

OPERATOR'S - SERVICE - PARTS MANUAL

**FOR
MOTOR COACH LEVELING SYSTEM
MODEL AP-2461**

HWH CORPORATION

OPERATOR'S MANUAL

DESCRIPTION

The leveling systems consist of:

1. An electrically driven hydraulic pump and reservoir package.
2. A hydraulic control valve assembly which has four levers to control each leveling unit independently. This control box is located on the floor panel of the vehicle near the driver's seat.
3. Four hydraulic leveling units (jacks). One unit is mounted on each corner of the motor home chassis.

When extended, the first movement of the leveling unit causes it to unfold into a position perpendicular to the vehicle's floor. Further extension of the leveling unit is then used to level the vehicle.

When retracted, the leveling unit reverses the extending motion and folds up into a travel position which is parallel with the vehicles floor.

Note: Hydraulic pressure is used to extend the leveling units and spring pressure is used to retract them. Therefore, the pump does not run during retraction. The advantage to this design is that the leveling units can be retracted into travel position even in the event of hydraulic or electrical failure.

SITE SELECTION

The leveling system was designed to reduce site selection problems. Sites which were previously unsatisfactory due to uneven ground or sloping terrain can be made comfortable by the leveling capacity of the system.

The front leveling units have the greater leveling adjustment, therefore, if parking on a slope, park with the front of the vehicle facing downward if possible.

LEVELING PROCEDURE

Extending the leveling units:

1. Turn the ignition switch to accessory position.

Note: When extending the leveling units, the initial movement of the control handle turns on the pump. Additional movement opens the control valve to the leveling units. Do not hold the control handles in this initial position for an extended period of time as this will cause heat buildup and draw excessive current. Never extend all of the leveling units to their maximum position at the same time as this may remove the vehicle's wheels from the ground and permit the motor home to move forward or backward.

Extending the leveling units (con't)

2. Extend the leveling unit of the lowest corner first, then the next lowest corner. This may require using two or three of the leveling units, but not all four to level the motor home. After the vehicle is level, extend the remaining leveling units just enough to contact the ground firmly and provide stability. When parking on soft ground place a wooden 2 x 6 on the ground underneath the foot of each leveling unit. This will prevent the foot from sinking into the ground while parked.
3. Turn off the ignition switch.

Caution: Do not use the leveling system for changing tire or working under the motor home without securely blocking the frame.

Retracting the leveling units:

1. Slowly move one or all of the control levers to the retract position. Hold this position until the vehicle's weight is all on the wheels, and then move the levers all the way into retract position.
2. Leave the control levers in the retract position when traveling.

Caution: Keep all persons away from the leveling system mechanism when operating the leveling system, driving the motor home and/or when the motor home is parked.

MAINTENANCE

When the motorhome is serviced, check the supply of oil in the hydraulic oil reservoir, also there is one grease fitting on each leveling unit. Grease with same grease as used on the vehicle chassis.

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.

To change the oil supply, unscrew and remove the bolt at the end of the reservoir. This bolt holds the reservoir to the hydraulic pump. Pull the reservoir away from the pump. The reservoir will empty very rapidly as this is done. After the reservoir is emptied, remove the screen from the reservoir by turning it counterclockwise. Wash the screen in solvent and return it to the reservoir. Now bolt the reservoir back onto the pump. Refill the reservoir through the breather cap opening until the oil reaches a level approximately one inch from the top of the reservoir. Cycle the hydraulic leveling units once, and recheck the oil level. Add more oil if necessary. (For recommended oil see "SPECIFICATION" section).

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:

Unusual Conditions

If driving conditions are unusually muddy, the linkage of the leveling 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.

In wet, icy weather, the linkage of the 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 have accumulated on the linkage.

Do not move the vehicle while the leveling units are still in contact with the ground. However, if this should accidentally happen, DON'T PANIC. The leveling system was designed to protect itself from damage in most cases if this should occur. First, place the control levers in the retract position, and then visually check to see if the leveling units have returned to travel position. If the units have done so, the system was not damaged and is ready for reuse. However, in some cases, the leveling units may not fold up completely after such an accident. When this happens, grasp the leveling unit by its pad (the part which makes contact with the ground) and pull downward. The leveling unit should then return back into retract position and be ready for further use.

Also if the leveling units extend when in the horizontal position without first pivoting to the vertical position check and see if the linkage overload device has been tripped. To reset the overload device place the control levers in the retract position and manually pull the leveling unit to the vertical position. The overload will then snap back into place. The unit should now function normally.

If unit still does not work correctly check for bent pins or links on the retract mechanism.

SPECIFICATIONS

LIFTING CAPACITIES

8,000 pounds at 2,700 psi

STROKE

8 3/4 Inches -- 7 3/4 Inches useful

EXTENDED LENGTH

23 Inches

RETRACTED LENGTH

14 3/4 Inches

RETRACTED HEIGHT

6 inches

WEIGHT (Approx.)

200

HYDRAULIC OIL CAPACITY

Reservoir - 1 gallon

Total System - Approximately 1 1/2 Gallon

RECOMMENDED TYPE OF HYDRAULIC FLUID

Type F Transmission Fluid (Ford)

Type B Transmission Fluid (Dextron)

NOTE: Never use brake fluid or hydraulic jack fluid.

SERVICE MANUAL

ADJUSTING THE LEVELING UNIT

There are two basic adjustments which can be made to the hydraulic leveling units. [These adjustments are made at the factory, and in most cases, readjustment is not necessary. However, when adjustment of a leveling unit is needed, the following procedures are recommended.

1. ADJUSTING LEVELING UNITS TO PERPENDICULAR POSITION

The proper position of the leveling units when fully extended is perpendicular to the vehicle's floor. If any leveling unit is not in this position, it needs readjustment. The necessary adjustment can be made by first extending the leveling unit to a position where the pad remains approximately ONE INCH from the ground. Next, loosen the hex nuts at the top of the adjustable links (AP-1405 and AP-1406). (See parts manual). Then, depending on which direction the leveling unit must move to become perpendicular to the vehicle's floor, loosen or tighten the hex nuts at the bottom of the adjustable links.

It is important that the adjustable links are adjusted equally. This is done by turning both bottom hex nuts equally during the adjusting process. Turn one nut a portion of a turn, and then the other, until the leveling unit is perpendicular to the vehicle's floor.

Now, from a position viewing up at the unit's linkage, look at the adjustable links (where they make contact with the bushings (P-1399)). The adjustable links should hit the bushings on their respective sides in the same place. If the adjustable links do not line up the same on the bushings, it will be necessary to loosen one of the bottom hex nuts and tighten the other. Continue in this manner, until the adjustable links line up in the same place on the bushings while the leveling unit's position is perpendicular to the vehicle's floor.

2. ADJUSTING THE STOP

The position of the leveling unit in the retract position can be raised or lowered by adjusting the stop (P-1378). The stop can be moved to any one of three holes found in the side of the mounting bracket (AP-1232).

