OPERATORS MANUAL

CD3-A DISPENSER

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United States of America

!!! WARNING !!!

SAFETY PRECAUTIONS

The CD3-A dispenser can develop fluid pressures in excess of 2,500 psi. Eye protection must be worn when this unit is energized. The dispenser must be considered energized unless the system air supply is disconnected and vented, the shut off cocks at the downstream end of the dispense line have been opened to relieve any resin pressures, and (e) pressure vessel tanks are vented.

Mechanical members are actuated under forces of up to 2,000 psi. Maiming injuries can be incurred. The Plexiglas observation shield must be in place at all times when the unit is energized.

Additional safety information is contained throughout operating instructions for the cabinet as well as the accessories. Familiarity with ALL of this information is necessary to assure safe operation.

Solvents are normally used for the clean-up of this unit. Be acquainted with the characteristics of these materials. They are hazardous under all circumstances and extremely dangerous in unventilated areas.

INTRODUCTION

The CD3-A dispenser is a precision machine and must be cared for as such. Safe, accurate, and dependable performance requires reasonable care and maintenance. Prior to operation therefore, it is absolutely necessary that the operator thoroughly understands this manual. You are encouraged to phone Lily Corporation for clarifications.

Available technical sheets applicable to components furnished by other manufacturers are enclosed and should be reviewed prior to operating the system.

The balance of this manual MUST be read prior to operating the system. Essential safety and operating data is contained only in this manual.

PRODUCT WARRANTY, DISCLAIMERS, WARNINGS TO USERS,

AND LIMITATIONS OF LIABILITY

EXPRESS WARRANTY AND DISCLAIMER OF IMPLIED WARRANTIES

Lily Corporation unconditionally guarantees products of their manufacture to be free of defects in material or workmanship. Lily further warrants that, for a period of three months from date of factory shipment, its products will meet the performance criteria stated in Lily Corporation's publications.

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.

WARNINGS TO USERS ABOUT INADEQUATE MIXING THROUGH IN-LINE STATIC MIXERS

Lily Corporation cautions the users of its products that epoxies must be thoroughly mixed to achieve formulated strengths. Many factors affect the mixing of epoxies, including temperatures, in-line pressure, induction time, and other job-site conditions beyond the control of Lily Corporation.

Thorough mixing of epoxies in static mixers only occurs under uniform flow of the two components through the mixer. Transmission of the individual components through separate hoses to a remote mixer may result in uneven flow of the components due to dilation and constriction of the hoses, or varying compressibility of the material due to air content or chemistry.

Consequently, there is a danger of "apparent mixing" of the epoxy components. Even though the two components appear to the operator to be sufficiently blended (i.e., good color without streaks), some epoxies may require additional mixing and / or reorientation in the flow pattern to achieve the strengths represented by the manufacturers.

Therefore, Lily Corporation strongly recommends that the user submit samples of resins mixed under job-site conditions to the epoxy manufacturer for laboratory confirmation of proper mixing.

LIMITATION OF LIABILITY

Because job-site conditions and resulting epoxy strengths are beyond the control of Lily Corporation (as described above), the express written warranty to repair or replaced defective equipment shall be the sole and exclusive remedy against Lily Corporation arising out of its manufacture or sale of these products, or the use or performance of these products, and shall be in lieu of all other liabilities, remedies or claims for damages against Lily Corporation, whether based on contract, tort, personal injury, or otherwise, including claims of incidental or consequential damages.

RESERVATION OF RIGHTS

Lily Corporation reserves the right to make any changes in its products, pricing, materials, equipment specifications, and models at any time and without notice, and to discontinue the manufacture and sale of models or parts.

OPERATION OF THE CD3-A DISPENSER WHEN USING A PRESSURE VESSEL ASSEMBLY.

START UP

Charge the purge assembly per instructions for the PA-15 Purge on page #13.

Pour base and catalyst resins into pressure vessels, taking care not to interchange the lids. Secure the lids and connect the two Material Supply Lines from the pressure vessels to the cabinet. The connectors are dissimilar to avoid an incorrect connection. If they fit, they are correct.

Install the Pneumatic Harness (A-112) by connecting the two 6' sections of 5/32" tubing to the elbow fittings (P-242) on the pressure vessels. Insert the tubing into the fittings to connect. The male coupler (P-017) is inserted into the mating coupler (#16) on the dispenser cabinet. The remaining fitting is to be connected to an air supply.

The Air Filter (#14) component to the cabinet is a micro-filter and cannot effectively manage heavily contaminated air common to many job sites. A moisture separator ahead of the system is necessary since excessive moisture in the air supply will scour the lubrication from the valve components, resulting in erratic operation. It is especially important that vapors from solvents or synthetic lubricants not be permitted to enter the compressor intake since they are detrimental to the seals within the air switches.

If air pressure is indicated at the Cylinder Pressure Gauge, (#9) unlock the Pressure Regulator (#7) knob by pulling out. Turn the knob counterclockwise until the pressure is reduced to 0. Press the knob in to lock it into place.

Observe the system! The Pressure Vessel Assembly should be free of air leaks at vent cocks and seals. Each cabinet Pump Piston (#16) should be fully extended with its Piston Roller (#45) slot seated on the cam blade.

Do not proceed if the pistons are not fully extended or there are leaks! See Trouble Shooting Guide or call the Lily service department.

Attach the Tempest Mixer and flip the Cabinet Switch (#10) to ON and gradually increase the cylinder pressure until the system is activated. Dispense some material into a waste container until both components are being dispensed.

Conduct a complete ratio check prior to placing this unit in service. Key personnel should be involved so as to become familiar with a procedure which must become routine.

RATIO CHECK

WARNING! Your CD3-A dispenser contains moving parts. A moving part is a wearing part! Critical components are wearing from the moment you energize this system. It is absolutely essential that this wear be anticipated and monitored to prevent disastrous results at some time in the future.

The volumetric comparison of resin components taken from the CD-3A Dispenser as a ratio check is only valid for the rate of flow at which the samples are taken. Such samples are usually taken at relatively high flow rates which mask ratio errors significant at the very low flow rates common to injection. In addition, if the sample is not continuous from stroke-to-stroke, errors in valve performance will go undetected. Such tests are discouraged since they bestow a false sense of security upon the user!. The following is the only valid ratio-check for the CD-3A dispenser.

1. With cabinet switch in the OFF position and resin supply under pressure, open the dispense line shut off cock and observe for ten minutes. If any flow occurs refer to the Trouble Shooting section. Do not dispense!

2. With cabinet switch in ON position, resin supply under pressure, and 0 pressure at cylinder pressure gauge, open the dispense line shut off cock and observe for ten minutes. If any flow occurs refer to the Trouble Shooting section. Do not dispense!

3. With cabinet switch in ON position and cylinder pressure gauge at 0, disconnect material supply lines and attach mating male and female connectors (#55 & #56) in order to bypass the check valves component to the connectors. Then, with the dispense line shut off cock closed, increase cylinder air pressure to 75 psi and watch for any resin flow back through the supply lines for two minutes. If any flow is present, refer to the Trouble Shooting section. Do not dispense! On routine projects, it is not normally unnecessary to conduct the above tests daily; once a week being sufficient. However, on critical projects or if resins with abrasive characteristics are being used, the test must be taken much more frequently!

DISPENSING

Following ratio checks, adjust the dispense pressure to job site requirements. The pressure gauge on the cabinet indicates cylinder air pressure, not dispense pressure. At a 2/1 ratio, dispense pressure will be approximately six and one-half times the air cylinder pressure gauge reading. Estimate four times the indicated pressure at a 1 to 1 ratio and seven times at 4 to 1. The LC-650 Pressure Gauge can be connected to the 1/8" NPT port on the face of the Tempest Mixer to confirm the resin pressure. The system will maintain the selected pressure.

The fluid level in the five gallon vessels component to the Pressure Vessel Assembly should not be allowed to fall below the 1/2 gallon level. A lower resin level will allow air to enter the fluid system. The resin supply should be monitored by using the Counter (#8). For example, at a 2 to 1 ratio, resin will be consumed at the approximate rate of 100 strokes per gallon, varying slightly with each dispenser. If the exact number of strokes must be known, the system should be monitored for calibration during the dispensing of a known volume for future reference. The Counter is reset by depressing the reset button.

SHUT DOWN AND CLEAN UP

THE FOLLOWING CLEANING SEQUENCE MUST BE FOLLOWED EXACTLY. TO DO OTHERWISE MAY RESULT IN SEIZING THE SYSTEM WITH CATALYZED RESIN!

Immediately following the dispensing of a single cycle of resin, flip the cabinet switch to OFF. Do not disconnect air supply from the cabinet until this switch is thrown! Briefly open the downstream shut off cocks to vent the dispense leads and then close them off.
Quickly remove the Tempest Mixer from the cabinet, anticipating some resin drooling from the mixer when the fittings are loosened.

If there is any delay in removing the mixer from the cabinet, the system should be "burped" by dispensing a small volume of resin with the mixer removed. This is a precaution in case the base resin within the mixer has had sufficient time to settle into the catalyst inlet.

The PA-15 Purge Assembly should now be used to clean the mixer and fluid lines by introducing solvent bursts into an air stream. Instructions for the use of the PA-15 are on page 13.

MAINTENANCE

Routine maintenance of the CD3-A is keeping the system clean. A clean system is essential for the morale of your operator, the confidence of your client, and the performance of the dispenser.

