TO: ALL HOLDERS OF PASSENGER SERVICE UNIT OVERHAUL PROCEDURES OVERHAUL MANUAL, 25-20-00

REVISION NO. 20, DATED MAR 1/04

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D&O	D/Assy	Cleaning	Insp/Chk	Repair	Assy	F/C	Test	T/Shooting	S/Tools	Storage	IPL	L/Overhaul
Added clarifications to let you use alternative equipment								X					
Added schematics for wiring assemblies 65B52242-53, -54, -55									X				
Identified tests for free-flow and non-free flow oxygen systems								X					
Added clarifications to other details			X						X				

PASSENGER SERVICE UNIT OVERHAUL PROCEDURES

25-20-00

BOEING P/N NO ASSIGNED PART NUMBER

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 17866	Jan 5/75
		PRR 23605-44	Jan 5/75
		PRR 32632	Jan 5/75
		MC 41364	Dec 5/75
		PRR 78206	Mar 5/76

LIST OF EFFECTIVE PAGES

* Indicates pages revised, added or deleted in latest revision
F Indicates foldout pages - print one side only

	PAGE	DATE	PAGE	DATE	PAGE	DATE
25-20-00						
*	T-1	Mar 1/04				
	T-2	BLANK				
*	LEP-1	Mar 1/04				
	LEP-2	BLANK				
*	T/C-1	Mar 1/04				
	T/C-2	BLANK				
	1	Sep 1/95				
*	2	Mar 1/04				
	3	Sep 1/95				
	4	Sep 1/95				
	5	Mar 1/94				
	6	Jun 10/73				
	7	Jun 10/73				
*	8	Mar 1/04				
*	8A	Mar 1/04				
	8B	Mar 1/99				
	9	Mar 1/99				
*	10	Mar 1/04				
	11	May 10/84				
	12	May 10/84				
	12A	Feb 10/86				
	12B	BLANK				
*	12C	Mar 1/04				
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*[1] Use the parts list in the applicable overhaul manual or component maintenance manual. Use the OHM/CMM Index (D6-47081) to find the specific manual number for a given part number.

*[2] Refer to Testing, Trouble Shooting.

PASSENGER SERVICE UNIT OVERHAUL PROCEDURES

1. DESCRIPTION AND OPERATION

A. The passenger service unit assembly (PSU) supplies emergency oxygen, individual reading lights and air outlets and an attendant call switch and light for each passenger. Some units could have controls in the lower face and some could have speakers installed.

B. When the oxygen system is actuated, a pressure-operated latch opens the mask box door and the masks drop within easy reach of the passengers. As the passenger pulls the mask down, a short cord attached to the mask tubing pulls the outlet valve actuation pin which opens the valve to let oxygen flow to the mask.

2. DISASSEMBLY

WARNING: THE PASSENGER SERVICE UNIT ASSEMBLY CONTAINS OXYGEN EQUIPMENT WHICH MUST BE OVERHAULED IN A CLEAN, ENCLOSED AREA. BE CAREFUL TO KEEP CAPS ON ALL OPENINGS IN THE OXYGEN EQUIPMENT.

CAUTION: THE LOWER FACE OF SUCH EXTERIOR ITEMS AS THE SHELL, THE PANEL, AND THE OXYGEN MASK BOX DOOR CAN BE SEEN FROM THE CABIN INTERIOR. BE CAREFUL NOT TO DAMAGE SURFACES THE PASSENGERS WILL SEE.

A. Disassemble passenger service units only as necessary for cleaning, inspection/check, repair or replacement of components. Refer to vendors instructions for overhaul of vendor supplied items, as necessary.

B. Disconnect wires and remove connector pins, tubing and terminals only when necessary for repair or replacement. Tag disconnected wires to help during assembly. Refer to SOPM 20-12-01 for procedures about soldering.

3. CLEANING

WARNING: KEEP OIL, GREASE, FLAMMABLE SOLVENTS, DUST, LINT, FINE METAL FILINGS, OR OTHER COMBUSTIBLE MATERIAL AWAY FROM PARTS THAT WILL TOUCH PRESSURIZED OXYGEN. COMBUSTIBLE MATERIAL COULD CATCH FIRE AND CAUSE AN EXPLOSION WHEN TOUCHED BY PRESSURIZED OXYGEN.

A. Oxygen system components -- Refer to SOPM 20-70-01 for applicable instructions.

CAUTION: USE ONLY THE SPECIFIED LISTED CLEANING MATERIALS. OTHER MATERIALS OR PROCESSES COULD DAMAGE PARTS. DAMAGE TO PLASTIC COULD BE SUDDEN BUT NOT VISUALLY APPARENT.

B. Plastics and Decorative Interior Items -- Refer to Cleaning of Interior Painted and Plastic Surfaces in SOPM 20-30-03.

4. INSPECTION/CHECK -- Use standard industry practices.

5. REPAIR

A. Repair

(1) Decorative Plastic Parts

(a) Remove light scratches from smooth finishes with a good quality automotive polish.

(b) Remove light scratches from matte finish with a grit blast in a cabinet equipped with source of filtered air at 80 to 100 psi.

1) Make sure the equipment is clean.

2) Use filter screening to remove the dust.

3) Use this grit blast media only for plastic parts.

4) Remove surface dirt and unwanted matter per CLEANING. Dry fully.

5) Hold the position air nozzle 3-5 inches above the part. Maintain at an angle of 45-90 degrees.

6) Move the nozzle in a smooth motion across the part surface. Make an overlap with the last pass until all of the surface is covered. Two cross-coats are recommended.

(c) Defects on painted surfaces -- Use the applicable refinish instructions and the procedures of SOPM 20-41-01 and 20-41-04.

(2) Electrical Parts

(a) Repair electrical connectors per SOPM 20-11-02.

(b) Repair soldered connections per SOPM 20-12-01.

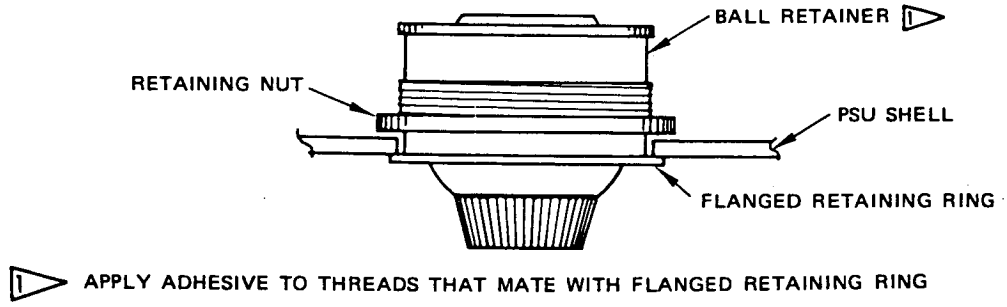
(c) Repair terminal lugs per SOPM 20-11-03.

(3) Loose gasper air assembly (Fig. 1).

(a) Assemble the gasper air assembly parts, but engage only the first thread of the ball retainer on the flanged retaining ring.