It is important when making this stop adjustment to visualize where the leveling unit could extend if the unit was to extend straight back instead of down. It is possible for this to happen, so clearance must be made for the various undercarriage parts of the vehicle.

ADJUSTING THE 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.

1. ADJUSTMENT OF THE DETENT PLATE

Adjustment of the detent plate (P1150) is necessary if the detent plate fails to hold the control levers in the retract position, or if the plunger (P-1217) is not depressed sufficiently by the valve handle (AP-1143) in the retract position.

To adjust the detent plate, first loosen the nuts which hold the valve mounting bracket (P-1151) and the detent plate (P-1150) to the valve assembly. The proper adjustment can then 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.

2. ADJUSTING THE MICROSWITCH

The microswitch (AP-1455) will need adjustment if the activating rod (P-1157) does not fall directly upon the nipple of the microswitch.

The adjustment must be made after disassembling a portion of the control valve. First, remove the mounting bracket (P-1151) and the detent plate (P-1150). Next, remove the snap rings on the pivot rod (P-1156), and then carefully slide off the valve handles (AP-1143), spacers (P-1160, P-1161 and P-1162) and spring (P-1331), 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 (P1149), and then making the proper correction.

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

ADJUSTING THE HYDRAULIC PUMP AND RESERVOIR

1. CHECKING AND CHANGING THE OIL

NOTE: It is important that the four leveling units are in the retract position before checking the hydraulic oil level.

To check the oil supply, remove the breather plug (P-1474) 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.

CHECKING AND CHANGING THE OIL (con't)

To change the oil supply, unscrew and remove the reservoir. Pull this reservoir away from the pump. The reservoir will empty *very* rapidly as this is done. After the reservoir is emptied, remove the screen from the suction tube by turning it counterclockwise. Wash the screen in solvent, and replace it on the suction tube. Now, bolt the reservoir back into the pump. Refill the reservoir through the breather cap opening until the oil reaches a level approximately one inch from the top of the reservoir. Cycle the hydraulic leveling units once, and recheck the oil level. Add more oil if necessary. (For recommended fluid see "specification" section).

2. CHECKING AND SETTING THE RELIEF

To check and set the relief, connect a pressure gauge to the outlet port (F-1514) of the hydraulic pump. Remove the cap (P-3400) which covers the relief screw (H-3401).

Activate the pump motor by moving a control valve handle, and check the pressure gauge. The correct relief pressure is 2750 p.s.i.

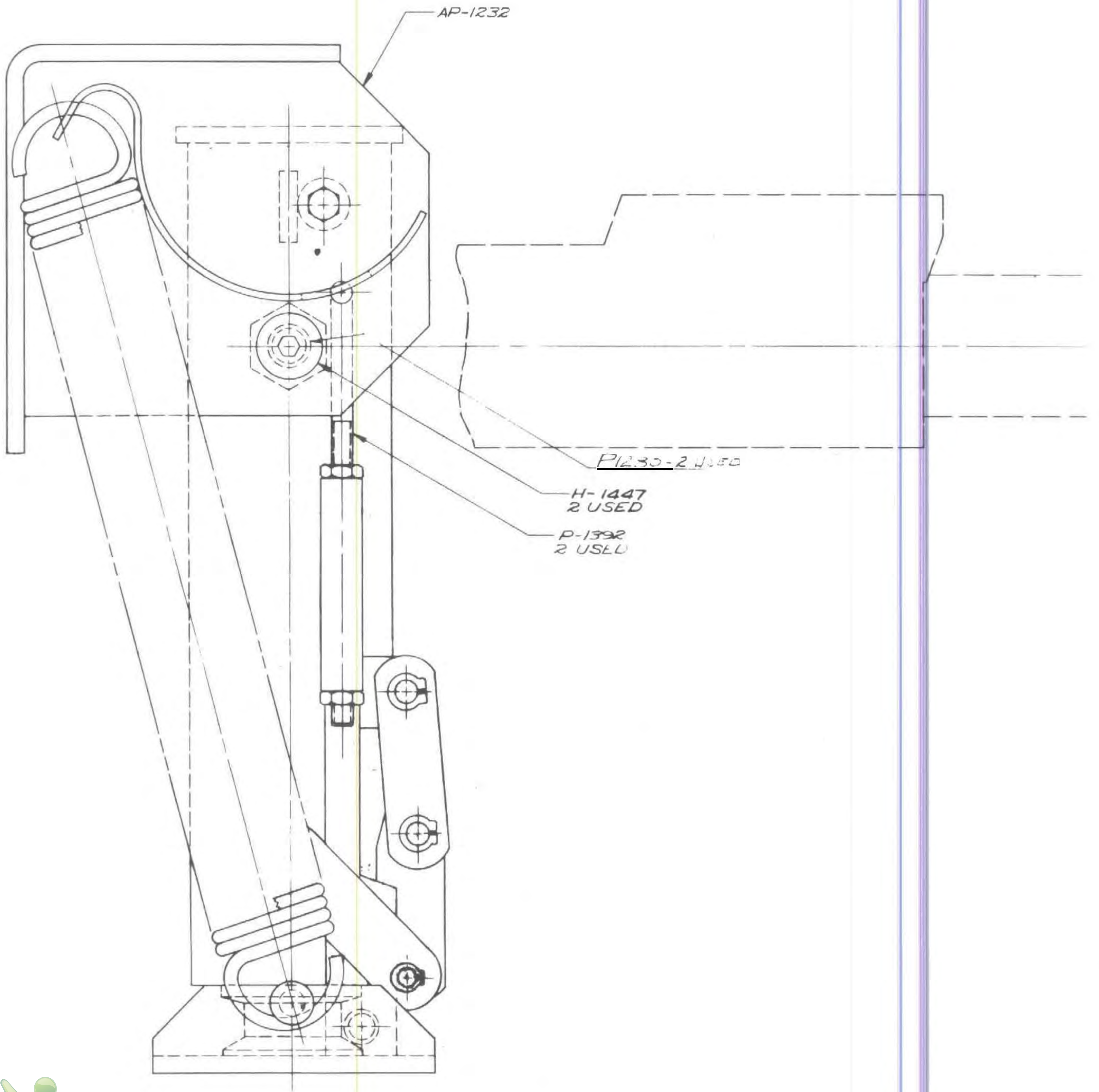
If the relief needs adjustment, turn the relief screw clockwise to increase the relief pressure, and counterclockwise to decrease the relief pressure.

TROUBLE SHOOTING

The following is a list of troubles, and possible solutions which might occur to the motor home leveling system.

