DOVER

VALVES

ADJUSTORS MANUAL INDEX

BOOK II

DIVISION 4 INDEX

"OILDRAULIC" CONTROLLERS

Feb., 1983

INTEGRAL VALVE ADJUSTMENTS

INTEGRAL VALVE ADJUSTMENTS

I. IF YOUR VALVE UNIT IS ASSEMBLED ON A POWER UNIT SHIPPED FROM THE FACTORY, YOU MAY ELIMINATE STEPS I, II, III, AND IV. THAT IS, START WITH STEP V FINAL ADJUSTMENTS. BEFORE PROCEEDING READ THE APPROPRIATE SEQUENCE OPERATION IN THE MANUAL, SEE PAGES #5 AND 7. A GOOD UNDERSTANDING OF THE VALVE OPERATION WILL HELP WHEN ADJUSTING. IF AT ANY POINT IN THE ADJUSTMENTS, THE VALVE FAILS TO RESPOND AS DESCRIBED, CALL OUR FACTORY FOR ASSISTANCE.

II. WITH POWER ON AND THE CAR ON INSPECTION, LOWER THE EMPTY CAR INTO THE PIT BY OPENING THE MANUAL LOWERING VALVE, THEN CLOSE VALVE BEFORE PROCEEDING. INSTALL PRESSURE GAUGE ON QUICK DISCONNECT PROVIDED ON FAR SIDE OF VALVE.

NOTE: ADJUSTMENTS OF ACCELERATION, DECELERATION AND STOP ARE DESIGNATED AS (A), (D), AND (S) ON THE INTEGRAL VALVE PILOTS AND IN THE FOLLOWING INSTRUCTIONS.

III. INITIAL SETTINGS

A. UP SIDE

1. LOW PRESSURE - BACK OUT ALL THE WAY, THEN TURN IN BY HAND UNTIL IT JUST TOUCHES THE PISTON.

2. RELIEF PRESSURE SCREW - SET SO THAT 1-1/8 INCHES OF SCREW EXTENDS BEYOND THE BODY.

3. NEEDLES - BACK THEM ALL OUT AS FAR AS POSSIBLE, THEN SCREW THE STOP (S) NEEDLE IN 18 TURNS.

4. LEVELING - BACK ALL THE WAY OUT.

B. DOWN SIDE

1. LOWERING SPEED - SET SO THAT 5/8 INCH OF SCREW EXTENDS BEYOND THE BODY AND FLATS (OR ARROWS) POINT TO 10 AND 4 O'CLOCK.

2. NEEDLES - BACK THEM ALL OUT AS FAR AS POSSIBLE, THEN SCREW THE DECELERATION (D) NEEDLE IN 18 TURNS.

INTEGRAL VALVE ADJUSTMENTS

IV. INITIAL ADJUSTMENTS

A. UP SIDE

1. LOW PRESSURE - PUT CONTROL ON "INSPECTION" AND START MOTOR. SCREW IN ON LOW PRESSURE ADJUSTMENT UNTIL THE CAR TRAVELS. LET CAR COME OUT OF THE PIT, THEN SCREW ADJUSTMENT OUT UNTIL CAR JUST STOPS, THEN SCREW AN ADDITIONAL 1/2 TURN MORE. TIGHTEN JAM NUT.

2. RELIEF VALVE - CLOSE LINE SHUTOFF, THEN OPEN MANUAL LOWERING TWO TURNS. RUN ON AUTOMATIC AND NOTE PRESSURE. SCREW IN ON DECELERATION (D) NEEDLE UNTIL PRESSURE INCREASES, THEN ONE MORE TURN. SET RELIEF VALVE TO FULL LOAD PRESSURE PLUS 25%. SCREWING IN INCREASES PRESSURE. STOP MOTOR, CLOSE MANUAL LOWERING AND OPEN LINE SHUTOFF.

3. RUN CAR ON "AUTOMATIC" TO SECOND FLOOR. CAR WILL SLOW DOWN ABRUPTLY AND STALL. SCREW IN ON THE LEVELING ADJUSTMENT UNTIL CAR LEVELS INTO THE FLOOR. READ THE NEXT SECTION FOR LOWERING THE CAR.

B. DOWN SIDE

START CAR DOWN ON "INSPECTION" AND SCREW IN ON DOWN STOP (S) UNTIL CAR COMES DOWN, THEN AN ADDITIONAL 1/2 TURN MORE. CHECK TO SEE THAT CAR WILL STOP. IF IT DOES NOT, BACK OUT STOP SCREW UNTIL IT DOES, ADJUST UNTIL BOTH START AND STOP ARE POSITIVE. CAR MAY NOW BE LOWERED ON "AUTOMATIC".

INTEGRAL VALVE ADJUSTMENTS

V. FINAL ADJUSTMENTS

FINAL UP AND DOWN ADJUSTMENTS MAY BE MADE SIMULTANEOUSLY TO SAVE TIME BUT THIS IS NOT NECESSARY. THEY MUST, HOWEVER, BE MADE IN THE ORDER GIVEN AND IT IS IMPORTANT THAT YOU BE COMPLETELY SATISFIED WITH EACH ACTION BEFORE YOU CONTINUE TO THE NEXT.

NOTE: IF YOUR VALVE IS ON A POWER UNIT SHIPPED FROM THE FACTORY AND YOU ARE STARTING YOUR ADJUSTMENTS AT THIS POINT, THE LOW PRESSURE MUST BE ADJUSTED BEFORE PROCEEDING. DE-ENERGIZE THE UP SLOW SOLENOID AND RUN MOTOR ON "INSPECTION". SCREW IN LOW PRESSURE ADJUSTMENT UNTIL CAR TRAVELS. THEN SCREW OUT UNTIL IT JUST STOPS, THEN GIVE IT AN ADDITIONAL 1/2 TURN MORE.

A. UP SIDE

1. DECELERATION AND LEVELING SPEED - THESE TWO FUNCTIONS MUST BE ADJUSTED TOGETHER SINCE ONE AFFECTS THE OTHER. MAKING THE DECELERATION SOFTER (SCREWING NEEDLE IN) INCREASES LEVELING SPEED. RUN THE CAR ON "INSPECTION" AND SET LEVELING SPEED AT 10 TO 15 FPM. SCREWING IN ON LEVELING ADJUSTMENT INCREASES LEVELING SPEED. RUN TO THE SECOND FLOOR AND OBSERVE THE DECELERATION. IT SHOULD BE SET SO YOU HAVE 2" OF STABLE LEVELING BEFORE STOPPING. EACH TIME YOU ADJUST THE DECELERATION YOU MUST RE-CHECK THE LEVELING SPEED ON "INSPECTION", AND ADJUST IT ACCORDINGLY.

2. ACCELERATION - SCREW IN THE ACCELERATION (A) NEEDLE 18 TURNS. RUN UP ON "AUTOMATIC" AND SCREW OUT UNTIL THE CAR STARTS. ADJUST FOR A SMOOTH START ASSURING THAT FULL SPEED IS ATTAINED IN A ONE FLOOR RUN. SCREWING IN MAKES THE ACCELERATION SOFTER.

3. STOP - IN MOST CASES THE STOP NEEDLE (S) WILL NEED NO ADJUSTMENT. IT CANNOT BE MADE FIRMER. IF YOU CONSIDER IT TOO FIRM, ADJUST AS FOLLOWS. DISCONNECT THE UP SLOW SOLENOID, (FRONT). WHILE RUNNING ON "INSPECTION", BACK OUT ON THE NEEDLE UNTIL CAR STARTS. TURN IN UNTIL IT STOPS, THEN TWO MORE ADDITIONAL TURNS. RECONNECT THE SOLENOID AND DO THE FINE ADJUSTMENT REMEMBERING THAT THIS NEEDLE WORKS IN REVERSE. SCREWING OUT THE ADJUSTMENT MAKES THE STOP SOFTER.

4. RELIEF PRESSURE (FINAL SETTING)

   CLOSE THE LINE SHUTOFF AND OPEN THE MANUAL LOWERING TWO TURNS. RUN CAR ON "AUTOMATIC" AND SET THE RELIEF PRESSURE AS BEFORE. STOP MOTOR, LOCK JAM NUT, CLOSE MANUAL LOWERING AND OPEN LINE SHUTOFF.

INTEGRAL VALVE ADJUSTMENTS

B. DOWN SIDE

1. DOWN SPEED - SET DOWN SPEED IN 1/2 TURN INCREMENTS OF LOWERING AND LEVELING SPEED ADJUSTMENT PRESERVING THE 10 O'CLOCK POSITION OF THE FLATS (OR ARROWS) AFTER EACH ADJUSTMENT. SCREWING OUT INCREASES SPEED.

2. LEVELING SPEED - SET LEVELING SPEED TO 10-12 FPM BY TURNING THE LOWERING AND LEVELING SPEED ADJUSTMENT WITHIN ONE HALF TURN. TURNING CLOCKWISE DECREASES SPEED. LOCK JAM NUT.

3. STOP - SCREWING IN MAKES STOP SOFTER.

4. ACCELERATION - SCREWING IN MAKES THE ACCELERATION SOFTER. MAKE ACCELERATION AS SOFT AS POSSIBLE ASSURING THAT FULL SPEED IS ATTAINED IN A ONE FLOOR RUN.

5. DECELERATION - RUN THE CAR DOWN AT LEVELING SPEED. SCREW OUT ON THE DECELERATION NEEDLE (D) UNTIL THE SPEED JUST STARTS TO INCREASE, THEN TURN IN TWO TURNS. FINE ADJUST KEEPING IN MIND THAT THIS NEEDLE WORKS IN REVERSE, SCREWING OUT MAKES THE DECELERATION SOFTER. SET FOR 3-4" INCHES OF STABLE LEVELING.

VI. CHECK WITH FULL LOAD

NOTE THAT ANY CHANGE IN THE ADJUSTMENTS MUST BE MADE IN THE SAME SEQUENCE AS BEFORE AND ALL SUBSEQUENT ADJUSTMENTS REPEATED. FOR EXAMPLE, IF THE DOWN STOP IS CHANGED, THEN THE ACCELERATION AND DECELERATION MUST BE RE-ADJUSTED AS WELL. THE UP ACCELERATION, UP DECELERATION, AND DOWN ACCELERATION WILL BE CONSIDERABLY FIRMER AT FULL LOAD. DO NOT READJUST THEM UNLESS AT LIGHT LOAD YOU HAVE SOME STABLE LEVELING DISTANCE TO SPARE AND SOME STABLE FULL SPEED TO SPARE IN EITEER DIRECTION. THE DOWN LEVELING DISTANCE WILL HAVE REDUCED AND THE DECELERATION SHOULD BE ADJUSTED TO PRODUCE AT LEAST 2" OF STABLE LEVELING.

VII. RE-CHECK WITH LIGHT LOAD IF ANY ADJUSTMENTS WERE CHANGED.

INTEGRAL VALVE ADJUSTMENTS

TROUBLE SHOOTING

INTEGRAL VALVE - LOWERING - LEVELING

	DIFFICULTY	SOLUTION
1.	Car will not lower.	(a) Check line shut-off valve. (b) Check solenoid.* (c) Back out down start adjustment. (d) Turn in on down stop adjustment. (e) Unscrew lowering speed adjustment.
2.	Bouncy, slow down start.	(a) Bleed jack of air or loosen packing, if possible. (b) Back out on down start adjustment. (c) Turn in on down stop adjustment. (d) Back out on lowering speed adjustment.
3.	Sudden down start.	(a) Turn in on down start adjustment.
4.	Car will not stop when started down.	(a) Tighten manual lowering. (b) Back out on down stop. (c) Check solenoid valve not closing (residual magnetism).*
5.	Down stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Back out on down stop.
6.	Down stop rough (quick).	(a) Turn in on down stop.
7.	Leveling bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Increase leveling speed.
8.	Car will not slow down to leveling speed.	(a) Check down fast solenoid.* (b) Down slowdown adjustment may be open too much (too soft). (c) Leveling speed may be set too high.
9.	Slowdown rough (quick).	(a) Back out on down slowdown adjustment.
	*Check solenoids for voltage and for damage to solenoid tube. If all else fails, unscrew solenoid tube and check plunger for binding. Do not reseat. If seat in pilot body is damaged, use new body.	

NOTE 1: During the lowering cycle, the pump may rotate backward.

NOTE 2: In offering these solutions, the manufacturer assumes there is no binding in the hatch and that the proper voltage is being supplied to the power unit.

INTEGRAL VALVE ADJUSTMENTS

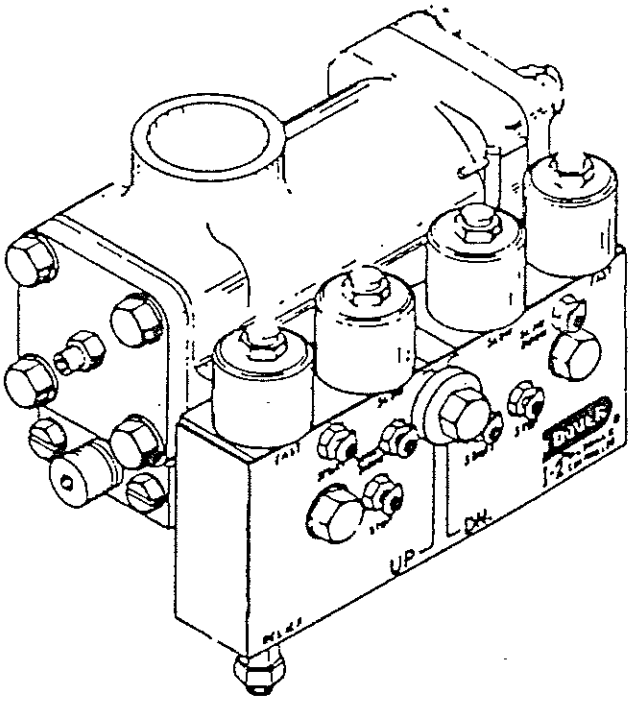
TROUBLE SHOOTING

INTEGRAL VALVE - ROTA-RELIEF - UP LEVELING - BYPASS STOP

DIFFICULTY	SOLUTION
1. Pump runs but car does not move.	(a) Check line shut-off valve. (b) Check motor rotation. (c) Check up slow solenoid.* (d) Turn in leveling adjustment. (e) Turn in low pressure adjustment. (f) Check relief pressure setting.
2. Car will not run at high speed.	(a) Check up fast solenoid.* (b) Back out up start adjustment. (c) Turn in up slowdown adjustment. (d) Make sure regulator piston is free.
3. Car will not slow down to leveling speed.	(a) Check up fast solenoid.* (b) Leveling set too high. (c) Make sure regulator piston parks open. (Check this with the low pressure adjustment screw.) (d) Slowdown set too smooth.
4. Car will not stop hydraulically.	(a) Check up slow solenoid.* (b) Turn in up stop adjustment. (c) Back out low pressure adjustment.
*Check solenoids for voltage and for damage to solenoid tube. If all else fails, unscrew solenoid tube and check plunger for binding. Do not reseat. If seat in pilot body is damaged, use new body.	

NOTE: The solutions to the problem are to be tried individually and in the order given. It is presumed that the initial valve adjustments have been completed.

I-2 & I-3 OILDRAULIC® CONTROLLER ADJUSTMENTS



I-2 SHOWN I-3 SIMILAR

1. A good understanding of the way the I-2 or I-3 "Oildraulic" controller operates will be a big help when adjusting. We suggest you become familiar with the sequence of operation - Division 4, Section P, Pages 13 through 20 of the Service Manual.

2. Adjustment of the up side does not affect the down side nor vice versa, however, note that certain individual adjustments within the up side and down side do affect one another, and must be adjusted together and in the order given for proper operation. Understanding these points will save considerable time in the adjusting procedures.

3. All hatch switches and cams shown in Installation Manual Division 1, Section G should be installed before adjusting the valve.

4. The power unit location should be heated and ventilated to maintain a room temperature between 50°F and 80°F.

   Variations in the temperature of the hydraulic oil will cause the valve to perform differently, so the closer you can approximate the expected operating temperature of the oil when making adjustments, the more stable the operation will be.

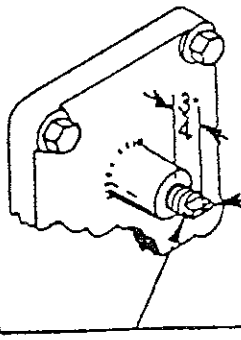
   If you do not have viscosity control on the power unit, make the initial valve adjustments with the oil temperature between 80°F and 110°F. Since oil temperature is affected by machine room temperature, pump output, frequency of operation, etc., it may be necessary to readjust the valve as the environmental and operational characteristics change.

5. Be extremely careful while making adjustments with the pump running.

I-2 & I-3 OILDRAULIC® CONTROLLER
ADJUSTMENTS

E. DOWN SIDE

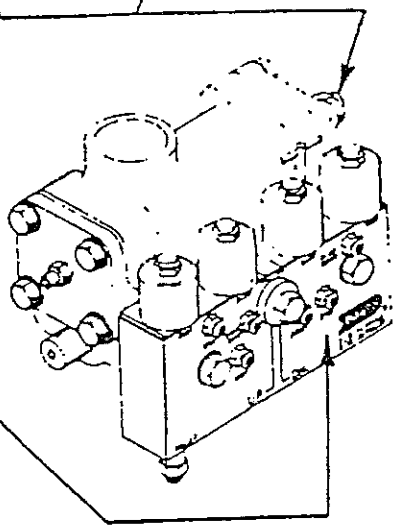
1. LOWERING AND LEVELING SPEED ADJUSTMENT (SET WITH CAR ON BUFFERS)
   a. Adjust so that 3/4" of the screw extends beyond the body and flat end of screw points to 9 o'clock and 3 o'clock.
   b. Tighten locknut.



2. ADJUSTMENT NEEDLES

NOTE: The nut on the adjustment needle assembly is not a lock nut. Do not loosen to make any adjustments. It should be snug against the valve body at all times.

   a. Turn the down-start, down-stop, and down-slowdown adjustment needles IN to fully closed and stopped position.
   b. Then turn down-start needle OUT 9 turns.
   c. Turn down-stop needle OUT 3 turns.
   d. Down-slowdown needle should remain closed at this point.



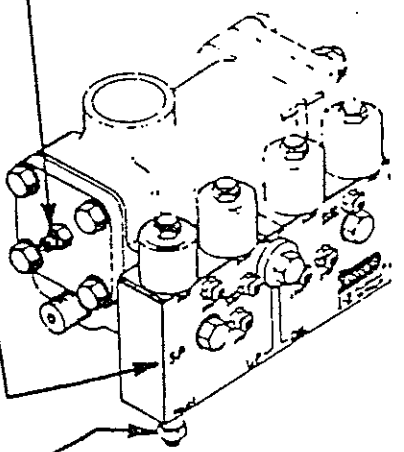
II. INITIAL ADJUSTMENTS (SET WITH AN EMPTY CAR)

A. UP SIDE

1. LOW PRESSURE ADJUSTMENT
   a. Turn power off.
   b. De-energize the up-slow solenoid by disconnecting V41 wire from controller.
   c. Put control on "inspection" and turn power on.
   d. Start motor with "Up" inspection button and check for correct rotation.
   e. Turn IN on low pressure adjustment until car moves slowly up. Be certain that car moves up far enough to allow access to line shutoff valve if located in the pit.
   f. Turn OUT on low pressure adjustment until car stops. Turn OUT an additional 1/2 turn.

Use Only When "SP" Stamped On Cover Plate Of I-2 Only.

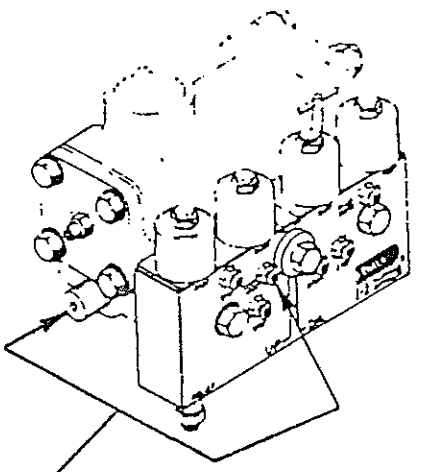
f(SP). (SPECIAL REGULATOR PISTON) Turn OUT 3 turns on low pressure adjustment. Check for too much time delay upon motor starting. Turn in on adjustment until excessive delay is eliminated. Car MUST be stopped and started to check setting.
   g. Tighten locknut.
   h. Stop motor and turn power OFF.
   i. Reconnect V41 wire to controller.



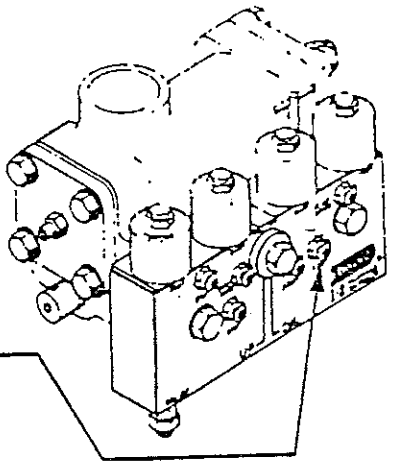
2. RELIEF PRESSURE ADJUSTMENT
   a. Close line shutoff valve.

I-2 & I-3 OILDRAULIC® CONTROLLER ADJUSTMENTS

b. Put control on "inspection" and turn power ON.
c. Start power unit with "Up" inspection button and read pressure. Stop power unit immediately if pressure exceeds 500 PSI.
d. Adjust relief valve to relieve at pressure indicated on the power unit nameplate. To increase relief pressure, turn IN the relief valve adjustment screw. To decrease relief pressure, turn OUT adjustment screw.
e. Tighten locknut and recheck relief pressure.
f. Stop power unit.
g. Open line shutoff valve.



3. UP-SLOWDOWN AND UP-LEVELING SPEED ADJUSTMENTS
   a. Turn up-slowdown adjustment OUT 10 turns.
   b. Put control on "Inspection".
   c. Start power unit with "Up" inspection button.
   d. Turn IN the up-slowdown adjustment until car moves at 10 to 12 FPM.
   e. Run car up to landing above.

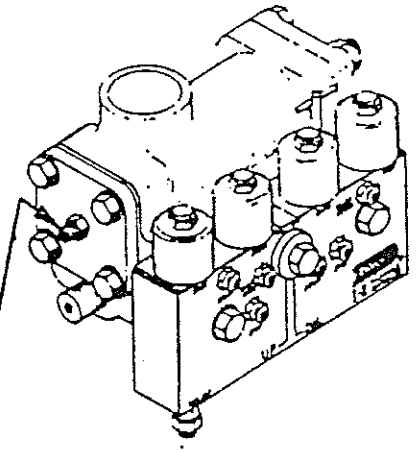


3. DOWN SIDE

1. With control on "Inspection", start car down.
2. It may be necessary to turn the down-stop adjustment IN to get the car to move. Adjust the down-stop until the speed is 10 to 12 FPM. Turn IN to increase speed.
3. Check to see that car will stop. If it does not stop, turn the down-stop adjustment OUT in small increments until you get a positive stop.

III. FINAL ADJUSTMENT (SET WITH AN EMPTY CAR)

Final up and down adjustments may be made simultaneously to save time, but this is not necessary. They MUST, however, be made in the order given, and it is important that you be completely satisfied with each adjustment before you continue to the next.

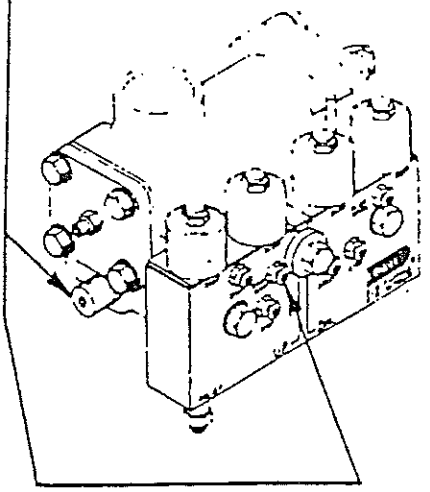


NOTE: If valve is on a power unit shipped from the factory and you are starting your adjustment at this point, the low pressure must be adjusted. Please complete initial low pressure adjustment as outlined in II - A - 1 before proceeding.

I-2 & I-3 OILDRAULIC® CONTROLLER
ADJUSTMENTS

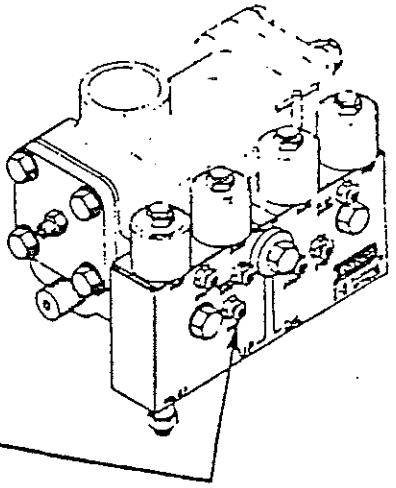
A. UP SIDE

1. UP-LEVELING SPEED AND UP-SLOWDOWN ADJUSTMENTS



NOTE: These adjustments affect each other. Turning IN the up-slowdown adjustment will make the up-slowdown softer and will increase the up-leveling speed. Turning IN the up-leveling speed adjustment will increase the up-leveling speed and will also make the up-slowdown softer.

a. Put control on "Automatic" operation.
b. Bring car to lowest landing.
c. Run the car to the floor above and observe the leveling zone.
d. Adjust the up-slowdown needle until you have 3 to 4 inches of leveling before final stop. Turning IN on the up-slowdown adjustment will shorten the leveling zone and will also increase the leveling speed. Turning OUT on the up-slowdown adjustment will lengthen the leveling zone and will also decrease the leveling speed.
e. Each time you adjust the up-slowdown, you must recheck the up-leveling speed with the control on "Inspection" and adjust it accordingly. Turning IN the up-leveling speed adjustment increases leveling speed. Turning OUT on the up-leveling speed adjustment decreases leveling speed.
f. The desired final adjustment should be a leveling speed of 10 to 12 FPM and 3 to 4 inches of leveling before final stop.



2. UP-STOP ADJUSTMENT

NOTE: The up-stop adjustment affects the up-start and must be adjusted before the up-start.

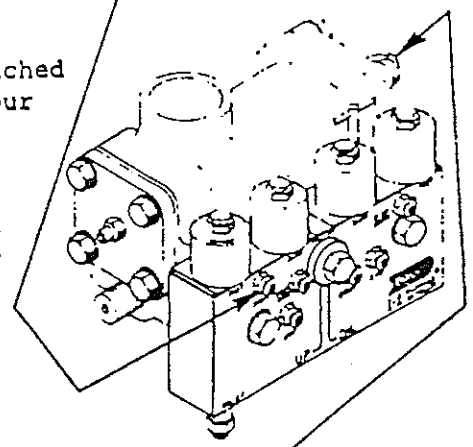
a. Adjust the up-stop for a soft but positive stop. Turning IN on the adjustment makes the up-stop softer and also makes the up-start firmer.

I-2 & I-3 OILDRAULIC® CONTROLLER ADJUSTMENTS

3. UP-START ADJUSTMENT

a. Adjust the up-start for a smooth but positive start. Turning IN the adjustment makes the up-start smoother.

b. Check to be certain full up speed is reached on a one floor run. This may require your making the UP-START more positive.

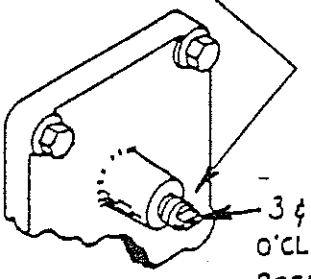


B. DOWN SIDE

NOTE: To prevent damage to valve seats, lowering and leveling speed adjustments must be made only while the car is in motion. (Up or Down)

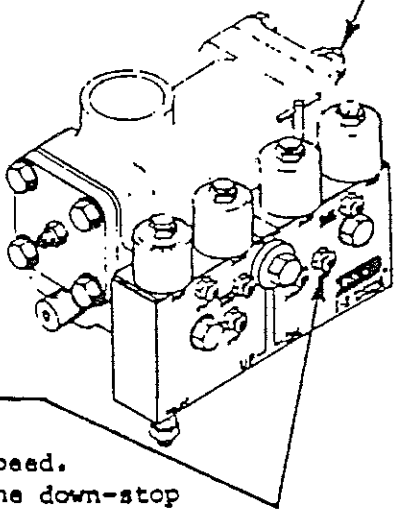
1. LOWERING SPEED ADJUSTMENT

a. Put control on "Automatic".
b. Refer to the layout drawing and set the lowering speed with empty car by turning the lowering speed ajustment in 1/2 turn increments - leaving the ends of the screw pointing to 9 and 3 o'clock after each adjustment. Turning OUT on the lowering speed adjustment increases the lowering speed.



2. DOWN-LEVELING SPEED AND DOWN-STOP ADJUSTMENT

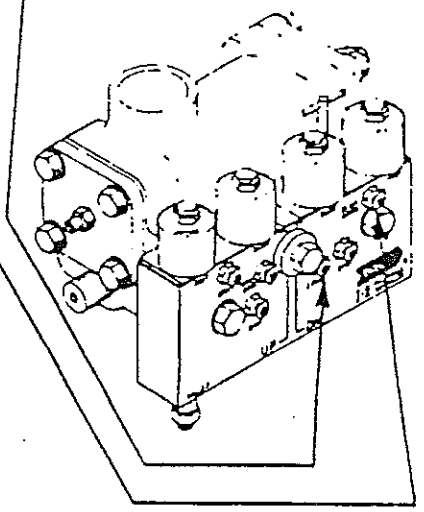
NOTE: The Down-leveling speed and the down-stop must be adjusted together since the down-stop affects the down-leveling speed. The down leveling speed, however, does not affect the down-stop.



a. Put control on "Inspection" and adjust down-leveling speed to 10 to 12 FPM by turning the down-leveling speed adjustment in increments of a few degrees from the lowering speed setting. Turning OUT on the down-leveling speed adjustment increases the leveling speed.
b. Adjust the down stop for a positive stop. Turning IN on the down-stop adjustment makes the stop softer and increases the leveling speed. If a softer stop is desired, do not adjust the down-stop before turning in all the way on the down slowdown adjustment. After desired down-stop is attained, readjust down slowdown.
c. Check to see that down-leveling speed is set to 10 to 12 FPM.
d. Tighten locknut on down-leveling speed adjustment.
e. Recheck down-leveling speed.

3. DOWN-START ADJUSTMENT
   a. Put control on "Automatic".
   b. Adjust the down-start adjustment to obtain a smooth start. Turning IN on down-start adjustment makes the start smoother.
   c. Check to be certain full down speed is reached on a one floor run. This may require your making the down-start more positive.

4. DOWN-SLOWDOWN ADJUSTMENT



NOTE: The effect of the down slow-down adjustment is opposite to previous adjustments. Turning OUT on the down-slowdown adjustment will shorten the leveling zone. Turning IN on the down-slowdown adjustment will lengthen the leveling zone. This adjustment should be made in small increments. The car will overshoot the landing if the adjustment is turned out too far.

   a. Turn OUT on down-slowdown adjustment in small increments until car has a leveling zone of 3 to 4 inches.

IV. PERFORMANCE CHECK WITH FULL LOAD

A. Put capacity load on car.

B. Run car on "Automatic" and check performance at all floors. All valve functions will become firmer. If adjustments are necessary, remember any change with full load will affect the empty car performance you had.

C. The down-leveling speed will increase and the down-leveling zone will be shorter. It may be necessary to change the down-slowdown adjustment to be certain there is at least 2" of leveling. If necessary to increase the leveling zone, turn IN the down-slowdown adjustment. See Final Adjustments, Section III - B - 4.

D. The up-leveling speed will increase. The up-leveling zone will change (it could be more or less) between no load and full load. Do not change any adjustments made with no load if you have at least 1" of up-leveling with full load. If necessary to increase the up-leveling zone, turn OUT on the up-slowdown adjustment. See Final Adjustments, Section III - A.

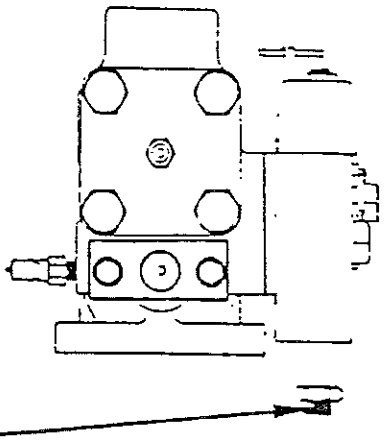
E. Check that car is obtaining full speed in both directions on a one floor run.

F. Record working pressure in the UP direction.

G. Remove capacity load from car.

I-2 & I-3 OILDRAULIC® CONTROLLER ADJUSTMENTS

V. FINAL RELIEF PRESSURE ADJUSTMENT



A. Close line shutoff valve.

B. Put control on "Inspection" and start pump with "Up" inspection button.

C. Read relief pressure.

D. Add 25% to the pressure recorded in Step IV - F and set relief valve to relieve at this pressure. To <u>increase</u> relief pressure, turn <u>IN</u> the adjustment screw. <u>To decrease</u> relief pressure, turn <u>OUT</u> the adjustment screw.

E. Tighten locknut with pump running and recheck relief pressure.

F. Stop power unit.

G. Open line shutoff valve.

VI. Recheck operation with an empty car.

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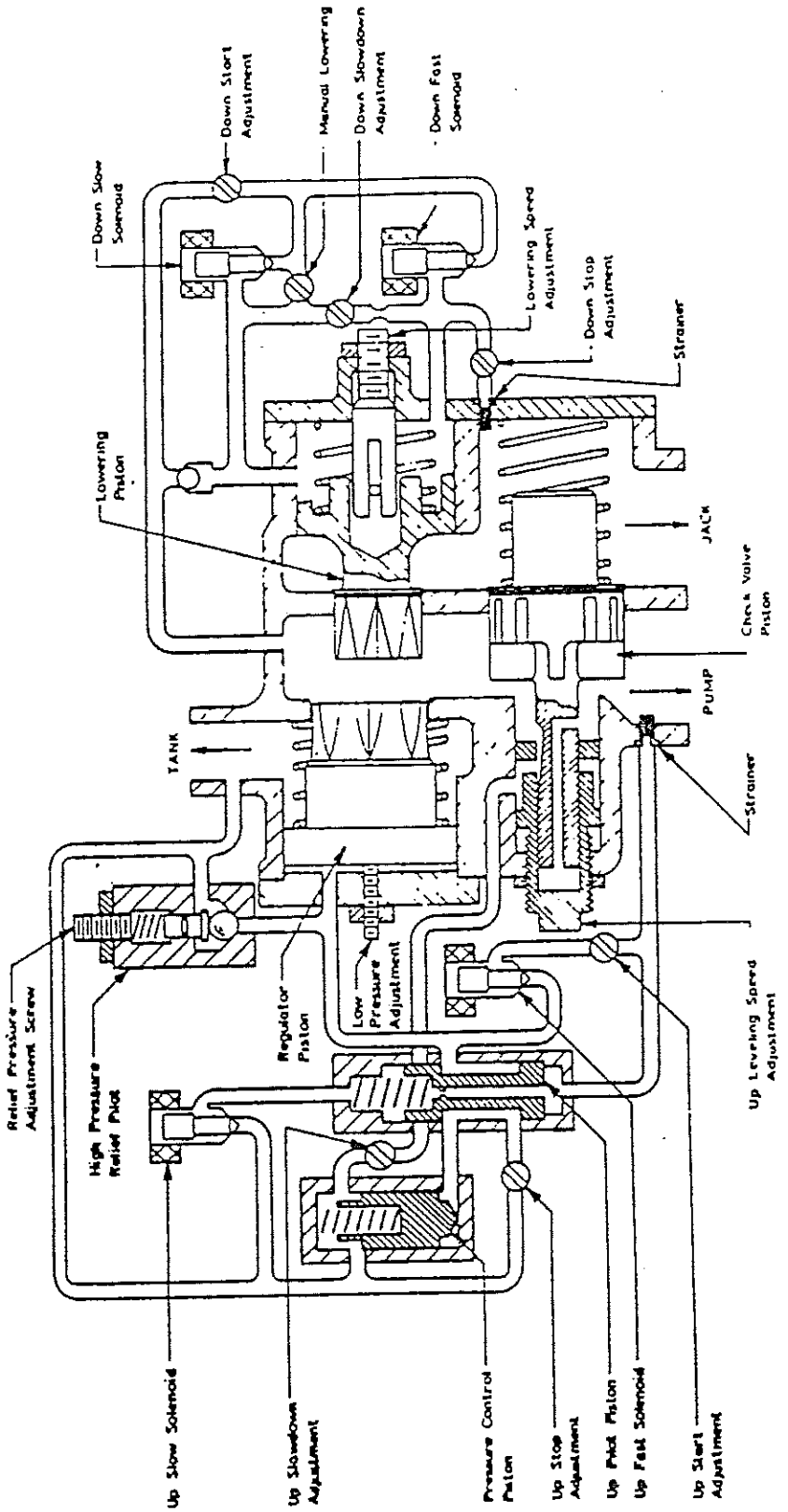
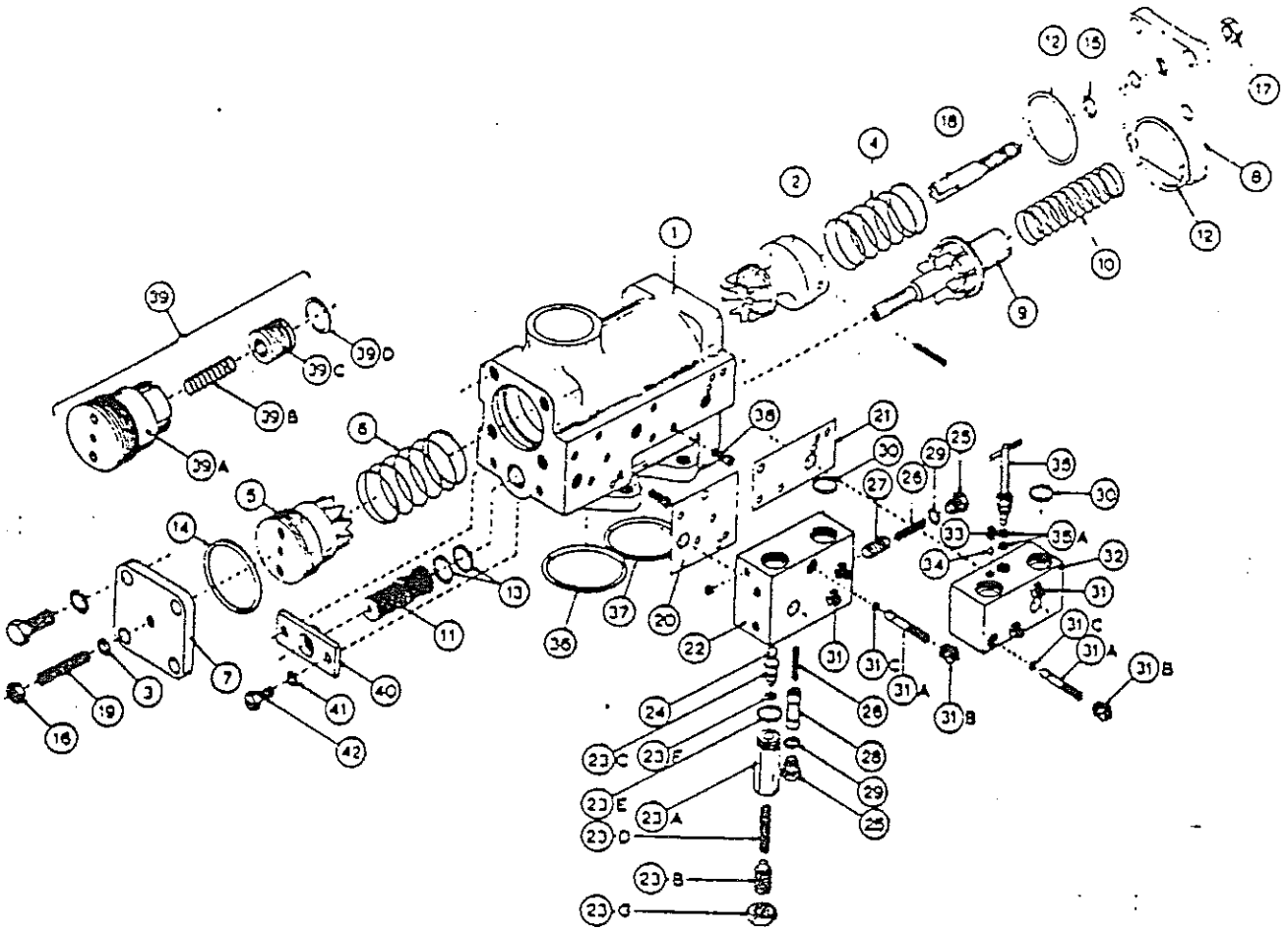
I-2 & I-3 OILDRAULIC® CONTROLLER

SCHEMATIC



I-2 & I-3 OILDRAULIC® CONTROLLER

EXPLODED VIEW



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Valve Main Body (I-2 Shown)	23G	Hex Jam Nut
2	Lowering Piston	24	Relief Ball
3	"O" Ring	25	Up Pilot Cap
4	Lowering Spring	26	Up Pilot Spring
5	Regulator Piston	27	Pressure Control Piston
6	Regulator Spring	28	Up Pilot Piston
7	Regulator Cap	29	"O" Ring
8	Lower & Check Cap	30	Flange Seal
9	Check Valve Piston	*31	Adjustment Screw Assembly
10	Check Spring	31A	Adjustment Screw
11	Leveling Adjustor	31B	Adjustment Screw Cap
12	"O" Ring	31C	"O" Ring
13	"O" Ring	32	Down Pilot Body
14	"O" Ring	33	Pipe Plug
15	"O" Ring	34	Steel Ball
16	Sealing Nut	*35	Manual Lowering Valve
17	Hex Jam Nut	35A	"O" Ring
18	Lowering Adjust Screw	36	"O" Ring
19	Oval Point Socket Screw	37	"O" Ring
20	Up Pilot Gasket	38	Strainer
21	Down Pilot Gasket	*†39	Regulator Piston Assembly (Special)
22	Up Pilot Body	39A	Regulator Piston
*23	Relief Assembly	39B	Starter Spring
23A	Relief Body	39C	Starter Piston
23B	Relief Adjustment Screw	39D	Retaining Ring
23C	Relief Plunger	40	Leveling Adjustor Cap
23D	Relief Spring	41	Lockwasher
23E	"O" Ring	42	Slotted Hex Machine Screw
23F	"O" Ring		

*Where item number is followed by a letter, the item is included in the assembly identified by the item number alone.
†Used only when down speed exceeds up speed on I-2 controllers only.

The up valve section consists of an up-leveling speed adjustment, a check valve piston, a regulator piston and a relief pilot. The valve provides four (4) functions for the elevator in the up cycle: (a) acceleration to full speed, (b) slow down to leveling speed, (c) hydraulic stopping and, (d) high pressure relief.

UP START & FULL SPEED

REFER TO SCHEMATIC DIAGRAMS, FIGURES 1 & 2

To start the elevator, the pump is started and the up-fast solenoid is energized, (see Figure 1). Since the regulator piston is parked open by its spring against the low pressure adjustment, all the oil will initially bypass to the tank. At the same time, some oil goes in through the up-start needle and out through the up-stop needle. Since the up-start needle is open more than the up-stop needle, pressure builds behind the regulator piston, causing it to move toward the closed position. It should be noted that, since oil is free to flow out through the up-stop needle, it is essential that the up-start adjustment be open more than the up-stop adjustment. The amount that the up-start adjustment is open will govern how fast the regulator piston moves and thus how rapidly the elevator starts. As the regulator piston closes, (see Figure 2) pressure from the pump builds up in the valve and causes the check valve piston to open. This allows oil to flow from the pump into the jack.

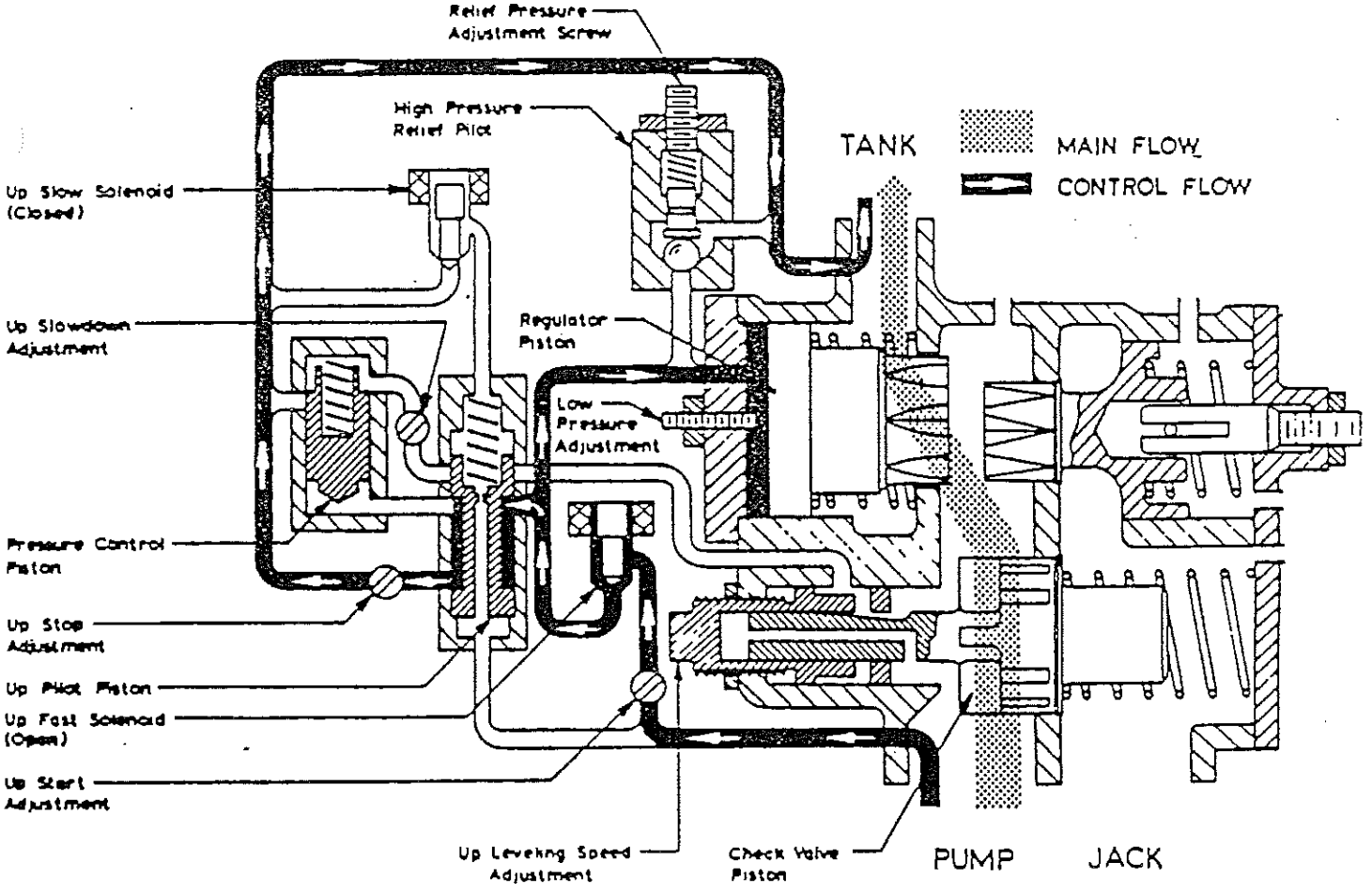


FIGURE 1 UP START

I-2 & I-3 OILDRAULIC® CONTROLLER

SEQUENCE OF OPERATION

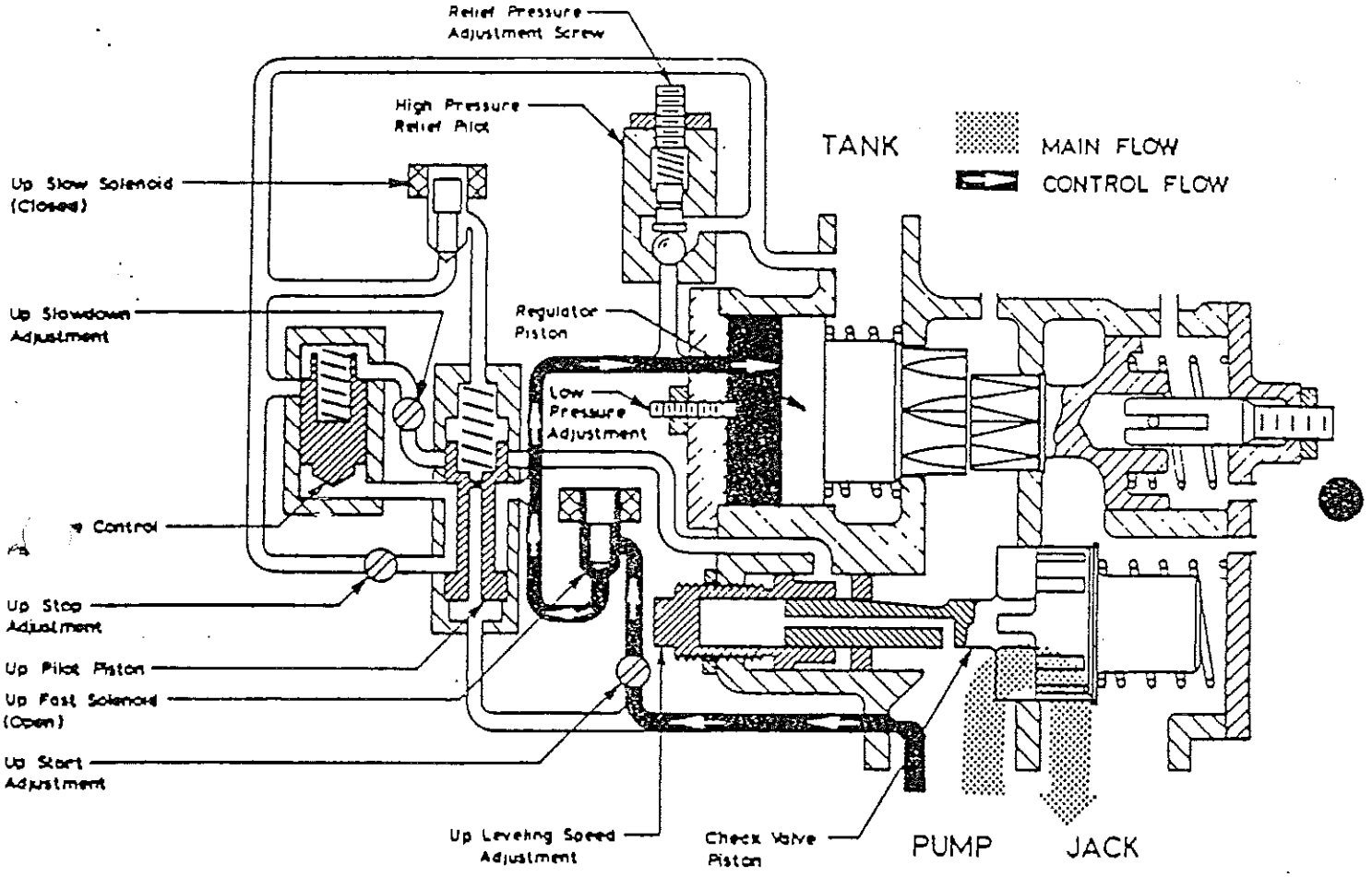


FIGURE 2 FULL SPEED

Printed in U.S.A. Mar., 1984

HIGH PRESSURE RELIEF

REFER TO SCHEMATIC DIAGRAM, FIGURE 3

If the pump produces pressure, for any reason, in excess of full load operating pressure, it will be transmitted to the high pressure relief pilot, causing it to move toward the open position. This movement allows the high pressure oil at the low pressure adjustment and of the regulator piston to escape to the tank. This causes the regulator piston to move rapidly to the low pressure stud, allowing full bypass from the pump to the tank and relieving quickly the excess pressure. In this manner, the system maintains only relief pressure as long as the pump continues to run.

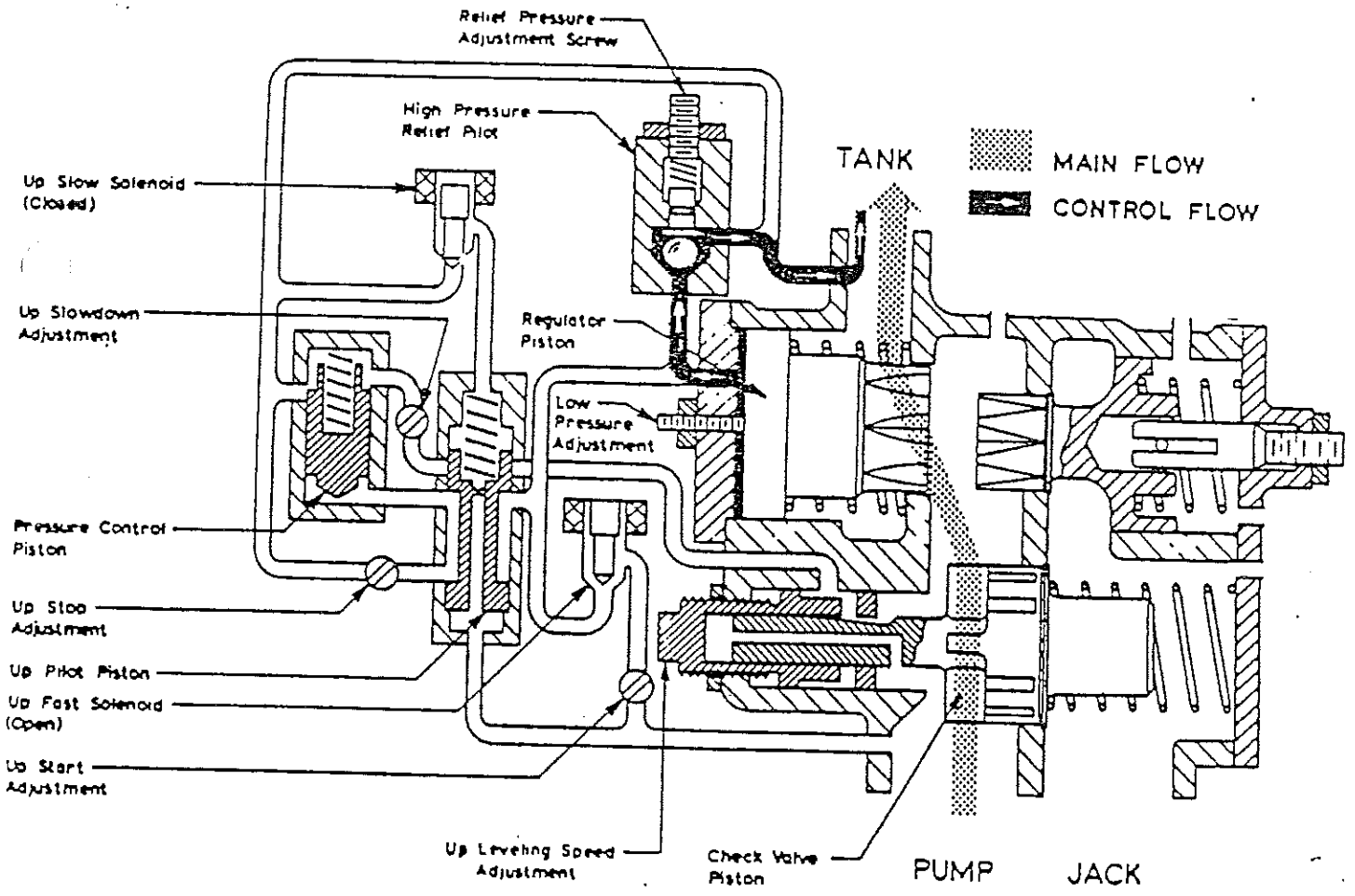


FIGURE 3 HIGH PRESSURE RELIEF

I-2 & I-3 OILDRAULIC® CONTROLLER
SEQUENCE OF OPERATION

UP SLOWDOWN & LEVELING SPEED

REFER TO SCHEMATIC DIAGRAM, FIGURE 4

To slow down to leveling speed, the up-fast solenoid is de-energized and the up-slow solenoid is energized. Since the pressure on the spring end of the up pilot piston is reduced, the up pilot piston shifts. Now the opening to the up-stop adjustment is closed and the opening to up slowdown and leveling adjuster is opened to the back of the regulator piston. The oil now flows out through the up slowdown adjustment reducing the pressure behind the regulator piston, which starts to open. The rate of speed change is controlled by the opening at the up slowdown adjustment, which determines the rate of oil flow from the low pressure adjustment end of the regulator piston back into the system. The wider the opening, the quicker the slowdown. As the regulator piston opens, the valve pressure drops and causes the check valve piston to close a little. When the slot on the check valve piston reaches the hole in the leveling speed adjustment, oil flows behind the regulator piston through the slot. When the slot has opened enough to allow the same amount of oil to flow in as the amount which flows out through the up slowdown needle, then the system reaches a hydraulic balance, which is leveling speed. By moving the hole in the leveling speed adjustment, the slot will follow it and change the leveling speed.

