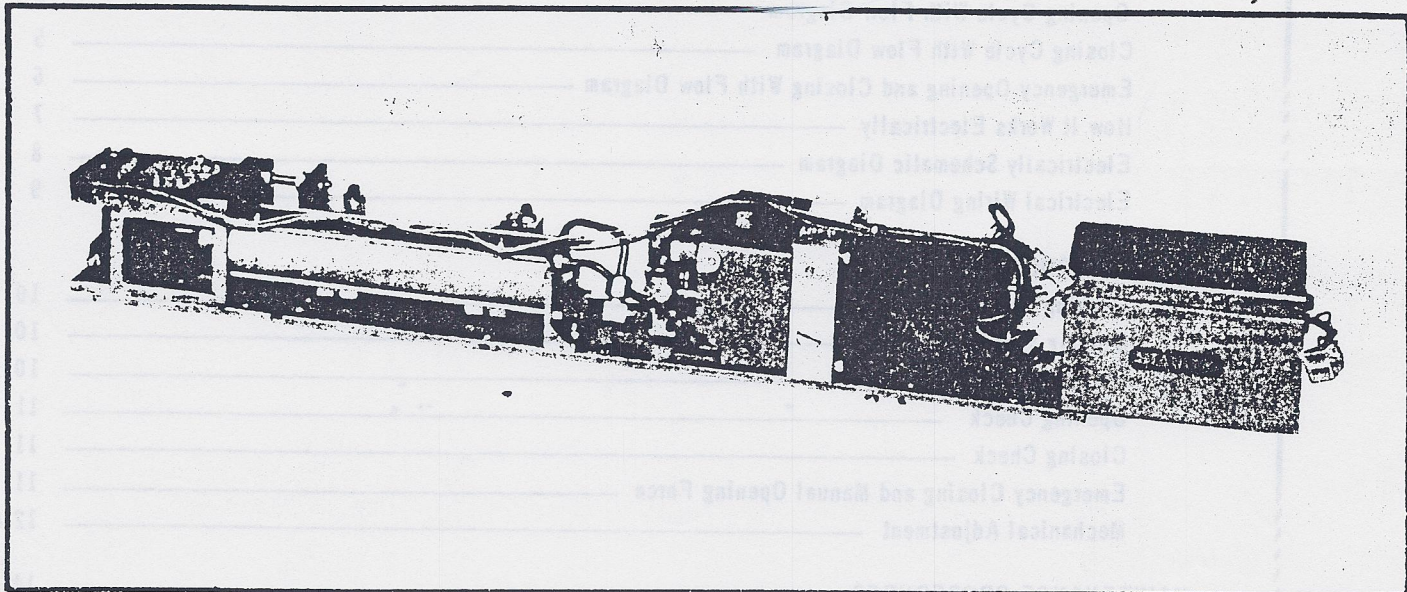


AUTO-SWING OPERATOR



FUNCTIONAL OPERATION TROUBLE SHOOTING and MAINTENANCE MANUAL

STANLEY DOOR OPERATING EQUIPMENT

*DIVISION OF THE STANLEY WORKS
FARMINGTON, CONNECTICUT 06032*

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OPERATION

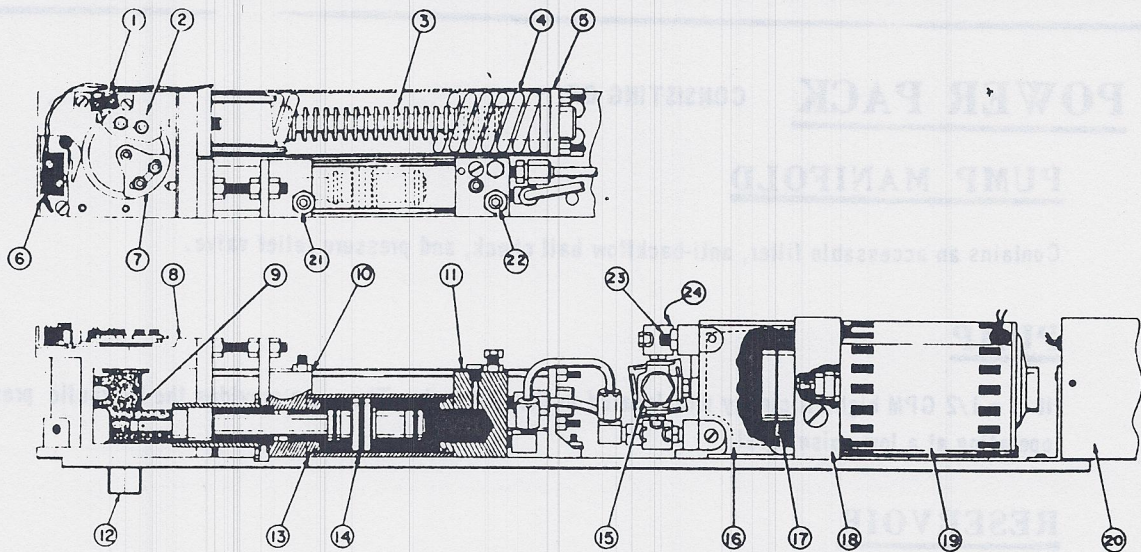


FIGURE 1

GENERAL

It is a self contained electro-hydraulic operator that is used to automatically open and close swinging doors that do not weigh more than 125 lbs., and do not exceed 44 inches in width.

The operator can be visibly mounted on the header or completely concealed in the header. It is powered open hydraulically and closes under spring tension.

An emergency release feature is built into all operators. "In" doors can be easily pushed in the emergency egress position.

The door will recycle to its fully open position at any point in its closing cycle when the operating control is actuated.

In the event of power failure the door can be opened manually.

FUNCTIONAL

THE MAJOR SUB-ASSEMBLIES ARE:

CONTROL BOX

Consisting of the circuit board, transformer, capacitor, and triac.

Low voltage from the operating signal energizes the solid state circuitry which allows high voltage to pass to the motor and solenoid valve.

It also contains safety circuitry that allows the swing side carpet to act as a safety carpet. This prevents opening of the door when it is approached from the wrong direction while the door is in its closed position.

In addition, a safety plus feature incorporates a two second delay in the event a person steps off the safety carpet momentarily. The safety carpet also acts as a hold open when the door is in the full open position.

OPERATIC

POWER PACK CONSISTING OF:

PUMP MANIFOLD

Contains an accessible filter, anti-backflow ball check, and pressure relief valve.

PUMP

It is a 1/2 GPM high efficiency unit located in the reservoir. The pump provides the hydraulic pressure while operating at a low noise level.

RESERVOIR

Contains 1/2 pint of silicone fluid. The opening speed and closing speed valve screws, and the solenoid valve are located on this casting.

MOTOR

Motor is 1/3 horse power, 117 volts AC. It is a capacitor start induction run unit.

POWER CYLINDER

Consists of the piston assembly, power end block and rod end block. The opening check adjustment is located in the rod end block. The closing check and emergency return control and manual opening force adjustment are located in the power end block.

SPRING CYLINDER

It contains two springs. The large spring is compressed by the rotation action of the spindle crank on opening cycle, and provides the closing force.

When the door is pushed in the emergency egress direction, the smaller spring is compressed and returns the door to its closed position with less force. The entire assembly is held together with end blocks and four tie rods.

CAUTION: This assembly is under compression. Under no circumstances should you disassemble this unit. Please observe the CAUTION warning fixed to this assembly.

SPINDLE HOUSING

Contains the spindle assembly which transfers the power from the operator to the door. The 90 degree limit switch which shuts off the motor when the door reaches the full open position. The emergency switch which shuts off all power when the door is pushed in the emergency egress direction.

Both switches can be adjusted with a cam assembly located on the spindle housing. Adjustment must not be made before reading the "tune-in" procedure section.