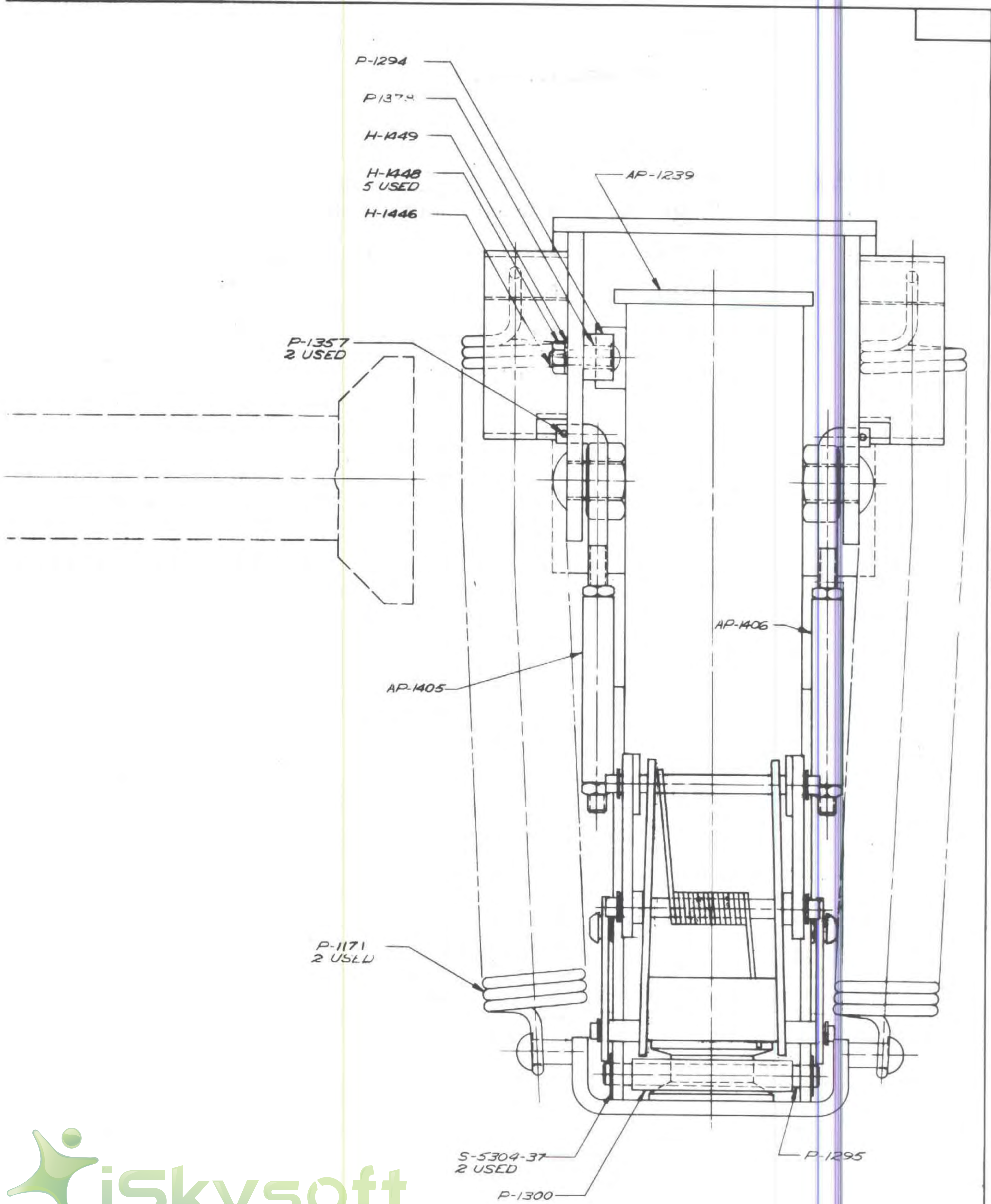
1. Hydraulic pump activates, but the leveling units will not extend.
 - a. Control valve lever not in full "on" position
 - b. Oil supply low in the reservoir
 - c. Relief stuck in "open" position
 - d. Broken hydraulic line
2. Leveling unit will not retract completely
 - a. Bent linkage
 - b. Linkage clogged with mud or ice
 - c. Scored rod
 - d. Waive plunger not completely depressed by valve handles (see detente plate adjustment)
 - e. Grease fitting on leveling unit
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 electrical connection
 - b. Bad microswitch
 - c. Blown fuse
5. Unit is extended but not vertical
 - a. Move control lever to the full retract position and manually pull the jack to the vertical position.

PARTS MANUAL



Automatic Leveling Unit

<u>Quantity</u>	<u>Number</u>	<u>Description</u>
1	AP-1206	Automatic Leveling Unit Complete
1	AP-1232	Weld Ass'y - Mounting Bracket
2	P-1280	Bushing
2	H-1447	Button Head Cap Screw 5/8 x 1
2	P-1392	Adjustable Link