(b) Apply a small amount of BMS 5-126 type 2 class 1 adhesive to the ball. Do not get the adhesive on the retaining ring threads.

(c) Tighten the ball retainer until it is down tight on the flanged ring. Let the adhesive cure before you install the gasper air assembly in the PSU.



Gasper Air Assembly Repair
Figure 1

B. Replacement

(1) Bonded Gasper Air Plenum Gaskets

CAUTION: DO NOT USE KETONE SOLVENTS TO SOFTEN OLD ADHESIVE. DAMAGE TO PLASTIC COULD BE SUDDEN BUT NOT VISUALLY APPARENT.

(a) Cut or scrape the defective gasket from the plenum.

(b) Scrape or sand remaining adhesive from the plenum.

(c) Install a new gasket with type 60 adhesive per SOPM 20-50-12.

C. Materials

NOTE: Equivalent substitutes can be used.

(1) Vegetable shell grit -- Shelblast AD-7B-35-60 (Ref SOPM 20-60-01).

(2) Adhesive -- Type 60 (Ref SOPM 20-50-12)

(3) Adhesive -- BMS 5-126, Type 2, Class 1 (Ref Type 38 in SOPM 20-50-12).

6. ASSEMBLY

NOTE: Use standard industry practices and these special steps.

WARNING: DO THE ASSEMBLY OPERATIONS UNDER CONTROLLED CONDITIONS. KEEP OIL, GREASE, FLAMMABLE SOLVENTS, DUST, LINT AND OTHER SUCH MATERIALS AWAY FROM PARTS WHICH WILL TOUCH OXYGEN. KEEP CAPS ON ALL OPENINGS AT ALL TIMES TO PREVENT CONTAMINATION. SUCH MATERIALS COULD CATCH FIRE AND CAUSE AN EXPLOSION IF TOUCHED BY COMPRESSED OR LIQUID OXYGEN.

CAUTION: BE CAREFUL NOT TO DAMAGE SURFACES OF THE UNIT THE PASSENGERS WILL SEE.

A. Oxygen mask packing (Fig. 2)

(1) Do the test procedure on the oxygen system before you pack the oxygen masks. Remove tissue paper packing from the mask facepiece. Then wrap the mask headstraps around the mask. Tuck the end of the strap between the mask end-plate and the bottom of the mask.

(3) Coil mask tubing and secure with coil retaining clips to dimensions shown for applicable configuration.

(4) Connect mask hoses to valve assembly outlet nozzle.

NOTE: Make sure that the mask hoses are adequately secured to the outlet nozzle of the valve assembly. Replace hoses that are cracked or deformed.

(5) Insert each valve actuating pin firmly into its respective valve assembly; if actuating attachment is used, rotate attachment to side of valve.

NOTE: Check each outlet to ensure valve actuating pin is firmly seated in its detent position in valve assembly.

(6) Fold reservoir bag lengthwise twice.

(7) If masks can be packed from rear side of PSU, close PSU door and place mask facepiece against door adjacent to their respective valves. Loosely coil reservoir bag and tubing on top of masks, next place pre-coiled tubing on top between valve and respective mask. Replace dust cover.

WARNING: ORDERLY AND UNCRAMPED POSITIONING OF MASKS AND TUBING IS REQUIRED TO AVOID HANG-UP WHEN MASKS ARE DROPPED.

(8) If masks can be packed only through door opening, place pre-coiled tubing in bottom of box adjacent to respective valve. Loosely coil remaining tubing and reservoir bag and place over pre-coiled tubing. Place mask facepiece up toward door. Close door.

(9) Latch PSU door and depress red tamper indicator.

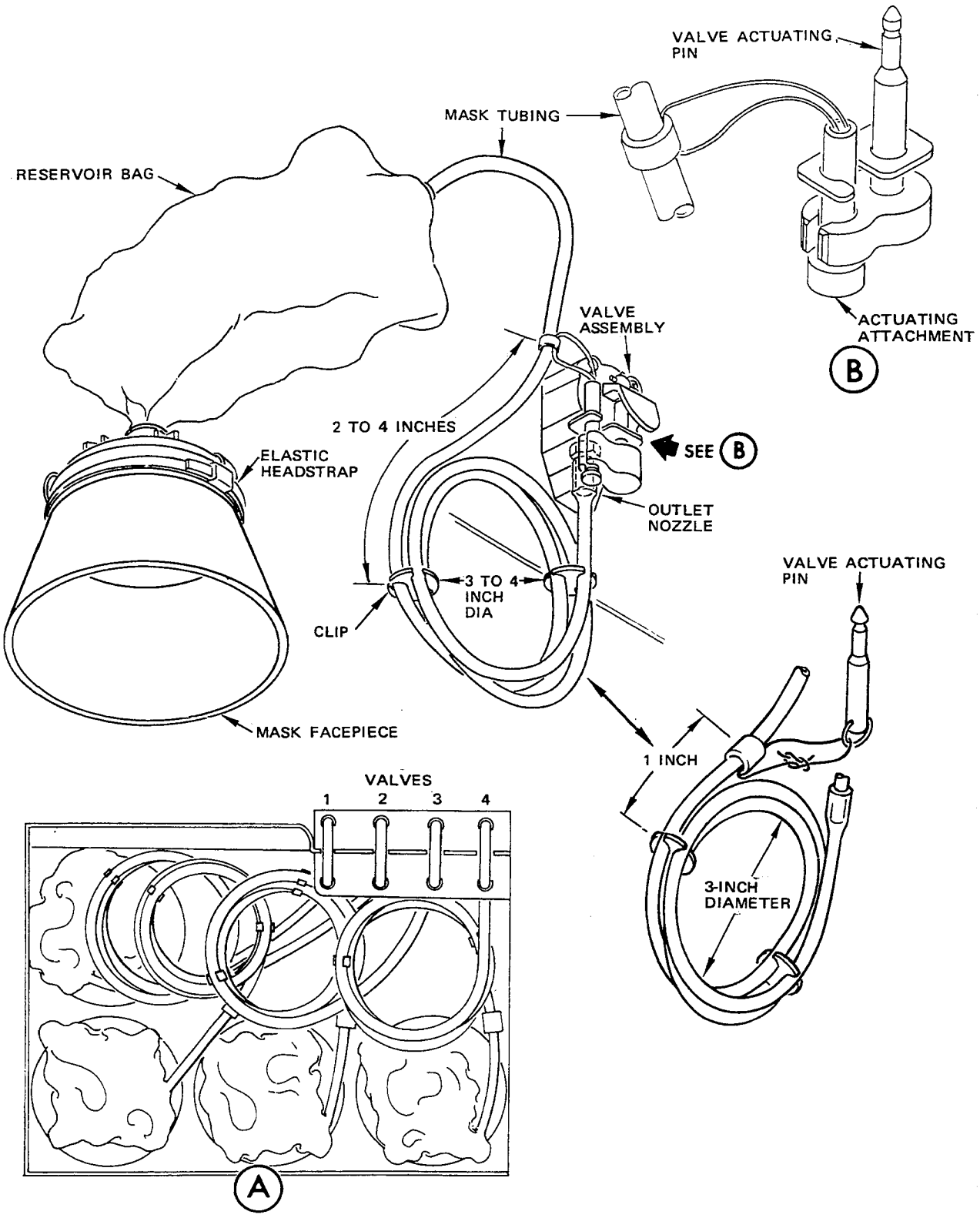
B. Gasper air assembly

(1) Tighten retaining nut until there is no end play between gasper air assembly and shell assembly, then turn retaining nut an additional 90 degrees.

