

RV-10 DOOR LATCH INDICATOR SYSTEM

Concept

The Door Latch Indicator system was designed to help the Pilot verify if each door is securely latched after being closed. The system consists of two magnetic reed switches for each door, one for each pin socket in the doorjamb. A cylindrical magnet is installed in the end of each latch pin to activate the reed switch when the pin has reached its proper latched position. A Light Emitting Diode (LED) mounted at a clearly visible location on the instrument panel is used to show the status of each door latch. The reed switches are connected in series so if either pin is not properly engaged through the Cabin Pin Block, the LED will light, indicating an improperly latched door. Because the reed switches have a normally closed state when the door is latched, relays are used to reverse the switch action so that the light turns on when a switch opens.

Installation

- Step 1. Remove the front and rear seats (if they are installed).
- Step 2. Remove the left and right F-1042G Wire Covers, the left and right F-1015D Mid Cabin Side Covers, the left and right F-1025 Rear Seat Cover Panels, and the F-1010-L Wire Cover (if they are installed). M
- Step 3. Mount a 49-496 Reed Switch at the left door, aft latch pin jamb hole using an MS21919DG4 Cushion Clamp. Use the lower AN509 screw that attaches the C-1010 Cabin Pin Block (see Step 3 photo). Substitute a slightly longer screw if necessary. Mount the reed switch, orientated as shown in the photo. Leave the screw just loose enough to allow rotating the clamp when doing the switch adjustments in steps 12 and 13. ✓✓
- Step 4. Mount a 49-496 Reed Switch at the left door, fwd latch pin jamb hole in the same manner as the rear switch, only this time use the upper AN509 screw that attaches the C-1010 Cabin Pin Block (see Step 4 photo). ✓✓
- Step 5. Close and fully latch the left door. ✓✓
- Step 6. Connect a continuity tester or an Ohm Meter to the two wires on the rear switch. In its current state with no magnet present, the switch is open and will measure no continuity or infinite resistance. ✓✓
- Step 7. Slide the magnet that was supplied with the 49-496 Magnetic Reed Contact Switch, into the C-1012-L Aft Latch Pin. As you insert the magnet you will see evidence on the tester or meter of the switch closing. Use something nonferrous (tooth pick, etc.), to slide the magnet forward in the latch pin until the switch opens. Take note of the depth you push the magnet in to the latch pin. ✓✓
- Step 8. Slip something ferrous into the C-1012-L Aft Latch Pin and pull out the magnet. ✓✓
- Step 9. Unlatch and open the left door. Mix approx. ½ teaspoon of five-minute epoxy and apply it inside the end of the C-1012 Aft Latch Pin as shown in the Step 9 photo. Wipe any excess from the exterior of the latch pin, then quickly close and latch the door. **Note: remember, you only have a five minute working time.** Enter the cabin through the other door. Insert the magnet into the end of the latch pin. Use something nonferrous to slowly slide the magnet forward in the latch pin until the tester/meter just indicates that the switch opens. Let the epoxy cure for at least 15 minutes before opening the door. NCO
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Step 10. Unlatch and open the left door. Repeat Steps 5-9 on the C-1011-L Fwd Latch Pin and 49-496 Reed Switch.

Step 11. Repeat Steps 3 – 10 on the right door. Note that the orientation of the switches when mounted will be a mirror image of the left side.

Step 12. With the right door closed and fully latched, connect a meter/tester to the fwd Reed Switch. Rotate the position of the reed switch away from the end of the C-1011-R Fwd Latch Pin until the meter/tester shows that the reed switch has opened (no continuity / infinite resistance). Now slowly rotate the reed switch back towards the fwd latch pin, just until the reed switch closes. Unlatch and open the door. Carefully tighten the screw by holding the nut and turning the screw to prevent disturbing the reed switch position.

Step 13. Repeat Step 12 on the three remaining Reed Switches.

Step 14. Use a Uni-bit® to drill a 3/16" hole in the top flange of the Left and Right F-1025 Rear Seat Cover Panels. The hole should be centered laterally, and 1/8" from the fwd edge of the flange. Refer to Step 14 photo and Detail A. Use a hand snips to cut away a 3/32" wide portion of the hole as shown in the photo and detail A.

