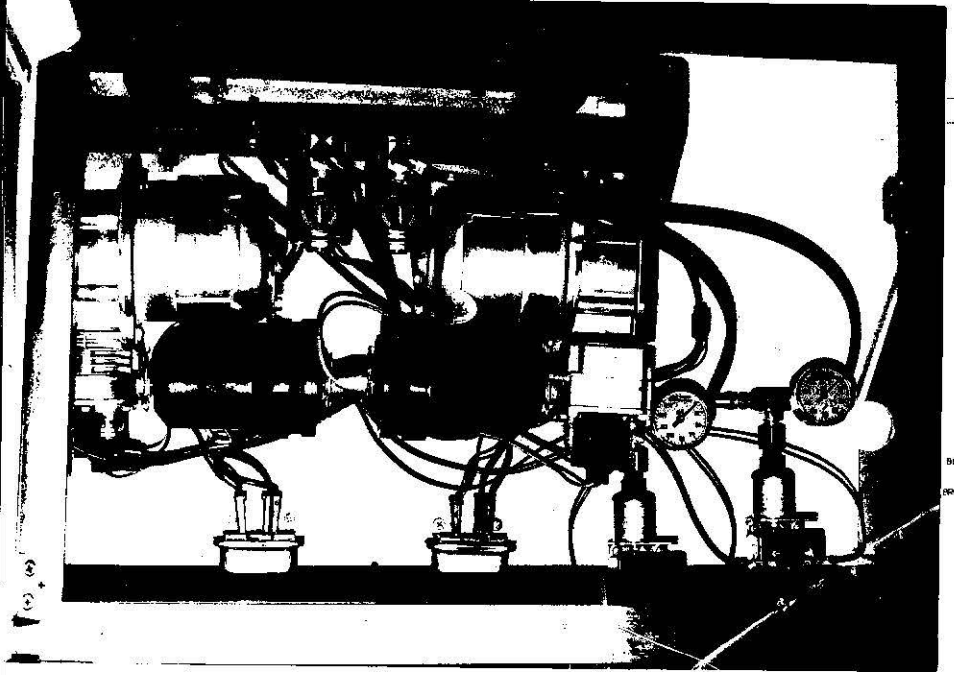
5. Lower to normal ride height and place in HOLD and/or turn off the ignition. (The HOLD solenoids close when the ignition is off regardless of control switch position.) Bleed off compressor head pressure at each Schrader valve. Disconnect the white tube from each dryer to verify that the new solenoid valves are properly containing air bag air pressure. (Note: A little Molykote 55M Silicone "O" Ring Grease is excellent for rejuvenating the "O" rings on the white tube fittings and on the dryer and exhaust solenoid "snouts".)

6. The pressure gauges read compressor head pressures first. They also read air bag pressures whenever the controls are in TRAVEL AUTO, RAISE or LOWER positions. They are purposely mounted between the compressor and the HOLD solenoid valves so they can monitor compressor head leakdown. Compressor head leakdown in the HOLD position is an indicator of compressor condition.

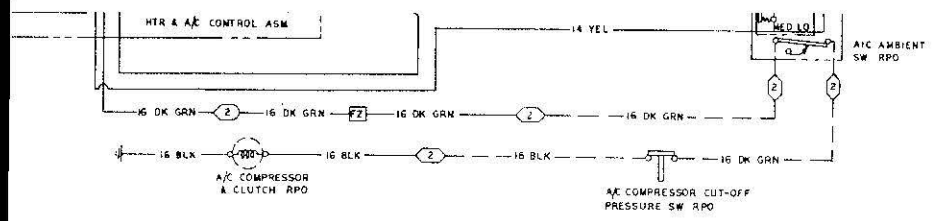
7. Set ride heights in accordance with manual instructions. After each sensor adjustment the coach should be lowered and then allowed to come up to its new setting in TRAVEL AUTO before a measurement is taken. When complete, the front heights should be equal. The rear heights should also be equal and 1 7/16" lower than the front.