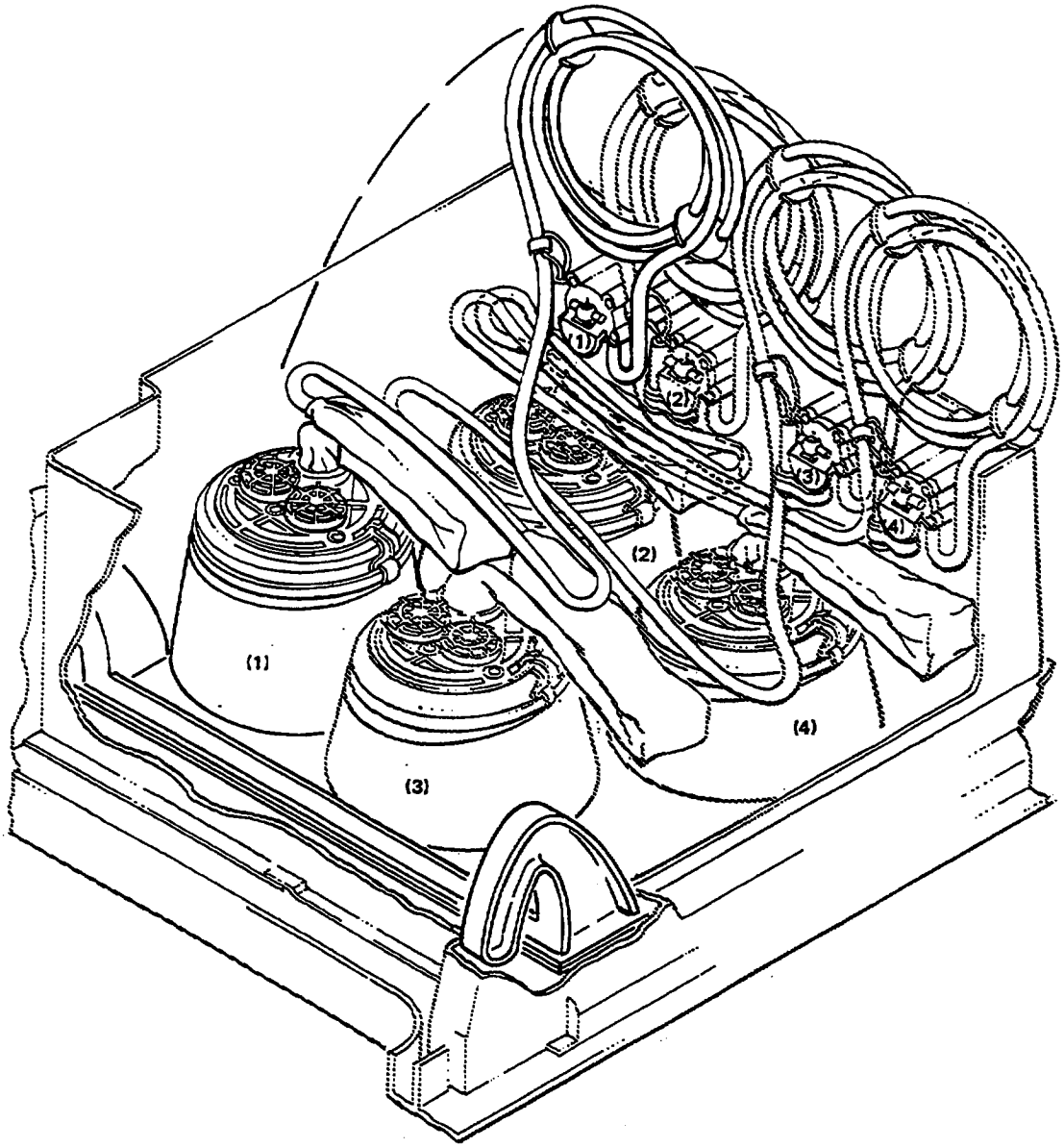
C. Gasper air plenum installation

CAUTION: OVERTIGHTENING GASPER AIR PLENUM ASSEMBLY ATTACHING SCREWS CAN DAMAGE PLENUM ASSEMBLY.

(1) On PSU assemblies containing plastic gasper air plenum assemblies, if plenum attaching screws penetrate upper surface of plenum, tighten screws until snug but do not distort upper surface of plenum.



Mask Packing Diagram (Typical)
Figure 2 (Sheet 1)



Mask Packing Diagram (Typical)
Figure 2 (Sheet 2)

7. TESTING

A. Test Equipment

(1) Pneumatic test stand that can supply test gas per par. (2) and that can be controlled from 0 to 100 psig.

(2) Test gas (selection optional)

(a) Nitrogen -- BB-N-411, type 1 class 1, grade A.

(b) Air -- Clean, dry, and with no particles greater than 100 microns in size, no more than 3 parts per million total hydrocarbons by weight, and with moisture content no more than 0.0002 gram per liter at 70°F and 760 mm mercury atmospheric pressure.

(c) Oxygen -- MIL-O-27210, type 1.

(3) Shutoff valve.

(4) Fixture to hold the passenger service unit to make a check of the installation and operation. (Locally made) (Refer to Fig. 2B)

(5) Variable frequency audio source -- Hewlett-Packard 3336C, V4X685, or equivalent

(6) Audio power meter -- Quadtech 1840A, V0PK96, or equivalent matching transformer and/or audio amplifier, if the passenger service unit assembly has a speaker.

B. Prepare for Test

(1) Oxygen Components

(a) Do these steps before you put the oxygen masks in the PSU assembly:

1) Close the PSU door. Make sure the door latches easily and smoothly.

2) Look for sufficient engagement between the hooks and latch or latch plate. On 65B-series passenger service unit assemblies, engagement should be 0.10 inch or more. If engagement is less than this value, examine parts for correct assembly.

3) Try the latch for free operation. Manually move the door engagement hook until the door opens. See that the door engagement hook snaps back to normal position smoothly and freely.

4) Try the red tamper pin for free movement.

5) Close the PSU door. Push the red tamper pin in with a pin punch, until you feel a click and there is engagement made with the hook.

C. Test Procedure

(1) Oxygen System Components

(a) Free-flow oxygen systems: Connect an air or nitrogen supply with a pressure gage and a shutoff valve to the oxygen inlet of the PSU assembly. Before you apply pressure, make sure all valve assemblies are completely closed and that all pressure connections are leak-tight. Gradually increase the pressure from 0 psig until, at pressure between 18 and 28 psig, you see the PSU door freely falls open. Open each valve assembly and look for free flow from each outlet to make sure that orifices or filter screens are not blocked.