Step 15. Drill a #27 hole, centered between the middle two lightening holes of the F-1005C-L Bulkhead Side Channel for attachment of a ring terminal (see Step 15 photo). Remove any paint and/or primer from around the hole to allow for a good electrical connection to airframe ground.

Step 16. Repeat Step 15 on the F-1005C-R Bulkhead Side Channel.

Step 17. Slide a plastic snap bushing over the two wires of the left door rear Reed Switch (see Step 17 photo). Strip the insulation from the end of either wire on the left door rear reed switch. Install an ES 36152 ring terminal on the end of the stripped wire. Using the hardware depicted on the Door Latch Indicator System Wiring Schematic, attach the ring terminal to the F-1005C-L Bulkhead Side Channel using the previously drilled #27 hole.

Step 18. Repeat Step 17 on the rear Reed Switch of the right door.

Step 19. Choose a prominent, easily visible location on the instrument panel for the # 276-270 LED Indicators. Drill a 9/32" hole for the installation of each light.

Step 20. Make the Relay Mount Plate shown in Diagram A. Choose a mounting location behind the instrument panel that will provide easy access for maintenance, and simple routing of wires to the indicator lights and the forward Door Latch Pin Reed Switches. After choosing a location, drill a #12 hole for mounting the relay mount plate.

Step 21. Use the 18 Ga. Wire provided to connect the not yet used wire on the left door rear Reed Switch, to either of the wires on the left door fwd Reed Switch. Leave enough extra wire for a service loop near the rear reed switch to allow for the removal and installation of the F-1025-L Rear Seat Cover Panel. Make the connection to the rear reed switch, using a ES 421-0107, and a ES 421-0108 Connector as shown on Door Latch Indicator System Wiring Schematic. This will provide an easy disconnection point for isolating the two reed switches from each other for future maintenance or troubleshooting. For the fwd reed switch wire connection, strip 3/8" of insulation from each wire. Cut a 3/4" piece of the supplied heat shrink tubing and slip it over one of the wires. Twist the two wires together and solder (Diagram B). After the solder cools, slide the heat shrink tubing over the bare area and shrink in place.

Step 22. Repeat Step 21 for the right door.

Step 23. Mount the two RLY-351 relays to the Relay Mount Plate to make a Relay Assembly. Refer to Step 23 photo, and Diagram A. Label the relays "Left Door" and "Right Door" to simplify maintenance and

troubleshooting later. Make the labeling readable with the relays in their installed location. Use the Door Latch Indicator System Wiring Schematic to pre-wire the two relays. Wire run distances from the mounting location of the relay assembly to the LED Indicators, the fwd Reed Switch on each door, and the Stall Warning circuit breaker should be measured to determine the wire lengths, then add a little extra to be sure to have enough. When connecting the System Power (SP) wires to the relays, the wires can be "Daisy Chained", by inserting two wires into one connector before crimping it (see Step 23 photo). Label the unconnected ends of the wires, using the designations on the Door Latch Indicator System Wiring Schematic, to assist in routing to the correct locations.

- Step 24. Mount the Relay Assembly using the hardware shown in Diagram A (see Step 24 photo). Route each wire to its previously labeled location.
- Step 25. Trim the DL and DR wires to final length and complete the second wire connection at the fwd Reed Switch at each door using the same process that was used in Step 21.
- Step 26. Trim the SP wire to final length, strip the insulation, and install an ES 36152 ring terminal. Connect the SP wire to the Stall Warning 2A Circuit Breaker (it will be sharing the circuit breaker with the B8 wire that powers the stall warning system).
- Step 27. Install the left # 276-270 LED Indicator by inserting its wires through the mounting hole and snapping it in place. Install the right LED Indicator in the same manner. Trim the IL wire to final length and connect it to the red wire of the left LED Indicator using the same process as was done at the fwd Reed Switch in Step 21. In the same manner, connect the IR wire to the red wire of the right LED Indicator.
- Step 28. Connect the black wire on each LED Indicator to a ground terminal behind the instrument panel. It is acceptable to connect the two black wires to each other and then connect them to ground using a single wire.
- Step 29. Label the LED Indicators "Left Door" and "Right Door". Placard the LED indicators "Light Out / Door Latched", or similar. See Step 29 photo.
- Step 30. Add to the Aircraft Operating Instructions for your aircraft, details about the operation of the Door Latch Indicator System. Add the following step to the Before Engine Start Check List, "With both Doors open, verify both LED Indicators are illuminated". Add the following step to the Before Take Off Check List, "Check that both Doors are securely latched and that neither of the LED Indicators are illuminated".