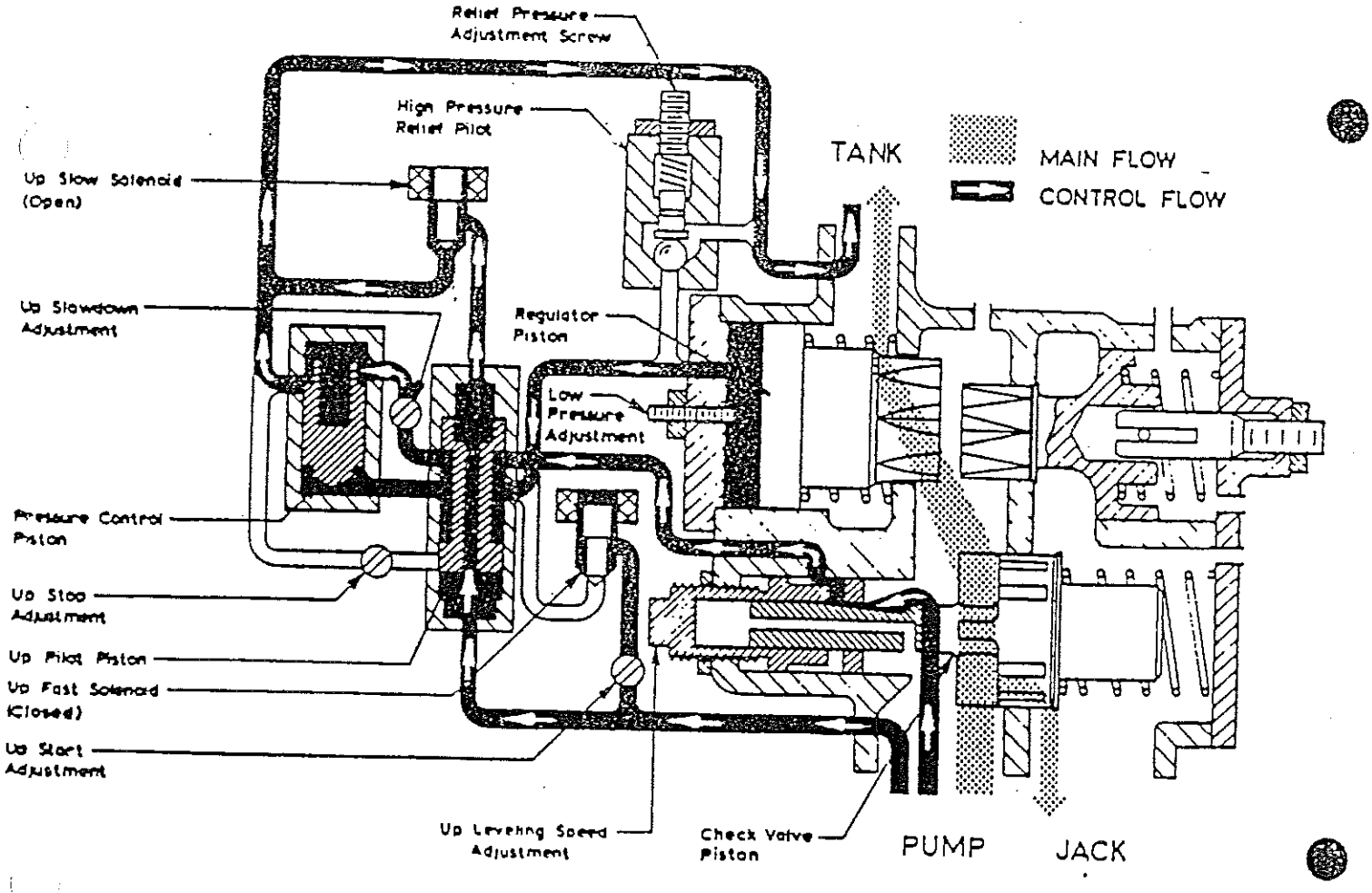


FIGURE 4 UP SLOWDOWN & LEVELING SPEED

UP STOP

REFER TO SCHEMATIC DIAGRAM, FIGURE 5

To stop the elevator, the up-slow solenoid is de-energized, but the pump is kept running slightly longer on a timed delay. This causes the spring end to pressurize, thus shifting the pilot piston to close the openings to up slowdown and leveling adjuster and open the flow to the up-stop adjustment. All flow in is stopped now. The up-stop needle allows flow out and causes the pressure to drop. The decreased oil pressure allows the spring force to push the regulator piston against the low pressure adjustment stud allowing full bypass. At the same time, the check valve piston closes. The stopping rate is controlled by the opening at the stop adjustment needle. The wider the opening, the faster the stop.

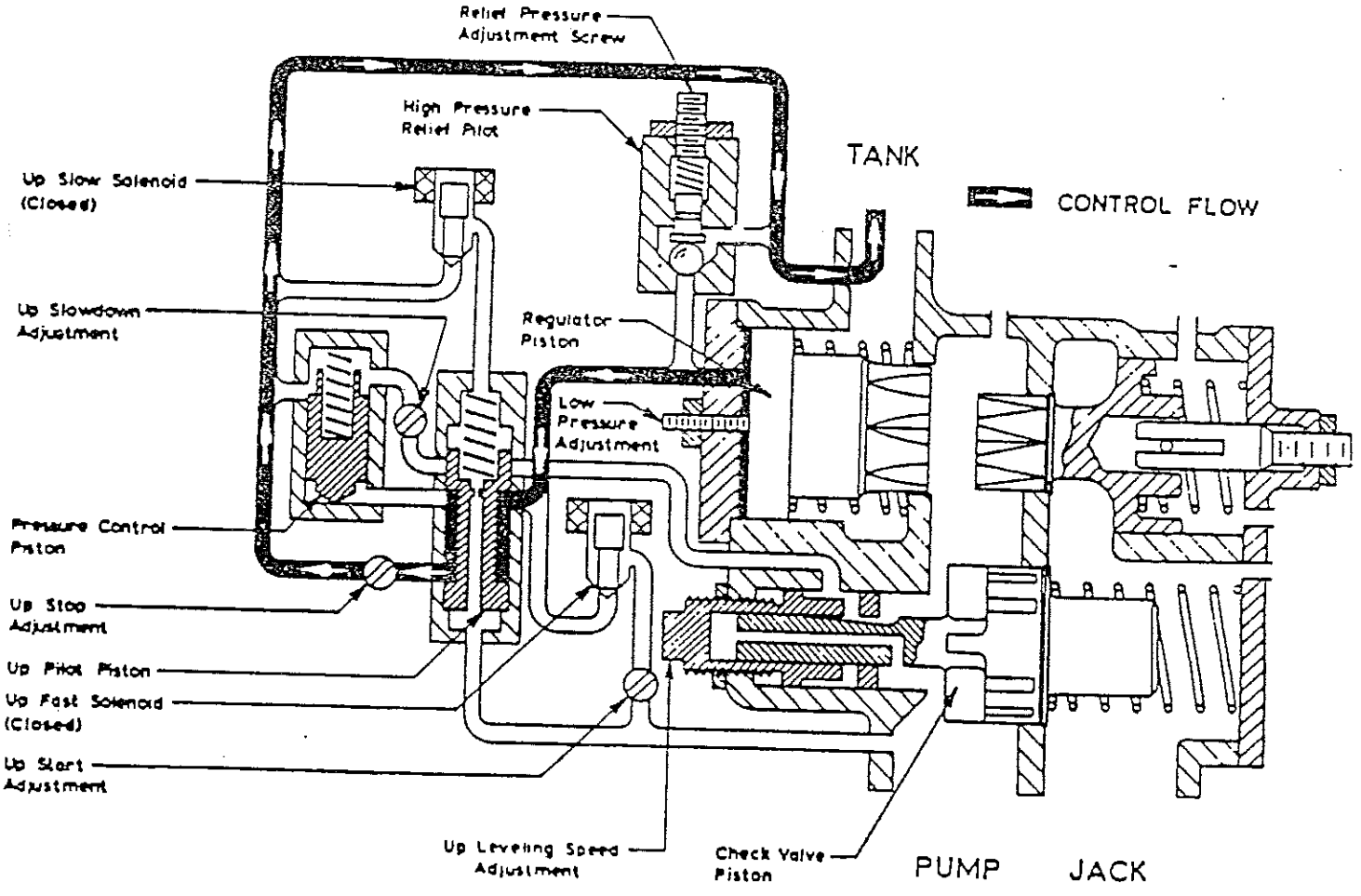


FIGURE 5 UP STOP

I-2 & I-3 OILDRAULIC® CONTROLLER
SEQUENCE OF OPERATION

The down portion of the valve consists of a piston that seats and can be controlled in three positions: (a) closed to stop the car, (b) partially open for slow speed and, (c) fully open for high speed.

DOWN START & FULL SPEED

REFER TO SCHEMATIC DIAGRAM, FIGURE 6

To start the elevator down, the down-fast and down-slow solenoids are energized, allowing the oil behind the piston to flow to tank through the down start adjustment. Since the area of the piston is larger than that of the seat, the reduction of pressure will cause the piston to lift. It will be noted that since oil is free to flow into this area through the down stop adjustment, it is essential that the down-start adjustment be open more than the down-stop. The amount that it is open more will govern how fast the piston moves and thus how rapidly the elevator starts. The lowering apeed adjustment limits the amount the piston can open and thus the elevator speed.

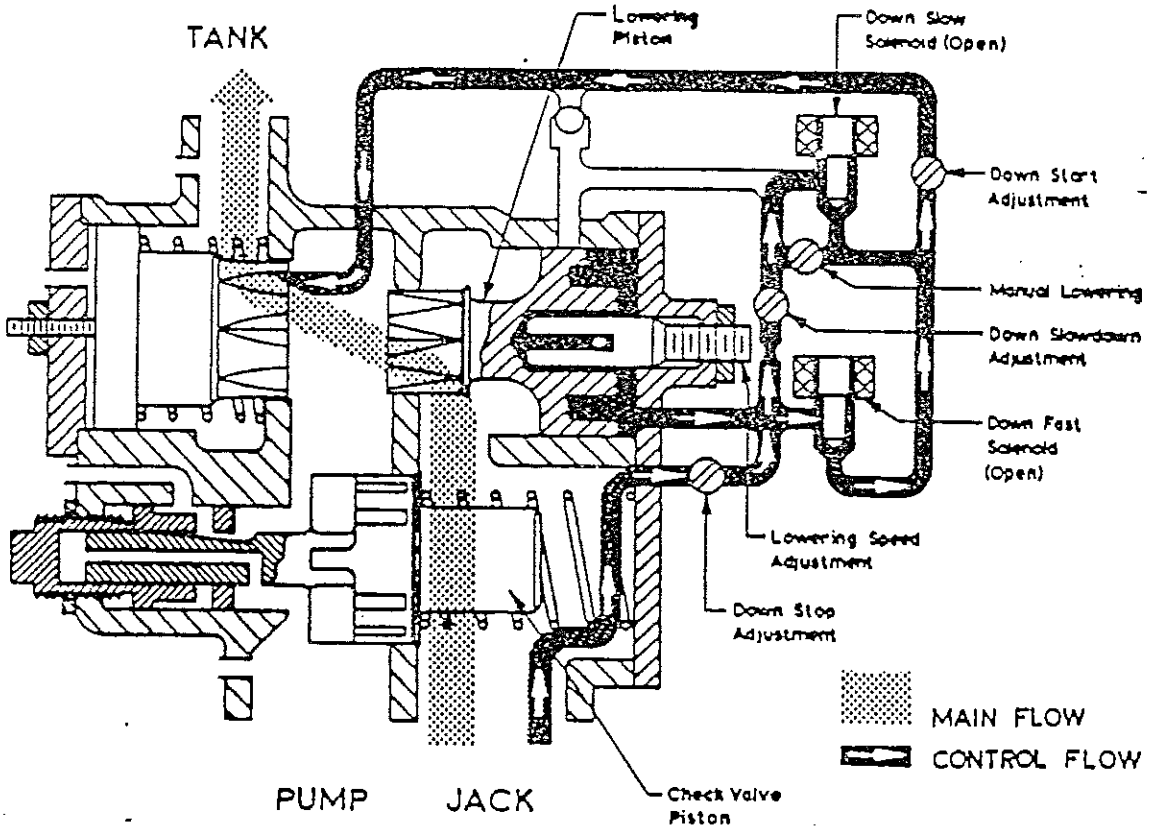


FIGURE 6 DOWN START & FULL SPEED

SEQUENCE OF OPERATION

DOWN SLOWDOWN & LEVELING

REFER TO SCHEMATIC DIAGRAM, FIGURES 6 & 7

To change to leveling speed, the down fast solenoid is closed. Since the lowering piston is in the full open position the oil passage to the tank is blocked by the piston itself (see Figure 6) and partially by the down slowdown adjustment, oil will flow in through the down stop adjustment and allow the piston to move toward closing (see Figure 7). The amount that the down slowdown adjustment is closed will govern how fast the piston moves and thus how rapidly the elevator slows down. When, however, it travels far enough to open the oil passage to tank, it will stop. The position at which this happens controls the leveling speed and is made variable by the shape of the skirt on the piston and by providing facilities to turn this piston. Turning is done through the lowering and leveling adjustment using increments of one 1/2 turns, which will change the lowering speed. Then rotating the adjustment less than a quarter turn either way will change the leveling speed.

MANUAL LOWERING

The manual lowering valve is parallel to the down slow solenoid, (see Figure 6) and when opened, will allow the car to be lowered at leveling speed during emergencies.

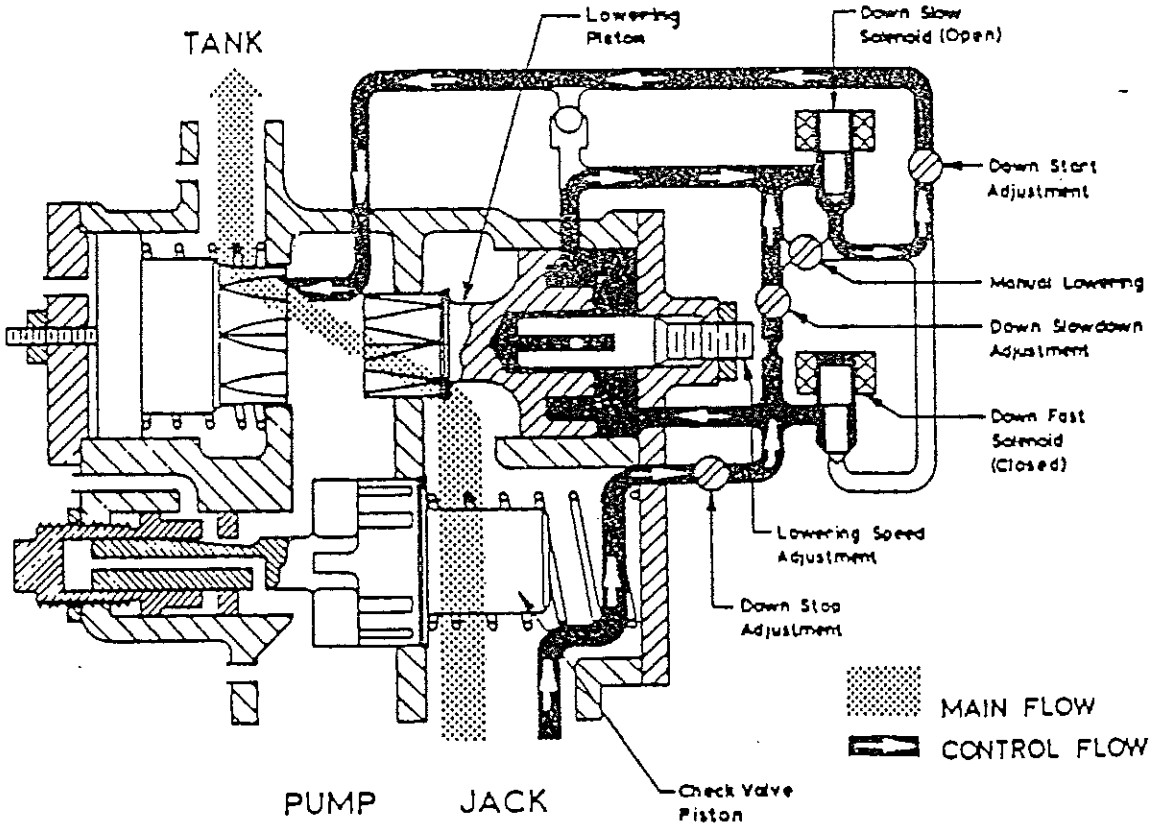


FIGURE 7 DOWN SLOWDOWN & LEVELING

I-2 & I-3 OILDRAULIC® CONTROLLER
SEQUENCE OF OPERATION

DOWN STOP

REFER TO SCHEMATIC DIAGRAM, FIGURE 8

To stop the elevator the down slow solenoid is de-energized, stopping all flow to the tank so the spring and pressure will close the piston. The rate of closing and thus the smoothness is controlled by the down stop adjustment.

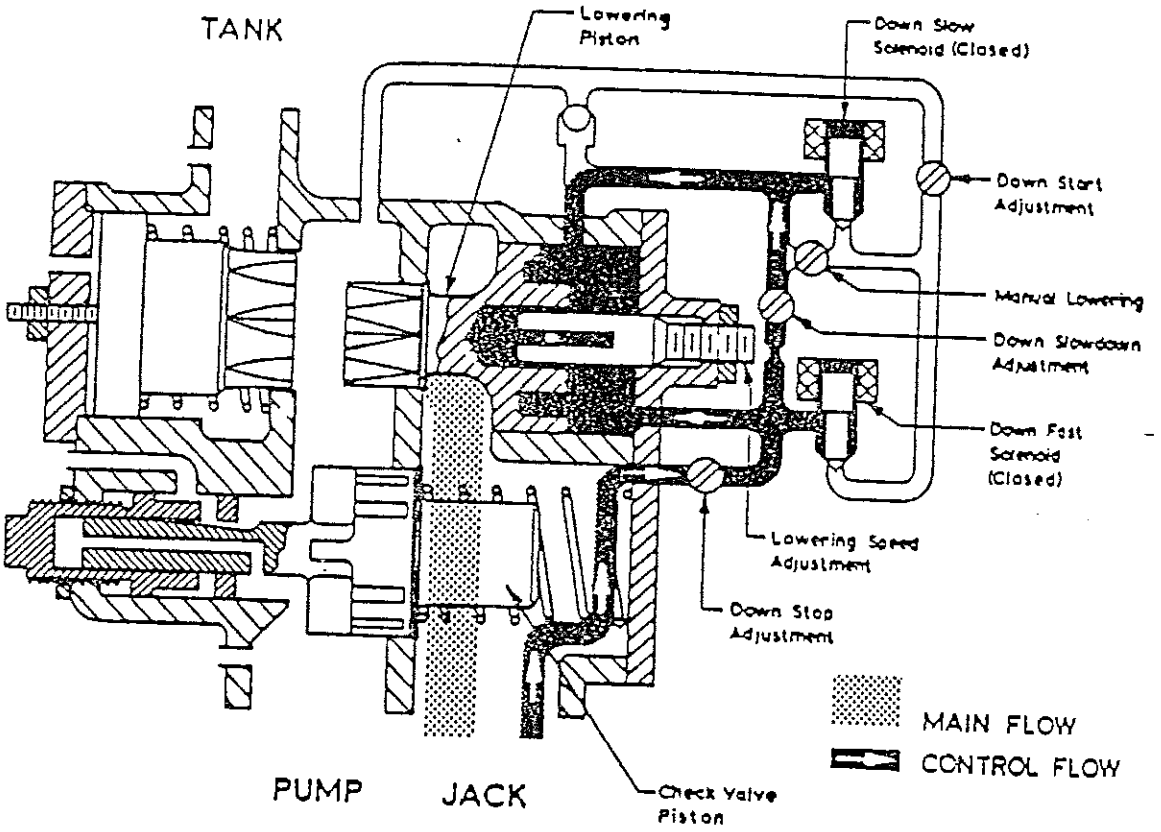


FIGURE 8 DOWN STOP

I-2 & I-3 OILDRAULIC® CONTROLLER
TROUBLE-SHOOTING

ROTA-RELIEF - UP LEVELING - BYPASS AND STOP

NOTE: In offering these solutions, it is assumed there is no binding in the hoistway; that the proper voltage is being supplied to the power unit and that all valve adjustments have been completed as recommended.

The solutions should be tried individually and in the order given.

Before making any changes or corrections to the up side of the valve, be certain all vee belts on the power unit have proper tension and there is no oil on the belts to cause slippage.

DIFFICULTY	SOLUTION
1. Pump runs but car does not run at high speed.	(a) Check that line shut-off valve is fully open. (b) Check for correct motor rotation. (c) Check for correct relief pressure setting. (d) Check that up fast solenoid pulls in.* (e) Turn out on up-start adjustment. (f) Turn in on up-stop adjustment. (g) Make sure regulator piston is free. (h) Make sure up pilot piston is free.
2. Car will not slow down to leveling speed.	(a) Check that up slow solenoid pulls in.* (b) Check that up fast solenoid drops out.* (c) Turn out on up slowdown adjustment. (d) Check up leveling speed. Set for 10 to 12 FPM. (e) Make sure regulator piston is free. (f) Make sure pressure control piston is free.
3. Car will not make a hydraulic stop.	(a) Check that up slow solenoid drops out.* (b) Check for correct low pressure adjustment. (c) Turn out up stop adjustment. (d) Make sure regulator piston is free. (e) Make sure up pilot piston is free.
4. Acceleration, deceleration, leveling speed or stop is erratic.	(a) Make sure the check valve piston is free. (b) Make sure the spring on the regulator piston does not bind.

*Check solenoids for voltage and for damage to solenoid tube and check plunger for binding. Do not reseat. If seat in pilot body is damaged, replace pilot.

I-2 & I-3 OILDRAULIC® CONTROLLER
TROUBLE-SHOOTING

LOWERING - LEVELING

NOTE: In offering these solutions, it is assumed there is no binding in the hoistway; that the proper voltage is being supplied to the power unit and that all valve adjustments have been completed as recommended.

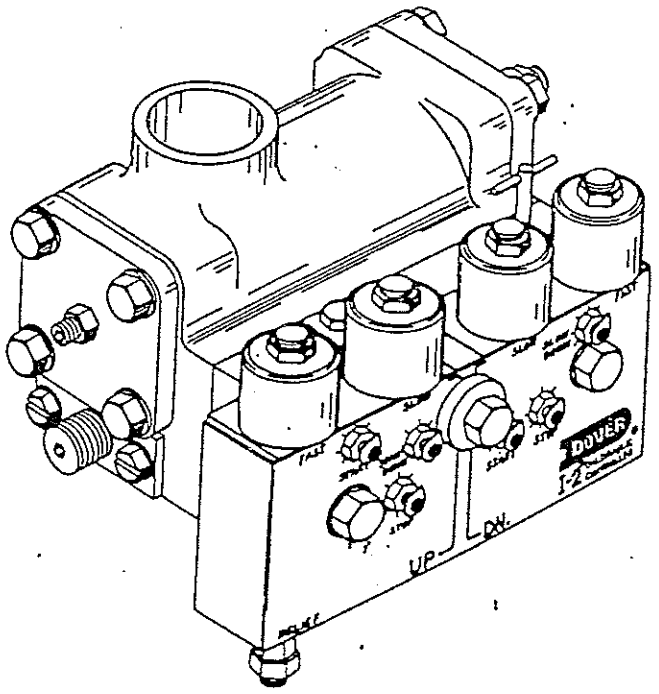
The solutions should be tried individually and in the order given.

During the lowering cycle, the pump may rotate backward.

	DIFFICULTY	SOLUTION
1.	Car will not lower.	(a) Check that line shut-off valve is fully open. (b) Check solenoids. * (c) Turn out down-start adjustment. (d) Turn in on down-stop adjustment.
2.	Slow or bouncy down start.	(a) Turn out on down-start adjustment. (b) Turn in on down-stop adjustment. (c) Bleed jack of air or loosen packing, if possible.
3.	Abrupt down start.	(a) Turn in on down-start adjustment. (b) Turn out on down-stop adjustment.
4.	Car will not stop when started down.	(a) Tighten manual lowering valve. (b) Turn out on down-stop adjustment. (c) Check solenoid valve not closing (residual magnetism).*
5.	Down stop too soft or bouncy.	(a) Turn out on down-stop adjustment. (b) Bleed jack of air or loosen packing, if possible.
6.	Down stop rough.	(a) Turn in fully on down slowdown adjustment. (b) Turn in on down-stop adjustment. (c) Turn out on down slowdown in small increments.
7.	Leveling bouncy.	(a) Check leveling speed. Set for 10 to 12 FPM. (b) Bleed jack of air or loosen packing, if possible.
8.	Car will not slow down to leveling speed.	(a) Check down fast solenoid.* (b) Down slowdown adjustment may be open too much (too soft). (c) Leveling speed may be set too fast. Set for 10 to 12 FPM.
9.	Slowdown rough.	(a) Turn out on down-slowdown adjustment.

* Check solenoids for voltage and for damage to solenoid tube. Unscrew solenoid tube check plunger for binding. Do not reseat. If seat in pilot body is damaged, replace pilot.

I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~ADJUSTMENTS~



I-2 SHOWN I-3 SIMILAR

1. A good understanding of the way the I-2 or I-3 "Oildraulic" controller operates will be a big help when adjusting. We suggest you become familiar with the sequence of operation - Division 4, Section P, Pages 15 through 30 of the Service Manual.

2. Adjustment of the up side does not affect the down side nor vice versa except for the piston limiter screw which affects the maximum down speed with light load, however, note that certain individual adjustments within the up side and down side do affect one another, and must be adjusted together and in the order given for proper operation. Understanding these points will save considerable time in the adjusting procedures.

3. All hatch switches and cams shown in Installation Manual Division 1, Section G should be installed before adjusting the valve.

4. The power unit location should be heated and ventilated to maintain a room temperature between 50°F and 80°F.

   Variations in the temperature of the hydraulic oil will cause the valve to perform differently, so the closer you can approximate the expected operating temperature of the oil when making adjustments, the more stable the operation will be.

   If you do not have viscosity control on the power unit, make the initial valve adjustments with the oil temperature between 80°F and 110°F. Since oil temperature is affected by machine room temperature, pump output, frequency of operation, etc., it may be necessary to readjust the valve as the environmental and operational characteristics change.

5. Be extremely careful while making adjustments with the pump running.

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I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING
~ADJUSTMENTS~

6. If at any point in the adjusting procedure the valve fails to respond as indicated, call the Factory Service Department for assistance.

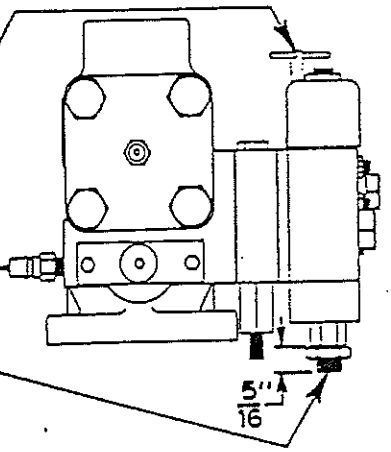
7. NOTE: IF THE VALVE IS ASSEMBLED ON A POWER UNIT SHIPPED FROM THE FACTORY, YOU SHOULD BEGIN WITH STEP III FINAL ADJUSTMENTS.

I. INITIAL SETTINGS (SET WITH AN EMPTY CAR)

A. Lower the car onto the buffers by opening the manual lowering valve.

B. Close manual lower valve.

C. Install pressure gauge on quick connector provided on far side of valve.



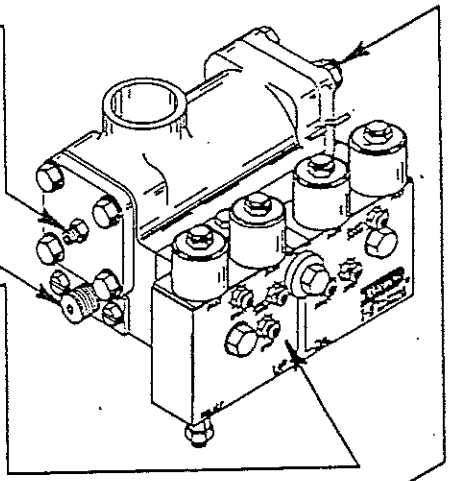
D. UP SIDE

1. RELIEF PRESSURE ADJUSTMENT
   a. Turn OUT until 5/16" of the screw extends beyond the relief assembly housing.
   b. Tighten locknut.

2. PISTON LIMITER SCREW
   a. Turn IN by hand until it just touches the regulator piston.
   b. Then turn OUT 8 turns.

3. UP LEVELING SPEED ADJUSTMENT
   a. Turn adjusting screw OUT until it stops.
   b. Then turn IN 4 turns.

4. ADJUSTMENT NEEDLES

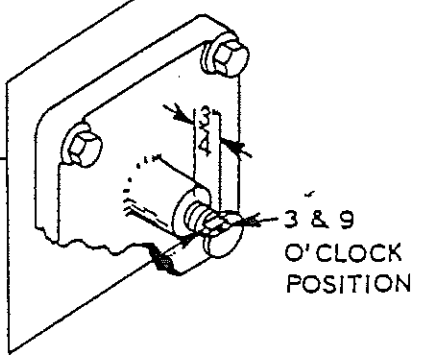


NOTE: The nut on the adjustment needle assembly is not a locknut. Do not loosen to make any adjustments. It should be snug against the valve body at all times.

   a. Turn the up-start, up-stop, and up-slowdown adjustment needles IN to fully closed and stopped position.
   b. Then turn up-start needle OUT 9 turns.
   c. Turn up-stop needle OUT 3 turns.
   d. The up-slowdown needle should remain closed at this point.

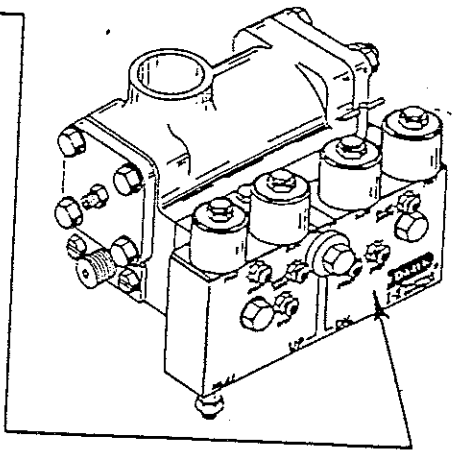
E. DOWN SIDE

1. LOWERING AND LEVELING SPEED ADJUSTMENT (SET WITH CAR ON BUFFERS)
   a. Adjust so that 3/4" of the screw extends beyond the body and flat end of screw points to 9 o'clock and 3 o'clock.
   b. Tighten locknut.



I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING -ADJUSTMENTS-

2. ADJUSTMENT NEEDLES

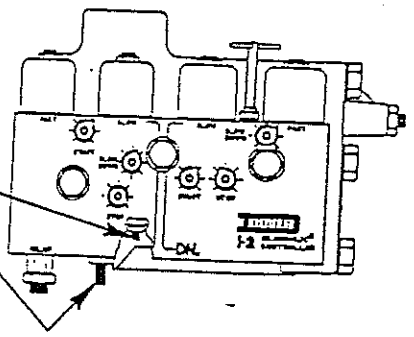


NOTE: The nut on the adjustment needle assembly is not a lock nut. Do not loosen to make any adjustments. It should be snug against the valve body at all times.

a. Turn the down-start, down-stop, and down-slowdown adjustment needles IN to fully closed and stopped position.
b. Then turn down-start needle OUT 9 turns.
c. Turn down-stop needle OUT 3 turns.
d. Down-slowdown needle should remain closed at this point.

F. CSL PILOT

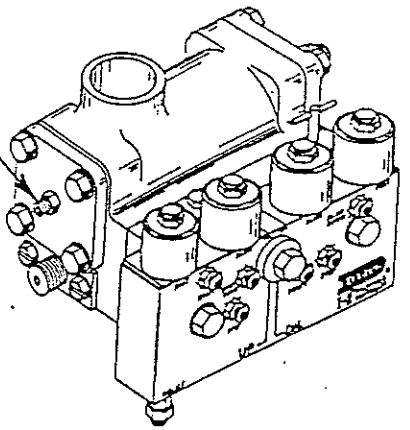
1. UP DELAY ADJUSTMENT SCREW
   a. Turn OUT adjustment screw until it stops.
   b. Turn IN adjustment screw 4 turns.
2. CSL REGULATOR ADJUSTMENT SCREW
   a. Turn adjustment screw OUT until it stops.
   b. Turn adjustment screw IN 9 turns.



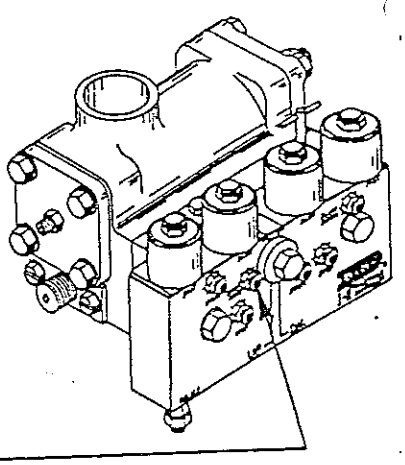
I. INITIAL ADJUSTMENTS (SET WITH AN EMPTY CAR)

A. UP SIDE

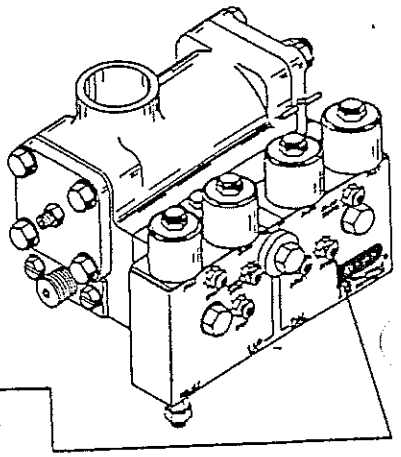
1. PISTON LIMITER SCREW
   a. Turn power off.
   b. De-energize the up-slow solenoid by disconnecting V41 wire from controller.
   c. Put control on "Inspection" and turn power on.
   d. Start motor with "Up" inspection button and check for correct rotation.
   e. Turn IN on piston limiter screw until car moves slowly up. Be certain that car moves up far enough to allow access to line shutoff valve if located in the pit.
   f. Turn OUT on piston limiter screw until car stops. Turn OUT an additional one turn.
   g. Tighten locknut.
   h. Stop motor and turn power off.
   i. Reconnect V41 wire to controller.



I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING
~ADJUSTMENTS~



2. UP-SLOWDOWN ADJUSTMENT
   a. Turn up-slowdown needle OUT 10 turns.
   b. Put control on "Inspection".
   c. Start power unit with "Up" inspection button.
   d. Turn IN the up-slowdown needle until car moves at 10 to 12 FPM. If car does not move, turn OUT the up delay adjustment screw 1 turn. Repeat steps a, c, and d.
   e. Run car up to the landing above.

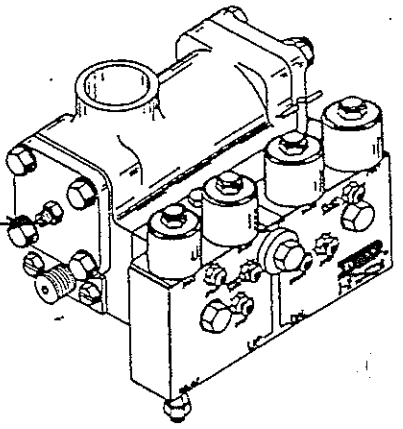


B. DOWN SIDE
   1. With control on "Inspection", start car down.
   2. If car does not move down, turn the down-stop adjustment IN until the car starts down. Adjust the down leveling speed with the lowering and leveling speed adjustment for 10 to 12 FPM.
   3. Check that car will stop. If it does not stop, turn the down-stop needle OUT in small increments until you get a positive stop.

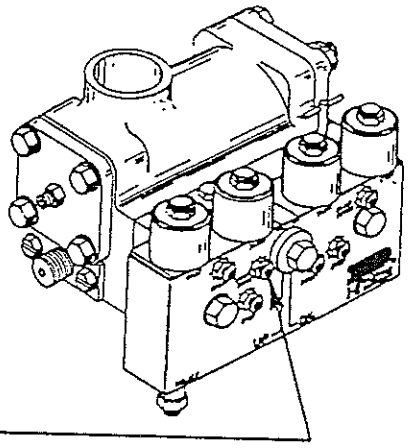
II. FINAL ADJUSTMENTS (SET WITH AN EMPTY CAR)

Final up and down adjustments may be made simultaneously to save time, but this is not necessary. They MUST, however, be made in the order given, and it is important that you be completely satisfied with each adjustment before you continue to the next.

NOTE: If valve is on power unit shipped from the factory and you are starting your adjustment at this point, the piston limiter screw must be adjusted. Please complete initial piston limiter adjustment as outlined in II - A - 1 before proceeding.

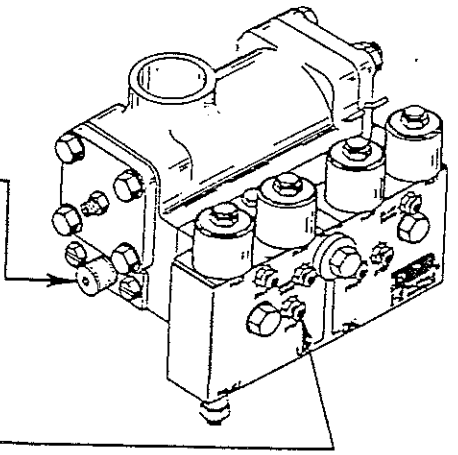


I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~ADJUSTMENTS~



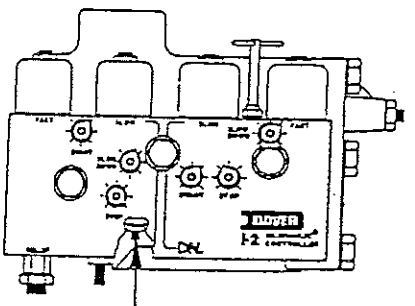
A. UP SIDE

1. UP-LEVELING SPEED AND UP-SLOWDOWN ADJUSTMENTS
   a. Put control on "Automatic operation.
   b. Bring car to lowest landing.
   c. Run the car to the floor above and observe the leveling zone.
   d. Adjust the up-slowdown needle until you have 3 to 4 inches of leveling before final stop. Turning IN on the up-slowdown needle will shorten the leveling zone and will also increase the leveling speed. Turning OUT on the up-slowdown needle will lengthen the leveling zone and will also decrease the leveling speed.
   e. Each time you adjust the up-slowdown, you must recheck the up-leveling speed with the control on "Inspection" and adjust it accordingly. Turning IN the up-leveling speed adjustment increases leveling speed. Turning OUT on the up-leveling speed adjustment decreases leveling speed.
   f. The desired final adjustment should be a leveling speed of 10 to 12 FPM and 3 to 4 inches of leveling before final stop.



2. UP-STOP ADJUSTMENT

NOTE: The up-stop adjustment affects the up-start and must be adjusted before the up-start.



   a. Put control on "Automatic".
   b. Adjust the up-stop for a soft but positive stop. Turning IN makes the up-stop softer and also makes the up-start firmer.

3. UP-DELAY ADJUSTMENT

NOTE: The up-delay is affected by both the up-stop and the up-start. Also, the up-delay may cause the up-start to be too quick at the beginning of up-start.

   a. Adjust the up-delay until there is about a half second delay between motor starting and the car moving up with light load. Turning IN increases the up-delay.

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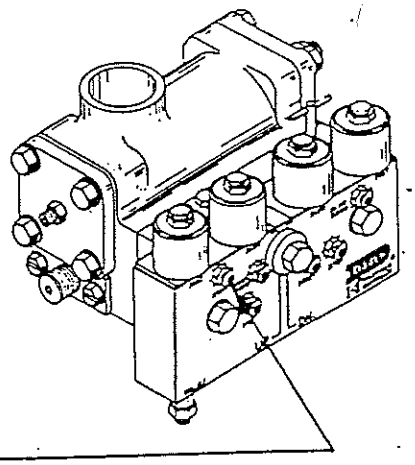
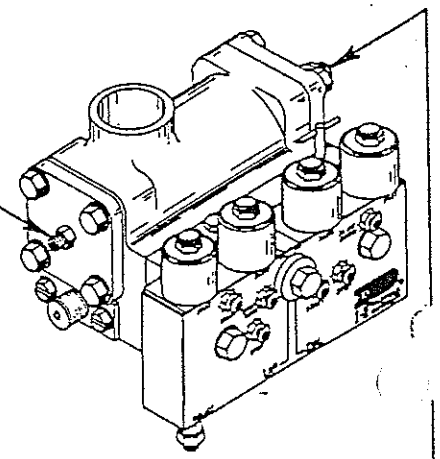
I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING
~ADJUSTMENTS~



4. UP-START ADJUSTMENT
   a. Adjust the up-start for a smooth but positive start. Turning IN the adjustment makes the up-start smoother.
   b. Check to be certain full up speed is reached on a one floor run. This may require your making the up-start more positive.

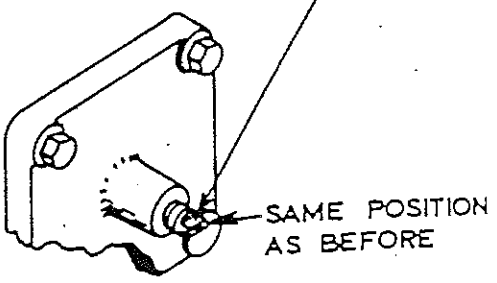
5. PISTON LIMITER SCREW
   a. Remove the coil from the up-slow solenoid. A metal object must be inserted in the coil to prevent it from burning up if the coil is to be energized for longer than 15 seconds.
   b. Put control on "Inspection" and turn power on.
   c. Start motor with up inspection button.
   d. After 3 to 4 seconds duration replace the coil on the solenoid and note the time it takes for the car to start. The delay should be about 2 seconds. Turning IN the piston limiter screw reduces the delay. Release "Inspection" button.
   e. Repeat steps a, c, and d until the right delay is attained.
   f. Tighten locknut.
   g. Stop motor and turn power OFF.
   h. Replace and tighten nut to hold coil down.



B. DOWN SIDE

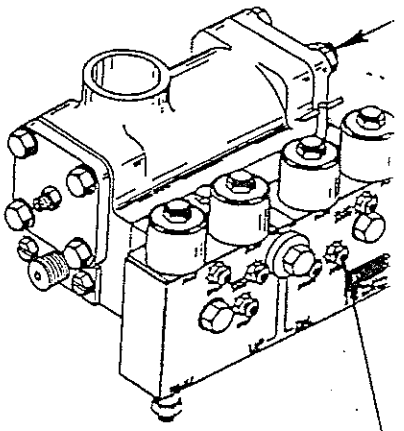
NOTE: To prevent damage to valve seats, lowering and leveling speed adjustments must be made only while the car is in motion. (Up or Down).

1. LOWERING SPEED ADJUSTMENT
   a. Put control on "Automatic".
   b. Refer to the layout drawing and set the lowering speed with empty car by turning the lowering speed adjustment in 1/2 turn increments - leaving the ends of the screw pointing in the same direction after each adjustment. When the down speed is to be increased, turn out on the adjustment until the down speed is reached or until the speed does not increase any more. Turning OUT on the lowering speed adjustment increases the lowering speed.



2. DOWN-LEVELING SPEED AND DOWN-STOP ADJUSTMENT

NOTE: The down-leveling speed and the down-stop must be adjusted together since the down-stop affects the down-leveling speed. The down-leveling speed, however, does not affect the down-stop.



a. Put control on "Inspection" and adjust down-leveling speed to 10 to 12 FPM by turning the down-leveling speed adjustment in increments of a few degrees from the lowering speed setting. Turning OUT on the down-leveling speed adjustment increases the leveling speed.

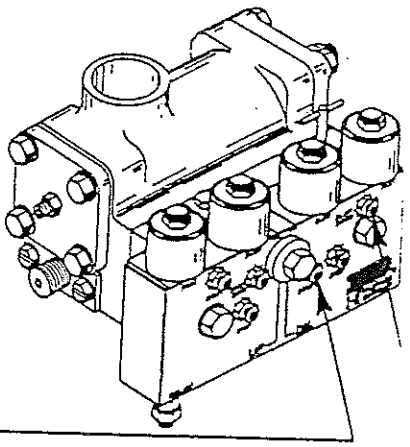
b. Put control on "Automatic", and adjust the down-stop for a positive stop. Turning IN on the down-stop needle makes the stop softer and increases the leveling speed. For readjusting, if a softer stop is desired, do not adjust the down-stop before turning in all the way on the down-slowdown needle. After desired down-stop is attained, readjust down-slowdown.

c. Check that down-leveling speed is set to 10 to 12 FPM with the control on "Inspection".

d. Tighten locknut on down-leveling speed adjustment.

e. Recheck down-leveling speed.

3. DOWN-START ADJUSTMENT



a. Put control on "Automatic".

b. Adjust the down-start needle to obtain a smooth start. Turning IN on down-start needle makes the start smoother.

c. Check that full down speed is reached on a one floor run. This may require your making the down-start more positive.

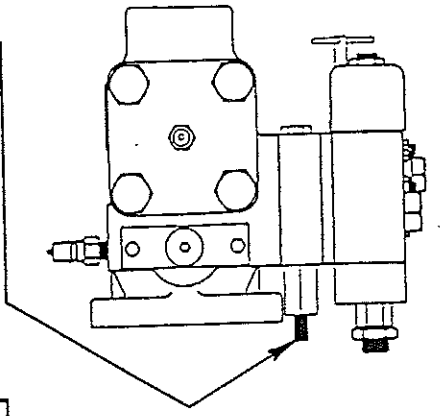
4. DOWN-SLOWDOWN ADJUSTMENT

NOTE: The effect of the down-slowdown needle is opposite to previous adjustments. Turning OUT on the down-slowdown needle will make the slowdown smoother and shorten the leveling zone. Turning IN on the down-slowdown needle will make the slowdown quicker and lengthen the leveling zone. This adjustment should be made in small increments. The car will overshoot the landing if the needle is turned out too far.

a. Turn OUT on down-slowdown needle in small increments until car has a leveling zone of 3 to 4 inches.

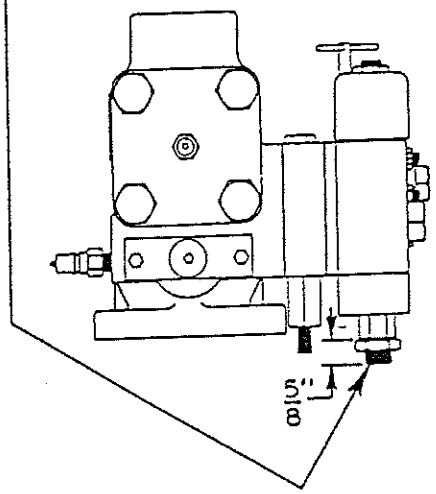
I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~ADJUSTMENTS~

5. CSL REGULATOR ADJUSTMENT
   a. Put capacity load on car.
   b. Turn OUT the adjustment screw 5 turns.
   c. Run car down and check down speed. Car must be stopped and started to check setting between adjustments. Adjust until the down speed is 6 FPM faster than with the light load or up to 10% faster. Turning IN increases the down speed.



V. FINAL RELIEF PRESSURE ADJUSTMENT

A. Close line shutoff valve. Turn relief adjustment out until 5/8" of screw extends beyond relief assembly housing.
B. Put control on "Inspection" and start pump with "Up" inspection button.
C. Set relief pressure per power unit nameplate.
D. To increase relief pressure, turn IN the adjustment screw. To decrease relief pressure, turn OUT the adjustment screw.
E. Tighten locknut with pump running and recheck relief pressure.
F. Stop power unit.
G. Open line shutoff valve.



V. PERFORMANCE CHECK WITH FULL LOAD

A. Run car on "Automatic" and check performance at all floors. All valve functions will become more firm. If readjustment is necessary, remember any change with full load will affect the empty car performance you had.

B. The down-leveling speed will increase and the down-leveling zone will be shorter. It may be necessary to change the down slowdown adjustment to be certain there is at least 2" of leveling. If necessary to increase the leveling zone, turn IN the down-slowdown needle. See Final Adjustments, Section III - B - 4.

C. The up-leveling speed will increase. The up-leveling zone will change (it could be more or less) between no load and full load. Do not change any adjustments if you have at least 1" of up-leveling with full load. If necessary to increase the up-leveling zone, turn OUT on the up-slowdown needle. See Final Adjustments, Section III - A.

D. Check that car obtains full speed in both directions on a one floor run.

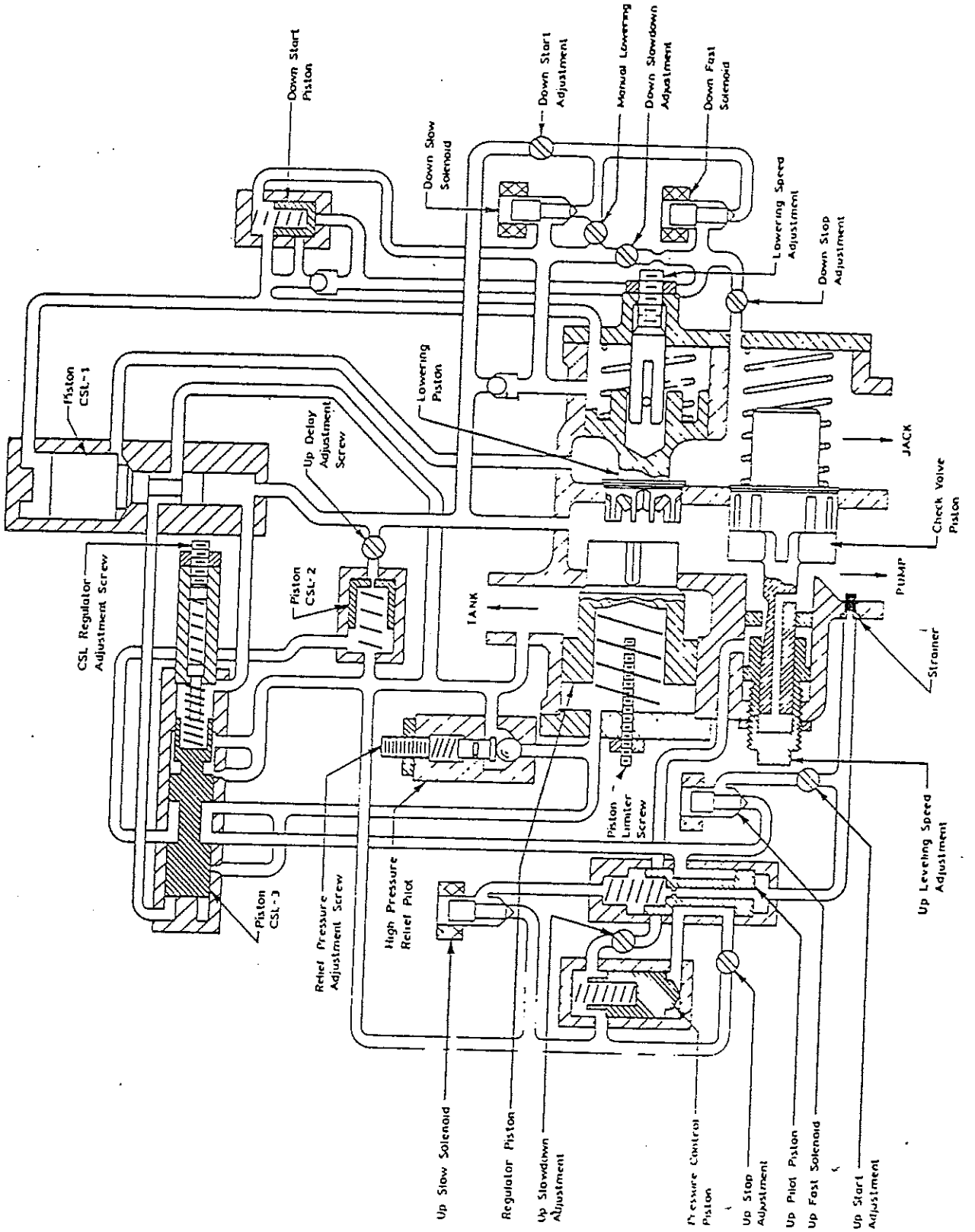
E. Record working pressure in the UP direction. Relief pressure should be 125% of this pressure. Make correction to relief setting as required.

F. Remove capacity load from car.

G. If any adjustments have been made with full load, then check performance with empty car and readjust if necessary.

I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~ SCHEMATIC ~

Division	4
Section	Q
Page	11



DOVER CORPORATION / ELEVATOR DIVISION

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Mar. 1984

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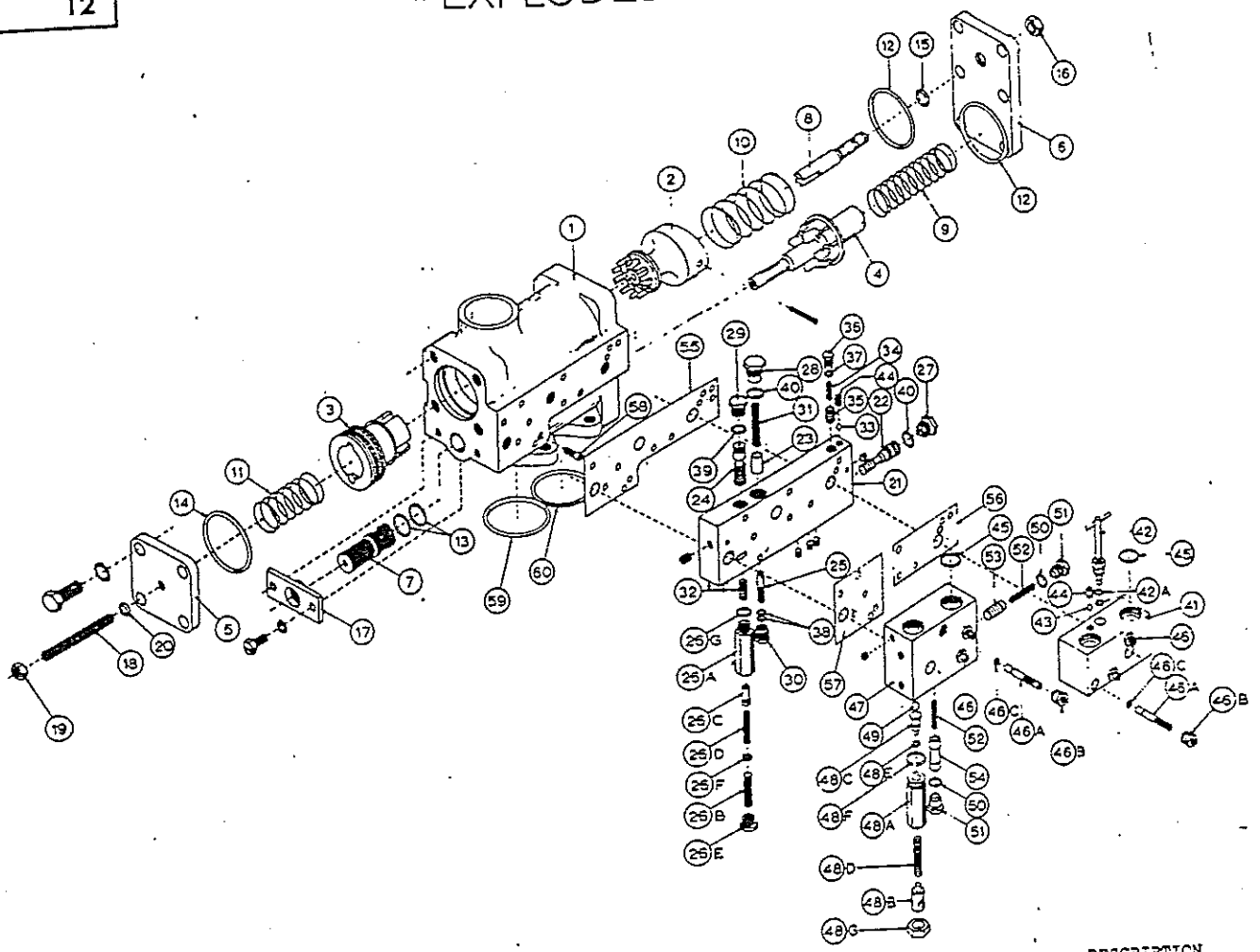
WITH CONSTANT SPEED LOWERING
~EXPLODED VIEW~



ITEM	DESCRIPTION
1	Valve Main Body (I-2 Shown)
2	CSL Piston
3	CSL Regulator Piston
4	Check Valve Piston
5	Regulator Cap
6	Lower & Check Cap
7	Leveling Adjustor
8	Lowering Adjustment Screw
9	Check Spring
10	Lowering Spring
11	Regulator Spring
12	"O" Ring
13	"O" Ring
14	"O" Ring
15	"O" Ring
16	Hex Jam Nut
17	Leveling Adjustor Cap
18	Hex Socket Set Screw
19	Sealing Nut
20	"O" Ring
21	CSL Pilot Body
22	Piston CSL-1
23	Piston CSL-2
24	Piston CSL-3
25	Up Delay Adjustment Screw

ITEM	DESCRIPTION
*26	CSL Adjustment Screw Assembly
26A	CSL Adjustment Screw Body
26B	CSL Adjustment Screw
26C	CSL Plug
26D	CSL Regulator Control Spring
26E	CSL Adjustment Screw Cap
26F	"O" Ring
26G	"O" Ring
27	Cap CSL-1
28	Cap CSL-2
29	Cap CSL-3
30	Adjustment Screw Cap
31	Up Start Delay Spring
32	CSL-3 Piston Park Spring
33	Stainless Steel Ball
34	Down Start Spring
35	Down Start Piston
36	Cap
37	"O" Ring
38	"O" Ring
39	"O" Ring
40	"O" Ring
41	Down Pilot Body
*42	Manual Lowering Valve
42A	"O" Ring
43	Steel Ball
44	Pipe Plug
45	Flange Seal

ITEM	DESCRIPTION
*46	Adjustment Screw Assembly
46A	Adjustment Screw
46B	Adjustment Screw Cap
46C	"O" Ring
47	Up Pilot Body
*48	Relief Assembly
48A	Relief Body
48B	Relief Adjustment Screw
48C	Relief Plunger
48D	Relief Spring
48E	"O" Ring
48F	"O" Ring
48G	Hex Jam Nut
49	Relief Ball
50	"O" Ring
51	Up Pilot Cap
52	Up Pilot Spring
53	Pressure Control Piston
54	Up Pilot Piston
55	CSL Pilot Gasket
56	Down Pilot Gasket
57	Up Pilot Gasket
58	Strainer
59	"O" Ring
60	"O" Ring

*Where the item number is followed by a letter, the item is included in the assembly identified by the item number alone.