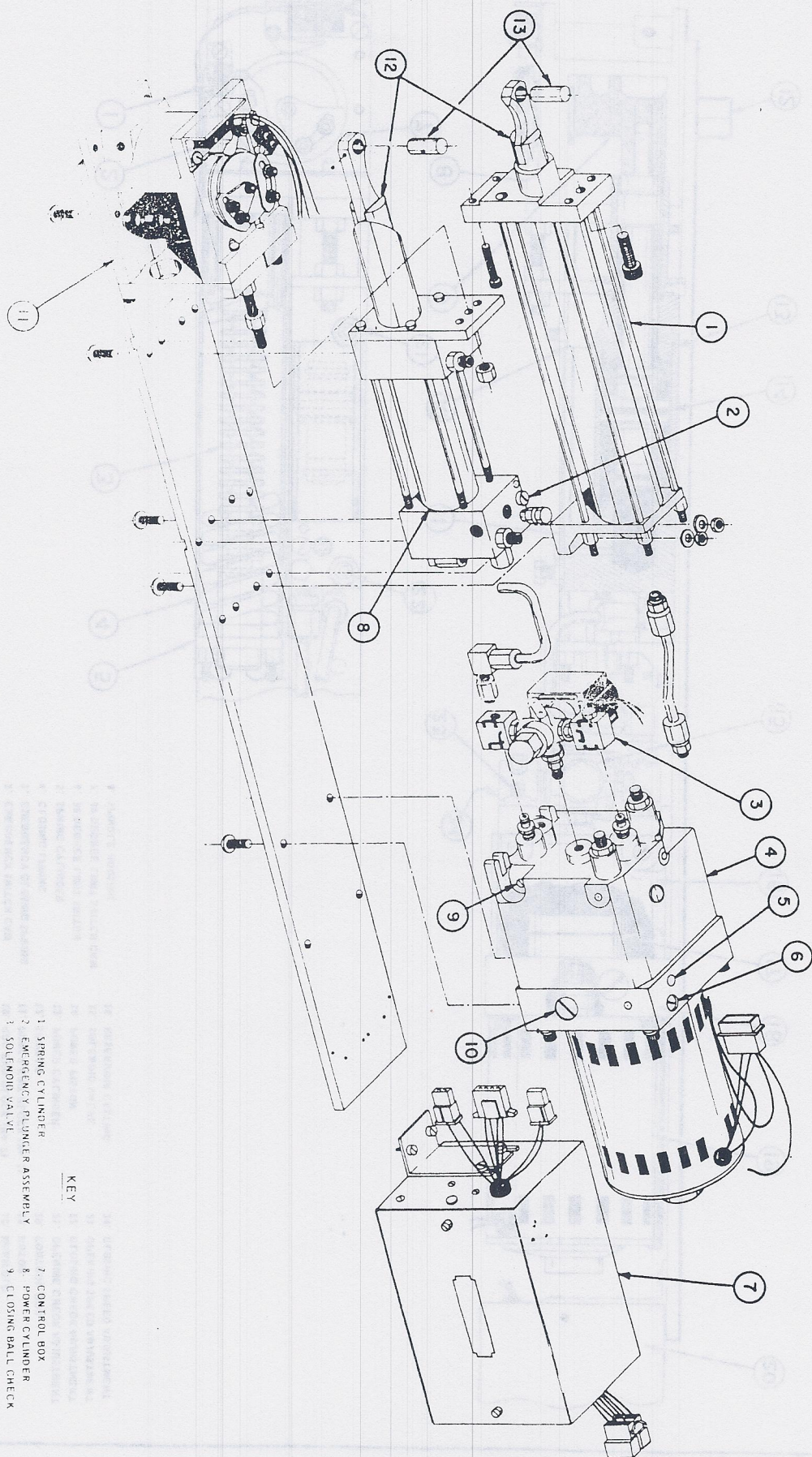
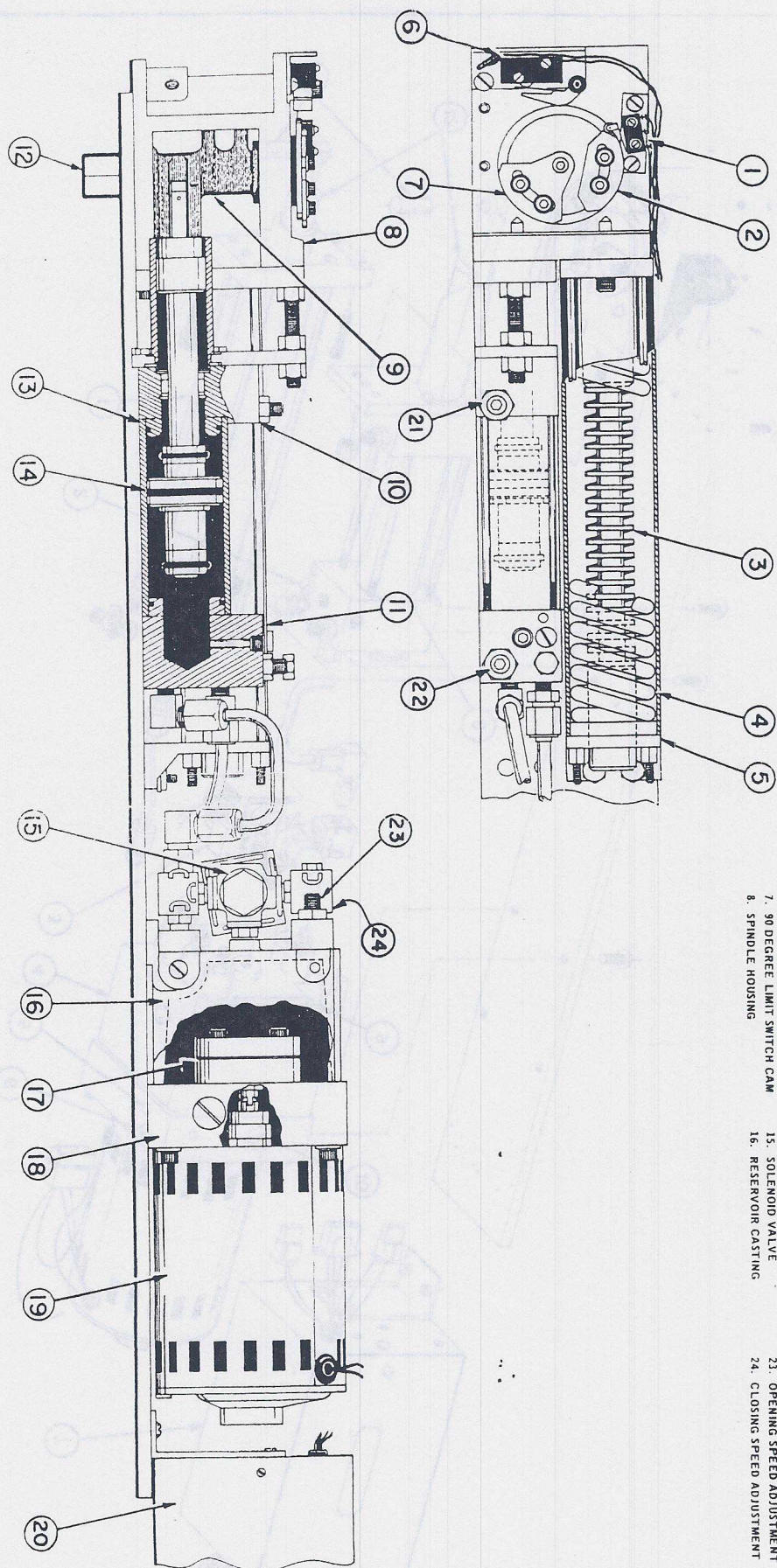


FIGURE 2

- KEY**
- 1. SPRING CYLINDER
 - 2. EMERGENCY PLUNGER ASSEMBLY
 - 3. SOLENOID VALVE
 - 4. RESERVOIR CASTING
 - 5. CLOSING BALL CHECK
 - 6. ANTI-BACK FLOW BALL CHECK
 - 7. CONTROL BOX
 - 8. POWER CYLINDER
 - 9. PRESSURE CONTROL VALVE
 - 10. FILTER
 - 11. SPINDLE HOUSING
 - 12. PINS
 - 13. PINS



KEY

- | | | |
|-------------------------------|-----------------------------|------------------------------|
| 1. EMERGENCY SWITCH | 9. SPINDLE CRANK | 17. PUMP ASSEMBLY |
| 2. EMERGENCY SWITCH CAM | 10. ROD END BLOCK (No. 2) | 18. MANIFOLD |
| 3. EMERGENCY CLOSING SPRING | 11. POWER END BLOCK (No. 1) | 19. MOTOR |
| 4. CLOSING SPRING | 12. SPINDLE | 20. CONTROL BOX |
| 5. SPRING CYLINDER | 13. POWER CYLINDER | 21. OPENING CHECK ADJUSTMENT |
| 6. 90 DEGREE LIMIT SWITCH | 14. POWER PISTON | 22. CLOSING CHECK ADJUSTMENT |
| 7. 90 DEGREE LIMIT SWITCH CAM | 15. SOLENOID VALVE | 23. OPENING SPEED ADJUSTMENT |
| 8. SPINDLE HOUSING | 16. RESERVOIR CASTING | 24. CLOSING SPEED ADJUSTMENT |

FIGURE 1

OPERATION

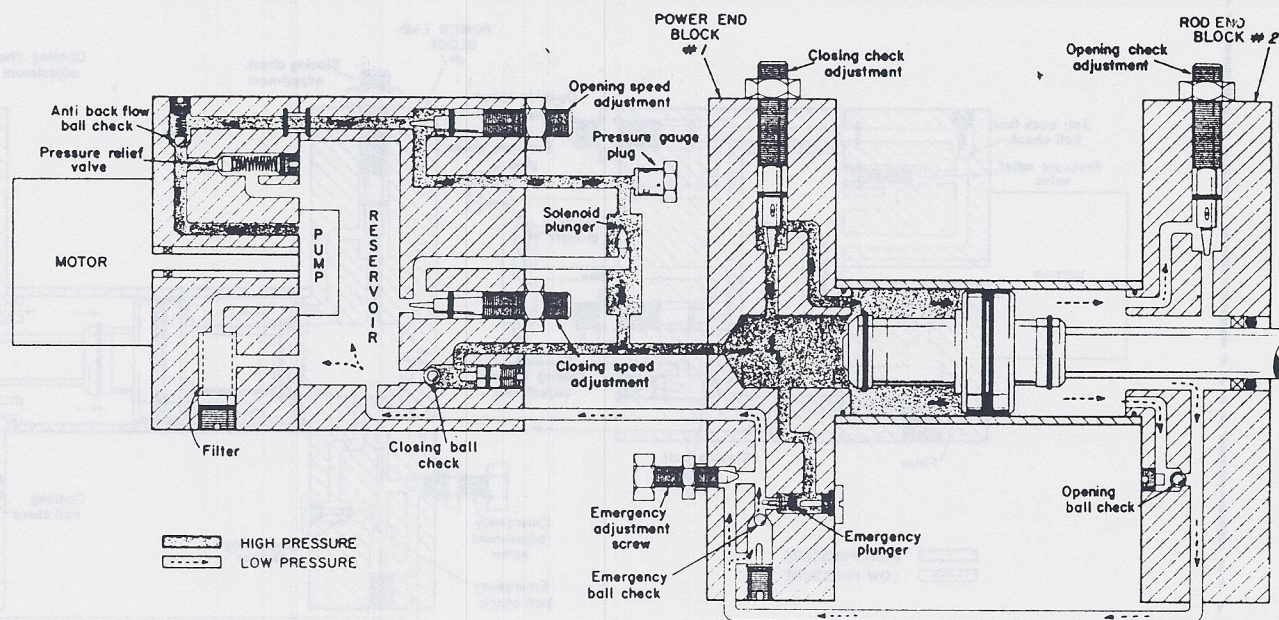


FIGURE 3

OPENING CYCLE

Actuating the operating control energizes the integrated circuitry in the control box with low voltage, allowing 117 volts to energize the motor and solenoid valve.

The motor rotates the pump which draws fluid from the reservoir, thru the filter and out of the pump. The fluid is forced thru the manifold where the pressure relief valve vents fluid back to the reservoir if the pressure exceeds 650 p. s. i.