System Testing

Note: To test the Door Latch Indicator System you need to have a functioning electrical system with the aircraft's battery at least temporarily installed. If the installation of the electrical system is not yet complete you will have to delay system testing until the complete aircraft electrical system is being tested.

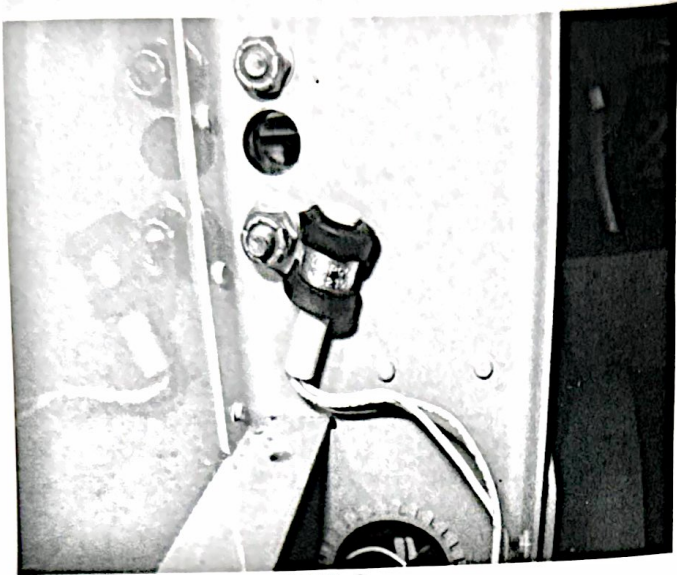
- Step 1. Open both doors. Double-check all the connections at the relays and the switches.
- Step 2. Turn on the master switch
- Step 3. With both doors unlatched and open, both LED Indicators should be illuminated.
- Step 4. Close and latch either door. As the door latch handle engages in its detent, the LED Indicator for that door should extinguish. Close and latch the other door and verify the other LED indicator extinguishes also. Turn off the master switch.

If an LED Indicator fails to extinguish

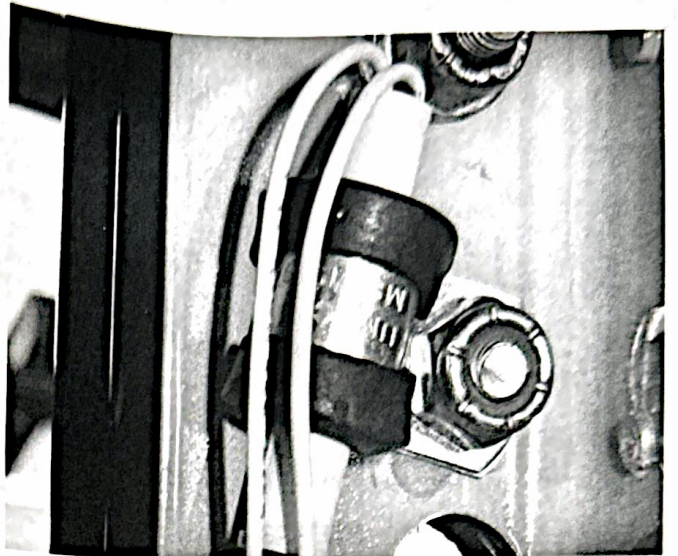
- Step 1. With the master switch in the off position, disconnect the DL (door left) or DR (door right) wire from the appropriate relay (they should be connected to terminal 85).
- Step 2. Connect a continuity tester or Ohm Meter between the DL or DR wire and airframe ground.
- Step 3. When the door is unlatched, the tester/meter should show no continuity or infinite resistance.
- Step 4. Close and latch the door. As the latch engages in the detent, the tester/meter should show continuity/zero resistance. If it does, then there is a problem with the wiring of the relay and/or LED indicator. If it does not show continuity/zero resistance when the door is latched, then one of the switches is misadjusted. Continue with Step 5.
- Step 5. Remove the F-1015D Mid Cabin Side Cover if installed. Disconnect the rear Reed Switch at the connector adjacent to the reed switch. Connect a continuity tester or Ohm Meter between the connector on the reed switch wire and airframe ground. Latch and unlatch the door. The tester/meter should show continuity or zero resistance when the door is latched. If it does not, readjust the reed switch using the adjustment procedure in Step 12 of the Installation section. If the rear reed switch reads correctly, continue on to Step 6.
- Step 6. Connect the meter between the other half of the rear Reed Switch connector (on the wire routing to the forward Reed Switch), and the DL or DR wire previously disconnected from the relay. Perform the switch adjustment procedure in Step 12 of the Installation section. Restore all wire connections, and retest the operation of the LED Indicators.

