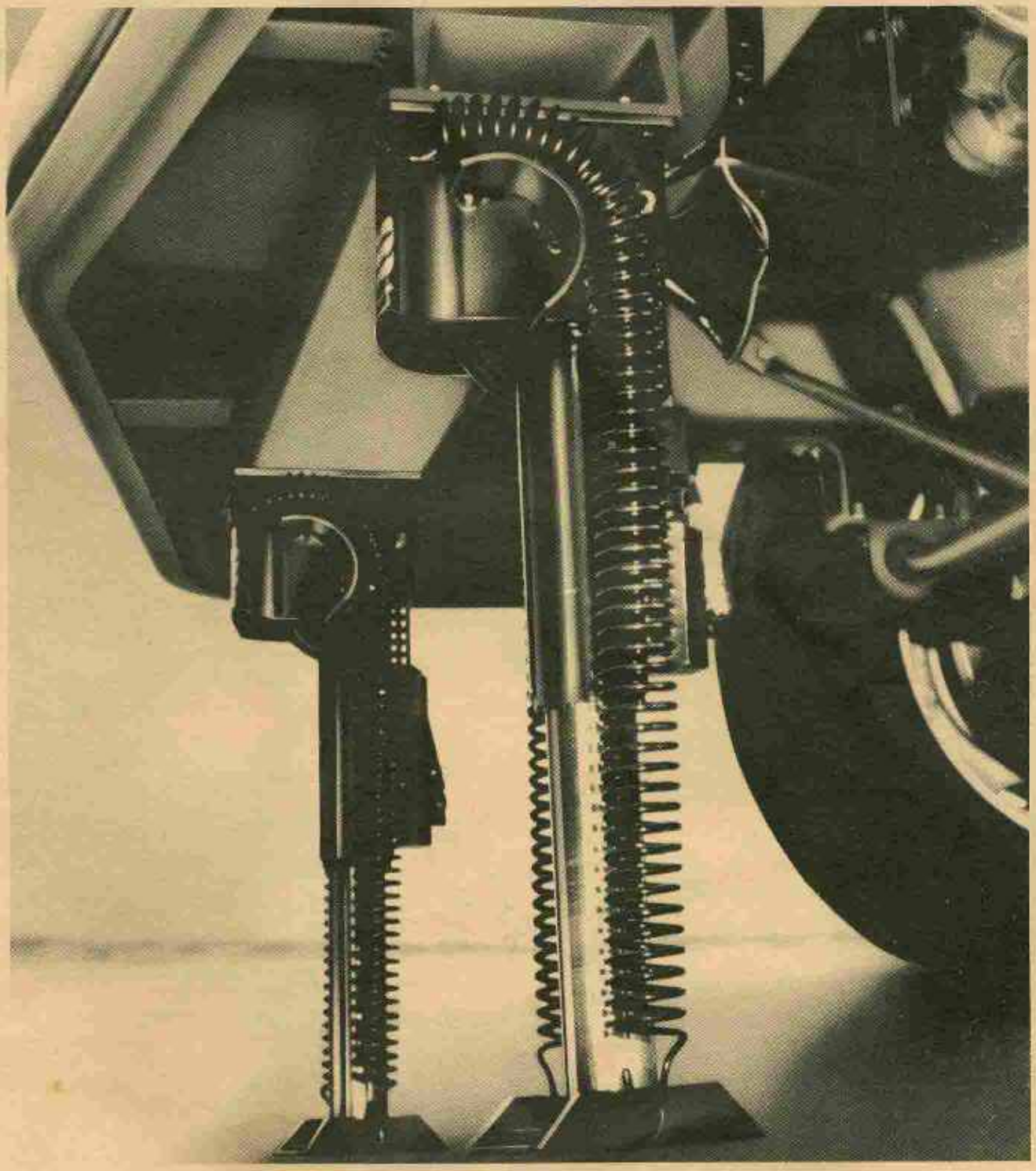
A&E Systems Inc.

Quality RV Products

HYDRAULIC POWER LEVELERS

INSTALLATION/OPERATION MANUAL



160929-988 JULY 1988

INSTALLATION

APPLICATION

A&E Hydraulic Power Levelers are designed to meet varying requirements of vehicles from mini-motorhomes to luxury bus conversions.

Because of the many differences in coach types and locations of vehicle components, the installation requirements will vary. The installation procedures in this manual are suggestions only.

If any problems or questions arise, consult A&E Systems at (714) 540-6444.

NOTE: A&E Systems, Inc. assumes no liability for damages or injuries resulting from installation or operation of this product.

NOTE: For vehicles equipped with air ride suspension, use A&E Automatic Hydraulic Leveling System Part No. 945103 (Air Ride Suspension Model).

