*ZEE Systems, Inc.*

*COMPONENT MAINTENANCE MANUAL*

# *Component*

# *Maintenance*

# *Manual*

***with***

***Illustrated Parts List***

***for***

# *Z21-701-SERIES*

# *Evaporator Assembly*

## *Record of Revision*

| *REVISION NO:* | *ISSUE DATE* | *POSTED DATE* | *INSERTED BY:* |
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## *ZEE Systems, Inc.*

## *COMPONENT MAINTENANCE MANUAL*

# *List of Effective Pages and Table of Contents*



* INITIAL RELEASE 3-24-03

## *1.0 INTRODUCTION*

1.1 This Component Maintenance Manual provides information on the maintenance, maintenance schedules and repair and replacement of parts.

1.2 Refer to the Illustrated Parts List (IPL) in Section 8 when using this manual or ordering replacement parts. Parts are identified in parenthesis (FIG-ITEM NO.).

1.3 The Z21-701 Evaporator Assembly was designed utilizing an electrical motor and blower configuration. The squirrel cage blower wheel draws air across the coils and into the aircraft ducting for circulation.

***WARNING***

**THIS SYSTEM IS UNDER PRESSURE. INJURY COULD OCCUR IF PROPER SAFETY PRECAUTIONS ARE NOT TAKEN. THE SYSTEM PRESSURE MUST BE RELIEVED BEFORE ANY LINES ARE DISCONNECTED.**

***WARNING***

**AVOID PROLONGED SKIN CONTACT WITH THE REFRIGERANT HFC-134a. AVOID CONTACT WITH EYES. DO NOT BREATH THE FUMES. REFER TO THE MATERIAL SAFETY DATA SHEET FOR INFORMATION ON TREATMENT.**

## *2.0 SPECIAL TOOLS AND MATERIALS*

2.1 No special tools are required to perform the maintenance described in this manual.

2.2 The following equipment and material may be required to perform maintenance in this manual.

| ITEM | SOURCE |
|---|---|
| Liquid Detergent, water soluble | Commercially available |
| Cloth, lint free | Commercially available |
| Tape, Insulation, | Commercially available |
| Detector, Leak, Suitable for HFC-134a | Commercially available |

### *3.0 INSPECTION, REPAIR AND REPLACEMENT OF COMPONENTS*

3.0.1 Refer to Installation drawings for instructions to access the evaporator. Remove the covers/panels as necessary.

3.0.2 The only component on the Evaporator Unit which requires routine maintenance is the inlet Air Filter. The unit and other components are serviced on condition.

***CAUTION***

**AIR CONDITIONING SYSTEM UNDER PRESSURE. APPROPRIATE SAFETY MEASURES SHOULD BE TAKEN WHEN SERVICING THIS EQUIPMENT. ONLY TRAINED PERSONNEL WITH APPROVED SAFETY EQUIPMENT SHOULD PERFORM SERVICING DUTIES.**

***NOTE***

**IT IS UNLAWFUL TO RELEASE R-12 OR OTHER REFRIGERANTS TO THE ATMOSPHERE. USE APPROVED RECOVERY/RECYCLE EQUIPMENT TO CAPTURE REFRIGERANTS. USE ONLY LAWFUL MEANS TO DISPOSE OF RECOVERED REFRIGERANTS. CHECK WITH LOCAL AGENCIES FOR APPROVED DISPOSAL PROCEDURES.**

***NOTE***

**CAP ALL OPEN LINES TO PREVENT CONTAMINANTS AND MOISTURE FROM ENTERING THE SYSTEM.**

3.1 AIR FILTER (1-1)

3.1.1 INSPECTION: Inspect the filter every 100 hours for clogging due to dust or other airborne contaminants. Check for tears in the element. Check the foam insulation for wear or deterioration.

3.1.2 REMOVAL: Slide the top of the filter from the housing until it clears the top cover then lift the filter from the evaporator.

3.1.3 SERVICE: On condition. Clean the filter with a solution of water and liquid detergent, rinse with clear water. Dry the filter with light compressed air. Care should be taken not to damage the element. Replace foam insulation if worn or damaged.