If neither LED Indicator will turn on.

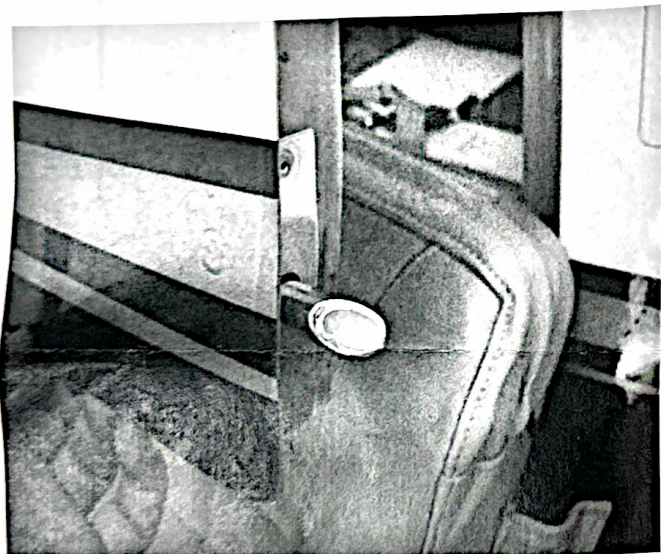
- Step 1. Verify that 12 volt power is present at terminals 30 and 86 on both relays.
- Step 2. Verify that the black wires on the LED indicators have a good connection to airframe ground.