TOOLS REQUIRED FOR INSTALLATION

- ☐ Pencil
- ☐ Measuring Tape
- ☐ Electric Drill
- ☐ Drill Bits—½", 7/16", 9/16", ¾"
- ☐ Pliers
- ☐ Wrenches—⅜", ½", 7/16", 9/16", ⅝"
- ☐ Screw Drivers
- ☐ Wire Cutter
- ☐ Welding Equipment
- ☐ Electric Tape

EXTRA PARTS NEEDED

- ☐ Wire Connectors (crimp type)
- ☐ Silicone Sealant
- ☐ Teflon Sealant
- ☐ 16-Gauge Electrical Wire
- ☐ Battery Cable (SAE #4)
- ☐ 1½ gal. Hydraulic Fluid (see list below)

RECOMMENDED HYDRAULIC FLUID

Dextron II Transmission Fluid

Alternate Fluids:

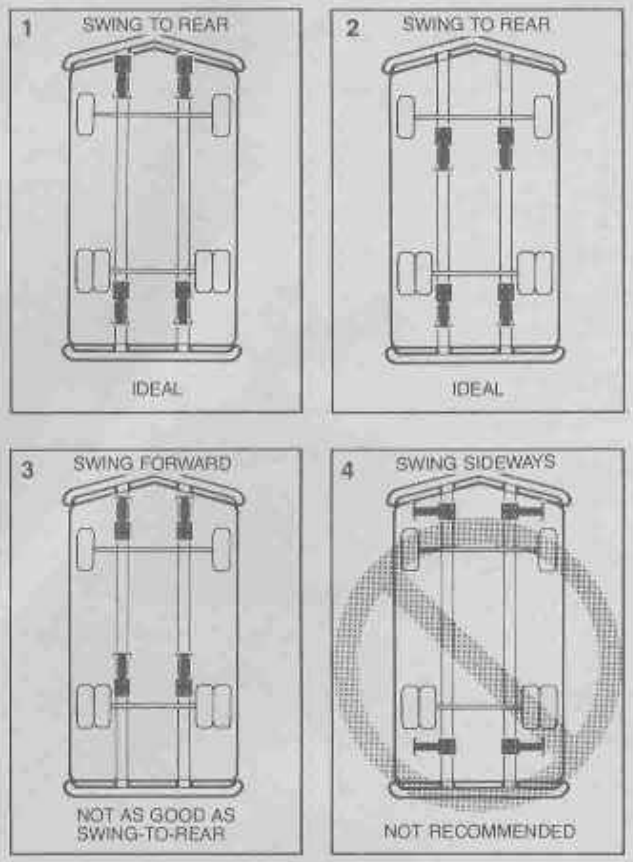
SAE 5W Non-detergent Motor Oil
SAE 10W Non-detergent Motor Oil
SAE 5W Light Hydraulic Oil
Type A Transmission Fluid
Type B Transmission Fluid
Type F Transmission Fluid

WARNING: Never use Brake Fluid or Hydraulic Jack Fluid.

IMPORTANT PRECAUTIONS

- Read the entire installation procedure before starting installation.
- Do not turn on power until installation is complete.
- During retraction cycle the leveling unit will abruptly swing up the moment it clears the ground.
- When routing hydraulic hoses be sure they are not exposed to engine, exhaust, or any high temperature components of the vehicle.

INSTALLATION PROCEDURE



1. LOCATING THE LEVELING UNITS

A. Mounting Arrangement

The leveling units should be mounted as close as possible to the front and rear axles.

Position the levelers so that they swing up toward the REAR when retracted. Figs. 1 & 2.

If necessary, the levelers may be mounted to swing forward. Fig. 3.

Mounting the levelers sideways is not recommended, as this position offers no protection from damage if the vehicle is accidentally moved while the levelers are down on the ground. Fig. 4.

B. Ground Clearance (Figs. 5, 6, 7.)

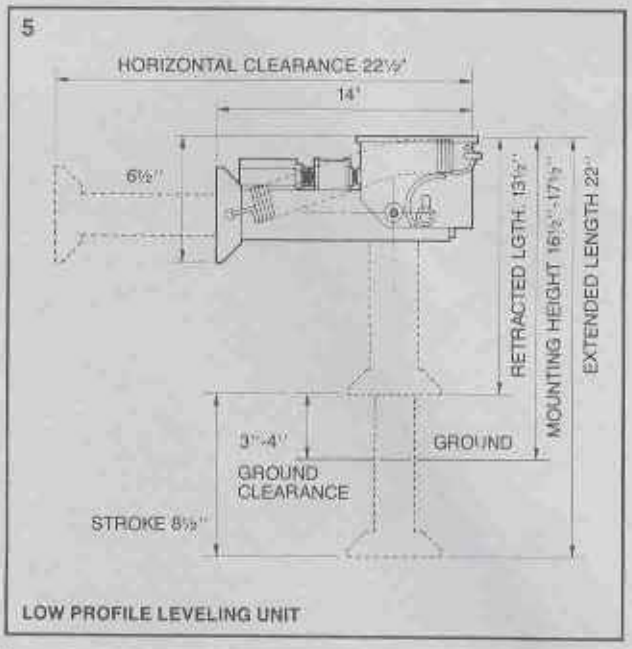
Each leveler unit must be mounted so that when it is in vertical position (but not extended), there is a clearance of 3 to 4 inches between the ground and the foot pad. This ground clearance will facilitate the operation of levelers on uneven terrain and permit placement of a 2 × 8 when operating on soft ground.