The fluid then un-seats the anti-back flow ball check. The fluid under pressure is forced past the opening speed screw (where the flow rate of fluid is adjusted and determines the opening speed) the fluid now flows thru the solenoid valve and seats the closing ball check before it enters power end block (No. 1) of the power cylinder.

As the fluid enter power end block (No. 1) it seats the emergency ball check plunger which stops the oil flow in that direction.

Fluid under pressure forces the piston forward. The piston rod is attached to the spindle crank, and as the piston moves forward it rotates the spindle crank from 0 degrees to 80 degrees and the door now enters the checking area.

The checking sleeve of the piston enters the checking cavity of rod end block (No. 2). The oil flow is metered by the opening check adjustment screw, seats the opening ball check, and flows through the return line.

Fluid passes through the emergency ball check which was previously unseated by the emergency ball check plunger, through the emergency closing valve and returns to the reservoir.

The rotation of the spindle crank during opening cycle has compressed the large coil spring in the spring cylinder. The spring supplies the power on closing cycle.

90 DEGREE OPEN POSITION

When the door reaches 90 degrees, the cam located on top of the spindle housing actuates the 90 degree limit switch and shuts off the motor which stops the rotation of the pump, but the solenoid valve remains energized.

OPERATION

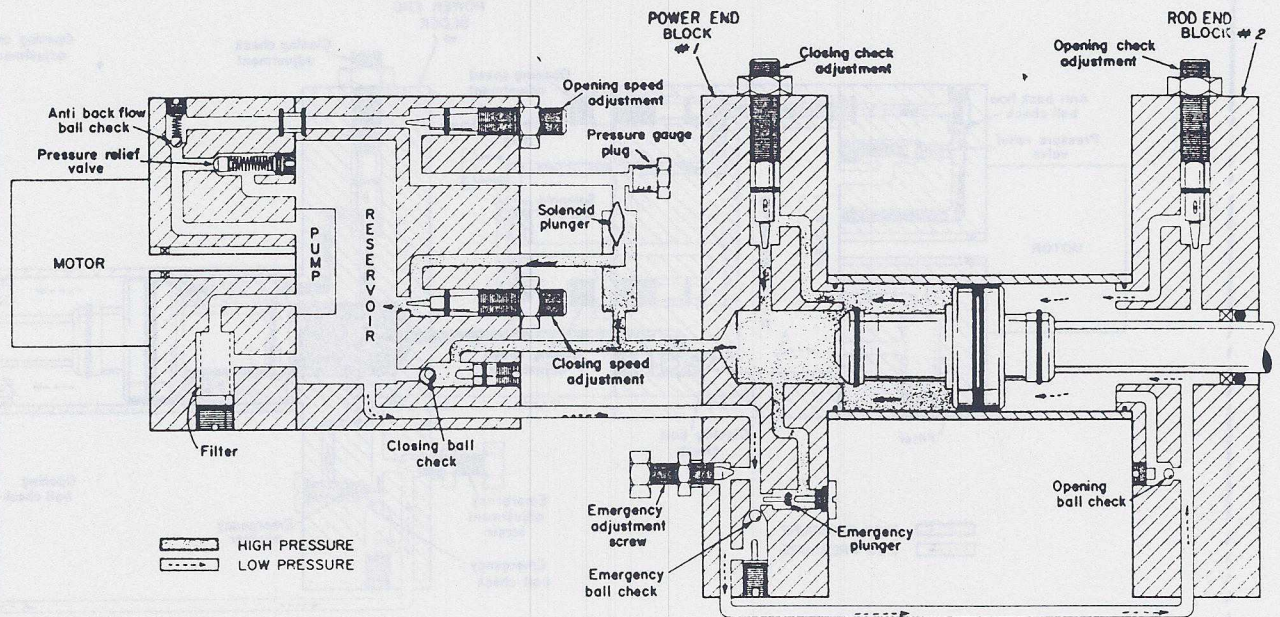


FIGURE 4

CLOSING CYCLE

When the operating control is deactuated, a time delay circuit holds the solenoid valve energized for approximately 1 second. The solenoid valve then deenergizes and opens its exhaust port to the reservoir.

The large spring which was compressed in the opening cycle now supplies the power to close the door.

As it pushes the spindle crank from 90 degrees to 0 degrees the spindle crank rotation moves the power piston toward power end block (No. 1).

The fluid in power end block (No. 1) is forced thru the exhaust port of the solenoid valve, past the closing speed control valve (the adjustment of this valve determines the closing speed).

When the checking sleeve of the piston enters the checking cavity of power end block (No. 1), oil flow is metered by the closing check adjustment screw before it enters the reservoir. The adjustment of this valve determines the checking action achieved.

As the piston is moving fluid is drawn from the reservoir through the rod end block (No. 2) and into the power cylinder.

OPERATION

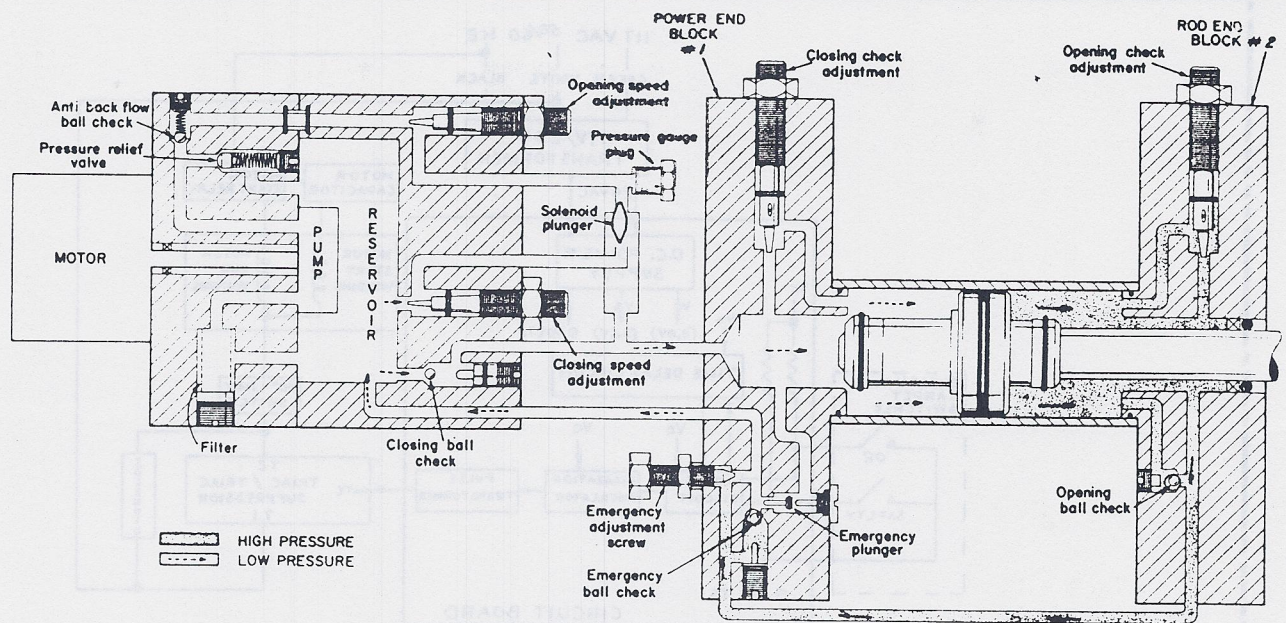


FIGURE 5

EMERGENCY OPENING AND CLOSING

EMERGENCY OPENING:

When the door is manually pushed in its emergency egress direction, the rotation of the spindle crank moves the piston toward power end block (No. 1) forcing fluid out of the cylinder, through the closing check adjustment screw, thru the solenoid valve exhaust port past the closing speed control valve and back to the reservoir.

As the door moves 2 degrees to 3 degrees past its fully closed position the cam of the spindle housing opens the N.C. emergency egress switch and interrupts the circuit from the carpet.

The movement of the piston toward power end block (No. 1) draws fluid from the reservoir into rod end block (No. 2).

As the door moves past 30 degrees in the emergency direction, the piston reverses direction and moves toward rod end block (No. 2), forcing fluid past the emergency valve screw and back to the reservoir. As the piston moves towards rod end block (No. 2) fluid is drawn from the reservoir into power end block (No. 1).

While the door is moving in its emergency egress direction the rotation of the spindle crank compresses the emergency closing (small) spring in the spring cylinder.

EMERGENCY CLOSING:

After the door is pushed open and then released, the emergency closing (small) spring which was compressed as the door was pushed in its emergency egress direction provides the power to close the door.

The door swings closed with the small spring pressure returning the door from 90 degrees to 30 degrees forcing fluid out of power end block (No. 1) to the reservoir and drawing fluid into rod end block (No. 2) from the reservoir.

As the door reaches 30 degrees the piston reverses direction, drawing fluid into power end block (No. 1) and forcing fluid from rod end block (No. 2). Fluid seats the emergency ball check and flows past the emergency control valve to the reservoir. The adjustment of this valve controls the speed of the door from 30 degrees to 0 degrees.