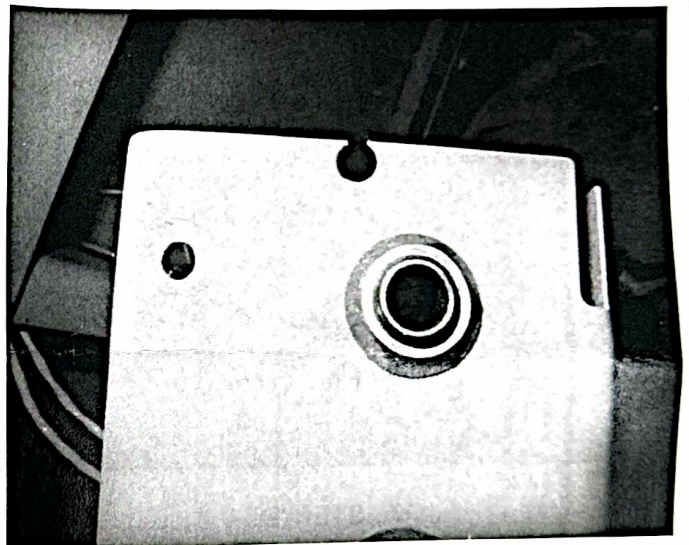
STEP 3



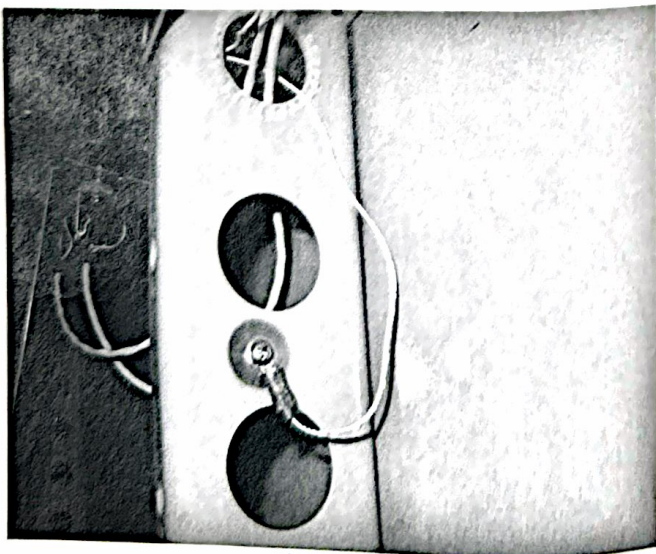
STEP 4



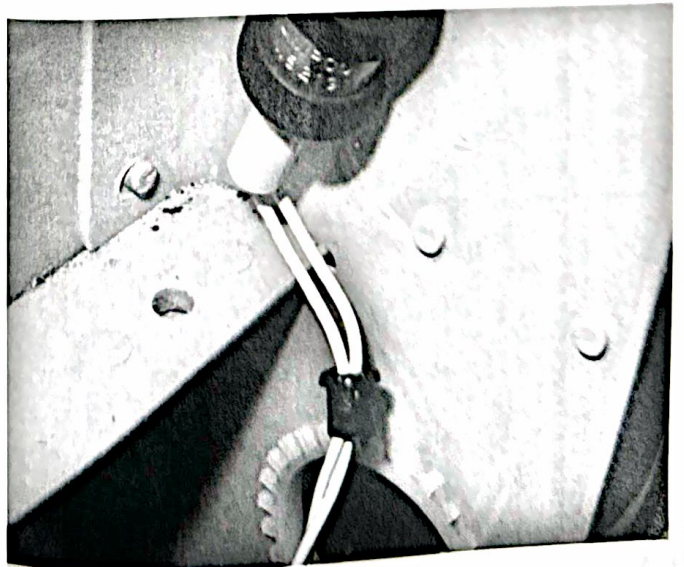
STEP 9



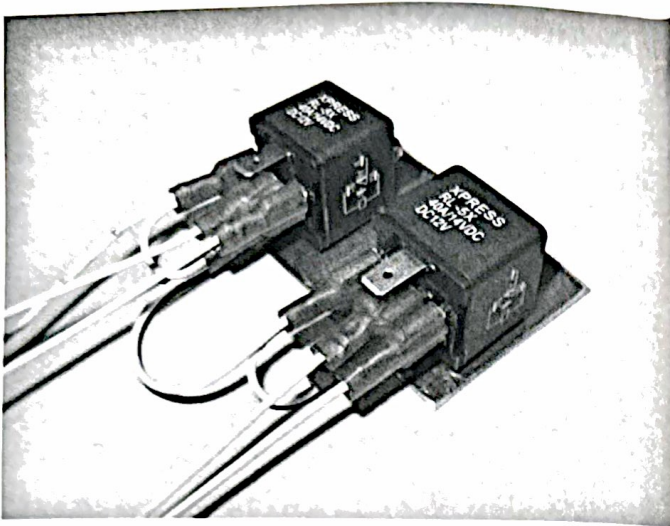
STEP 14