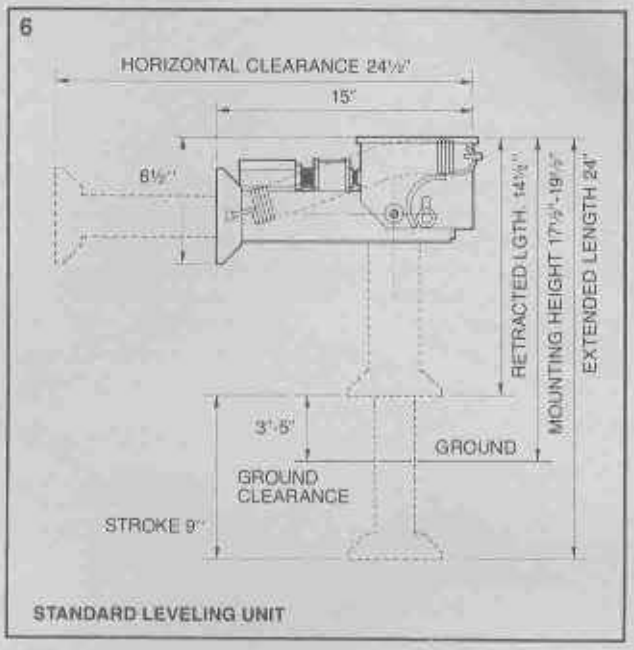
Mounting Height (From the ground to the top of the leveler mounting bracket):

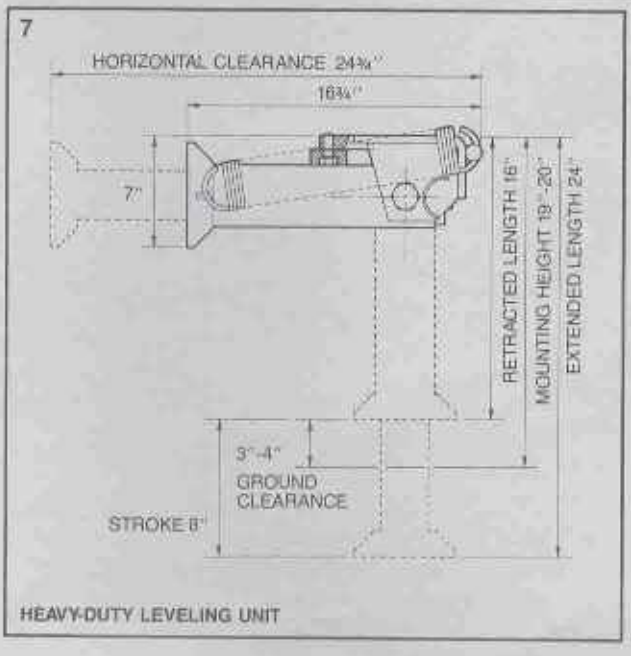
Low Profile Unit — 16½ to 17½ in.
Standard Unit — 17½ to 19½ in.
Heavy-Duty Unit — 19 to 20 in.

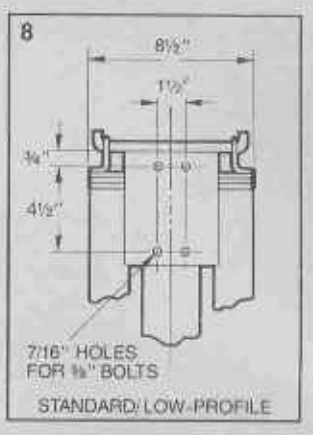
The above dimensions apply to coaches with a full load of gas, water and equipment. When empty, add 1 inch to the above dimensions.

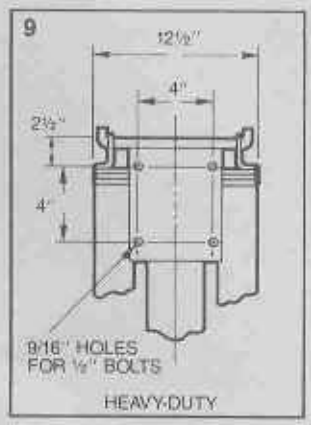
Also take into consideration that new coaches can settle down ¾" or more during the first year or initial 10,000 miles.







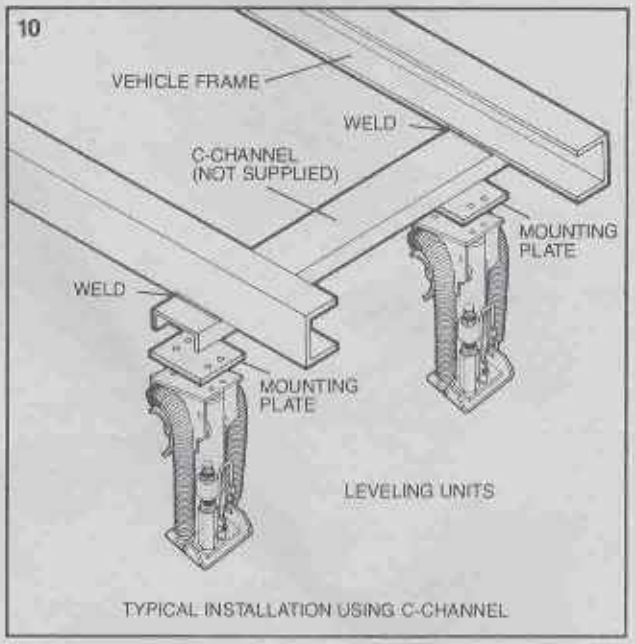




C. Retracted Clearance (Figs. 5, 6, 7.)

Provide sufficient clearance to permit leveling units to swing up into horizontal position while FULLY EXTENDED.