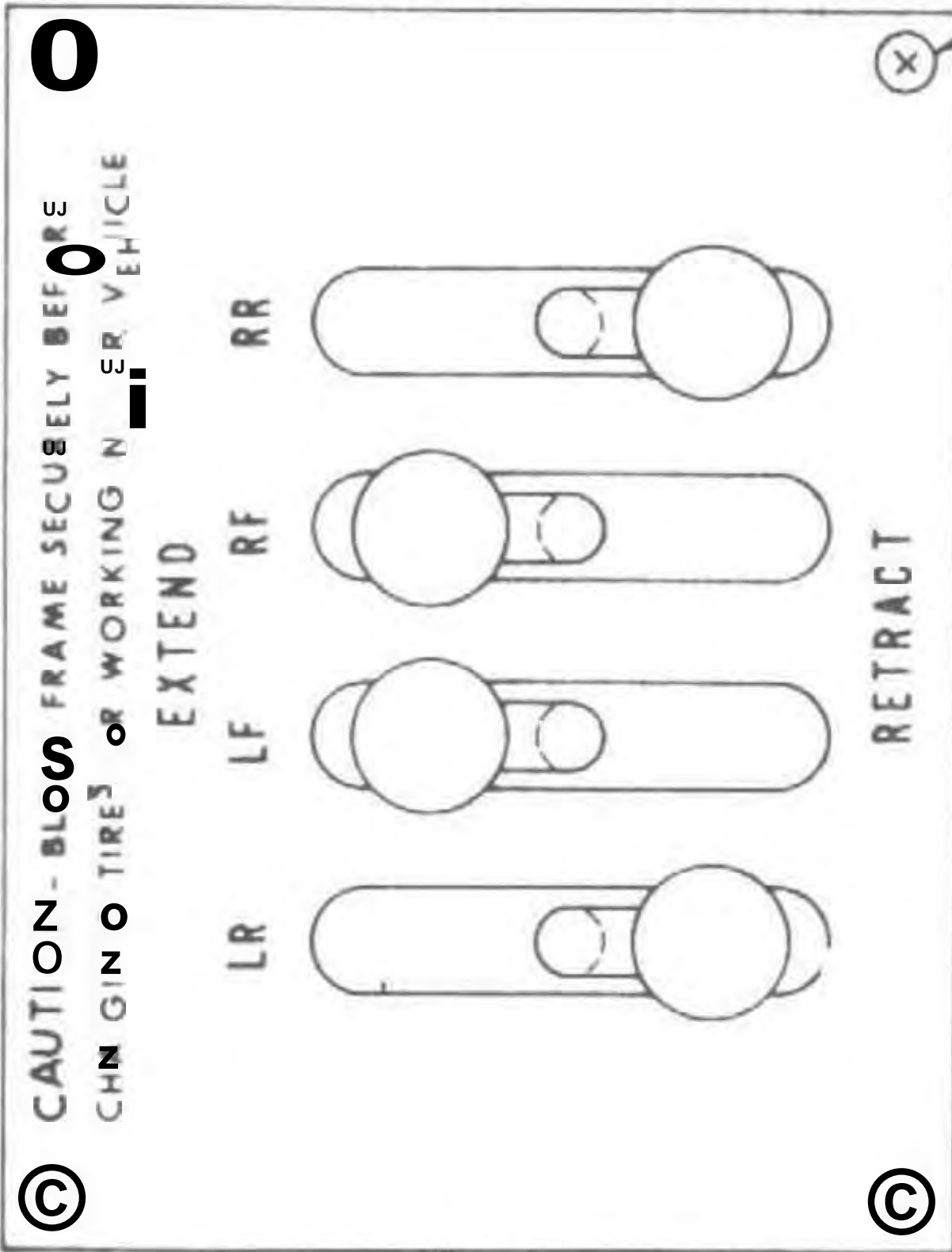


Automatic Leveling Unit (con't)

<u>Quantity</u>	<u>Number</u>	<u>Description</u>
1	P-1294	Hose
1	P-1378	Bushing-Stop
1	H-1449	5/16 Lockwasher
5	H-1448	5/16 N C Nut
1	H-1446	Button Head Cap Screw 5/16 x 1
2	P-1357	1/8 x 1 Cotter Pin
1	AP-1239	Hydraulic Ram
1	AP-1405	Weld Ass'y - Left Link
1	AP-1406	Weld Ass'y - Right Link
2	P-1171	Spring
2	S-5304-37	Snap Rings
1	P-1295	Pin
1	P-1300	Tube

Hydraulic Ram Ass'y

<u>Quantity</u>	<u>Number</u>	<u>Description</u>
1	P-1240	Wiper Seal
1	B-329	Backup Washer
7	O-329	"O" Ring
2	H-1452	5/16 x 1/2 Button Head Cap Screw
2	P-1380	Bushing
1	F-1453	Hydraulic Fitting
1	P-1241	Snap Ring
2	S-5555-31	Snap Rings
1	AP-1213	Weld Ass'y - Rod & Base
2	P-1397	Link
1	AP-1407	Weld Ass'y - Link
2	P-1356	Link
4	S-5555-31	Snap Rings
1	AP-1233	Weld Ass'y - Barrel
1	P-1394	Pin
2	P-1399	Bushing
2	P-1296	Pin
1	P-1161	Spacer
1	P-1365	Torsion Spring



AP-1146

(12) H-1431

(4) AP-1379

P-1156

P-1157

(2) P-1149

P-1150

P-1160

P-1331

(2) P-1162

AP-1435

(2) H-1462

(2) H-1463

(2) H-1464

(4) H-1465

(4) H-1466

P-1161

(2) H-1459

(2) P-1151

(5) F-1456

(5) P-1400 PLUG

F-1458

P-1401 PLUG

F-1457

(2) H-1461

(2) H-1460

AP-1315

(2) AP-1153

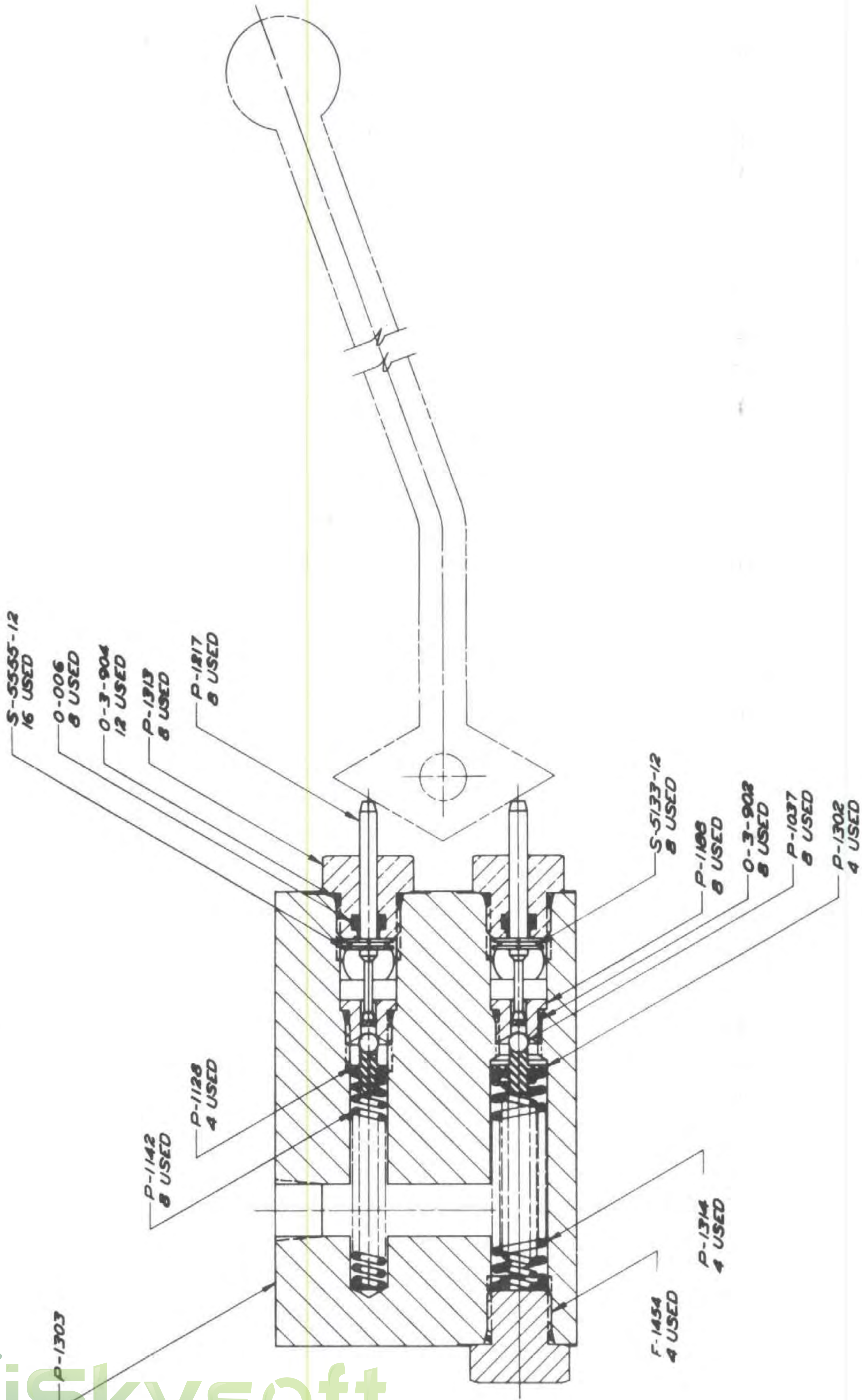
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Control Valve Ass'y