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~TROUBLE-SHOOTING~

UP DIRECTION

NOTE: In offering these solutions, it is assumed there is no binding in the hoistway; that the proper voltage is being supplied to the power unit and that all valve adjustments have been completed as recommended.

The solutions should be tried individually and in the order given.

Before making any changes or corrections to the up side of the valve, be certain all vee belts on the power unit have proper tension and there is no oil on the belts to cause slippage.

DIFFICULTY	SOLUTION
1. Pump runs but car does not run during high speed call.	(a) Check that line shut-off valve is fully open. (b) Check for correct motor rotation. (c) Check for correct relief pressure setting. (d) Check that up-fast solenoid pulls in.* (e) Turn out on up-start adjustment. (f) Turn in on up-stop adjustment. (g) Make sure regulator piston is free. (h) Make sure up pilot piston is free. (i) Make sure CSL-2 piston is free. (j) Turn out on up delay adjustment. (k) Make sure piston limiter screw is set correctly.
2. Car will not slow down to leveling speed.	(a) Check that up-slow solenoid pulls in.* (b) Check that up-fast solenoid drops out.* (c) Turn out on up-slowdown adjustment. (d) Check up leveling speed. Set for 10 to 12 FPM. (e) Make sure regulator piston is free. (f) Make sure pressure control piston is free. (g) Make sure down-start piston is free.
3. Car will not make a hydraulic stop.	(a) Check that up-slow solenoid drops out.* (b) Check for correct piston limiter adjustment. (c) Turn out up-stop adjustment. (d) Make sure regulator piston is free. (e) Make sure up pilot piston is free.
4. Acceleration, deceleration, leveling speed or stop is erratic.	(a) Make sure the check valve piston is free. (b) Make sure the spring on the regulator piston does not bind.
5. Beginning of up-start too abrupt.	(a) Turn in up delay adjustment.

*Check solenoids for voltage and for damage to solenoid tube and check plunger for binding. Do not reseat. If seat in pilot body is damaged, replace pilot.

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I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~TROUBLE-SHOOTING~

DOWN DIRECTION

NOTE: In offering these solutions, it is assumed there is no binding in the hoistway; that the proper voltage is being supplied to the power unit and that all valve adjustments have been completed as recommended.

The solutions should be tried individually and in the order given.

DIFFICULTY	SOLUTION
1. Car will not lower.	(a) Check that line shut-off valve is fully open. (b) Check solenoids.* (c) Turn out down-start adjustment. (d) Turn in on down-stop adjustment. (e) Make sure CSL-1 piston is free.
2. Slow or bouncy down-start.	(a) Turn out on down-start adjustment. (b) Turn in on down-stop adjustment. (c) Bleed jack of air or loosen packing, if possible.
3. Abrupt down-start.	(a) Turn in on down-start adjustment. (b) Turn out on down-stop adjustment.
4. Car will not stop when started down.	(a) Tighten manual lowering valve. (b) Turn out on down-stop adjustment. (c) Check solenoid valve not closing (residual magnetism).*
5. Down-stop too soft or bouncy.	(a) Turn out on down-stop adjustment. (b) Bleed jack of air or loosen packing, if possible.
6. Down-stop rough.	(a) Turn in fully on down-slowdown adjustment. (b) Turn in on down-stop adjustment. (c) Turn out on down-slowdown in small increments.
7. Leveling bouncy.	(a) Check leveling speed. Set for 10 to 12 FPM. (b) Bleed jack of air or loosen packing, if possible.
8. Car will not slow down to leveling speed.	(a) Check down-fast solenoid.* (b) Down-slowdown adjustment may be open too much (too soft). (c) Leveling speed may be set too fast. Set for 10 to 12 FPM.
9. Slowdown rough.	(a) Turn out on down-slowdown adjustment.
10. Down speed not constant across load.	(a) Adjust CSL regulator adjustment. (b) Make sure CSL-3 piston is free. (c) Make sure CSL-1 piston is free. (d) Make sure regulator piston is free.

*Check solenoids for voltage and for damage to solenoid tube. Unscrew solenoid tube and check plunger for binding. Do not reseat. If seat in pilot body is damaged, replace pilot.

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Mar., 1984

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

The up valve section consists of an up-leveling speed adjustment, a check valve piston, a regulator piston and relief pilot. The valve provides four (4) functions for the elevator in the up cycle: (a) acceleration to full speed, (b) slow down to leveling speed, (c) hydraulic stopping and, (d) high pressure relief. Refer to pages 16 through 25.

The down portion of the valve consists of a piston that seats and can be controlled in three positions: (a) closed to stop the car, (b) partially open for slow speed and (c) fully open for high speed. Refer to pages 26 through 30.

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I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

UP-START & FULL SPEED

REFER TO SCHEMATIC DIAGRAMS, FIGURES 1 & 2

To start the elevator, the pump is started and the up-fast solenoid is energized, (see Figure 1). Since the regulator piston is parked closed by its spring against the seat, the oil cannot bypass to tank. Pressure builds in the pump cavity causing the regulator piston to open by forcing the oil behind the regulator piston to go past the CSL-3 and the CSL-2 pistons to tank. Some oil also flows through the up delay adjustment screw causing the CSL-2 piston to close. This stops the oil flow to tank from the back of the regulator piston. The opening at the up delay adjustment screw determines how fast the CSL-2 piston closes and thus how much delay there is before up-start begins. At the same time, the oil goes in through the up-start needle and out through the up-stop needle. Since the up-start needle is open more than the up-stop needle, pressure builds behind the regulator piston, causing it to move toward the closed position. It should be noted that, since oil is free to flow out through the up-stop needle, it is essential that the up-start adjustment be open more than the up-stop adjustment. The amount that the up-start adjustment is open will govern how fast the regulator piston moves and thus how rapidly the elevator starts. As the regulator piston closes, (see Figure 2) pressure from the pump builds up in the valve and causes the check valve piston to open. This allows oil to flow from the pump into the jack.

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I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~SEQUENCE OF OPERATION~

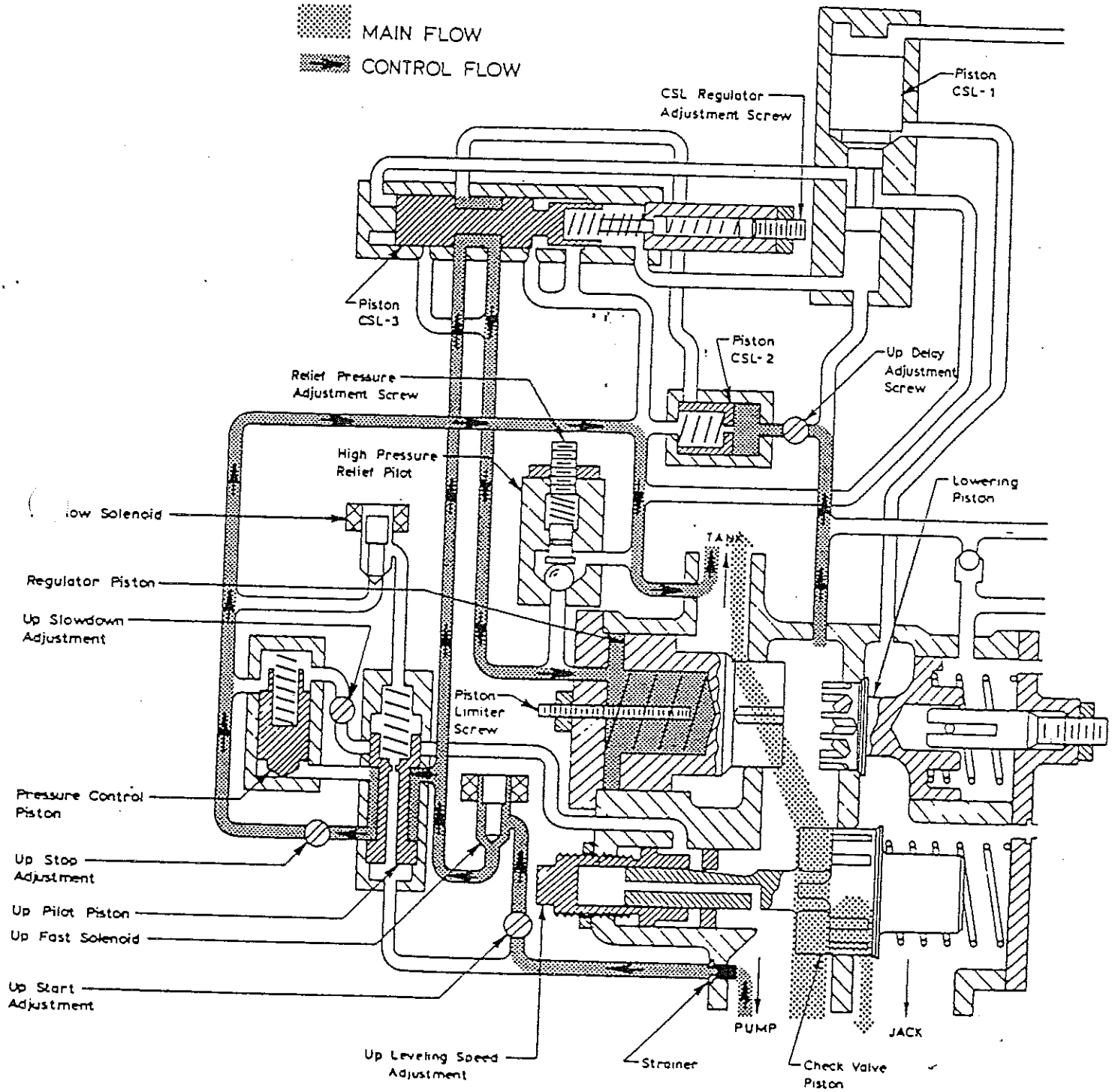

FIGURE 1 UP-START

I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~SEQUENCE OF OPERATION~

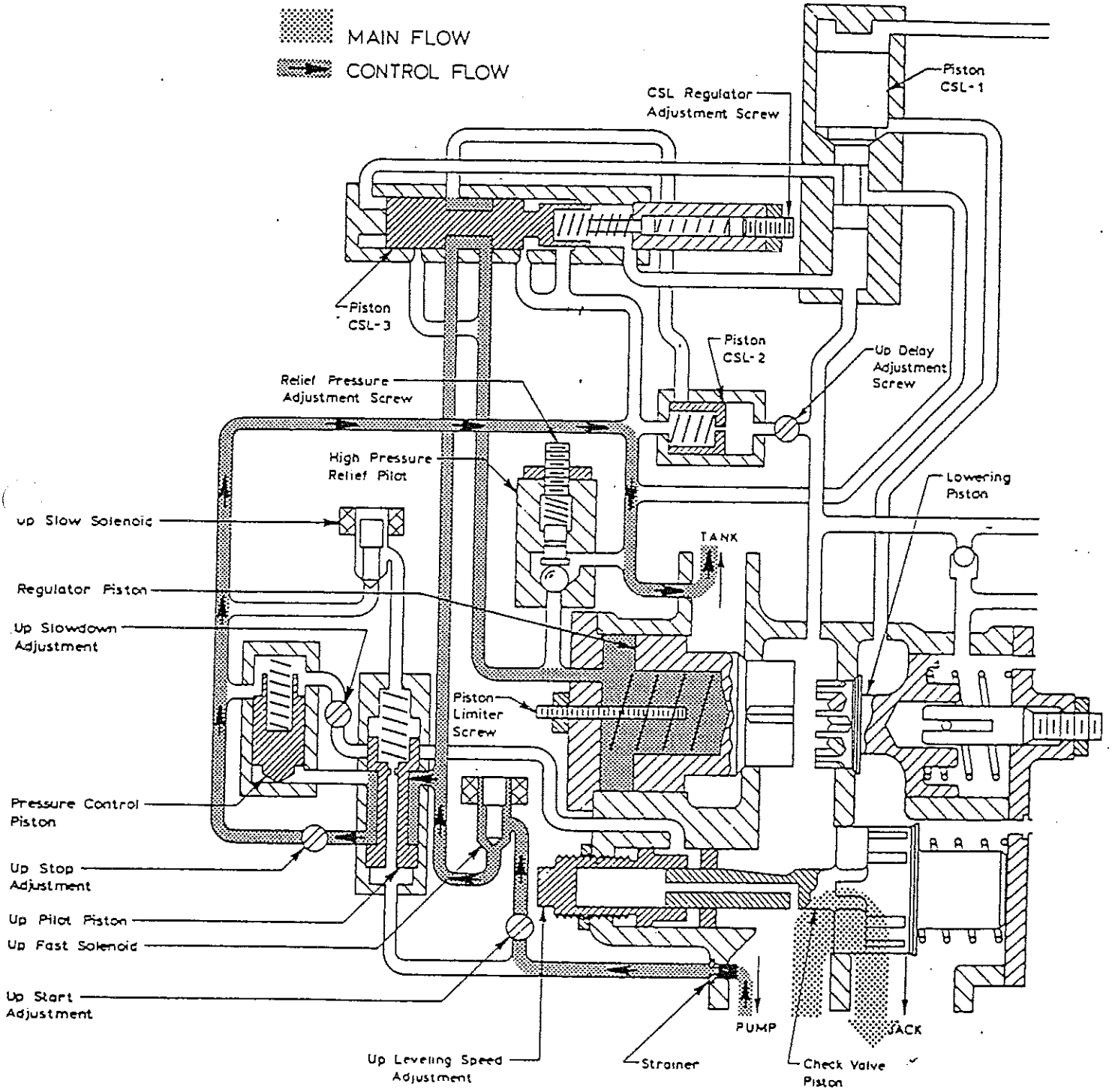

FIGURE 2 FULL SPEED

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

HIGH PRESSURE RELIEF

REFER TO SCHEMATIC DIAGRAM, FIGURE 3

If the pump produces pressure, for any reason, in excess of full load operating pressure, it will be transmitted to the high pressure relief pilot, causing it to move toward the open position. This movement allows the high pressure oil at the piston limiter screw end of the regulator piston to escape to the tank. This causes the regulator piston to open rapidly, allowing full bypass from the pump to the tank and relieving quickly the excess pressure. In this manner, the system maintains only relief pressure as long as the pump continues to run.

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

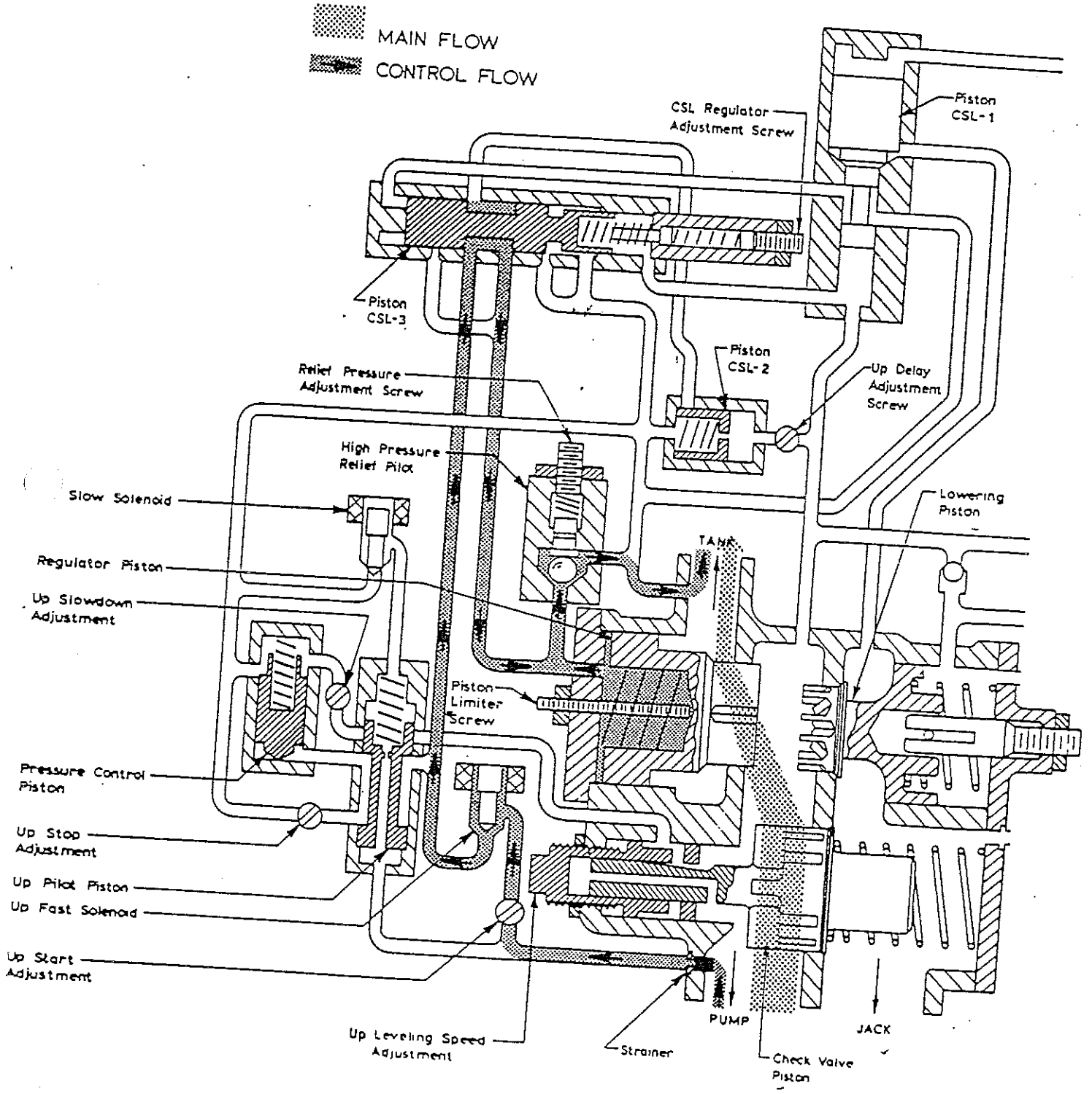

FIGURE 3 HIGH PRESSURE RELIEF

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

UP-SLOWDOWN & LEVELING SPEED

REFER TO SCHEMATIC DIAGRAM, FIGURE 4

To slow down to leveling speed, the up-fast solenoid is de-energized and the up-slow solenoid is energized. Since the pressure on the spring end of the up pilot piston is reduced, the up pilot piston shifts. Now the opening to the up-stop adjustment is closed and the opening to up-slowdown and leveling adjuster is opened to the back of the regulator piston. The oil now flows out through the up slowdown adjustment reducing the pressure behind the regulator piston, which starts to open. The rate of speed change is controlled by the opening at the up-slowdown adjustment, which determines the rate of oil flow from the piston limiter screw end of the regulator piston back into the system. The wider the opening, the quicker the slowdown. As the regulator piston opens, the valve pressure drops and causes the check valve piston to close a little. When the slot on the check valve piston reaches the hole in the leveling speed adjustment, oil flows behind the regulator piston through the slot. When the slot has opened enough to allow the same amount of oil to flow in as the amount which flows out through the up-slowdown needle, then the system reaches a hydraulic balance, which is leveling speed. By moving the hole in the leveling speed adjustment, the slot will follow it and change the leveling speed.

I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~SEQUENCE OF OPERATION~

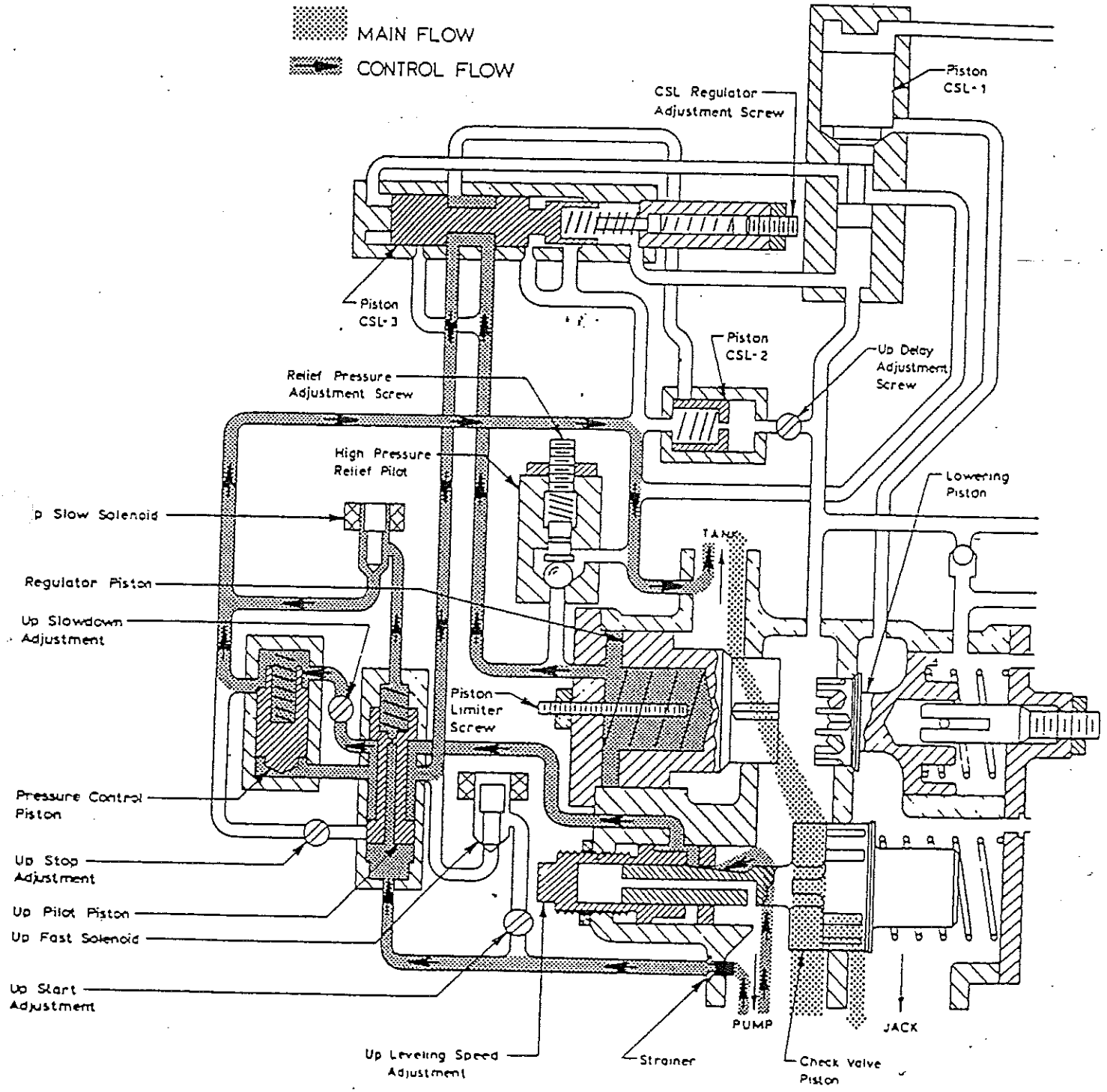

FIGURE 4 UP-SLOWDOWN & LEVELING SPEED

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I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

UP-STOP

REFER TO SCHEMATIC DIAGRAM, FIGURE 5

To stop the elevator, the up-slow solenoid is de-energized, but the pump is kept running slightly longer on a timed delay. This causes the spring end to pressurize, thus shifting the pilot piston to close the openings to up slowdown and leveling adjuster and open the flow to the up-stop adjustment. All flow in is stopped now. The up-stop needle allows flow out and causes the pressure to drop. The oil pressure in the pump cavity pushes the regulator piston more open allowing full bypass. At the same time, the check valve piston closes. The stopping rate is controlled by the opening at the stop adjustment needle, the wider the opening, the faster the stop. After the pump stops, the CSL-2 piston is forced open by its spring. Also the regulator piston is parked closed by its spring against the seat.

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WITH CONSTANT SPEED LOWERING
~SEQUENCE OF OPERATION~

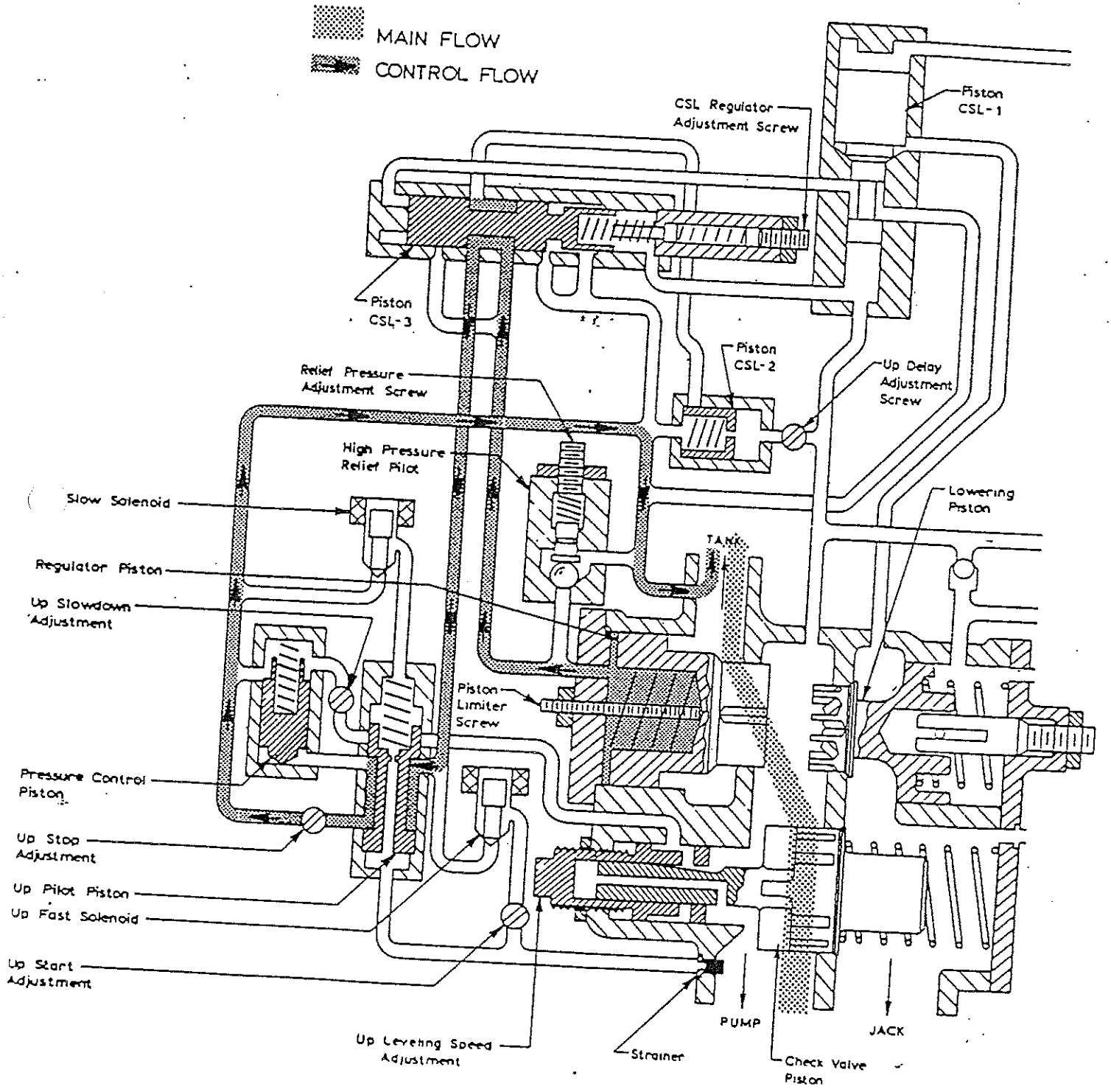

FIGURE 5 UP-STOP

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATIONS~

DOWN-START & FULL SPEED

REFER TO SCHEMATIC DIAGRAM, FIGURE 6

To start the elevator down, the down-fast and down-slow solenoids are energized, allowing the oil behind the lowering piston to flow to tank past the ball check and the down-start piston and through the down-start adjustment. Since the area of the lowering piston is larger than that of the seat, the reduction of pressure will cause the piston to lift. It will be noted that since oil is free to flow into this area through the down-stop adjustment, it is essential that the down-start adjustment be open more than the down-stop. The amount that it is open more will govern how fast the piston moves and thus how rapidly the elevator starts. The lowering speed adjustment limits the amount the piston can open and thus the elevator speed. At the same time oil at the top of the CSL-1 piston also flows to tank, allowing it to move away from its seat. When the CSL-1 piston moves open, this allows flow from jack to the end of CSL-3 piston forcing it to move by compressing its spring. The moving CSL-3 piston uncovers the hole which connects tank with the back of the regulator piston allowing the regulator piston to open. When some load is added to the car, the higher jack pressure applied to the end of CSL-3 piston causes it to move. This movement uncovers the hole which lets jack flow to back of regulator piston. As the regulator piston closes, pressure is built up in the pump cavity and also on the spring end of CSL-3 piston since they connect. This higher pressure on the spring end of CSL-3 piston prevents the jack-regulator piston hole from opening too wide thus limiting the flow through this hole. The spring on the CSL-3 piston also limits the hole opening.

The limited flow through the jack-regulator piston hole causes the regulator piston and the CSL-3 piston to balance at a certain position. As the jack load is increased the regulator piston is balanced at a more closed position. The CSL-3 piston causes the regulator piston to be balanced at positions which maintain equal pressure drops across the lowering piston for all jack loads, hence constant speed lowering.

I-2 & I-3 OILDRAULIC® CONTROLLER
WITH CONSTANT SPEED LOWERING
~SEQUENCE OF OPERATION~

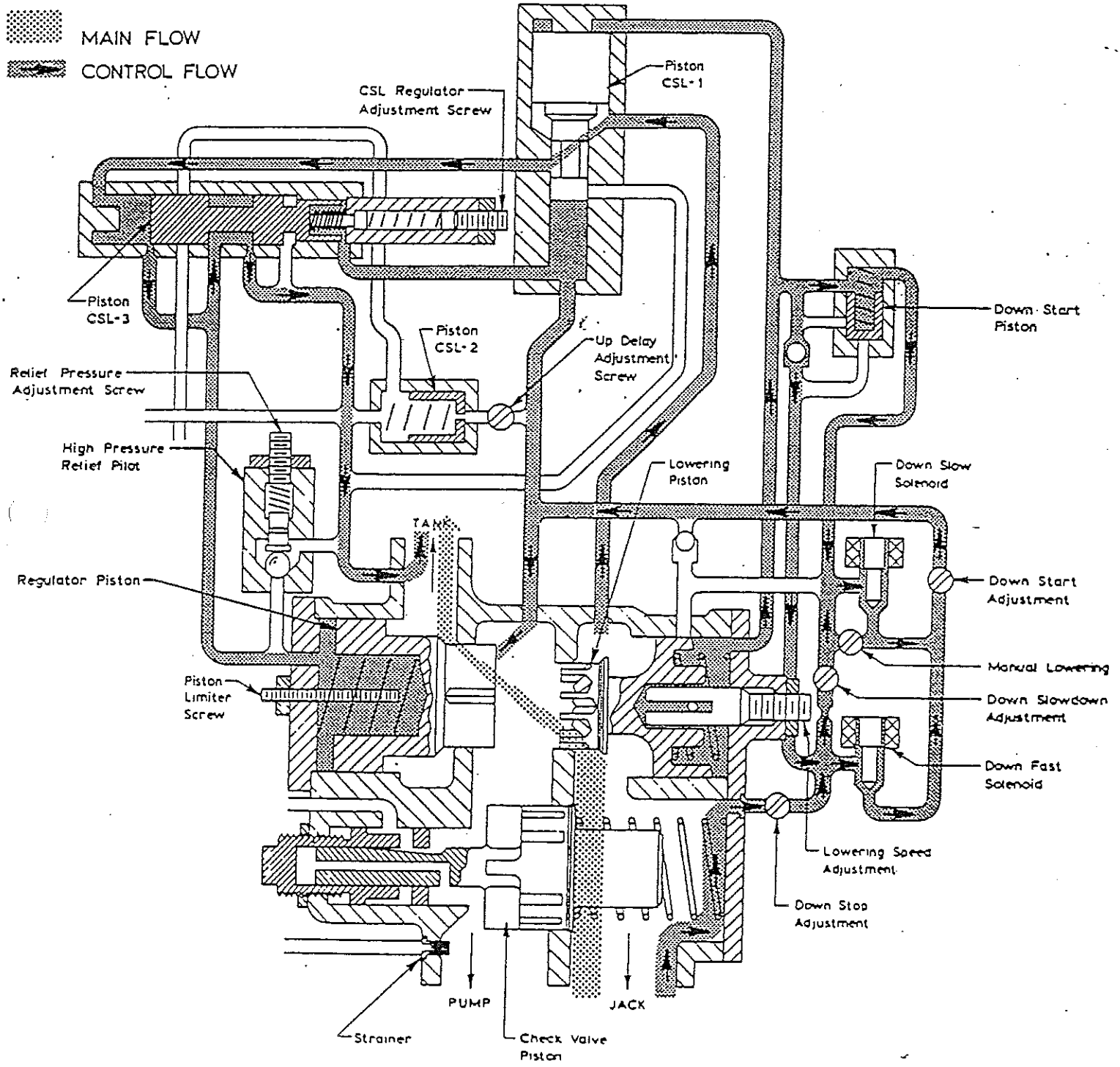

FIGURE 6 DOWN-START & FULL SPEED

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

DOWN-SLOWDOWN & LEVELING

REFER TO SCHEMATIC DIAGRAM, FIGURES 6 & 7

To change to leveling speed, the down-fast solenoid is closed. Since the lowering piston is in the full open position, the oil passage to the tank is blocked by the piston itself (See Figure 6) and partially by the down-slowdown adjustment. Oil will flow in through the down-stop adjustment forcing the down-start piston to move up thus opening the hole to let oil flow to the lowering piston causing it to close (see Figure 7). Some oil also flows out through the down-slowdown adjustment. The amount that the down-slowdown adjustment is closed will govern how fast the lowering piston moves and thus how rapidly the elevator slows down. When, however, it travels far enough to open the oil passage to tank, it will stop. The position at which this happens controls the leveling speed and is made variable by the shape of the skirt on the piston and by providing facilities to turn this piston. Turning is done through the lowering and leveling adjustment using increments of one 1/2 turns, which will change the lowering speed. Then rotating the adjustment less than a quarter turn either way will change the leveling speed.

MANUAL LOWERING

The manual lowering valve is parallel to the down-slow solenoid, (see Figure 6) and when opened, will allow the car to be lowered at leveling speed during emergencies.

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING ~SEQUENCE OF OPERATION~

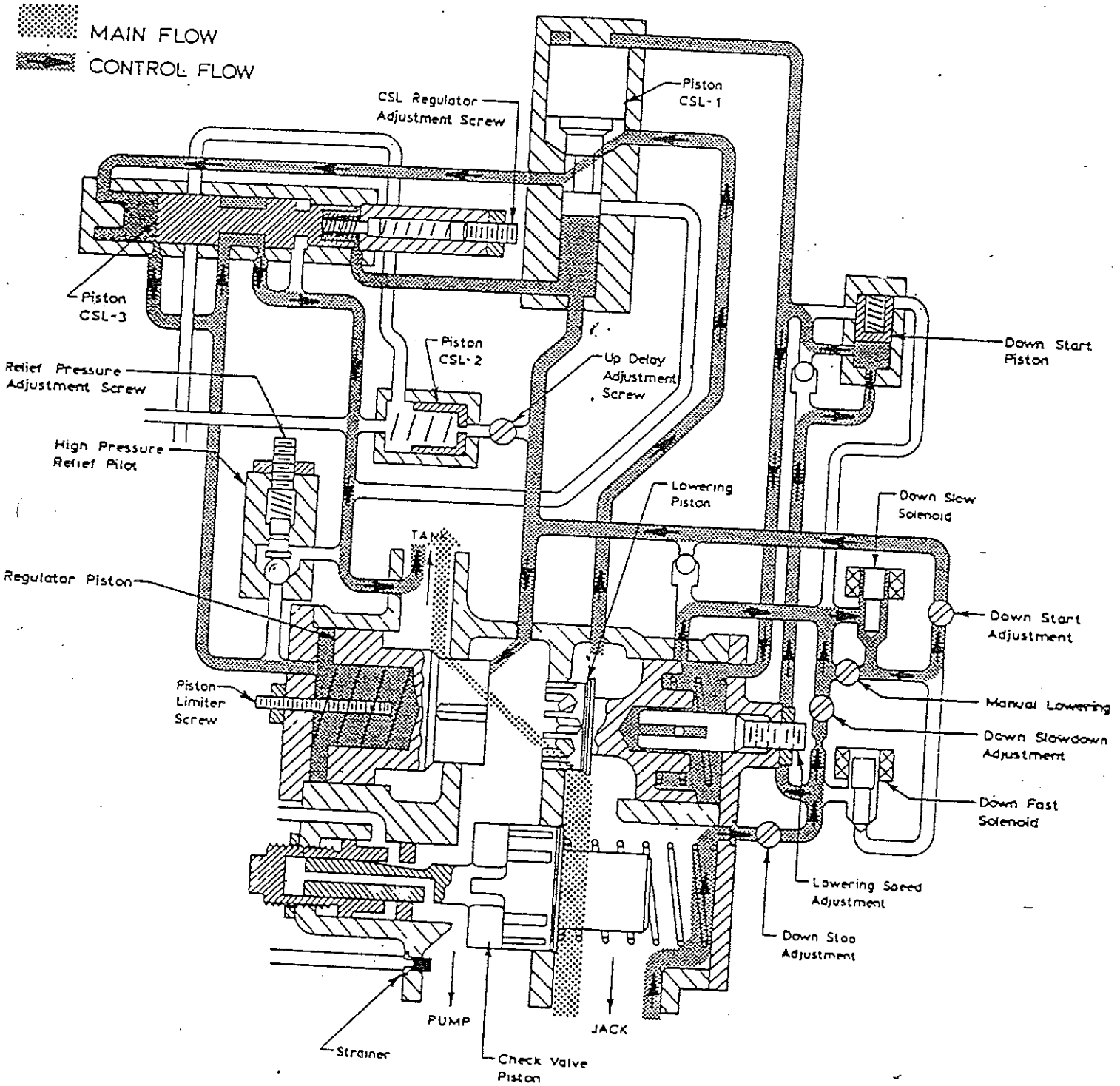

FIGURE 7 DOWN-SLOWDOWN & LEVELING

I-2 & I-3 OILDRAULIC® CONTROLLER WITH CONSTANT SPEED LOWERING

~SEQUENCE OF OPERATION~

DOWN-STOP

REFER TO SCHEMATIC DIAGRAM, FIGURE 8

To stop the elevator, the down-slow solenoid is de-energized, stopping all flow to the tank so the spring and pressure will close the piston. The rate of closing and thus the smoothness is controlled by the down-stop adjustment. The CSL-1 piston is parked closed by by the higher pressure at its top. The CSL-3 and the regulator pistons are parked by their springs.

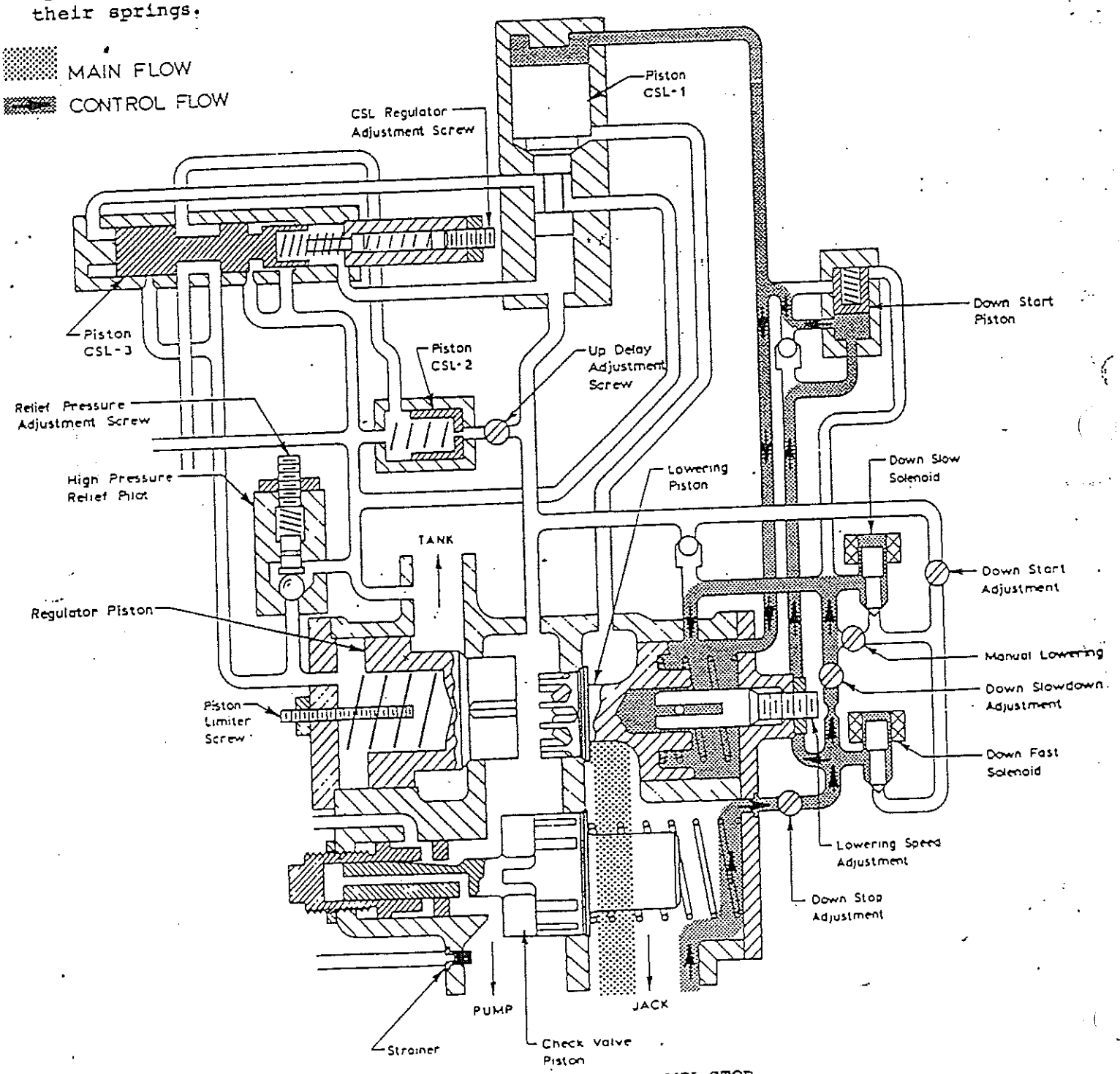

FIGURE 8 DOWN-STOP

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Mar., 1984

OILDRAULIC CONTROLLER ADJUSTMENTS

GUIDE TO ADJUSTMENT INSTRUCTIONS AND SEQUENCE OF OPERATION
60000 SERIES OILDRAULIC CONTROLLERS

Determine assembly model number from job card for the particular installation or from nameplate on center section. Find assembly number in left hand column and determine page number (in this division and section unless otherwise noted) for desired information.

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence	Down Cycle Adjustments	Down Cycle Sequence
* 63070	Rota Relief, Up Stop, Lowering, Leveling, 300 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63071	Rota Relief, Up Stop, Lowering, 300 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63072	Rota Relief, Hi Speed Lowering, 300 GPM	9 and 10	10-S	1 thru 4	3-S
* 63073	Rota Relief, Up Stop, Hi Speed Lowering, Leveling, 300 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63074	Rota Relief, Lowering, 2 Way Leveling, 300 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63075	Rota Relief, Hi Speed Lowering, 2 Way Leveling, 300 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63076	Rota Relief, Lowering, 2 Way Leveling, Explosion Proof, 300 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63077	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 300 GPM	13 thru 16	15-S	17 thru 20	19-S
* 63078	Rota Relief, Up Stop, Constant Speed Lowering, 300 GPM	5 thru 8	7-S	17 thru 20	19-S
* 63079	Rota Relief, Up Stop, Lowering, Leveling, 150 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63080	Rota Relief, Lowering, Leveling, 150 GPM	9 and 10	10-S	1 thru 4	3-S
* 63081	Rota Relief, Up Stop, Lowering, 150 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63082	Rota Relief, Hi Speed Lowering, 150 GPM	9 and 10	10-S	1 thru 4	3-S
* 63083	Rota Relief, Separate Lowering, 150 GPM	9 and 10	10-S		
* 63084	Rota Relief, Up Stop, Hi Speed Lowering, Leveling, 150 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63085	Rota Relief, Lowering, 2 Way Leveling, 150 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63086	Rota Relief, Hi Speed Lowering, 2 Way Leveling, 150 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63087	Rota Relief, Lowering, 2 Way Leveling, Explosion Proof, 150 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63088	Rota Relief, Lowering, Leveling, Explosion Proof, 150 GPM	9 and 10	10-S	1 thru 4	3-S
* 63089	Rota Relief, Up Stop, Lowering, Leveling, Explosion Proof, 150 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63090	Rota Relief, Hi Speed Lowering, Explosion Proof, 150 GPM	9 and 10	10-S	1 thru 4	3-S

* Obsolete

OILDRAULIC CONTROLLER ADJUSTMENTS

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence	Down Cycle Adjustments	Down Cycle Sequence
* 63091	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 150 GPM	13 thru 16	15-S	17 thru 20	19-S
* 63092	Rota Relief, Up Stop, Constant Speed Lowering, 150 GPM	5 thru 8	7-S	17 thru 20	19-S
* 63093	Rota Relief, Constant Speed Lowering, 2 Way Leveling, Explosion Proof	5 thru 8	7-S	17 thru 20	19-S
* 63094	Rota Relief, Up Stop, Lowering, Leveling, 60 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63095	Rota Relief, Lowering, Leveling, 60 GPM	9 and 10	10-S	1 thru 4	3-S
* 63096	Rota Relief, HI Speed Lowering, 60 GPM	9 and 10	10-S	1 thru 4	3-S
* 63097	Rota Relief, Separate Lowering, 60 GPM	9 and 10	10-S		
* 63098	Rota Relief, Lowering, 2 Way Leveling, 60 GPM	13 thru 16	15-S	1 thru 4	3-S
* 63099	Rota Relief, Lowering, Leveling, Explosion Proof, 60 GPM	9 and 10	10-S	1 thru 4	3-S
* 63100	Rota Relief, Up Stop, Lowering, Leveling, Explosion Proof, 60 GPM	5 thru 8	7-S	1 thru 4	3-S
* 63101	Rota Relief, HI Speed Lowering, Explosion Proof 60 GPM	9 and 10	10-S	1 thru 4	3-S
* 63102	Plain Relief, Separate Lowering, 60 GPM	11 and 12	12-S		
* 63375	Rota Relief, Up Stop, Lowering, Leveling, 350 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
* 63376	Rota Relief, Up Stop, Lowering, 350 GPM, 115/230 V	5 thru 8	7-S	1 thru 4	3-S
* 63377	Rota Relief, HI Speed Lowering, 350 GPM, 115/230 V	9 and 10	10-S	1 thru 4	3-S
63378	Rota Relief, Up Stop, HI Speed Lowering, Leveling, 350 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
63379	Rota Relief, Lowering, 2 Way Leveling, 350 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63380	Rota Relief, HI Speed Lowering, 2 Way Leveling, 350 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63381	Rota Relief, Lowering, 2 Way Leveling, Explosion Proof, 350 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63382	Rota Relief, Constant Speed Lowering, 2 Way Leveling, 350 GPM, 115 V	13 thru 16	15-S	17 thru 20	19-S
63384	Rota Relief, Constant Speed Lowering 2 Way Leveling, Explosion Proof, 350 GPM, 115 V	13 thru 16	15-S	17 thru 20	19-S
* 63385	Rota Relief, Up Stop, Constant Speed lowering, 350 GPM, 115/230 V	5 thru 8	7-S	17 thru 20	19-S

* Obsolete

OILDRAULIC CONTROLLER ADJUSTMENTS

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence	Down Cycle Adjustments	Down Cycle Sequence
* 63386	Rota Relief, Lowering, 2 Way Leveling, 120 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
* 63387	Rota Relief, Lowering, 2 Way Leveling, 120 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
63395	Rota Relief, Up Stop, Lowering, Leveling, 150 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
63396	Rota Relief, Lowering, Leveling, 150 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
63397	Rota Relief, Up Stop, Lowering, 150 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
63398	Rota Relief, Hi Speed Lowering, 150 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 63399	Rota Relief, Separate Lowering, 150 GPM	9 and 10	10-S		
63400	Rota Relief, Up Stop, Hi Speed Lowering, Leveling, 150 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
63401	Rota Relief, Lowering, Leveling, Explosion Proof, 150 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
63402	Rota Relief, Up Stop, Lowering Leveling, Explosion Proof, 150 GPM, 115 V.	5 thru 8	7-S	1 thru 4	3-S
63403	Rota Relief, Hi Speed Lowering, Explosion Proof, 150 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 63404	Rota Relief, Up Stop, Constant Speed Lowering, 215 GPM, 115/230 V	5 thru 8	7-S	17 thru 20	19-S
63405	Rota Relief, 2 Way Leveling, Lowering, 215 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63406	Rota Relief, 2 Way Leveling, Hi Speed Lowering, 215 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63407	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 215 GPM, 115 V	13 thru 16	15-S	17 thru 20	19-S
63408	Rota Relief, 2 Way Leveling, Lowering, Explosion Proof, 215 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63409	Rota Relief, 2 Way Leveling, Constant Speed Lowering, Explosion Proof, 215 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
63411	Rota Relief, Up Stop, Lowering, Leveling, 60 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
63412	Rota Relief, Lowering, Leveling, 60 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
63413	Rota Relief, Hi Speed Lowering, 60 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 63414	Rota Relief, Separate Lowering, 60 GPM	9 and 10	10-S		
* 63415	Rota Relief, Lowering, 2 Way Leveling, 60 GPM, 115/230 V	13 thru 16	15-S	1 thru 4	3-S

* Obsolete

OILDRAULIC CONTROLLER ADJUSTMENTS

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence	Down Cycle Adjustments	Down Cycle Sequence
63416	Rota Relief, Lowering, Leveling, Explosion Proof, 60 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
63417	Rota Relief, Up Stop, Lowering, Leveling, Explosion Proof, 60 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
63418	Rota Relief, Hi Speed Lowering, Explosion Proof, 60 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 63419	Plain Relief, Separate Lowering, 60 GPM	11 and 12	12-S		
* 63436	Rota Relief, Up Stop, Lowering, 350 GPM, 460 V	5 thru 8	7-S	1 thru 4	3-S
* 63444	Rota Relief, Constant Speed Lowering, 2 Way Leveling, Explosion Proof, 350 GPM, 230 V	13 thru 16	15-S	17 thru 20	19-S
* 63445	Rota Relief, Up Stop, Constant Speed Lowering, 350 GPM, 460 V	5 thru 8	7-S	17 thru 20	19-S
* 63446	Rota Relief, Up Stop, Lowering, Leveling, 350 GPM, 460 V	5 thru 8	7-S	1 thru 4	3-S
* 63447	Rota Relief, Hi Speed Lowering, 350 GPM, 460 V	9 and 10	10-S	1 thru 4	3-S
* 63448	Rota Relief, Up Stop, Hi Speed Lowering, Leveling, 350 GPM, 460 V	5 thru 8	7-S	1 thru 4	3-S
* 63449	Rota Relief, Lowering, 2 Way Leveling, 350 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
* 63450	Rota Relief, Hi Speed Lowering, 2 Way Leveling, 350 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
* 63451	Rota Relief, Lowering, 2 Way Leveling Explosion Proof, 350 GPM, 230 V	13 thru 16	15-S	1 thru 4	3-S
* 63452	Rota Relief, Constant Speed Lowering 2 Way Leveling, 350 GPM, 460 V	13 thru 16	15-S	17 thru 20	19-S
* 63455	Rota Relief, Up Stop, Lowering, Leveling, 215 GPM, 460 V	5 thru 8	7-S	1 thru 4	3-S
* 63456	Rota Relief, Lowering, Leveling, 215 GPM, 460 V	9 and 10	10-S	1 thru 4	3-S
* 63457	Rota Relief, Up Stop, Lowering, 215 GPM, 460 V	5 thru 8	7-S	1 thru 4	3-S
* 63458	Rota Relief, Hi Speed Lowering, 215 GPM, 460 V	9 and 10	10-S	1 thru 4	3-S
* 63460	Rota Relief, Up Stop, Hi Speed Lowering, Leveling, 215 GPM, 460 V	9 and 10	10-S	1 thru 4	3-S
* 63461	Rota Relief, Lowering, Leveling, Explosion Proof, 215 GPM, 230 V	9 and 10	10-S	1 thru 4	3-S
* 63462	Rota Relief, Up Stop, Lowering, Leveling, Explosion Proof, 215 GPM, 230 V	5 thru 8	7-S	1 thru 4	3-S
* 63463	Rota Relief, Hi Speed Lowering, Explosion Proof, 215 GPM, 230 V	9 and 10	10-S	1 thru 4	3-S

* Obsolete

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OILDRAULIC CONTROLLER ADJUSTMENTS

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence	Down Cycle Adjustments	Down Cycle Sequence
* 63464	Rota Relief, Up Stop, Constant Speed Lowering, 215 GPM, 460 V	5 thru 8	7-S	17 thru 20	19-S
* 63465	Rota Relief, 2 Way Leveling, Lowering, 215 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
* 63466	Rota Relief, 2 Way Leveling, Hi Speed Lowering, 215 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
* 63467	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 215 GPM, 460 V	13 thru 16	15-S	17 thru 20	19-S
* 63468	Rota Relief, 2 Way Leveling, Lowering, Explosion Proof, 215 GPM, 230 V	13 thru 16	15-S	1 thru 4	3-S
* 63469	Rota Relief, 2 Way Leveling Constant Speed Lowering, 215 GPM, 230 V	13 thru 16	15-S	1 thru 4	3-S
* 63471	Rota Relief, Up Stop, Lowering, Leveling, 60 GPM, 460 V	5 thru 8	7-S	1 thru 4	3-S
* 63472	Rota Relief, Lowering, Leveling, 60 GPM, 460 V	9 and 10	10-S	1 thru 4	3-S
* 63473	Rota Relief, Hi Speed Lowering, 60 GPM, 460 V	9 and 10	10-S	1 thru 4	3-S
* 63475	Rota Relief, Lowering, 2 Way Leveling, 60 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
* 64376	Rota Relief, Lowering, Leveling, Explosion Proof, 60 GPM, 230 V	9 and 10	10-S	1 thru 4	3-S
* 63477	Rota Relief, Up Stop, Lowering, Leveling, Explosion Proof, 60 GPM, 230 V	5 thru 8	7-S	1 thru 4	3-S
* 63478	Rota Relief, Hi Speed Lowering, Explosion Proof, 60 GPM, 230 V	9 and 10	10-S	1 thru 4	3-S
* 63652	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 215, GPM, 115/230 V	13 thru 16	15-S	** 29 thru 32	** 31-S
* 63653	Rota Relief, Constant Speed Lowering, 2 Way Leveling, 350 GPM, 115/230 V	13 thru 16	15-S	** 29 thru 32	** 31-S
* 63711	Rota Relief, Constant Speed Lowering, 2 Way Leveling, 350 GPM, 115/230 V	** 21 thru 24	23-S	17 thru 20	19-S
* 63712	Rota Relief, Constant Speed Lowering, 2 Way Leveling, 350 GPM, 460 V	** 21 thru 24	23-S	17 thru 20	19-S
* 63713	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 215 GPM, 115/230 V	** 21 thru 24	23-S	17 thru 20	19-S
* 63714	Rota Relief, 2 Way Leveling, Constant Speed Lowering, 215 GPM, 460 V	** 21 thru 24	23-S	17 thru 20	19-S
* 63756	Rota Relief, 2 Way Leveling, Lowering, 215 GPM, 220 V	13 thru 16	15-S	** 1 thru 4	** 3-S
* 64534	Rota Relief, Up Stop, Hi Speed Lowering, Leveling, 215 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
66535	Rota Relief, Up Stop, Lowering, Leveling, 215 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S

* Obsolete
** Division 4, Section G

OILDRAULIC CONTROLLER ADJUSTMENTS

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence	Down Cycle Adjustments	Down Cycle Sequence
* 66536	Rota Relief, Lowering, Leveling Explosion Proof, 215 GPM, 115 V	9 thru 10	10-S	1 thru 4	3-S
* 66537	Rota Relief, Up Stop, Lowering, 215 GPM, 115/230 V	5 thru 8	7-S	1 thru 4	3-S
* 66538	Rota Relief, Hi Speed Lowering, 215 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 66539	Rota Relief, Up Stop, Lowering, Leveling, Explosion Proof, 215 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
* 66540	Rota Relief, Hi Speed Lowering, Explosion Proof, 215 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 66541	Rota Relief, Separate Lowering 215 GPM	9 and 10	10-S		
* 66542	Rota Relief, Lowering Leveling, 215 GPM, 115 V	9 and 10	10-S	1 thru 4	3-S
* 66629	Rota Relief, Lowering, 2 Way Leveling, 120 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
66630	Rota Relief, Lowering, 2 Way Leveling, 120 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
66631	Rota Relief, 2 Way Leveling, Hi Speed Lowering, 120 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
* 66632	Rota Relief, 2 Way Leveling, Hi Speed Lowering 120 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
66633	Rota Relief, 2 Way Leveling, Lowering, Explosion Proof, 120 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
* 66634	Rota Relief, 2 Way Leveling, Lowering, Explosion Proof, 120 GPM, 230 V	13 thru 16	15-S	1 thru 4	3-S
66635	Rota Relief, Lowering, 2 Way Leveling, 60 GPM, 115 V	13 thru 16	15-S	1 thru 4	3-S
* 66636	Rota Relief, Lowering, 2 Way Leveling, 120 GPM, 460 V	13 thru 16	15-S	1 thru 4	3-S
67529	Rota Relief, Up Stop, Lowering, Leveling, 60 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S
67652	Rota Relief, Up Stop, Lowering, Leveling, 215 GPM, 115 V	5 thru 8	7-S	1 thru 4	3-S

* Obsolete

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OILDRAULIC CONTROLLER ADJUSTMENT

LOWERING ADJUSTMENTS
(Follow The Sequence As Outlined)

Adjust With Car Empty:

1. Disconnect leveling (Terminal V-11) on Control Panel.
2. Open Down-Start and Down-Stop 2 or 3 turns. Down-Start must be opened wider than Down-Stop to permit car to lower.
3. Adjust lowering speed to correspond with speed shown on layout drawing.
4. Adjust Down-Stop. Make sure the stop is as quick as is comfortable with the empty car.
5. Adjust the Down-Start.
6. Adjust Limit and Floor Switches to stop the car about 2" above the floor if one-way leveling is to be used.