The entire exterior of the unit, with the exception of the plastic pressure regulator, the pressure gauge face, and the counter can be pressure washed or stripped of catalyzed material with Lily Strip-it cleaner. The Plexiglas panels should be replaced periodically to discourage their removal due to obscured visibility.

It is important that material line Quick Connectors (#55 & 56) be kept clean. Following use, male connectors should be cleaned with a solvent or detergent. Periodically, it may be necessary to replace the seal within the female quick connector. To do this, remove the existing seal with a seal pick, thoroughly clean the connector with Strip-it or some other suitable product, and reinstall new EPR seals (P-099) which are available from Lily Corporation. The pick (p-457) is also available.

Frequently observe the "dispense" lines running downstream from the mixing head to the ports. Where there is evidence that these lines are crimped, trim the damaged segment and reconnect the lines. Normally, crimping will occur immediately adjacent to the fitting at the mixing head.

Exterior surfaces of the Pressure vessels and TA-1 Transfer Assemblies can be easily cleaned with Strip-it. Once a week unscrew the filter bowl by turning it counterclockwise and inspect the filter element. It is important that these elements are clean. Replacement elements (#14) are available from Lily Corporation (P-303) as well as locally. No item of maintenance is more important. The air circuit will deliver literally millions of trouble free cycles with a clean and dry air supply.

Following extended use, drool will appear at the piston blocks, indicating a need to replace the seals(#17). To do so, turn the pressure regulator counter-clockwise until the pressure gauge registers 0 and put the on/off switch in the on position. This will open the outlet valves. Manually press the pistons into the pump blocks, displacing the resin in the chambers out through the outlet valves. Some drool will occur at the outlet fittings.

Remove the blocks (#42 or #82) from the spur assemblies, by pulling the Block Release Pins (#4). The blocks can then be dropped and turned askew to remove the piston. Be prepared for drool from the pump block. On the catalyst side, clearance for the removal of the block from the spur is inadequate at most ratios unless the Strut Pin (#6) is removed to allow the pump to be elevated for clearance.

Following removal of the pistons, use a seal pick to remove the Piston Seal and split ring retainer scarfs. It is recommended that the Pistons be thoroughly cleaned at this opportunity with a detergent or solvent. Take care not to flush the lubricant from the roller bearing. When reassembling the seal, be certain that the retainer scarfs are properly lapped and set with the sharp edge away from the seal. Lubricate the seal and the inside of the pump block with Lily Lube Silicone Lubricant (P-315). Re-insert the piston into the pump block and replace the retaining pin. Be certain the Piston Axle (#44) extension is toward the front of the machine.

To replace the Ball Valve Seals, remove the Back Panel (#25). The actuators will remain suspended from the steel tubing. It is recommended that only one assembly be removed at a time to avoid a catalyzed spill and limit confusion. Disconnect the air supply tubing at the actuator by depressing the collar and pulling the tubing loose. These lines are reconnected by inserting the tubing into the collar. Disconnect the flexible nylon material tubes (#59) from the assembly at the Street Tees (#71) and then disconnect the rigid steel tube segments (#64, 65, 66, & 67) at the ball valves to free the assembly. Some drool will occur as each of these fittings is disconnected.

To remove the Ball Valves (#73) from the Actuator Assembly (#74), loosen the two socket head cap screws component to each of the couplers between the actuator and the valves and then remove the screws securing the ball valves to the bracket. Loosen the two remaining screws in each of the valves and swing the valve body out. The seals can then be replaced. Carefully swing the valve body back into place, taking care not to damage the seals. Reinstall the valve body in the bracket making certain it is in the correct open/closed position and tighten the screws uniformly. Re-tighten the coupling screws and reassemble the unit in the reverse sequence. See the Whitey Company Assembly Instructions in the Glossary section for clarifications.

Be certain to conduct all ratio checks prior to returning the unit to service. Periodically, and especially after washing the unit, apply a lubricant to the piston rollers and the edge of the cam blades.

HOW THE SYSTEM WORKS

A thorough understanding of the CD3-A operation will take the guess work out of trouble shooting, result in greater ease and confidence in its use, and provide a better appreciation of conditions which may adversely affect its performance.

Just as an auto engine has a carburation system and an ignition system which are both vital to its operation, the CD3-A dispenser has a "fluid system" and a "pneumatic system". The performance of both is vital.

The Fluid System

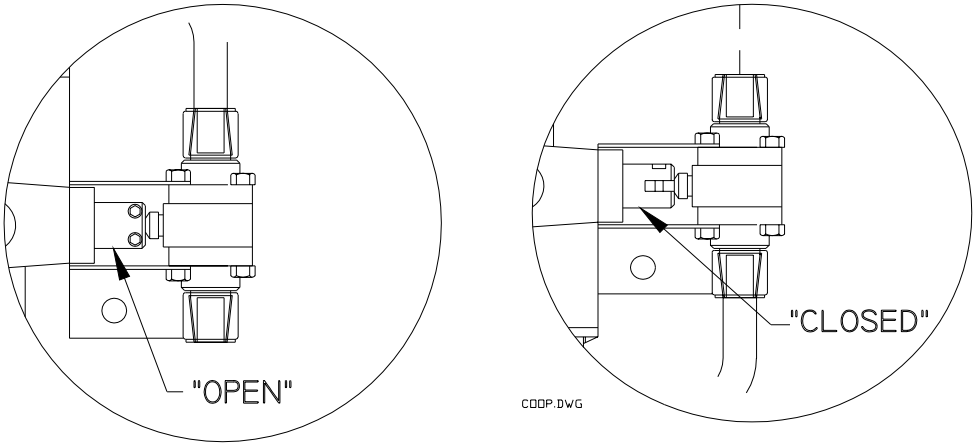
Using a clean and adequate air supply, 99% of the maintenance on the CD3-A cabinet will be on the fluid system side. For this reason the air circuitry is not addressed in this manual. Should there be a problem you attribute to the air circuitry, phone Lily Technical Service.

The following is a very important explanation of the CD3-A plumbing. Study it now and review it periodically.

Frame "A" (pg. 9) shows the resins entering the pump blocks through the open inlet valves. The resins are supplied under pressure by either the Pressure Vessel Assembly or the TA-l Transfer Assembly. Under this pressure the pistons are extended until the rollers seat on the cams.

Note that the sensor knees (#29 & #30) require the joint action of the base and catalyst piston axles to activate the switch. The system is thus prevented from operating if either pump is not filled. However, this feature will not shut down the system if a pressure vessel is emptied of material. Air is a fluid and the system does not know the difference. However, the operator will notice erratic behavior as the pump piston returns on air. This is due to the much higher velocity of the piston as it slams into the cam. When using the TA-1 Transfer Assembly, a return of the pistons will not occur since they cannot compress air and will simply run away. This will be audible.

When the extended pistons from the base block and catalyst blocks have provided the joint leverage to activate the sensor switch, the signal opens the outlet valves and closes the inlet valves. (Frame "B" Pg. 10). At the same time, the air cylinder is energized elevating the cams to depress the piston pumps. The resin flow is then on the downstream side of the system, flowing through the outlet valves to the mixing head. The amount of force on the piston is determined by the cylinder pressure set at the regulator. When the back pressure on the dispense side of the system is equivalent to the force available from the air cylinder, the system will stall until the downstream pressure is relieved or the dispense pressure is increased. When a stroke is completed the actuators are once again rotated 90 degrees to open the inlet valves and close the outlet valves. Simultaneously, the air cylinder returns to the "start-up" position. The cycle repeats itself.



The condition shown in frame "A" is the same as when the unit is in the OFF position. That is, the inlet valves are open and the outlet valves are closed. It is in this position that the Stage I ratio check is conducted. This check consists of placing the On/Off switch in the OFF position and opening the dispense line to observe any resin flow. This test will reveal any seepage across the outlet valves from the incoming supply. If a valve is leaking, incoming supply of perhaps 100 psi from pressure vessels or perhaps 1,200 psi from the TA-l Transfer Assembly will seep across the valve and alter the ratio.

The Stage II ratio check is conducted with the switch in the ON position but with the pressure to the air cylinder at 0. In this position the inlet valves are closed, the outlet valves are open, but the pistons are not actuated. As with the Stage I check, the downstream end of the mixing head is observed for any resin flow. If a flow appears, this indicates that the inlet valve is allowing supply resin to seep across and alter the ratio.