CAUTION: Clearance MUST be provided for the leveling units to extend fully in horizontal position to prevent serious damage to the vehicle.



2. MOUNTING THE LEVELING UNITS

A. The underside of a frame is the best place to mount the levelers.

B. If the underside of the frame is higher than the ground clearance dimensions discussed in Step 1B, weld steel channels or square steel tubing to the frame to obtain the needed clearance. Figs. 10, 11, 12, 13 & 14A.

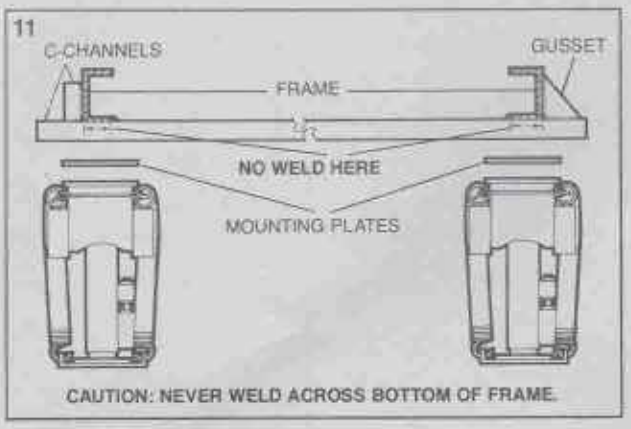
C. If the underside of the frame is too low to the ground, use iron channels to mount the levelers to the sides of the frame. Fig. 14.

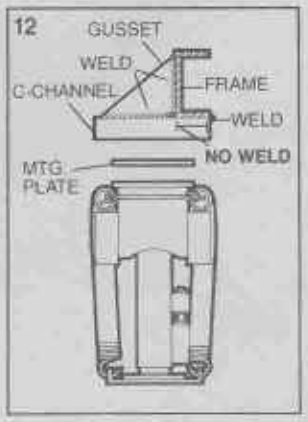
Note the use of a gusset (a triangular insert) to strengthen the installation.

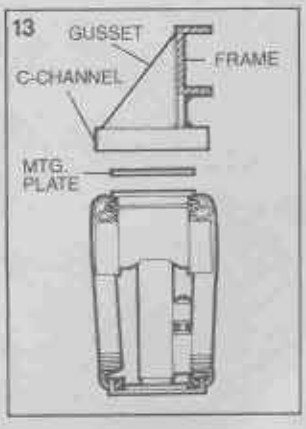
D. A mounting plate 745013 is supplied for each leveling unit. Locate and weld the mounting plate in proper position. Then bolt the leveling unit to the mounting plate. Mounting in this manner will facilitate servicing when needed.

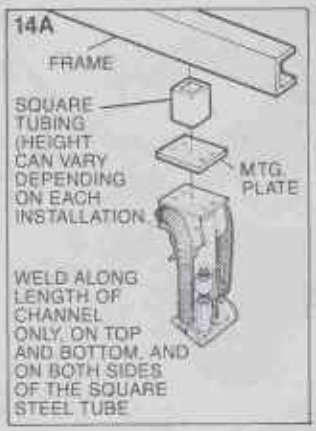
CAUTION: NEVER weld across the bottom flange of vehicle frame, as doing so can cause serious structural failure.