Test With Car Loaded:

1. Place rated load on car.
2. Operate elevator and check performance under load. Minor adjustments may be necessary to compensate for load.

IMPORTANT: Final Car Stop is controlled by the proper location of Hoistway Switches and Cams. The Oildraulic Controller regulates only the smoothness of operation.

LEVELING ADJUSTMENTS
(When Required)

Adjust With Car Loaded:

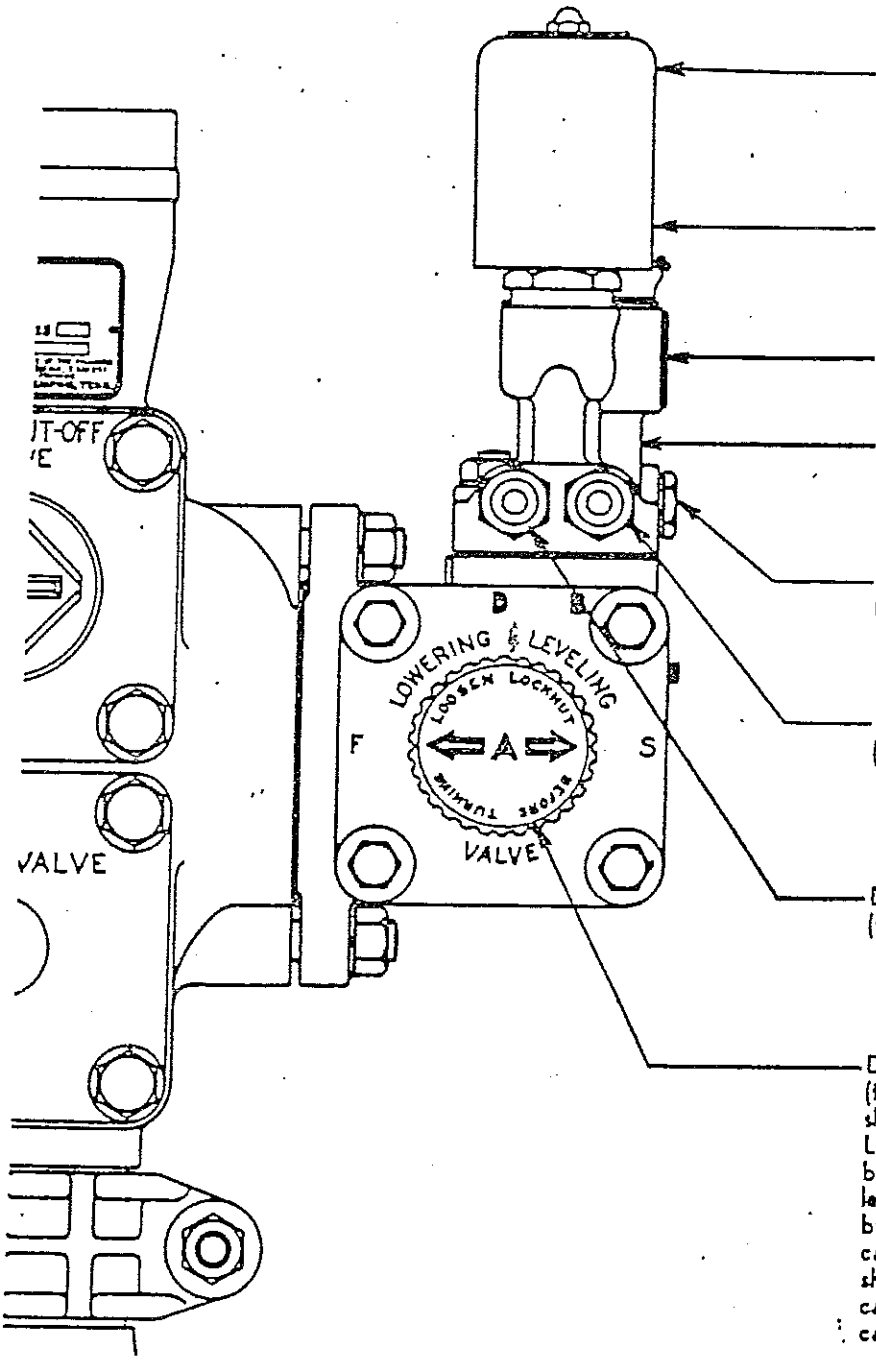
1. Connect leveling (Terminal V-11) on Control Panel.
2. Adjust leveling speed. Correct leveling speed should be 1/3 to 1/4 of lowering speed, but not more than 25 FPM.
3. Set Leveling Cams for stopping car even with floor level.

Test With Car Empty:

1. Remove rated load from car.
2. Operate elevator and check performance. Any re-adjustment of Down-Stop will necessitate a re-adjustment of the Down-Start to compensate.

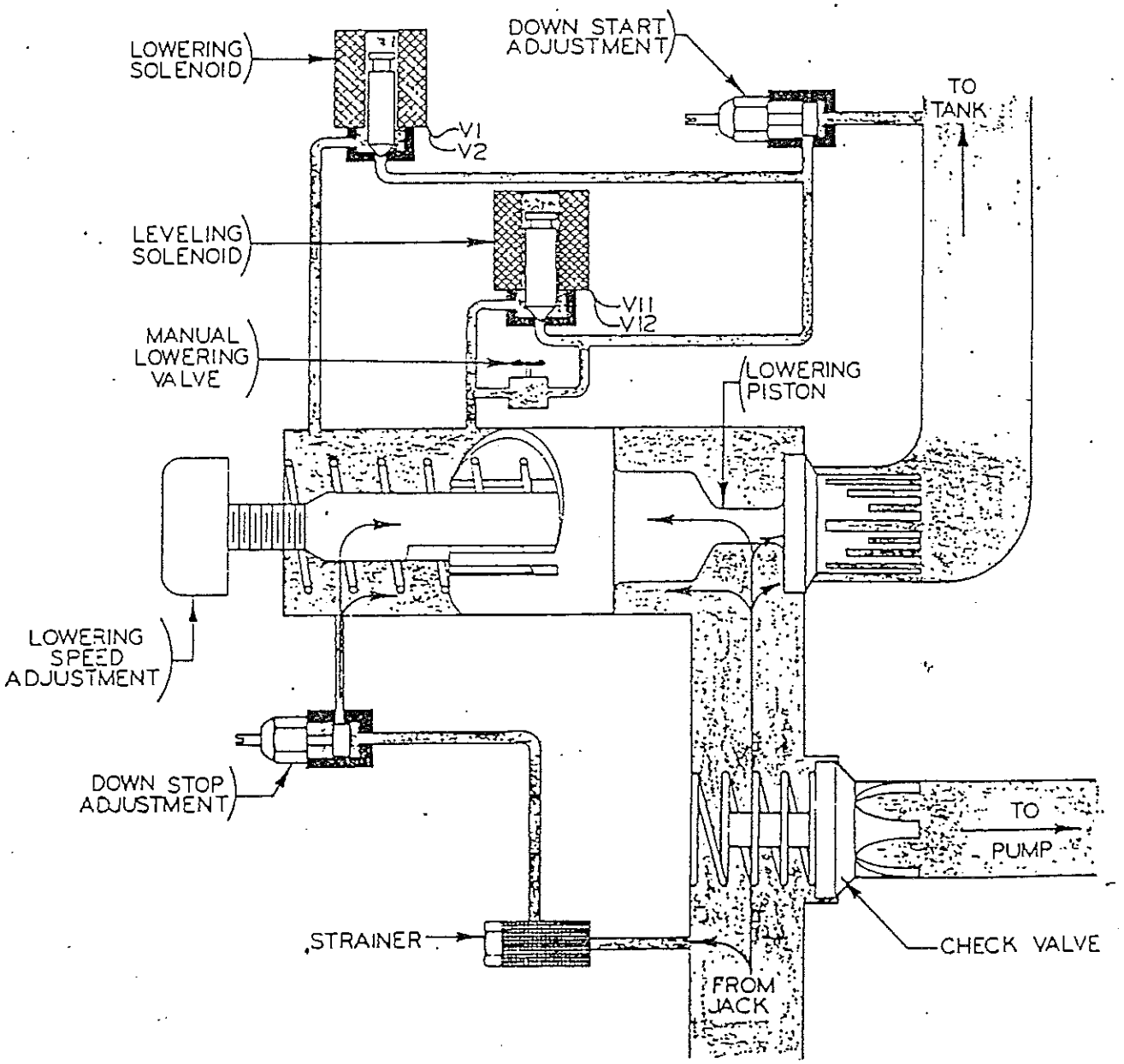
CAUTION: The Oildraulic Controller is designed to control car speed and smoothness of operation only. The actual stopping position of the car is controlled by Hoistway Switches and Cams. DO NOT re-adjust the Oildraulic Controller if car misses a floor—Move the hoistway equipment at the floor where the miss occurs. Adjust the Oildraulic Controller only if the car misses every floor an identical amount.

OILDRAULIC CONTROLLER ADJUSTMENT



LOWERING SIDE

SCHEMATIC OIL FLOW DIAGRAM



SEQUENCE OF OPERATION

PLAIN LOWERING AND LEVELING*

REFER TO SCHEMATIC DIAGRAM ON PAGE 3.

This valve consists of a piston that seats and can be controlled in three positions, closed to stop the car, partially open for slow speed and fully open for high speed. The valve is shown in the closed position.

To start the elevator down, the lowering solenoid is energized, allowing the oil behind the piston to flow to tank through the "down start" adjustment. Since the area of the piston is larger than that of the seat, the reduction of pressure will cause the piston to lift. It will be noted that since oil is free to flow into this area through the strainer and "down stop" adjustment, it is essential that the "down start" adjustment be open more than the down stop. The amount that it is open more will govern how fast the piston moves and thus how rapidly the elevator starts. The lowering speed adjustment limits the amount the piston can open and thus the elevator speed.

To change to slow speed or leveling* position the "lowering" solenoid is closed and the "leveling" solenoid opened. Since in this position the oil passage to tank is blocked by the piston itself, oil will flow in through the strainer and "down stop" adjustment and allow the piston to move toward closing. When, however, it travels far enough to open the oil passage to tank, it will stop. The position at which this happens controls the leveling speed and is made variable by forming the skirt of the piston on an angle and providing facilities to turn it. Turning is accomplished by the "lowering speed" adjustment with a half turn altering the leveling speed and multiples of half turns altering the high speed. When leveling is not provided, closing the lowering solenoid will stop the elevator in the same manner.

To stop the elevator the "leveling" solenoid is de-energized, stopping all flow to the tank so the spring and pressure will close the piston. As in the case of slowdown, the rate of closing and thus the smoothness is controlled by the "down stop" adjustment.

The manual lowering valve does the same thing as the "leveling" solenoid.

*When used—when leveling is not provided, operation is the same, except the leveling solenoid is not provided, and the corresponding functions are not available.

OILDRAULIC CONTROLLER ADJUSTMENT

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Car will not lower.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Chuck current supply. (d) Check Solenoid coil. (e) Turn out Down-Start Adjustment. (f) Turn in on Down-Stop Adjustment. (g) Unscrew Lowering Speed Adjustment.
2. Bouncy, slow Down-Start.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Start. (c) Turn in on Down-Stop. (d) Back out on Lowering Speed Adjustment.
3. Sudden Down-Start.	(a) Turn in on Down-Start.
4. Car will not stop when started down.	(a) Tighten manual lowering. (b) Check for clogged strainers. (c) Turn out on Down-Stop. (d) Check Solenoid valve not dropping out. (residual magnatism)
5. Down-Stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Stop.
6. Down-Stop rough (quick).	(a) Turn in on Down-Stop.
7. Leveling bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Increase Leveling speed.

NOTE: In offering these solutions, the manufacturer assumes there is no binding in the Hatch and that the proper voltage is being supplied to the Power Unit.

OILDRAULIC CONTROLLER ADJUSTMENTS

(See back of sheet for drawing)

RELIEF PRESSURE SETTING*

(Follow in sequence as given)

1. Open both adjustment needles fully (do not force).
2. Close up stop adjustment two full turns.
3. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
4. Install Pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
5. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
6. Start unit and read from gage.
7. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit.
8. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.
9. Replace acorn nut and gasket.
10. Open Shut-off Valve.

UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

1. Remove any load from car.
2. Close Up Start Adjustment.
3. Remove acorn nut on Low Pressure Adjustment and back off.
4. Start Power Unit. If car moves, back off on low pressure until car stands still.
5. Turn in on Low Pressure Adjustment until car starts to creep up slowly, then back off until car just stands still, then back off ½ turn more.
6. Open Up-Start fully. (Do not force)
7. Open Up-Stop fully (Do not force). Close up two full turns.
8. Put rated load on car.
9. Disconnect Leveling (V-11).
10. Adjust Up-Stop, making it as quick as is comfortable.
11. Adjust Up-Start.
12. Set Limits to stop car about 1" to 2" above floor with rated load, and connect Leveling (V-11).
13. Check with empty car.

(Caution: Do not run unit by-passing or relieving more than one or two minutes at a time, as heat generated may damage pump.)

*This adjustment is factory set on new units and so will be required only on replacements.

Division	4
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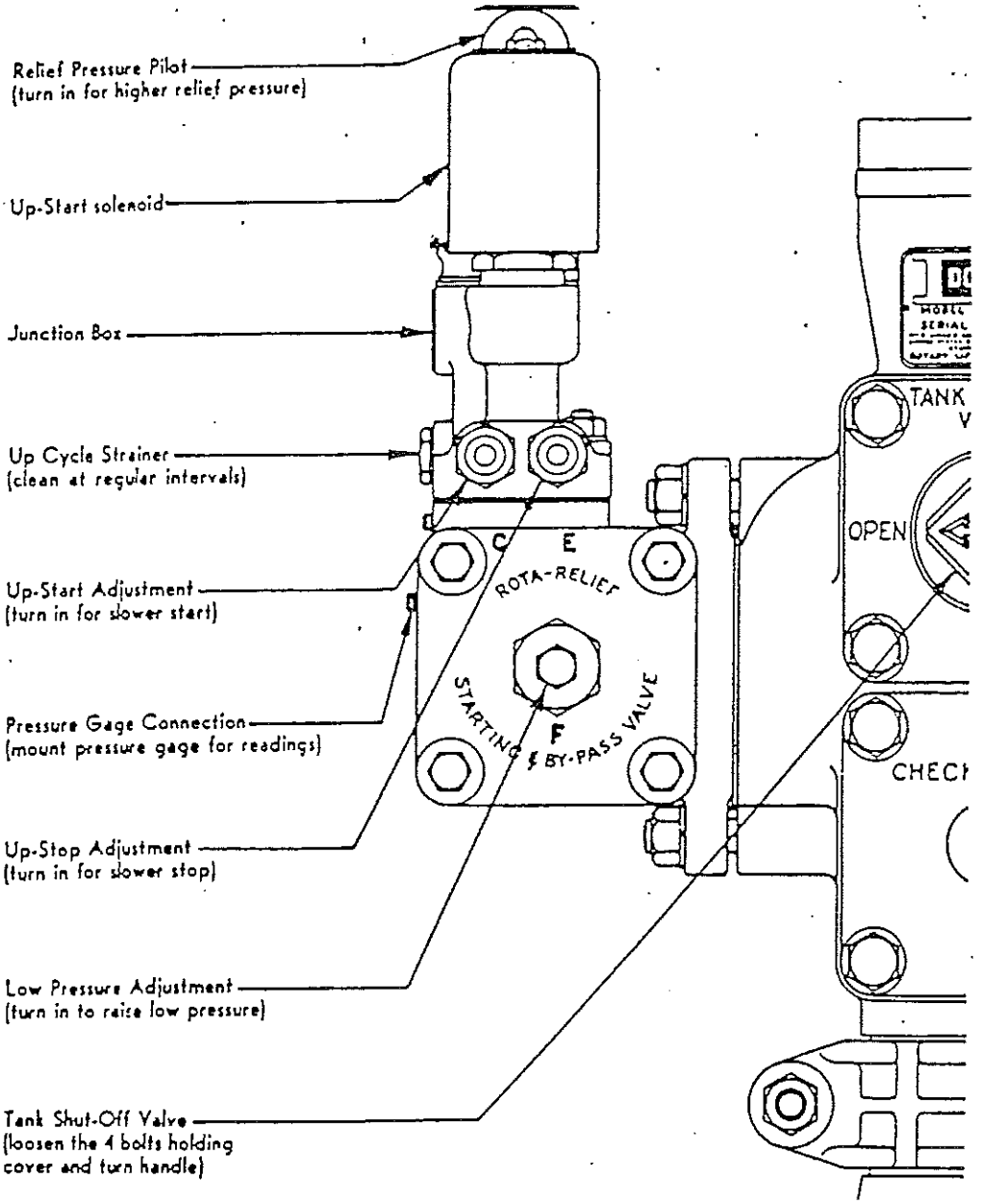
	6

OILDRAULIC CONTROLLER ADJUSTMENT

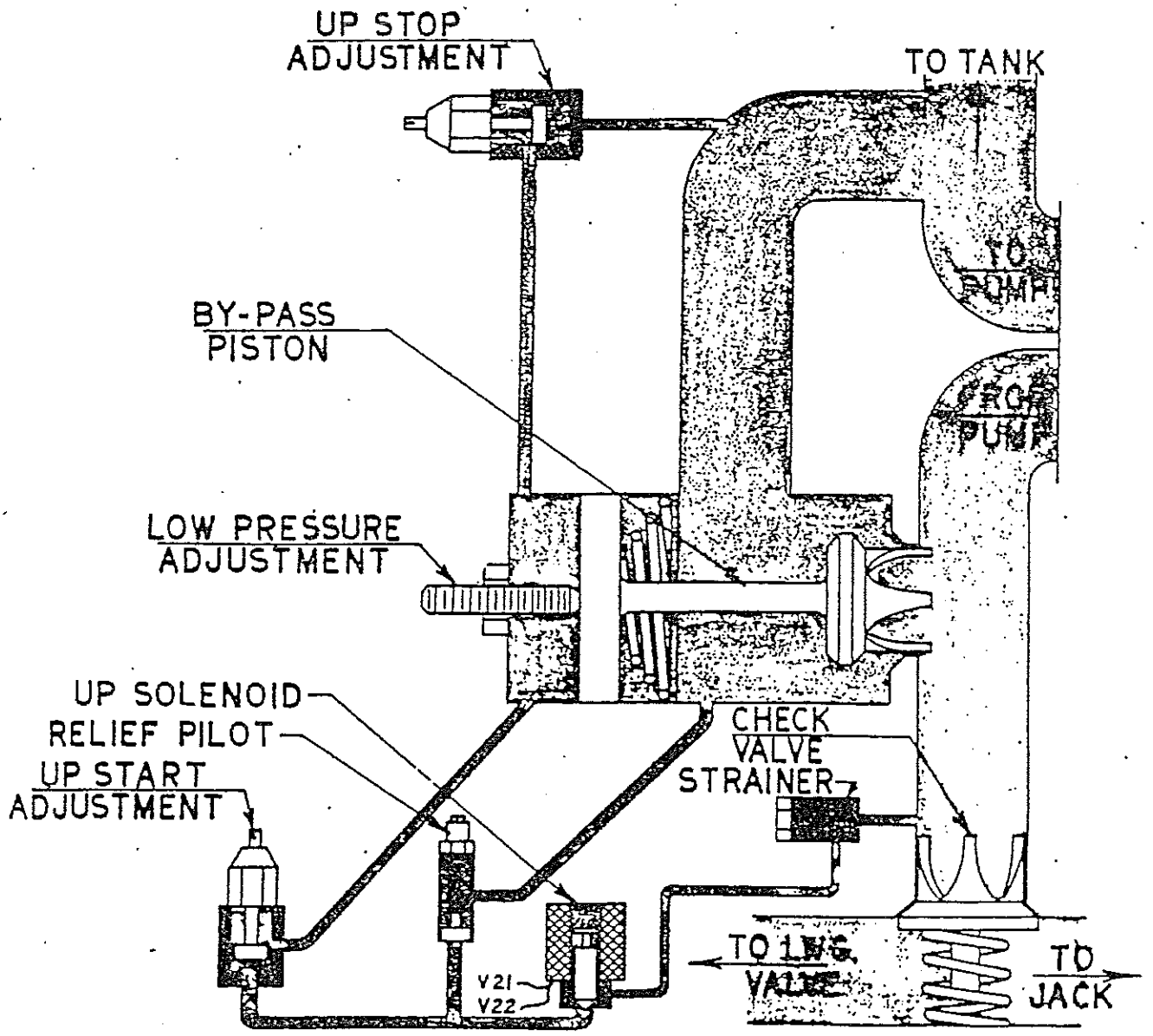
(See front of sheet for Adjustment Instructions)



OILDRAULIC CONTROLLER ADJUSTMENTS

UP SIDE

SCHEMATIC OIL FLOW DIAGRAM



SEQUENCE OF OPERATION

ROTA RELIEF—BYPASS—UP STOP

Refer to Schematic Diagram on Page 7

This valve consists of a non-seating piston which will perform both as a bypass and a pressure relief valve. The valve is shown in its parked position.

To start the elevator, the pump is started and the "up" solenoid energized. At first, since the bypass piston is parked open against the low pressure adjustment by its spring, all flow will bypass to tank. The pressure built up in the system due to this bypassing will cause oil to flow through the strainer, "up" solenoid and "up start" adjustment to the left side of the piston. Since the area of this end of the piston is larger than the ported end, the pressure will close it against the flow and against the spring, causing the bypassing oil to be gradually diverted to the plunger. Since the "up stop" adjustment is hindering this action by allowing oil to escape to tank, it is necessary that it be restricted more than the "up start adjustment." The difference between the two adjustments will govern the rate at which the piston closes and the smoothness of the start.

To stop the elevator, the solenoid is de-energized, but the pump is allowed to run slightly longer on a timed delay.* During this delay the bypass piston, now deprived of its restraining force is re-opened by the pump pressure and the spring. Since the oil behind the piston must be forced out through the "up stop" adjustments, its setting will control the rate of closing and thus the smoothness of the stop. The pump will now stop on the timed delay.

In the event of excessive pump pressure, the relief pilot piston will be unseated, limiting the closing pressure on the bypass piston and allowing it to open.

*On some equipment, the timed delay is not provided, and the elevator will stop as soon as pump output ceases.

OILDRAULIC CONTROLLER ADJUSTMENTS

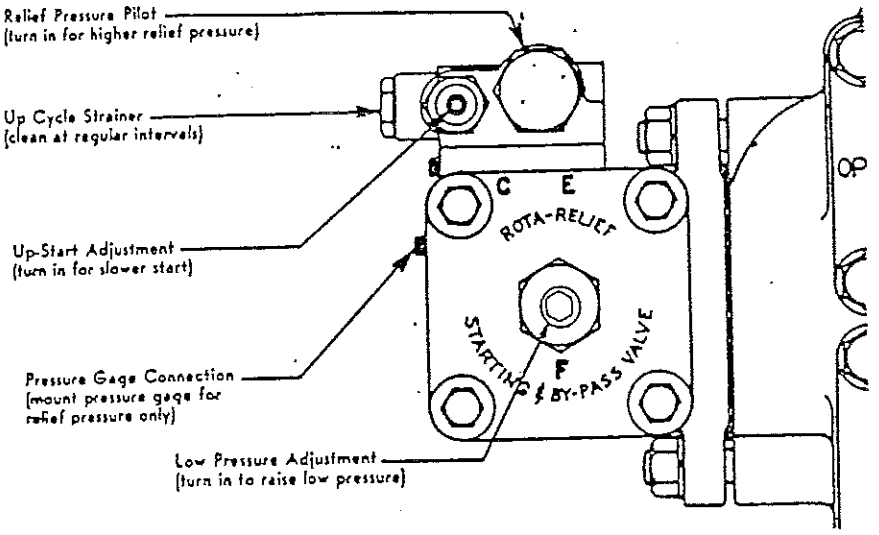
TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Close Manual Lowering Valve. (d) Check direction of motor rotation. (e) Turn in on Up-Stop. (f) Turn in on Relief Pressure. (g) Turn out on Up-Start.
2. Up Start slow.	(a) Turn in on Up-Stop. (b) Turn out on Up-Start. (c) Turn in on Low Pressure Adjustment.
3. Rough Up-Start	(a) Turn in on Up-Start. (b) Turn out on Low Pressure Adjustment.
4. Slow Up Speed.	(a) Turn in on Relief Pressure. (b) Turn in on Up-Stop. (c) Turn out on Up-Start.
5. Too much Up Drift.	(a) Turn out on Up-Stop.
6. Rough Up-Stop.	(a) Turn in on Up-Stop.

Note: Up drift is caused by pump coast. If pump does not have much coast, there will be practically no drift. The up stop adjustment cannot compensate for this and if it is closed too much, the next up start will be rough unless there is a long time between up starts. A time delay circuit is provided on most electric controllers to compensate for lack of pump coast. See sequence of operation, page 7-S.

Caution: Many jobs have a rough start caused by the Low Pressure Adjustment being closed too much. This seems to be a common field fault. Pay strict attention to instructions on this adjustment.

OILDRAULIC CONTROLLER ADJUSTMENTS



UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

Note: Steps 1 thru 6 will not be required on new units, as the relief pressure is correctly set in the factory. Replacement units will require this adjustment.

1. Open up start fully (do not force).
2. Close line shut off valve (make sure tank shut off is open). Install pressure gage. Gage scale should read from 2 to 500 or 600 PSI.
3. Remove Acorn cap from over relief pilot adjustment screw. Unscrew adjustment until it extends at least 1½" above lock nut.
4. Start unit and read from gage, screwing in or out on relief pilot adjustment until gage gives desired reading, and stop unit.
5. Tighten lock nut, remove pressure gage and open line shut off valve.
6. Replace Acorn cap and gasket.
7. Remove any load from car. Close up start adjustment.
8. Loosen sealing lock nut on low pressure adjustment. Start unit, if car goes up back off on low pressure adjustment until car stops.
9. Turn in on low pressure until car creeps slowly up, back off until car just stands still, then back off ½ turn more. Lock adjustment.
10. Stop unit. Caution: Do not run more than one or two minutes when by passing as heat generated may damage pump.
11. Put rated load on car.
12. Adjust up start.
13. Set hoistway switches to stop car approximately 1" above floor level.
14. Check with empty car.

OILDRAULIC CONTROLLER SEQUENCE OF OPERATION

ROTA RELIEF—BYPASS—BALL CHECK STOP

Refer to Schematic Diagram Page 10

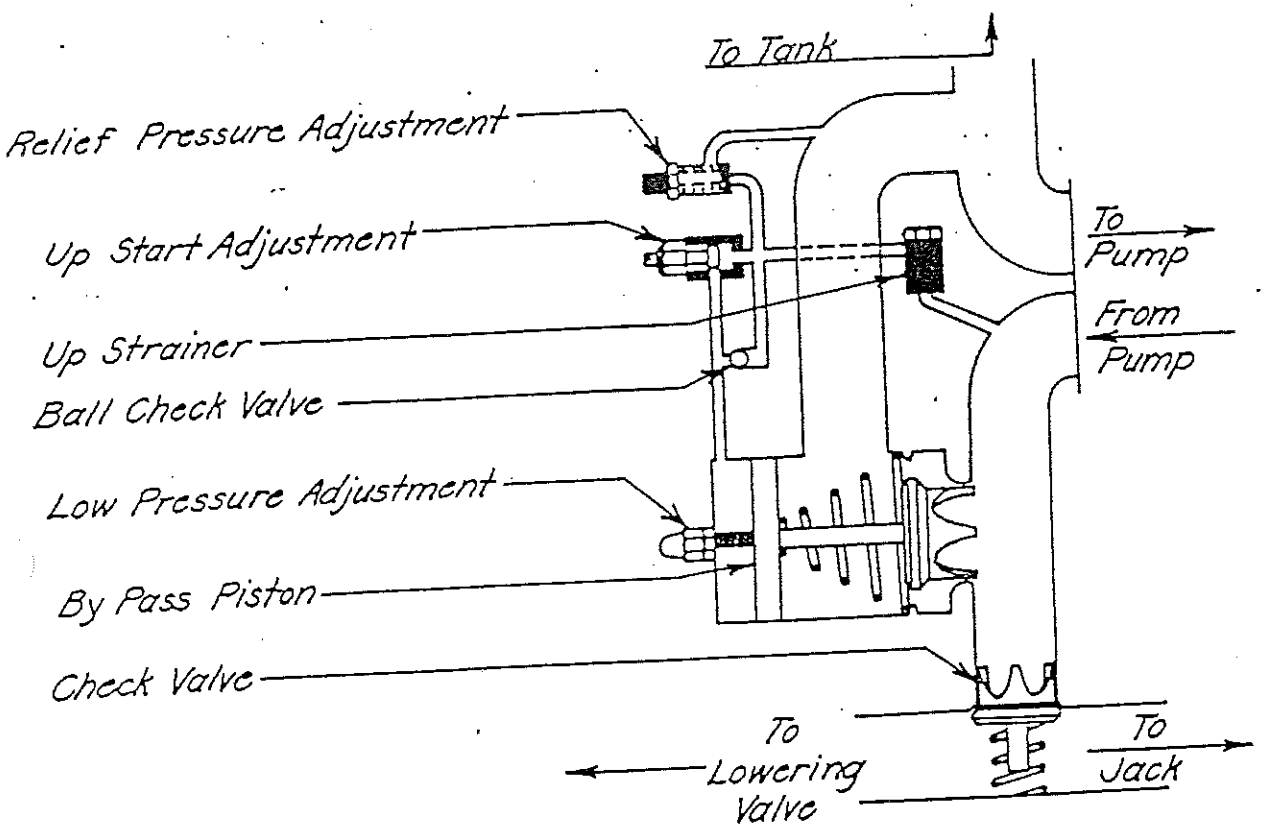
This valve consists of a non-seating piston which will perform both as a bypass piston and a pressure relief valve. The valve is shown in its parked position.

To start the elevator, the only action required is to start the pump. At first, since the bypass piston is parked open against the "low pressure" adjustment by its spring, all flow will bypass to tank. The pressure built up in the system due to this bypass will cause the oil to flow through the strainer and "up start" adjustment to the left side of the bypass piston. Since the area of this end of the piston is larger than the ported end, the pressure will close it against the flow and against the spring, causing the bypassing oil to be gradually diverted to the plunger, the rate being governed by the "up start" adjustment. This produces a smooth start.

To stop the elevator the pump is stopped. When flow ceases, the main check valve will close, holding back plunger pressure. Pump pressure will drop to zero. The bypass piston spring will now return the piston to its open position by forcing the oil on its left side out through the ball check valve. The smoothness of the stop is dependent on the coasting of the pump.

In the event of excessive pump pressure, the relief piston will be unseated limiting the closing pressure on the bypass piston and allowing it to open.

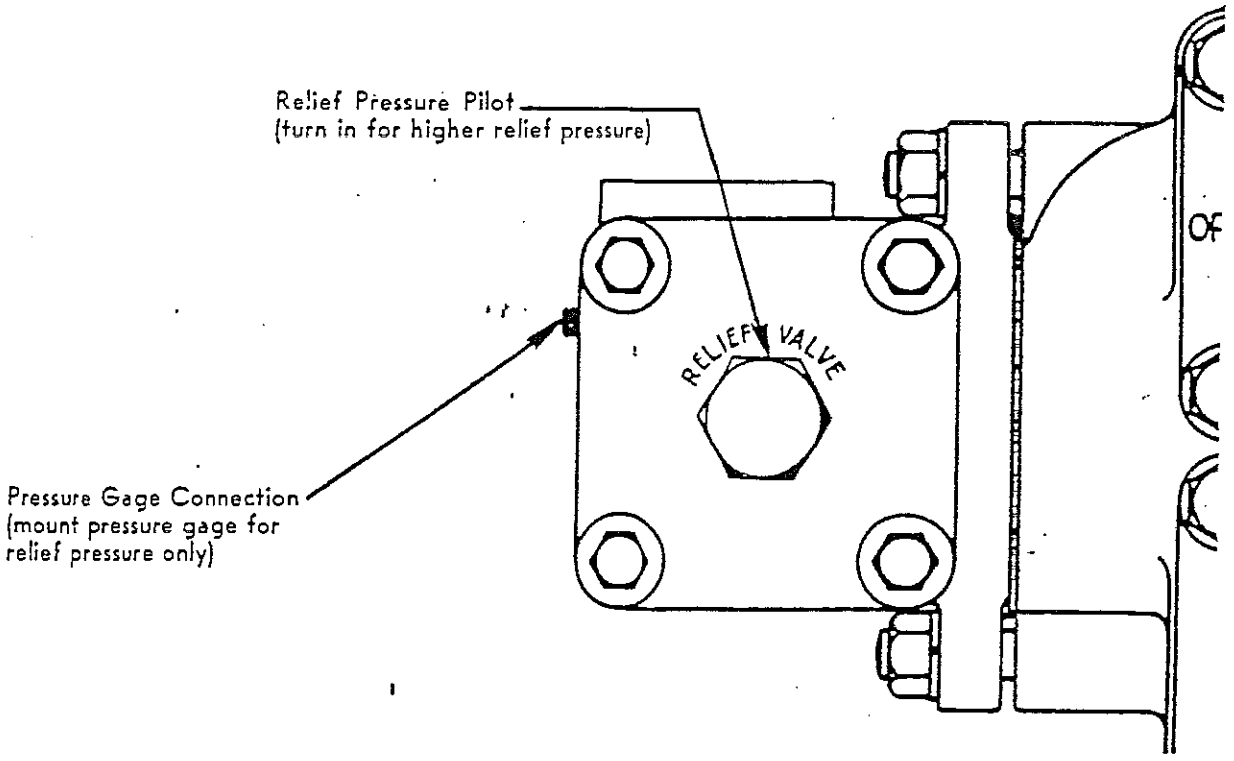
OILDRAULIC CONTROLLER ADJUSTMENT



TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check direction of motor rotation. (b) Turn out on Up-Start. (c) Turn in on Relief Pressure.
2. Up-Start Slow.	(a) Turn out on Up-Start. (b) Turn in on Low Pressure Adjustment.
3. Rough Up-Start.	(a) Turn in on Up-Start. (b) Re-adjust Low Pressure Adjustment.

OILDRAULIC CONTROLLER ADJUSTMENT



RELIEF PRESSURE ADJUSTMENT

(Follow in sequence as given)

1. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
2. Install pressure gage. (Gage scale should read from 0 to 500 or 600 PSI.)
3. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
4. Start Unit and read from gage.
5. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit.
6. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.
7. Replace acorn nut and gasket, remove pressure gage.
8. Open Shut-off Valve.

OILDRAULIC CONTROLLER SEQUENCE OF OPERATION

RELIEF AND CHECK VALVE

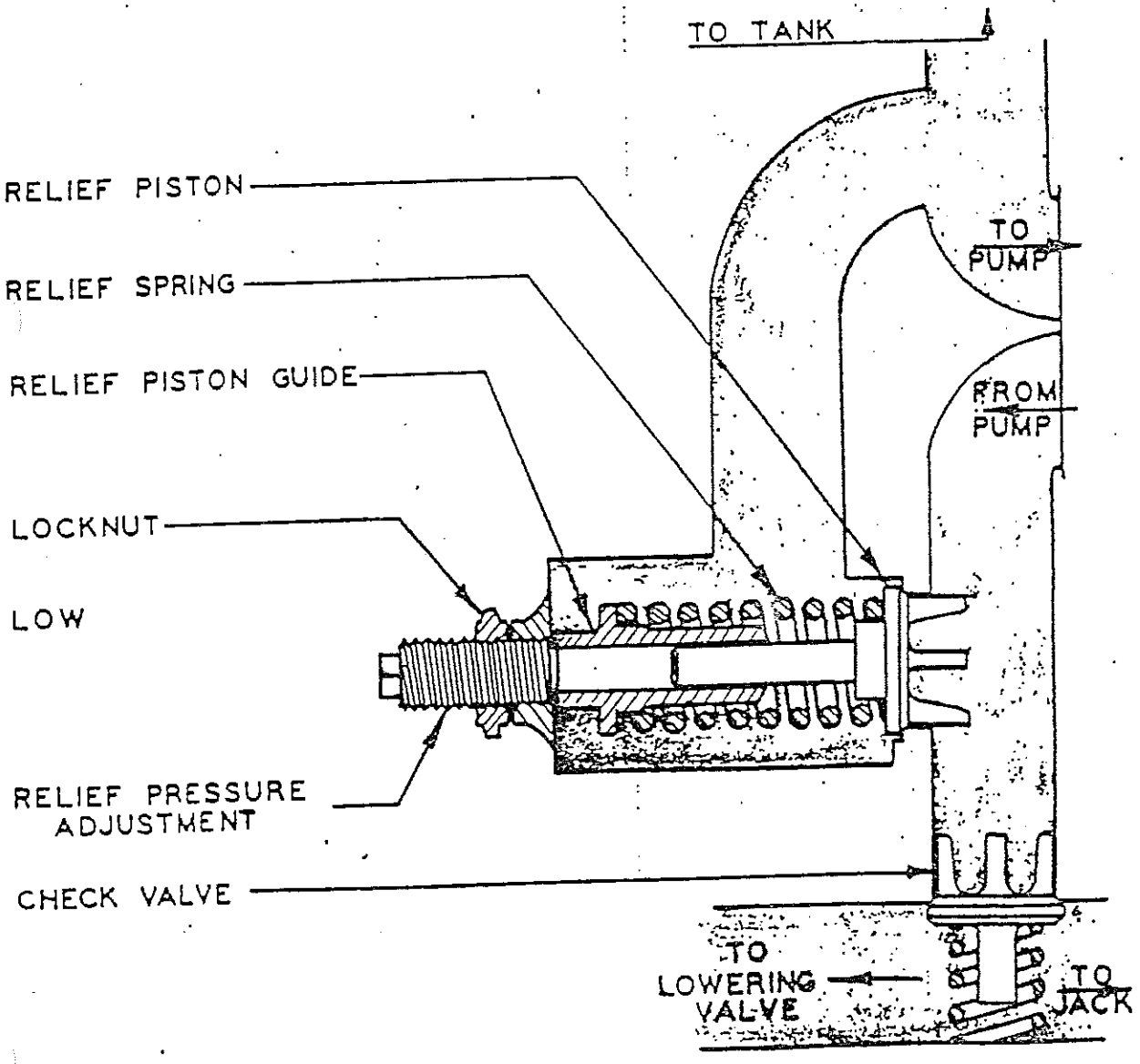
Refer to Schematic Diagram on Page 12

This valve consists of a check valve and a pressure relief valve. The check valve provides single direction flow by allowing pump pressure to lift it while jack pressure seats it. The relief valve provides over-pressure protection since excessive pressure will open the piston against the spring. This valve does not provide volume control; the elevator will start and stop with the pump motor.

OILDRAULIC CONTROLLER ADJUSTMENT

UP SIDE

SCHEMATIC OIL FLOW DIAGRAM



OILDRAULIC CONTROLLER ADJUSTMENT

ADJUSTMENT INSTRUCTIONS
60000 Series Oildraulic Controller — Rota-Relief — Up Leveling — By pass stop

NOTE: On a new power unit, Steps A, B & C have been factory set and only Steps D and E need be done in field. On a replacement, all steps are required.

A. PRELIMINARY RELIEF PRESSURE SETTING

1. Open up start, slow down and stopping adjustments four full turns and open up leveling speed adjustment fully (notch on top of stud pointing towards motor), tightening locknut after setting.
2. Close line shut-off valve (MAKE SURE TANK SHUT-OFF IS OPEN).
3. Install pressure gauge of approximately twice the desired working pressure in bleed plug of silencer. Open manual lowering valve two complete turns
4. Remove relief pressure acorn nut, loosen lock nut and back off screw until it extends 1-1/2" above lock nut.
5. Back off low pressure adjustment until it just touches the piston. Start unit with both solenoids de-energized. Screw in on low pressure adjustment until pressure reaches 100 PSI.
6. Energize both solenoids and screw in on the relief pilot adjustment until guage pressure reads 75 PSI above full load pressure as shown on job sheet.
7. Tighten lock nut, close manual lowering valve and open line shut-off valve.

B. LEVELING ADJUSTMENT

1. Car should be empty, but with cab, door operator and all other assemblies in place.
2. Start unit with up slow solenoid energized.
3. Loosen locknut and turn up leveling speed adjustment (a handle is provided on later units).
4. Run car from bottom landing to top landing at up leveling speed repeatedly until oil is at normal operating temperature.
5. Recheck up leveling speed and reset to 10 FPM minimum if necessary.

C. LOW PRESSURE ADJUSTMENT

1. With car empty and both solenoids de-energized, start power unit.
2. Loosen lock nut and turn in on low pressure adjustment until car just starts to lift, then back off until it stops. Now back off one turn more and lock adjustment.

D. FINAL ADJUSTMENTS

1. Set up start and slow down adjustments so car reaches full speed before slow down signal is given, and so car reaches leveling speed approximately 4" below floor.

   Note: See switch and cam chart for proper setting for the car speed used on this job.
2. Set stopping rate (after leveling) for a smooth but firm stop. Car must stop before pump cuts off.

E. FINAL RELIEF SETTING

1. Close line valve and start unit with only up slow solenoid energized. Make sure relief pressure is 50–75 PSI more than full load pressure.
2. Shut off unit, remove pressure gage, replace acorn nut on relief adjustment.

Division	4
Section	H
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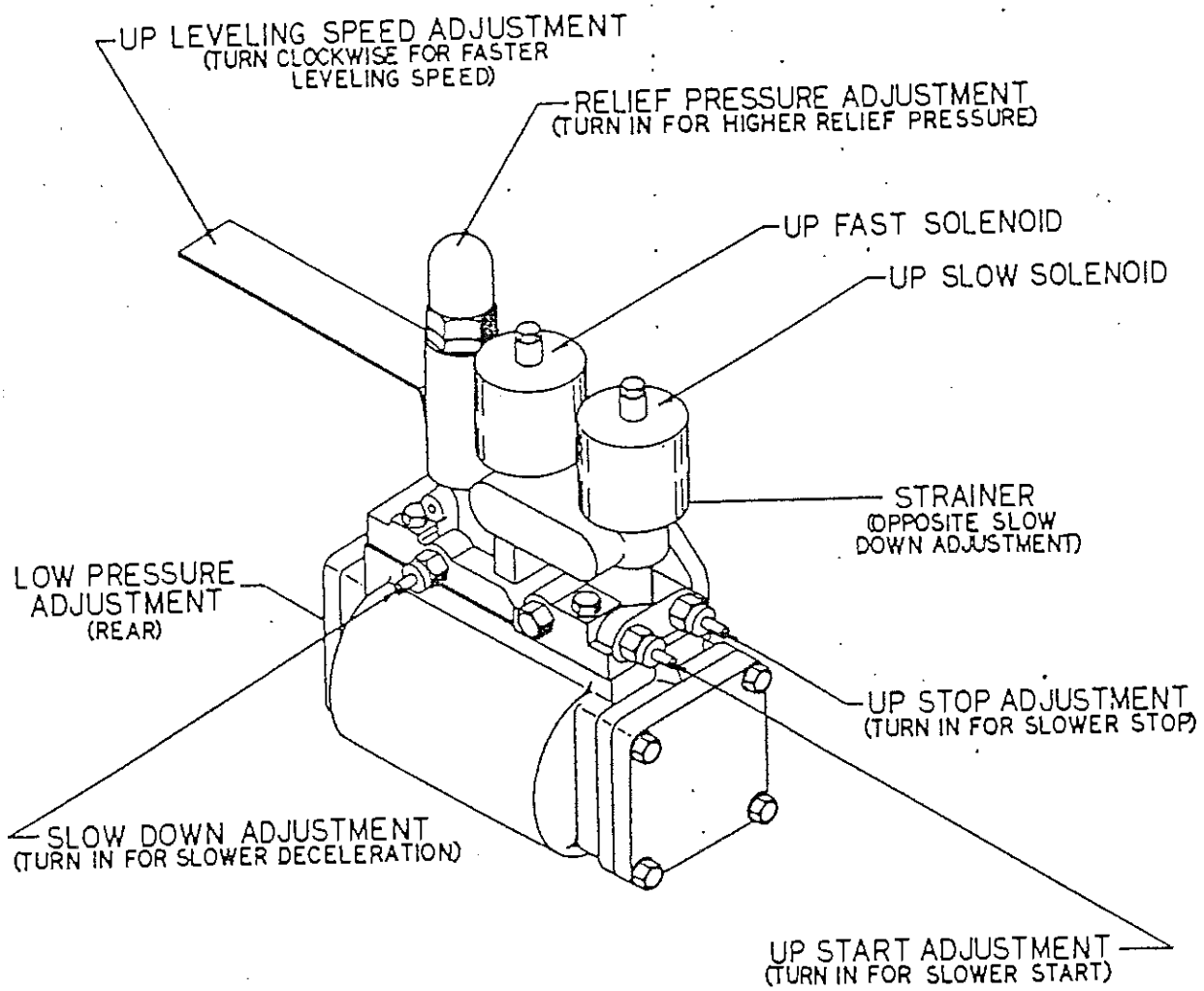
OILDRAULIC CONTROLLER ADJUSTMENT



SEQUENCE OF OPERATION

This valve consists of a leveling speed adjustment orifice, a regulating bypass piston, and a relief pilot. The valve provides three functions for the elevator in the up cycle: to accelerate to full speed, to slow down to leveling speed, and to stop hydraulically.

To start the elevator, the pump is started and both solenoids are energized. Since the regulating piston is parked open by its spring, against the low pressure adjustment, all the oil will initially bypass to the tank. At the same time, high pressure oil from the pump side of the orifice goes through the ball check and the slowdown needle and causes the piston to try to move toward the closed position. However, the piston cannot move because of the oil trapped behind it. When the pump started, the "Up Fast" solenoid was energized allowing oil to flow from the strainer through the pilot piston. Pressure against it causes the pilot piston to shift and compress its spring. Thus, the port from behind the regulating piston is opened to the starting adjustment needle. The opening at this point determines the rate at which the oil moves out from behind the regulating piston, controlling its rate of speed in closing and gradually stopping the bypass action, giving the car a smooth acceleration from zero to full speed. The wider the opening, the quicker the acceleration.

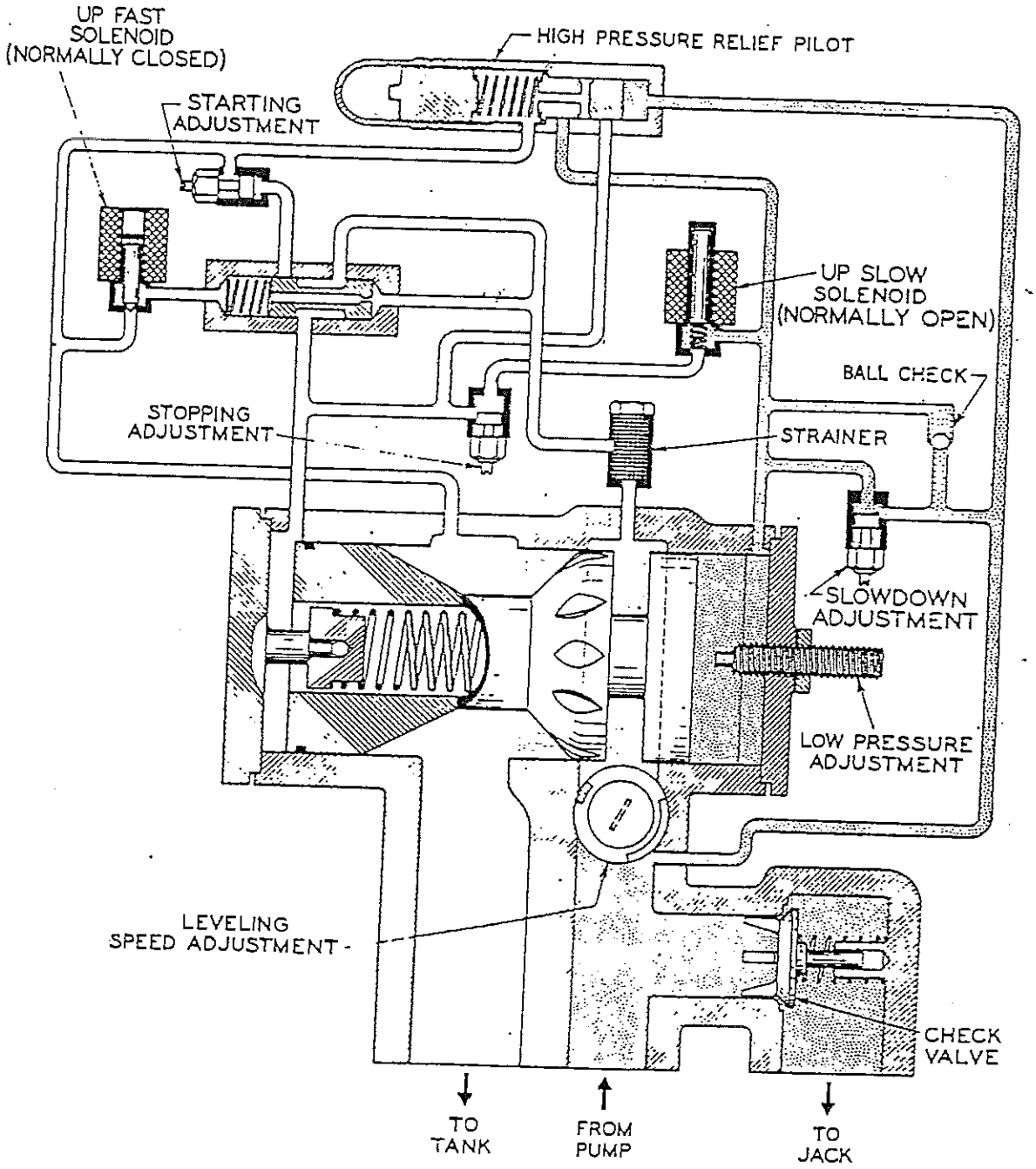
To slowdown to leveling speed, the "Up Fast" solenoid is de-energized creating a hydraulic balance at both ends of the pilot piston, which allows its spring to push it to the other end of the bore. This opens the port from the strainer to the area behind the regulating, or bypass piston, and now oil pressure plus spring compression causes the piston to move toward the open position. When the piston has opened enough to start the bypassing action, a pressure drop will be created due to oil flow across the leveling speed adjustment orifice. When the combination of this reduced hydraulic pressure and spring force equals the hydraulic pressure on the high pressure end of the regulating piston, movement toward the open position will cease and the car will have had a smooth transition from full speed to the selected leveling speed. The rate of speed change is controlled by the opening at the slowdown adjustment needle which determines the rate of oil flow from the high pressure end of the regulating piston back into the system. The wider the opening, the quicker the slowdown.

To stop the elevator, the "Up Slow" solenoid is de-energized but the pump is kept running slightly longer on a timed delay. During this delay, high pressure oil flows past the ball check, through the now open solenoid and stopping adjustment needle to the other end of the regulating piston. The increased oil pressure plus the remaining spring force pushes the piston against the low pressure adjusting stud allowing full bypass, causing the car to stop. The stopping rate is controlled by the opening at the stopping adjustment needle. The wider the opening, the quicker the stop.

If the pump produces pressure, for any reason, in excess of full load operating pressure, it will be transmitted to the high pressure relief pilot piston causing it to move toward the open position. This movement allows the high pressure oil to work in conjunction with the spring to push the regulating, or bypass, piston toward the low pressure adjustment stud. It connects, at the same time, the port from the high pressure end of the bypass piston to a port going back to the tank. This causes the bypass piston to move rapidly to the low pressure stud, allowing full bypass from the pump to the tank and relieving quickly the excess pressure. In this manner, the system maintains only relief pressure as long as the pump continues to run.

OILDRAULIC CONTROLLER ADJUSTMENT

SCHEMATIC UP LEVELING



OILDRAULIC CONTROLLER ADJUSTMENT

TROUBLE SHOOTING
"NEW" MODEL ROTA RELIEF—UP LEVELING—BYPASS STOP

WARNING: The regulating piston in this valve is equipped with a pressure ring and MUST be disassembled in the following order.

1. Remove front cap, pull piston forward and remove ring.
2. Remove back cap and push piston out from front to back. Assemble in reverse order, replacing the rear cap before the ring is put on. Under no circumstances should the rear cap be removed first.

DIFFICULTY	SOLUTION
Pump Runs But Car Does Not Move	1. Check line shut-off. 2. Check motor rotation. 3. Check up Slow solenoid. 4. Back off starting adjustment. 5. If constant speed lowering valve used, read Trouble Shooting section of those adjustments. 6. Check relief pressure setting.
Car Will Not Run At High Speed	1. Check up fast solenoid. 2. Check strainer. 3. Make sure pilot piston is free. 4. Make sure main regulating piston is free.
Car Will Not Slowdown Into Leveling	1. Check up fast solenoid for seating. 2. Make sure pilot piston is free and parks open by its spring. 3. Make sure main regulating piston parks open (Check this with the low pressure adjustment screw. DO NOT remove the rear cap before front cap).