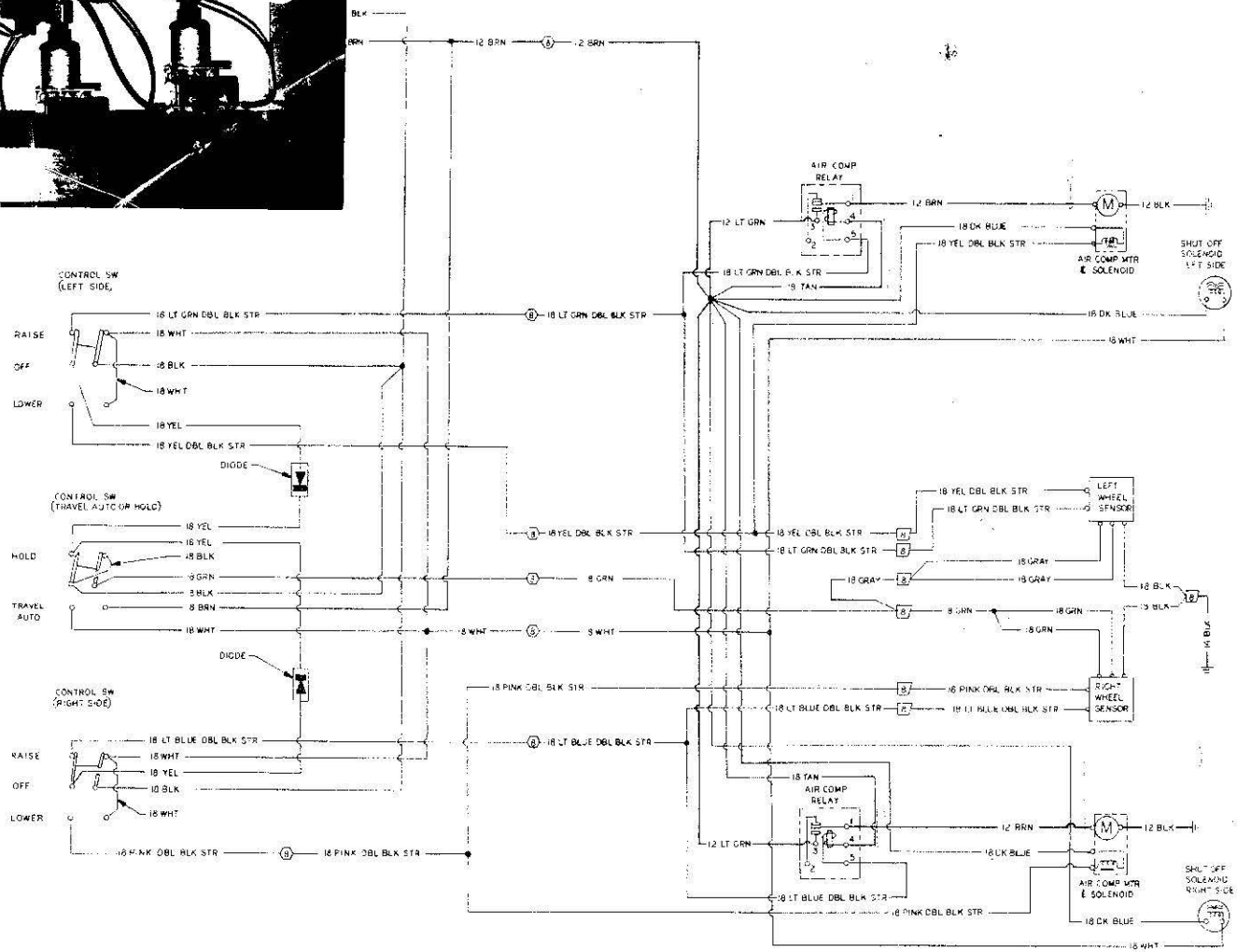
8. Soap test all joints and repair any leaks detected.

9. From now on always drive in TRAVEL AUTO so your ride heights will be continuously controlled as was contemplated in the original design of the GMC Motorhome's air suspension. In TRAVEL AUTO the Electro Level II control system will add or subtract air pressure in each air bag in response to load and environmental changes. If either compressor comes on and stays on for an extended period of time, STOP! Extended compressor operation is indicative of trouble and it should be investigated to avoid overloading tire, wheel, and axle assemblies.



ELECTRO LEVEL





LEFT FRONT SPEAKER

RIGHT MIDDLE SPEAKER

RIGHT FRONT SPEAKER

LEFT MIDDLE SPEAKER