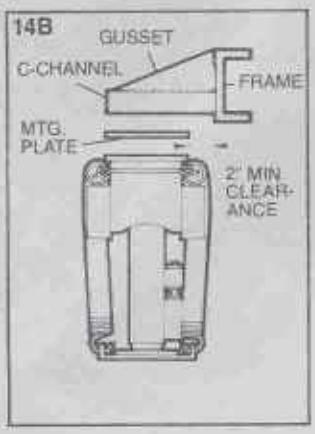
MARCH 1986

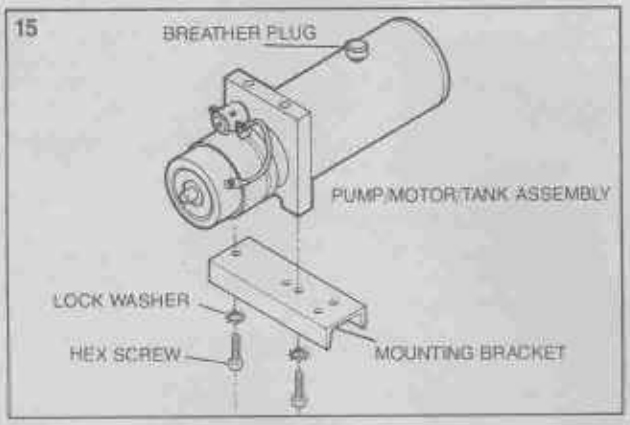












3. HYDRAULIC PUMP/MOTOR ASSEMBLY

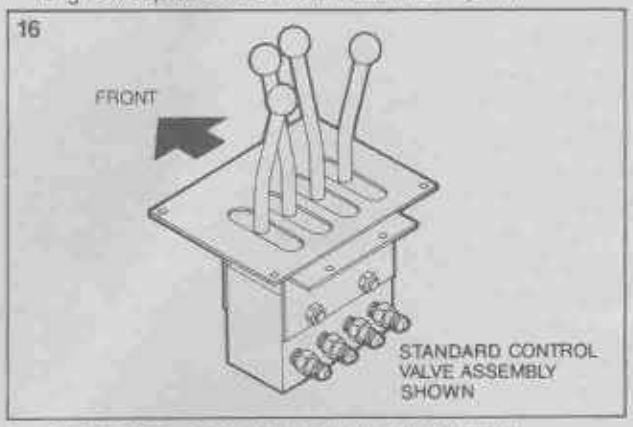
A. Refer to the Hydraulic Hook-up diagram.

B. Locate the pump/motor assembly in the vicinity of the control valve assembly. This distance between the pump and the valve is limited by the 7'-0" high-pressure hose No. 845024-084.

C. Access should be provided to fill the tank and check the oil level.
NOTE: When inspecting the oil level, all leveling units must be fully retracted.

D. A mounting bracket (3" channel) is supplied. Fig. 15.

E. Bolt or weld the bracket to the selected location, then mount the pump to the bracket using the ⅜"-16 unc × ¾" long hex cap screws and star washers. Fig. 15.



4. STANDARD CONTROL VALVE ASSEMBLY DELUXE CONTROL VALVE W/BOX

A. The control valve should be located at a convenient location such as on the floor beside the driver's seat or by the entry door.

B. The valve handles should be easily accessible and the space below the control valve should be sufficient for hydraulic plumbing.

C. When the control valve is located close to the front wheel, turn the wheel to full lock in both directions to check clearance. Also allow for wheel bounce.

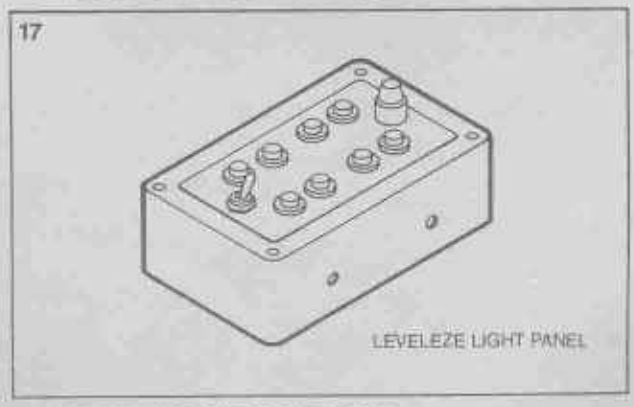
D. The control valve assembly must be able to be connected to the pump/motor assembly by means of a 7'-0" high-pressure hose No. 845024-007.

E. Use the supplied template to cut the rectangular hole for the control valve.
FOR STANDARD CONTROL SYSTEM ONLY CONTINUE THROUGH STEP 5D.
FOR DELUXE CONTROL SYSTEM PROCEED TO STEP 6.

F. Secure the control valve assembly from the bottom with four (4) #10 × ¾" long sheet metal screws.

G. Position End Plates to seal ends of valve assembly and secure with four #10 × ¾" long sheet metal screws. Fig. 25.

H. Carefully align the cover plate with the control handles and secure with four (4) Phillips screws.



5. LEVELEZE LIGHT PANEL FOR STANDARD CONTROL SYSTEM ONLY

A. The preferred location of the light panel is directly ahead of the control valve, although this position may not always be possible.

B. Do not mount the light panel until the wiring is complete. Refer to Step 10 D.

C. Refer to the electrical hook-up diagram.

D. Drill a ¾" diameter hole through the floor for the lead wires.

6. DELUXE CONTROL SYSTEM

A. Place Deluxe Control Valve into (5" × 5¾") rectangular cut-out from top side, feeding the wire bundle and level sensor through cut-out first.

B. Secure both light panel and control valve box simultaneously using four (4) #10 × ¾" Phillips screws.

C. If a particular installation will not permit the level sensor to feed through (due to physical size of sensor), the required space can be reduced by disconnecting the sensor from the control valve assembly and feeding the smaller plug end of the sensor through the available openings. This can be accomplished before the light panel and control valve box are secured, by lifting the light panel, removing (4) screws holding the hole cover in place and disconnecting the sensor plug from the light panel. After running the sensor cable, use care when reconnecting the plug to the light panel to avoid damaging either part of the plug.
Refasten the hole cover using screws previously removed and secure light panel and control valve box as in step B.

D. The 9-wire bundle contains all wires necessary for electrical hook-up (except battery cable). Refer to electrical hook-up diagram for color codes. Solder and tape or use butt connectors to join harness wires to warning switch wires. Harness wires may be cut to required lengths to suit vehicle.