3.1.4 INSTALLATION: Slide the filter into the housing in reverse order of removal.

3.2 DRAIN LINE (NOT SHOWN)

3.2.1 INSPECTION: Check that the connection on the external drain tube is secure. Check for any leaks or damaged areas on the flexible tube. Using an Air Supply, apply 10 PSI (max.) to the flexible tube at the highest point to the external drain outlet. Check that drain line is clear.

3.2.2 REMOVAL: Loosen the clamp that attaches the drain line to the evaporator drain pan. And pull the flexible drain line off of the evaporator drain pan tube.

3.2.3 SERVICE: Clear any obstructions as required. Replace flexible tube as required by condition.

3.2.4 INSTALLATION: Slide the flexible tube over the evaporator drain pan tube. And tighten the clamp.

3.3 BLOWER MOTOR (1/2/4-5)

3.3.1 INSPECTION: On condition. Check for slow or noisy operation.

3.3.2 REMOVAL: It may be necessary to remove the whole Evaporator Unit from the aircraft. Refer to Installation drawings for removal procedure. Unsolder the motor red wire at the resistor (NS) on the blower housing. Remove the three screws and washers 1/2/3/4-22, 1/2/3/4-26, 1/2/3/4-29) and spacers (2/3/-27) between the motor and the blower housing. Disconnect the black ground wire.

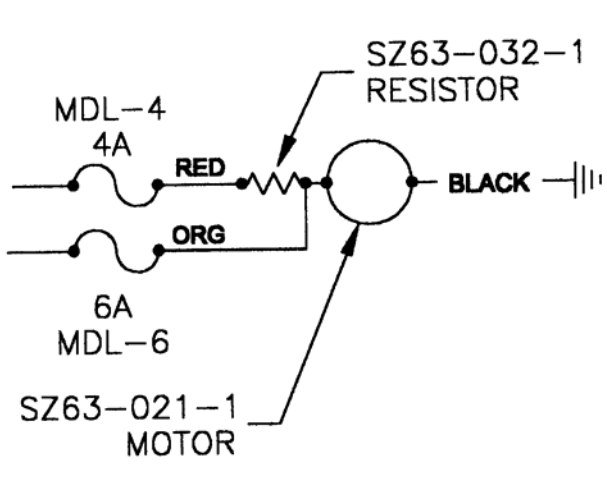



***Illustration 1.***

3.3.2.1 Note the spacing of the (squirrel cage) wheel (4-7) on the motor shaft. Loosen the set screw on the wheel (4-7) and remove from the defective motor and attach wheel (4-7) to the new motor with the same alignment spacing.

3.3.3 SERVICE: There is no field repair for this sealed motor. Replace if defective.

3.3.4 INSTALLATION: Attach the (squirrel cage) wheel (4-7) on the new motor shaft. Care should be taken to insure the squirrel cage has the same alignment to the motor and is free to rotate. Tighten the set screw. Attach the blower motor with blower wheel to the blower housing in reverse order as removed. Place shrink tube material over the wires that were unsoldered. Solder the red motor wire to the resistor on the same side as the orange wire. Move shrink tubing in place and heat. Connect the black motor wire to the ground post.

3.4 THERMOSTATIC EXPANSION VALVE (TXV) (1/2-31)

***CAUTION***

**AIR CONDITIONING SYSTEM UNDER PRESSURE. APPROPRIATE SAFETY MEASURES SHOULD BE TAKEN WHEN SERVICING THIS EQUIPMENT. ONLY TRAINED PERSONNEL WITH APPROVED SAFETY EQUIPMENT SHOULD PERFORM SERVICING DUTIES.**

***WARNING***

**SYSTEM IS UNDER PRESSURE AND MUST BE RELIEVED BEFORE ANY SERVICE TO THE EXPANSION VALVE CAN BE ACCOMPLISHED.**

3.4.1 INSPECTION: On condition.

3.4.2 REMOVAL: Expose the Thermostatic Bulb on the Suction Line on the evaporator by removing the insulating tape (2-32). Care should be taken not to puncture or damage the bulb or any of the coils on the evaporator. Next, carefully remove the clip (2-30) holding the bulb to the Suction Line, retain it for reinstallation.