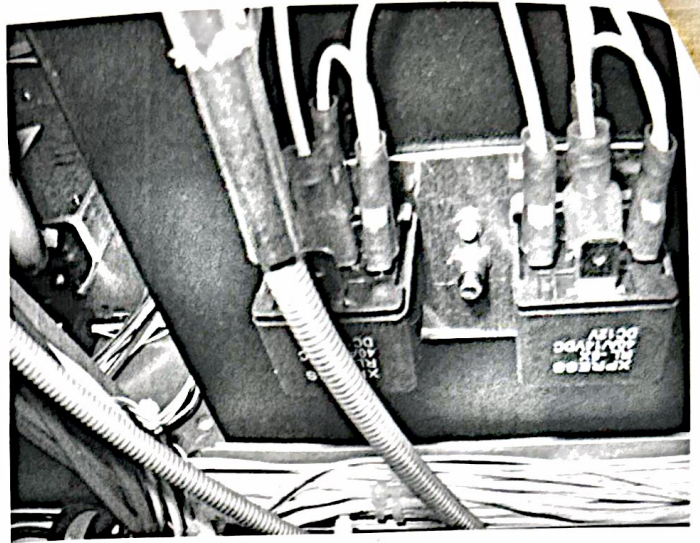
STEP 15



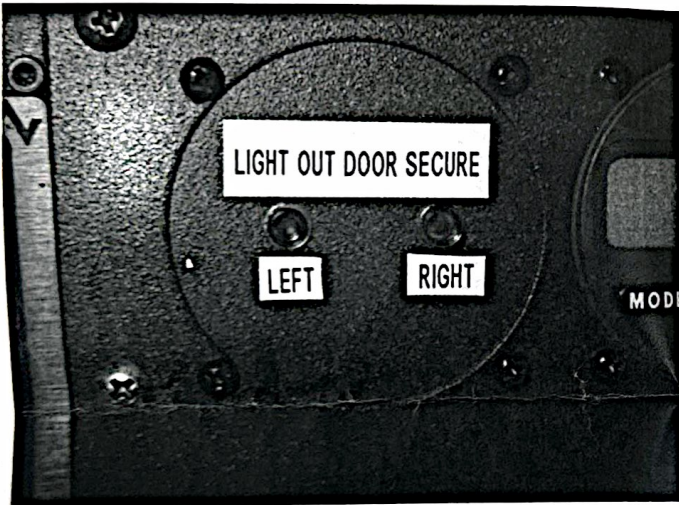
STEP 17



STEP 23

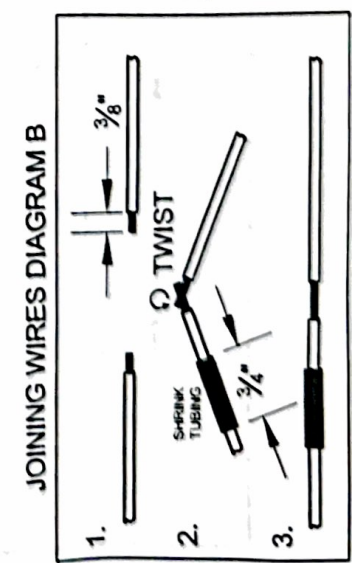
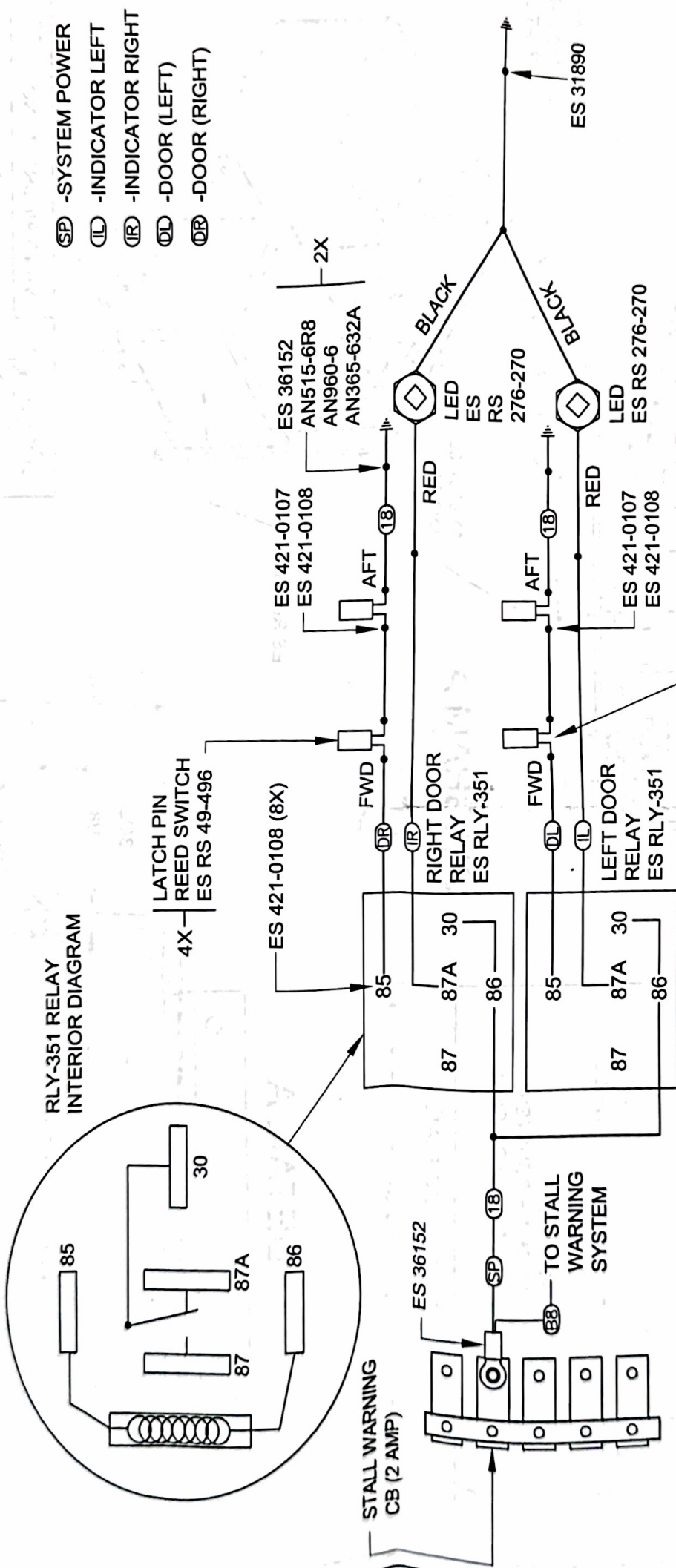