<u>Quantity</u>	<u>Number</u>	<u>Description</u>
1	AP-1118	Control Valve assembly Complete
1	AP-1146	Cover Plate with Seal
12	H-1493	#10 x 3/4 Metal Screws
4	AP-1379	Knob-Control Handle
4	AP-1143	Valve Handle
2	S-5555-31	Snap Ring
1	P-1150	Detent Plate
2	H-1461	1/4 UNC Hex Nut
2	H-1460	1/4 Lock Washer
1	P-1156	Pivot Rod
1	P-1157	Activating Rod-Switch
2	P-1149	Pivot Plate - Valve
2	H-1459	Hex Head Cap Screw 1/4 UNC x 2-1/2
2	P-1151	Mounting Bracket
5	F-1456	Fitting
5	P-1400	Caplugs 4x
1	AP-1315	Valve - Sub Ass'y
2	AP-1153	End Plate with Seal
2	P-1162	Spacer
1	P-1331	Spring
1	P-1160	Spacer
1	P-1161	Spacer
1	AP-1455	Switch & Wire Ass'y
2	H-1462	#2 7/16 Round Phillips
2	H-1463	#2 Lockwasher
2	H-1464	#2 Hex Nut
4	H-1465	#8 x 1/2 Round Phillips Head Cap
4	H-1466	#8 Lockwasher
1	F-1458	Fitting
1	P-1401	Caplug 3
1	F-1457	Fitting

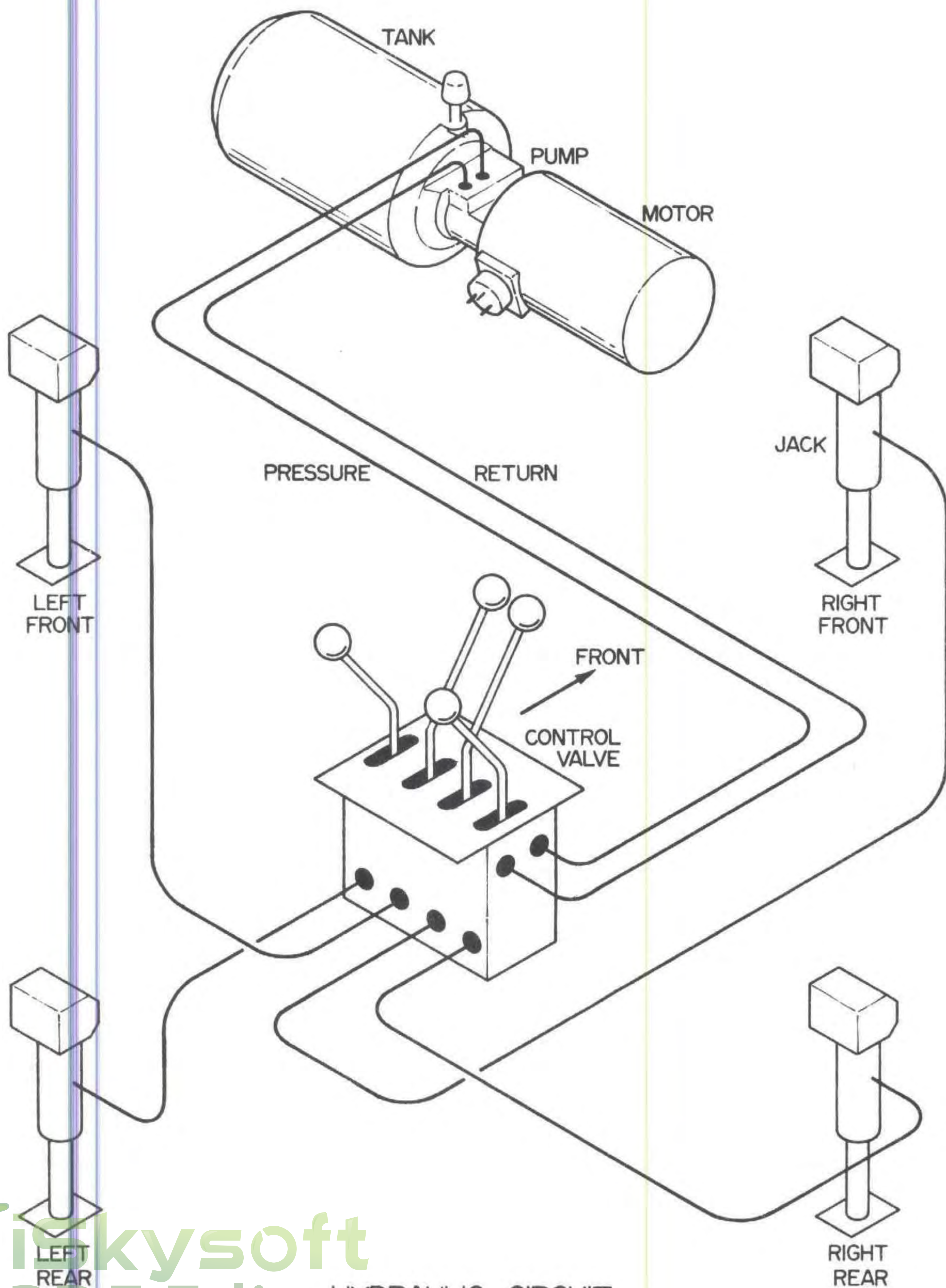


Valve Ass'y (interior)