Note: The solutions to the problems are to be tried individually and in the order given. They presume that valve adjustment has been completed.

OILDRAULIC CONTROLLER ADJUSTMENTS

CONSTANT SPEED LOWERING VALVE ADJUSTMENTS

See Illustration on Page 18

PRELIMINARY ADJUSTMENTS

NOTE: All power units are factory adjusted and require only final adjustments in the field. Replacement valves will require full adjustment.

A. Close manual lowering needles tightly.

B. Open all adjustment needles fully. (Do not force.)

C. Turn in leveling speed adjustment until it contacts piston, then turn three full turns more.

D. Turn in down speed adjustment until it contacts piston, then turn out ten full turns.

E. Turn out on regulating piston limiter adjustment until zero spring tension is obtained.

F. Run the car and set lowering speed to desired figure. Turning in on down speed adjustment REDUCES speed. With car traveling down at contract speed with light load, turn regulating piston limiter adjustment in until it just touches the regulating piston.

G. Run car with down fast solenoid de-energized and set leveling speed. Turning in on leveling speed adjustment INCREASES speed. If inspection operation is provided, it will be a convenient means of running the car at leveling speed.

H. Proceed with final adjustments.

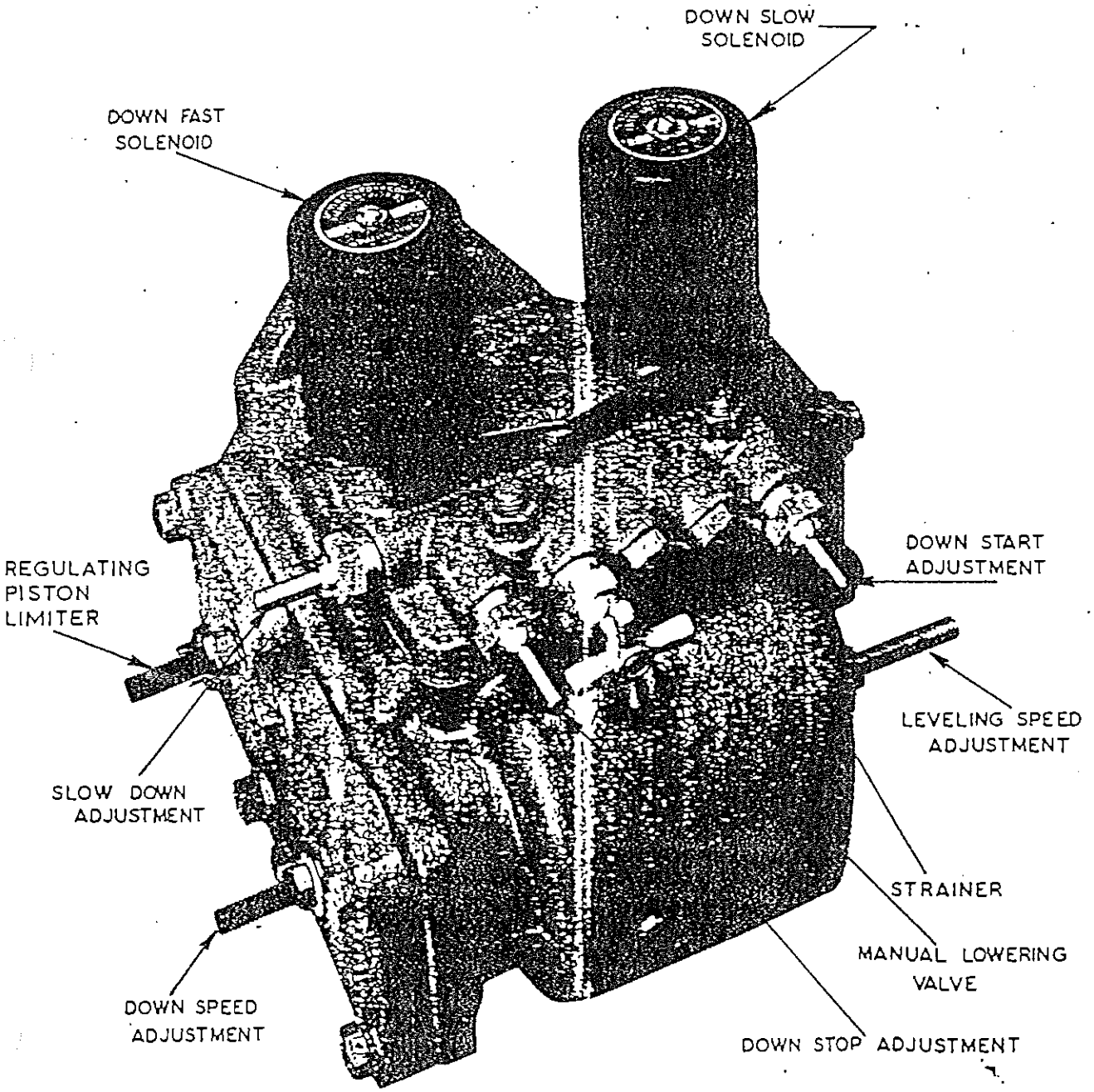
FINAL ADJUSTMENTS

A. Adjust the three needles, down start, down stop and slowdown to suit. The adjustments are all independent of one another. Turning in produces smoother (more gradual) action with all three adjustments.

B. Final check is to de-energize both solenoids while the car is lowering at full speed, check that the down-stop needle is adjusted to where the car stops smoothly without bouncing. Where the stop is very rough, screw in on the stop-needle until the operation is rapid but smooth. This will duplicate the operation when the stop switch is thrown or an interlock is broken while the car is in operation.

OILDRAULIC CONTROLLER ADJUSTMENTS

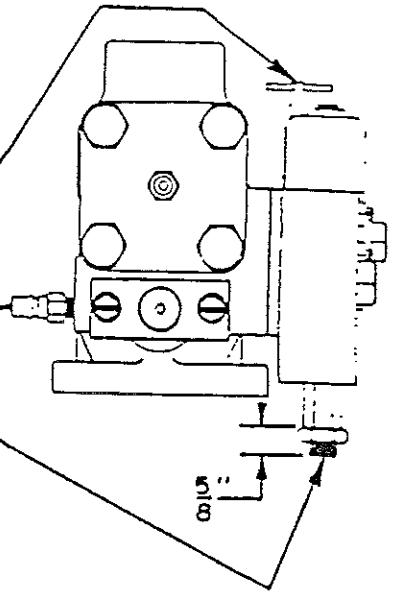
CONSTANT SPEED LOWERING ADJUSTMENTS



I-2 & I-3 OILDRAULIC® CONTROLLER ADJUSTMENTS

If at any point in the adjusting procedure the valve fails to respond as indicated, call the Factory Service Department for assistance.

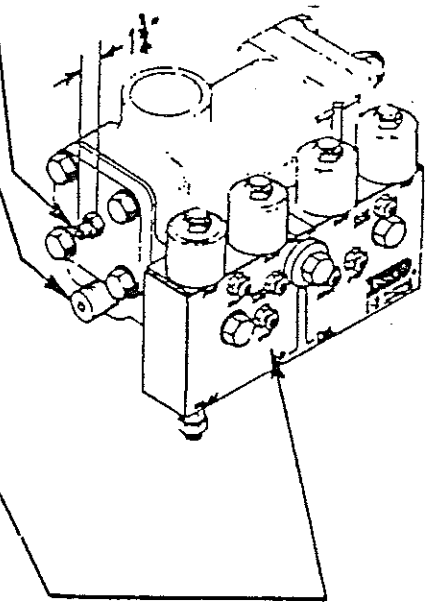
7. NOTE: IF THE VALVE IS ASSEMBLED ON A POWER UNIT SHIPPED FROM THE FACTORY, YOU SHOULD BEGIN WITH STEP III FINAL ADJUSTMENTS.



I. INITIAL SETTINGS (SET WITH AN EMPTY CAR)

A. Lower the car onto the buffers by opening the manual lowering valve.
B. Close manual lowering valve.
C. Install pressure gauge on quick connector provided on far side of valve.
D. UP SIDE

1. RELIEF PRESSURE ADJUSTMENT
   a. Turn OUT until 5/8" of the screw extends beyond the relief assembly housing.
   b. Tighten lock nut.
2. LOW PRESSURE ADJUSTMENT
   a. Turn OUT until 1-3/4" of the screw extends beyond the cover plate.
   b. Then turn IN by hand until it just touches the regulator piston.
3. UP LEVELING SPEED ADJUSTMENT
   a. Turn adjusting screw OUT until it stops.
   b. Then turn IN 4 turns.
4. ADJUSTMENT NEEDLES



NOTE: The nut on the adjustment needle assembly is not a lock nut. Do not loosen to make any adjustments. It should be snug against the valve body at all times.

   a. Turn the up-start, up-stop, and up-slowdown adjustment needles IN to fully closed and stopped position.
   b. Then turn up-start needle OUT 9 turns.
   c. Turn up-stop needle OUT 3 turns.
   d. The up-slowdown needle should remain closed at this point.

SEQUENCE OF OPERATION

CONSTANT SPEED LOWERING VALVE

Schematic Diagram on Page 19

This valve consists of a non-seating two-position orifice piston, a seating regulating piston, and two pilot pistons. The orifice pilot and its solenoid control the position of the orifice piston, while the regulating pilot and its solenoid control the motion of the regulating piston. The valve is shown as it parks with the orifice piston to the left in slow speed position, the regulating piston seated and the elevator at rest.

To start the car down both solenoids are energized. Energizing the "down fast" solenoid drains oil from the top end of the orifice pilot allowing the spring to open it. Oil is now free to drain from the orifice piston to tank, allowing it to shift to the right or high speed position, limited by the down speed adjustment. Energizing the "down slow" solenoid drains oil from the top end of the regulating pilot allowing pressure to open it. Oil is now free to flow from the strainer on the downstream side of the orifice piston through the "down start" adjustment to the left end of the regulating piston. This allows equal pressure on the two ends of this piston enabling the spring to open it at a rate controlled by the "down start" adjustment. As this opens, oil begins to flow through the orifice piston dropping the pressure on its downstream side and, since they are interconnected, on the left side of the regulating piston. This pressure will continue to drop with increased flow until the now unbalanced pressure on the regulating piston balances the spring force thus arresting the opening. Here it will hover in balance allowing just enough oil to escape to maintain the pressure drop across the orifice piston. Since the regulation is not dependent on the working pressure, it is not affected by it, hence "constant speed lowering."

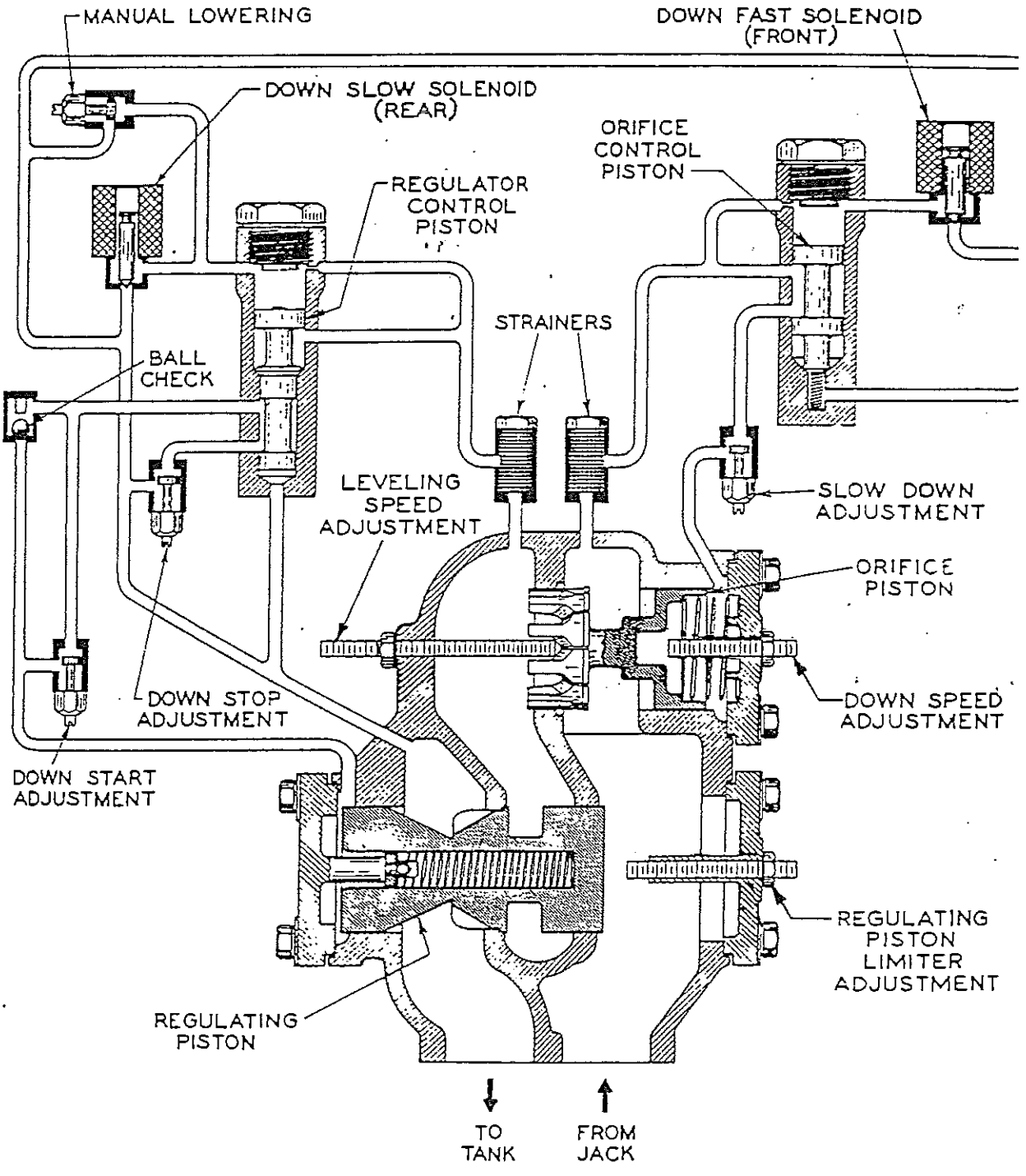
To slow down into leveling speed, the "down fast" solenoid is de-energized, allowing the orifice pilot to close and thus oil to flow from the strainer on the upstream side of the orifice piston through the "slowdown" adjustment to the right end of the orifice piston. The spring and flow will move the piston to the left at a rate controlled by the "slowdown" adjustment, and to a position limited by the leveling speed adjustment. As this happens, the regulating piston will follow, closing off just enough to maintain the pressure drop across the orifice piston until the elevator reaches leveling speed.

The final stop is accomplished by de-energizing the "down slow" solenoid, returning the regulating pilot to its closed position. This disconnects the left end of the regulating piston from pressure and allows it to drain to tank through the "down stop" adjustment. The pressure on its opposite end then closes it at a rate controlled by the "down stop" adjustment.

The manual lowering valve bypasses the "down slow" solenoid allowing the elevator to lower at leveling speed.

OILDRAULIC CONTROLLER ADJUSTMENTS

SCHEMATIC CONSTANT SPEED LOWERING



OILDRAULIC CONTROLLER ADJUSTMENTS

CONSTANT SPEED LOWERING

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
Car will not lower	1. Check line shut off. 2. Check tank shut off. 3. Check power supply. 4. Check solenoids. 5. Check freedom of regulating piston. (Behind caps on "inside" of valve body.)
Car will not stop	1. Make sure load on jack is sufficient to produce required minimum pressure of 100 PSI. 2. Tighten manual lowering. 3. Check freedom of regulator control piston. (Located behind cap between manual lowering valve and strainer.) 4. Check freedom of orifice control piston. (Located next to strainer on "INSIDE" of valve.) 5. Make sure solenoid valves are seating properly. 6. Make sure regulating piston is free. (Beneath cap on "outside" of valve.)
"Bouncy" or "Hunting" during start, slowdown or leveling.	1. Bleed air from jack. 2. Inspect ball check spring. (Located beneath 1/8" Allen pipe plug on top of valve.) 3. If jack fitted with adjustable packing, make sure same is not too tight. 4. Increase leveling speed slightly.
Car will not lower at high speed.	1. Check freedom of orifice control piston. Check its spring, spring must park piston open. 2. Check power supply. 3. Check down fast solenoid. 4. Check freedom of orifice piston.
Car will not slow down to leveling speed	1. Make sure down fast solenoid is being de-energized. 2. Make sure orifice piston is free and that the spring parks it closed.
Car will not raise from bumpers	1. Back off completely on leveling speed adjustment.

The solutions to the problems are to be tried individually and in the given order. They presume that all normal adjustment has been completed.

P-56 ADJUSTMENTS

MODELS P-56R A or B
(Leveling not included on Model P-56R-A)

UP TRAVEL ADJUSTMENTS
(Follow in sequence as given)

1. Set Relief Pressure
   (a) Open Up-Start and Low Pressure 2 or 3 turns.
   (b) Close main line shut-off valve.
   (c) Note the "Working Pressure" shown on Hatch wiring diagram.
   (d) Set Relief Pressure at approximately 70 PSI more than given working pressure.
2. Open shut-off valve and close Up-Start.
3. Disconnect Leveling (Terminal V-11), if used.
4. Start Power Unit and turn in on Low Pressure until car barely creeps up.
5. Back off until car just stands still. (Made with empty car only)
6. Adjust Up-Start.
7. Set Limit and Floor switches to stop car about 2" above floor.
8. Check with empty car.

LOWERING ADJUSTMENTS
(Follow in sequence as given)

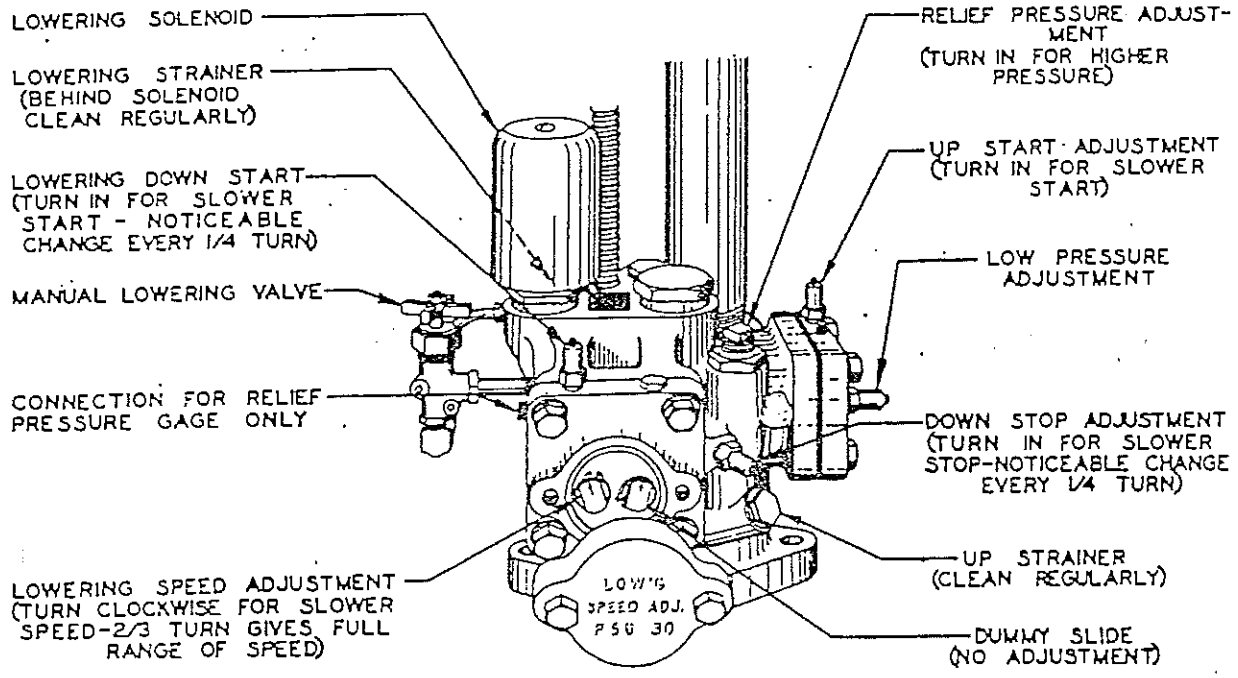
1. Put rated load on car. Disconnect Leveling (Terminal V-11), if used.
2. Open Down-Stop and Down-Start 2 or 3 turns.
3. Adjust Lowering Speed.
4. Adjust Down-Stop. Make as quick as is comfortable.
5. Adjust Down-Start.
6. Set Limit and Floor switches to stop car about 2" above floor.

LEVELING ADJUSTMENTS
(When required)

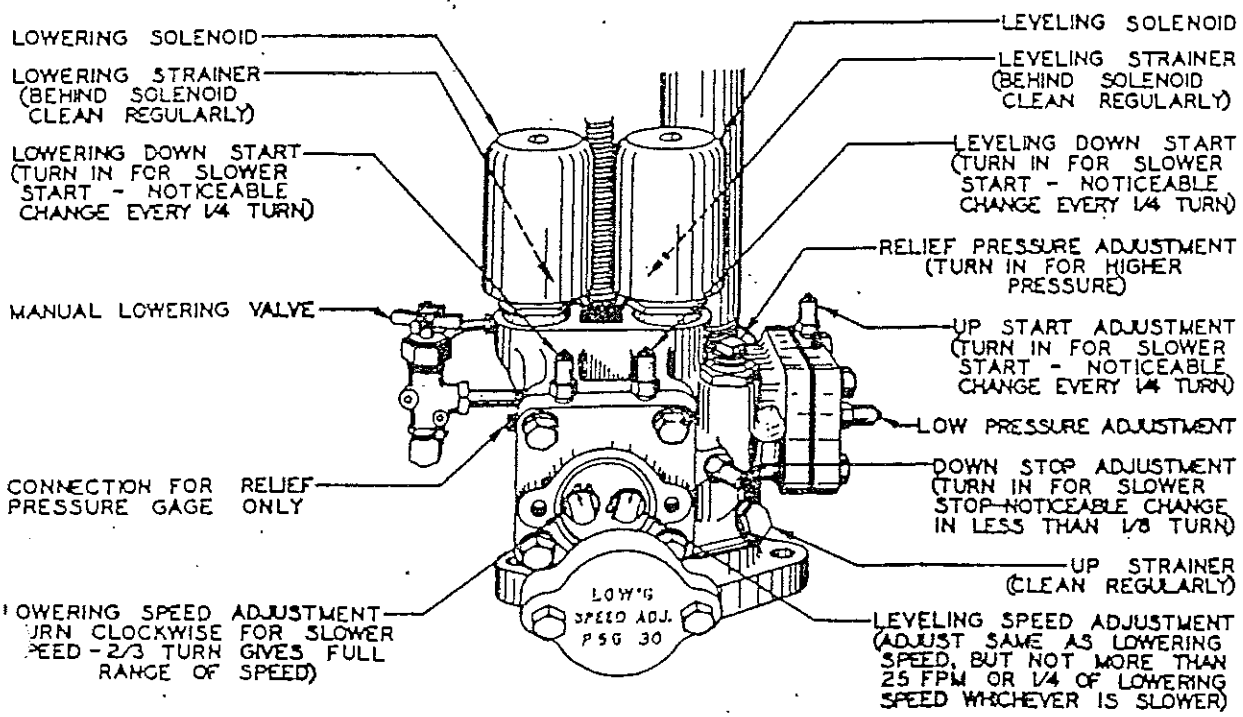
1. Connect Leveling (Terminal V-11).
2. Set Leveling Speed to about 1/3 of Lowering Speed but not more than 25 FPM.
3. Adjust Leveling Down-Start.
4. Do not readjust Down-Stop unless absolutely necessary.

Note: Oildraulic Controller Adjustments control only the smoothness of the operation. To make the car stop level with the floor, it is necessary to move the hatchway switches and cams. DO NOT adjust the P-56 to compensate for the car not stopping level at a floor, unless it is off the same amount at each floor.

P-56 ADJUSTMENTS

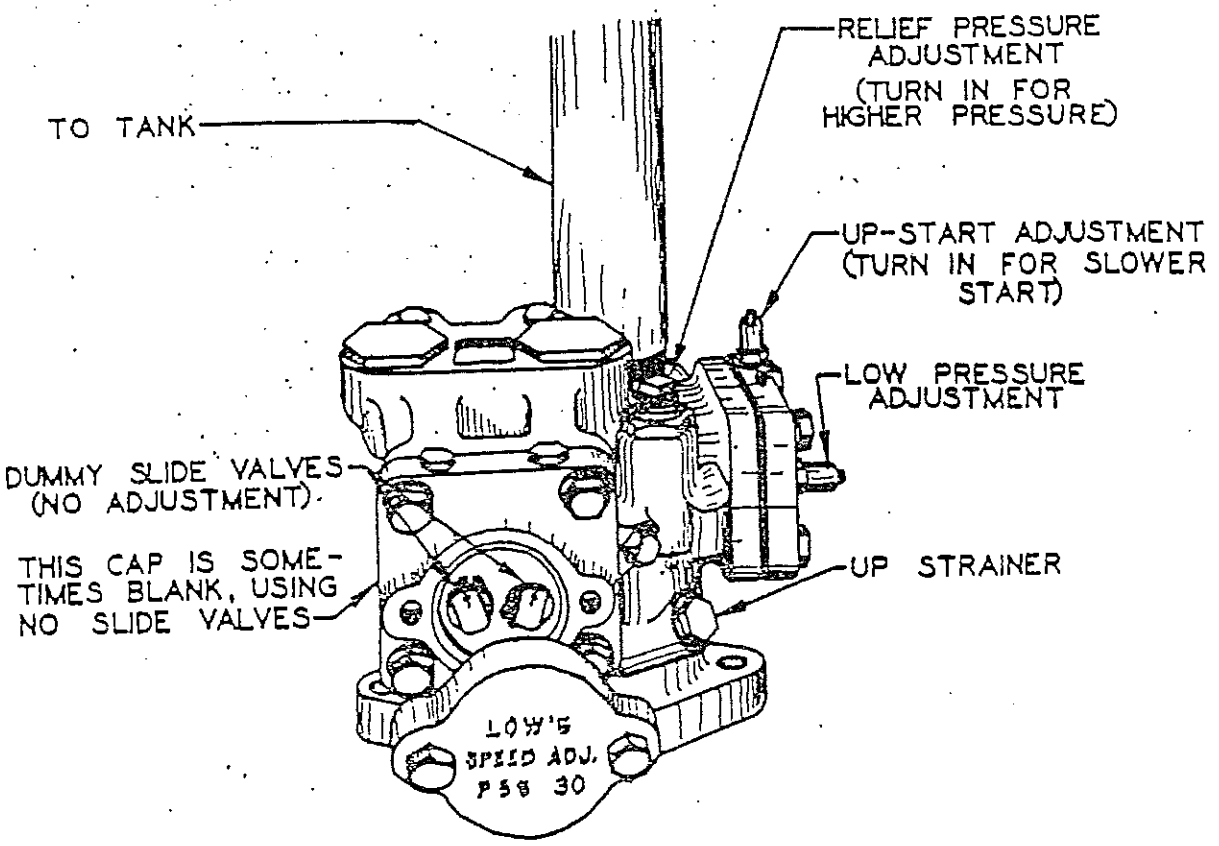


P-56R-A



P-56R-B

P-56 ADJUSTMENTS



P-56-C OR F

DESCRIPTION AND HISTORY

P-56-C Oildraulic Controllers are used on dual P-56 installations. Very few of this model Oildraulic Controllers were made, a P-56-A model being substituted very soon after the first P-56-C was produced. The P-56-C contains a check valve and Lowering piston. The piston acts as a guide for the check valve only, no Lowering action being performed by this model.

P-56-F Oildraulic Controllers are used when separate Lowering is required. It does not include a check valve or Lowering piston. The P-56-C is used exclusively on Industrial equipment.

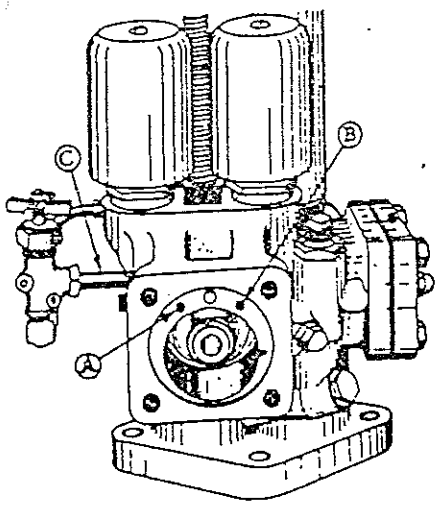
ADJUSTMENT INSTRUCTIONS

Follow "Up Travel Adjustments" as given on Page 1 this section. As there are no Lowering adjustments on this Oildraulic Controller, disregard the Lowering and Leveling Adjustment Instructions. Consult piping diagram on job layout drawing for Lowering details.

P-56 ADJUSTMENTS

TO LOCATE A LEAK:

1. Remove the strainer from the oil reservoir; close the oil inlet with a 1-1/2" pipe cap. Do NOT close the shut-off valve.
2. Remove the lowering cylinder cover. Note relative position of speed adjustment pistons so they will be reassembled correctly.
3. Wipe cylinder flange free of oil. A leak thru port Ⓐ indicates that manual lowering or the lowering pilot is at fault.
   To determine which:
   a. Close shut-off valve.
   b. Disconnect manual lowering valve from the P56 body at point Ⓒ.
   c. Open shut-off valve and observe whether leak is thru port Ⓐ or thru the needle valve.
4. Leak thru port Ⓑ indicates faulty leveling pilot.
5. No leak at Ⓐ or Ⓑ indicates that the main lowering valve is at fault.



TO REPAIR A LEAK:

1. Thru port Ⓐ or Ⓑ.
   a. Close shut-off valve; remove pilot; clean armature and seat of foreign matter.
   b. Re-seat armature by holding in a VERTICAL position on seat and tapping lightly with a hammer.
   c. Reassemble valve.
2. Thru manual lowering (point Ⓒ).
   Replace needle valve.
   Thru main lowering valve.

To grind in an Oildraulic Controller valve, cover the seat area very sparingly with medium grinding compound. Oscillate the valve with a screw driver or other tool back and forth through a 1/8 turn only (a complete rotation will ruin not only the valve but its seat, which means the body itself might have to be scrapped). The grinding should be continued for 15 seconds or so, lifting the valve off its seat every fifth to sixth oscillation so the compound can be sucked back on the seat by the lifting operation.

After about 15 seconds, the valve should be removed and inspected. If the seat seems to be cut in evenly all the way around (inspect with a magnifying glass under a good light) the job may be completed. In no events should the ground surface on the valve be wider than 3/32". We try to keep it right at 1/16". If the surface looks good, wipe off the medium compound and re-do, using fine compound.

When this is completed, smear a light even coating of blueing on the valve seat only. Then position valve in place and rotate 1/8 turn only. Remove and inspect the valve. If the valve is seated properly, the blueing compound will be evenly scrapped off the ground-in seat.

Caution: All grinding compound must be carefully removed, as it can damage pump and other parts.

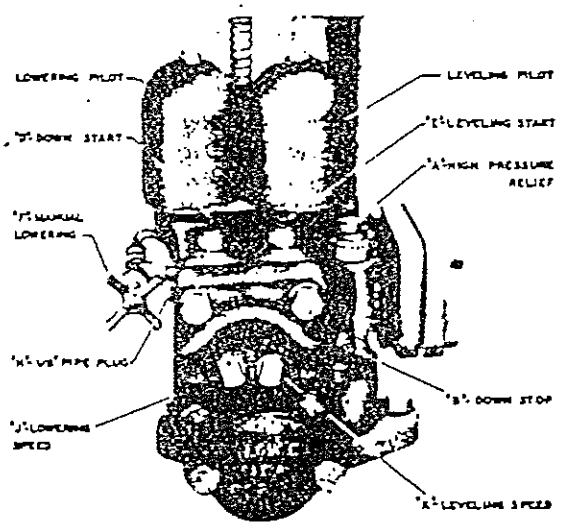
After cleaning, oil parts and replace.

P-56 ADJUSTMENTS

HISTORY

An older version of the P-56 Oildraulic Controller (Identified by the omission of the suffix "R") was made prior to valve serial number 1407.

The P-56-A or B has several physical differences from the P-56R-A or B. Note the rounded solenoid covers and the lack of an external Up-Start Adjustment.



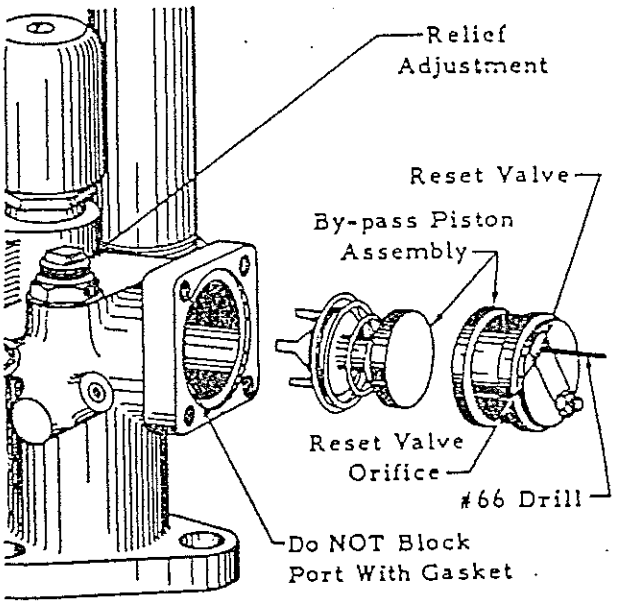
The photograph shows the adjustments. The sequence of adjustment is the same as outlined for the P-56R, with the exception of the Up-Start adjustment. Slight differences in construction of various parts need not cause confusion.

As the P-56R-A or B versions are much more easily adjusted, an exchange of Oildraulic Controllers is recommended. Consult the Factory for price and delivery.

UP START ADJUSTMENT
(As used on P-56-A or B)

1. Remove the strainer from the oil reservoir. Close the oil inlet with a 1-1/2" pipe cap.

2. Remove the By-Pass cover. About one quart of oil will be spilled when the piston assembly is removed.



3. Make adjustment required. (The larger the opening left uncovered by the Reset Valve, the quicker the start) A #66 drill will serve as a gage for a trial setting and also a clamp while the retaining nut is tightened.

4. Reassemble the valve and replace the tank strainer.

5. Test the operation.

P-56 ADJUSTMENTS

DUAL P-56 OILDRAULIC CONTROLLER
(May be either P-56 or P-56-R)

WHEN USED

Two P-56 Oildraulic Controllers were used in parallel on "L" type power units. This design was in use from 1948 until 1951. The early L units used one P-56-B and one P-56-C. However, it was soon discovered that the lowering speed was insufficient, so on later models a P-56-A and a P-56-B were used.

Refer to pages 1 and 2 of this section for location of the following adjustments.

UP START ADJUSTMENTS

1. Close Up-Start and open Low Pressure on both P-56's.
2. Start Power Unit. Turn in on Low Pressure on P-56-A until car starts to creep up. Back off until car just stands still.
3. Turn in on Low Pressure on P-56-B until car creeps up. Back off one full turn.
4. Adjust Up-Start on P-56-A. (This will be the initial start)
5. Adjust P-56-B so it comes in several seconds after the P-56-A. Slowly open P-56-B until it feels like one long start, the P-56-A always starting first.

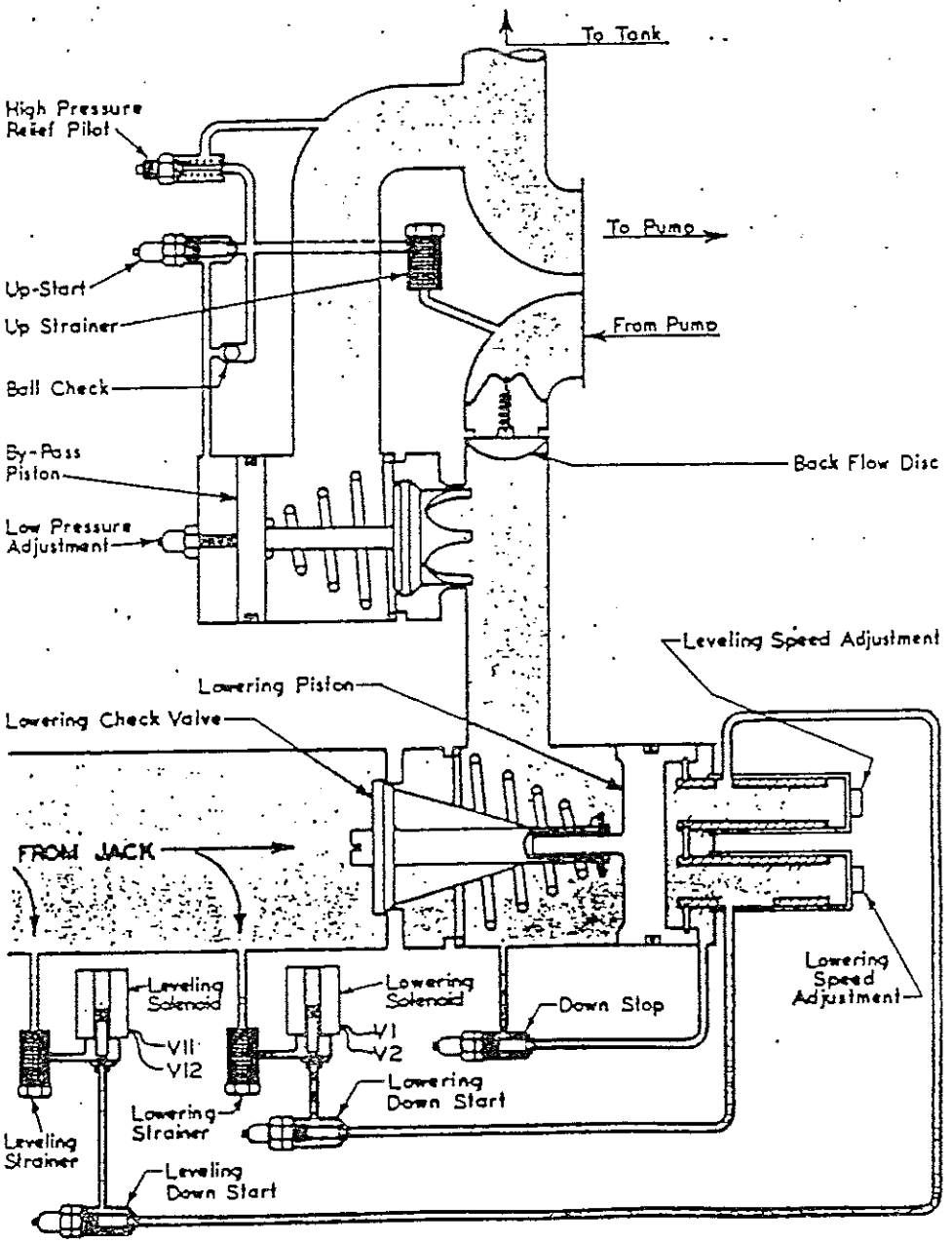
DOWN TRAVEL ADJUSTMENTS

1. Disconnect Lowering (Terminal V-1) and Leveling (Terminal V-11) on P-56-B.
2. Set Lowering Speed on P-56-A to fastest setting. (Arrow at about 9:00) Check time of travel from top to bottom floors.
3. Turn Speed Adjustment (P-56-A) a little at a time towards the slower position, checking speed each time. Repeat until speed is reduced by several seconds.
4. Connect P-56-B Lowering and disconnect P-56-A Lowering. Set Speed on P-56-B as in #3 above.
5. Connect the P-56-A Lowering and check total speed. If too fast, slow down P-56-B.
6. Set Down-Stops on both; smooth on P-56-B, quick on P-56-A. Adjust P-56-A stop until smooth stop results, P-56-B always last.
7. Adjust Down-Start on both, either one may be first.
8. Connect Leveling (Terminal V-11). Set Leveling Speed. Do not adjust Down-Stop unless it is absolutely required. (On P-56-B) If required, Lowering Start must be readjusted.

P-56 ADJUSTMENTS

P-56R - "A" OR "B" SCHEMATIC DRAWING OIL FLOW DIAGRAM

ELIMINATE LEVELING SOLENOID, DOWN START, AND SPEED ADJUSTMENT FOR P-56R-A



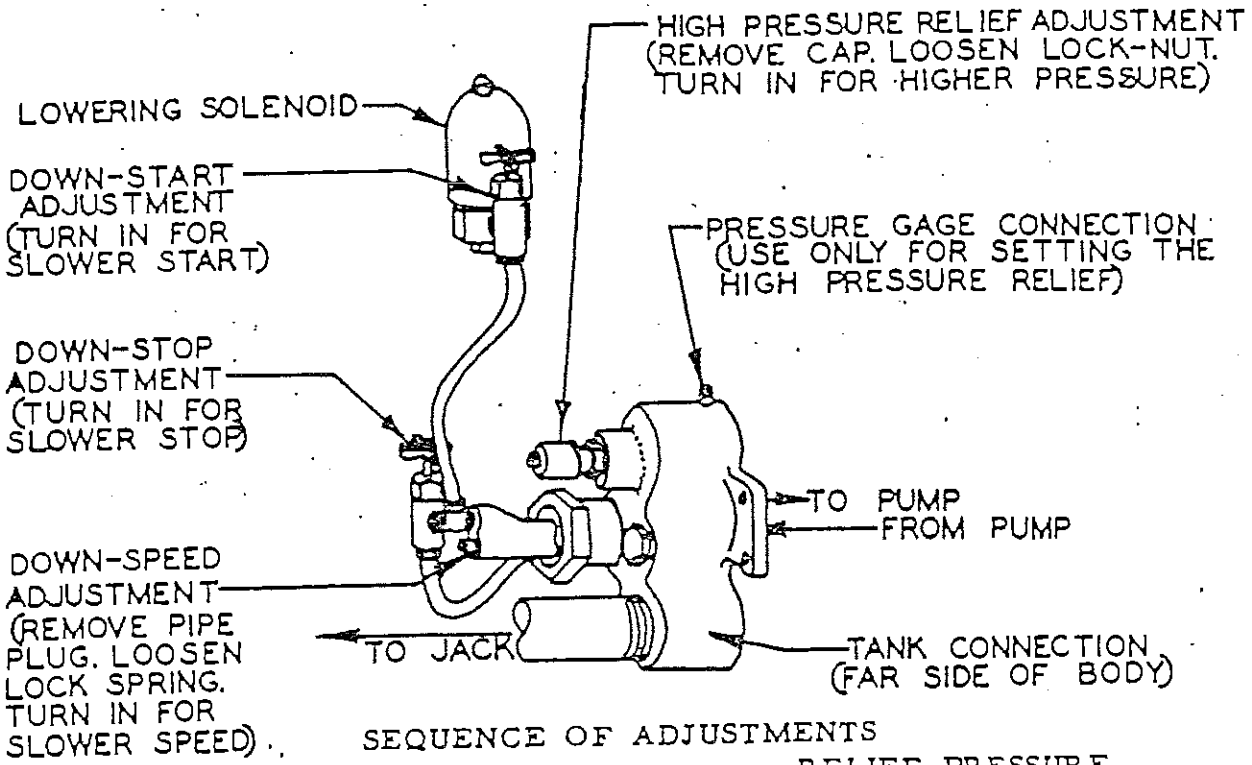
P-56 ADJUSTMENTS

TROUBLE SHOOTING

Difficulty	Solution
1. Car will not lower.	(a) Check line Shut-off Valve. (b) Check Lowering Strainer. (c) Check current supply. (d) Check Solenoid coil. (e) Turn out Down-Start Adjustment. (f) Turn in on Down-Stop Adjustment.
2. Bouncy, slow Down-Start.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Start. (c) Turn in on Down-Stop. (d) Check Lowering Strainer.
3. Sudden Down-Start.	(a) Turn in on Down-Start.
4. Car will not stop when started down.	(a) Tighten manual lowering. (b) Check Electrical Circuit. (c) Turn out on Down-Stop.
5. Down-Stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Stop.
6. Down-Stop rough (quick).	(a) Turn in on Down-Stop.
7. Pump runs, but car does not move.	(a) Check direction of motor rotation. (b) Turn out on Up-Start. (c) Turn in on Relief Pressure.
8. Up-Start slow.	(a) Turn out on Up-Start. (b) Turn in on Low Pressure Adjustment.
9. Rough Up-Start.	(a) Turn in on Up-Start. (b) Re-adjust Low Pressure Adjustment.
10. Slow Up Speed.	(a) Turn in on Relief Pressure. (b) Turn out on Up-Start.

P-99 & P-99A ADJUSTMENTS

P-99 & P-99A OILDRAULIC CONTROLLER



SEQUENCE OF ADJUSTMENTS

LOWERING (P-99A ONLY)

1. Put rated load on car.
2. Open Down-Start about two turns more than Down-Stop
3. Remove pipe plug over Lowering Speed Adjustment.
4. Loosen lock spring holding Lowering Speed Adjustment.
5. Adjust Lowering Speed.
6. Set Down-Stop.
7. Set Down-Start

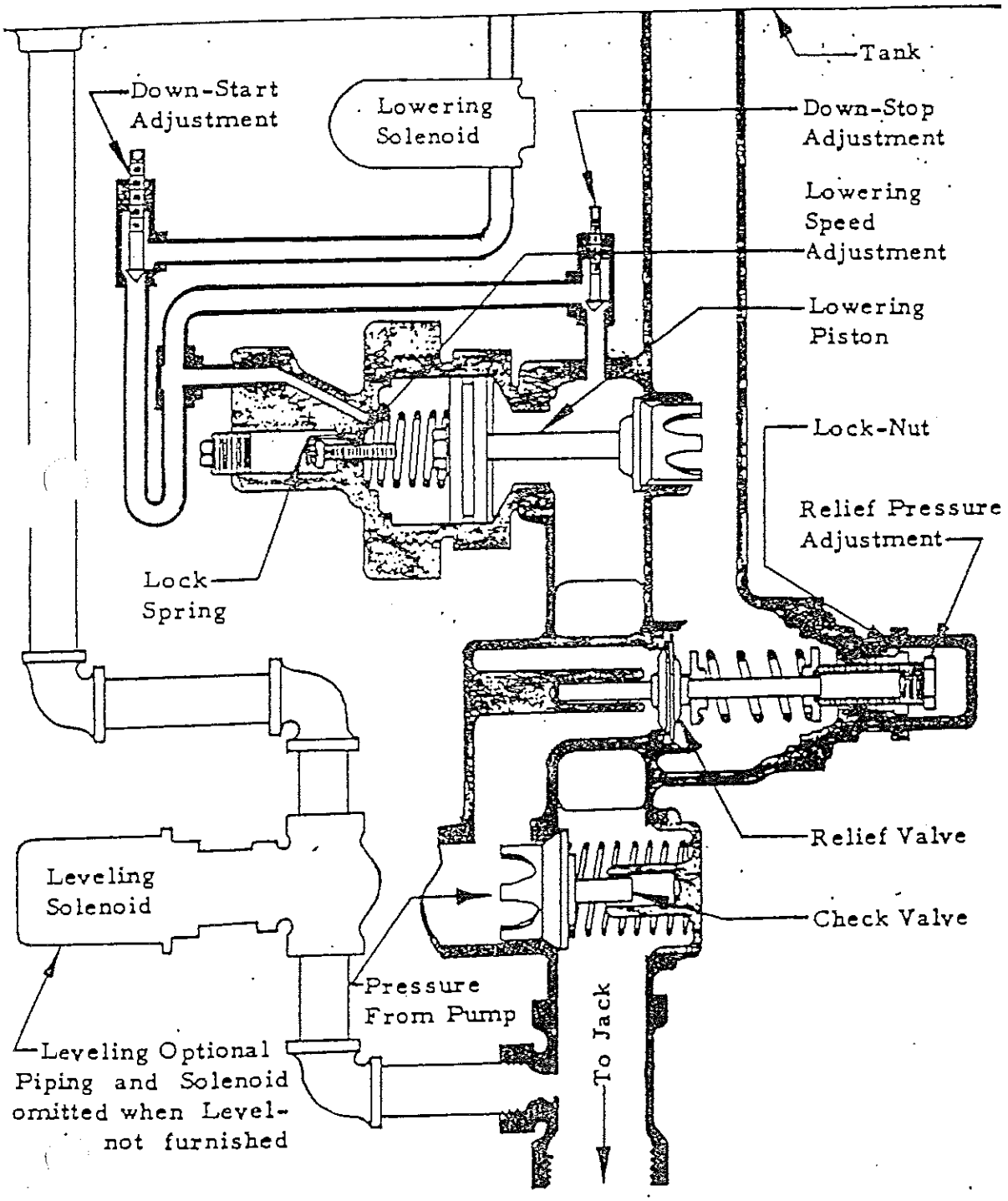
Note: The Oildraulic Controller adjusts the smoothness of operation only, not the accuracy of the floor stops. Do not try to readjust the Oildraulic Controller if car misses the floor, unless all floors are off an exact amount.

RELIEF PRESSURE (P-99 & P-99A)

1. Check working pressure shown on Hatch Wiring Diagram.
2. Close shut-off valve in line to jack.
3. Mount pressure gage in hole on valve body.
4. Remove Relief Pressure cap.
5. Loosen lock nut and unscrew pressure adjustment two or three turns.
6. Start pump and check reading on pressure gage.
7. Adjust to proper relief pressure.
8. Open shut-off valve.
9. Place rated load on car and check up-speed.
10. If speed is too slow, turn in on relief adjustment until proper speed results.

P-99 & P-99A ADJUSTMENTS

P-99 & P-99A OILDRAULIC CONTROLLER



SCHEMATIC DIAGRAM

Parts not shown in actual relationship.

Note: The P-99 Oildraulic Controller does not include pilot solenoid, tubing and lowering adjustments shown here. The lowering piston is worked by a mechanically operated lever.

P-101-A PUMP

P-101-A ROTA-RELIEF VALVE

Adjustment Instructions

HISTORY: This combination smooth starting and relief valve was furnished on the Rota-Radial Model 1-A pump shipped April 1941 through September 1948.
OPERATION: This valve allows the pump to start against practically no load, and then start the car ascending smoothly. It also incorporates a high pressure relief valve.

Starting Adjustments
(See Cut Next Page)

(1) Minimum starting pressure:
Place one-quarter contract load on car. Close needle valve entirely. Remove cap, catching small amount of oil that will run out. Back off starting adjustment screw lock nut. Back out screw until car stands still. Replace cap.

(2) Up-start timing:
With pump running, but car not moving, slowly open needle valve until car starts to ascend. As this adjustment is quite sensitive, make setting changes by one-eighth turns. The needle valve should be opened only far enough to give smooth starts with the car carrying one-fourth contract load. If the valve is too far open, starts will be abrupt. If the valve is not open far enough, starts will be unduly delayed.

High Pressure Relief Adjustment
(See Cut Next Page)

(1) Place full contract load on car. Note: Replace cap before testing elevator after each change of setting.

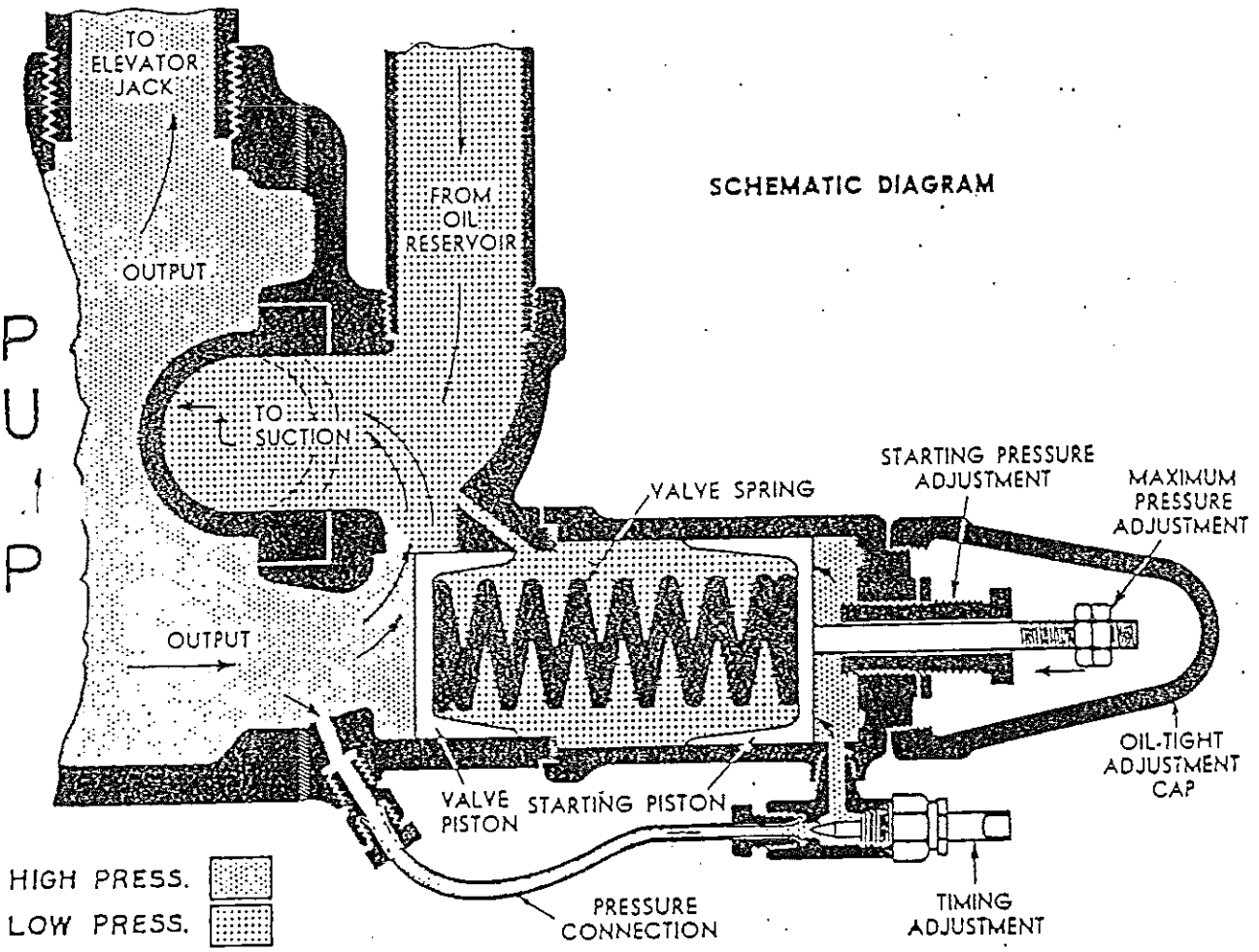
(2) Turn self-locking nut clockwise while holding screw with screw driver. Continue this adjustment until there is a noticeable speed reduction as car goes up.

(3) Then reverse procedure; turn nut counterclockwise until rated speed returns. Then make one more complete revolution to assure high enough setting.

Caution: Too high a relief pressure will permit serious overloading abuses. Setting should only be high enough to raise rated load at contract speed.

P-101-A PUMP

PUMP

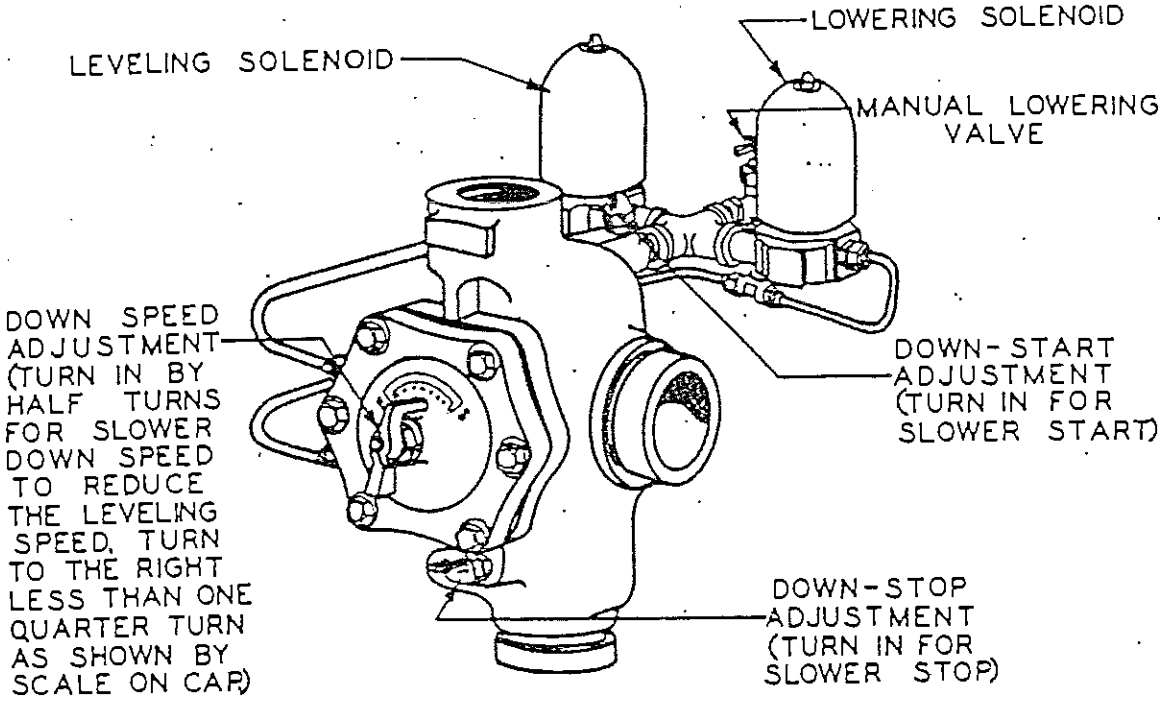


Smooth Starting Operation: The instant the pump starts, hydraulic pressure pushes back the valve piston against its spring and full output is diverted to the suction side of the pump. Hydraulic pressure flowing through the timing adjustment closes the valve gradually, smoothly diverting full output to the elevator jack. This occurs because the starting piston is larger than the valve piston (the same pressure per square inch is exerted on both pistons).