(b) Non-free-flow oxygen systems: With all valve assemblies closed, gradually increase pressure to 100 psig. Look for leaks. Reject the PSU assembly if the leakage rate is more than 1 cc per minute. This leakage rate limit can be converted into an equivalent pressure decrease rate limit, which you can monitor with the pressure gage. See Fig. 2A for details.

(c) Remove the air supply, cap the oxygen inlet, and stow the oxygen masks in PSU assembly per assembly instructions.

(2) Individual Air Outlet Components

(a) Connect an air supply to the cold air inlet hose. See that the nozzle valve of each air outlet opens and closes freely and turns freely, with sufficient friction to stay in one direction if let go.

(b) Open each air outlet one at a time and make sure there is a good flow of air.

(c) Close the air outlets and apply air at pressure 1 psig. Examine for air leaks. Some air leaks could occur, but do not reject the unit unless the air stream makes a sound or jet that could annoy passengers.

CALCULATION OF PRESSURE DECREASE LIMIT EQUIVALENT TO THE PSU LEAKAGE RATE LIMIT OF 1 CC/MIN

$$PDL = P_T \left[\frac{V_T \ (P_T / P_A)^{0.7143}}{V_T \ (P_T / P_A)^{0.7143} - 1} \right]^{1.4} - P_T$$

WHERE

PDL = PRESSURE DECREASE LIMIT, PSI/MIN

P_A = AMBIENT (ATMOSPHERIC) PRESSURE, PSIA [1]

P_T = TOTAL TEST PRESSURE, PSIA = TEST PRESSURE (100 PSI) + P_A

V_T = TOTAL TEST VOLUME, CC = $V_P + V_{TE}$

V_P = VOLUME OF THE PSU ASSEMBLY, CC [3]

V_{TE} = VOLUME OF THE TEST EQUIPMENT, CC [2] [3]

EXAMPLE:

$V_P = 8$ CC, $V_{TE} = 15$ CC, $P_A = 14.7$ PSI. FIND PDL

SOLUTION:

$P_T = (100 + P_A) = (100 + 14.7) = 114.7$ PSIA

$V_T = (V_P + V_{TE}) = (8 + 15) = 23$ CC

$$PDL = 114.7 \left[\frac{23 \ (114.7 / 14.7)^{0.7143}}{23 \ (114.7 / 14.7)^{0.7143} - 1} \right]^{1.4} - 114.7$$

$$PDL = \left[114.7 \left(\frac{99.78366}{98.78366} \right)^{1.4} - 114.7 \right] = 114.7 \ (1.0142) - 114.7$$

$PDL = 1.63$ PSI/MIN

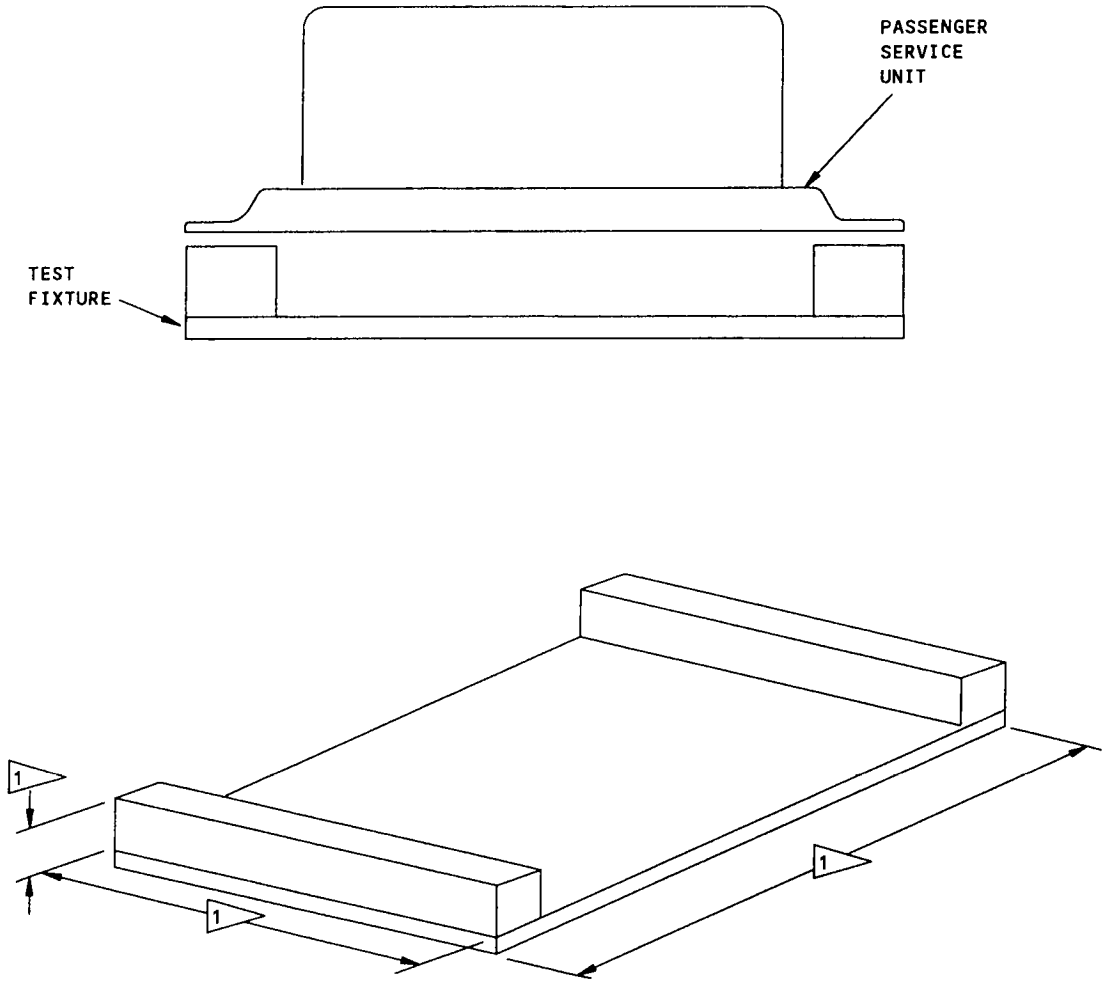
THIS MEANS THE PSU IS ACCEPTABLE IF THE PRESSURE DOES NOT DECREASE FASTER THAN THIS LIMIT.