OPERATION

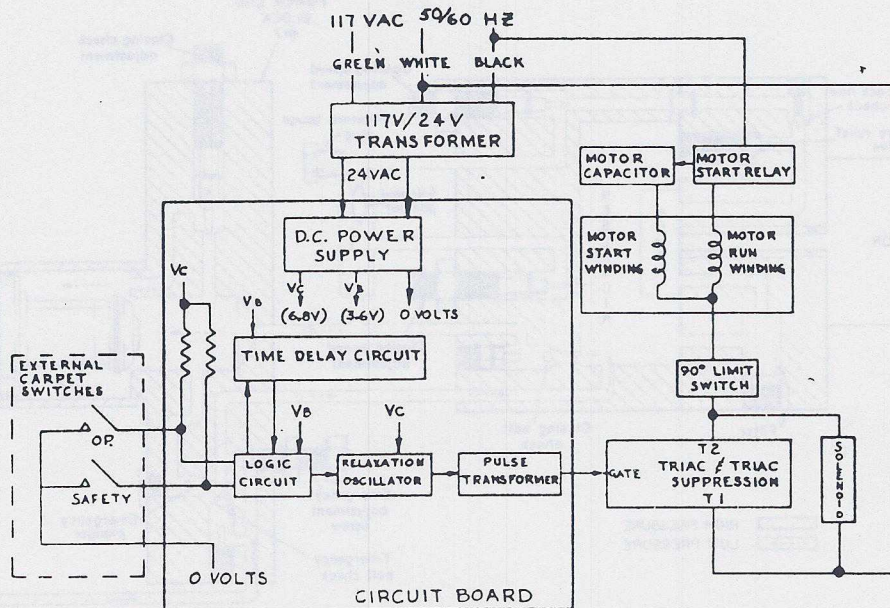


FIGURE 6

HOW IT WORKS ELECTRICALLY

The major subassemblies which comprise the electrical control box for the Auto-Swing are as follows:

Transformer, circuit board, motor start capacitor, motor start relay and triac.

The transformer converts the 117 volt AC power to low voltage 24 volt AC power. The low voltage 24 volt AC power is then fed to a rectifier which converts 24 volt AC to DC. This feeds the circuit board which contains the DC power supply. The DC power puts out various voltages which are used throughout the logic circuit board for various functions. The external carpet switches, operate and safety, (when energized), initiate action by sending a signal to the logic circuit board.

The logic circuit consists of the transistors, diodes, resistors, capacitors and integrated circuits which are on the circuit board. The signal is processed through the circuit board and turns "On" the triac. When the triac turns on, it is acting as a closed switch which will allow current to flow through it.

The 117 volt power is also fed to the motor start relay coil (which is in series with the motor run winding) senses a high surge of current which closes a contact in the motor start relay which then puts 117 volts to the motor start capacitor. When the motor starts up to speed, the current starts to decrease in the motor run winding and the current sensitive motor start relay drops out cutting off the 117 volt power to the motor start capacitor. The motor start winding and capacitor are now out of the circuit as the motor gets up to speed. This is a capacitor start induction run motor. The motor gets to full operating speed in about 150 milliseconds. The door will continue to open until the 90 degree limit switch is hit by the cam which cuts off the motor but the solenoid valve remains energized.

The N.C. 90 degree switch is now open. When the switch opens, the motor is disconnected from the low side of the 117 volt power. As long as someone is still standing on the operate carpet, the triac remains turned on. When a person goes from the operate to the safety carpet, the logic circuit remains energized thereby keeping the triac on. When a person steps off the safety circuit, a time delay is initiated keeping the logic circuit on and thereby keeping the triac on for about 1 second. When a person steps on the safety carpet first and no one is on the operate carpet, the logic does not turn on the triac. The triac remains in the off state and no action is initiated. When one person steps on the operate while another is on the safety, the logic still does not turn on keeping the triac off. When a person steps off the safety while another is still standing on the operate, there will be a 2 second delay before the logic circuit will turn on the triac. This is the safety plus feature.

ELECTRICAL SCHEMATIC DIAGRAM

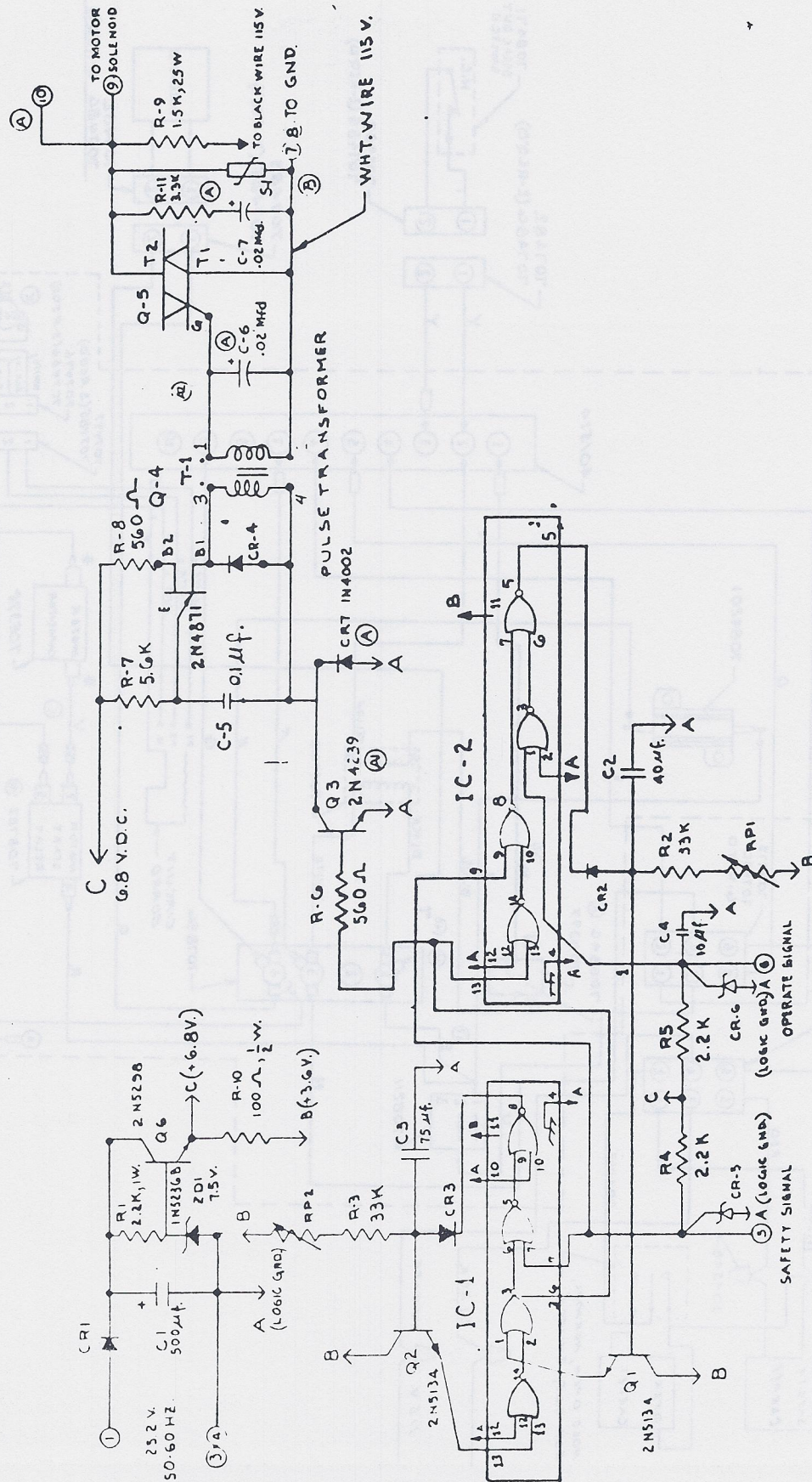


FIGURE 7

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TUNE-IN AND ADJUSTMENT

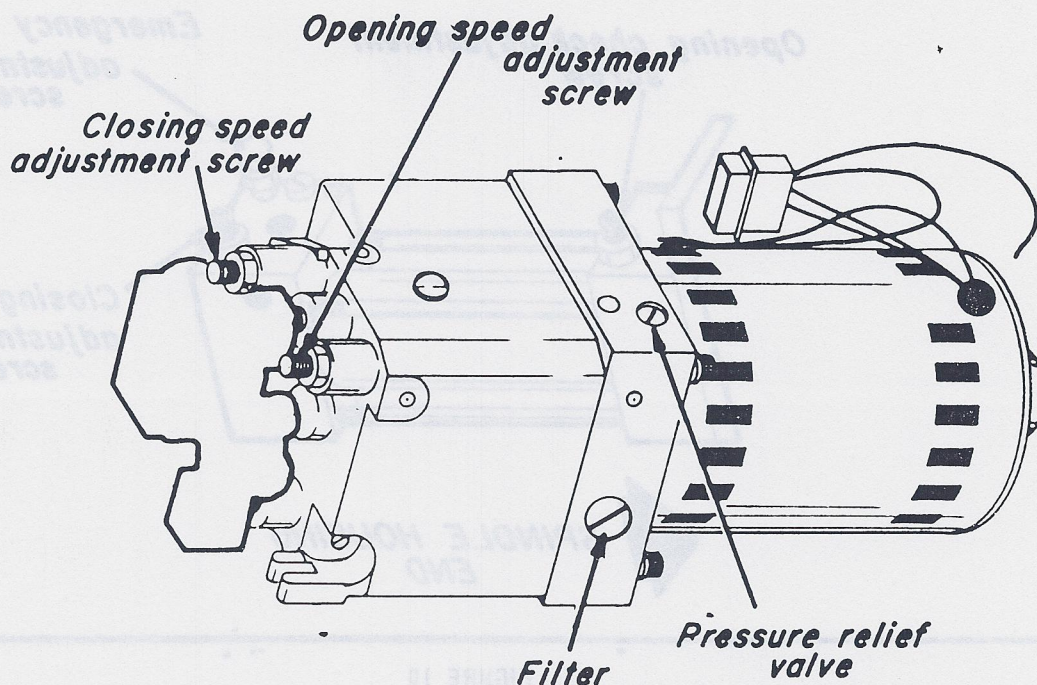


FIGURE 9

OPERATOR SPEED ADJUSTMENTS

NOTE: The operator is factory adjusted, but some adjustment may be required to accommodate different door sizes, wind conditions, etc. The speed and checking times given are factory specifications and are offered as a guide for typical installations.

The adjustments are best made after cycling the operators for a few minutes to warm it up as this allows the fluid to circulate thoroughly and stabilize the temperature.

OPENING SPEED (0 degrees to 80 degrees) 1.2 – 1.5 seconds.

Refer to Figure 9. This shows the position of the opening speed adjustment screw.

Loosen locking nut. With an allen wrench turn the opening speed valve screw CCW to increase opening speed; and CW to decrease opening speed. **CAUTION:** Do not turn this valve more than 3 full turns CCW from fully closed position, leakage may result. Tighten locking nut.