3.4.2.1 Disconnect and remove the Inlet Hose (NS). Plug the hose end to prevent any contamination of the system. Hold the expansion valve (1/2-31) with a wrench and loosen the B-Nut on the Pressure Line (Inlet) on the evaporator. Remove the Expansion Valve (1/2-31) including the bulb. There is an adapter (2-33) and O-Ring (2-18) between the Expansion Valve and the coil (2/3-3). Retain the adapter to be re-installed. Plug the Pressure Line and inlet on the coil (2/3-3) to prevent contamination to the system.

3.4.3 SERVICE: Defective expansion valve must be replaced.

3.4.4 INSTALLATION: Apply a light film of P.O.E. oil on the new O-Ring (2-18) and fit it on the adapter (2-33). Fit the adapter and O-Ring in the new expansion valve (1/2-31). Use a back-up wrench to tighten the connection. Next use clip (2-30) to attach the Thermostatic Bulb to the Suction Line on the evaporator. The Thermostatic Bulb must have FULL contact with the line. Thoroughly cover the bulb by wrapping with insulating tape (2-32).

3.4.4.1 Attach the inlet hose to the expansion valve. During servicing check for leaks.

### *4.0 SERVICING – REFRIGERANT CHARGE*

***CAUTION***

**AIR CONDITIONING SYSTEM UNDER PRESSURE. APPROPRIATE SAFETY MEASURES SHOULD BE TAKEN WHEN SERVICING THIS EQUIPMENT. ONLY TRAINED PERSONNEL WITH APPROVED SAFETY EQUIPMENT SHOULD PERFORM SERVICING DUTIES.**

***NOTE***

**IT IS UNLAWFUL TO RELEASE R-12 OR OTHER REFRIGERANTS TO THE ATMOSPHERE. USE APPROVED RECOVERY/RECYCLE EQUIPMENT TO CAPTURE REFRIGERANTS. USE ONLY LAWFUL MEANS TO DISPOSE OF RECOVERED REFRIGERANTS. CHECK WITH LOCAL AGENCIES FOR APPROVED DISPOSAL PROCEDURES.**

***NOTE***

**CAP ALL OPEN LINES TO PREVENT CONTAMINANTS AND MOISTURE FROM ENTERING THE SYSTEM.**

4.1 CHECK THE SYSTEM. Anytime refrigerant has been lost or removed from the system. Check for leaks and secure all plumbing connections before filling the system with refrigerant.

### *5.0 SERVICE SCHEDULES*

5.1 MAINTENANCE SCHEDULE

| ***ITEM DESCRIPTION*** | ***INSPECTION INTERVAL **** | ***R&R/T.B.O. HRS*** |
|---|---|---|
| SZ84-010-3<br>Air Filter (1-1) | Every 100 Hrs. Inspect for tears or damage.<br>Refer to 3.1. | ON CONDITION |
| SZ63-021-1<br>Blower Motor (1/2/4-5) | N/A | ON CONDITION |
| 14-2409<br>TXV (1/2-31) | N/A | ON CONDITION |

### *6.0 TOLERANCES*

6.1 TORQUE VALUES. Use standard torque values for bolts and other fasteners.

## *7.0 TROUBLE SHOOTING*

| TROUBLE | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| Evaporator Blowers low flow | Obstructed blower Inlet. | Remove obstruction. |
| | Obstructed duct. | Remove obstruction. |
| | Obstructed Outlet. | Remove obstruction. |
| Evaporator Blowers Inoperative. | Motor open. Motor brushes worn beyond limits. | Replace Motor Blower Assy. |
| | Check fuse on fuse block | Replace fuse |
| | Check wiring to motor. Check switch in cockpit. Check motor for shorts. | Repair or replace faulty system or component. |
| System not cooling with. Adequate airflow over evaporators | Condenser airflow blocked. | Remove obstruction. |
| | Low refrigerant. | Service system. |
| | Overcharge of refrigerant. | Service system |
| | Faulty Compressor | Replace Compressor. |
| | High Discharge Pressure Overcharge of refrigerant. | Service system |
| | Obstruction in Receiver-Dryer. | Replace defective component and service system |
| | Obstructed Expansion Valve | Remove obstruction or Replace Expansion Valve and service system |