[1] ACTUAL PRESSURE AT THE TIME AND ALTITUDE OF THE TEST

[2] INCLUDES LINE BETWEEN BENCH SHUTOFF VALVE TO THE PRESSURE GAGE, THE PRESSURE GAGE ITSELF, AND THE REMAINING TUBING FROM THE PRESSURE GAGE TO THE PSU ASSEMBLY

[3] IF THESE VOLUMES CANNOT BE FOUND EXACTLY, IT IS BETTER TO OVERESTIMATE THEIR VALUES

Pressure Decrease Limit Calculations
Figure 2A



1 DIMENSIONS MAY VARY DEPENDING ON P.S.U. SIZE.

Passenger Service Unit Test Fixture
Figure 2B

8. TROUBLE SHOOTING

NOTE: These procedures are a check of the operation of the reading lights, call lights, information signs, and speakers. Refer to the applicable schematic diagram (Fig. 3) to identify connector pins and circuits.

A. Test Equipment -- AC power supply, variable output, controllable to 28V ac.

B. Test of the 65B52242-and 69B54496-Series Wiring Assys (Fig. 3, Sheets 1, 1A)

(1) Reading Lights (as applicable)

(a) Apply 27V ac to the 27V ac pin, ground the pin for LT No. 1, and make sure the light comes on.

(b) Remove the ground from LT No. 1 pin, ground the pin for LT No. 2, and make sure the light comes on.

(c) Remove the ground from LT No. 2 pin, ground the pin for LT No. 3, and make sure the light comes on.

(d) Remove the ground from LT No. 3, ground the pin for LT No 4, and make sure the light comes on.

(e) If the unit has a reading light switch, operate the switch while the reading light is on and make sure the switch makes the light go off and come on.

(f) Remove the voltage and the ground.

(2) Attendant Call Lights

(a) Apply 5V ac to CALL LT pin, ground the pin for GRD, and make sure the light comes on. If the unit has LH and RH lights, be sure to do this test to each light.

(b) Remove the voltage and the ground

(3) Information Signs

(a) Apply 27V ac to terminal FSB, ground terminal for GRD, and make sure the FASTEN SEAT BELT sign comes on.

(b) Remove voltage from FSB terminal and apply 27V ac to terminal NS. Check that NO SMOKING sign goes on.

(c) Remove voltage and ground from terminals.

C. Test -- 61-XXXXX Series Bundles (Fig. 3, Sheets 2,3,4)

(1) Reading Lights

(a) Apply 28V ac to pin D (or 4) and ground pin C (or 3).

(b) Press Reading Light switches and check that each light goes on.

(c) Remove voltage and ground from pins.

(2) Attendant Call Lights

(a) Install test lights as shown (Fig. 3, Sheet 2).

(b) Apply 28V ac to pin J (or 10), and ground pin K (or 11).

(c) Press and hold call switch. Check that call light and test lights goes on.

(d) Release call switch and check that test lights between pins H-M-K (or 8-11) goes off.

(e) Press call switch again and check that call light and remaining test lights go off.

(f) Remove voltage and ground from pins.

(3) Information Signs

(a) Apply 28V ac to pin E (or 5), ground pin C (or 3), and check that NO SMOKING sign goes on.

(b) Remove voltage from pin E (or 5), apply 28V ac to pin F (or 6), and check that FASTEN SEAT BELT sign goes on.

(c) Remove voltage and ground from pins.

(4) Speakers

(a) Connect speaker through a matching transformer or audio amplifier to a source of variable frequency audio at terminals A, B.

CAUTION: TO PREVENT DAMAGE TO SPEAKER CONE, DO NOT EXCEED AUDIO POWER OF 1/2 WATT ON SPEAKERS OF 5 INCHES DIA OR LESS, OR AUDIO POWER OF 2 WATTS ON SPEAKERS MORE THATN 5 INCHES DIA.

(b) Apply varying frequency signal that is comfortably audible.

(c) Vary frequency from 300-10,000 Hz and check that there is no audible distortion.

(d) Set frequency at 500 Hz and apply maximum wattage permitted. Check that there is no audible distortion.

(e) Disconnect unit from test equipment.

UNTERMINATED WIRE, PROTECT & STOW

WIRING ASSY PART NO.
65B52242-1, -17
65B52242–2, –18, –45
65B52242–3, –9, –19, –23, –41, –42, –43
65B52242–5, –20, –44
65B52242-6, -21
65B52242-7, -22
65B52242-8, -14
65B52242-10, -24
65B52242-11, -13
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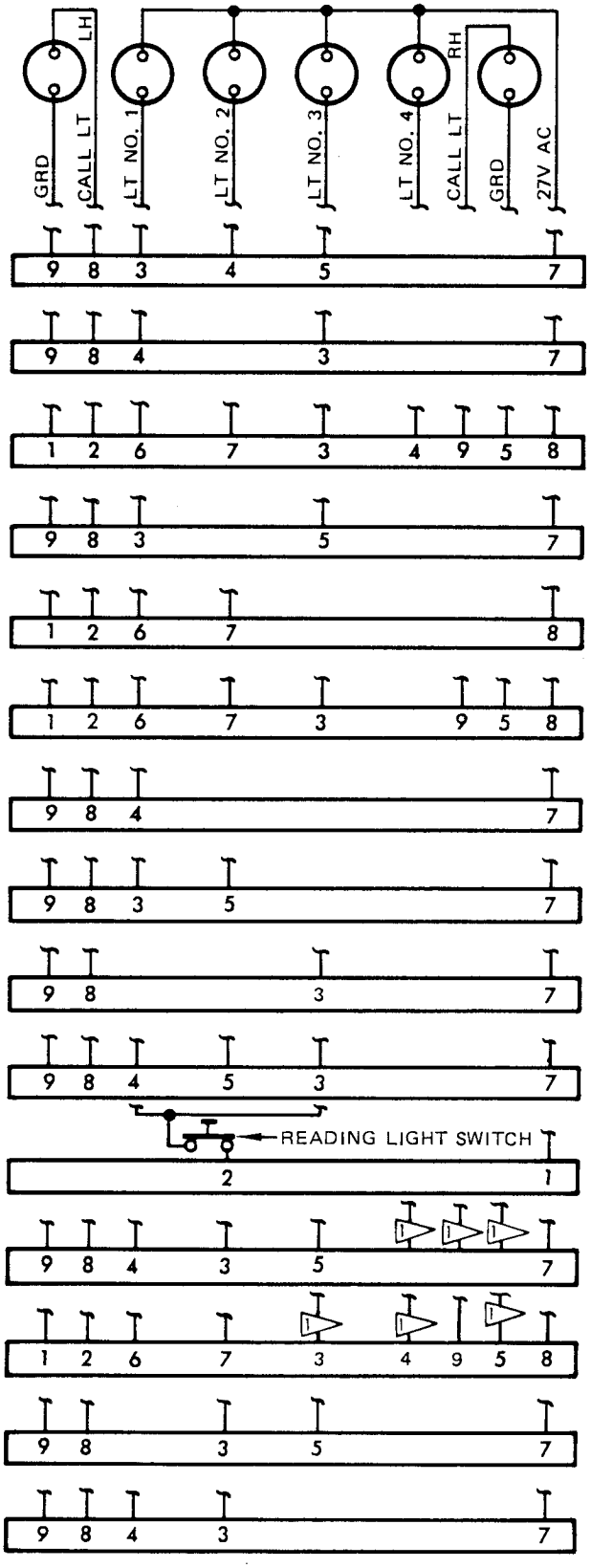
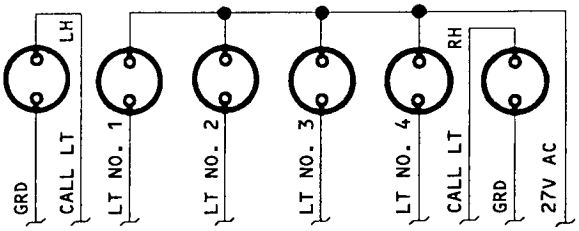
65B52242-29, -30
65B52242-31
65B52242-32