CLOSING SPEED (90 degrees to 10 degrees) 2.0 – 3.0 seconds.

Refer to Figure 9. The closing speed adjustment screw is always located directly over the coil of the solenoid valve. Loosen locking nut. With an allen wrench turn the closing speed adjustment screw CCW for faster closing speed and CW for slower closing speed. Tighten locking nut.

PRESSURE ADJUSTMENT

A pressure gauge with a male Gra-Tec fitting must be used to adjust the pressure. Remove the Gra-Tec clip and plug on top of the solenoid fitting and insert the gauge using the clip. The pressure should be 650 PSI as the door goes through its opening check. The valve only relieves during opening check. Turning the valve screw CW increases the pressure and CCW decreases the pressure. Only slight adjustments are required to make significant changes in pressure. **CAUTION:** Pressure must not exceed 650 PSI.

TUNE-IN AND ADJUSTMENT

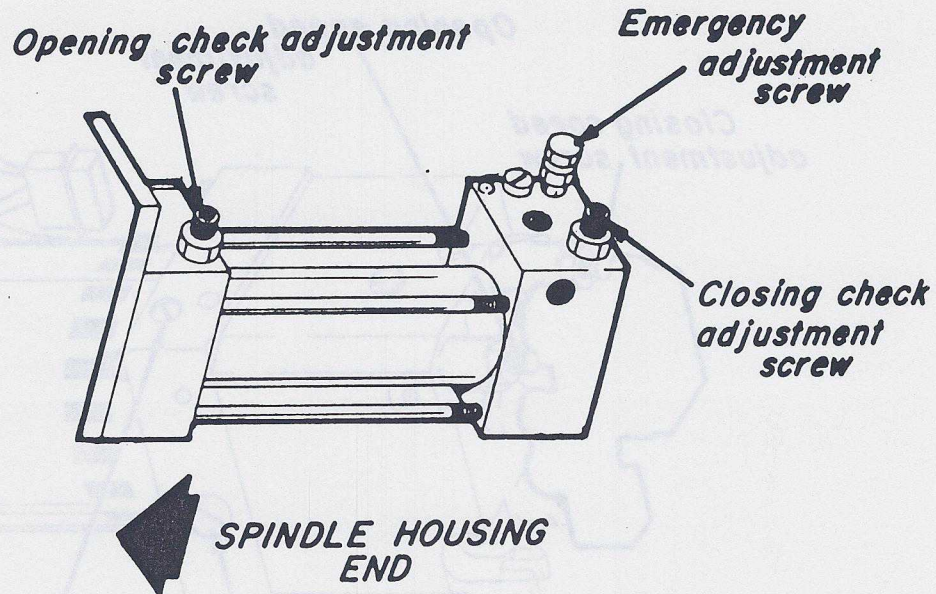


FIGURE 10

OPENING CHECK (80 degrees to full open) 1.0 – 2.0 seconds.

Refer to Figure 10. This adjustment screw is always located on the rod end block (No. 2). Loosen locking nut. With an allen wrench turn the opening check adjustment screw CCW for faster checking action, and CW for slower checking action. Tighten locking nut.

CLOSING CHECK (10 degrees to 0 degrees) 1.0 – 2.0 seconds.

Refer to Figure 10. This adjustment screw is always located on the power end block (No. 1). With an allen wrench turn the closing check adjustment screw CCW for faster checking action; and CW for slower checking action. Tighten locking nut.

EMERGENCY RETURN CONTROL & MANUAL OPENING FORCE

Refer to Figure 10. This is the only hex head screw adjustment. It is located on power end block (No.1). A lock nut and sleeve are provided on newer models, which must be loosened. Turning the adjustment screw CW slows the emergency return and increases the force required to open the door manually. Turning the screw CCW increases the speed of emergency return and decreases the force required to open the door manually.

"IN" DOORS (Where emergency egress is required)

The adjustment screw should be turned approximately 1/8 turn CCW from its fully closed position.
CAUTION: A controlled return from emergency direction is essential.

"OUT" DOORS

The adjustment screw can be set 1/8 turn CCW from its fully closed position or can be turned 2 full turns CCW for easier manual operation.

TUNE-IN AND ADJUSTMENT

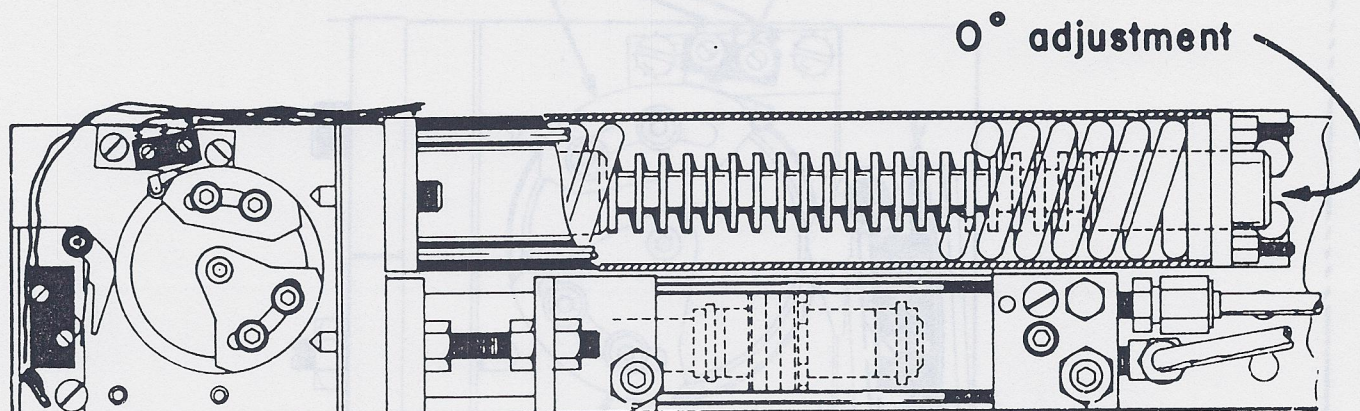


FIGURE 11

MECHANICAL ADJUSTMENTS

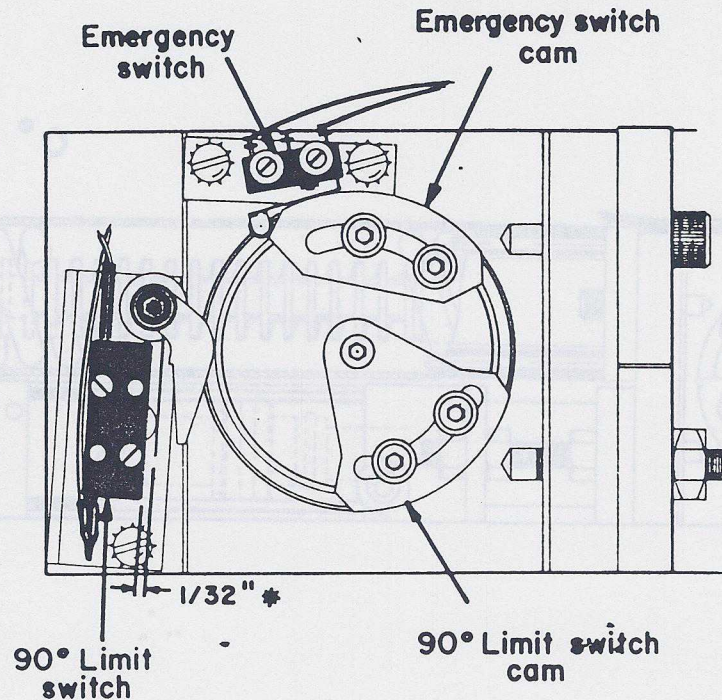
DOOR ZERO POSITION

Refer to Figure 11.

Turn the hex bolt on the end of spring cylinder. This adjustment is made using a 9/16" thinwall socket with a special adapter (Part No. 310582) and an open end wrench.

CAUTION: Remove tools before actuating the operator.

TUNE-IN AND ADJUSTMENT



* $1/32"$ when switch is actuated

FIGURE 12

EMERGENCY SWITCH

Refer to Figure 12. This is adjusted by loosening and shifting the emergency switch cam. Adjust the cam so that the emergency switch is actuated by the cam when the door has moved 2-3 degrees in the emergency egress position.

90 DEGREE LIMIT SWITCH (Refer to Figure 12)

1. **SWITCH LOCATION:** If there is a reason to suspect that the switch mounting plate has moved from its factory setting, it should be checked. Otherwise, only cam adjustment is necessary (See No. 2 Below). Improper location can result in physical damage to the switch or burning of contacts. To prevent this from happening:
 - a. Remove the operator from the header.
 - b. Remove the two cam clamping screws.
 - c. Swing the cam toward the switch until it hits the actuator at the center of the cam.
 - d. Loosen switch bracket clamping screw.
 - e. Adjust mounting bracket so that there is approximately $1/32"$ between the end of the actuating spring and actuator (white delrin material).
 - f. Tighten bracket clamping screw.
2. **CAM ADJUSTMENT:** Will now give proper 90 degree full open position. This can be done with the operator in the header.
 - a. Swing cam back and refasten clamping screws.
 - b. Cycle operator open, note open position.
 - c. Allow to close and adjust cam as necessary.

NOTE: If during cycling and adjustment the door opens and will not close, this indicates that the spindle hit the 93 degree mechanical stop before the motor cut out. If this happens, turn off the operator, wait a few minutes and tap solenoid to relieve hydraulic lock. Re-adjust cam.

93 DEGREE MECHANICAL STOP

The spindle should hit the head of the stop location in the spindle casting when the door is at 93 degrees open. This stop is set and locked at the factory and rarely needs adjustment.

MAINTENANCE PROCEDURES

CAUTION:

When inspecting linkage and/or other moving parts of the operator, always place the On-Off switch at the control box to the OFF position.