High Pressure Relief Operation: When elevator is ascending both pistons have moved to the left in the illustration as far as the maximum pressure adjustment will permit. If the pressure should become excessively high, the valve spring would compress, allowing the output of the pump to fully relieve.

P-115 ADJUSTMENTS

P-115 OILDRAULIC CONTROLLER



SEQUENCE OF ADJUSTMENTS

LOWERING

1. Disconnect terminals V-11 on control panel. (If supplied -used for leveling)
2. Put rated load on car.
3. Open Down-Start 2 turns. Open Down-Stop 1/2 turn.
4. Adjust lowering speed. Adjust only when car is on bumpers or while car is lowering.
5. Adjust Down-Stop.
6. Adjust Down-Start.
7. Set Limit Switches to stop car 2" to 3" above floor.
8. Test with empty car.

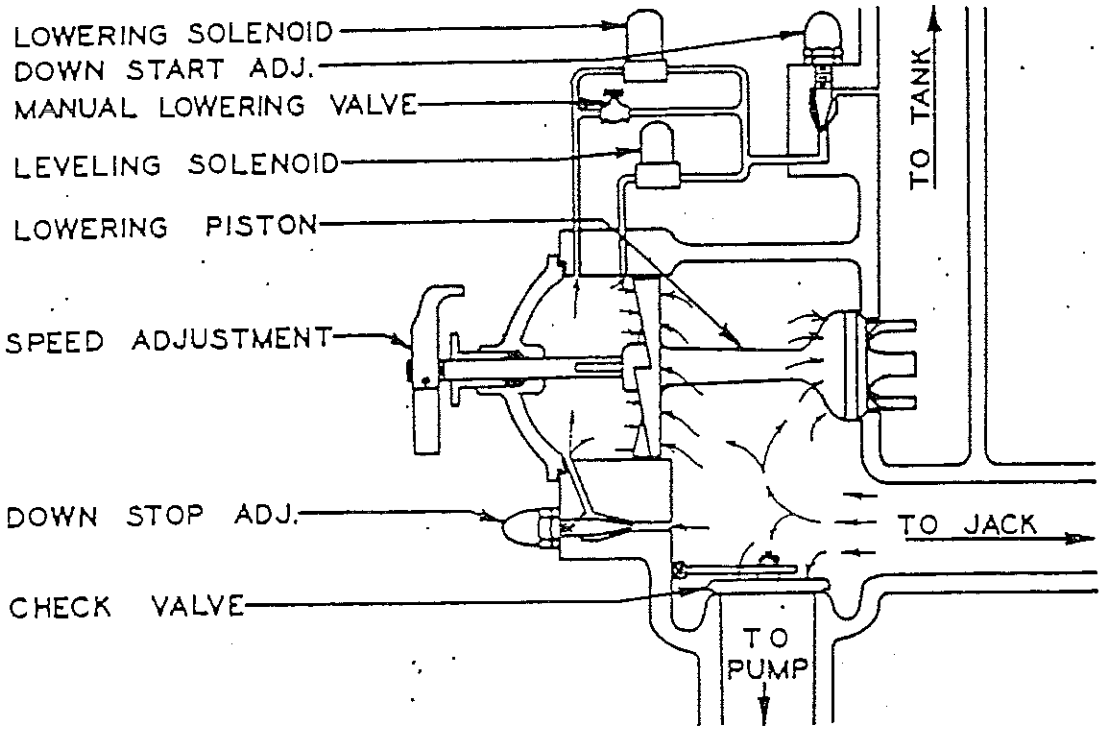
   Note: Down stop should be as quick as comfort allows.

LEVELING

1. Connect terminals V-11 and V-12.
2. Adjust leveling speed to approximately 1/3 of lowering speed but not more than 25 FPM.
3. Readjust Down-Stop if required.
4. Locate or adjust the leveling cams to make the car stop level with the floor. The Oildraulic Controller adjusts the smoothness of operation only, not the accuracy of the floor stops. Do not try to readjust the Oildraulic Controller if car misses the floor, unless all floors are off an exact amount.

P-115 ADJUSTMENTS

P-115 OILDRAULIC CONTROLLER
(See front of sheet for adjustments)



Schematic Oil-Flow Diagram

Small arrows show direction of pressure when car is at rest.

HISTORY

The P-115 Oildraulic Controller was first used Feb. 15, 1941. The original models, P-115-A and -B, had spring type valves, and were used until April 1943. In May, 1943 the current solenoid type was produced. Several minor changes were made, the final models bearing the numbers P-115-G and -H. The suffix -G shows that the Oildraulic Controller is arranged for lowering only (one pilot solenoid), while the suffix -H shows arrangement for lowering and leveling (two pilot solenoids). This suffix should be given when writing the factory.

P-119 ADJUSTMENTS

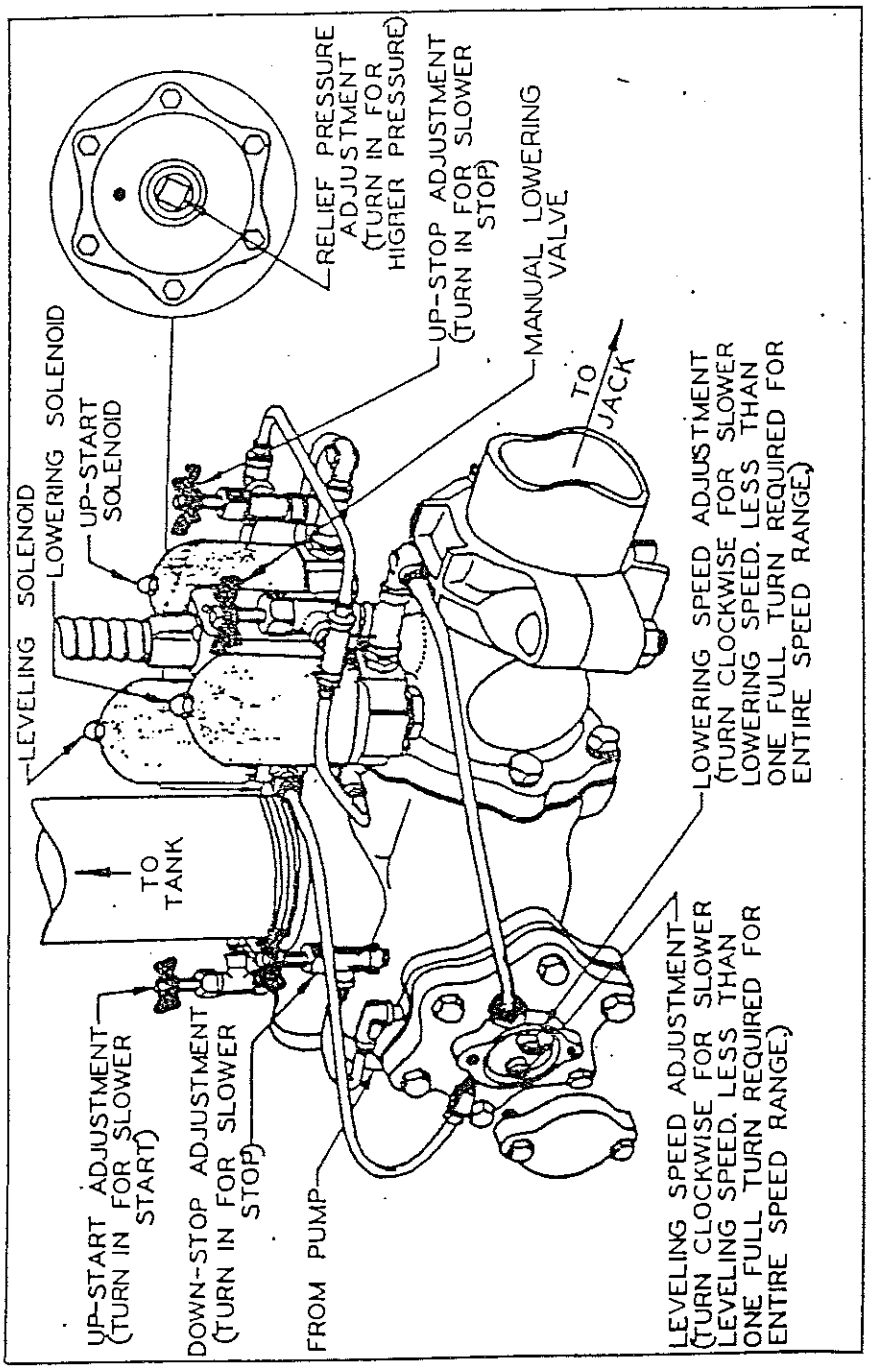
LOWERING & LEVELING
(Follow in sequence as given)

1. Disconnect Leveling (Terminal V-11 on control panel).
2. Put rated load on car.
3. Open Down-Stop 2 or 3 turns.
4. Adjust Lowering speed. If car will not lower, turn in on Down-Stop until car lowers.
5. Adjust Down-Stop.
6. Test with empty car.
   Note: Down-Stop should be as quick as is comfortable with empty car.
7. Adjust Limit switches to stop car 2 or 3 inches above all floors except top floor. Make this adjustment with rated load on car.
8. Connect Leveling (Terminal V-11).
9. Adjust Leveling speed.
   Note: Leveling speed should be approximately 1/3 of lowering speed, but not over 25 FPM.
10. Set Leveling cams for stopping at landings. Oildraulic controller controls only the smoothness of the car starts and stops. Stopping position can be controlled only by the hatchway switches and cams. Do not attempt to make car stop at proper level by adjusting controller.

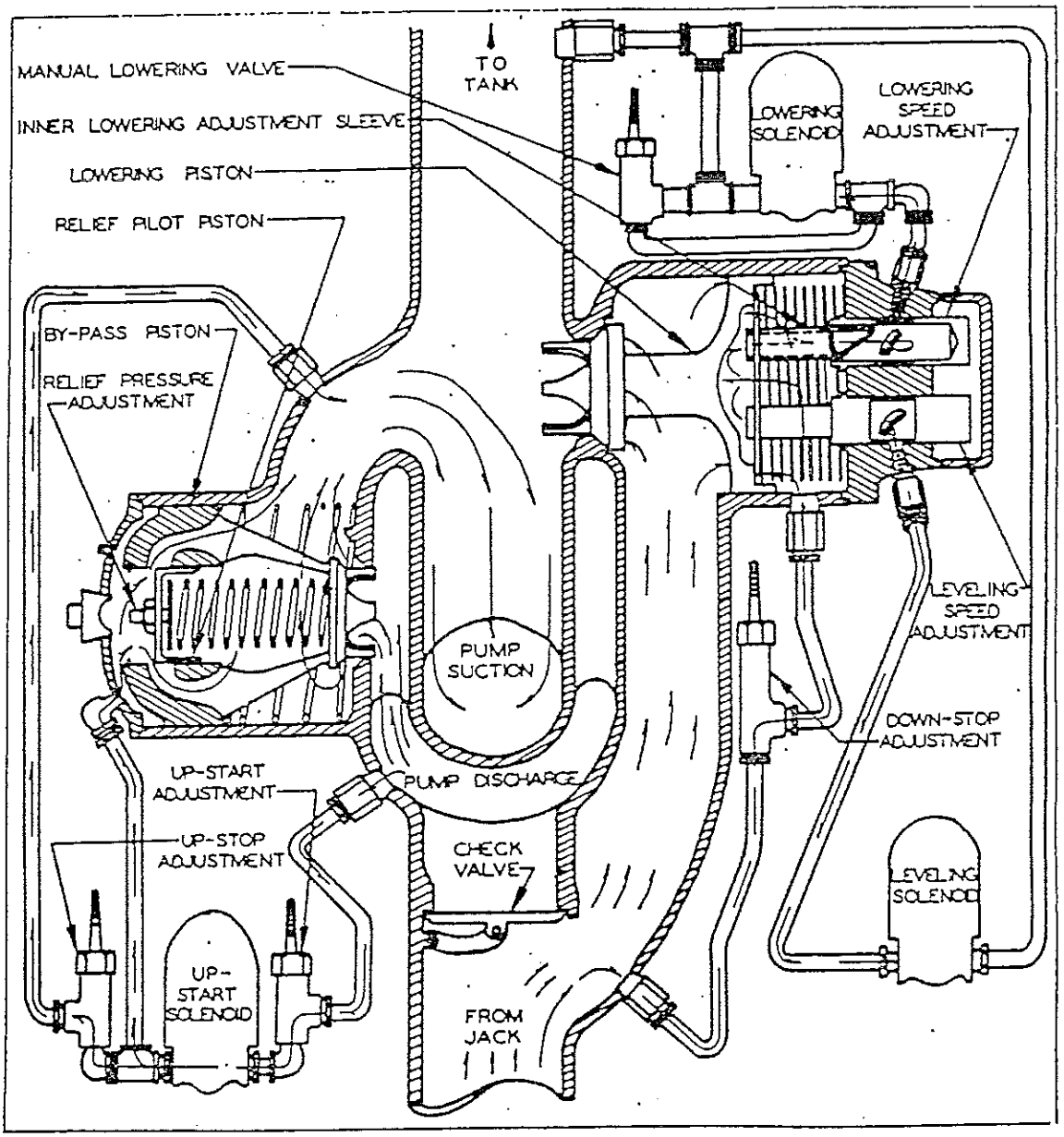
UP TRAVEL
(Follow in sequence as given)

1. Set Relief Pressure.
   (a) Open Up-Start 1 or 2 turns.
   (b) Close Shut-off valve in oil line to jack.
   (c) Note "Working Pressure" on Hatch Wiring Daigram.
   (d) Attach pressure gage at small pipe plug on by-pass cap.
   (e) Start pump and note pressure.
   (f) To adjust, remove large plug in by-pass cap and turn allen-head set screw in to raise pressure. If whole piston turns, remove gage and insert small tool thru small hole to lock piston in place.
   Note: Do not attempt to run pump with plugs removed.
2. Put rated load on car and open shut-off valve.
3. Disconnect Terminal V-11.
4. Adjust Up-Stop.
   Note: Up-Stop should be as quick as is comfortable with loaded car. Stop will be smoother with empty car.
5. Adjust Up-Start.
6. Set limits and floor selectors to stop car about 2" above all floors except bottom, with rated load.
7. Connect leveling (Terminal V-11).
8. Check with empty car.

P-119 ADJUSTMENTS



P-1.19 ADJUSTMENTS



SCHEMATIC DRAWING
Parts not shown in actual position.
Small arrows show direction of oil flow.

P-119 ADJUSTMENTS

TROUBLE SHOOTING

Difficulty	Solution
1. Car will not lower.	(a) Check line Shut-off Valve. (b) Check current supply. (c) Check Solenoid Coil. (d) Turn in on Down-Stop Adjustment.
2. Bouncy, slow Down-Start.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn in on Down-Stop.
3. Car will not stop when started. down.	(a) Tighten manual lowering. (b) Check for clogged strainers. (c) Turn out on Down-Stop. (d) Check Solenoid valve not dropping out.
4. Down-Stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Stop.
5. Down-Stop rough (quick).	(a) Turn in on Down-Stop.
6. Pump runs, but car does not move.	(a) Close Manual Lowering. (b) Check direction of motor rotation. (c) Turn out on Up-Start. (d) Turn in on Relief Pressure.
7. Up-Start slow.	(a) Turn out on Up-Start.
8. Rough Up-Start.	(a) Turn in on Up-Start.
9. Slow Up Speed.	(a) Turn out on Up-Start. (b) Turn in on Up-Stop. (c) Turn in on Relief Pressure.
10 Rough Up-Stop	(a) Turn in on Up-Stop.
11 Too much Up Drift	(a) Turn out on Up-Stop.

P-125 6 & 7 ADJUSTMENTS

GUIDE TO ADJUSTMENT INSTRUCTION & SEQUENCE OF OPERATION
P-125-6-7 SERIES OILDRAULIC CONTROLLERS

Each Oildraulic controller assembly model number consists of a prefix: P-125, P-126 or P-127, indicating the size, and a suffix, which is the letter "M" followed by one or two digits. This "M" number determines what the features of the assembly are. The size does not affect the adjustments or sequence of operation for a given "M" number. The chart gives the features and page numbers (in this division and section) for the other information listed at the head of the column.

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence of Operation	Down Cycle Adjustments	Down Cycle Sequence of Operation
M-1	Rota-Relief-Up stop-Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-2	Rota-Relief-Up stop-Lowering	5 thru 8	7-S	1 thru 4	3-S
M-3	Rota-Relief-Up stop-Separate Lowering	5 thru 8	7-S	—	—
M-4	Rota-Relief-Hi Speed Lowering-Leveling	9 and 10	10-S	1 thru 4	3-S
M-5	Rota-Relief-Lowering-Leveling	9 and 10	10-S	1 thru 4	3-S
M-6	Rota-Relief-Hi Speed Lowering	9 and 10	10-S	1 thru 4	3-S
M-7	Rota-Relief-Lowering	9 and 10	10-S	1 thru 4	3-S
M-8	Rota-Relief-Separate Lowering	9 and 10	10-S	—	—
M-9	Plain Relief-Hi Speed Lowering-Leveling	11 and 12	12-S	1 thru 4	3-S
M-10	Plain Relief-Lowering-Leveling	11 and 12	12-S	1 thru 4	3-S
M-11	Plain Relief-Hi Speed Lowering	11 and 12	12-S	1 thru 4	3-S
M-12	Plain Relief-Lowering	11 and 12	12-S	1 thru 4	3-S
M-13	Plain Relief-Separate Lowering	11 and 12	12-S	—	—
M-14	Rota-Relief-Lowering-2 Way Leveling	13 thru 16	15-S	1 thru 4	3-S
M-15	Rota-Relief-Hi Speed Lowering-2 Way Leveling	13 thru 16	15-S	1 thru 4	3-S
M-16	Rota-Relief-Up stop-Hi Speed Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-17	Rota-Relief-Up stop-Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-18	Rota-Relief-Lowering-Leveling	9 and 10	10-S	1 thru 4	3-S
M-19	Rota-Relief-Up stop-Lowering	5 thru 8	7-S	1 thru 4	3-S
M-20	Rota-Relief-Hi Speed Lowering	9 and 10	10-S	1 thru 4	3-S
M-21	Rota-Relief-Separate Lowering	9 and 10	10-S	—	—
M-22	Rota-Relief-Lowering-2 Way Leveling-Up stop	13 thru 16	15-S	1 thru 4	3-S
M-23	Rota-Relief-Lowering-2 Way Leveling-Up stop-150 GPM	13 thru 16	15-S	1 thru 4	3-S
M-24	Rota-Relief-Hi Speed Lowering-2 Way Leveling-Up stop-150 GPM	13 thru 16	15-S	1 thru 4	3-S
M-25	Rota-Relief-Hi Speed Lowering-2 Way Leveling-Up stop-240 GPM	13 thru 16	15-S	1 thru 4	3-S
M-26	Rota-Relief-Hi Speed Lowering-Up stop-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-27	Rota-Relief-Lowering-2 Way Leveling-By pass stop-300 GPM	17 thru 20	19-S	1 thru 4	3-S
M-28	Rota-Relief-Hi Speed Lowering-2 Way Leveling-By pass stop-300 GPM	17 thru 20	19-S	1 thru 4	3-S

P-125 6 & 7 ADJUSTMENTS

Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence of Operation	Down Cycle Adjustments	Down Cycle Sequence of Operation
M-29	Rota-Relief-Lowering-2 Way Leveling-By pass stop-300 GPM	21 thru 24	23-S	1 thru 4	3-S
M-30	Rota-Relief-Hi Speed Lowering-2 Way Leveling-By pass stop-300 GPM	21 thru 24	23-S	1 thru 4	3-S
M-31	Rota-Relief-Constant Speed Lowering-2 Way Leveling-By pass stop	21 thru 24	23-S	—	—
M-32	Rota-Relief-Constant Speed Lowering-2 Way Leveling-By pass stop	21 thru 24	23-S	—	—
M-33	Rota-Relief-Lowering-2 Way Leveling-By pass stop-300 GPM-Exp. proof	21 thru 24	23-S	1 thru 4	3-S
M-34	Rota-Relief-Lowering-2 Way Leveling-By pass stop-150 GPM-Exp. proof	21 thru 24	23-S	1 thru 4	3-S
M-35	Rota-Relief-Up stop-Lowering-Leveling-Exp. proof	5 thru 8	7-S	1 thru 4	3-S
M-36	Rota-Relief-Hi Speed Lowering-Exp. proof	9 and 10	10-S	1 thru 4	3-S
M-37	Rota-Relief-Constant Speed Lowering-2 Way Leveling-By pass stop	21 thru 24	23-S	25 thru 28	27-S
[illegible]	Rota-Relief-Up stop-Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-39	Rota-Relief-Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-40	Rota-Relief-Up stop-Lowering	9 and 10	10-S	1 thru 4	3-S
M-41	Rota-Relief-Hi Speed Lowering	9 and 10	10-S	—	—
M-42	Rota-Relief-Separate Lowering	5 thru 8	7-S	1 thru 4	3-S
M-43	Rota-Relief-Hi Speed-Lowering-Leveling-Up stop	21 thru 24	23-S	1 thru 4	3-S
M-44	Rota-Relief-Lowering-2 Way Leveling-By pass stop	21 thru 24	23-S	1 thru 4	3-S
M-45	Rota-Relief-Hi Speed Lowering-2 Way Leveling-By pass stop	21 thru 24	23-S	25 thru 28	27-S
M-46	Rota-Relief-Constant Speed Lowering-2 Way Leveling-By pass stop	21 thru 24	23-S	1 thru 4	3-S
M-47	Rota-Relief-Lowering-2 Way Leveling-By pass stop-Exp. Proof	9 and 10	10-S	1 thru 4	3-S
M-48	Rota-Relief-Lowering-Leveling-Exp. Proof	5 thru 8	7-S	1 thru 4	3-S
M-49	Rota-Relief-Up stop-Lowering-Leveling-Exp. Proof	9 and 10	10-S	1 thru 4	3-S
M-50	Rota-Relief-Hi Speed Lowering-Exp. Proof	9 and 10	10-S	—	—
M-51	Plain Relief-Separate Lowering	5 thru 8	7-S	25 thru 28	27-S
M-52	Rota-Relief-Up stop-Contsant Speed Lowering	21 thru 24	23-S	—	—
M-53	Rota-Relief-Constant Speed Lowering-2 Way Leveling-By pass stop	5 thru 8	7-S	29 thru 32	31-S
M-54	Rota-Relief-Up-stop-Constant Speed Lowering	5 thru 8	7-S	1 thru 4	3-S
M-55	Rota-Relief-Up stop-Lowering-Leveling	9 and 10	10-S	1 thru 4	3-S
M-56	Rota-Relief-Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
M-57	Rota-Relief-Up stop-Lowering	9 and 10	10-S	1 thru 4	3-S
M-58	Rota-Relief-Hi Speed-Lowering				

P-125 6 & 7 ADJUSTMENTS

Division	4
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Assembly Model Number	Features	Up Cycle Adjustments	Up Cycle Sequence of Operation	Down Cycle Adjustments	Down Cycle Sequence of Operation
M-59	Rota-Relief-Separate Lowering	9 and 10	10-S	—	—
M-60	Rota-Relief-Up stop-Hi Speed Lowering-Leveling	5 thru 8	7-S	1 thru 4	3-S
H-61	Rota-Relief-By pass stop-2 Way Leveling-Lowering	21 thru 24	23-S	1 thru 4	3-S
M-62	Rota-Relief-By pass stop-2 Way Leveling-Hi Speed Lowering	21 thru 24	23-S	1 thru 4	3-S
M-63	Rota-Relief-By pass stop-2 Way Leveling-Lowering-Explosion Proof	21 thru 24	23-S	1 thru 4	3-S
M-64	Rota-Relief-Lowering-Leveling-Explosion Proof	9 and 10	10-S	1 thru 4	3-S
M-65	Rota-Relief-Up stop-Lowering-Leveling-Explosion Proof	5 thru 8	7-S	1 thru 4	3-S
M-66	Rota-Relief-Hi Speed Lowering-Explosion Proof	9 and 10	10-S	1 thru 4	3-S
M-67	Plain Relief, Separate Lowering	11 and 12	12-S	—	—
M-68	Rota-Relief-By pass stop-2 Way Leveling-Constant Speed Lowering	21 thru 24	23-S	29 thru 32	31-S
M-69	Rota-Relief-Up stop-Constant Speed Lowering-Leveling	5 thru 8	7-S	29 thru 32	31-S
M-70	Rota-Relief-By pass stop-2 Way Leveling-Constant Speed Lowering	21 thru 24	23-S	29 thru 32	31-S
M-71	Rota-Relief-By pass stop-Constant Speed Lowering-2 Way Leveling-Explosion Proof	21 thru 24	23-S	29 thru 32	31-S

P-125 6 & 7 SEQUENCE OF OPERATION

PLAIN LOWERING AND LEVELING*

REFER TO SCHEMATIC DIAGRAM ON PAGE 3.

This valve consists of a piston that seats and can be controlled in three positions, closed to stop the car, partially open for slow speed and fully open for high speed. The valve is shown in the closed position.

To start the elevator down, the lowering solenoid is energized, allowing the oil behind the piston to flow to tank through the "down start" adjustment. Since the area of the piston is larger than that of the seat, the reduction of pressure will cause the piston to lift. It will be noted that since oil is free to flow into this area through the strainer and "down stop" adjustment, it is essential that the "down start" adjustment be open more than the down stop. The amount that it is open more will govern how fast the piston moves and thus how rapidly the elevator starts. The lowering speed adjustment limits the amount the piston can open and thus the elevator speed.

To change to slow speed or leveling* position the "lowering" solenoid is closed and the "leveling" solenoid opened. Since in this position the oil passage to tank is blocked by the piston itself, oil will flow in through the strainer and "down stop" adjustment and allow the piston to move toward closing. When, however, it travels far enough to open the oil passage to tank, it will stop. The position at which this happens controls the leveling speed and is made variable by forming the skirt of the piston on an angle and providing facilities to turn it. Turning is accomplished by the "lowering speed" adjustment with a half turn altering the leveling speed and multiples of half turns altering the high speed. When leveling is not provided, closing the down fast solenoid will stop the elevator in the same manner.

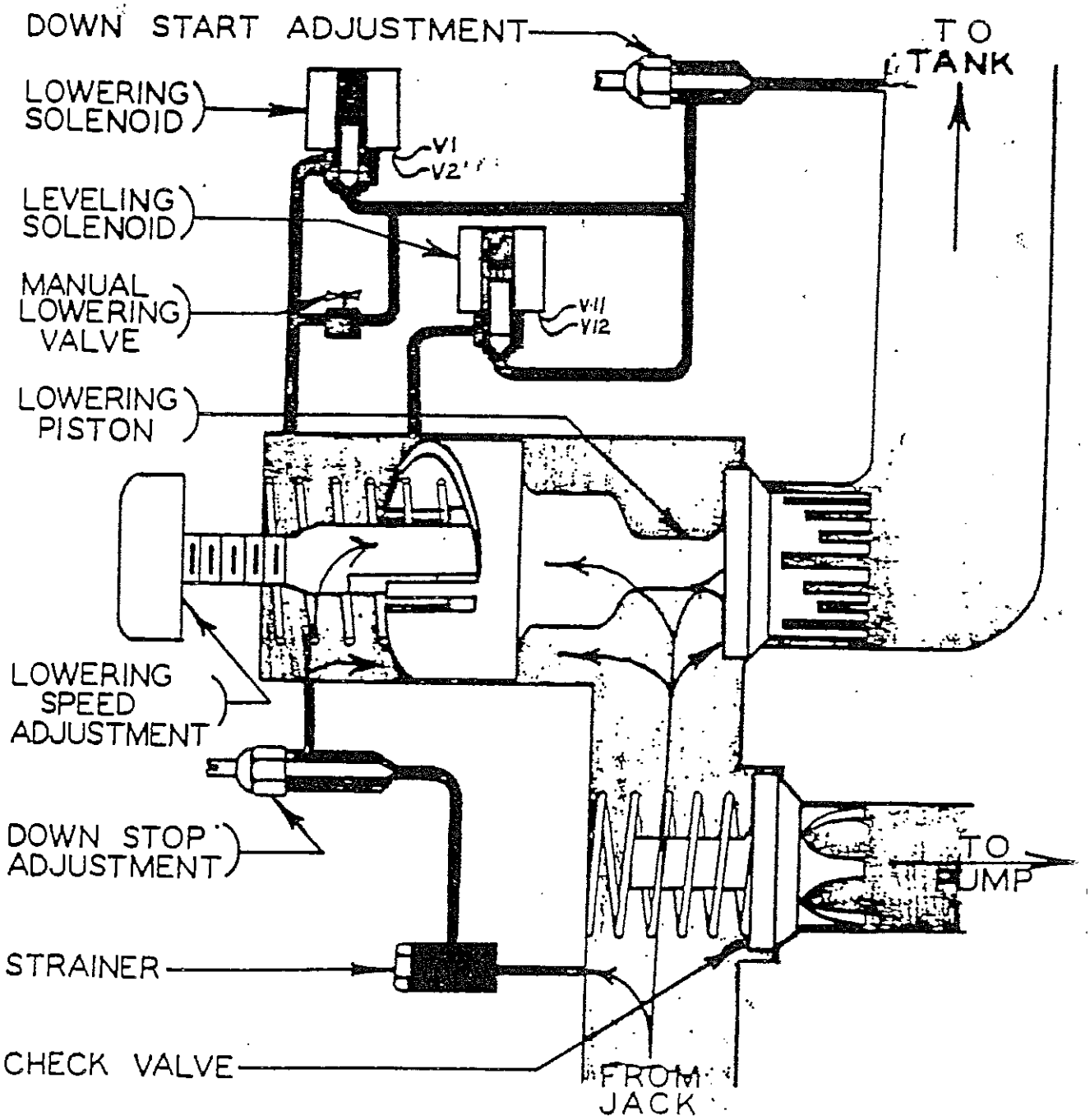
To stop the elevator the "leveling" solenoid is de-energized, stopping all flow to the tank so the spring and pressure will close the piston. As in the case of slowdown, the rate of closing and thus the smoothness is controlled by the "down stop" adjustment.

The manual lowering valve does the same thing as the "down fast" solenoid.

*When used—when leveling is not provided, operation is the same, except the leveling solenoid is not provided, and the corresponding functions are not available.

P-125 6 & 7 ADJUSTMENTS

LOWERING SIDE
SCHEMATIC OIL FLOW DIAGRAM



P-125 6 & 7 ADJUSTMENTS

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Car will not lower.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Check current supply. (d) Check Solenoid coil. (e) Turn out Down-Start Adjustment. (f) Turn in on Down-Stop Adjustment. (g) Unscrew Lowering Speed Adjustment.
2. Bouncy, slow Down-Start.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Start. (c) Turn in on Down-Stop. (d) Back out on Lowering Speed. Adjustment.
3. Sudden Down-Start.	(a) Turn in on Down-Start.
4. Car will not stop when started down.	(a) Tighten manual lowering. (b) Check for clogged strainers. (c) Turn out on Down-Stop. (d) Check Solenoid valve not dropping out. (residual magnatism)
5. Down-Stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Stop.
6. Down-Stop rough (quick).	(a) Turn in on Down-Stop.
7. Leveling bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Increase Leveling speed.

NOTE: In offering these solutions, the manufacturer assumes there is no binding in the Hatch and that the proper voltage is being supplied to the Power Unit.

P-125 6 & 7 ADJUSTMENTS

RELIEF PRESSURE SETTING
(Follow in sequence as given)

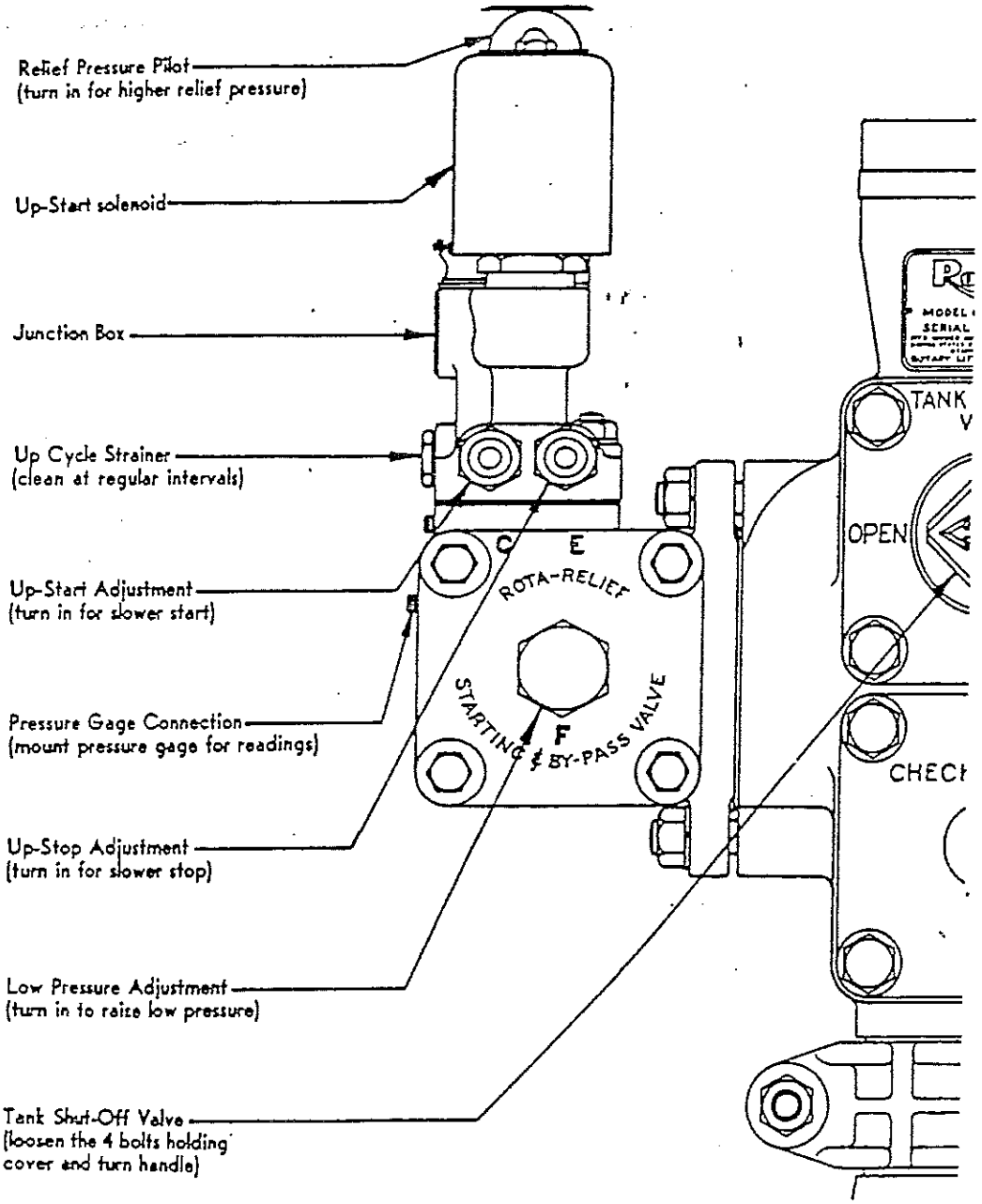
1. Open Up Start 2 or 3 turns.
2. Open Up Stop ½ turn.
3. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
4. Install Pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
5. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
6. Start unit and read from gage.
7. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit. (30 PSI more than "working pressure" on Hatch Wiring Diagram.)
8. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.
9. Replace acorn nut and gasket.
10. Open Shut-off Valve.

UP TRAVEL ADJUSTMENTS
(Follow in sequence as given)

1. Remove any load from car.
2. Close Up Start Adjustment.
3. Remove acorn nut on Low Pressure Adjustment and back off.
4. Start Power Unit. If car moves, back off on low pressure until car stands still.
5. Turn in on Low Pressure Adjustment until car starts to creep up slowly, then back off until car just stands still, then back off ½ turn more.
6. Open Up-Start 2 or 3 turns.
7. Open Up-Stop ½ turn.
8. Put rated load on car.
9. Disconnect Leveling (V-11).
10. Adjust Up-Stop, making it as quick as is comfortable.
11. Adjust Up-Start.
12. Set Limits to stop car about 1" to 2" above floor with rated load, and connect Leveling (V-11).
13. Check with empty car.

(Caution: Do not run unit by-passing or relieving more than one or two minutes at a time, as heat generated may damage pump.)

P-125 6 & 7 ADJUSTMENTS



P-125 6 & 7 SEQUENCE OF OPERATION

ROTA RELIEF—BYPASS—UP STOP

Refer to Schematic Diagram on Page 7

This valve consists of a non-seating piston which will perform both as a bypass and a pressure relief valve. The valve is shown in its parked position.

To start the elevator, the pump is started and the "up" solenoid energized. At first, since the bypass piston is parked open against the low pressure adjustment by its spring, all flow will bypass to tank. The pressure built up in the system due to this bypassing will cause oil to flow through the strainer, "up" solenoid and "up start" adjustment to the left side of the piston. Since the area of this end of the piston is larger than the ported end, the pressure will close it against the flow and against the spring, causing the bypassing oil to be gradually diverted to the plunger. Since the "up stop" adjustment is hindering this action by allowing oil to escape to tank, it is necessary that it be restricted more than the "up start adjustment." The difference between the two adjustments will govern the rate at which the piston closes and the smoothness of the start.

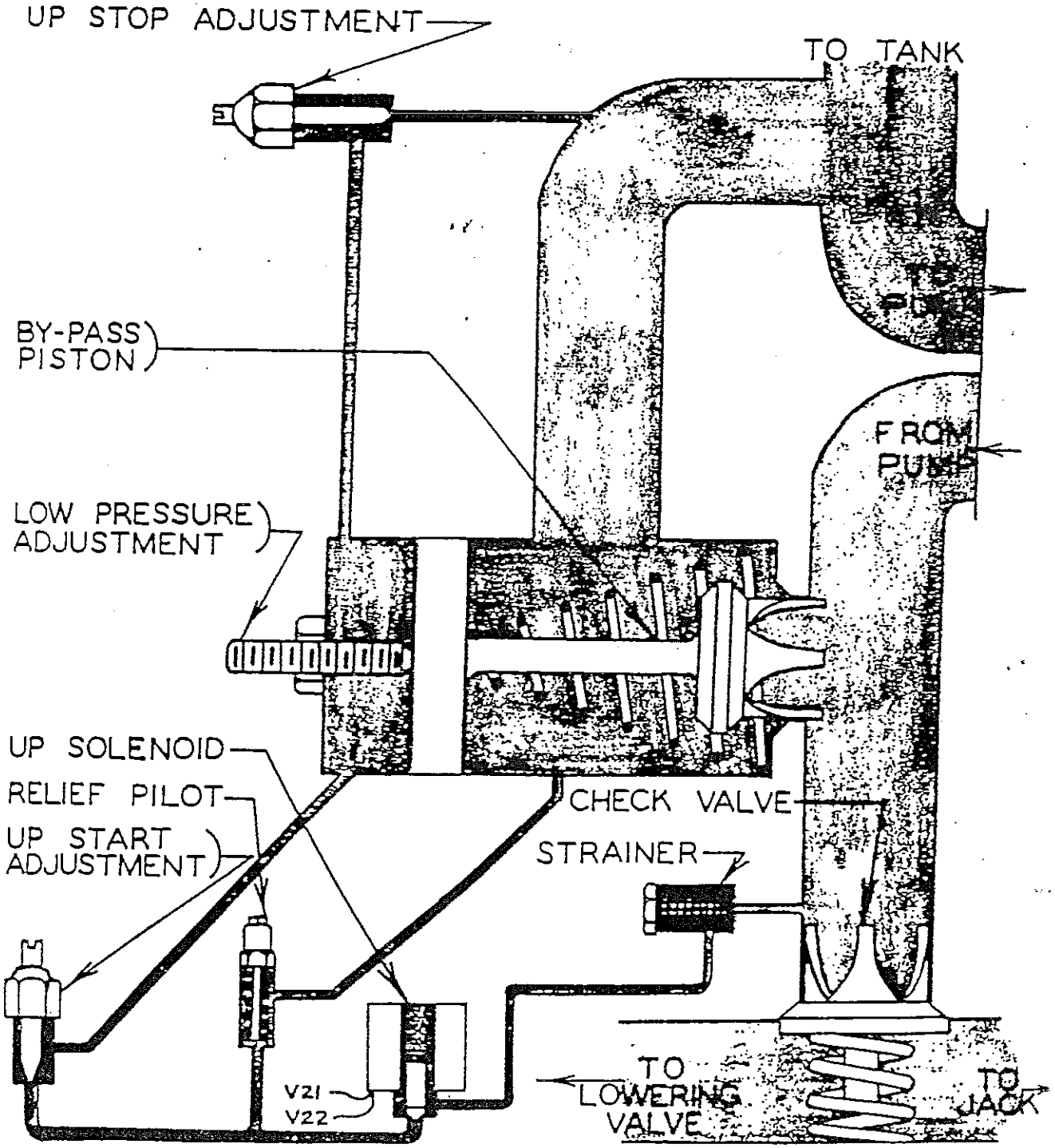
To stop the elevator, the solenoid is de-energized, but the pump is allowed to run slightly longer on a timed delay.* During this delay the bypass piston, now deprived of its restraining force is re-opened by the pump pressure and the spring. Since the oil behind the piston must be forced out through the "up stop" adjustments, its setting will control the rate of closing and thus the smoothness of the stop. The pump will now stop on the timed delay.

In the event of excessive pump pressure, the relief pilot piston will be unseated, limiting the closing pressure on the bypass piston and allowing it to open.

*On some equipment, the timed delay is not provided, and the elevator will stop as soon as pump output ceases.

P-125 6 & 7 ADJUSTMENTS

UP SIDE
SCHEMATIC OIL FLOW DIAGRAM



P-125 6 & 7 ADJUSTMENTS

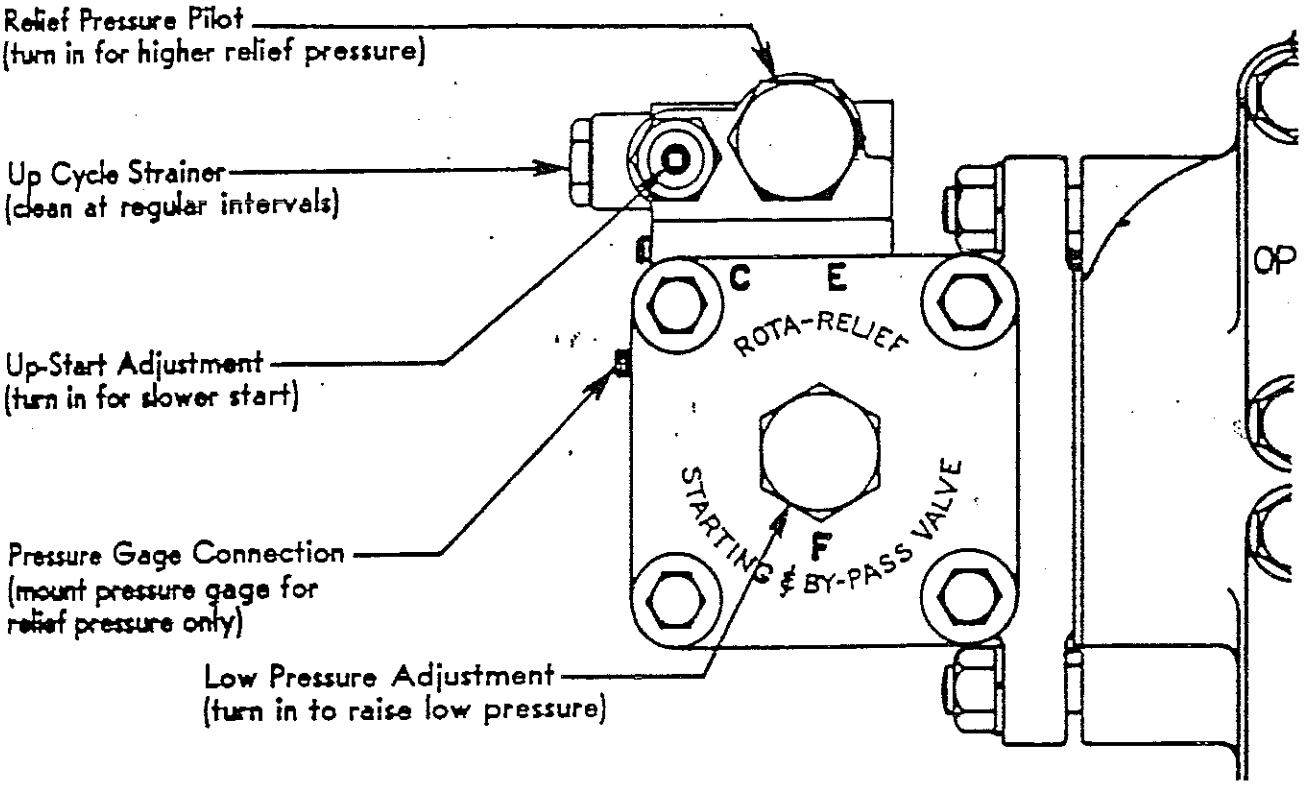
TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Close Manual Lowering Valve. (d) Check direction of motor rotation. (e) Turn in on Up-Stop. (f) Turn in on Relief Pressure. (g) Turn out on Up-Start.
2. Up Start slow.	(a) Turn in on Up-Stop. (b) Turn out on Up-Start. (c) Turn in on Low Pressure Adjustment.
3. Rough Up-Start	(a) Turn in on Up-Start. (b) Turn out on Low Pressure Adjustment.
4. Slow Up Speed.	(a) Turn in on Relief Pressure. (b) Turn in on Up-Stop. (c) Turn out on Up-Start.
5. Too much Up Drift.	(a) Turn out on Up-Stop.
6. Rough Up-Stop.	(a) Turn in on Up-Stop.

Note: Up drift is caused by pump coasting. If pump does not have much coast, there will be practically no up drift requiring the Up-Stop to be turned all the way in to get full benefit of the little coast available. When Up-Stop is turned all the way in, the next Up-Start will probably be rough. If such condition exists, the Oildraulic Controller should be converted to a model M4, M5, etc. Consult the factory.

Caution: Many jobs have a rough start caused by the Low Pressure Adjustment being closed too much. This seems to be a common field fault. Pay strict attention to instructions on this adjustment.

P-125 6 & 7 ADJUSTMENTS



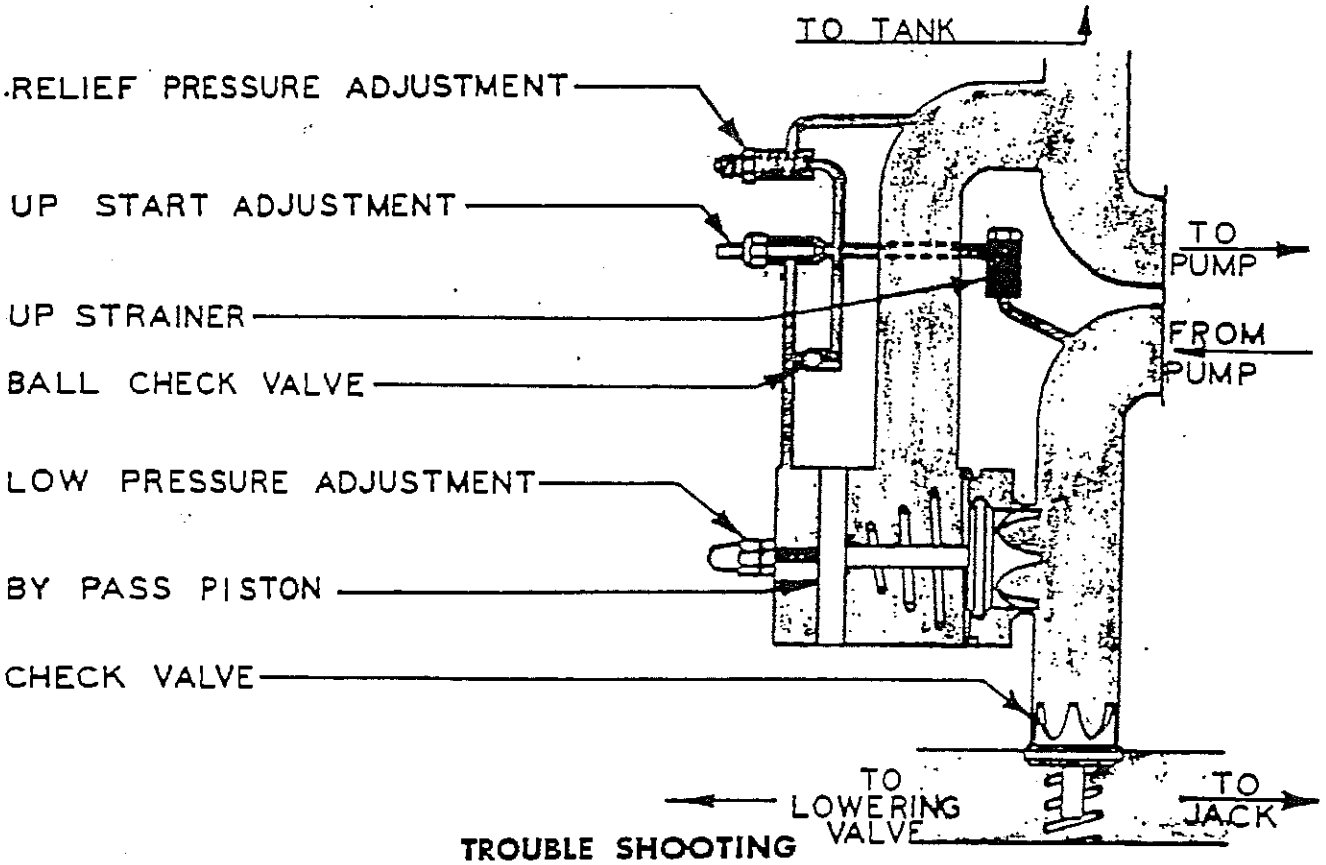
UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

1. Open up start 2 or 3 turns.
2. Close line shut-off valve. (Make sure tank shut-off is open), and install pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
3. Remove relief pressure pilot acorn nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
4. Start unit and read from gage, screwing in or out on relief pilot adjustment until gage gives desired reading, and stop unit. (30 PSI more than "working pressure" on hatch wiring diagram.)
5. Tighten lock nut, remove pressure gage and open line shut-off valve.
6. Replace acorn nut and gasket.
7. Close up start, and remove load from car.
8. Start power unit, if car goes up, back off on low pressure until car stops.
9. Turn in on low pressure until car creeps slowly up, then back off until car just stands still, then back off an additional ½ turn.
10. Stop power unit. Do not run more than one or two minutes when by-passing as heat generated may damage pump.
11. Put rated load on car.
12. Adjust up start.
13. Set limit and floor switches to stop car 1" to 2" above floor.
14. Check with empty car.

P-125 6 & 7 ADJUSTMENTS

UP SIDE
SCHEMATIC OIL FLOW DIAGRAM



TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check direction of motor rotation. (b) Turn out on Up-Start. (c) Turn in on Relief Pressure.
2. Up-Start Slow.	(a) Turn out on Up-Start. (b) Turn in on Low Pressure Adjustment.
3. Rough Up-Start.	(a) Turn in on Up-Start. (b) Re-adjust Low Pressure Adjustment.

P-125 6 & 7 SEQUENCE OF OPERATION

ROTA RELIEF—BYPASS—BALL CHECK STOP

Refer to Schematic Diagram Page 10

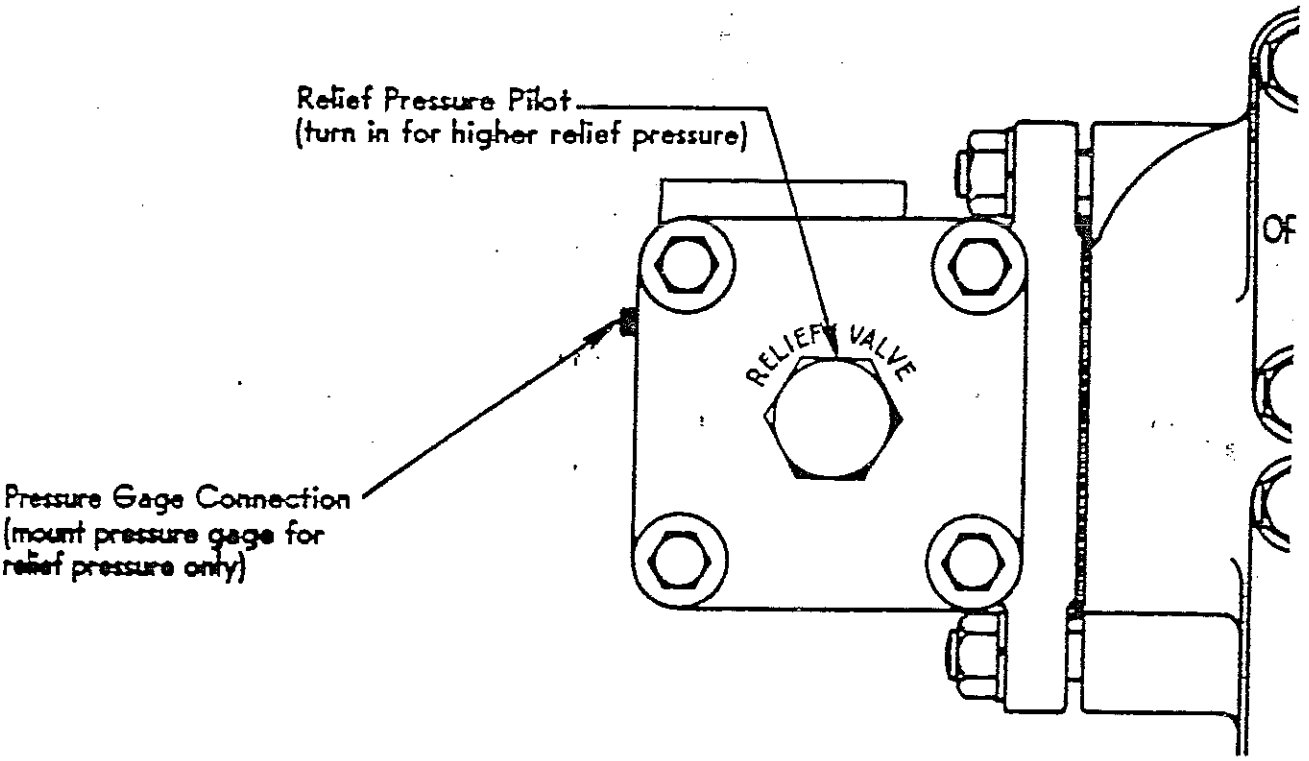
This valve consists of a non-seating piston which will perform both as a bypass piston and a pressure relief valve. The valve is shown in its parked position.

To start the elevator, the only action required is to start the pump. At first, since the bypass piston is parked open against the "low pressure" adjustment by its spring, all flow will bypass to tank. The pressure built up in the system due to this bypass will cause the oil to flow through the strainer and "up start" adjustment to the left side of the bypass piston. Since the area of this end of the piston is larger than the ported end, the pressure will close it against the flow and against the spring, causing the bypassing oil to be gradually diverted to the plunger, the rate being governed by the "up start" adjustment. This produces a smooth start.

To stop the elevator the pump is stopped. When flow ceases, the main check valve will close, holding back plunger pressure. Pump pressure will drop to zero. The bypass piston spring will now return the piston to its open position by forcing the oil on its left side out through the ball check valve. The smoothness of the stop is dependent on the coasting of the pump.