E. After securing control valve and light plate, caulk around bottom of box flange.

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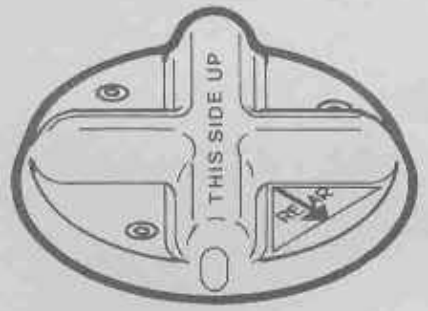

LEVEL SENSING UNIT

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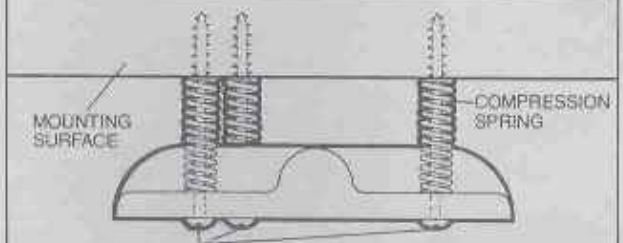

LEVEL SENSING UNIT

7. LEVEL SENSING UNIT Figs. 18 & 19.

A. The sensing unit is to be mounted to a flat horizontal surface on the underside of the coach.

NOTE: DO NOT MOUNT the level sensing unit near heat emitting surfaces like hot hoses, engine components, exhaust pipes, etc..

B. The unit must be aligned with the rear of the vehicle as indicated on the unit. Fig. 18.

C. Use the supplied template to drill holes for the mounting screws.

D. Note the inscription "THIS SIDE UP." Fig. 18. The sensing unit can be mounted on top or bottom of the mounting surface, but the "UP" side must be facing up.

E. The sensing unit must be securely grounded to frame.

F. Mount the unit using three (3) sets of # 8 x 2" sheet metal screws and springs. Fig. 19.

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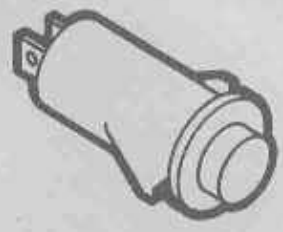

MASTER WARNING LIGHT

8. MASTER WARNING LIGHT Fig. 20.

A. The red warning light is to be attached on or near the dashboard visible to the driver.

B. A hole may have to be drilled through the fire wall for the warning light wire.

This same hole can be used for the lead between the ignition switch and the light panel.

C. Drill a ½" hole for mounting the light.

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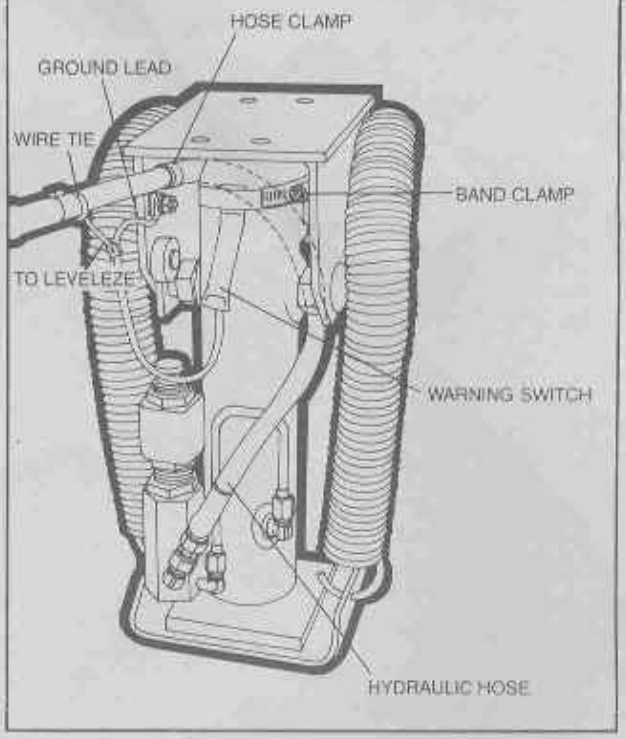

9. WARNING SWITCHES Fig. 21.

A. Mount a warning switch to each leveler using the band clamps supplied. Fig. 21.

B. Secure the ground wire and the leveler hydraulic hose to the leveler mounting bracket using a hose clamp. Fig. 21.

C. Refer to the electrical system hook-up diagram.

10. HYDRAULIC SYSTEM HOOKUP

CAUTION: During handling of the hoses, the plugs must remain in place to prevent contamination.

When routing hoses and electrical wires be sure they are not exposed to engine, exhaust, or any high temperature components of the vehicle; or to any sharp edges of the vehicle. Depending upon the vehicle configuration, it may be necessary to ADEQUATELY insulate the hoses and wires to prevent damage.

IMPORTANT: Identify and use the different types and sizes of hoses correctly.

Do not overtighten fittings, or damage may result.

A. Refer to the hydraulic system hookup diagram.

B. Four lengths of hoses are provided to connect the four leveling units to the control valves.

An extra hose, 4-feet long, is provided if needed.