The following maintenance should be performed at least every six months:

1. Lubricate 4 pins and 2 clevises in the spindle and linkage assembly with SAE 30 non-detergent oil.
2. Check oil level with dip stick. Add 707259 silicone fluid only if required.
3. Inspect all plug and wire nut connections.
4. Inspect and tighten door arms.
5. Check force required to open the door manually. It must not exceed 50 lbs. at the leading edge of the door.
6. Check emergency egress for "In" doors. Pull door towards you. When the door moves 2-3 degrees past its closed position the opening carpet should be deactivated, and the operator should not attempt to cycle the door open. If the carpet does not deactivate, check the emergency egress switch and/or cam. The door should return to its closed position from full break-out at a controlled speed. If it doesn't, refer to "Tune-In and Adjustment" section of this manual.
7. Check opening and closing speeds, and checking action. If adjustments are required, refer to "Tune-In and Adjustment" section of this manual.
8. Inspect opening and safety carpets for proper operation.
9. Make sure that the door moves freely without bind or drag.
10. Inspect pivots and/or hinges, rails, molding, etc., tighten and/or replace if necessary.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
A. Door will not open when opening carpet is actuated. (Motor does not run)	(1) Check On/Off/Hold-open switch. It should be in the "On" position for powered operation. If not		Put switch in "On" position.
	(2) Put On/Off/Hold-Open switch on "Hold-Open". If door now opens	Faulty opening carpet or leads.	Test for faulty "open" carpet. Replace if necessary.
	(3) Check On/Off switch on control box. It should be in the "On" position for powered operation. If not		Put switch in "On" position.
	(4) Disconnect safety carpet at wire nut splice. If door now opens when opening carpet is actuated or switch is on "Hold-Open"	Safety carpet or leads shorted.	Replace safety carpet.
	(5) Visually check to make sure that emergency switch lever is not actuated by cam when door is in closed position. If it is	Door not at true zero position or emergency cam misadjusted.	Adjust door zero position or adjust cam. (See Tune-In Section)
	(6) Turn off power and disconnect emergency switch leads (violet) at connector. Check for continuity through leads and switch. If open circuit	Switch is bad or leads open. NOTE: IF old style visible linkage with breakout switch is used, check that switch also. (Both emergency switches are normally closed)	Replace emergency switch assembly and readjust. Be sure the switch mounting plate is shifted fully toward spindle to retain top spindle bearing. (See Tune-In Section)
	(7) Check fuse in control box for continuity. Be sure to turn off power before removing fuse. If fuse is open		Replace fuse and exercise operator thoroughly.
	(8) If new fuse blows	Suspect circuit board component.	Replace control box. Refer to control box trouble shooting.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
A. Door will not open when opening carpet is actuated. (Motor does not run) continued	(9) Disconnect power leads 6-pin connector at control box. Check for supply voltage of 117 v. between pins 3 and 4 (black & white). If no voltage	Circuit breaker at main panel tripped.	Reset breaker.
	(10) Verify that all four lead connectors are firmly plugged together.	An intermittent contact can open due to motor vibration.	Plug connectors together firmly.
	(11) Disconnect solenoid valve 2 pin connector. Check for 117 volts across connector from control box when switch is on "Hold-Open". If no solenoid voltage	Faulty control box.	Replace control box. Refer to Control Box Trouble Shooting.
	(12) If there is solenoid voltage but motor still won't run	Low voltage logic and switching in control box is O.K. Suspect motor thermal overload, 90 degree switch, motor windings or control box.	See following Steps: (A-13 - A-17)
	(13) Disconnect motor leads 4-pin connector. Check for 23-32 OHMS between pins 1 and 3 (red and yellow leads from motor) and for 13-18 OHMS between pins 2 and 3 (blue and yellow leads from motor). If open circuit, wait 15 minutes and test again. If resistances are now correct.	Motor was overheated and thermal overload cut out. Possible reasons for cut-out are: Motor running continuously is open position	See Trouble Shooting - Steps D-1 & D-2.
		OR Operator "blipping" on Hold-Open.	See Trouble Shooting - Steps P-1 thru P-5.
		OR Defective motor start capacitor or relay	Replace control box. Refer to Control Box Trouble Shooting.
		OR Relief valve pressure set too high.	Check & reset pressure to 650 PSI. If necessary (See Tune-In Section).
		OR Defective thermal overload, binding pump or motor bearings	Replace operator.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
A. Door will not open when opening carpet is actuated. (Motor does not run) continued	(14) If above test still reads open circuit, test for continuity across 90 degree limit switch (normally closed) at switch terminals with 4-pin connector still disconnected. Do not destroy shrink tubing with meter probes. If open circuit	90 degree switch is defective.	Replace 90 degree switch assembly. Dress leads away from moving parts. Adjust switch and cam. (See Tune-In Section)
	(15) If 90 degree switch tests O.K. and there is still an open circuit across yellow and blue leads	Motor windings or thermal overload defective (open).	Replace operator.
	(16) If resistance is too low between pins 1 and 3.	Starting windings of motor are shorted.	Replace operator.
	(17) If resistance is too low between pins 2 and 3.	Run windings or motor are shorted.	Replace operator.
B. Door will not open when opening carpet is actuated. (Motor hums but doesn't run).	(1) Install new control box. If operator now O.K.	Original control box defective, probably motor start relay or motor start capacitor.	Replace control box. Refer to Control Box Trouble Shooting.
	(2) Rotate motor rotor with a screwdriver through slots in end of motor.	If rotor does not turn freely then bearings or pump are binding.	Replace operator.
C. Door will not close with no object on carpets.	(1) On-Off, Hold-Open switch on Hold-Open.		Put switch in "On" position.
	(2) Disconnect opening carpet. If door closes	Opening carpet or leads shorted.	Replace opening carpet.
	(3) Disconnect safety carpet. If door closes	Safety carpet or leads shorted.	Replace safety carpet.
	(4) Disconnect solenoid leads at connector. If door closes immediately	Control box failure.	Replace control box. Refer to Control Box Trouble Shooting.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
C. Door will not close with no object on carpets. continued	(5) Motor <u>may</u> be running continuously, if so, turn off power. Wait a few minutes, tap solenoid valve. If door closes	Door stop or other object on floor or in path of door, door dragging on molding, etc.	Remove obstacle.
		OR 90 degree switch actuator spring broken.	Replace actuator spring. Readjust 90 degree switch and cam to stop door at 90 degrees. (See Tune-In Section)
		OR 90 degree switch misadjusted, spindle hits mechanical 93 degree stop.	Verify that mechanical stop is at 93 degree and adjust if necessary. (See Tune-In Section)
D. Motor runs continuously when door is fully open. (Motor thermal overload eventually cuts out)	(1) See Step C-5.		
	(2) Verify that power lines to control box are connected black to black and white to white through six pin connector (pins 3 and 4) and through splice to building wiring. Disconnect 90 degree switch lead 2 pin connector and check for a short between the leads and body of operator.	If power is tied in white to black and black to white, <u>and</u> the 90 degree switch leads or terminals are shorted to the operator body (ground) the motor runs continuously.	Rewire power and correct shorted leads or terminals if necessary.
E. Door opens too slowly.	(1) Loosen lock nut and turn opening speed screw in to seat (CW) then open (CCW) 3 full turns. If speed is O.K.	Speed was set too slow.	Readjust opening speed. (See Tune-In Section)
	(2) Loosen lock nut and turn emergency screw in to seat (CW) Open (CCW) 1 full turn. If speed is O.K.	Emergency ball check and plunger not operating properly.	"Out" doors: Leave emergency screw at 1 full turn out. Lock with locknut. "In" doors: Adjust emergency screw for proper control of door during return from emergency (Continued next page)