In the event of excessive pump pressure, the relief piston will be unseated limiting the closing pressure on the bypass piston and allowing it to open.

P-125 6 & 7 ADJUSTMENTS



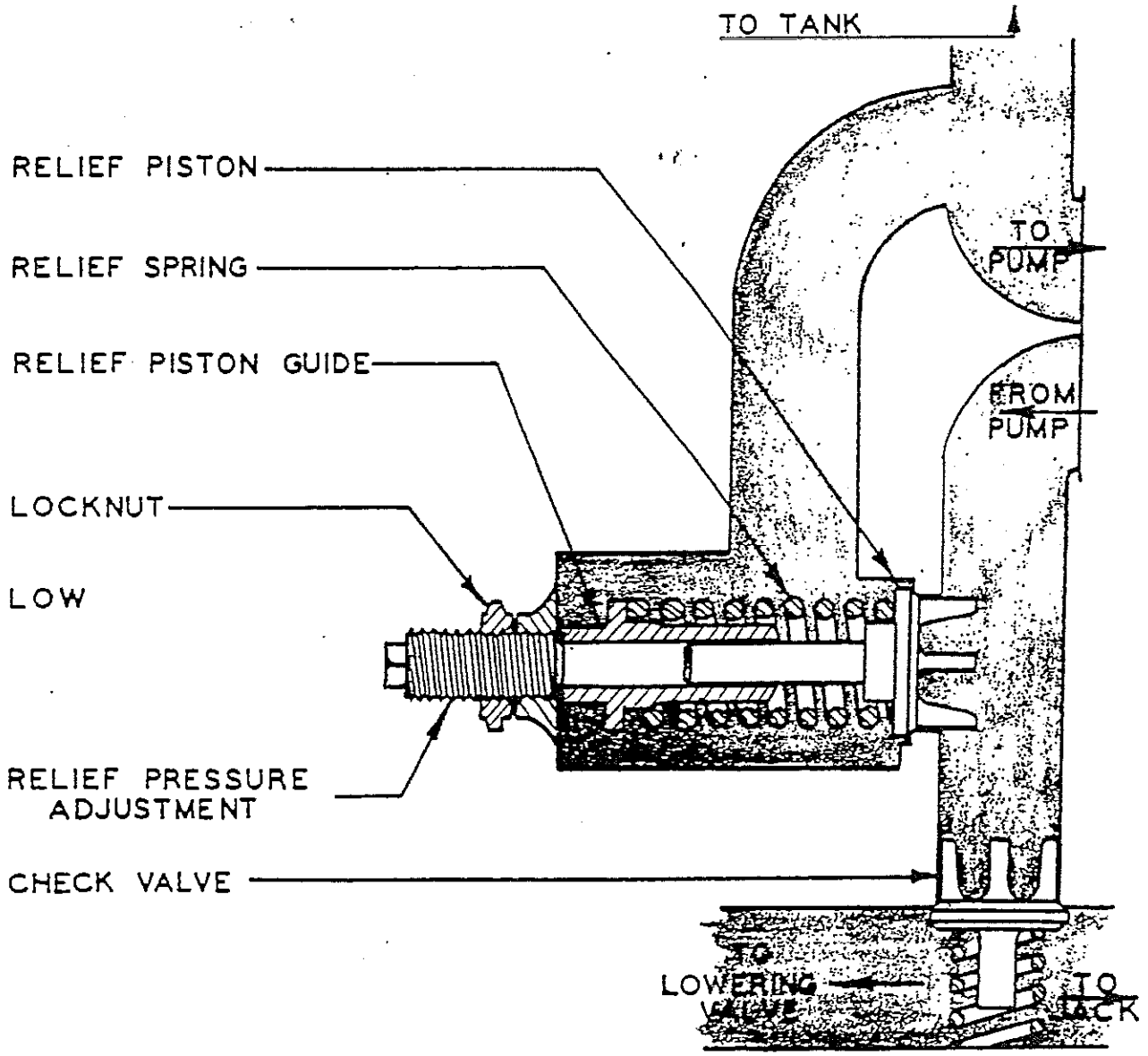
RELIEF PRESSURE ADJUSTMENT

(Follow in sequence as given)

1. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
2. Install pressure gage. (Gage scale should read from 0 to 500 or 600 PSI.)
3. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
4. Start Unit and read from gage.
5. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit. (30 PSI more than "working pressure" on Hatch Wiring Diagram.)
6. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.
7. Replace acorn nut and gasket, remove pressure gage.
8. Open Shut-off Valve.

P-125 6 & 7 ADJUSTMENTS

UP SIDE
SCHEMATIC OIL FLOW DIAGRAM



P-125 6 & 7 SEQUENCE OF OPERATION

RELIEF AND CHECK VALVE

Refer to Schematic Diagram on Page 12

This valve consists of a check valve and a pressure relief valve. The check valve provides single direction flow by allowing pump pressure to lift it while jack pressure seats it. The relief valve provides over-pressure protection since excessive pressure will open the piston against the spring. This valve does not provide volume control; the elevator will start and stop with the pump motor.

P-125 6 & 7 ADJUSTMENTS

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RELIEF PRESSURE SETTING

(Follow in sequence as given)

1. Open Up Start 2 or 3 turns.
2. Open Slow-Down 4 turns.
3. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
4. Install Pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
5. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
6. Start unit and read from gage. (Up Fast Solenoid must be energized.)
7. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit. (30 PSI more than "working pressure" on Hatch Wiring Diagram.)
8. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.
9. Replace acorn nut and gasket.

UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

1. Remove any load from car.
2. Close Up Start Adjustment.
3. Remove acorn nut on Low Pressure Adjustment and back off two turns.
4. Start Power Unit. If car moves, back off on low pressure until car stands still.
5. Turn in on Low Pressure Adjustment until car starts to creep up slowly, then back off until car just stands still, then back off ½ turn more. Replace Acorn Nut and Gasket.
6. Adjust Up-Start.

UP LEVELING ADJUSTMENTS

(Follow in sequence as given)

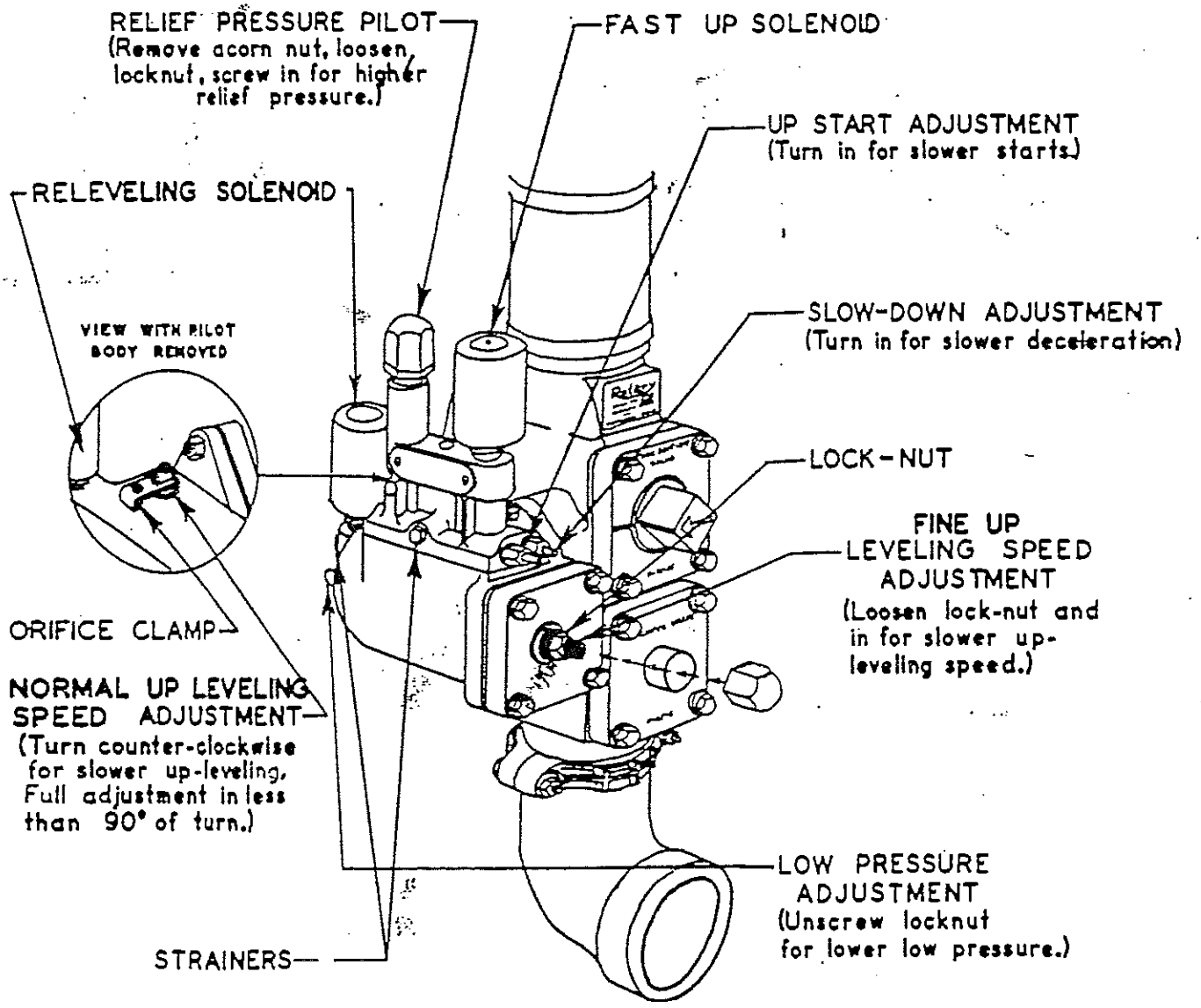
1. Remove acorn nut from Fine Up-Leveling Speed Adjustment and set adjustment stem so 3/4" of screw is out of lock-nut. Replace gasket and acorn nut.
2. Run car by activating up-leveling switch. Check up-leveling speed. It should be approximately 20 fpm but with no strugling or laboring sensation. Note: Down leveling (V-11 or V-12) must be disconnected.
3. Loosen orifice clamp by unscrewing allen head screw, and turn normal up-leveling speed adjustment until leveling speed is within 5 fpm of required speed. Note that this adjustment is very sensitive so make adjustments in very small increments. Tighten clamp before rechecking speed.
4. When speed is within 5 fpm of requirements, make final speed adjustments with fine up-leveling speed adjustment.
5. Adjust slow-down adjustment. (This controls transition from up full to up-leveling speed.)
6. Check with loaded car.

(NOTE: Final stop location is controlled by position of hatchway switches and cams . . . not by valve adjustments!)

(Caution: Do not run unit by-passing or relieving more than one or two minutes at a time, as heat generated may damage pump.)

P-125 6 & 7 ADJUSTMENTS

UP LEVELING ADJUSTMENTS



P-125 6 & 7 SEQUENCE OF OPERATION

BYPASS—UP LEVELING—HIGH PRESSURE RELIEF

Refer to Schematic Diagram on Page 15

This valve consists of an adjustable orifice (up leveling speed adjustment-normal) and a three position non-seating piston which will perform as a bypass piston, a regulating piston and a relief. When the piston is shifted to the right, all oil will bypass to tank; when it is shifted to the left, all oil will go to the plunger; when it is in mid-position, some oil will go each way producing a slow or leveling speed. The piston is shown in the latter position.

To start the elevator the pump is started and the "up fast" solenoid energized. At first, since the bypass piston is parked open against the low pressure adjustment by a spring, all flow will bypass to tank. The pressure built up in the system by this bypassing will cause oil to flow from the up stream (pump) side of "up leveling speed adjustment-normal" through the strainer and "up start adjustment" to the right side of the piston. At the same time, oil on the left side of the piston is free to flow to tank through the "up fast" solenoid even though some oil is admitted through the strainer on the downstream side of the "up leveling speed adjustment-normal" and the "slow-down" adjustment. This action will unbalance the bypass piston and compel it to close against its spring, gradually diverting the bypassing oil to the plunger. The rate of movement and thus the smoothness of the start is controlled by the "up start" adjustment. The elevator will then travel up at maximum speed.

To slow down into leveling speed, the "up fast" solenoid is de-energized, blocking the flow from the left side of the piston to tank and allowing the pressure on its two ends to equalize. The spring will start to open the piston, and as oil starts to bypass, flow through the "up leveling speed adjustment-normal" will cause the pressure on its downstream side, and (since they are interconnected), on the left side of the piston, to drop. As flow increases, the pressure will continue to drop until the unbalanced pressure on the two ends of the piston just balance the spring force. Here it will hover, in balance, bypassing some oil and sending the rest to the plunger, producing a slow or leveling speed. The rate at which this happens is controlled by the slowdown adjustment. The elevator is now traveling at leveling speed.

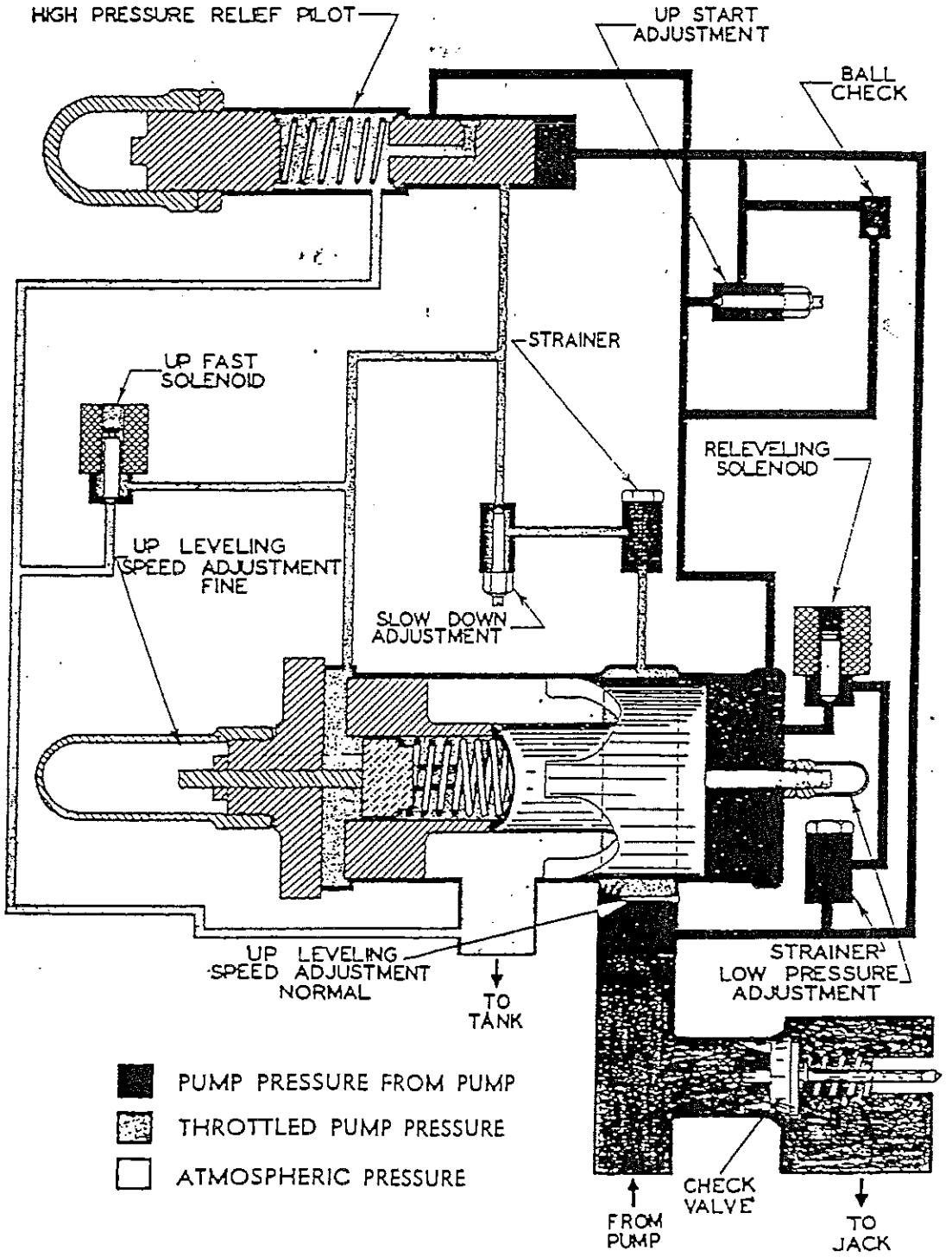
To stop the elevator the pump is stopped. When flow ceases, the main check valve will colse, holding back plunger pressure, and pump pressure will drop to zero. Both ends of the piston lose their pressure and the spring once again parks it open. The smoothness of the stop is dependent on the coasting of the pump.

To relevel the elevator, should this be required, the pump is started and the "releveling" solenoid energized, allowing oil to flow directly and immediately to the right side of the bypass piston. The leveling action will be as before.

In the event of excessive pump pressure, the relief pilot will be shifted to the left against its spring, thus connecting the left side of the bypass piston to high pressure and the right side to tank. This unbalance causes a rapid opening of the piston and consequently relief of the pressure. The main piston remains open just far enough to maintain the set pressure, the pilot floating with ports just cracked open.

P-125 6 & 7 ADJUSTMENTS

SCHEMATIC-UP LEVELING



P-125 6 & 7 ADJUSTMENTS

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Close Manual Lowering Valve. (d) Check direction of motor rotation. (e) Turn in on Relief Pressure. (f) Turn out on Up-Start. (g) If in up-leveling zone, turn clockwise slightly on Normal Up-Leveling Speed Adjustment.
2. Up start slow.	(a) Turn out on Up-Start. (b) Turn in on Low Pressure Adjustment. (c) If in up-leveling zone, check Releveling Solenoid strainer and be sure Releveling Solenoid is energized. (d) If in up-leveling zone, turn clockwise slightly on Normal Up-Leveling Speed Adjustment.
3. Rough up-start.	(a) Turn in on Up-Start. (b) Turn out on Low Pressure Adjustment. (c) Make sure Releveling Solenoid is de-energized.
4. Slow up speed.	(a) Turn in on Relief Pressure. (b) Turn out on Up-Start. (c) See if Up Fast Solenoid is energized.
5. Transition to up-leveling too slow.	(a) Turn out on Slow-Down.
6. Transition to up-leveling too quick.	(a) Turn in on Slow-Down.
7. Jerks when slowing down to up-leveling speed.	(a) Check to be sure up-leveling switch in hatch is energized before stopping switch is energized.

CAUTION: Many jobs have a rough start caused by the low pressure adjustment being closed too much. This seems to be a common field fault. Pay strict attention to instructions on this adjustment.

P-125 6 & 7 ADJUSTMENTS

RELIEF PRESSURE SETTING

(Follow in sequence as given)

1. Open Up Start 2 or 3 turns.
2. Open Slow-Down 4 turns
3. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
4. Install Pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
5. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
6. Start unit and read from gage. (Up Fast Solenoid must be energized.)
7. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit. (30 PSI more than "working pressure" on Hatch Wiring Diagram.)
8. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.

UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

1. Remove any load from car.
2. Energize Up Stop Solenoid and open up Stop 2 turns.
3. Remove acorn nut on Low Pressure Adjustment and back off two turns.
4. Start Power Unit. If car moves, back off on low pressure until car stands still.
5. Turn in on Low Pressure Adjustment until car starts to creep up slowly, then back off until car just stands still, then back off ½ turn more. Stop unit and de energize Up-Stop Solenoid. Replace Acorn Nut and Gasket.
6. Adjust Up-Start.

UP LEVELING ADJUSTMENTS

(Follow in sequence as given)

1. Run car by activating up-leveling switch Check up-leveling speed. It should be approximately 20 fpm but with no struggling or laboring sensation. Note: Down-leveling switch must be disconnected.
2. Adjust up-leveling speed.
3. Adjust slow-down adjustment. (This controls transition from up full to up-leveling speed.)
4. Check with loaded car.
5. Set final Up Stop.
6. Adjust Up Stop timer on control panel so motor stops within one second of time car stops.

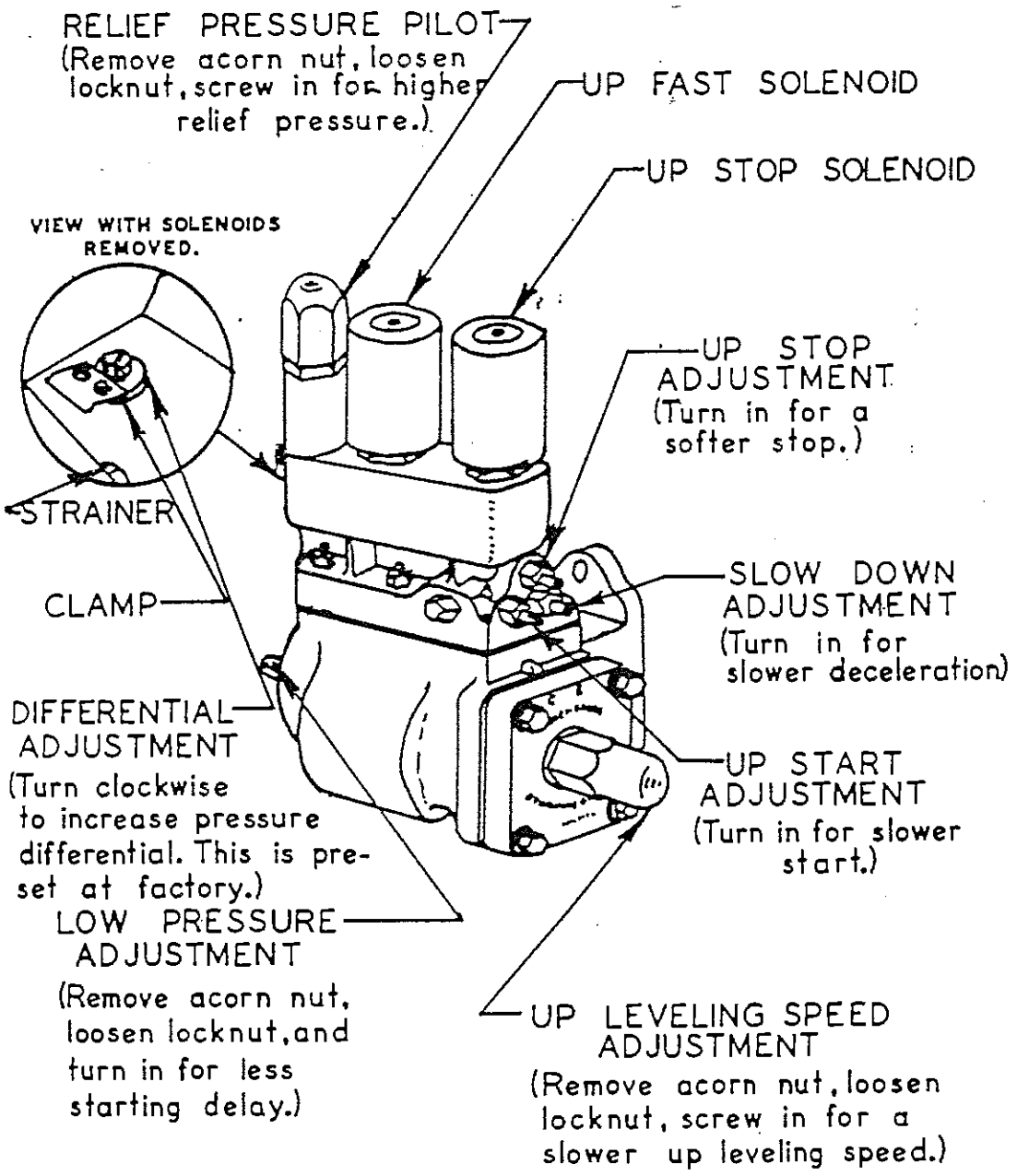
(NOTE: Differential Adjustment is factory set and should NOT be field adjusted without proper equipment and advice.)

(NOTE: Final stop location is controlled by position of hatchway switches and cams . . . not by valve adjustments!)

(Caution: Do not run unit by-passing or relieving more than one or two minutes at a time, as heat generated may damage pump.)

P-125 6 & 7 ADJUSTMENTS

UP LEVELING ADJUSTMENTS



P-125 6 & 7 SEQUENCE OF OPERATION

ROTA RELIEF—UP LEVELING—BYPASS STOP

Refer to Schematic Diagram on Page 19

(The perforated edge is considered the top of the page)

This valve consists of an adjustable orifice (differential adjustment), a three position regulating bypass piston and a relief pilot. When the regulating piston is fully open all oil will bypass to tank, when it is closed all oil will go to the plunger, and when it is regulating or partially open some oil will go each way providing leveling speed. The valve is shown in the latter position.

To start the elevator the pump is started and the up fast solenoid energized. Since the regulating piston is parked open against the low pressure adjustment, by its spring, all oil will initially bypass to tank. At this time oil will also flow through the ...t on the upstream (pump) side of the adjustable orifice to the top end of the bypass piston. At the same time, energizing of the "up fast" solenoid drains oil from beneath the pilot piston allowing pressure to move it downward thus connecting the bottom side of the bypass piston to tank through the "up start" adjustment. The higher pressure on the top side of the bypass piston now causes it to close against its spring at a rate controlled by the "up start" adjustment. This diverts the oil from bypass to plunger providing a smooth transition to full speed.

To slowdown into leveling speed the "up fast" solenoid is de-energized allowing the spring to shift the pilot piston up and open a passage from the strainer on the downstream side of the bypass piston through the "slowdown" adjustment to the bottom end of the bypass piston. Since both ends of this piston are now at the same pressure the spring will start to open it. As it opens and oil begins to bypass, the oil flow across the orifice will cause the pressure to drop on the downstream side, and since they are interconnected, on the bottom of the bypass piston. The bypass flow will continue to increase and the pressure continue to drop until the difference in pressure on the two ends of the piston just balances the spring force. At this point the piston will hover in balance, bypassing most of the oil to tank and the elevator will run at leveling speed. Since the spring force varies the amount of oil bypassed, its adjustment offers a "leving speed" adjustment. The rather delicate setting of the adjustable (differential) orifice to a particular flow is made in the factory with a differential pressure gauge.

To stop the elevator the "up stop" solenoid is energized and the pump allowed to run slightly longer on a timed delay. During this delay oil flows through the now open solenoid and the "up stop" adjustment to the bottom of the bypass piston equalizing the pressure on its two ends once again and allowing its spring to open it fully at a rate controlled by the "up stop" adjustment. This is completely accomplished, providing full bypass and a smooth stop, before the pump stops.

If an excess of pressure is encountered, it will be transmitted to the top side of the relief pilot causing it to move downward. This connects the bottom end of the bypass piston to high pressure and the top end to tank thus causing it to open rapidly and relieve the excess pressure.

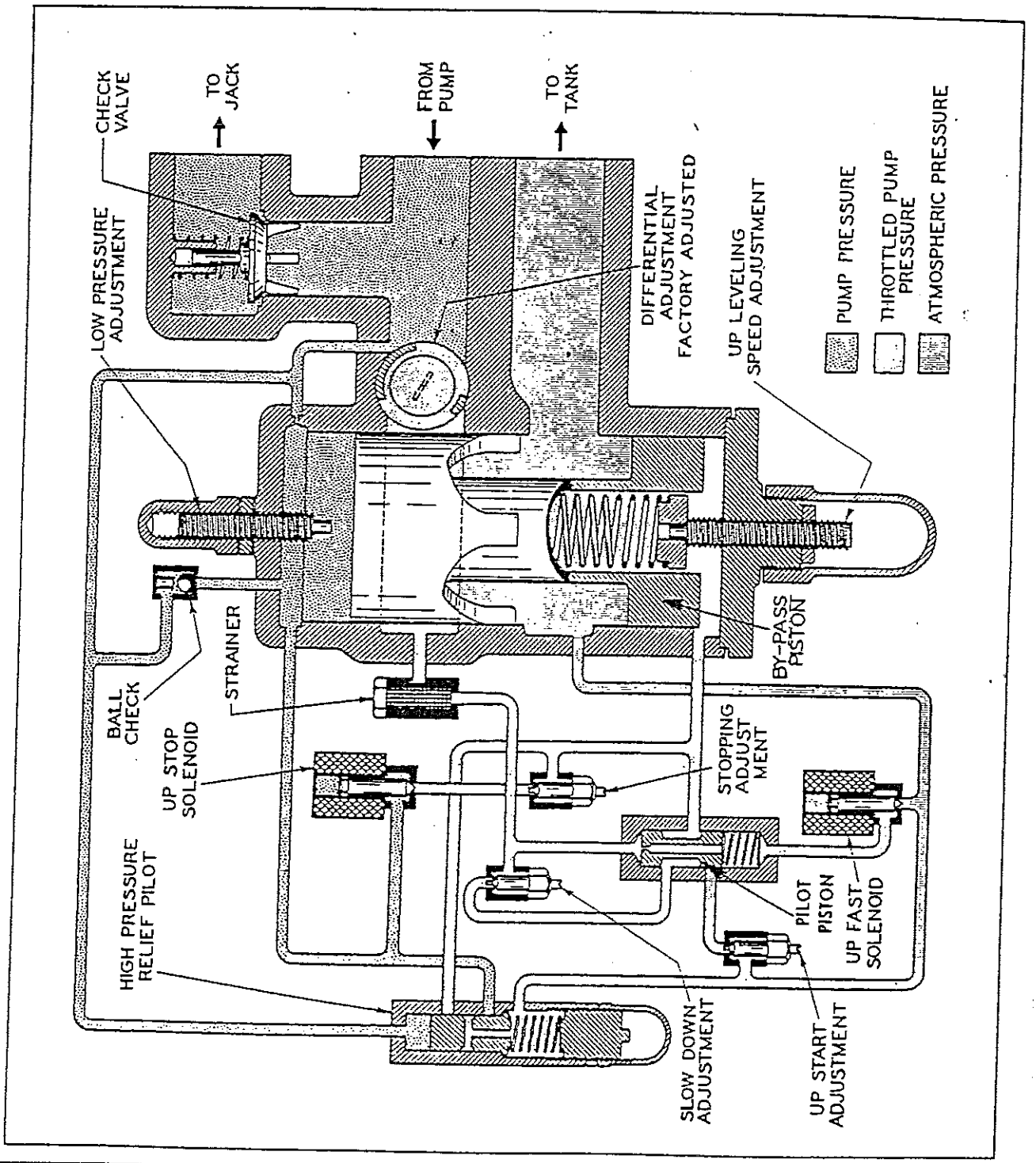
Printed in U.S.A.

DOVER CORPORATION
Elevator Division
MEMPHIS 2, TENN.

May 1, 1965

P-125 6 & 7 ADJUSTMENTS

SCHEMATIC-UP LEVELING



P-125 6 & 7 ADJUSTMENTS

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Close Manual Lowering Valve. (d) Check direction of motor rotation. (e) Turn in on Relief Pressure. (f) Turn out on Up-Start. (g) Make sure Up Stop Solenoid is de-energized.
2. Up start slow.	(a) Turn out on Up-Start. (b) Turn in on Low Pressure Adjustment. (c) If in up-leveling zone, check strainer. (d) Remove cap on side of pilot section and check spring and piston for trash.
3. Rough up-start.	(a) Turn in on Up-Start. (b) Turn out on Low Pressure Adjustment.
4. Slow up speed.	(a) Turn in on Relief Pressure. (b) Turn out on Up-Start. (c) See if Up Fast Solenoid is energized.
5. Transition to up-leveling too slow.	(a) Turn out on Slow-Down. (b) Remove cap on side of pilot section and check spring and piston for trash.
6. Transition to up-leveling too quick.	(a) Turn in on Slow-Down.

CAUTION: Differential Adjustment is factory set and should NOT be field adjusted without proper equipment and advice.

CAUTION: Many jobs have a rough start caused by the low pressure adjustment being closed too much. This seems to be a common field fault. Pay strict attention to instructions on this adjustment.

Moya Shorafeld.

P-125 6 & 7 ADJUSTMENTS

Division	
Section	
Page	

RELIEF PRESSURE SETTING

(For replacement units, follow in sequence.)
(For re-adjustment of existing valve, omit steps 1, 2, and 6.)

1. Open Up Start 2 or 3 turns.
2. Open Slow-Down 4 turns.
3. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
4. Install Pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
5. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
6. Remove acorn nut on Low Pressure Adjustment and back off at least two turns.
7. Start unit and read from gage. (Up Fast Solenoid must be energized.)
8. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit. (50 PSI more than "working pressure" on Hatch Wiring Diagram.)
9. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.

UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

1. Remove any load from car.
2. Open up Stop 5 to 6 turns.
3. Remove acorn nut on Low Pressure Adjustment and back off two turns.
4. Start Power Unit, leaving both Solenoids de-energized. If car moves, back off on low pressure until car stands still.
5. Turn in on Low Pressure Adjustment until car starts to creep up slowly, then back off until car just stands still, then back off ½ turn more. Stop unit. Replace Acorn Nut and Gasket.
6. Adjust Up-Start.

UP LEVELING ADJUSTMENTS

(Follow in sequence as given)

1. Run car by actuating up-leveling switch. Check up-leveling speed. It should be at least 25 fpm. Note: Down-leveling switch must be disconnected.
2. Adjust up-leveling speed.
3. After trying at full speed, adjust slow-down adjustment. (This controls transition from up full to up-leveling speed.)
4. Check with loaded car.
5. Set final Up Stop.
6. Up Stop timer on control panel should keep motor running a short while after car stops.

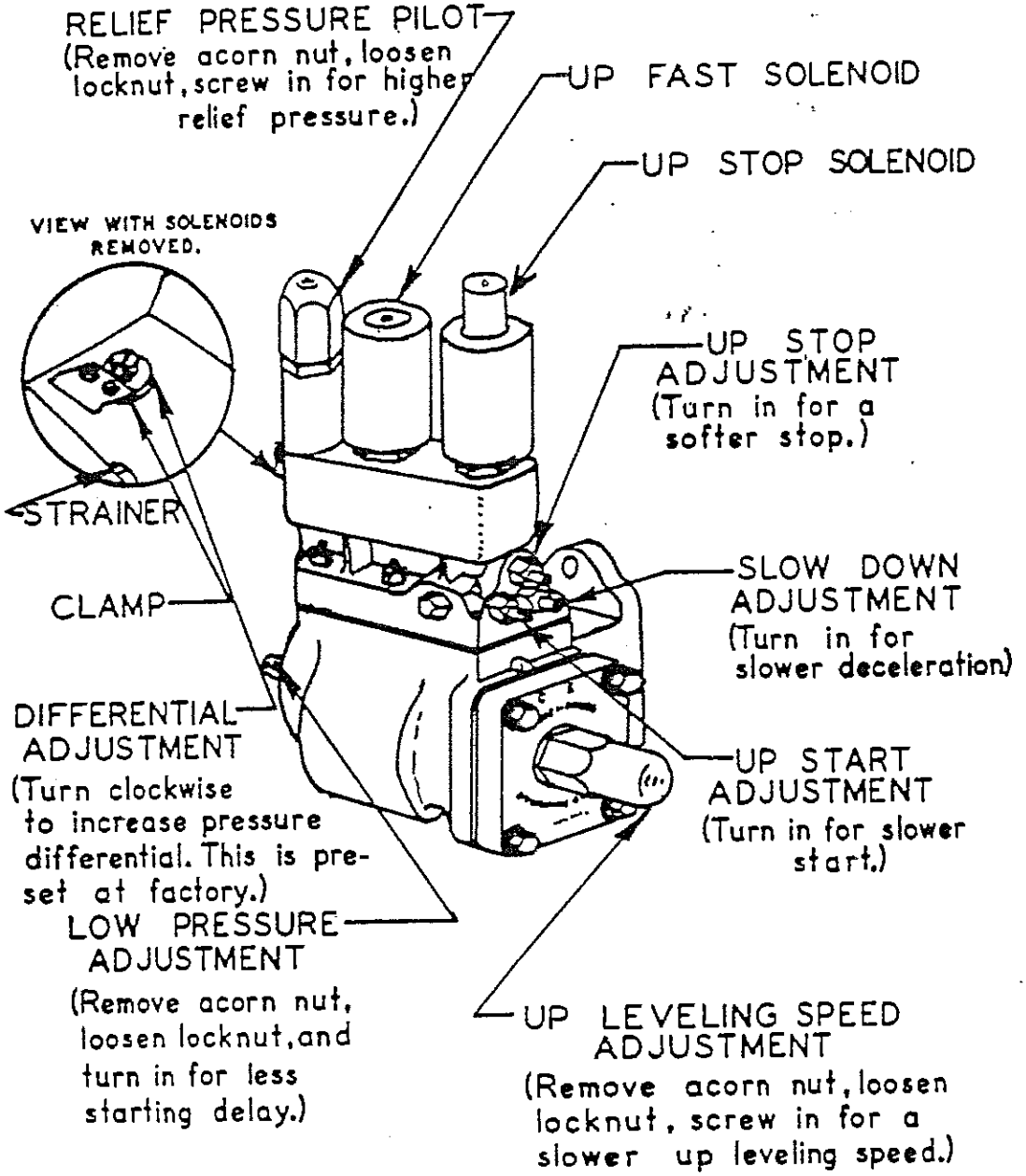
(NOTE: Differential Adjustment is factory set and should NOT be field adjusted without proper equipment and advice.)

(NOTE: Final stop location is controlled by position of hatchway switches and cams . . . not by valve adjustments!)

(Caution: Do not run unit by-passing or relieving more than one or two minutes at a time, as heat generated may damage pump.)

P-125 6 & 7 ADJUSTMENTS

UP LEVELING ADJUSTMENTS



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P-125 6 & 7 SEQUENCE OF OPERATION

ROTA RELIEF—UP LEVELING—BYPASS STOP

Refer to Schematic Diagram on Page 23
(The perforated edge is considered the top of the page)

This valve consists of an adjustable orifice (differential adjustment), a three-position regulating bypass piston, and a relief pilot. When the regulating piston is fully open all oil will bypass to tank, when it is closed all oil will go to the plunger, and when it is regulating or partially open some oil will go each way providing a leveling speed. The valve is shown in the latter position.

To start the elevator the pump is started and both solenoids are energized. Since the regulating piston is parked open against the low pressure adjustment by its spring, all oil will initially bypass to tank. At this time, oil will also flow from the inlet to the upstream (pump) side of the adjustable orifice to the top end of the bypass piston. At the same time, energizing of the "up fast" solenoid drains oil from beneath the pilot piston, allowing pressure to move it downward, thus connecting the bottom side of the bypass piston to tank through the "up start" adjustment. The high pressure on the top side of the bypass piston now causes it to close against its spring at a rate controlled by the "up start" adjustment. This diverts the oil from bypass to plunger providing a smooth transition to full speed.

To slow down into leveling speed the "up fast" solenoid is de-energized, allowing the pressure to equalize and the spring to shift the pilot piston up, opening a passage from the strainer on the downstream side of the bypass piston through the "slow-down" adjustment to the bottom end of the bypass piston. Since both ends of this piston are now at the same pressure the spring will start to open it. As it opens and oil begins to bypass, the oil flow across the orifice will cause the pressure to drop on the downstream side, and, since they are interconnected, on the bottom of the bypass piston. The bypass flow will continue to increase and the pressure to drop until the difference in pressure on the two ends of the piston just balances the spring force. At this point the piston will hover in balance, bypassing most of the oil to tank and the elevator will run at leveling speed. Since the spring force varies the amount of oil bypassed, its adjustment offers a "leveling speed" adjustment. The rather delicate setting of the adjustable orifice to a particular flow is made in the factory with a differential pressure gauge.

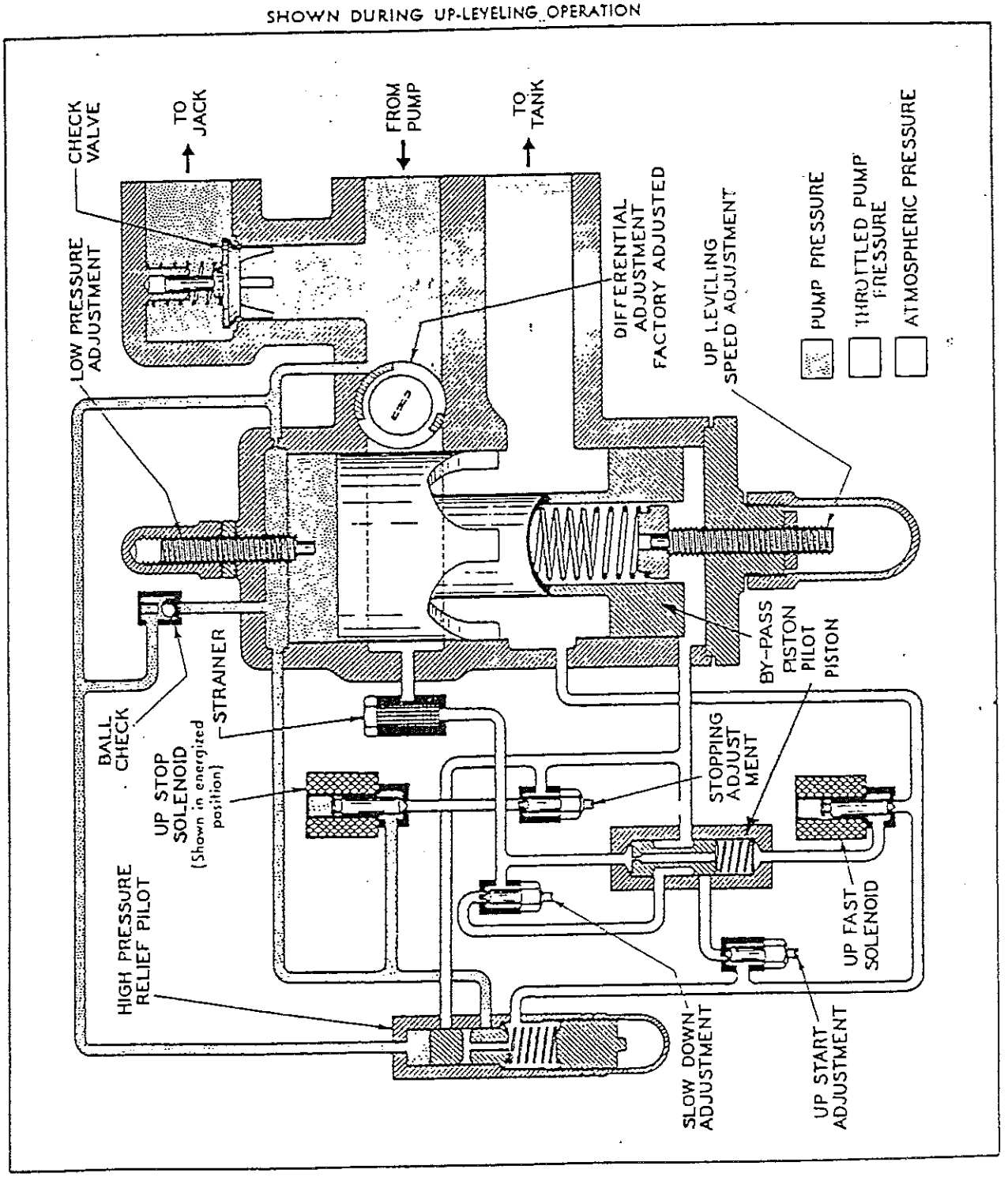
To stop the elevator the "up slow" solenoid is de-energized, but the pump is allowed to run slightly longer on a timed delay. During this delay oil flows through the now open solenoid and the "up stop" adjustment to the bottom of the bypass piston equalizing the pressure on its two ends once again and allowing its spring to open it fully at a rate controlled by the "up stop" adjustments. This is completely accomplished, providing full bypass and a smooth stop, before the pump stops.

If an excess of pressure is produced by the pump, it will be transmitted to the top side of the relief pilot causing it to move downward. This connects the bottom end of the bypass piston to high pressure and the top end to tank thus causing it to open rapidly and relieve the excess pressure. When the pressure falls to relief pilot setting it settles in cracked-open position and holds the bypass at the appropriate position to bypass flow at this pressure.

P-125 6 & 7 ADJUSTMENTS

SCHEMATIC-UP LEVELING

SHOWN DURING UP-LEVELING OPERATION



P-125 6 & 7 ADJUSTMENTS

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Close Manual Lowering Valve. (d) Check direction of motor rotation. (e) Make sure Up Stop Solenoid is energized. (Coil may be open.) (f) Turn in on Relief Pressure. (g) Turn out on Up-Start.
2. Up start slow.	(a) Turn out on Up-Start. (b) Turn in on Low Pressure Adjustment. (c) If in up-leveling zone, check strainer. (d) Remove cap on side of pilot section and check spring and piston for trash.
3. Rough up-start.	(a) Turn in on Up-Start. (b) Turn out on Low Pressure Adjustment.
4. Slow up speed.	(a) Turn in on Relief Pressure. (b) Turn out on Up-Start. (c) See if Up Fast Solenoid is energized.
5. Transition to up-leveling too slow.	(a) Turn out on Slow-Down. (b) Remove cap on side of pilot section and check spring and piston for trash.
6. Transition to up-leveling too quick.	(a) Turn in on Slow-Down.
7. Car will not stop with Up Stop Solenoid de-energized.	(a) Open Up Stop adjustment. (b) Turn out on Low Pressure adjustment

CAUTION: Differential Adjustment is factory set and should NOT be field adjusted without proper equipment and advice.

CAUTION: Many jobs have a rough start caused by the low pressure adjustment being closed too much. This seems to be a common field fault. Pay strict attention to instructions on this adjustment.

P-125 6 & 7 ADJUSTMENTS

CONSTANT SPEED LOWERING VALVE ADJUSTMENTS

PRELIMINARY ADJUSTMENTS

1. Steps A thru K have been factory set on all power units. It will be necessary to perform these steps on most replacement valves.
   - A. Open all needle adjustments (except manual lowering) three full turns.
   - B. Adjust leveling speed screw until it extends 7/8" from face on body.
   - C. Adjust lowering speed screw until it extends 5/8" from face on cap.
   - D. Unscrew regulating piston adjustment until the feel of the spring is lost.
   - E. Turn in until you feel the spring.
   - F. Turn regulating spring adjustment in 12 full turns.
   - G. Set up pressure differential gauge between jack pressure (outside connection on main body) and regulating piston (Connect to tap on rear cap).
   - H. Run elevator to top of hatch.
   - I. Lower the car.
   - J. As the car lowers set the differential to 22 PSI plus or minus 2 PSI, by turning in the regulating spring adjustment to raise or backing off regulating adjustment to lower the differential pressure.
   - K. Lock down the above adjustments.
2. Run the elevator to the top of the hatch.
3. Lower the car.
4. Set lowering speed with down speed adjustment. (Turning in reduces speed, turning out increases speed).
5. Lock down speed adjustment with lock nut and cover with acorn cap when desired speed is reached.
6. Run elevator up five feet.
7. De-energize the down fast solenoid.
8. Lower the car.
9. Adjust leveling speed. (Turn leveling speed adjustment in to increase speed, turn out to decrease speed.)

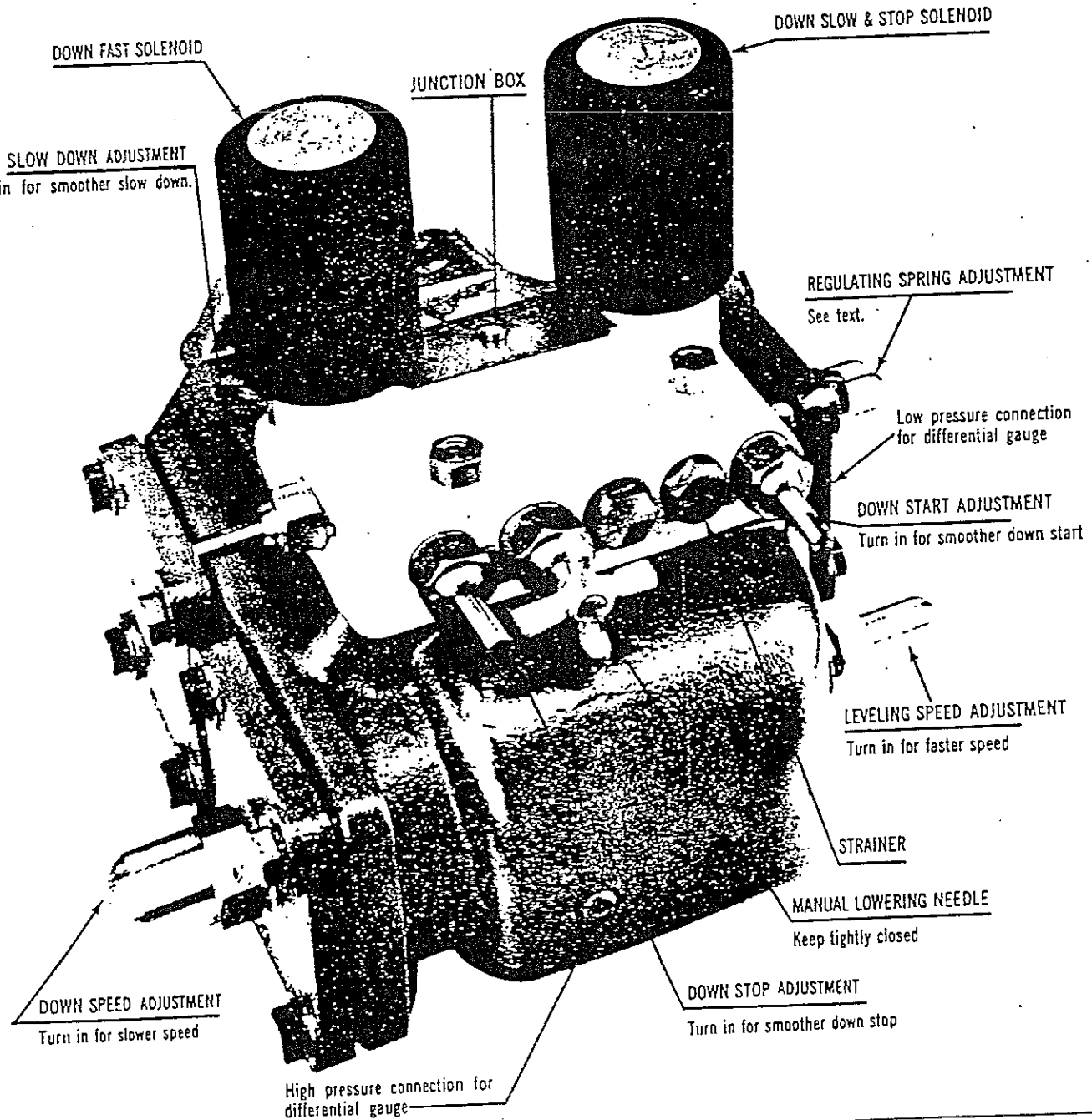
FINAL ADJUSTMENTS

1. Adjust the down start. (Turn in down start needle for smoother down start.)
2. Adjust slow down. (Turn slow down adjustment in for smoother slow down.)
3. Adjust the down stop. (Turn down stop adjustment in for smoother stop.)
4. Check manual lowering.
   - A. Run car up.
   - B. De-energize down fast solenoid.
   - C. Open manual lowering needle. (Car should lower at leveling speed.)

NOTE: All adjustments are Independent of Each other.

P-125 6 & 7 ADJUSTMENTS

CONSTANT SPEED LOWERING ADJUSTMENTS



Printed in U.S.A.

DOVER CORPORATION
Elevator Division
MEMPHIS 2, TENN.

May 1, 1965

P-125 6 & 7 SEQUENCE OF OPERATION

CONSTANT SPEED LOWERING VALVE

See Schematic Diagram on Page 27

This valve consists of a non-seating two-position orifice piston, a seating regulating piston, and two pilot pistons. The orifice pilot and its solenoid control the position of the orifice piston, while the regulating pilot and its solenoid control the motion of the regulating piston. The valve is shown as it parks with the orifice piston to the left in slow speed position, the regulating piston seated and the elevator at rest.

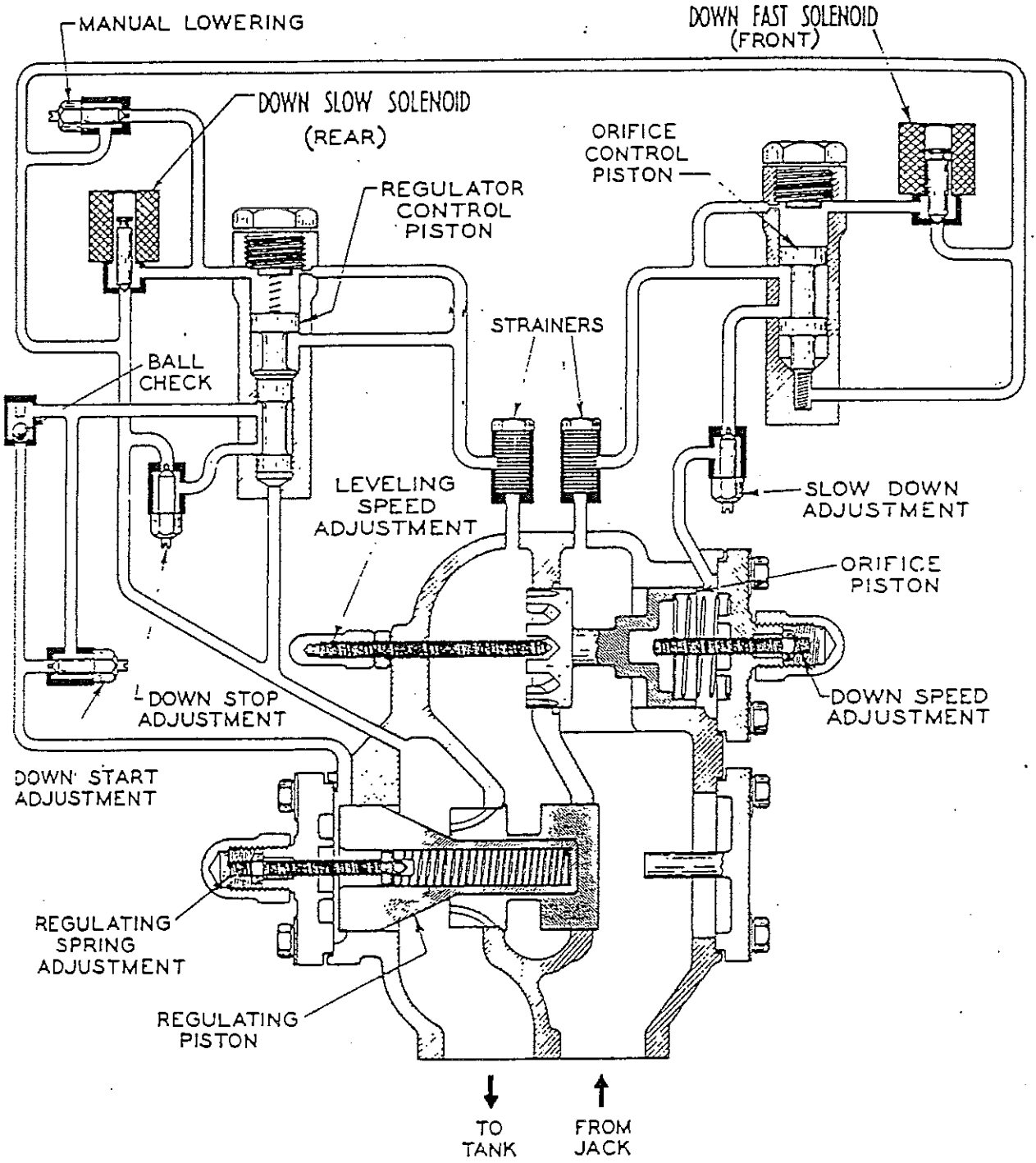
To start the car down both solenoids are energized. Energizing the "down fast" solenoid drains oil from the top end of the orifice pilot allowing the spring to open it. Oil is now free to drain from the orifice piston to tank, allowing it to shift to the right or high speed position, limited by the down speed adjustment. Energizing the "down slow" solenoid drains oil from the top end of the regulating pilot lowing pressure to open it. Oil is now free to flow from the strainer on the downstream side of the orifice piston through the "down start" adjustment to the left end of the regulating piston. This allows equal pressure on the two ends of this piston enabling the spring to open it at a rate controlled by the "down start" adjustment. As this opens, oil begins to flow through the orifice piston dropping the pressure on its downstream side and, since they are interconnected, on the left side of the regulating piston. This pressure will continue to drop with increased flow until the now unbalanced pressure on the regulating piston balances the spring force thus arresting the opening. Here it will hover in balance allowing just enough oil to escape to maintain the pressure drop across the orifice piston. Since the regulation is not dependent on the working pressure, it is not affected by it, hence "constant speed lowering."