C. Run hose around each level unit and secure with a hose clamp to prevent sagging. Fig. 21.

D. Use a teflon sealant on p

11. ELECTRICAL SYSTEM HOOKUP

A. Refer to the appropriate electrical system hook-up diagram.

B. Use 16-gauge wire and crimp-type connectors (both not supplied).

C. Use a battery cable (SAE #4, not supplied) to connect the pump/motor solenoid to the battery.

D. After all wiring is completed, secure the light panel with four (4) #10 × 3" long wood screws. (Std. system only)

12. COMPLETING THE INSTALLATION

A. Seal all openings made in the vehicle with silicon sealant.

B. Fill the hydraulic oil reservoir. Refer to the Maintenance section, Step 1 for procedure details.

13. TESTING THE INSTALLED SYSTEM

A. Refer to the Operating Instructions and operate the system.

B. Check the following items:

- Oil level—Refer to the Maintenance Step 1.
- Leaks in the system—Check all hydraulic connections.
- Verticality and horizontality of leveling units—Refer to the Adjustments Step 2.
- Operation of the Levelleze light panel—operate all leveling units and check for proper function of the light panel.
- Master Warning Light—This light should come on when ignition switch is turned to "on" position when one or more of the levelers are down.

ADJUSTMENTS

1. LEVEL SENSING UNIT

A. Level the coach using a conventional bubble level.

B. Adjust the three screws on the sensing unit until all GREEN lamps on the light panel are out.

Try adjusting ½ turn at a time to start, then ¼ turn for fine adjustment.

NOTE: After each adjustment, lightly tap the screws to let the mercury settle into the new position.

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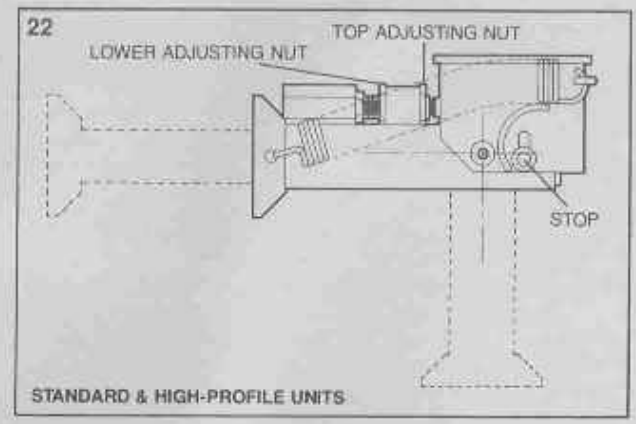

STANDARD & HIGH-PROFILE UNITS

2. STANDARD AND HIGH-PROFILE LEVELING UNITS Fig 22.

A. Vertical adjustments

If unit did not reach the vertical position loosen lower adjusting nut and tighten top adjusting nut. If the unit went past the vertical position loosen top adjusting nut and tighten the lower adjusting unit.

B. Horizontal adjustments

The position of the leveling unit in the travel position can be raised or lowered by moving the stop up or down in the slot. This adjustment can be used to provide the necessary clearance of the leveler to the vehicle when horizontal.

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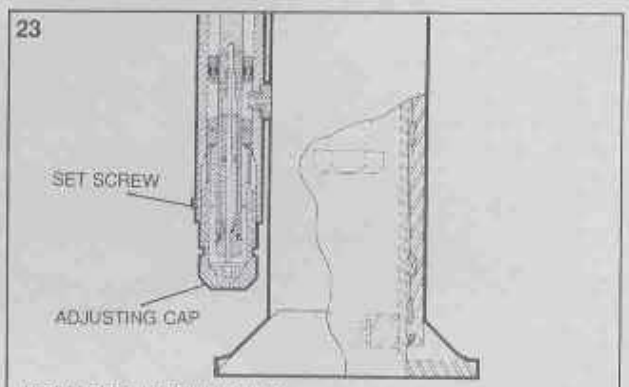

HEAVY-DUTY LEVELING UNIT

3. HEAVY-DUTY LEVELING UNITS Fig. 23.

A. Vertical adjustments

If unit did not reach the vertical position loosen set screw, turn adjusting cap clockwise. If unit went past the vertical position turn adjusting cap counterclockwise. Do not turn adjusting cap more than one turn before recycling unit.

B. Horizontal adjustments

The horizontal position is fixed.

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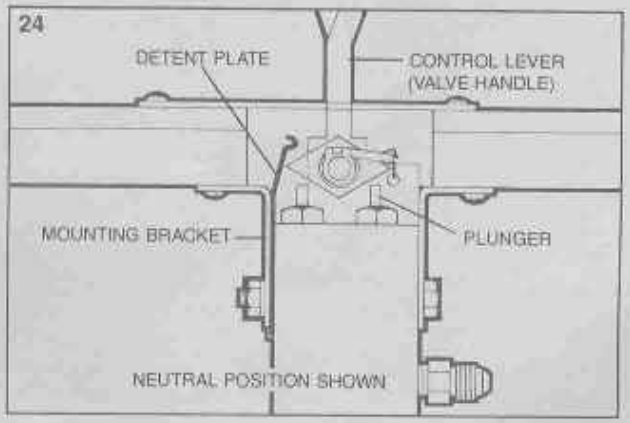