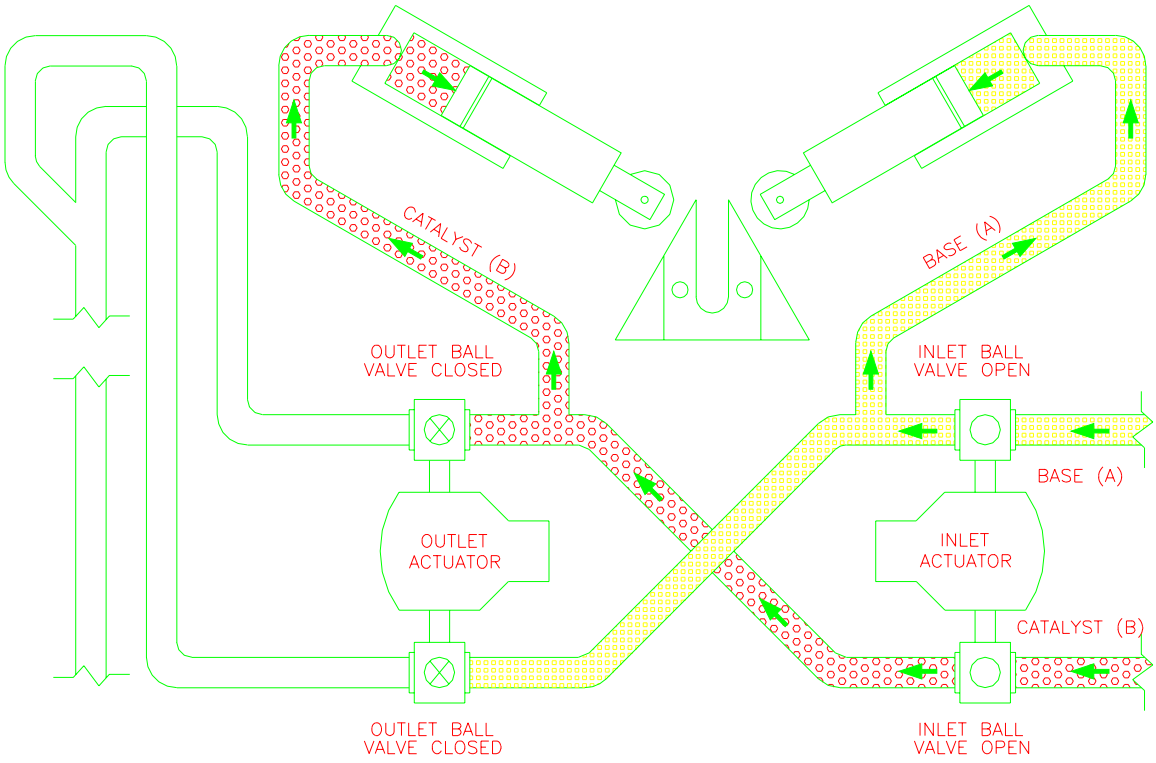
The Stage III ratio check is also conducted with the switch in the ON position except that the cylinder pressure is set at 75 psi and the dispense line is closed off. This test is designed to detect any seepage across the inlet valve in the opposite directions: that is, from the downstream side to the upstream side. Should a leak occur at this location, resin will be dispensed upstream toward the supply when dispensing at pressures higher than the supply pressure. Leakage across these valves can be observed by disconnecting the material supply lines and opening the inlet quick connects by inserting the opposite mate. Any flow indicates seepage through the inlet ball valve.

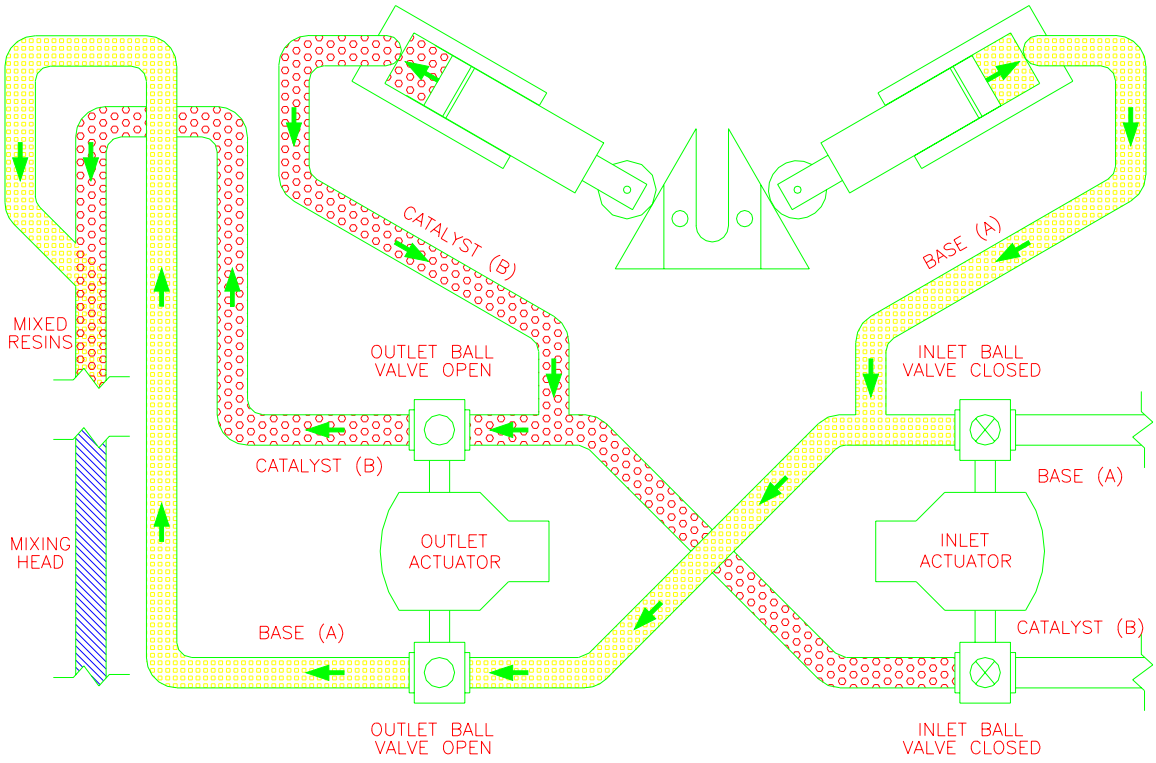
The CD3-A ratio is determined by the slope of the cams and the attitude of the piston pump. For example, with a 2 to 1 ratio the master pump will have a piston travel of 2 inches due to the shape of the cam while the catalyst side will have a travel of only 1 inch. On both sides of the machine you will note that the pump assembly is perpendicular to the cam. This attitude avoids side load and obtains the maximum deliverable force.

In order to change ratio, release the catalyst cam by removing the clevis pin (47), and then remove it from the retaining block. Replace the cam with one appropriate for the ratio change and secure it with the pin and e ring. If the ratio is 1/1 both pump assemblies should be fully elevated with the Strut Faspins (6) in the lower holes through the struts (39). For all other ratios, the catalyst strut only should be pinned in the upper hole to lower the assembly.

In the design of the CD3-A dispenser, considerable attention has been paid to the danger of the entrapment of air. Because of its high compressibility, entrapped air can drastically affect ratio. Theoretically, air could be entrapped in the nylon lines (59) which arch from the pump blocks to the ball valve assembly. However, due to the relatively small (.188) inside diameter of this tubing, the air is quickly purged with a single relatively swift stroke. It is important that this tubing not be replaced with tubing of a larger ID. A larger ID could permit entrapment of air! More important, a thinner wall will drastically reduce the burst strength of the tubing.

FRAME “A”





FRAME “B”

An inadequate volume of air will cause the unit to operate sluggishly. Normally, the problem is a dirty filter element. Replace this element. Do not operate without it - ever!

Injection resins tend to rapidly build up sticky films on the pistons. This condition makes it difficult for the base resin piston to return as promptly and forcefully as it should. The remedy is to remove the piston and thoroughly clean it and the inside of the block bore.

Sluggish return can also be caused by the use of heavy viscosity resins during cold weather. The system is designed for epoxy injection which presumes the use of low viscosity resins. This is normally not a problem using the TA-1 Transfer Assembly because of the greater force which it develops.

A high breakaway pressure normally occurs for the same reasons as discussed on the item above. The breakaway pressure can be kept low with proper cleaning of the pistons and the block bores.

Dispensing the single component when using pressure vessels can happen if either supply is depleted. Use the counter to monitor the resin consumption. However, if a resin is depleted, the system will probably "clank" as the piston returns on air pressure. This is an alarm. Air bubbles in outlet fluid lines will also signify to the mechanic that the resin is depleted.

Material line quick connectors can be damaged through the use of inappropriate solvents or abrasives. Always wipe the male member before engaging the quick connects. The

seals in the female quick connects can be easily replaced. Do not discard the fittings. It is very difficult to engage quick connects when there is pressure on either side and virtually impossible to do so when there is pressure on both. When possible, relieve the pressure prior to engaging these connectors.

The pusher screw (#28) adjustment is set during manufacture. It should not be tampered with without consulting with the factory. To do so could result in severe damage to the switch within the right hand sensor knee.

The Pneumatic System

The pneumatics consist of an air cylinder to drive the material pistons, an air actuator to rotate the material inlet ball valves, a second actuator to rotate the material outlet valves, and a control circuit. A separate control valve is assigned to each apparatus.

Before preceding it is necessary to become acquainted with the symbols of the CD-3A air circuit.

The pilots are attached to each of the valves, and convert a pneumatic signal to a mechanical signal to shift the valve. On the diagram, a signal from the left will shift the valve so that the configuration in the lift block will prevail, while a signal from the right pilot will move the right hand block into position. Do not confuse this relationship with the physical valve since it is just the opposite. On the valve itself, a signal from the right-hand pilot causes a signal from the more distant outlet port!

INSTRUCTIONS FOR USE OF PA-15 (A-325) PURGE ASSEMBLY

Carefully inspect the assembly for any physical damage. Then - prior to adding solvent - pressurize the tank and check for leaks at fittings or elsewhere. Following inspection, vent the tank by opening the Outlet Valve (P-319) and then remove the lid. Add up to one U.S. gallon of Acetone or MEK. Other solvents may be detrimental to the EPR tank seals. If other solvents are favored, contact Lily for different seals. With the outlet valve closed (the bar handle being in the horizontal position) pressurize the tank.

For cleaning, connect the two hose fittings from the tank to the mating fittings on the mixer or manifold component to be cleaned. The fittings are JIC. Take appropriate environmental and safety precautions to arrest the resin, air burst, and solvent vapors which will be exhausted under high pressure from the components being cleaned.