| TROUBLE | POSSIBLE CAUSE | REMEDY |
|---|---|---|
| Low Discharge Pressure. | Low refrigerant. | Service system |
| | Faulty Compressor. | Replace bad component and service system |
| Excessive vibration at Motor/Compressor. | Improper belt tension. | Adjust belt to correct tension. |
| | Worn, damaged or loose or over tightened mounts. | Adjust or replace mounts. |
| Quick refrigerant loss. | Open in system. | Check compressor head gasket. Check Hoses or tubing for holes. Check connections. Replace defective component. Service system |
| | Defective O-Ring. | Replace defective O-Ring. Service system |
| | Loose connections. | Tighten connections. Service system |
| Slow refrigerant loss. | Loose connections. | Tighten connections. Service system |

## *8.0 ILLUSTRATED PARTS LIST*

8.1 EXPLANATION OF SYMBOLS:
ALT - The Part Number shown is an approved alternate, either part number may be used.
MOD "X" Refers to modification information of this part as applicable to this assembly.
NP - Not Procurable individually, see next higher assembly.
NS - Not Shown
OBS - Obsolete
USAGE/QTY - This identifies parts used on specific applications (not common to all units).
.. - Part of higher assembly.
*/# - See explanation at end of parts list.

| *FIG-ITEM* | | *PART NUMBER* | *NOMENCLATURE* | *QTY* |
|---|---|---|---|---|
| | | *USAGE* | | |
| 1 | -1 | SZ84-010-3 | FILTER, AIR | 1 |
| 1 | -2 | SZ48-017-3 | CLIP | 2 |
| 2/3 | -3 | SZ63-004-2 | COIL ASSY | 1 |
| 1 | -4 | SZ63-014-3 | COVER | 1 |
| 1/2/4 | -5 | SZ63-021-1 | MOTOR, BLOWER | 1 |
| 1/2/4 | -6 | SZ63-023-1 | BLOWER MOTOR ASSY | 1 |
| 4 | -7 | SZ63-326CCW-5/16 | BLOWER WHEEL | 1 |
| 1/2/4 | -8 | SZ63-675 | HOUSING, BLOWER | 1 |
| 4 | -9 | Z05-402-1 | SPACER | 1 |
| 2/3 | -10 | Z15-033-2 | FUSE HOLDER | 1 |
| 2/3 | -11 | Z21-301-1 | HOUSING | 1 |
| 2 | -12 | Z21-302-1 | COVER | 1 |
| 1 | -13 | Z21-303-1 | PANEL | 1 |
| 2/3 | -14* | Z21-304-1 | DRAIN PAN | 1 |
| 2 | -15 | DS200U137-108 | UNION | 1 |
| 2/3 | -16 | MDL-4 | FUSE | 1 |
| 2/3 | -17 | MDL-6 | FUSE | 1 |
| 2(NS) | -18 | MS28775-013 | O-RING | 1 |
| NS | -19 | MS3367-4-9 | CABLE TIE | AR |
| 2/3 | -20 | MS35206-229 | SCREW | 2 |
| 1/2/3 | -21 | MS35206-245 | SCREW | 21 |
| 1/2/3/4 | -22 | MS35206-246 | SCREW | 4 |
| 4 | -23 | MS35206-247 | SCREW | 4 |
| NS | -24 | MS35265-29 | SCREW | 2 |
| 2/3 | -25 | MS35338-41 | WASHER, LOCK ALT: AN935-6 | 6 |
| 1/2/3/4 | -26 | MS35338-42 | WASHER, LOCK ALT: AN936-8 | 29 |
| 2/3/4 | -27 | NAS1149F0363P | WASHER, FLAT ALT: AN960-10 | 6 |
| 2/3 | -28 | NAS1149FN616P | WASHER, FLAT ALT: AN960-6L | 2 |
| 1/2/3/4 | -29 | NAS1149FN816P | WASHER, FLAT ALT: AN960-8L | 29 |
| 2 | -30 | 14-2388 | CLIP | 1 |
| 1/2 | -31 | 14-2409 | EXPANSION VALVE | 1 |