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
E. Door opens too slowly. continued			direction and acceptable manual opening force. (See Tune-In Section)
	(3) "In" doors: Can't adjust emergency screw for proper emergency return control without excessively slowing opening speed.	Emergency plunger jammed.	Remove emergency plunger plug and manually push plunger down against spring. If jammed, replace plunger.
		Hole or ball seat in power end block deformed, resulting in failure of plunger to hit ball or ball wedged in seat.	Replace operator.
	(4) Check pressure with gauge equipped with Gra-Tec fitting as door goes through opening check. If less than 650 PSI	Pressure relief valve misadjusted.	Readjust pressure relief valve screw. (See Tune-In Section)
	(5) Remove pressure relief valve screw, spring, poppet and poppet sleeve. (Use magnet) If there are chips or dirt on components or on seat.	Relief valve bypassing oil to reservoir.	Clean components and the cavity. (Q tip works well). Reinstall poppet, poppet "O" ring and sleeve as a unit, gently reseal poppet with a light tap on a drift, replace spring and screw, readjust pressure relief valve screw. (See Tune-In Section)
F. Door opens too slowly during first 30 degree of swing then speeds up for remainder of swing.	(1) Observe closing check.	Closing check set too tight.	Adjust closing check. (See Tune-In Section)
	(2) If closing check is satisfactory, remove closing check screw and test spring loaded floating needle for free movement. If jammed ...	Needle not rising to allow flow of high pressure oil to piston.	Clean floating needle area or replace check screw. Readjust closing check. (See Tune-In Section)
G. Door opens <u>very</u> slowly, will not fully open. Motor runs continuously when opening carpet is actuated.	(1) Disconnect solenoid lead (2 pin) connector. Check resistance of solenoid coil. (160 OHMS) If coil is shorted or open	Solenoid coil defective, valve not pulling in.	Replace solenoid coil. Dress leads away from moving parts and pinch points.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
E. Door opens too slowly. continued			direction and acceptable manual opening force. (See Tune-In Section)
	(3) "In" doors: Can't adjust emergency screw for proper emergency return control without excessively slowing opening speed.	Emergency plunger jammed.	Remove emergency plunger plug and manually push plunger down against spring. If jammed, replace plunger.
		Hole or ball seat in power end block deformed, resulting in failure of plunger to hit ball or ball wedged in seat.	Replace operator.
	(4) Check pressure with gauge equipped with Gra-Tec fitting as door goes through opening check. If less than 650 PSI	Pressure relief valve misadjusted.	Readjust pressure relief valve screw. (See Tune-In Section)
	(5) Remove pressure relief valve screw, spring, poppet and poppet sleeve. (Use magnet) If there are chips or dirt on components or on seat.	Relief valve bypassing oil to reservoir.	Clean components and the cavity. (Q tip works well). Reinstall poppet, poppet "O" ring and sleeve as a unit, gently reseal poppet with a light tap on a drift, replace spring and screw, readjust pressure relief valve screw. (See Tune-In Section)
F. Door opens too slowly during first 30 degree of swing then speeds up for remainder of swing.	(1) Observe closing check.	Closing check set too tight.	Adjust closing check. (See Tune-In Section)
	(2) If closing check is satisfactory, remove closing check screw and test spring loaded floating needle for free movement. If jammed ...	Needle not rising to allow flow of high pressure oil to piston.	Clean floating needle area or replace check screw. Readjust closing check. (See Tune-In Section)
G. Door opens <u>very</u> slowly, will not fully open. Motor runs continuously when opening carpet is actuated.	(1) Disconnect solenoid lead (2 pin) connector. Check resistance of solenoid coil. (160 OHMS) If coil is shorted or open	Solenoid coil defective, valve not pulling in.	Replace solenoid coil. Dress leads away from moving parts and pinch points.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
G. Door opens very slowly, will not fully open. Motor runs continuously when opening carpet is actuated. continued	(2) If solenoid coil resistance is O.K.	Solenoid valve jammed.	Clean valve per Step (N-1). If valve still will not function, replace operator.
H. Door opens slowly and/or pump cavitating. (Drawing in air)	(1) Check oil level with dipstick.	Low oil.	Fill if necessary.
	(2) Remove filter and clean.	Clogged filter.	If filter is mechanically sound, clean thoroughly. If mesh is collapsed or "O"-ring cut, replace filter. Screw filter in until flush with manifold.
I. Door not centered on jamb in closed position.	(1) Door dragging on threshold or on jamb.	Worn pivot, door arm loose in door, sagging door, damaged weatherstripping.	Adjust or replace worn pivots, sagging door or tighten door arm mounting screws.
	(2) Excessive free play between door arm and spindle (move door, spindle does not move)	Loose or deformed door arm.	Tighten loose door arm, replace deformed door arm.
	(3) Excessive free play between spindle and spring cylinder. (Move door, spring cylinder clevis does not move)	Wear of spindle or clevis pins.	Replace operator.
	(4) If none of the above	Zero position maladjusted.	Using 9/16" thin-wall socket and adaptor 0 degree adjusting tool, adjust hex bolt on power pack end of spring cylinder to center door. (See Tune-In Section)
J. Manual opening too difficult.	(1) Powered opening O.K.	Emergency screw adjusted too tight.	Readjust emergency screw. (See Tune-In Section).
K. Emergency operation too difficult. 0 to -30 degree door angle.	(1) Loosen locknut and back out (CCW) closing speed screw 1/2 turn.	Closing speed set too tight.	Readjust closing speed screw. (See Tune-In Section)
	(2) Loosen locknut and back-out (CCW) closing, check screw 1/2 turn.	Closing check screw set tight.	Readjust closing check screw. (See Tune-In Section)

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
L. Emergency operation too difficult. Minus 30 to 90 degree door angle.	(1) If door control during return from emergency direction is too firm . . .	Emergency screw set too tight.	Readjust emergency screw. (See Tune-In Section)
M. Linkage binds during emergency operation on return.	(1) Inspect power cylinder clevis tube. If power cylinder link hits slot in tube	Clevis tube turned out of position.	Rotate tube until link clears the slot and refasten tube with penetrating locktite or epoxy.
	(2) Inspect spring cylinder clevis and end bracket casting. If dry and powdering	Clevis sticking in casting bore.	Lubricate clevis.
	(3) If spring clevis and/or casting bore is severely worn. . . .	Clevis jamming in casting bore.	Replace operator.
N. Operator cycles on and off ("blips" when holding open).	(1) Remove solenoid valve hex cap, spring and plastic seat. If there is dirt or chips	Solenoid valve leaking oil from power cylinder to reservoir.	Clean and reassemble valve. Take care not to cut hex-cap "O" ring.
	(2) Remove emergency plunger cap, plunger and spring. If plunger "O" ring is cut or worn	Oil is leaking from power cylinder past "O" ring to reservoir.	Replace emergency plunger and "O" ring assembly.
	(3) Remove closing ball check plug and ball. If there is dirt or chips on ball seat	Oil is leaking from power cylinder thru closing ball check to reservoir.	Clean ball seat. Replace ball and reseal <u>gently</u> with a tap on a small drift. Replace plug.
	(4) Remove anti-back flow ball check plug, spring and ball. If there is dirt or chips on ball seat	Oil is leaking from power cylinder thru anti-backflow ballcheck to reservoir.	Clean ball seat. Replace ball and reseal <u>gently</u> with a tap on a small drift. Replace spring and plug.
	(5) If not numbers 1 thru 4 above, then suspect scored cylinder cut piston or piston rod "O" rings.	Internal leak from power end of cylinder to rod end.	Replace operator.
O. External leakage of silicone fluid.	(1) Silicone fluid coming from around opening or closing check adjustment screws.	Cut or broken "O" ring.	Replace the checking screw assembly. Readjust for proper checking. (See Tune-In Section) Opening and closing check screws are identical parts.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
O. External leakage of silicone fluid. continued	(2) Silicone fluid coming from around emergency adjustment screw.	Cut or broken "O" ring.	Replace emergency screw assembly. Readjust for proper control of door during return from emergency and proper manual operation.
	(3) Silicone fluid coming from around opening or closing adjustment screws.	Cut or broken "O" ring.	Replace speed screw assembly. Readjust for proper door speed. (See Tune-In Section) Lock adjustment with locknut. (Opening and closing speed screws are identical parts).
	(4) Silicone fluid coming from around emergency plunger plug.	Cut or broken "O" ring plug.	Replace plunger plug and "O" ring assembly.
	(5) Silicone fluid coming from solenoid valve Tru-seal nuts.	Tru-seal nut not tight enough.	Carefully tighten Tru seal nut (not more than 40 in. lbs. to avoid stripping).
	(6) Silicone fluid coming from Gra-Tec solenoid valve plumbing.	Cut or broken Gra-Tec "O" ring. (There are 7 such "O" rings)	Disconnect high pressure line at Flodar fittings, using <u>two wrenches</u> , one for body of fitting, one for hex nut. Remove Gra-Tec clips necessary to gain access to leaking "O" ring. Replace "O" ring. Reassemble. Remember, Gra-Tec "O" rings are easily cut during assembly of fitting.
	(7) Silicone fluid inside motor housing.	Leaking rotor shaft seal or scored rotor shaft.	Replace operator.
	(8) Silicone fluid coming out of clevis tube or between rod end block and mounting bracket.	Leaking piston rod seal or scored piston rod.	Replace operator.
	(9) Silicone fluid coming out around anti-backflow ball check plug.	Cut or broken "O" ring on plug.	Remove plug. Replace with new plug and "O" ring assembly. Turn plug in until flush or slightly below top surface of manifold block. Do not tighten down solid.

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
O. External leakage of silicone fluid. continued	(10) Silicone fluid coming out around pressure relief valve screw.	Cut or broken "O" ring.	Remove screw. Replace with new screw and "O" ring assembly. Reset pressure relief valve screw. (See Tune-In Section)
	(11) Silicone fluid coming out around closing check ball check plug.	Cut or broken "O" ring.	Remove plug. Replace with new plug and "O" ring assembly. Turn plug in until flush or slightly below surface of reservoir. Do not tighten down solid.
	(12) Silicone fluid coming from flodar tube fittings on <u>high pressure line</u> .	Fitting not tight or defective flare on tubing.	Try tightening fittings. If hex ferrules are tight and leak persists, replace high pressure tubing assembly. Make sure spring cylinder does not hit fitting on opening cycle.
	(13) Silicone fluid coming from flodar tube fittings on <u>return line</u> .	Fitting not tight or defective flare on tubing.	Try tightening fittings. If hex ferrules are tight and leak persists, return tubing assembly must be replaced. To do this, disconnect high pressure line Gra-Tec Clip and return line flodar fitting. Remove two mounting screws holding power pack to base plate (on bottom of base plate). Replace return line and reinsert Gra-Tec. Refasten power pack to base plate. Tighten flodar fittings and slide in Gra-Tec Clip.
	(14) Silicone fluid coming from flodar tube fittings on power cylinder bypass line.	Fitting not tight or defective flare on tubing.	Replace operator.
	(15) Silicone fluid coming out around filter.	Cut or broken "O" ring.	Replace filter with new filter "O" ring assembly. Install new filter until flush or slightly below surface of solenoid block. Do not tighten down solid. (Filter "O" ring is easily cut during insertion)

AUTO-SWING FIELD TROUBLE SHOOTING CHART

TROUBLE	TEST	CAUSE	REMEDY
P. Noisy Operation.	(1) Vibration during powered opening cycle.	Door arm mounting screws loose.	Tighten door arm screws.
		Loose glass, glass stops, header or jambs.	Tighten or refasten loose parts of door or frame.
		Operator vibrating against header.	Tighten mounting screws. Add 2 mounting screws at motor end of base plate. (Tapped holes provided in base plate).
		Control box vibrating against header.	Check control box mounting fasteners. Place a shim between control box and header if box is touching header.
		Header cover loose.	Replace any missing cover screws and tighten.
	(2) Check oil level in reservoir with dipstick.	Low oil can cause pump cavitation resulting in vibration.	Fill reservoir.
	(3) Noise coming from motor. (Use a screwdriver as a listening aid).	Worn or dry motor bearings.	Replace operator.
Q. Groaning noise on closing cycle.	(1) Noise coming from power cylinder rod end block. (Use a screwdriver as a listening aid.)	Piston rod seal vibration.	Put 2 or 3 drops, <u>not more</u> , of <u>clean</u> non-detergent lubricating oil in reservoir.
R. Noisy spring cylinder.	(1) Use screwdriver as a listening aid.		Replace operator.
S. Squeaking on opening or closing.		Insufficient lubrication at spindle-clevis area, visible linkage, if any, or door pivot(s).	Lubricate 4 pins, 2 clevises, visible linkage, if any, and door pivot(s).