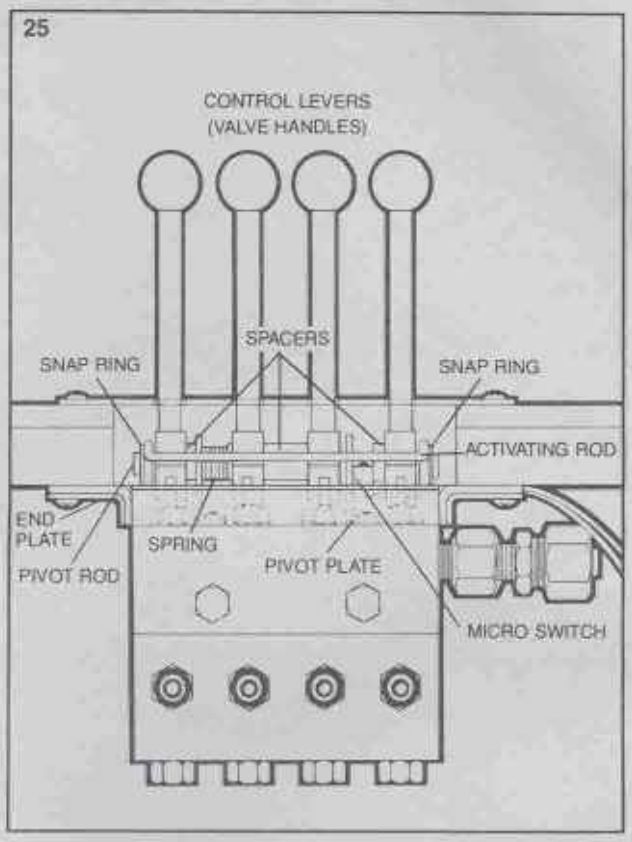
4. **HYDRAULIC CONTROL VALVE**

Two parts of the control valve are possible to adjust. The proper adjustments for these parts are made at the factory, so readjustments will rarely be necessary. The following procedures are recommended to adjust them if the need arises.

A. Detent Plate

Adjustment of the detent plate is necessary if the detent plate fails to hold the control levers in the retract position, or if the plunger is not depressed sufficiently by the valve handle in the retract position.

To adjust the detent plate, first loosen the nuts which hold the valve mounting bracket and the detent plate to the valve assembly. The proper adjustment can be made by moving the detent plate up or down to a point where the valve handle is resting solidly on the detent plate in the retract position, yet holding the plunger down to its fullest extent or no less than 1/16" of this extension.



B. Microswitch

If the activating rod does not fall directly upon the nipple of the microswitch, the problem can be corrected by either of the following two methods.

Method #1: Carefully bend the activating rod until it is properly aligned with the microswitch.

Method #2: If method #1 can not correct the problem, the adjustment must be made by disassembling a portion of the control valve.

First, remove the mounting bracket and the detent plate. Next, remove the snap rings on the pivot rod and then carefully slide off the valve handles, spacers and spring, noting where each part must go during reassembly.

The microswitch is then adjusted by loosening the small hex nuts which hold the microswitch to the pivot plate, and then making the proper correction.

Finally, reassemble the control valve, remembering to properly adjust the detent plate as it is replaced.

MAINTENANCE

1. **Hydraulic oil**

A. When the vehicle is serviced, check the supply of oil in the hydraulic oil reservoir.

NOTE: It is important that the four leveling units are in the retracted position before checking the hydraulic oil level.
To check the oil supply, remove the breather plug from the top of the hydraulic oil reservoir. The oil level should be approximately one inch below the top of the reservoir when adequately filled. (For recommended oil see "SPECIFICATION" section).

2. **Unusual Conditions**

In general, to insure the smooth operation of the leveling system, it is a good idea to occasionally check the individual leveling units to prevent problems. This is especially true under the unusual conditions stated in the following:

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

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

C. Do not move the vehicle while the leveling units are still in contact with the ground. However, if this should accidentally happen the leveling system was designed to protect itself from damage in most cases. Place the control levers in the retract position and then visually check to see if the leveling units have returned to travel position.

TROUBLE SHOOTING GUIDE

The following is a list of troubles and possible causes.

1. Hydraulic pump activates, but the leveling units will not extend.
   a. Control valve lever not in full "on" position
   b. Oil supply low in reservoir
   c. Relief valve stuck in "open" position
   d. Broken hydraulic line
2. Leveling unit will not retract completely
   a. Bent linkage
   b. Leveler clogged with mud or ice
   c. Scored rod
   d. Valve plunger not completely depressed by valve handles (see detent plate adjustment)
3. Hydraulic pump activates without use of control valve handles
   a. Short in valve assembly
   b. Microswitch out of adjustment
   c. Broken spring on pivot rod
4. Ignition switch on, but no power to hydraulic pump
   a. Faulty wire or connection at ignition wire
   b. Bad microswitch
   c. Blown fuse
5. Unit is extended but not vertical
   a. Vertical adjustment
   b. Leveler clogged with mud or ice