| *FIG-ITEM* | | *PART NUMBER* | *NOMENCLATURE* | *QTY* |
|---|---|---|---|---|
| | | *USAGE* | | |
| 2 | -32 | 18-2710 | INSULATION | AR |
| 2 | -33 | 6242 | ADAPTER ALT: 20-4444 | 1 |
| NS | -34 | 10220-1 | I.D. PLATE | 1 |
| NS | -35 | 403904-1 | PLACARD “FLOW” | 1 |
| 4 | -36 | 67470 | INSULATION, FOAM | AR |
| NS | NS | N3 | CLAMP, NYLON | 1 |
| NS | NS | SZ63-032-1 | RESISTOR | 1 |

* DRIN TUBE OMITTED FROM FIGURE.

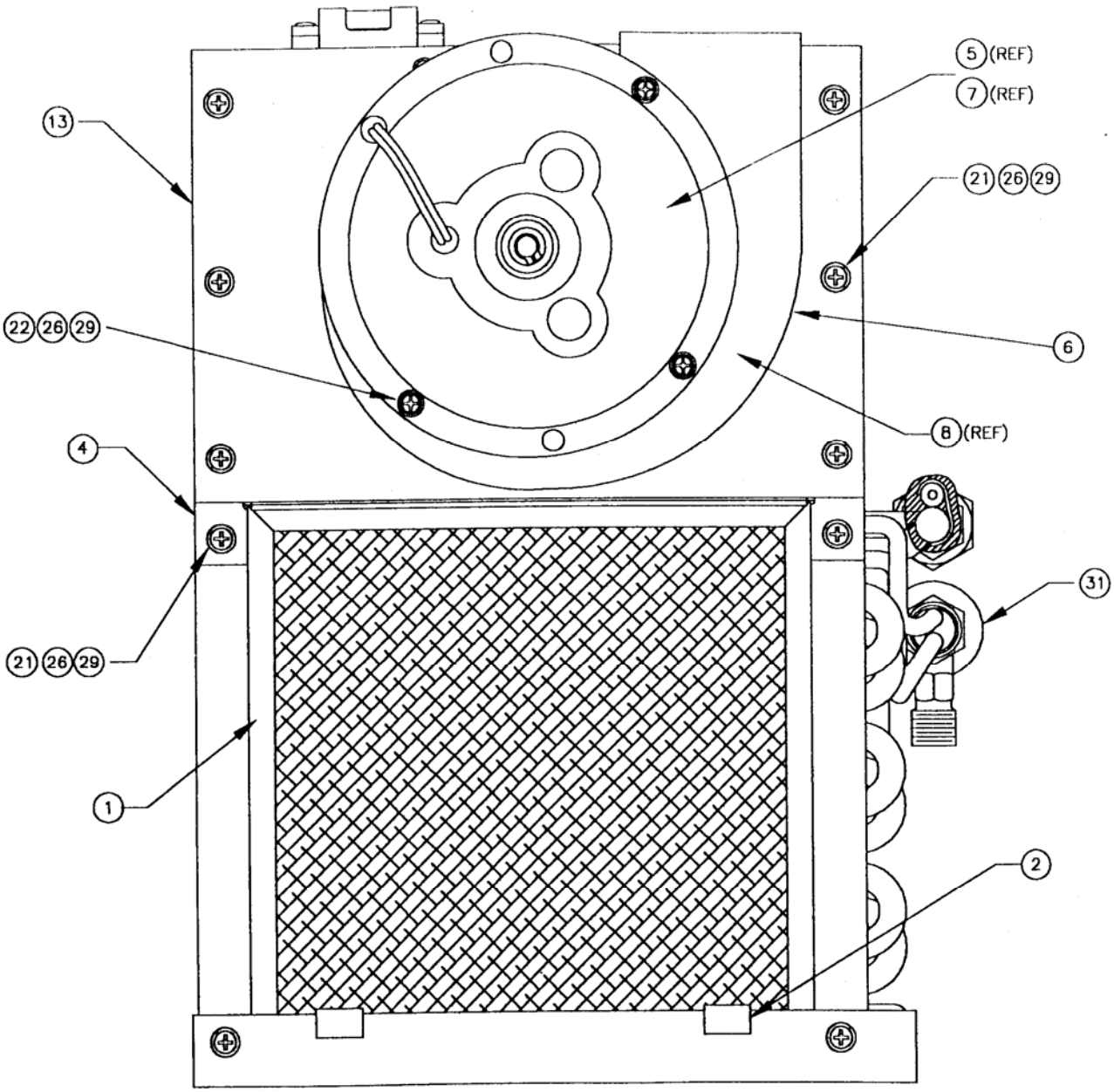
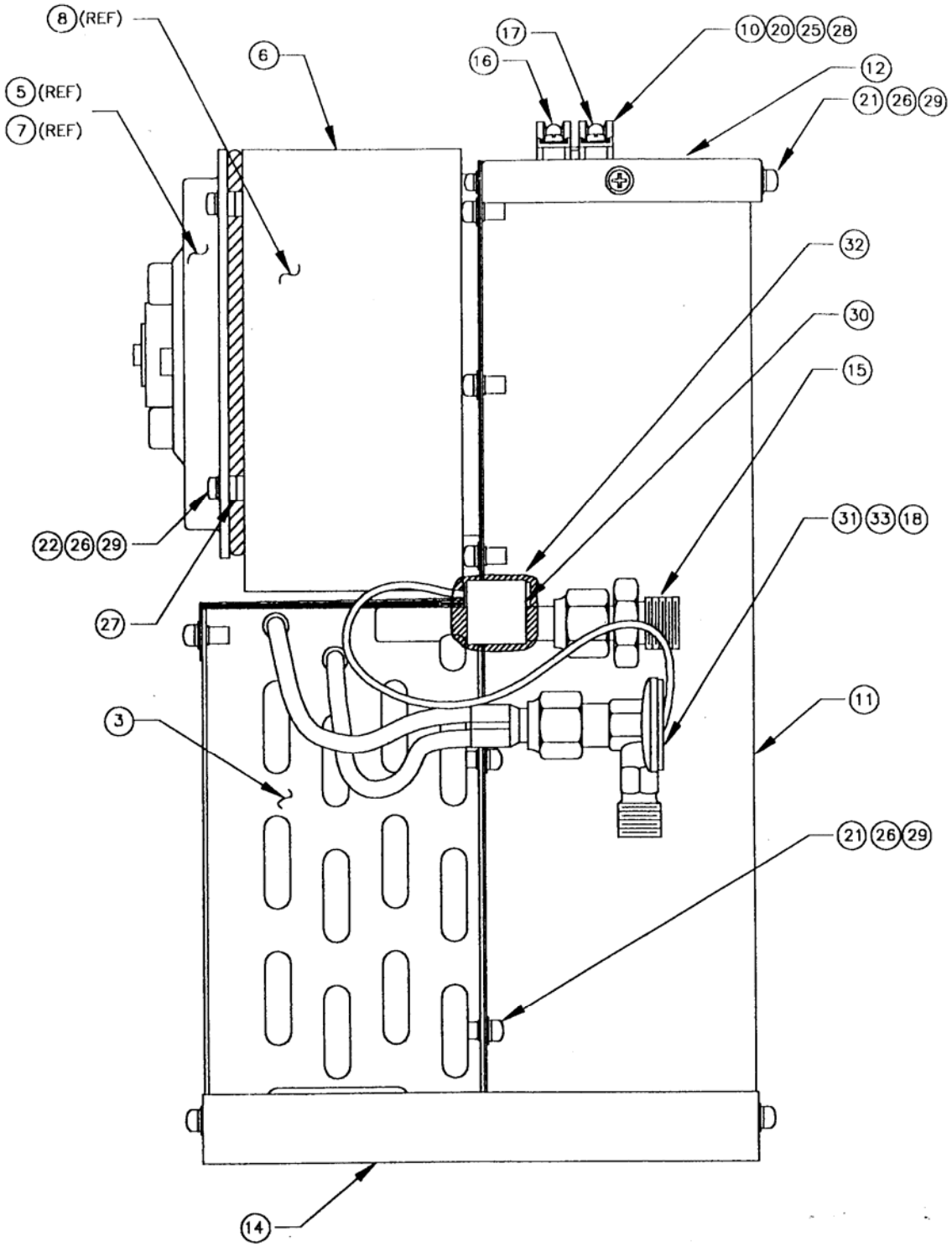