Initiate cleaning by opening the outlet valve. Air will purge the resin accumulations from the components. Continue the air purge until the exhaust is free of drool and then close off the air flow until the compressor has developed maximum pressure. Then introduce very brief solvent bursts into the air stream by shaking the tank to splash the solvent against the outlet. The smaller the solvent splash the better since too much will choke the velocity of the air stream. Since cleansing depends upon the abrasive scouring action of the solvent, a high velocity air stream is essential.

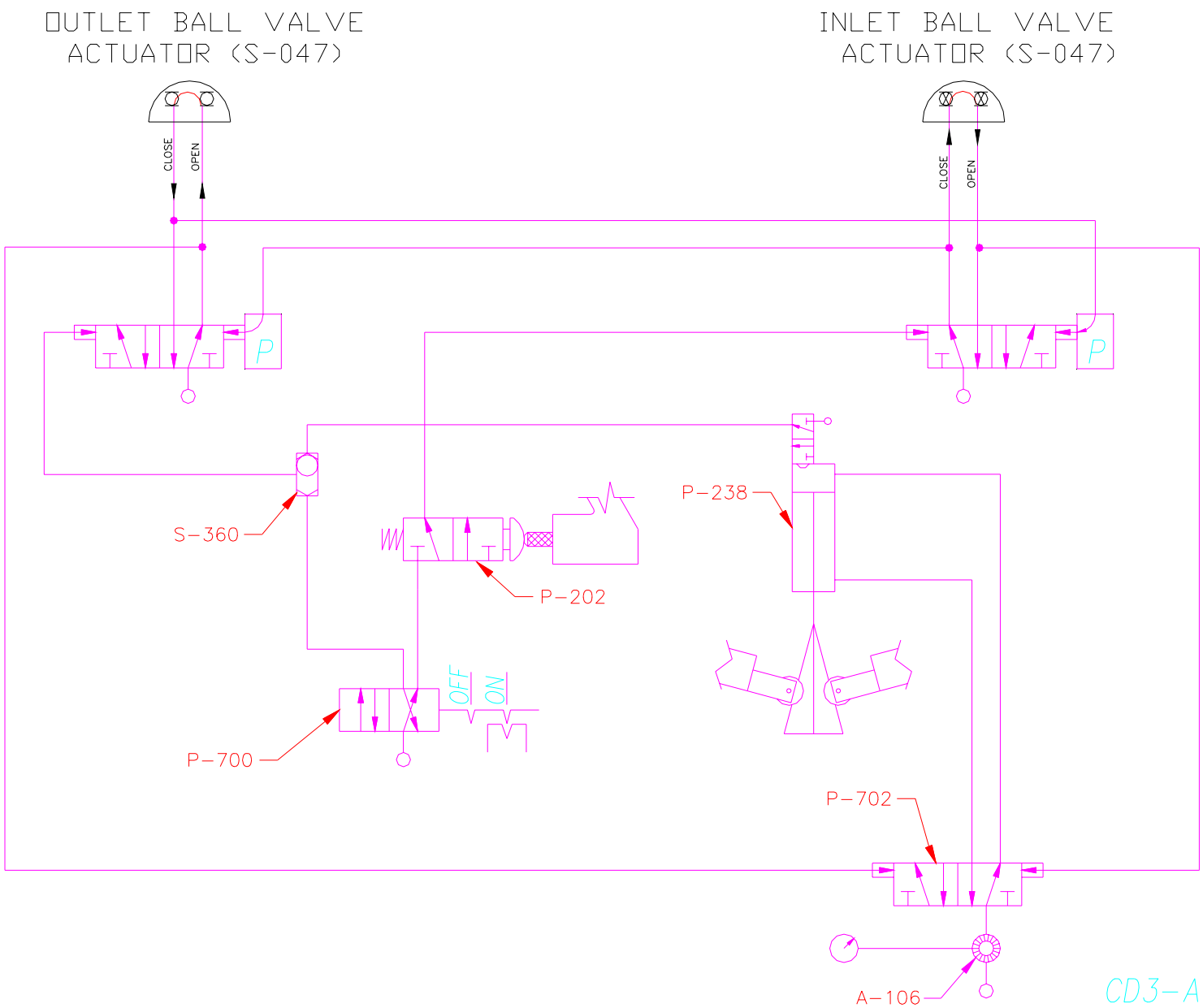
Repeat the solvent bursts at five second intervals. Normally four such bursts will be sufficient to clean following the use of low viscosity resins. A few additional bursts will be needed with heavier materials or long lines. Remember! The smaller the solvent burst, the more effective the cleaning.

To clean outlet valves beyond the mixer, close them off and tip the tank to introduce a full solvent flow. Under full flow, quickly open and close each of the valves a few times.

Following cleaning, blow all remaining solvent from the mixers and other components and vent the tank by removing the air supply and opening the outlet valve to vent remaining pressure through the component. Close the outlet valve. Disconnect the JIC fittings.

ALWAYS WEAR SAFETY GOGGLES AND A RESPIRATOR
WHEN USING THE PA-15.

1	CABINET	A-100
2	WINDOW	M-101
3	KNEE BUSHING	M-121
4	BLOCK FASPIN	P-100
5	STRUT CLEVIS PIN	M-104
6	STRUT FASPIN	P-101
7	PRESSURE REGULATOR	A-106
8	COUNTER	P-299
9	PRESSURE GAGE	P-104
10	ON/OFF SWITCH	P-700
11	BULKHEAD FITTING	P-105
12	PIPE FITTING 1/8” NPT 90 BRASS	P-045
13	AIR FILTER 1/8” NPT	P-107
14	FILTER ELEMENT	P-303
15	COUPLER	P-016
16	PISTON	M-105
17	GT PISTON SEAL	P-110
18	CAM BLOCK AXLE	M-120
19	PIVOT BOLT	M-370
20	WINDOW KNOB	A-102
21	WINDOW BAR	M-102
22	MASTER CAM 1 : 1	M-107
23	MASTER CAM 2 : 1	M-108
24	AIR CYLINDER	PM-100
25	BACK PANEL	M-117
26	SIDE BACK SCREWS	S-110
27	ACORN NUT	S-102
28	PUSHER SCREW	S-108
29	LEFT SENSOR KNEE	M-118
30	RIGHT SENSOR KNEE	MA-107
31	RING - “E” - 1/8”	P-111
32	PIPE NIPPLE 1/8” NPT HEX BRASS	P-121
33	CAM AXLE BUSHING	M-103
34	KNEE BOLT	SS-100
35	SPACER	M-122
36	HANDLE	M-123
37	HANDLE SCREW	S-122
38	HANGER	M-124
39	STRUT	M-125
40	RING - “E” - 1/4”	P-575
41	SPUR	M-126
42	PUMP BLOCK - BASE	M-128
43	RING - “E” - 3/16”	P-112
44	PISTON AXLE	M-129
45	PISTON ROLLER	A-109
46	KNEE BOLT SPACER	P-114
47	CAM CLEVIS PIN	M-131
48	CAM BLOCK	M-132
49	COMPRESSION FITTING 5/32” X 10-32 TEE	P-020
50	BULKHEAD FITTING	S-009
51	PIPE ELBOW 1/4” NPT STREET BRASS	S-007
52		
53	10-32 ADJUSTABLE ELBOW	P-126
54		
55	QUICK CONNECT - 1/4” M	S-002
56	QUICK CONNECT - 1/4” F	S-001
57	CABINET MATERIAL HOSE	S-005
58	COMPRESSION FITTING 3/8” X 1/8” NPT ELBOW	S-023
59	PUMP BLOCK TUBE	S-072
60	HANGER SCREW	S-111
61		
62	BASE ACTUATOR TUBE	S-064L
63	CATALYST ACTUATOR TUBE	S-062L
64	CATALYST INLET TUBE	S-068L
65	BASE INLET TUBE	S-066L
66	BASE OUTLET TUBE	S-063L
67	CATALYST OUTLET TUBE	S-070L
68		MAC-B
69	FLUID FITTING 5/16” X 1/4” NPT ELBOW	P-675
70	FLUID FITTING 5/16” X 1/4” NPT M	P-676
71	PIPE FITTING 1/4” NPT STREET TEE	S-020
72	COMPRESSION FITTING 3/8” X 1/4” ELBOW	S-022
73	BALL VALVE	S-046
74	BALL VALVE ACTUATOR	S-047
75	BALL VALVE BRACKET	S-048
76	COMPRESSION FITTING 5/32 X 1/4” NPT ELBOW	N-212
77		
78		
79		
80	BALL VALVE COUPLING	M-351
81	FLUID FITTING 3/8 X 1/4 NPT JIC UNION	P-692
82	PUMP BLOCK - CATALYST	M-127
83	AL - VALVE - CLIPPARD	P-702
84	AL - PILOT - CLIPPARD	P-703
85	AL - PULSE RELAY	P-113
86	COMPRESSION FITTING 5/32” X 10-32 UNION	P-186
87	COMPRESSION FITTING 5/32” X 1/8” NPT ELBOW	P-176
88		
89	SCREW 10-32 X .250 BUTTON HEAD SOCKET SS	S-101
90	MOUNTING BLOCK - AIR LOGIC	M-119
91	PIPE FITTING 1/4” NPT STREET TEE	S-021
92	ELECTRIC SWITCH COUNTER	P-297
93	ELECTRIC SWITCH COVER	P-298
94	10-32 ADJUSTABLE “T”	P-777
95	SPACER	M-834
96	SCREW 10-32 X 2.25 SHCS SS	P-733