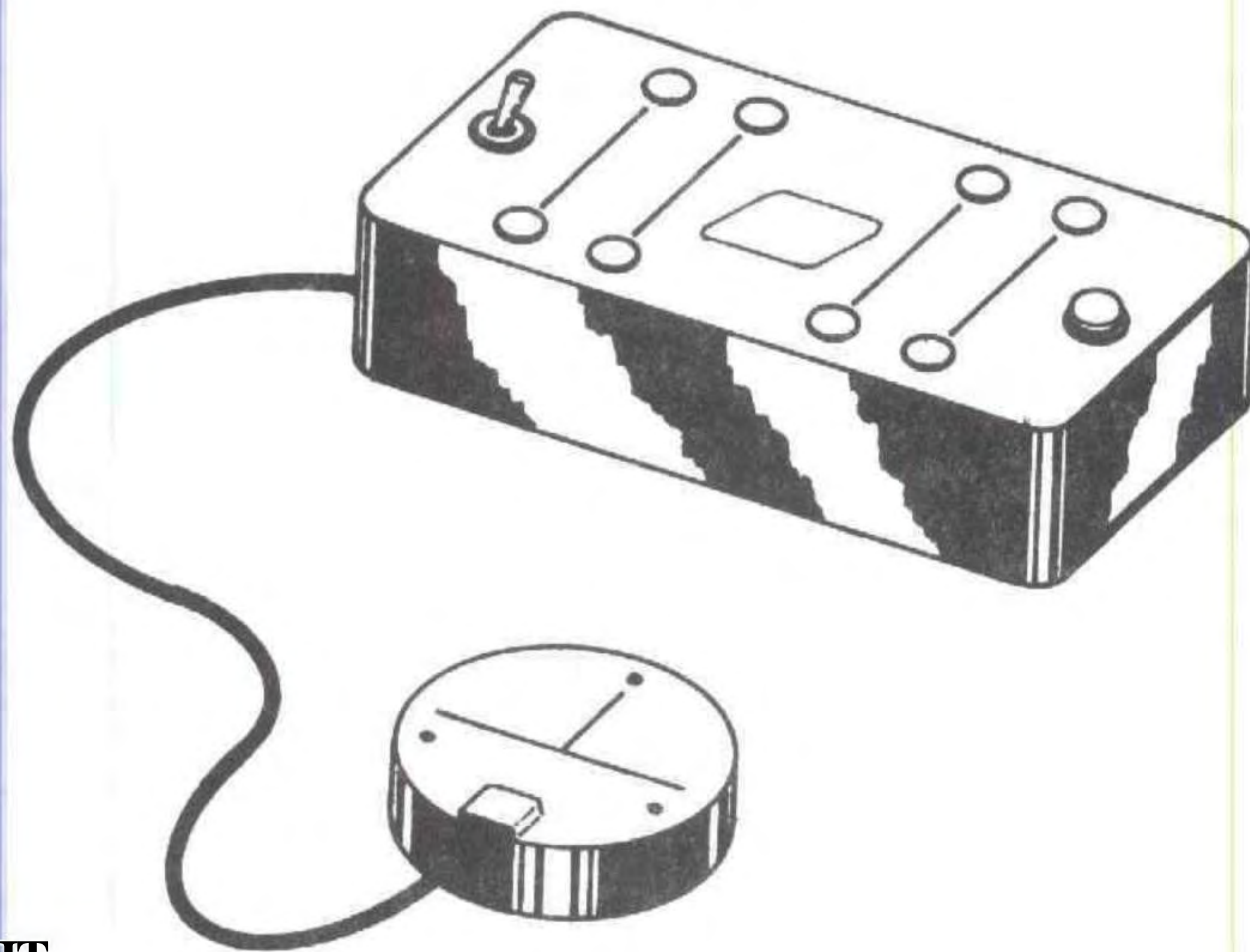
<u>Quantity</u>	<u>Number</u>	<u>Description</u>
1	P-1303	Body
8	P-1142	Spring
4	P-1128	Spring Spacer
16	S-5555-12	Snap Ring
8	0-006	"0" Ring
12	0-3-904	"0" Ring
8	P-1313	Plunger Guide
8	P-1217	Plunger
4	F-1454	"0" Ring Plug
4	P-1314	Spring
8	S-5133-12	Snap Ring
8	P-1188	Valve Seat-Pressure
8	0-3-902	"0" Ring
8	P-1037	Ball
4	P-1302	Spring Spacer

1 Gallon Webster Pump, Motor, Tank Assembly

<u>Quantity</u>	<u>Number</u>	<u>Description</u>
1	AP-3269	1 Gal. Webster Pump, Motor, Tank Assembly Complete
1	P-3385	1 Gallon Tank
1	P-3386	Suction Tube
1	P-3387	Magnet
8	H-3392	Hex Head Cap Screw
1	H-3393	Nut, Lock
1	P-3388	Strainer, Suction
1	P-3389	Face Seal
1	P-3390	Backup Ring
1	P-3391	Filler Breather
1	P-3394	Center Plate Assembly
1	P-3395	Plug, Valve
1	P-3405	O-Ring
1	P-3396	Spring
1	H-3397	Ball
1	P-3398	Poppet
1	P-3399	Spring
1	H-3401	Screw, Adjusting
1	P-3404	Seal Ring
1	P-3400	Cap
1	P-3409	Motor
1	P-3410	Solenoid
1	P-3412	Washer, Backup
1	P-3413	Washer, Thrust
1	P-3411	Seal
2	H-3407	Washer, Spring Lock
2	H-1448	Nut, Hex (5/16)
1	P-3403	Jumper
2	H-3297	Cap Screw Hex Head
2	H-3406	Washer, Spring Lock
1	H-3402	Nut, Hex #10-32
1	H-3408	Washer, Spring Lock



HWH LEVELEZE INDICATING AND LEVELING UNIT POSITION WARNING LIGHT SYSTEM



WHAT IS IT

Main components of the system consist of a level sensing unit, leveling unit position switches and indicating lamp panel.

HOW IT WORKS

To operate turn on switch which activates the indicating lamps and leveling system.
An "on" leveleze lamp indicates the corner that should be raised. Raise corner until lamp is "off". When leveling unit is extended a red warning light will come on indicating unit is down. Repeat until all leveleze lamps are off. When all leveleze lamps are off your unit is level, then turn off switch. It's that easy.