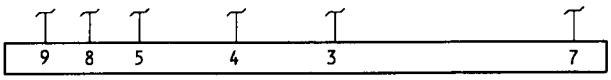


Schematic Diagram
Figure 3 (Sheet 1)

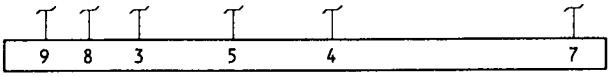


WIRING ASSEMBLY PART NO.

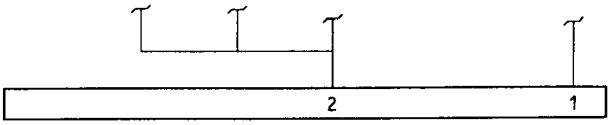
65B52242-35



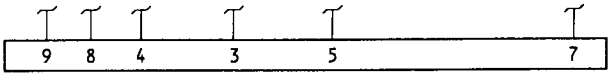
65B52242-36



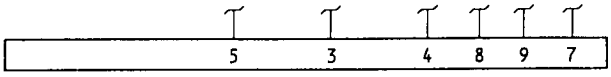
65B52242-38



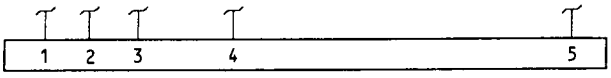
65B52242-43,-46