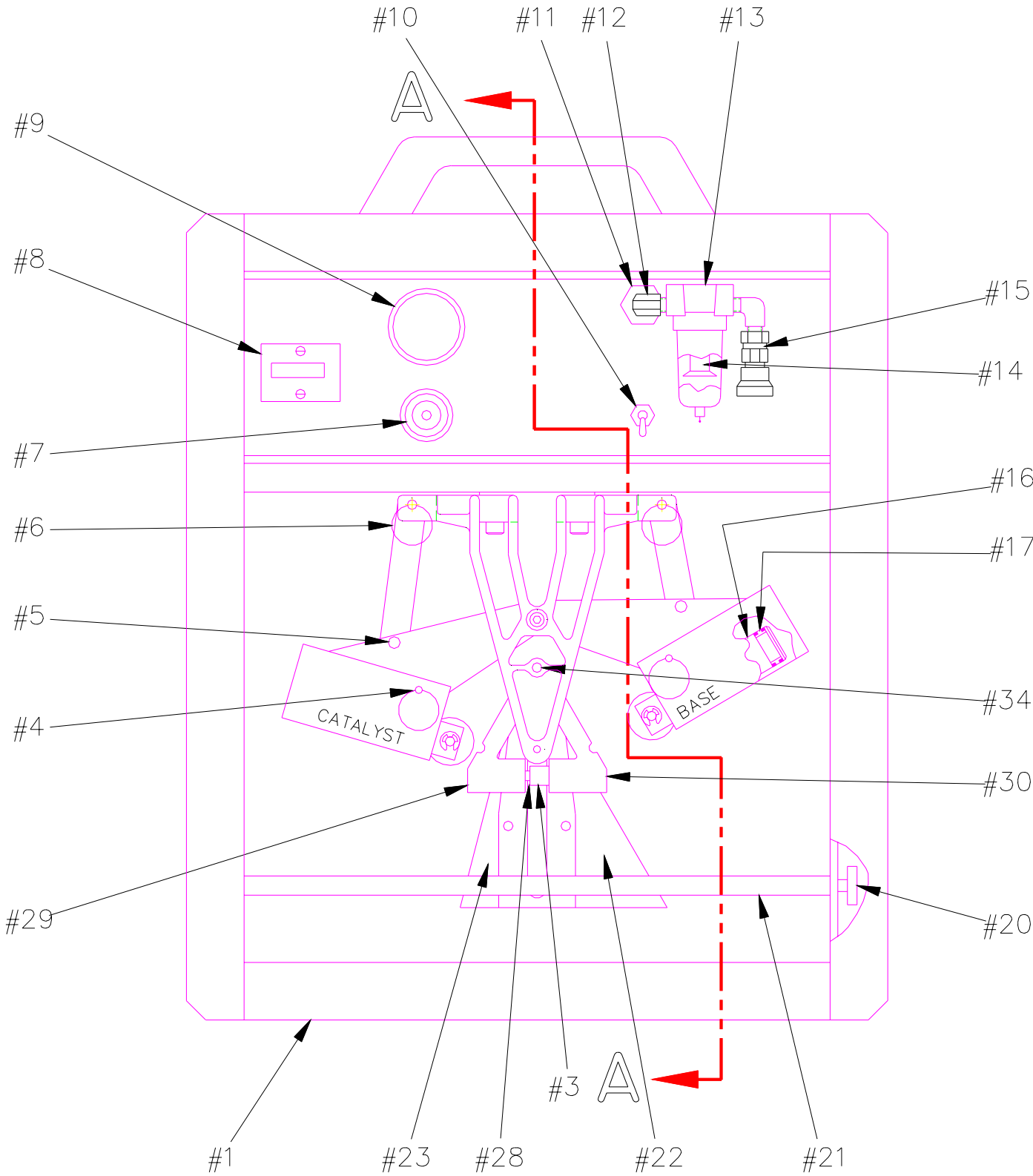


CD3-A AIR LOGIC

PATENT PENDING

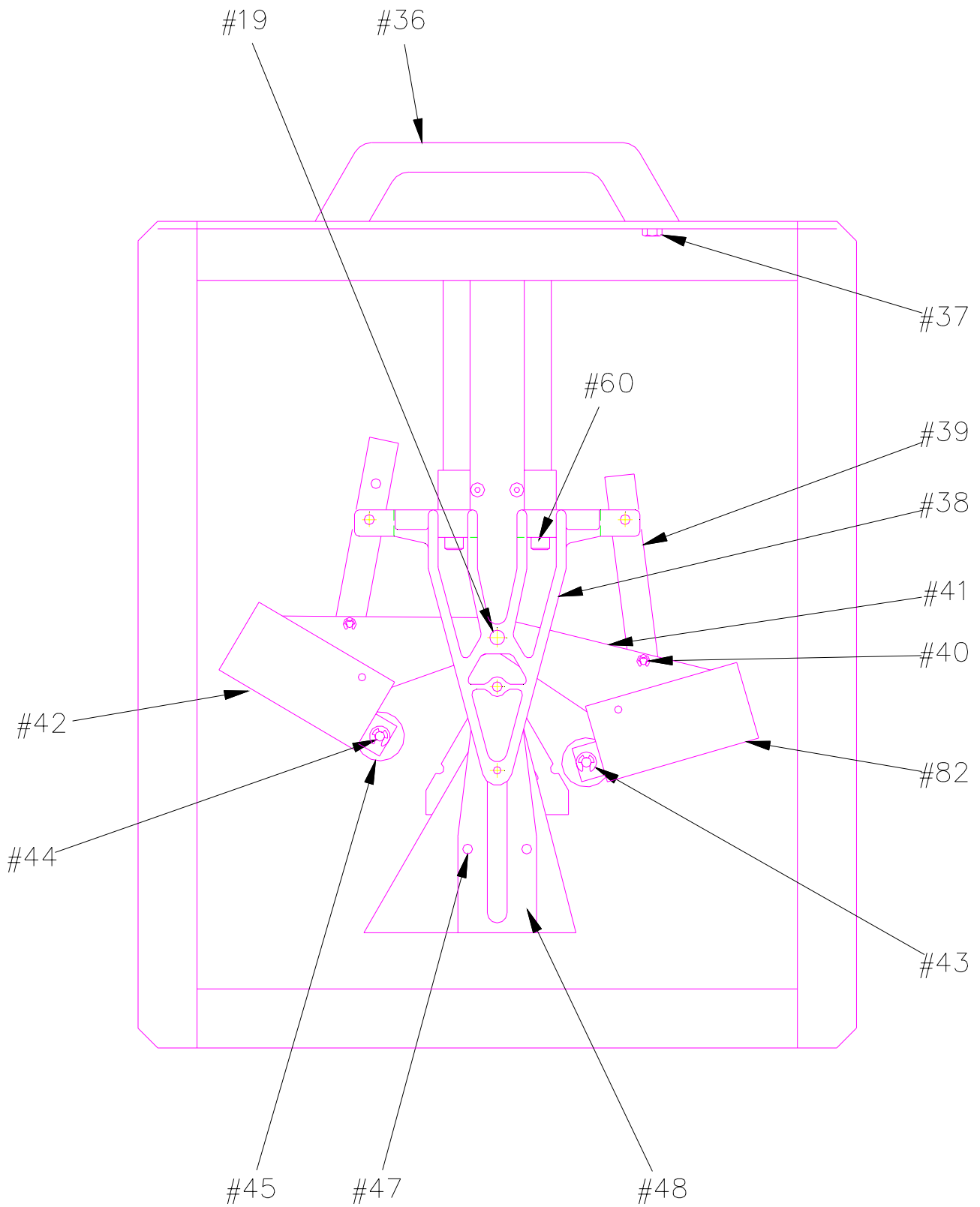
LILY CORPORATION
AURORA, ILLINOIS
UNITED STATES OF AMERICA

○ UNREGULATED CONSTANT AIR PILOT P PULSE RELAY



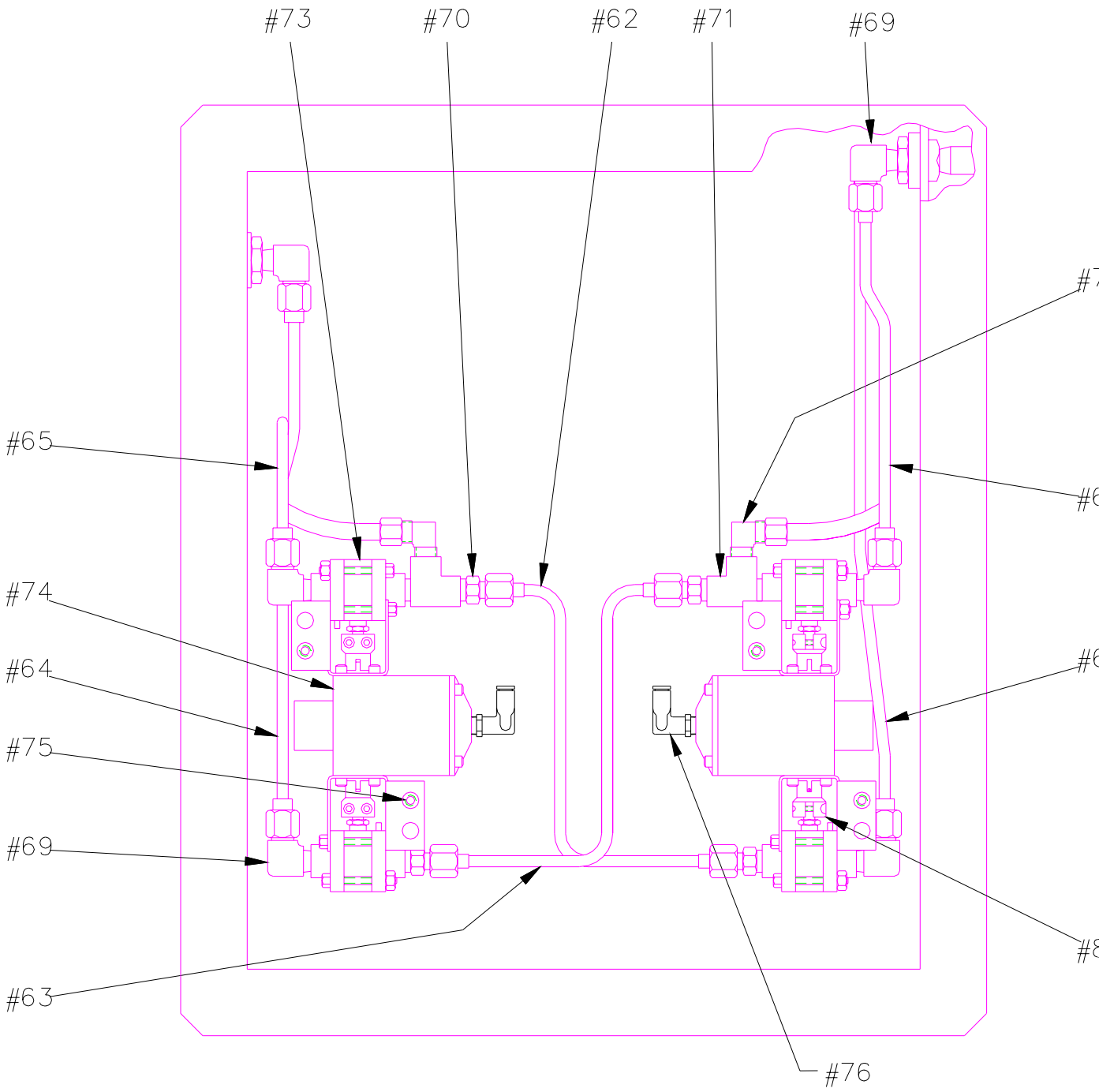
FRONT VIEW

ASSY-1-F

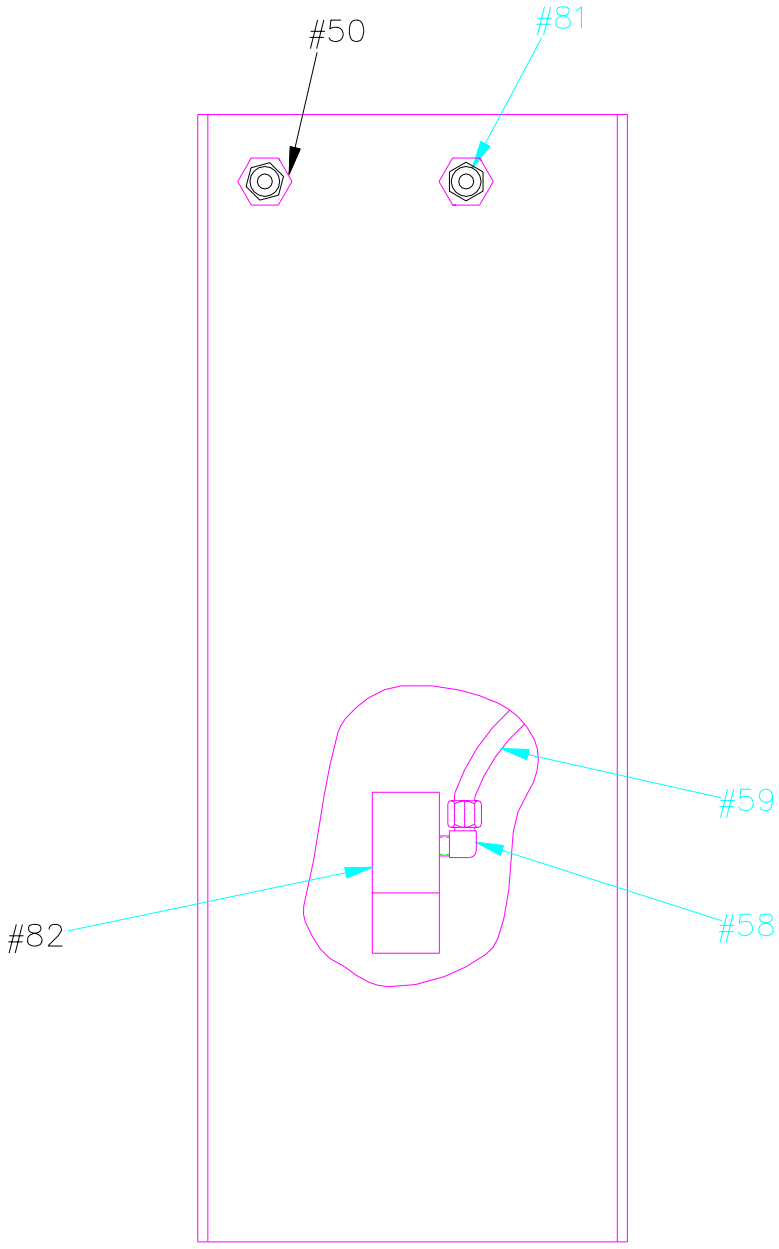