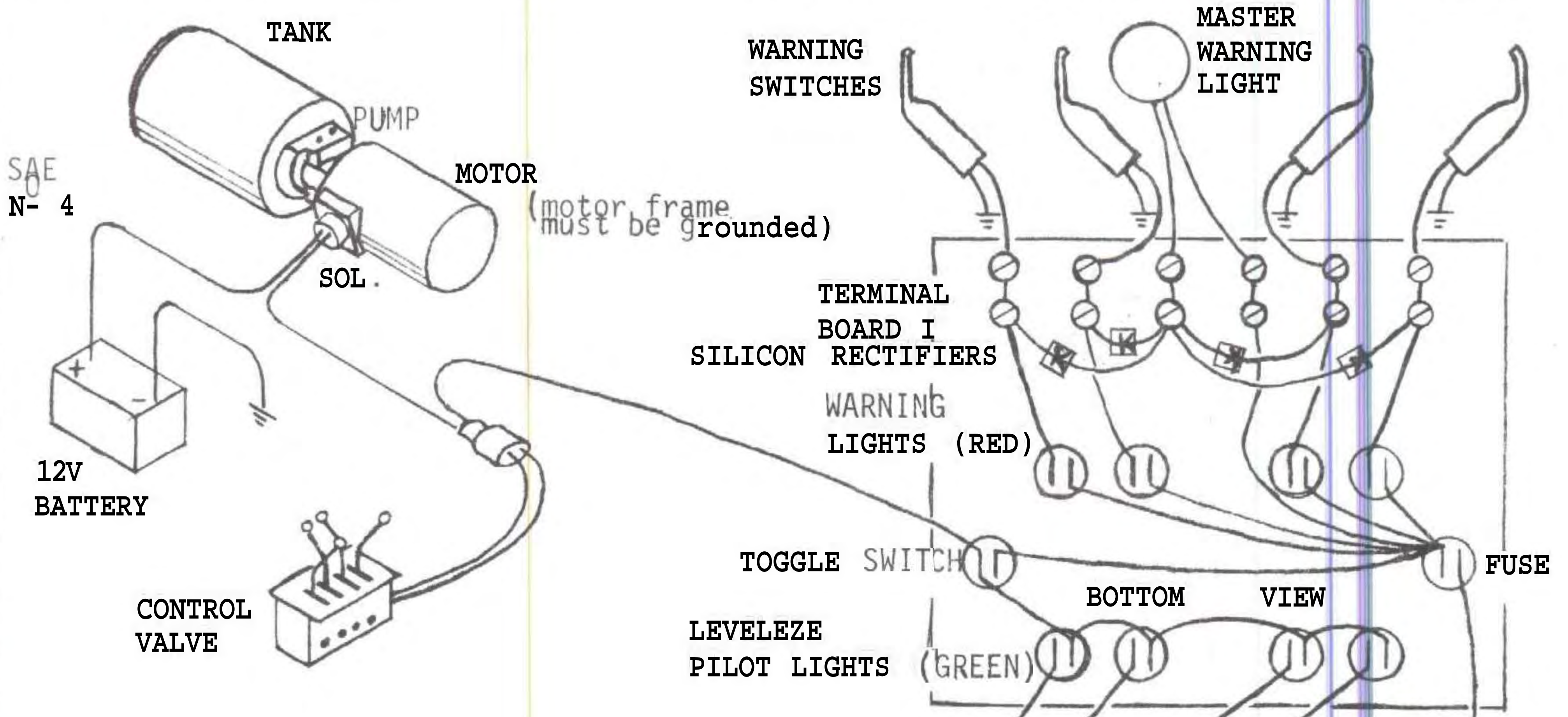
NOTE: Leveleze lamps are green and warning lights are red. The red lamps will remain on as long as leveling units are extended and ignition switch is on.

WHY HAVE IT

1. Indicating light immediately tells operator which lever to operate. This eliminates the problem of figuring out which way to tilt the coach to bring level bubble to center position.
2. The sensing unit can be mounted remotely from the indicating lights. This insures that you are leveling the critical area of the coach.
3. Position warning lights tells operator which units are extended and also reminds the operator to retract units before moving coach.
4. It adds pizzazz to the coach.

GENERAL INSTALLATION INSTRUCTIONS

1. Mount sensing unit in most desirable position (i.e. under or near a critical area such as a refrigerator or stove). Align sensing unit using scribe marks stamped on the face of the unit. Drill three 5/32" holes using the diagram at the left as a template. (See FIG. A for mounting details).
2. Mount indicating lamp assembly in a convenient location.
3. Mount position warning switches. See FIG. B for mounting details.
4. Install wiring as shown in WIRING DIAGRAM.
5. Level coach using a conventional bubble level.
6. Adjust the three mounting/adjusting screws on the Sensing Unit until all lamps (green) are "out". Leveling system is now properly adjusted and should require no further adjustment.



PARTS LIST	
DESCRIPTION	PART NO.
COMPLETE KIT	AP-2462
SPRING	P- 2166
NO. 10 x 3" SCREW	STD
SWITCH	AP-2354
FUSE 3AG	15AMP
FUSE HOLDER	AP-2353
SENSING UNIT	AP-2469
LAMP-GREEN	AP-2355
LAMP-RED	AP-2472
WARNING SWITCH	AP-2477
BAND	P-2508
WIRE TIE	P-2507
BOX	P-2506
SILICON RECTIFIER	P-2473
TERMINAL BOARD	P-2509