STEP 24

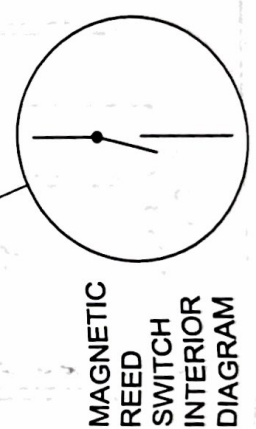


STEP 29

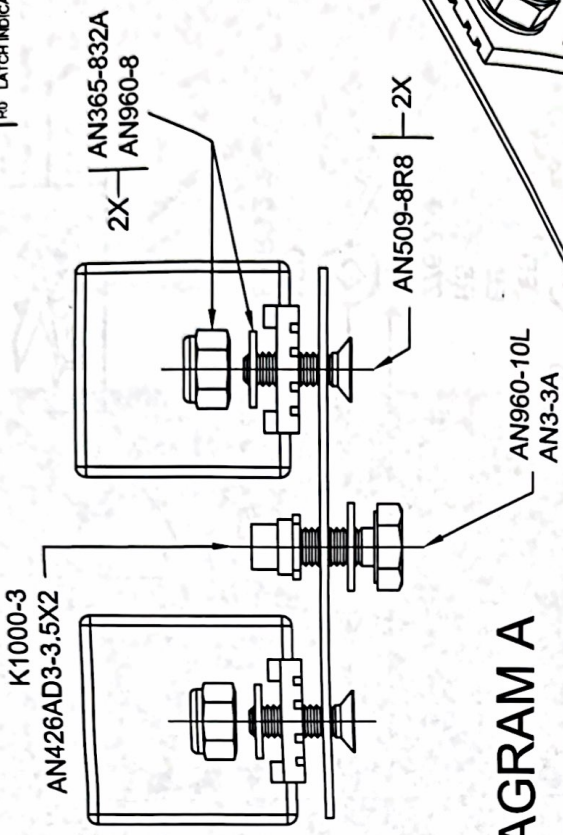
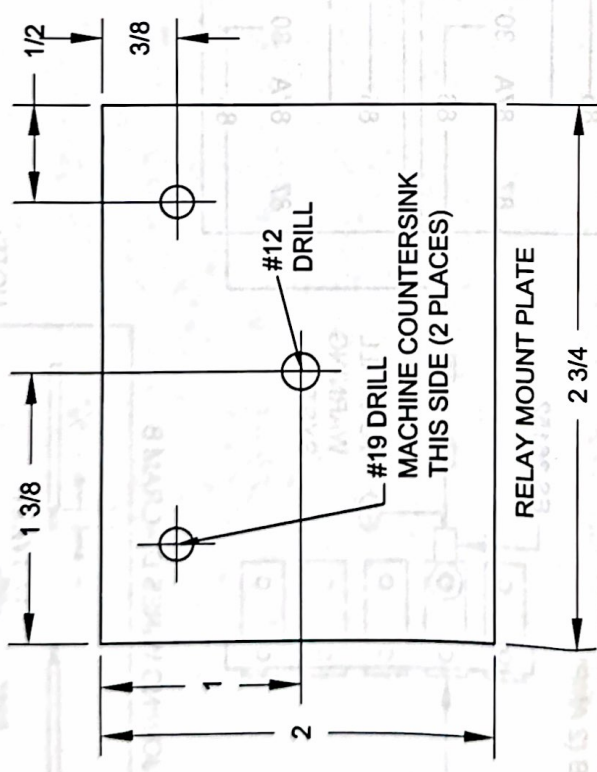
- (SP) -SYSTEM POWER
- (IL) -INDICATOR LEFT
- (IR) -INDICATOR RIGHT
- (OL) -DOOR (LEFT)
- (OR) -DOOR (RIGHT)