REAR VIEW

ASSY-1-B

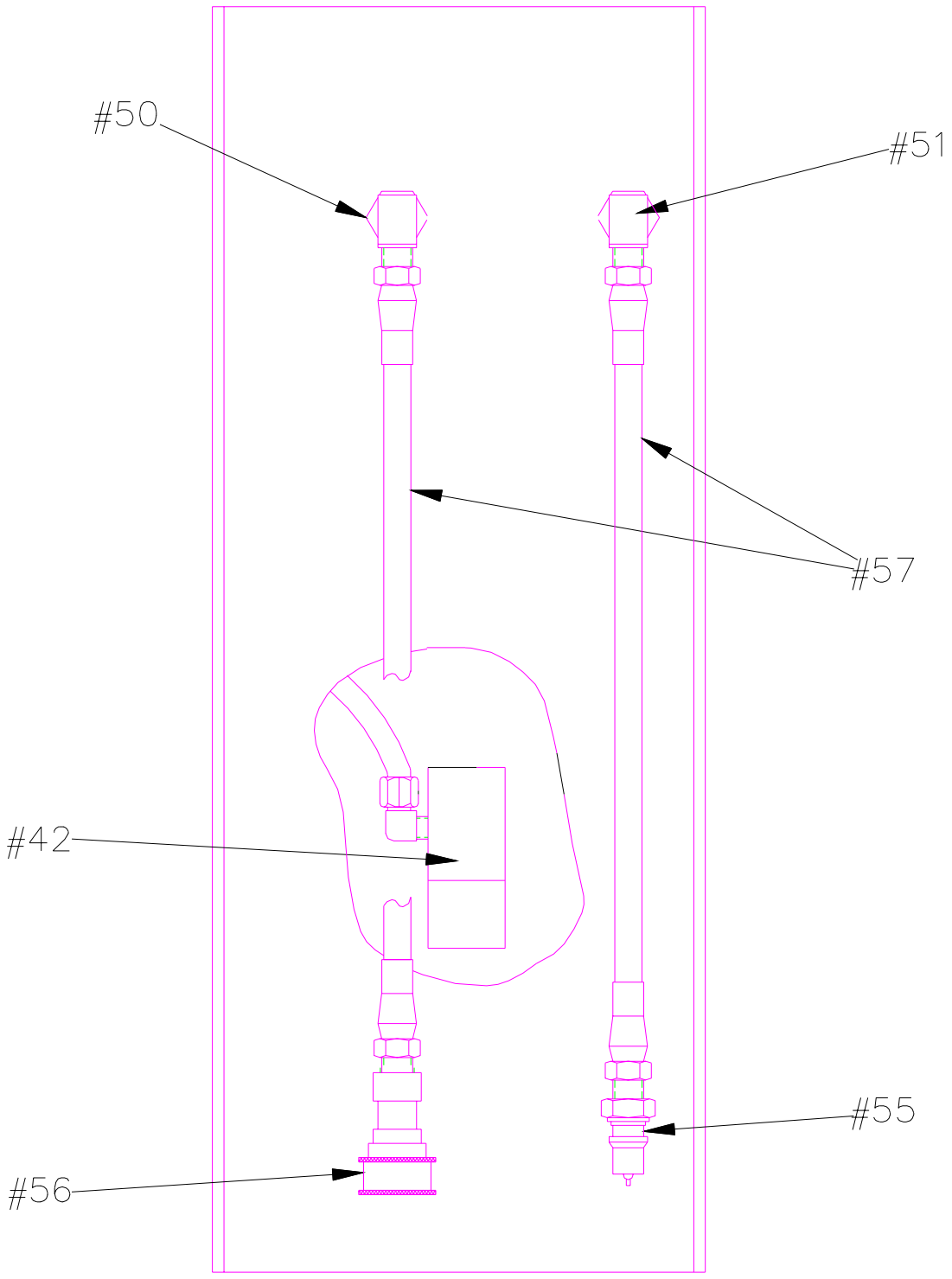


ASSY-3



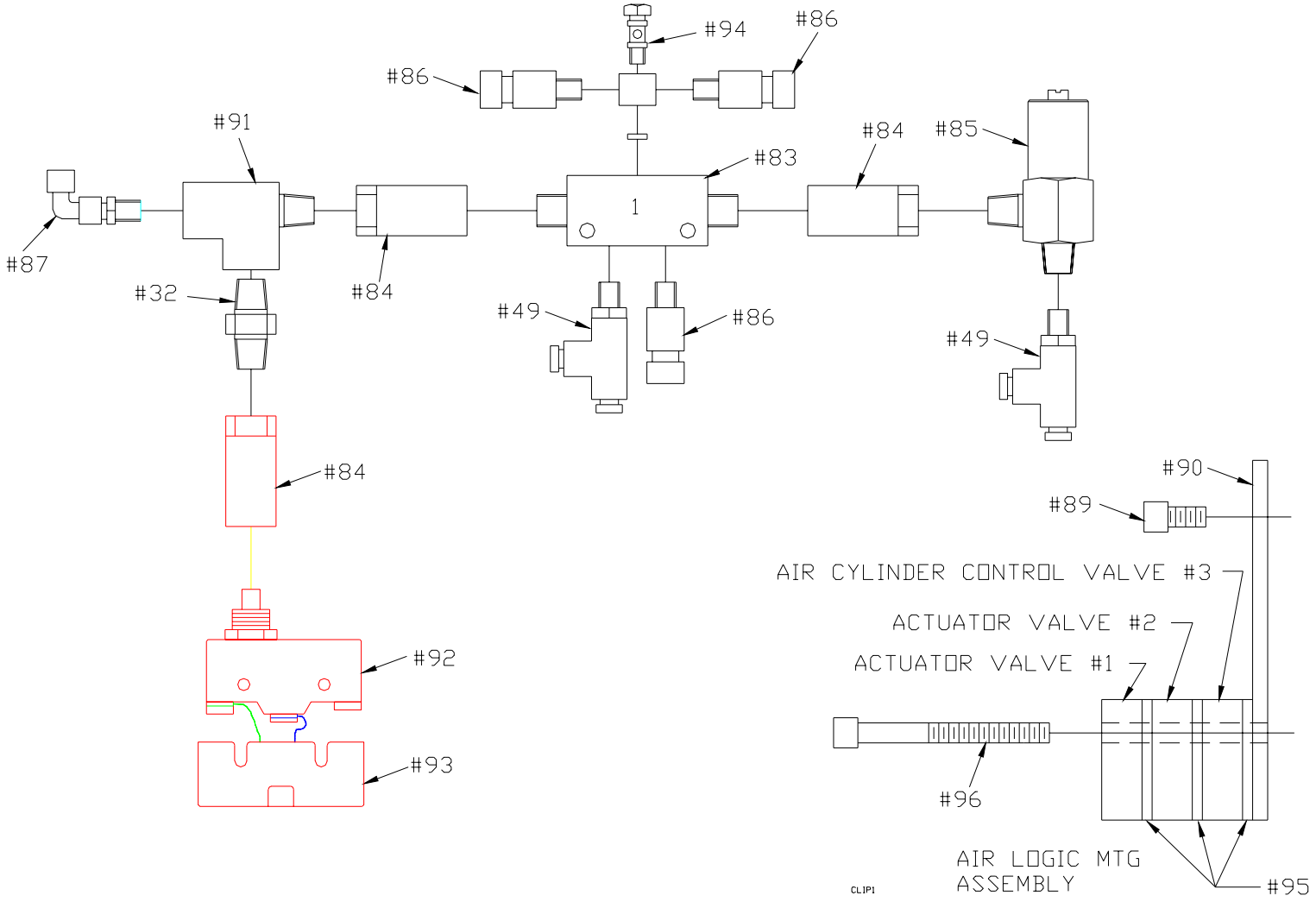
LEFT HAND VIEW

ASSEMBLY-4



RIGHT HAND VIEW

ASSEMBLY-5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#91
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#32
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#49