CONTROL BOX LOCATION POINT

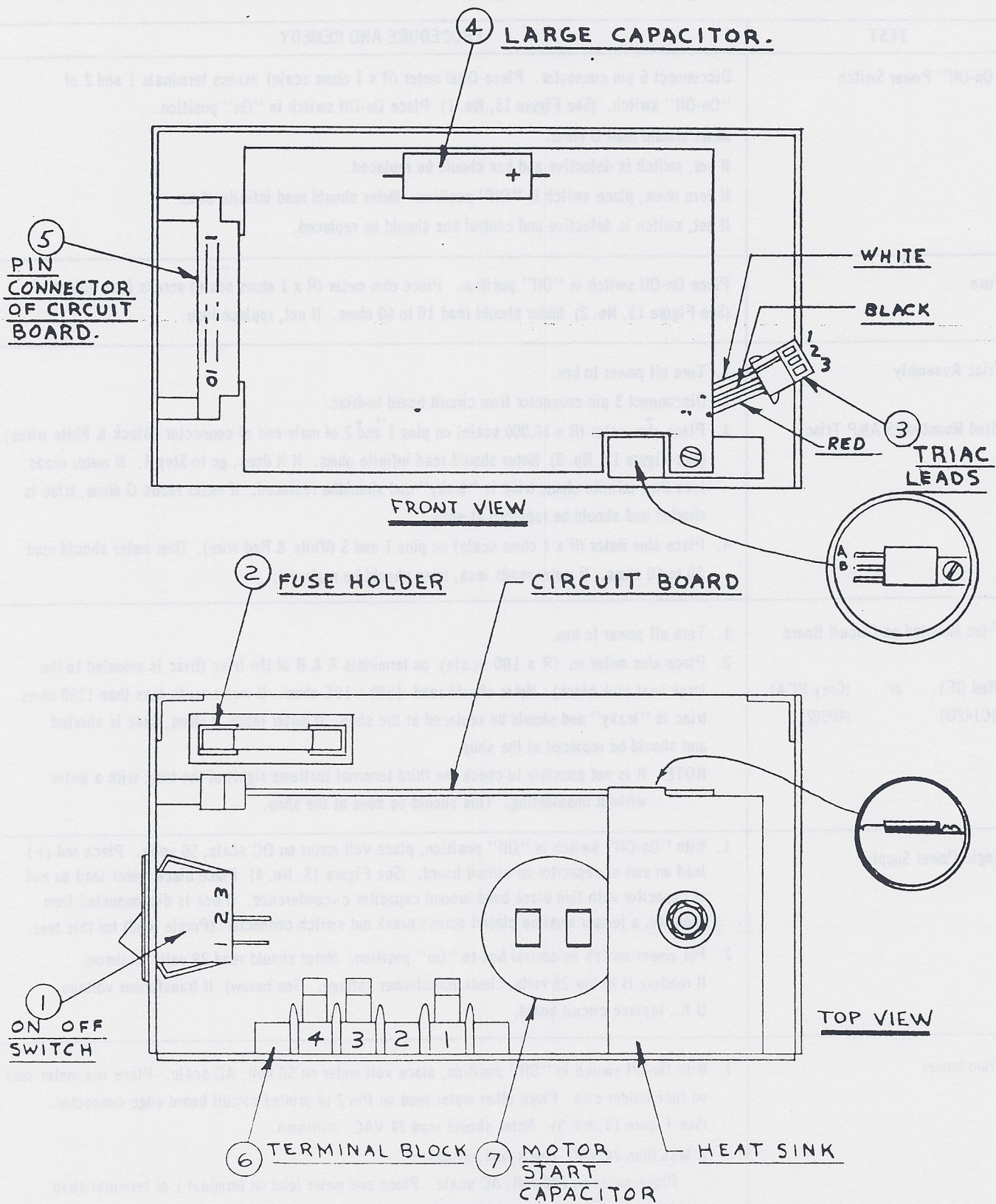


FIGURE 13

FIELD TROUBLE SHOOTING PROCEDURE - CONTROL BOX

This trouble shooting chart should be used after it has been determined that the control box has failed. Symptom in all cases is "Control Box Defective". (Refer to Figure 13, for location of components. Ohm meter should be "zeroed" for each scale used.)

TEST	PROCEDURE AND REMEDY
"On-Off" Power Switch	<p>Disconnect 6 pin connector. Place OHM meter (R x 1 ohms scale) across terminals 1 and 2 of "On-Off" switch. (See Figure 13, No. 1) Place On-Off switch in "On" position.</p> <p>Meter should read 0 ohms.</p> <p>If not, switch is defective and box should be replaced.</p> <p>If zero ohms, place switch in "Off" position. Meter should read infinite ohms.</p> <p>If not, switch is defective and control box should be replaced.</p>
Fuse	<p>Place On-Off switch in "Off" position. Place ohm meter (R x 1 ohms scale) across fuse holder. (See Figure 13, No. 2) Meter should read 10 to 60 ohms. If not, replace fuse.</p>
Triac Assembly (Stud Mounted 25 AMP Triac)	<ol style="list-style-type: none"> 1. Turn off power to box. 2. Disconnect 3 pin connector from circuit board to triac. 3. Place ohm meter (R x 10,000 scale) on pins 1 and 2 of male end of connector (Black & White wires). (See Figure 13, No. 3) Meter should read infinite ohms. If it does, go to Step 4. If meter reads less than infinite ohms, triac is "leaky" and should be replaced. If meter reads 0 ohms, triac is shorted and should be replaced at shop. 4. Place ohm meter (R x 1 ohms scale) on pins 1 and 3 (White & Red wire). Ohm meter should read 20 to 60 ohms. If meter reads less, triac should be replaced.
Triac Mounted on Circuit Board (Red GE) or (Grey RCA) (SC142D) (40902)	<ol style="list-style-type: none"> 1. Turn off power to box. 2. Place ohm meter on (R x 100 scale) on terminals A & B of the triac (triac is mounted to the large heat sink block). Meter should read $1500 \pm 10\%$ ohms. If meter reads less than 1350 ohms, triac is "leaky" and should be replaced at the shop. If meter reads 0 ohms, triac is shorted and should be replaced at the shop. <p>NOTE: It is not possible to check the third terminal (extreme right) of the triac with a meter without unsoldering. This should be done at the shop.</p>
Logic Power Supply	<ol style="list-style-type: none"> 1. With "On-Off" switch in "Off" position, place volt meter on DC scale, 50 volts. Place red (+) lead on end of capacitor on circuit board. (See Figure 13, No. 4) Place black meter lead on end of capacitor with thin black band around capacitor circumference. If box is disconnected from operator, a jumper must be placed across break out switch connector (Purple lead) for this test. 2. Put power switch on control box to "On" position. Meter should read 29 volts minimum. If reading is below 29 volts, check transformer voltage. (See below) If transformer voltage O.K., replace circuit board.
Transformer	<ol style="list-style-type: none"> 1. With On-Off switch in "Off" position, place volt meter on 50 volt, AC scale. Place one meter lead on fuse holder clip. Place other meter lead on Pin 2 of printed circuit board edge connector. (See Figure 13, No. 5) Meter should read 24 VAC. minimum. <p>If less than 24 VAC, check line voltage:</p> <p>Place meter on 200 volt, AC scale. Place one meter lead on terminal 1 of terminal strip in control box. Place other meter lead on terminal 3 of terminal strip in control box. (See Figure 13, No. 6) The circuit board can operate if the line voltage is 104 volts minimum. (continued on next page)</p>

FIELD TROUBLE SHOOTING PROCEDURE - CONTROL BOX

TEST	PROCEDURE AND REMEDY
Transformer continued	<p>However, the motor must have a minimum of 105 volts to operate. See Chart on wire size for certain distances from power source. If line voltage is 104 volts or above and transformer is below 24 volts, transformer is defective.</p> <p>Replace control box.</p>
Motor start Capacitor	<ol style="list-style-type: none"> 1. Turn power switch to "Off" position. 2. Carefully holding an insulated handle screwdriver with hand on the insulated portion, place blade across the two terminals on the motor start capacitor, shorting it out. (See Figure 13, No. 7) A large spark may occur. After the capacitor has been discharged, place a meter on the R x 10,000 ohm scale and place the leads on the capacitor terminals. The meter should start at 0 ohms and go to 100 K ohms or greater in approximately 30 to 60 seconds. If meter does not rise to 100 K ohms but stays at 0 ohms, replace capacitor.
Motor start Relay	<ol style="list-style-type: none"> 1. It is not feasible to test the motor start relay in the field since it is inaccessible. If the motor capacitor checks out O.K. and symptom is motor fails to start but just hums, it is a good indication motor start relay is bad and should be replaced.

GLOSSARY OF TERMS

CAPACITOR START INDUCTION RUN MOTOR	It is an A.C. motor with two windings a start winding and a run winding. The start winding which in conjunction with the motor start relay and motor start capacitor supply the initial torque to start the motor. Once the motor reaches operating speed, the start winding is cut out by the motor start relay and the run winding continues for the remainder of the cycle.
CCW	Counter Clockwise
CW	Clockwise
GPM	Gallons Per Minute
"IN" DOOR	The Door swings under the operator in a visible application, and under the swing up header in an in header application.
LEFT HAND OPERATOR	The operator swings the door in a counter clockwise direction.
NC	Normally Closed
NO	Normally Open
OPERATING CONTROL	Any signal that is used to actuate an operator such as a carpet photo electric, push plate, etc.
"OUT" DOOR	The door swings away from the operator in a visible application, and away from the swing up header cover in an in header application.
PSI	Pounds Per Square Inch
RIGHT HAND OPERATOR	The operator swings the door in a clockwise direction.
TRIAC	It is a controllable AC switch that is used in place of a motor contactor.