To slow down into leveling speed, the "down fast" solenoid is de-energized, allowing the orifice pilot to close and thus oil to flow from the strainer on the upstream side of the orifice piston through the "slowdown" adjustment to the right end of the orifice piston. The spring and flow will move the piston to the left at a rate controlled by the "slowdown" adjustment, and to a position limited by the leveling speed adjustment. As this happens, the regulating piston will follow, closing off just enough to maintain the pressure drop across the orifice piston until the elevator reaches leveling speed.

The final stop is accomplished by de-energizing the "down slow" solenoid, returning the regulating pilot to its closed position. This disconnects the left end of the regulating piston from pressure and allows it to drain to tank through the "down stop" adjustment. The pressure on its opposite end then closes it at a rate controlled by the "down stop" adjustment.

The manual lowering valve bypasses the "down slow" solenoid allowing the elevator to lower at leveling speed.

SCHEMATIC CONSTANT SPEED LOWERING



P-125 6 & 7 ADJUSTMENT

P-149 AND P-150 LOWERING SECTION

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Car will not Lower.	A. Check Line Shut-off Valve. B. Check Tank Shut-off Valve. C. Check Current Supply. D. Check Solenoid Coils. E. Turn out on Down Start Adjustment. F. Turn out on Down Speed Adjustment. G. Check Regulator Control Piston Spring.
2. Bouncy, Slow, Down-Start.	A. Bleed Jack of air, or Loosen packing if possible. B. Turn out on Down Start Adjustment. C. Turn out on Down Speed Adjustment.
3. Sudden Down Start.	A. Turn in on Down-Stop Adjustment.
4. Car will not stop when started Down	A. Tighten Manual Lowering. B. Turn out on Down Stop Adjustment. C. Check Solenoid Valves not seating. D. Check for Clogged Strainers.
5. Bouncy, Slow, Down-Stop.	A. Bleed Jack of Air or Loosen packing, if possible. B. Turn out on Down-Stop Adjustment.
6. Abrupt Down-Stop. (Quick)	A. Turn in on Down-Stop Adjustment.
7. Slow Down Abrupt. (Quick)	A. Turn in on Slow Down Adjustment.
8. Slow - Slow Down.	A. Check Strainers.
9. Leveling Bouncy.	A. Bleed Jack of Air or Loosen packing if possible. B. Increase Leveling Speed.

P-125, 6 AND 7 ADJUSTMENTS

CONSTANT SPEED LOWERING VALVE ADJUSTMENTS

See illustration on page 30

PRELIMINARY ADJUSTMENTS

Note: All power units are factory adjusted and require only final adjustments in the field. Replacement valves will require full adjustment.

A. Close manual lowering needle tightly.

B. Open all adjustment needles three full turns. (Close snugly, then open three full turns.)

C. Turn in leveling speed adjustment until it contacts piston, then three full turns more.

D. Turn in down speed adjustment until it contacts piston, then turn out ten full turns.

E. Run the car and set lowering speed to desired figure. Turning in on lowering speed adjustment REDUCES speed.

F. Run car with down fast solenoid de-energized and set leveling speed. Turning in on leveling speed adjustment INCREASES speed. If inspection operation is provided, it will be a convenient means of running the car at leveling speed.

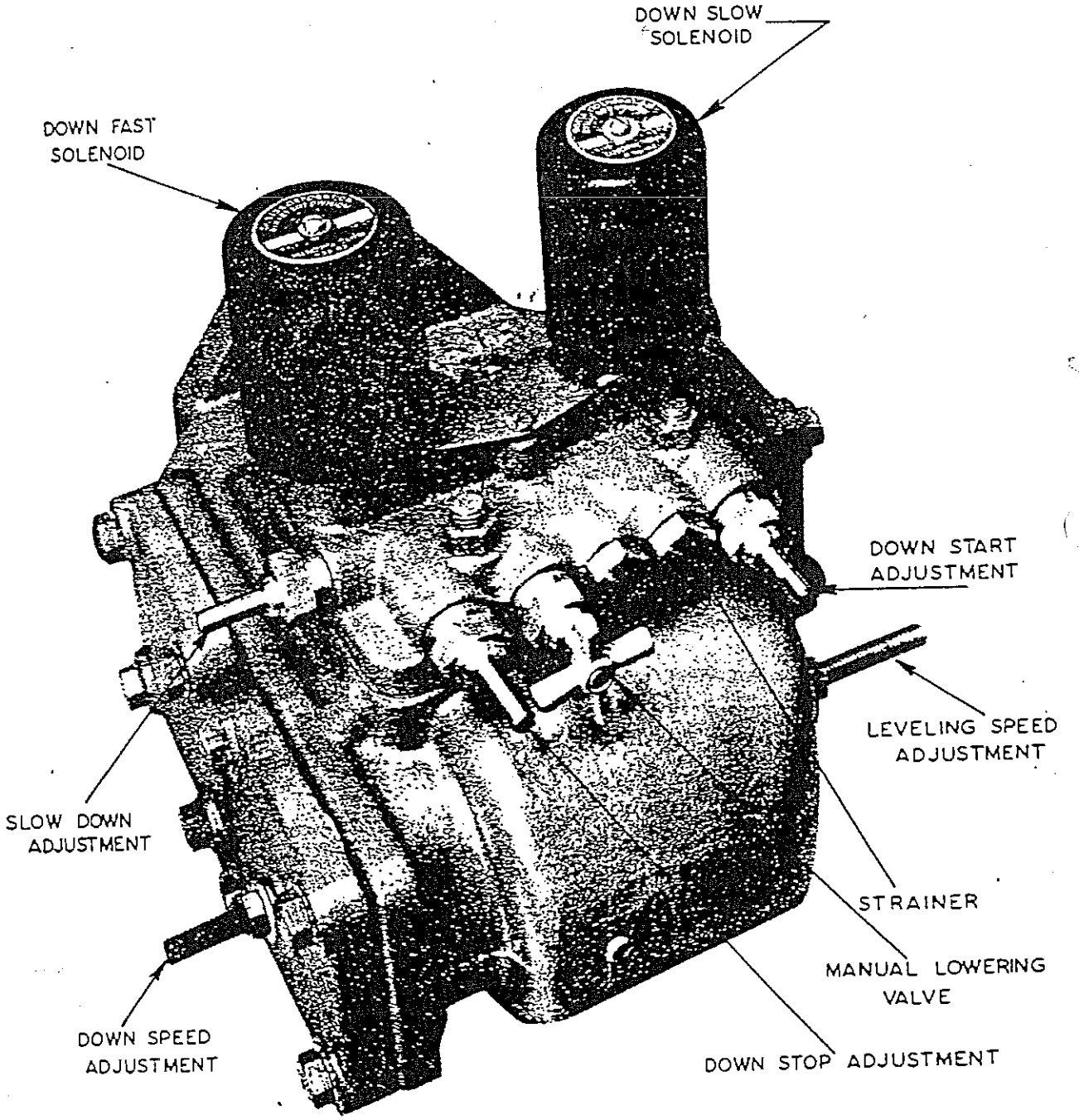
G. Proceed with final adjustments.

FINAL ADJUSTMENTS

A. Adjust the three needles, down start, down stop and slowdown to suit. The adjustments are all independent of one another. Turning in produces smoother (more gradual) action with all three adjustments.

P-125, 6 AND 7 ADJUSTMENTS

CONSTANT SPEED LOWERING ADJUSTMENTS



P-125 6 & 7 SEQUENCE OF OPERATION

CONSTANT SPEED LOWERING VALVE

Schematic Diagram on Page 31

This valve consists of a non-seating two-position orifice piston, a seating regulating piston, and two pilot pistons. The orifice pilot and its solenoid control the position of the orifice piston, while the regulating pilot and its solenoid control the motion of the regulating piston. The valve is shown as it parks with the orifice piston to the left in slow speed position, the regulating piston seated and the elevator at rest.

To start the car down both solenoids are energized. Energizing the "down fast" solenoid drains oil from the top end of the orifice pilot allowing the spring to open it. Oil is now free to drain from the orifice piston to tank, allowing it to shift to the right to high speed position, limited by the down speed adjustment. Energizing the "down slow" solenoid drains oil from the top end of the regulating pilot allowing pressure to open it. Oil is now free to flow from the strainer on the downstream side of the orifice piston through the "down start" adjustment to the left end of the regulating piston. This allows equal pressure on the two ends of this piston enabling the spring to open it at a rate controlled by the "down start" adjustment. As this opens, oil begins to flow through the orifice piston dropping the pressure on its downstream side and, since they are interconnected, on the left side of the regulating piston. This pressure will continue to drop with increased flow until the now unbalanced pressure on the regulating piston balances the spring force thus arresting the opening. Here it will hover in balance allowing just enough oil to escape to maintain the pressure drop across the orifice piston. Since the regulation is not dependent on the working pressure, it is not affected by it, hence "constant speed lowering."

To slow down into leveling speed, the "down fast" solenoid is de-energized, allowing the orifice pilot to close and thus oil to flow from the strainer on the upstream side of the orifice piston through the "slowdown" adjustment to the right end of the orifice piston. The spring and flow will move the piston to the left at a rate controlled by the "slowdown" adjustment, and to a position limited by the leveling speed adjustment. As this happens, the regulating piston will follow, closing off just enough to maintain the pressure drop across the orifice piston until the elevator reaches leveling speed.

The final stop is accomplished by de-energizing the "down slow" solenoid, returning the regulating pilot to its closed position. This disconnects the left end of the regulating piston from pressure and allows it to drain to tank through the "down stop" adjustment. The pressure on its opposite end then closes it at a rate controlled by the "down stop" adjustment.

The manual lowering valve bypasses the "down slow" solenoid allowing the elevator to lower at leveling speed.

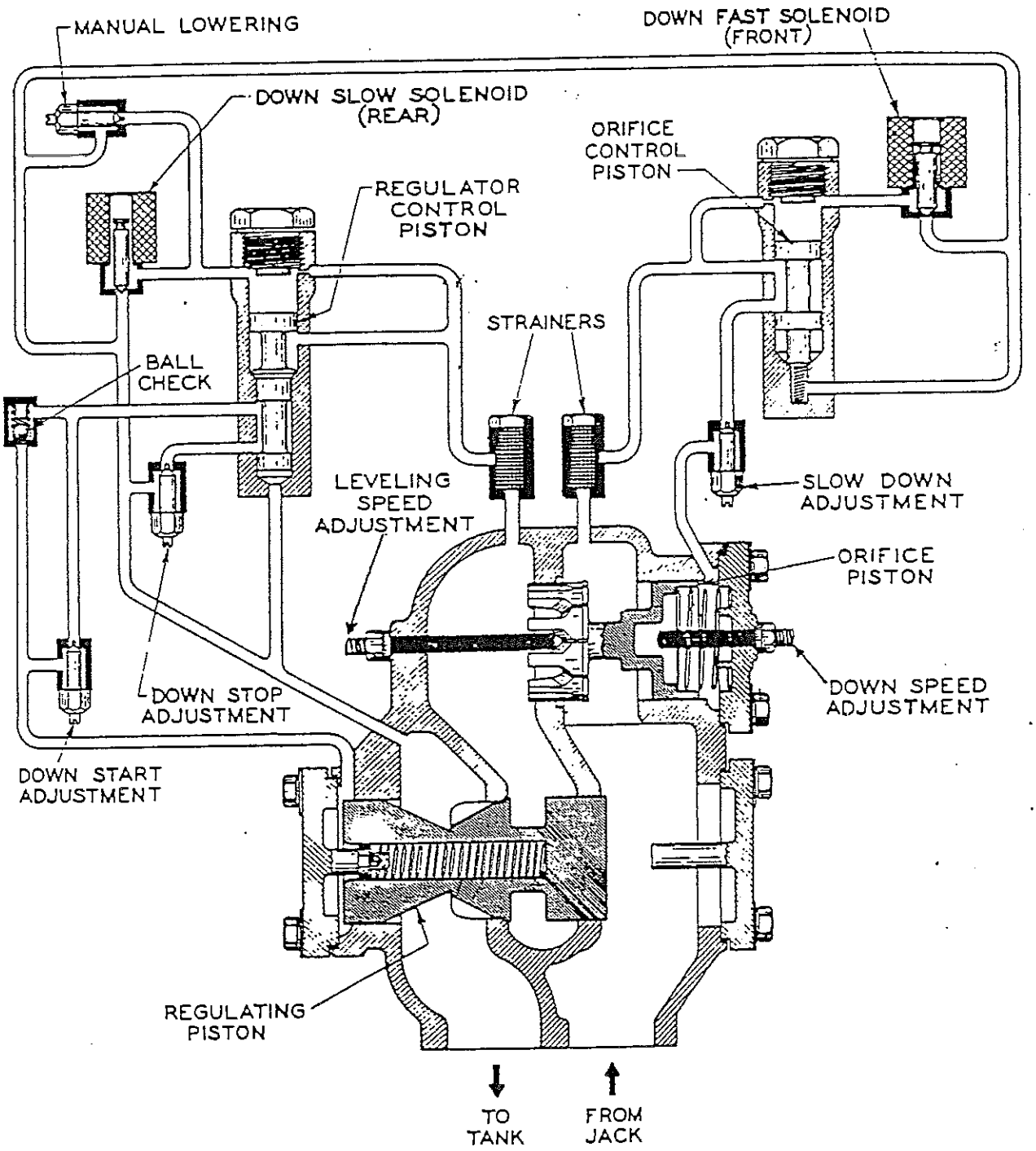
Printed in U.S.A.

DOVER CORPORATION
Elevator Division
MEMPHIS 2, TENN.

May 1, 1965

P-125, 6 AND 7 ADJUSTMENTS

SCHEMATIC CONSTANT SPEED LOWERING



P-125, 6 AND 7 ADJUSTMENTS

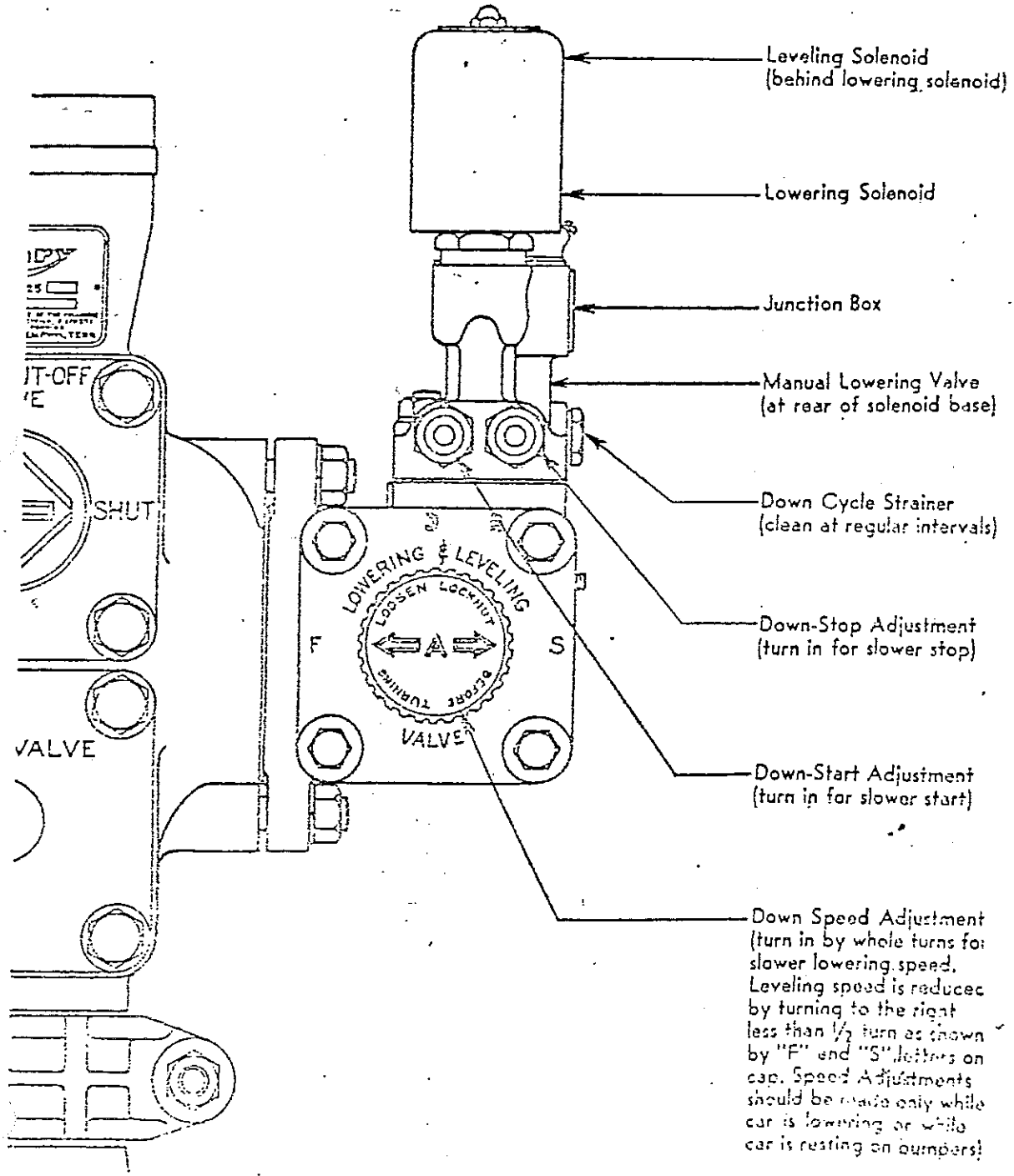
CONSTANT SPEED LOWERING
TROUBLE SHOOTING

DIFFICULTY	SOLUTION
Car will not lower	1. Check line shut off. 2. Check tank shut off. 3. Check power supply. 4. Check solenoids. 5. Check freedom of regulating piston. (Behind caps on "inside" of valve body.)
Car will not stop	1. Make sure load on jack is sufficient to produce required minimum pressure of 100 PSI. 2. Tighten manual lowering. 3. Check freedom of regulator control piston. (Located behind cap between manual lowering valve and strainer.) 4. Check freedom of orifice control piston. (Located next to strainer on "INSIDE" of valve.) 5. Make sure solenoid valves are seating properly. 6. Make sure regulating piston is free. (Beneath cap on "outside" of valve.)
"Bouncy" or "Hunting" during start, slowdown or leveling.	1. Bleed air from jack. 2. Inspect ball check spring. (Located beneath 1/8" Allen pipe plug on top of valve.) 3. If jack fitted with adjustable packing, make sure same is not too tight. 4. Increase leveling speed slightly.
Car will not lower at high speed.	1. Check freedom of orifice control piston. Check its spring, spring must park piston open. 2. Check power supply. 3. Check down fast solenoid. 4. Check freedom of orifice piston.
Car will not slow down to leveling speed	1. Make sure down fast solenoid is being de-energized. 2. Make sure orifice piston is free and that the spring parks it closed.
Car will not raise from bumpers	1. Back off completely on leveling speed adjustment.

Note: The solutions to the problems are to be tried individually and in the given order. They presume that all normal adjustment has been completed.

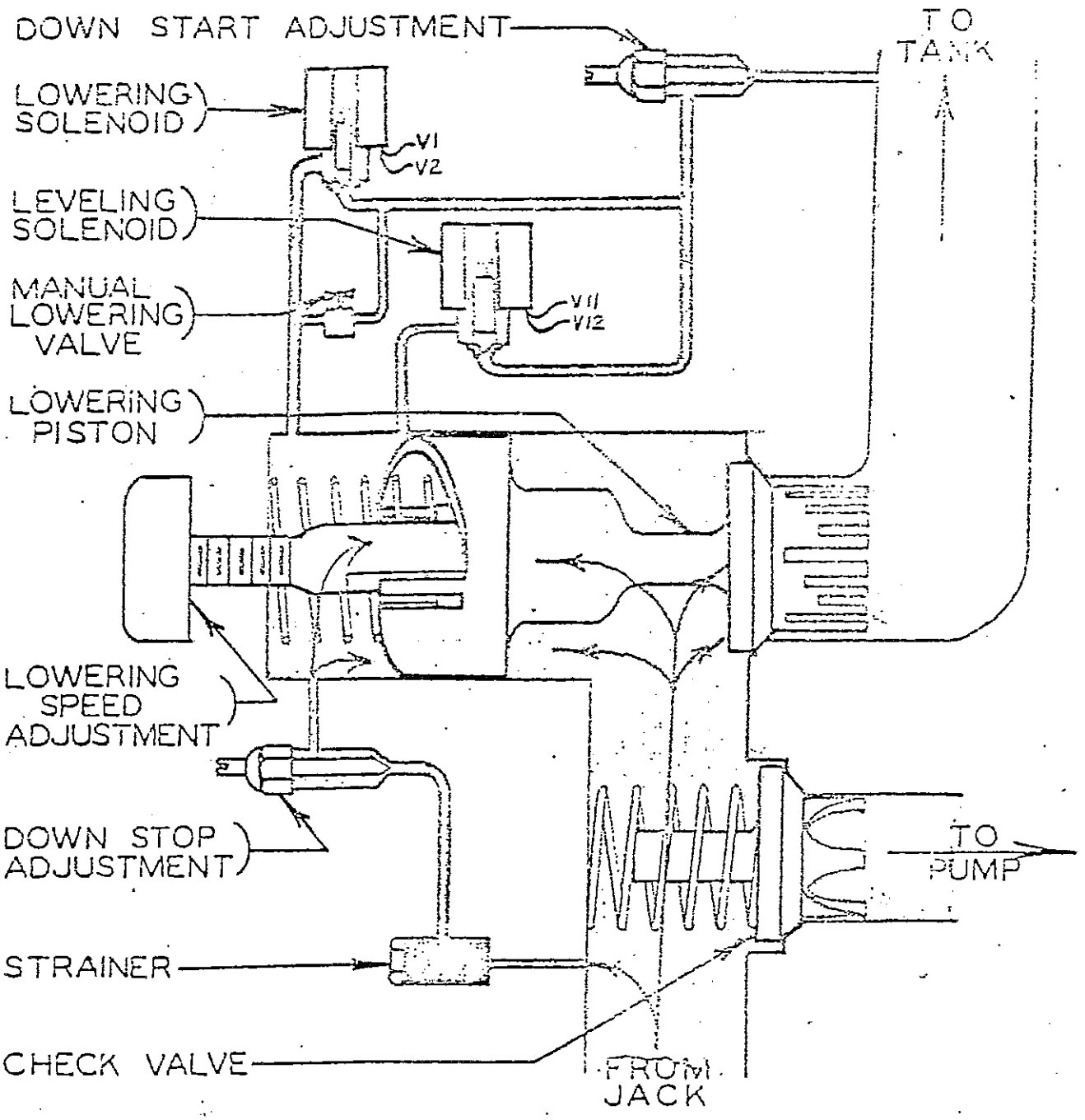
P-125 6 & 7 ADJUSTMENTS

USED ON ALL MODELS EXCEPT M-3, M-8, & M-13
(See front of sheet for Adjustment Instructions)



P-125 6 & 7 ADJUSTMENTS

LOWERING SIDE
SCHEMATIC OIL FLOW DIAGRAM
Used On All Models Except M3, M8 & M11



P-125 6 & 7 ADJUSTMENTS

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Car will not lower.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Check current supply. (d) Check Solenoid coil. (e) Turn out Down-Start Adjustment. (f) Turn in on Down-Stop Adjustment. (g) Unscrew Lowering Speed Adjustment.
2. Bouncy, slow Down-Start.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Start. (c) Turn in on Down-Stop. (d) Back out on Lowering Speed. Adjustment.
3. Sudden Down-Start.	(a) Turn in on Down-Start.
4. Car will not stop when started down.	(a) Tighten manual lowering. (b) Check for clogged strainers. (c) Turn out on Down-Stop. (d) Check Solenoid valve not dropping out. (residual magnatism)
5. Down-Stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Stop.
6. Down-Stop rough (quick).	(a) Turn in on Down-Stop.
7. Leveling bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Increase Leveling speed.

NOTE: In offering these solutions, the manufacturer assumes there is no binding in the Hatch and that the proper voltage is being supplied to the Power Unit.

P-125 6 & 7 ADJUSTMENTS

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USED ON MODELS M1, M2 & M3

(See back of sheet for drawing)

RELIEF PRESSURE SETTING

(Follow in sequence as given)

1. Open Up Start 2 or 3 turns.
2. Open Up Stop ½ turn.
3. Close Line Shut-off Valve. (Make sure Tank Shut-off is open.)
4. Install Pressure gage. (Gage scale should read from 2 to 500 or 600 PSI.)
5. Remove Relief Pressure Pilot acorn nut, loosen lock nut and unscrew adjustment screw until it extends at least 1½" above lock nut.
6. Start unit and read from gage.
7. Screw in on Relief Pilot adjustment until gage gives desired reading, and stop unit. (30 PSI more than "working pressure" on Hatch Wiring Diagram.)
8. Tighten lock nut, remove Pressure Gage and open Line Shut-off Valve.
9. Replace acorn nut and gasket.
10. Open Shut-off Valve.

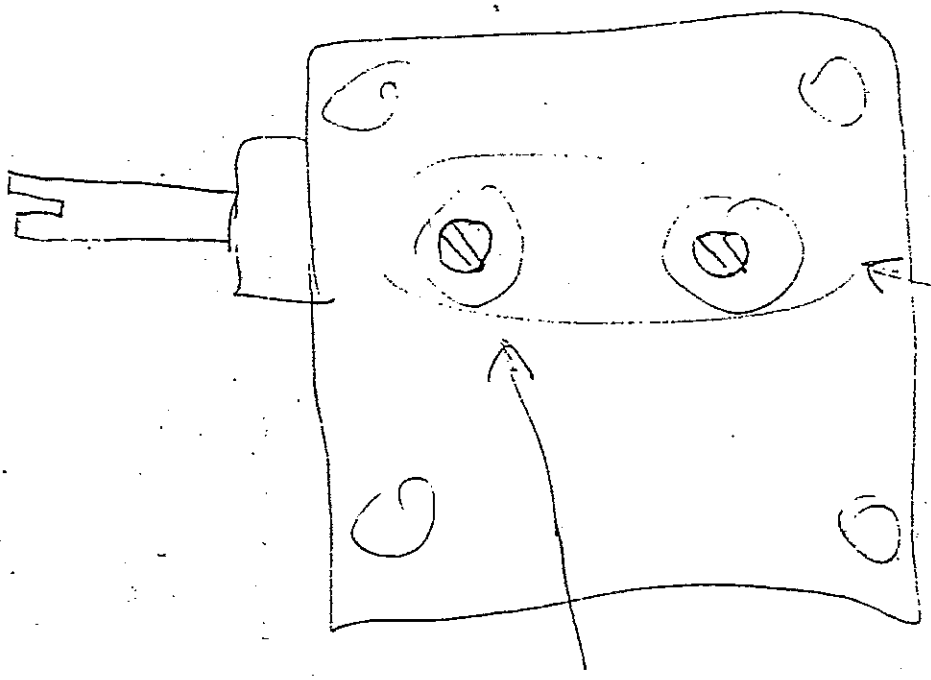
UP TRAVEL ADJUSTMENTS

(Follow in sequence as given)

1. Remove any load from car.
2. Close Up Start Adjustment.
3. Remove acorn nut on Low Pressure Adjustment and back off.
4. Start Power Unit. If car moves, back off on low pressure until car stands still.
5. Turn in on Low Pressure Adjustment until car starts to creep up slowly, then back off until car just stands still, then back off ½ turn more.
6. Open Up-Start 2 or 3 turns.
7. Open Up-Stop ½ turn.
8. Put rated load on car.
9. Disconnect Leveling (V-11).
10. Adjust Up-Stop, making it as quick as is comfortable.
11. Adjust Up-Start.
12. Set Limits to stop car about 1" to 2" above floor with rated load, and connect Leveling (V-11).
13. Check with empty car.

(Caution: Do not run unit by-passing or relieving more than one or two minutes at a time, as heat generated may damage pump.)

Model with side up only

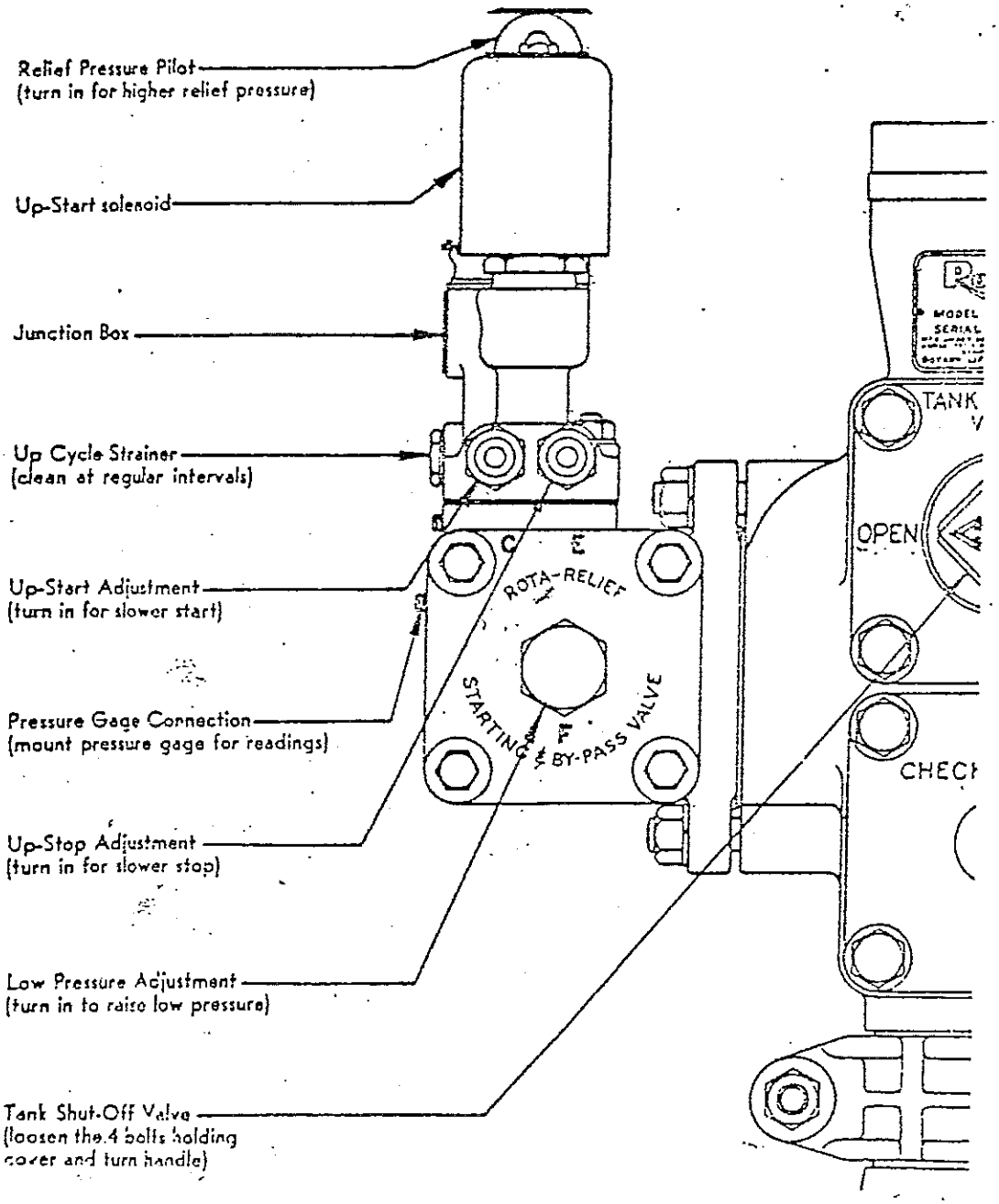


counter clock wise if can overshoot in up direction.

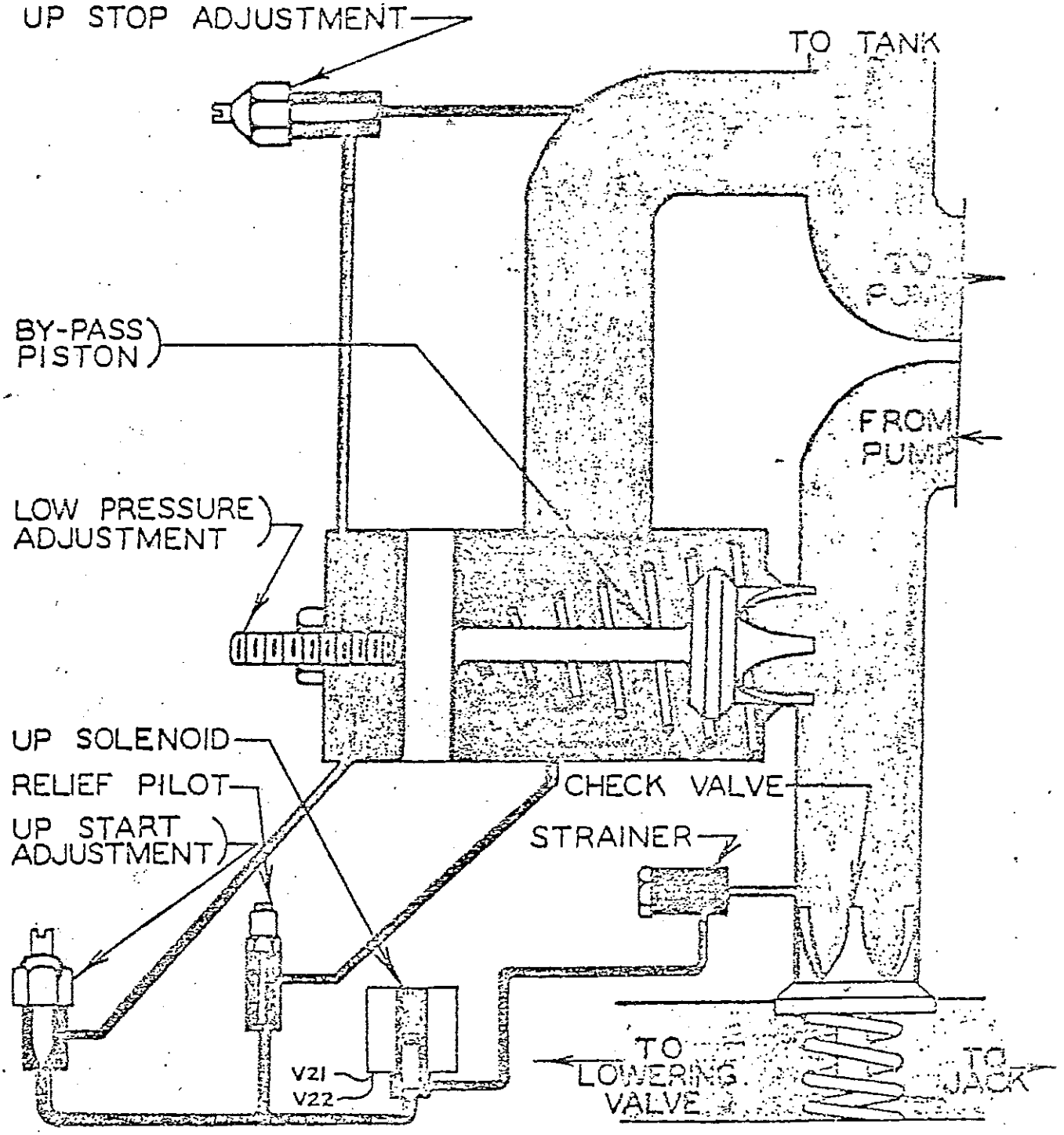
up start adj. turn in for slower smoother start.

P-125 & 2: 7 ADJUSTMENTS

USED ON MODELS M-1, M-2, & M-3
(See front of sheet for Adjustment Instructions)



UP SIDE
SCHEMATIC OIL FLOW DIAGRAM
Used Only On Models M1, M2 & M3



P-125 6 & 7 ADJUSTMENTS

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Pump runs, but car does not move.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Close Manual Lowering Valve. (d) Check direction of motor rotation. (e) Turn in on Up-Stop. (f) Turn in on Relief Pressure. (g) Turn out on Up-Start.
2. Up Start slow.	(a) Turn in on Up-Stop. (b) Turn out on Up-Start. (c) Turn in on Low Pressure Adjustment.
3. Rough Up-Start	(a) Turn in on Up-Start. (b) Turn out on Low Pressure Adjustment.
4. Slow Up Speed.	(a) Turn in on Relief Pressure. (b) Turn in on Up-Stop. (c) Turn out on Up-Start.
5. Too much Up Drift.	(a) Turn out on Up-Stop.
6. Rough Up-Stop.	(a) Turn in on Up-Stop.

Note: Up drift is caused by pump coasting. If pump does not have much coast, there will be practically no up drift requiring the Up-Stop to be turned all the way in to get full benefit of the little coast available. When Up-Stop is turned all the way in, the next Up-Start will probably be rough. If such condition exists, the Oildraulic Controller should be converted to a model M4, M5, etc. Consult the factory.

Caution: Many jobs have a rough start caused by the Low Pressure Adjustment being closed too much. This seems to be a common field fault. Pay strict attention to instructions on this adjustment.

OILDRAULIC CONTROLLER ADJUSTMENT

LOWERING ADJUSTMENTS
(Follow The Sequence As Outlined)

Adjust With Car Empty:

1. Disconnect leveling (Terminal V-11) on Control Panel.
2. Open Down-Start and Down-Stop 2 or 3 turns. Down-Start must be opened wider than Down-Stop to permit car to lower.
3. Adjust lowering speed to correspond with speed shown on layout drawing.
4. Adjust Down-Stop. Make sure the stop is as quick as is comfortable with the empty car.
5. Adjust the Down-Start.
6. Adjust Limit and Floor Switches to stop the car about 2" above the floor if one-way leveling is to be used.

Test With Car Loaded:

1. Place rated load on car.
2. Operate elevator and check performance under load. Minor adjustments may be necessary to compensate for load.

IMPORTANT: Final Car Stop is controlled by the proper location of Hoistway Switches and Cams. The Oildraulic Controller regulates only the smoothness of operation.

LEVELING ADJUSTMENTS
(When Required)

Adjust With Car Loaded:

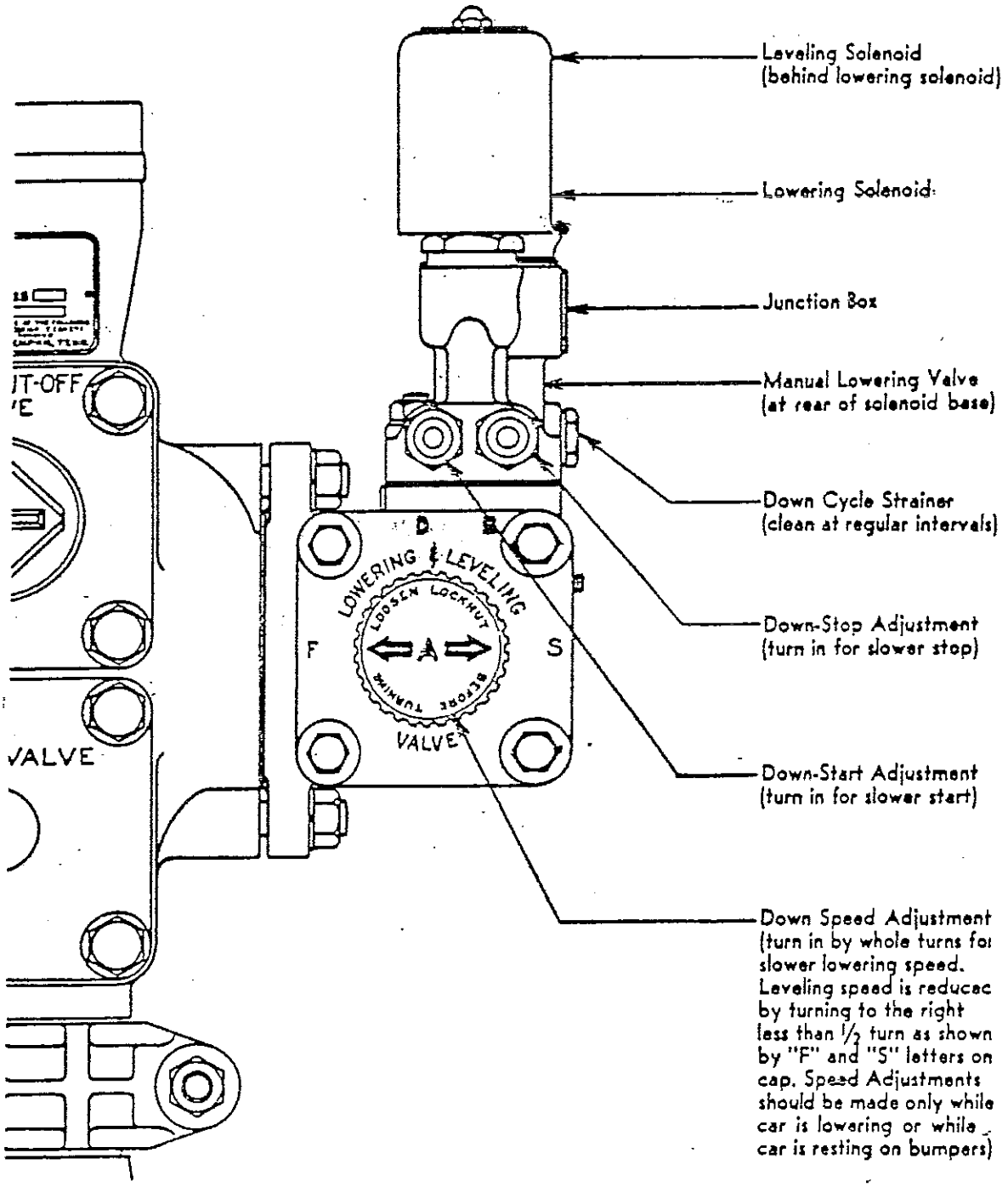
1. Connect leveling (Terminal V-11) on Control Panel.
2. Adjust leveling speed. Correct leveling speed should be 1/3 to 1/4 of lowering speed, but not more than 25 FPM.
3. Set Leveling Cams for stopping car even with floor level.

Test With Car Empty:

1. Remove rated load from car.
2. Operate elevator and check performance. Any re-adjustment of Down-Stop will necessitate a re-adjustment of the Down-Start to compensate.

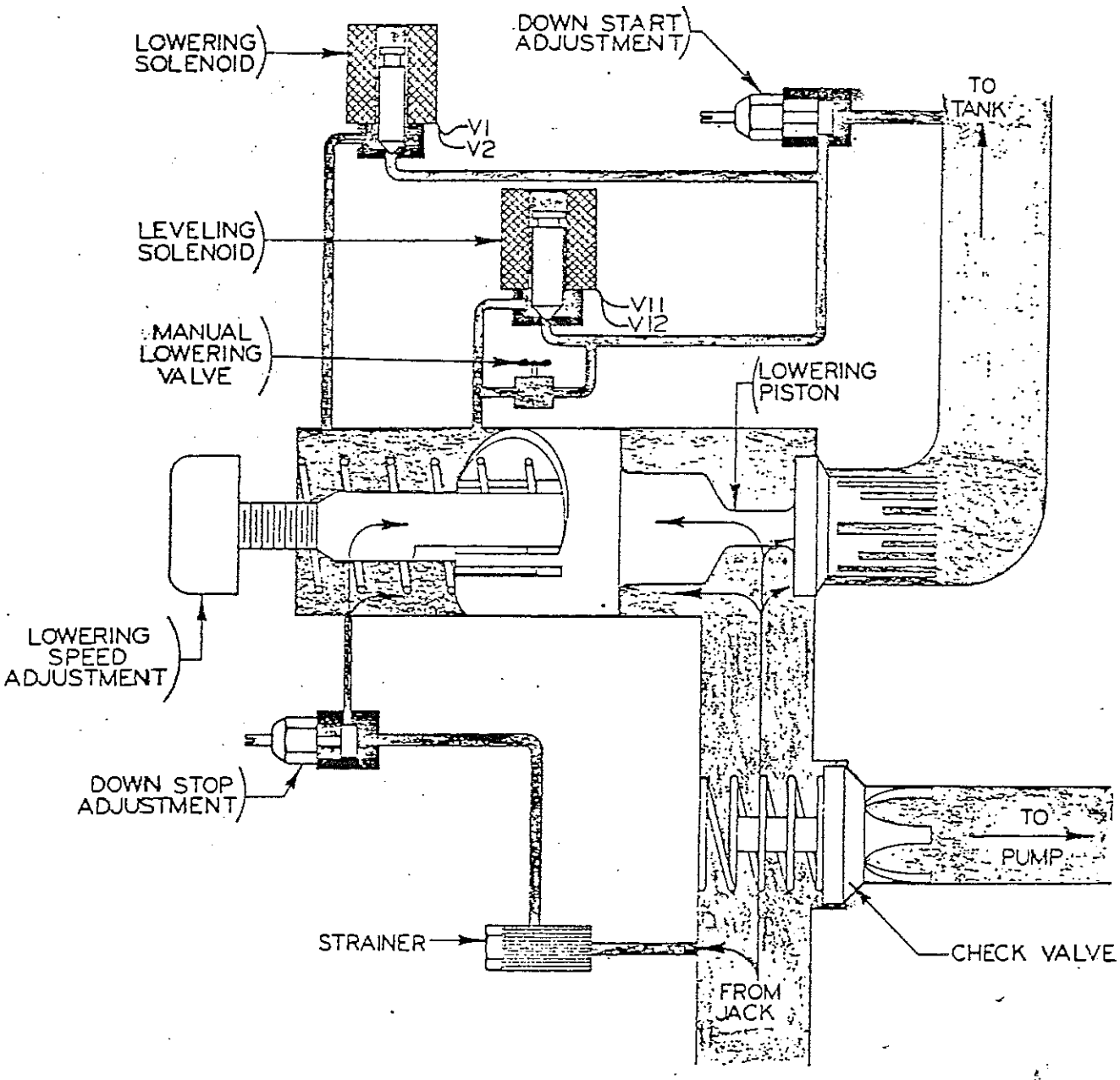
CAUTION: The Oildraulic Controller is designed to control car speed and smoothness of operation only. The actual stopping position of the car is controlled by Hoistway Switches and Cams. DO NOT re-adjust the Oildraulic Controller if car misses a floor—Move the hoistway equipment at the floor where the miss occurs. Adjust the Oildraulic Controller only if the car misses every floor an identical amount.

OILDRAULIC CONTROLLER ADJUSTMENT



LOWERING SIDE

SCHEMATIC OIL FLOW DIAGRAM



OILDRAULIC CONTROLLER ADJUSTMENT

TROUBLE SHOOTING

DIFFICULTY	SOLUTION
1. Car will not lower.	(a) Check line Shut-off Valve. (b) Check tank Shut-off Valve. (c) Chuck current supply. (d) Check Solenoid coil. (e) Turn out Down-Start Adjustment. (f) Turn in on Down-Stop Adjustment. (g) Unscrew Lowering Speed Adjustment.
2. Bouncy, slow Down-Start.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Start. (c) Turn in on Down-Stop. (d) Back out on Lowering Speed Adjustment.
3. Sudden Down-Start.	(a) Turn in on Down-Start.
4. Car will not stop when started down.	(a) Tighten manual lowering. (b) Check for clogged strainers. (c) Turn out on Down-Stop. (d) Check Solenoid valve not dropping out. (residual magnatism)
5. Down-Stop slow or bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Turn out on Down-Stop.
6. Down-Stop rough (quick).	(a) Turn in on Down-Stop.
7. Leveling bouncy.	(a) Bleed jack of air or loosen packing, if possible. (b) Increase Leveling speed.

NOTE: In offering these solutions, the manufacturer assumes there is no binding in the Hatch and that the proper voltage is being supplied to the Power Unit.

Elevator Service Co.

P-123 6 & 7 ADJUSTMENTS

Elevator Service Co.

SOUTH DEERFIELD, MA. • 01373

Page 1

ALL MODELS EXCEPT M-3, M-8 AND M-13
(See drawing on back of sheet)

LOWERING ADJUSTMENTS
(Follow in sequence as given)

1. Disconnect Leveling (Terminal V 11) on control panel.
2. Put rated load on car.
3. Open Down-Start and Down-Stop 2 or 3 turns. (Down-Start must be open wider than Down-Stop or car will not lower.
4. Adjust Lowering Speed to speed shown on layout drawing.
5. Adjust Down-Stop. (Make stop as quick as is comfortable with the empty car.
6. Adjust the Down-Start.
7. Test with empty car.
8. Adjust Limit and Floor Switches to stop the car about 2" above the floor if Leveling is to be used. This setting made with empty car.

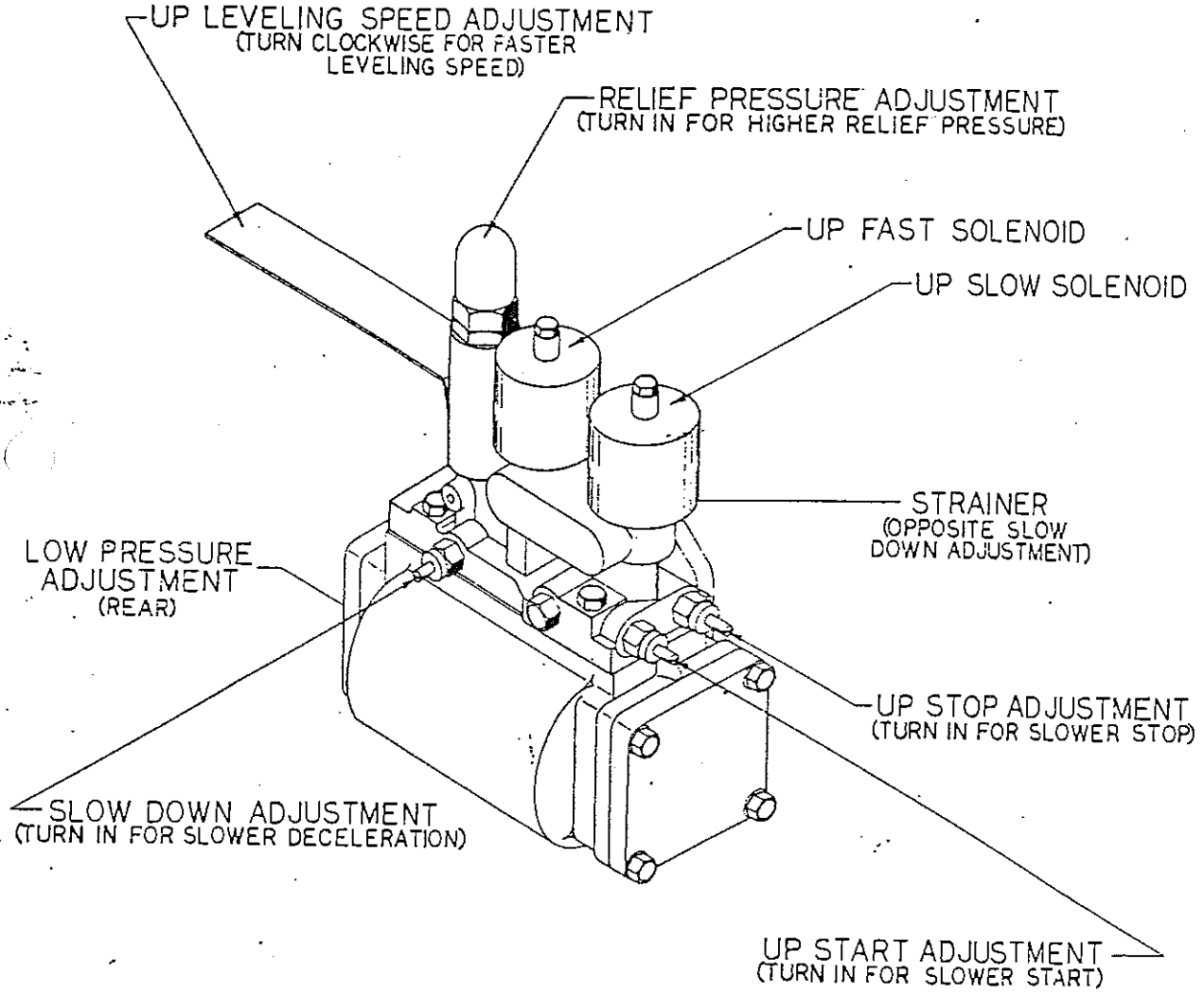
CAUTION: The proper location of the hatchway switches and cams controls the final car stop. The Oildraulic Controller controls only the smoothness of operation.

LEVELING ADJUSTMENTS
(When Required)
(Follow in sequence as given)

1. Connect Leveling (Terminal V-11) on control panel.
2. Put rated load on car.
3. Adjust Leveling Speed.
   Note: Leveling Speed should be 1/3 to 1/4 of Lowering Speed but not more than 25 FPM.
4. Set Leveling cams for stopping car level with floor.
5. Check with empty car. If any re-adjustment of Down-Stop is made, it will be necessary to readjust the Down-Start to compensate.

CAUTION: The Oildraulic Controller is designed to control only the speed and smoothness of the operation. The actual stopping position of the car is controlled only by the hatchway cams and switches. DO NOT readjust the Oildraulic Controller if the car misses a floor---move the hatchway equipment at the floor at which the miss occurs. Adjust the Oildraulic Controller only if the car misses every floor an identical amount

OILDRAULIC CONTROLLER ADJUSTMENT



OILDRAULIC CONTROLLER ADJUSTMENT

TROUBLE SHOOTING
"NEW" MODEL ROTA RELIEF—UP LEVELING--BYPASS STOP

WARNING: The regulating piston in this valve is equipped with a pressure ring and MUST be disassembled in the following order.

1. Remove front cap, pull piston forward and remove ring.
2. Remove back cap and push piston out from front to back. Assemble in reverse order, replacing the rear cap before the ring is put on. Under no circumstances should the rear cap be removed first.

DIFFICULTY	SOLUTION
Pump Runs But Car Does Not Move	1. Check line shut-off. 2. Check motor rotation. 3. Check up Slow solenoid. 4. Back off starting adjustment. 5. If constant speed lowering valve used, read Trouble Shooting section of those adjustments. 6. Check relief pressure setting.
Car Will Not Run At High Speed	1. Check up fast solenoid. 2. Check strainer. 3. Make sure pilot piston is free. 4. Make sure main regulating piston is free.
Car Will Not Slowdown Into Leveling	1. Check up fast solenoid for seating. 2. Make sure pilot piston is free and parks open by its spring. 3. Make sure main regulating piston parks open (Check this with the low pressure adjustment screw. DO NOT remove the rear cap before front cap).

Note: The solutions to the problems are to be tried individually and in the order given. They presume that valve adjustment has been completed.

OILDRAULIC CONTROLLER ADJUSTMENT

ADJUSTMENT INSTRUCTIONS
60000 Series Oildraulic Controller — Rota-Relief — Up Leveling — By pass stop

NOTE: On a new power unit, Steps A, B & C have been factory set and only Steps D and E need be done in field. On a replacement, all steps are required.

A. PRELIMINARY RELIEF PRESSURE SETTING

1. Open up start, slow down and stopping adjustments four full turns and open up leveling speed adjustment fully (notch on top of stud pointing towards motor), tightening locknut after setting.
2. Close line shut-off valve (MAKE SURE TANK SHUT-OFF IS OPEN).
3. Install pressure gauge of approximately twice the desired working pressure in bleed plug of silencer. Open manual lowering valve two complete turns
4. Remove relief pressure acorn nut, loosen lock nut and back off screw until it extends 1-1/2" above lock nut.
5. Back off low pressure adjustment until it just touches the piston. Start unit with both solenoids de-energized. Screw in on low pressure adjustment until pressure reaches 100 PSI.
6. Energize both solenoids and screw in on the relief pilot adjustment until guage pressure reacs 75 PSI above full load pressure as shown on job sheet.
7. Tighten lock nut, close manual lowering valve and open line shut-off valve.

B. LEVELING ADJUSTMENT

1. Car should be empty, but with cab, door operator and all other assemblies in place.
2. Start unit with up slow solenoid energized.
3. Loosen locknut and turn up leveling speed adjustment (a handle is provided on later units).
4. Run car from bottom landing to top landing at up leveling speed repeatedly until oil is at normal operating temperature.
5. Recheck up leveling speed and reset to 10 FPM minimum if necessary.

C. LOW PRESSURE ADJUSTMENT

1. With car empty and both solenoids de-energized, start power unit.
2. Loosen lock nut and turn in on low pressure adjustment until car just starts to lift, then back off until it stops. Now back off one turn more and lock adjustment.

D. FINAL ADJUSTMENTS

1. Set up start and slow down adjustments so car reaches full speed before slow down signal is given, and so car reaches leveling speed approximately 4" below floor.

   Note: See switch and cam chart for proper setting for the car speed used on this job.
2. Set stopping rate (after leveling) for a smooth but firm stop. Car must stop before pump cuts off.

E. FINAL RELIEF SETTING

1. Close line valve and start unit with only up slow solenoid energized. Make sure relief pressure is 50–75 PSI more than full load pressure.
2. Shut off unit, remove pressure gage, replace acorn nut on relief adjustment.

OILDRAULIC CONTROLLER ADJUSTMENT

SCHEMATIC UP LEVELING