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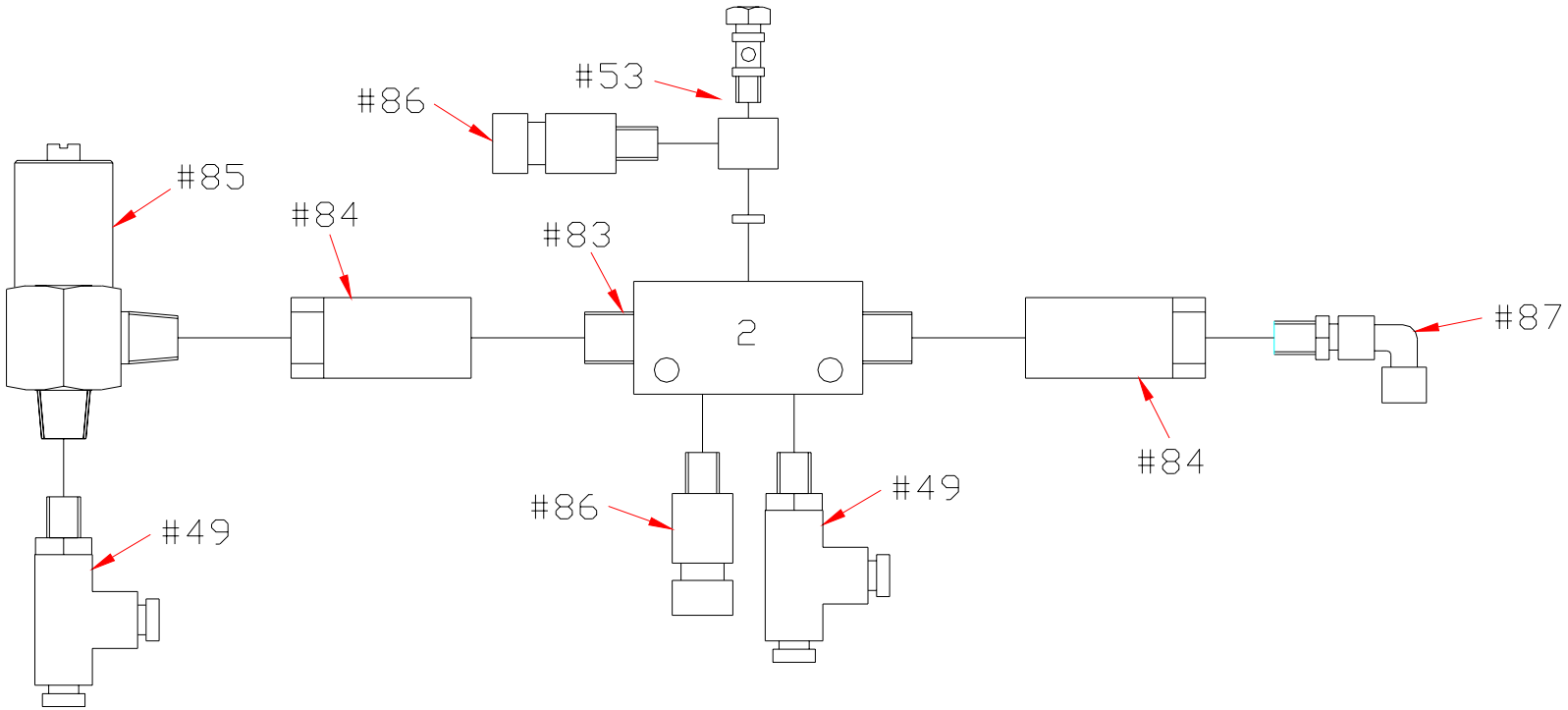
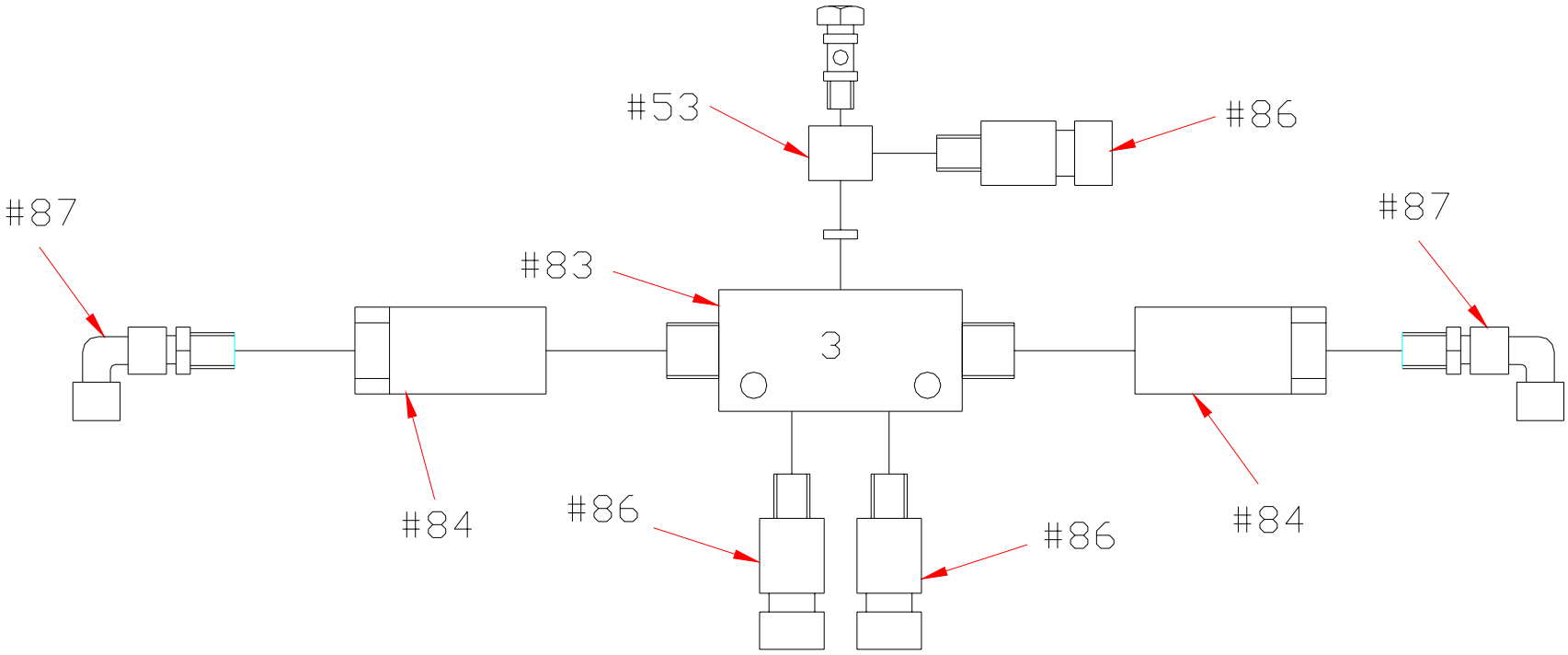
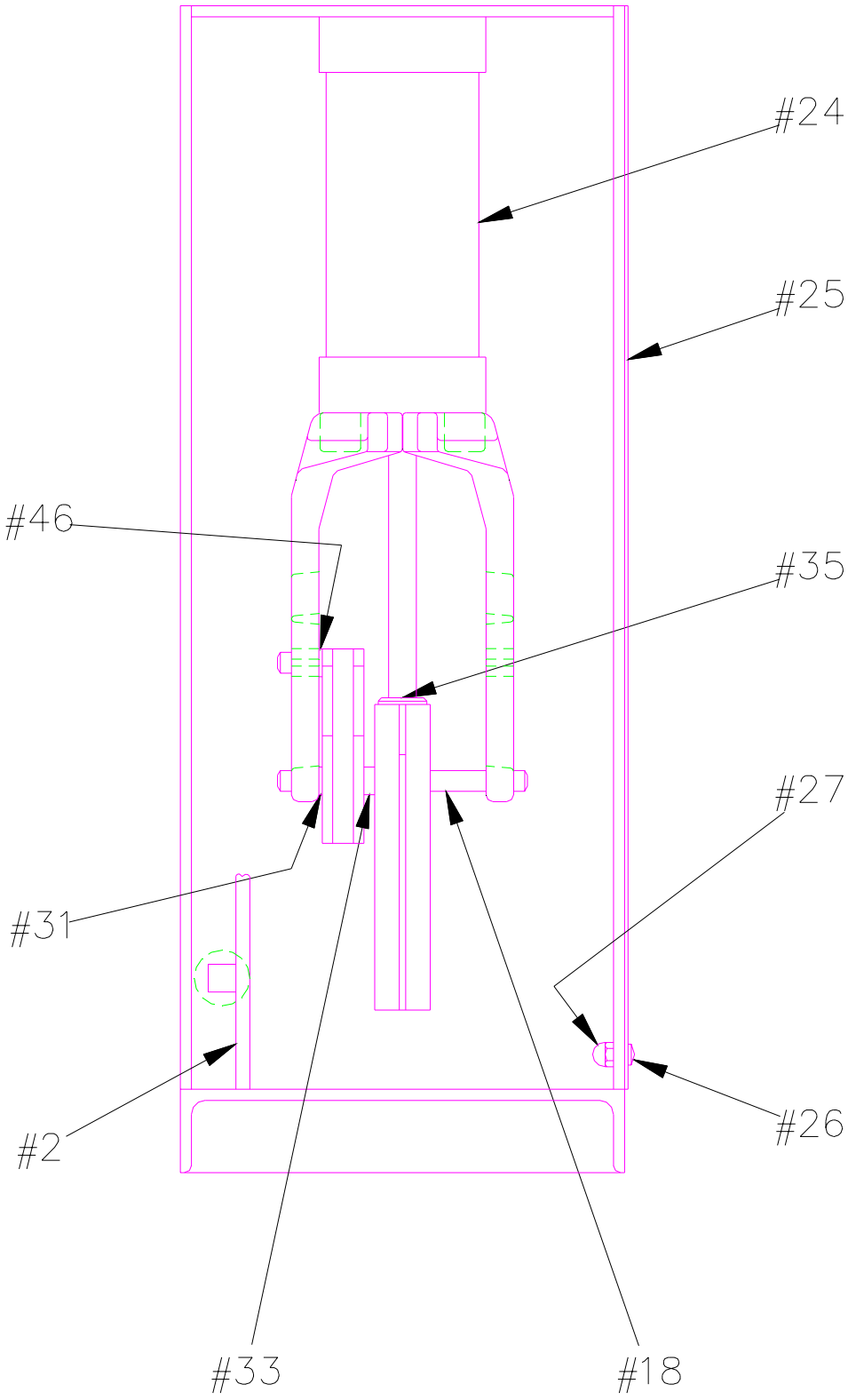
#84
#90
#89
AIR CYLINDER CONTROL VALVE #3
ACTUATOR VALVE #2
ACTUATOR VALVE #1
#92
#93
#96
AIR LOGIC MTG
ASSEMBLY
#95
CLIP1