NOTE:
ALL WIRE SPLICES AS SHOWN IN DIAGRAM B UNLESS CALLED-OUT OTHERWISE.

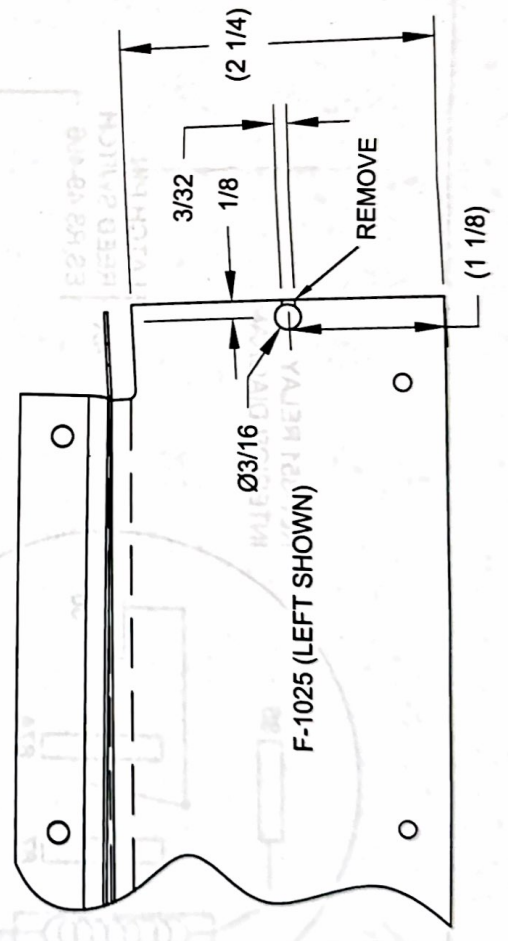


VAN'S AIRCRAFT, INC. 14401 NE KEEL RD. AURORA, OR 97002 USA	
PART DESCRIPTION: DOOR LATCH INDICATOR	
UNITS:	DRAWING (PART) NO.:
INCHES	RV-10
SCALE:	PAGE 1 OF 2
DATE DRAWN: 12-14-05	
DRAWN BY: A. PETERSEN	
TOLERANCES: (UNLESS OTHERWISE SPECIFIED)	
(U.S. OTHER PUBLICATIONS) COMPONENT DOCUMENTATION (RV-10 DOOR INDICATOR) (RV-10 DOOR LATCH) A-SIZE ORIGINAL	



RELAY MOUNT PLATE

DETAIL A



ES RLY-351



VAN'S AIRCRAFT, INC. 14401 NE KEL RD. AURORA, OR 97002 USA		DATE DRAWN: 01/16/06	UNITS: INCHES	DRAWING PART NO.: RV-10
PART DESCRIPTION: DOOR LATCH INDICATOR MATERIAL SPECIFICATION:		DRAWN BY: A. PETERSEN	SCALE:	PAGE 2 OF 2
		TOLERANCES: (UNLESS OTHERWISE SPECIFIED)		Q/LC OTHER PUBLICATIONS COMPONENT DOCUMENTATION: RV-10 DOOR INDICATOR: RV-10 DOOR LATCH DIAGRAM A