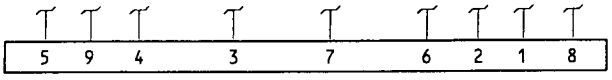
65B52242-47,-54,-55



65B52242-48,-49,-50

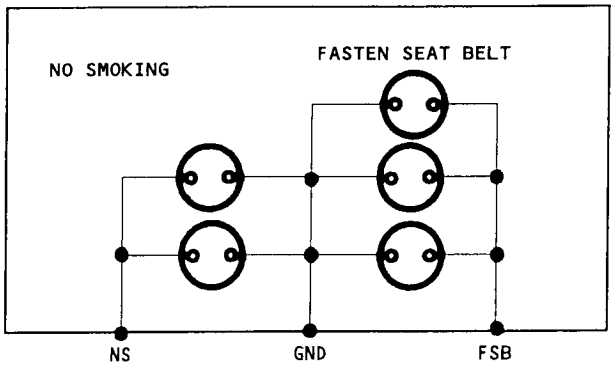


65B52242-53

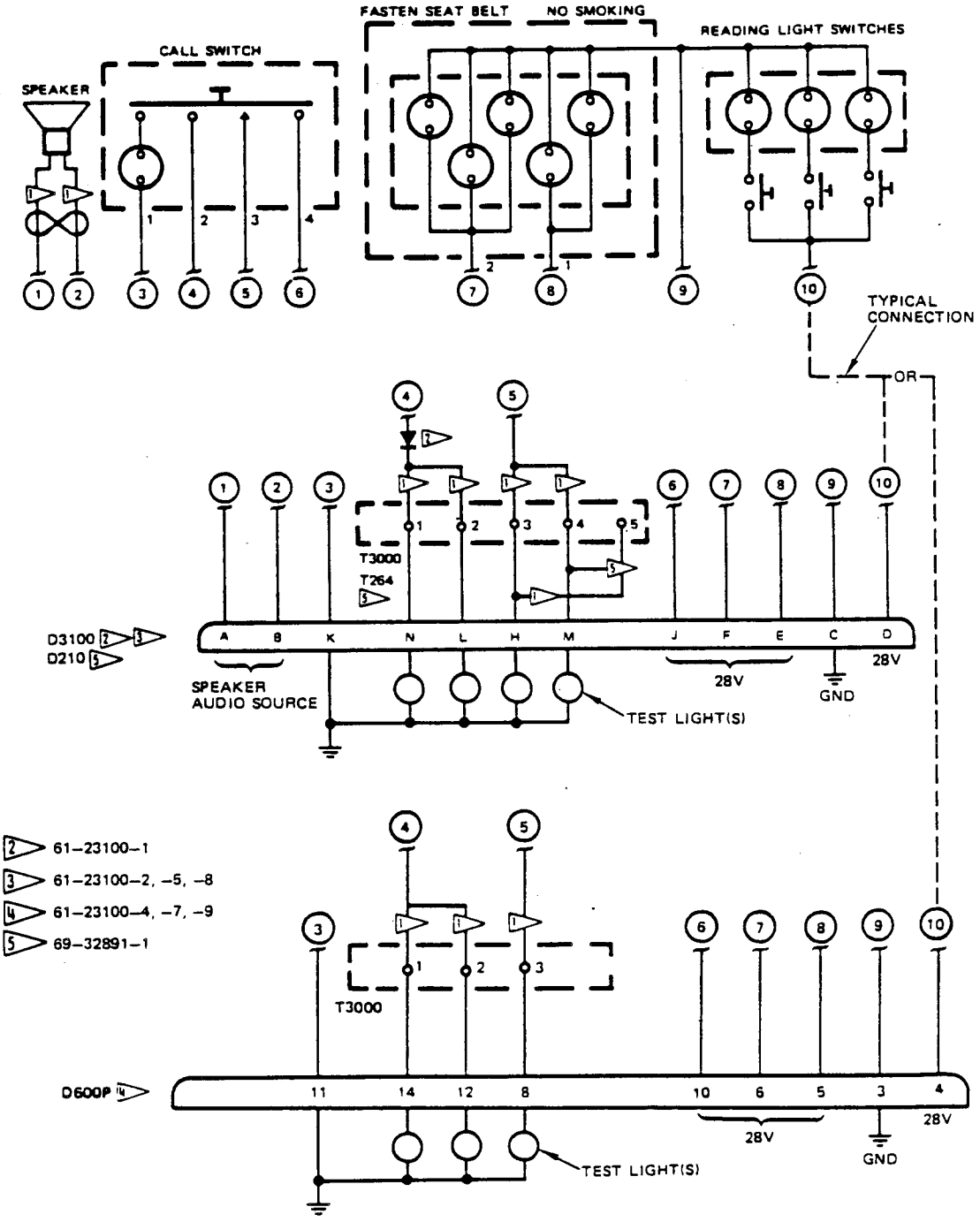


65B54496-1,-3

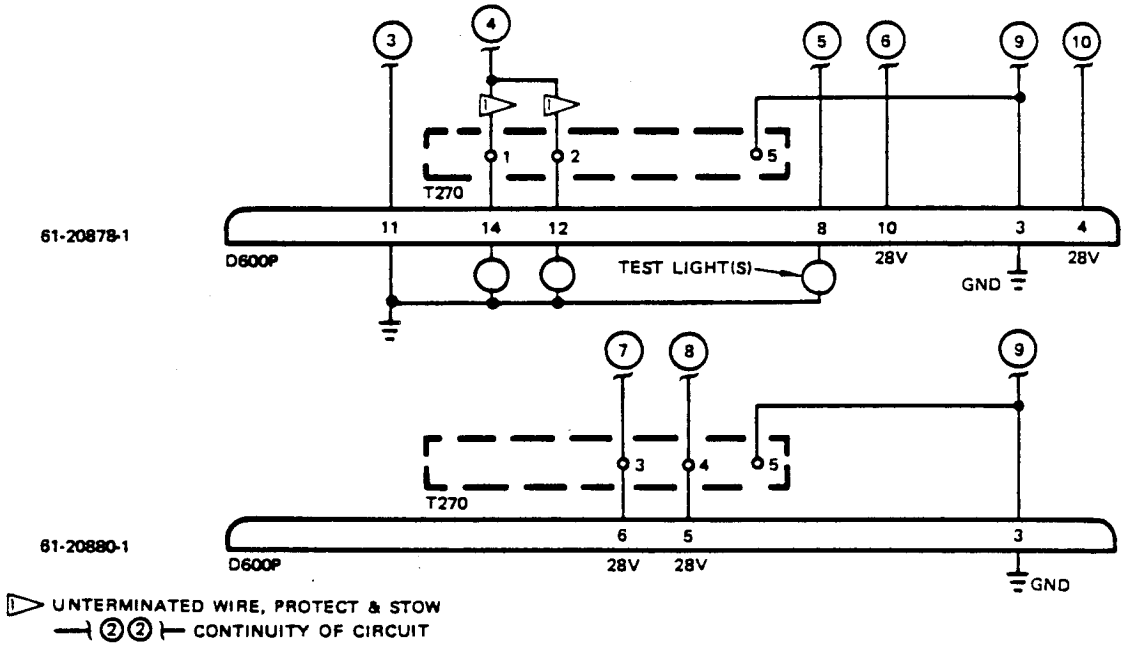
65B50018
FASTEN SEAT BELT AND
NO SMOKING SIGN

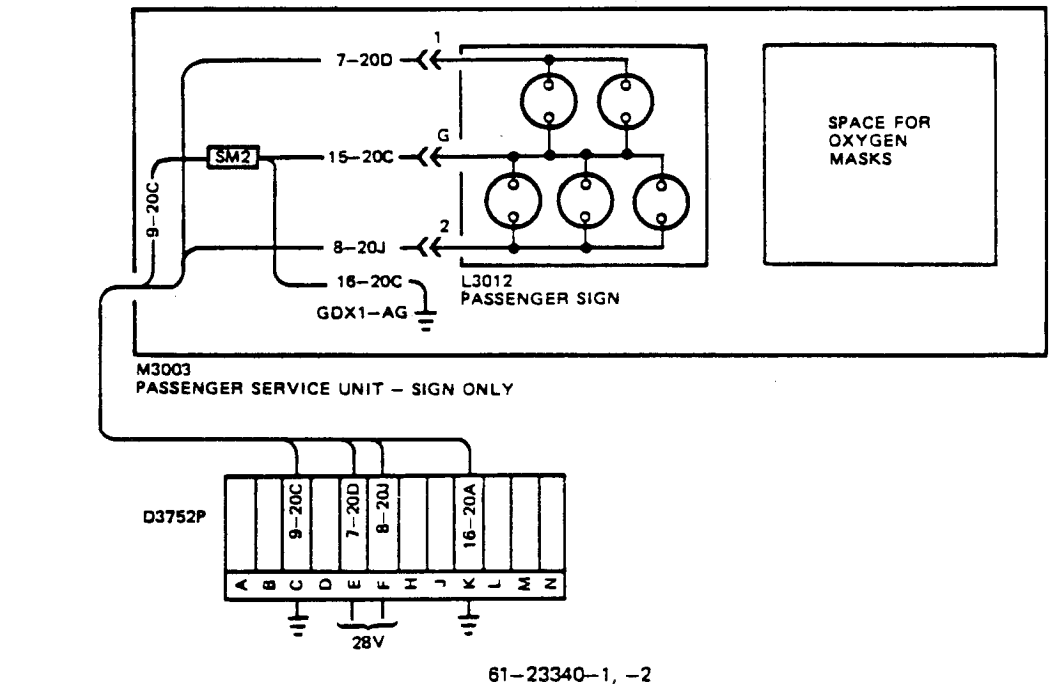


Schematic Diagram
Figure 3 (Sheet 1A)