CLIP2

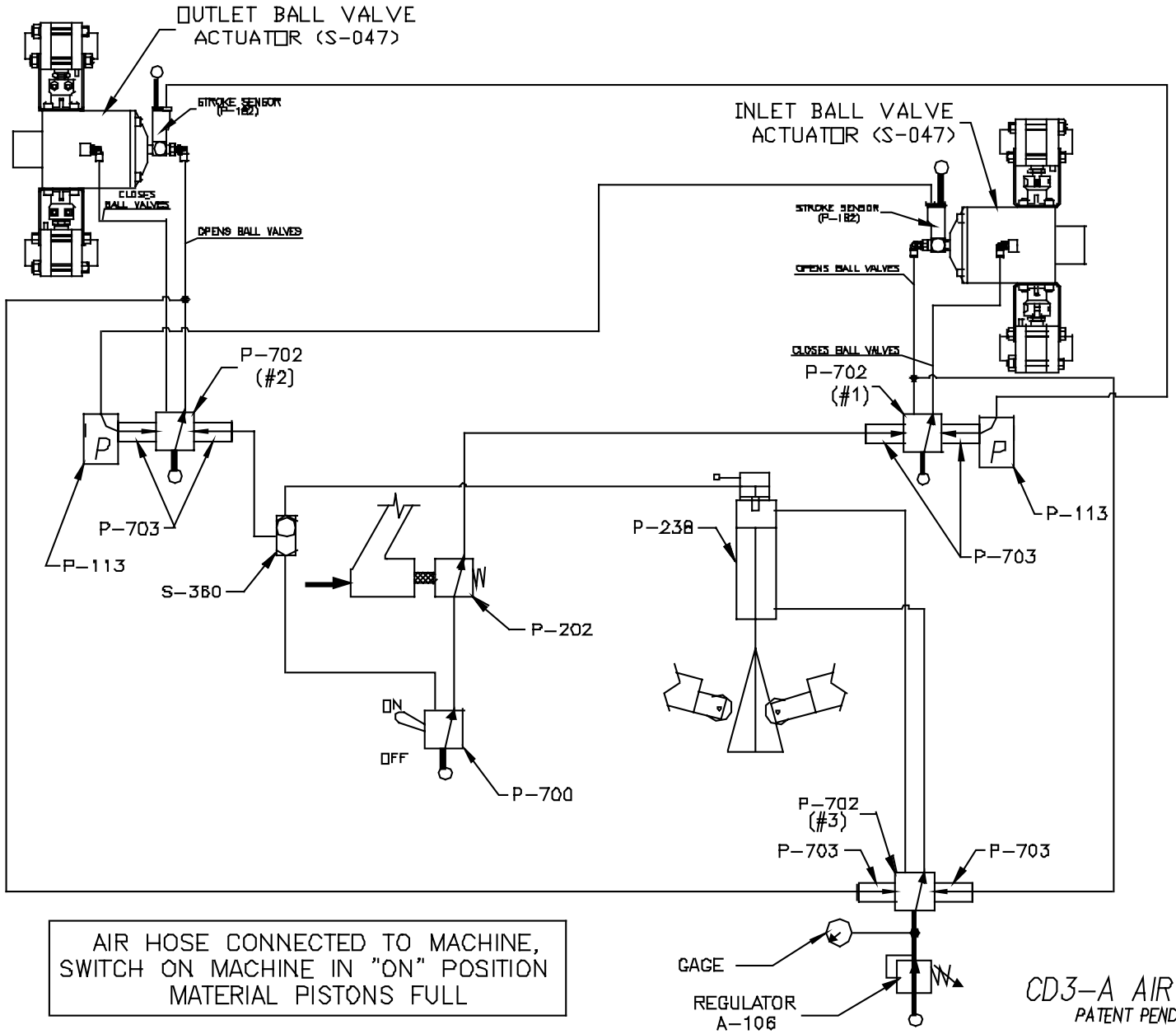


CLIP3



VIEW A-A

ASSY-1-S



CD3-A AIR LOGIC

PATENT PENDING

LILY CORPORATION
AURORA, ILLINOIS
UNITED STATES OF AMERICA