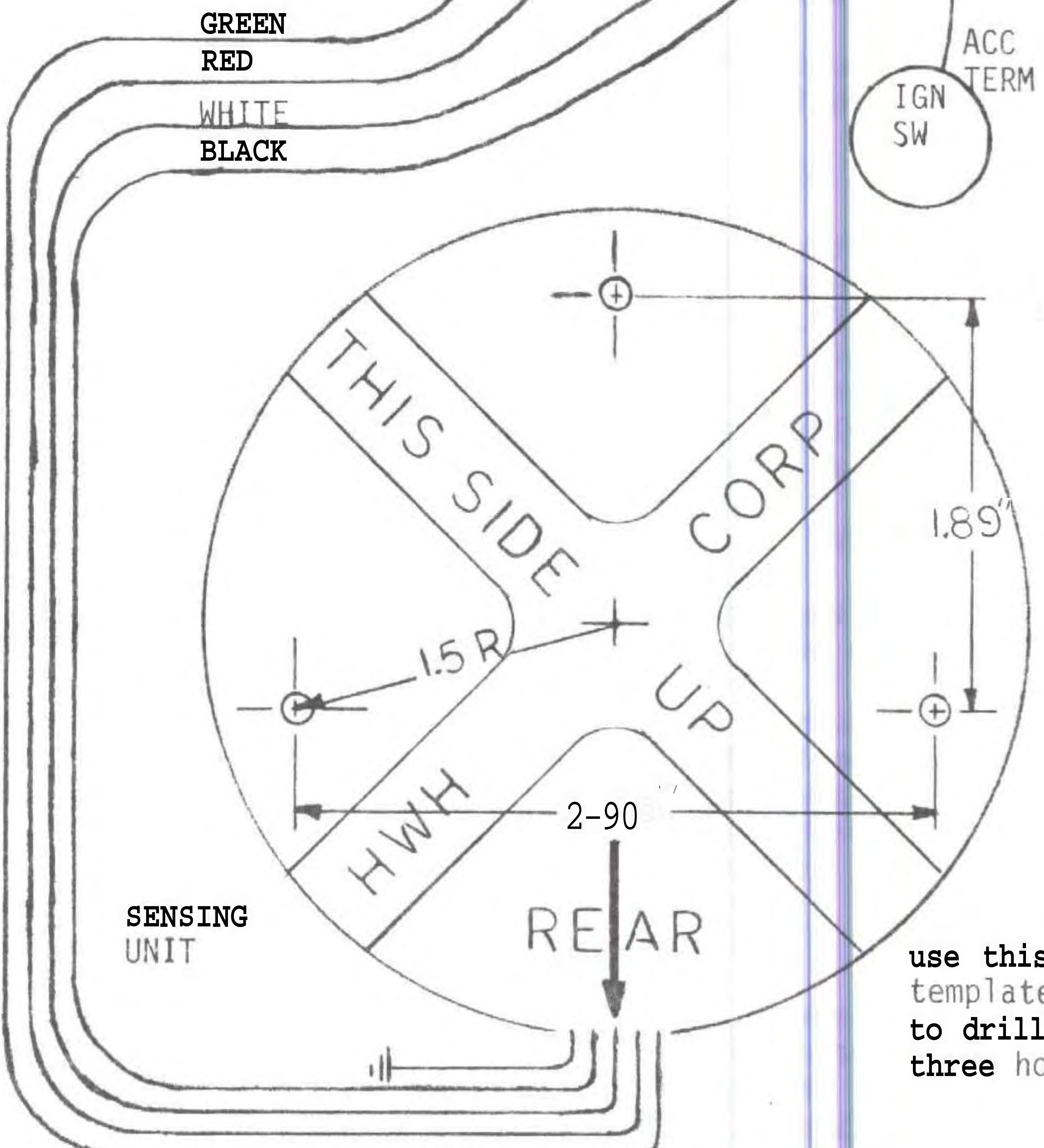
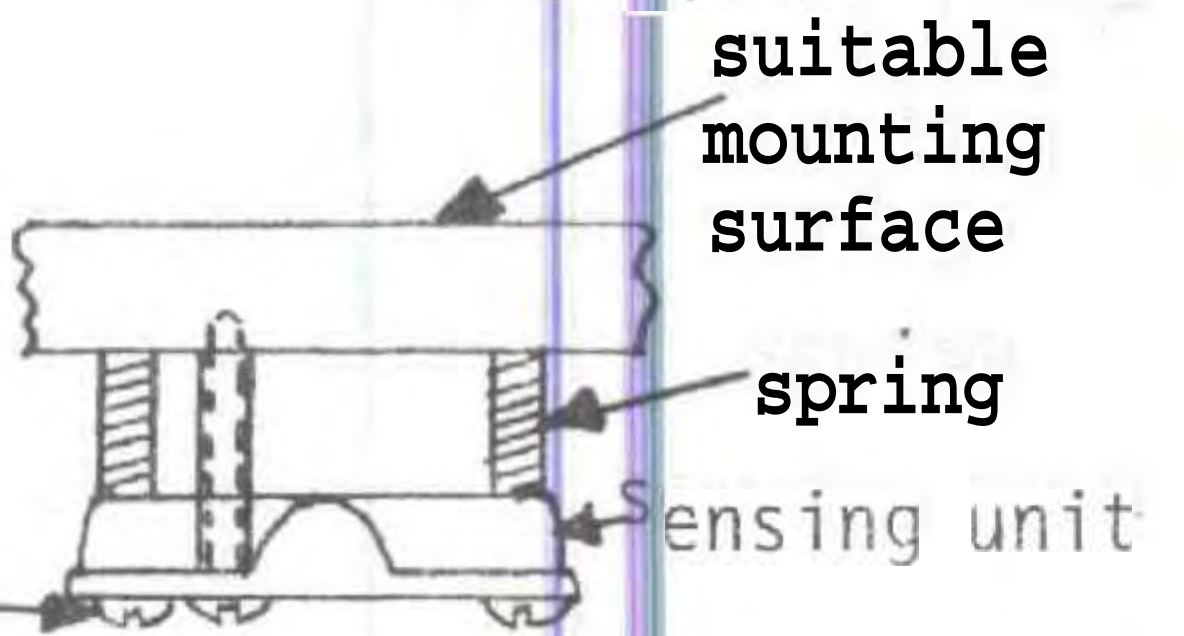
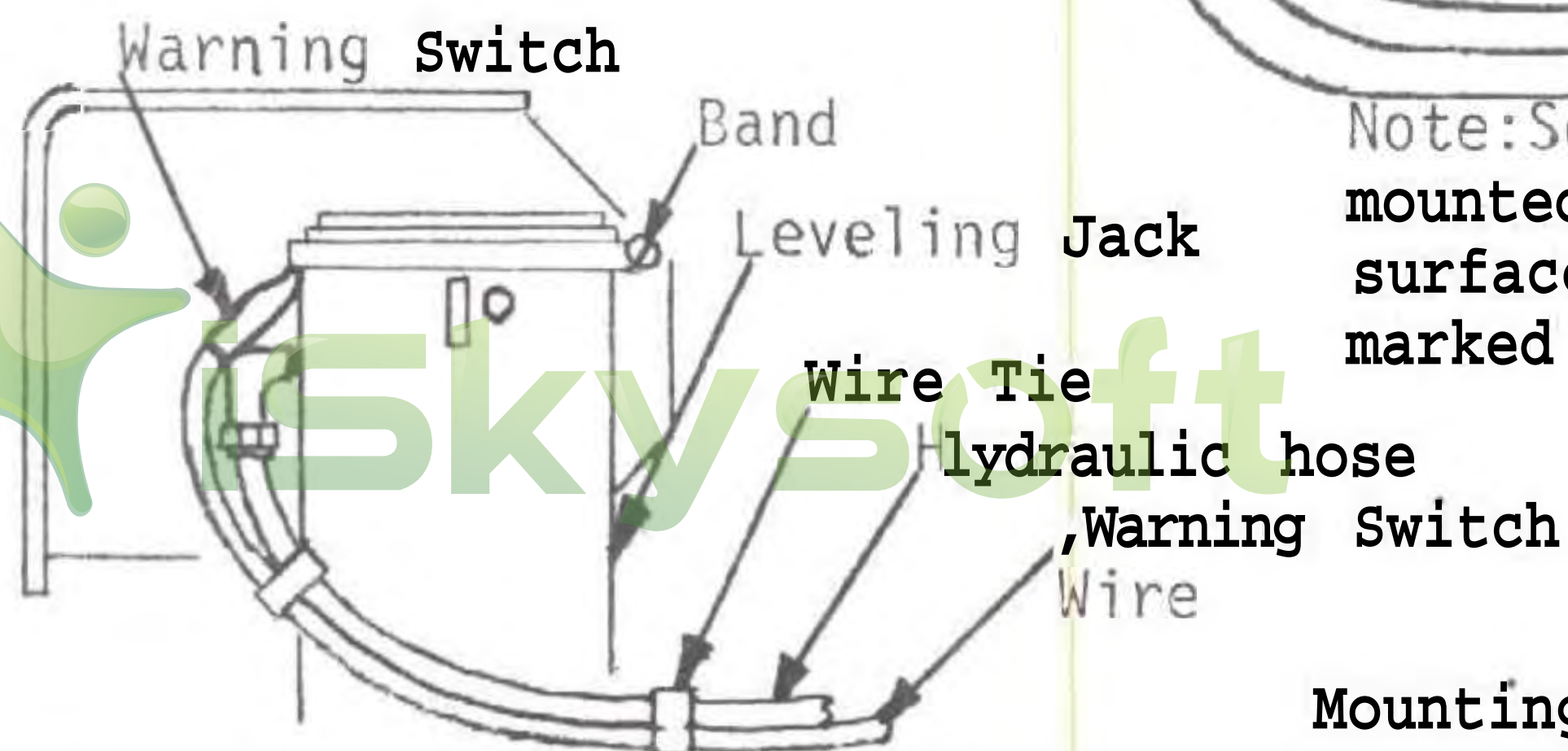


FIG. B- warning switch mounting detail

FIG. A-sensing unit mounting detail (side view)



use this template to drill three holes.