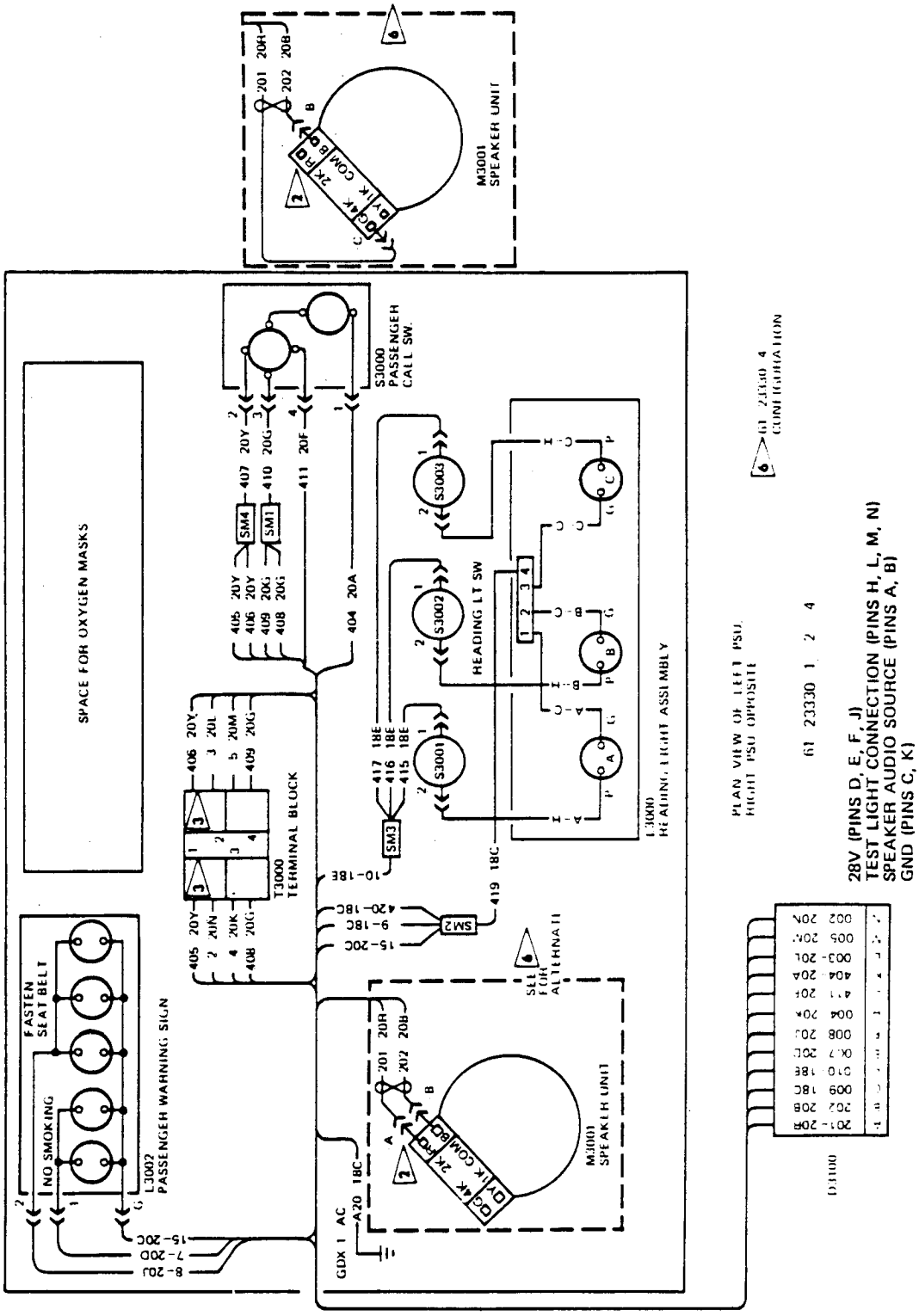


Schematic Diagram
Figure 3 (Sheet 2)

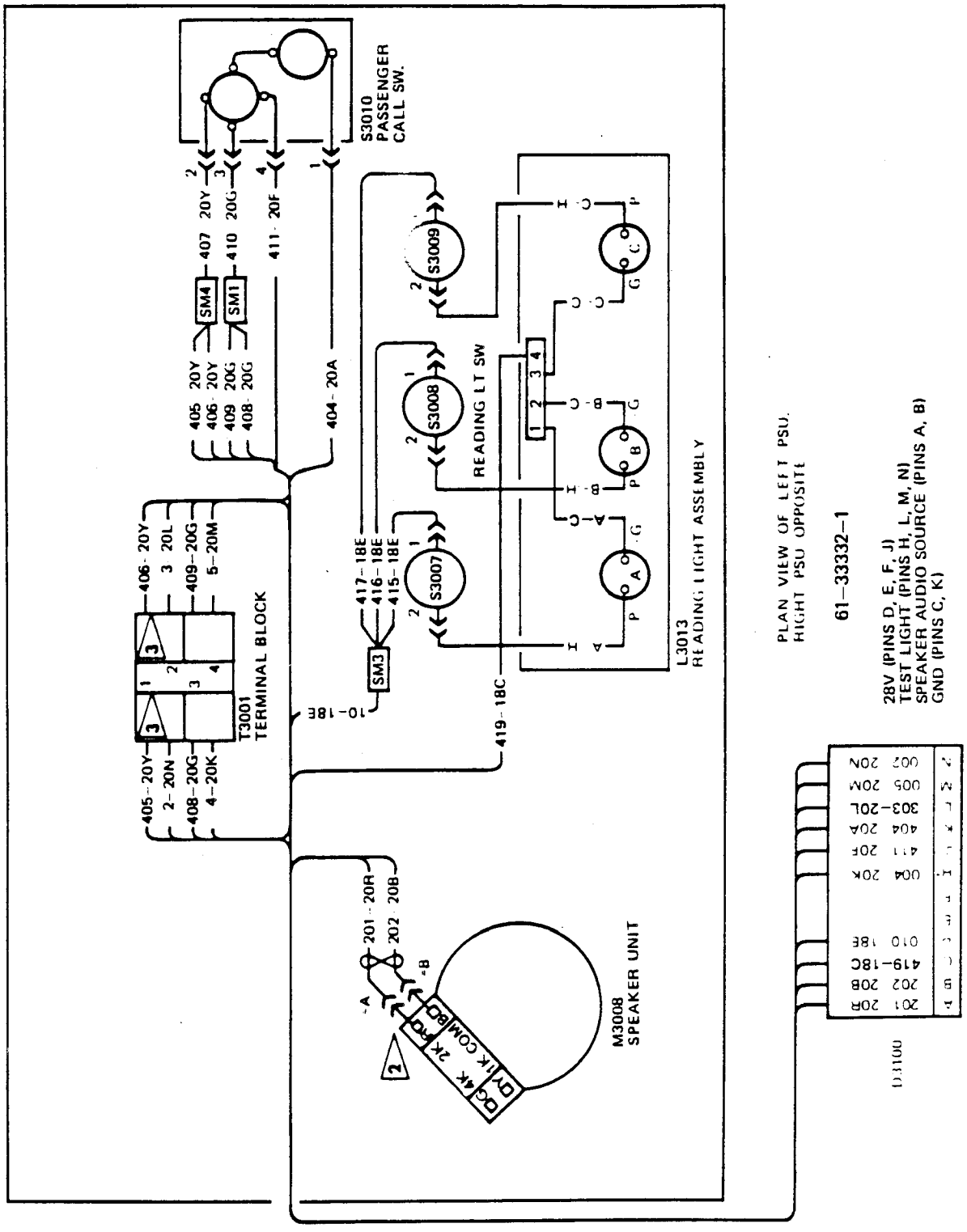

61-20878-1
D600P
T270
TEST LIGHT(S)
28V
GND
61-20880-1
UNTERMINATED WIRE, PROTECT & STOW
CONTINUITY OF CIRCUIT


7-20D
SM2
15-20C
9-20C
8-20J
16-20C
GDX1-AG
L3012
PASSENGER SIGN
SPACE FOR OXYGEN MASKS
M3003
PASSENGER SERVICE UNIT – SIGN ONLY
D3752P
9-20C
7-20D
8-20J
16-20A
28V

61-23340-1, -2



Schematic Diagram
Figure 3 (Sheet 4)



Schematic Diagram
Figure 3 (Sheet 5)

9. STORAGE INSTRUCTIONS

CAUTION: SUCH EXTERNAL ITEMS AS THE LOWER FACE OF THE SHELL, THE PANEL, AND THE OXYGEN MASK DOOR CAN BE SEEN FROM THE CABIN INTERIOR WHEN THE UNIT IS INSTALLED. BE CAREFUL NOT TO DAMAGE SURFACES THE PASSENGERS WILL SEE.

A. Use standard industry practices and the instructions in SOPM 20-44-02 and 20-70-01.

10. VENDORS

V0PK96	Quadtech, Inc., 5 Clock Tower Place, 210 East, Maynard, Massachusetts 01754
V4X685	Hewlett-Packard Co., Instrument Support Div., 301 E. Evelyn Ave., Mountain View, California 94041-1500