FIG. 1


8 (REF)
6
17
16
10 20 25 28
12
21 26 29
5 (REF)
7 (REF)
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30
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31 33 18
22 26 29
27
3
11
21 26 29
14

FIG. 2

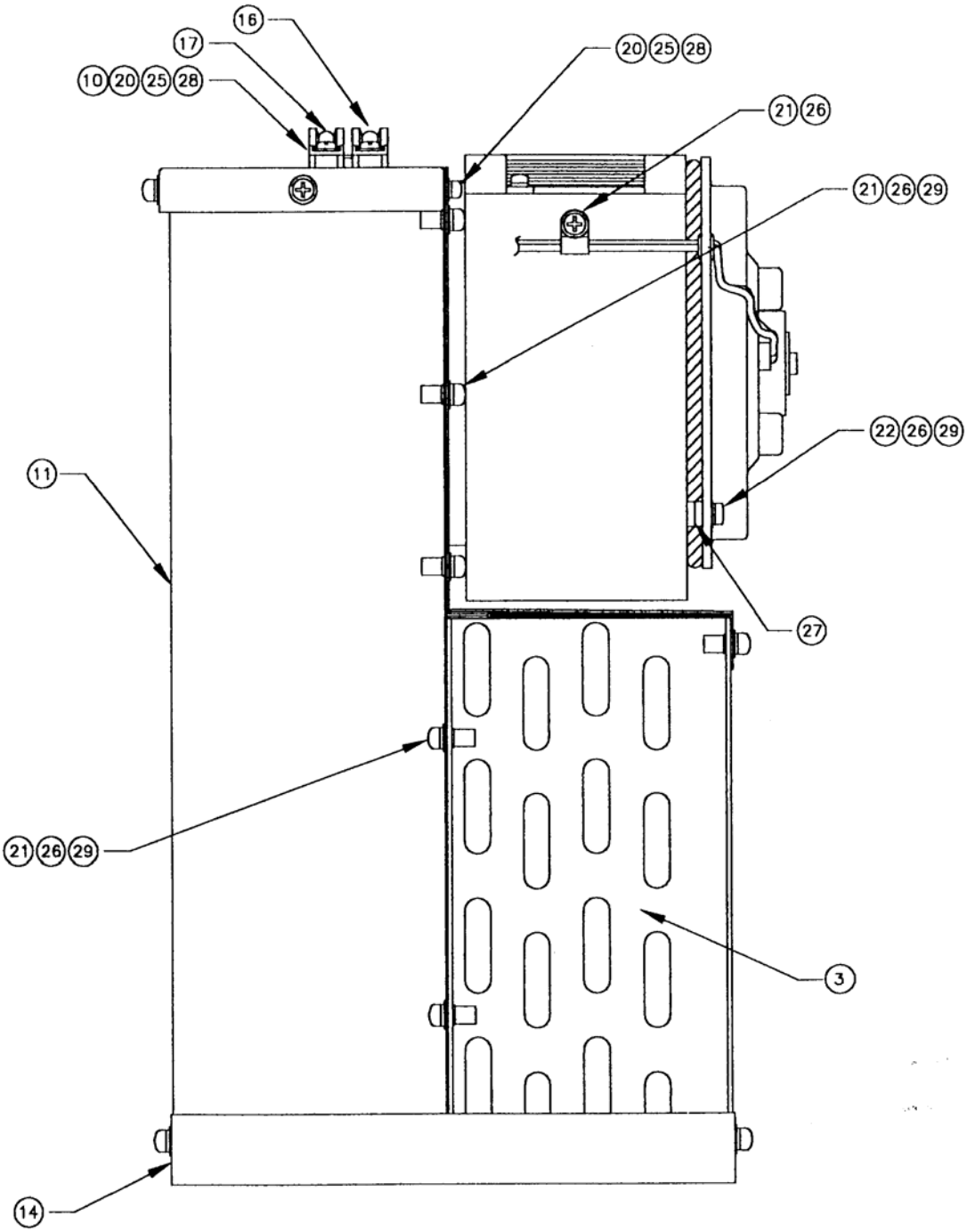


FIG. 3

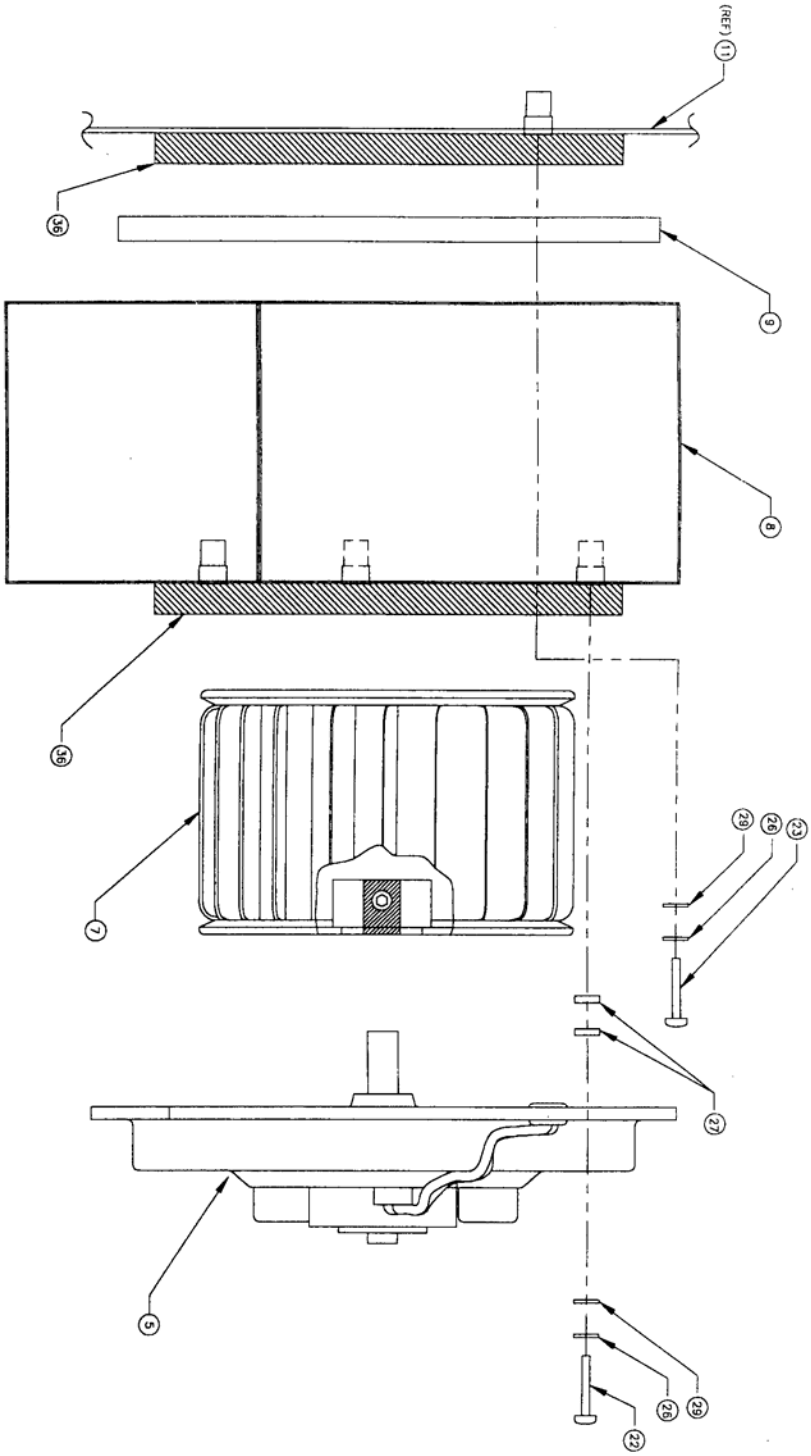


FIG. 4