

ORGANIZATIONAL AND INTERMEDIATE MAINTENANCE

DESCRIPTION AND PRINCIPLES OF OPERATION

PCU-26/P PERSONNEL PARACHUTE TORSO SUIT HARNESS ASSEMBLY

PART NO. 814AS101-1

AND

HBU-18/A AIRCRAFT SAFETY LAP BELT ASSEMBLY

PART NO. 814AS105-1

List of Effective Work Package Pages

<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>	<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>	<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>	<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>
1 thru 6	10						

Reference Material

Organizational and Intermediate Maintenance, Illustrated Parts Breakdown, PCU-26/P Personnel Parachute Torso Suit Harness Assembly and HBU-18/A Aircraft Safety Lap Belt Assembly WP 007 02

Alphabetical Index

<u>Title</u>	<u>Page</u>
Description	2
Aircraft Applications	2
Aircrew Systems Record	2
Configurations	2
General	2
Functions	2
Ordering and Reporting Information	2

Record of Applicable Technical Directives

None

1. DESCRIPTION.**2. GENERAL.**

a. The PCU-26/P Torso Harness Assembly and the HBU-18/A Lap Belt Assembly are designed for the aircrew to don in the aircraft. An aircrew wearing the harness is attached to the parachute by mating the canopy release body assemblies to the parachute adapter assemblies on the parachute risers, then fastening the HBU-18/A Lap Belt latch and adjusting the webbing strap ends, while seated in the aircraft.

NOTE

The PCU-26/P Torso Harness Assembly and HBU-18/A Lap Belt assembly are exclusively designed for use by the US Navy Blue Angels, flight demonstration aircrew only.

3. AIRCRAFT APPLICATIONS.

a. To provide aircrew and integrated restraint system during flight demonstration and an emergency bailout capability. This configured PCU-26/P Harness and the HBU-18/A Lap Belt is the authorized integrated aircrew system for use by the Blue Angels, aboard the flight demonstration F/A-18 aircraft and shall not be used with any other parachute assembly or aircraft system.

4. CONFIGURATIONS.

a. The PCU-26/P Torso Harness consists of a light-weight, flexible, nylon framework mounted on a nylon vest and utilizing a sectional main sling. There are

three-quick adjustment, two secondary side adjusters, two cinch strap and two canopy release adjustment points (Figures 1, 2 and 3). The HBU-18/A Lap Belt Assembly consist of a medium weight, flexible, nylon webbing sewn to metal hardware and two adjustable attachment straps (Figures 1 and 4).

5. FUNCTIONS.

a. The harness and lap belt must fit the aircrew member properly to provide the required restraint and protection. When aboard the aircraft and seated, the aircrew attaches the canopy release fittings on the parachute risers to the fittings on the harness, fastens the lap belt hardware assembly and then adjusts the adjustable strap ends.

6. AIRCREW SYSTEMS RECORD.

a. Refer to OPNAVINST 4790.2 (series) for filling out the Aircrew Personnel Equipment Record (OPNAV 4790/159).

7. ORDERING AND REPORTING INFORMATION.

a. Commander, Code 461000D, NAVAIRWAR-CENWPNDIV, 1900 N Knox Road Stop 6206, China Lake, CA 93555-6106 is the Cognizance Field Activity (CFA) and point of contact for manufacturing the PCU-26/P Torso Harness, part number 814AS101-1 and HBU-18/A Lap Belt Assembly, part number 814AS105-1.

b. The top assembly configuration part number (814AS101-1 or 814AS105-1) shall be reported when inspection or maintenance is performed, as applicable.

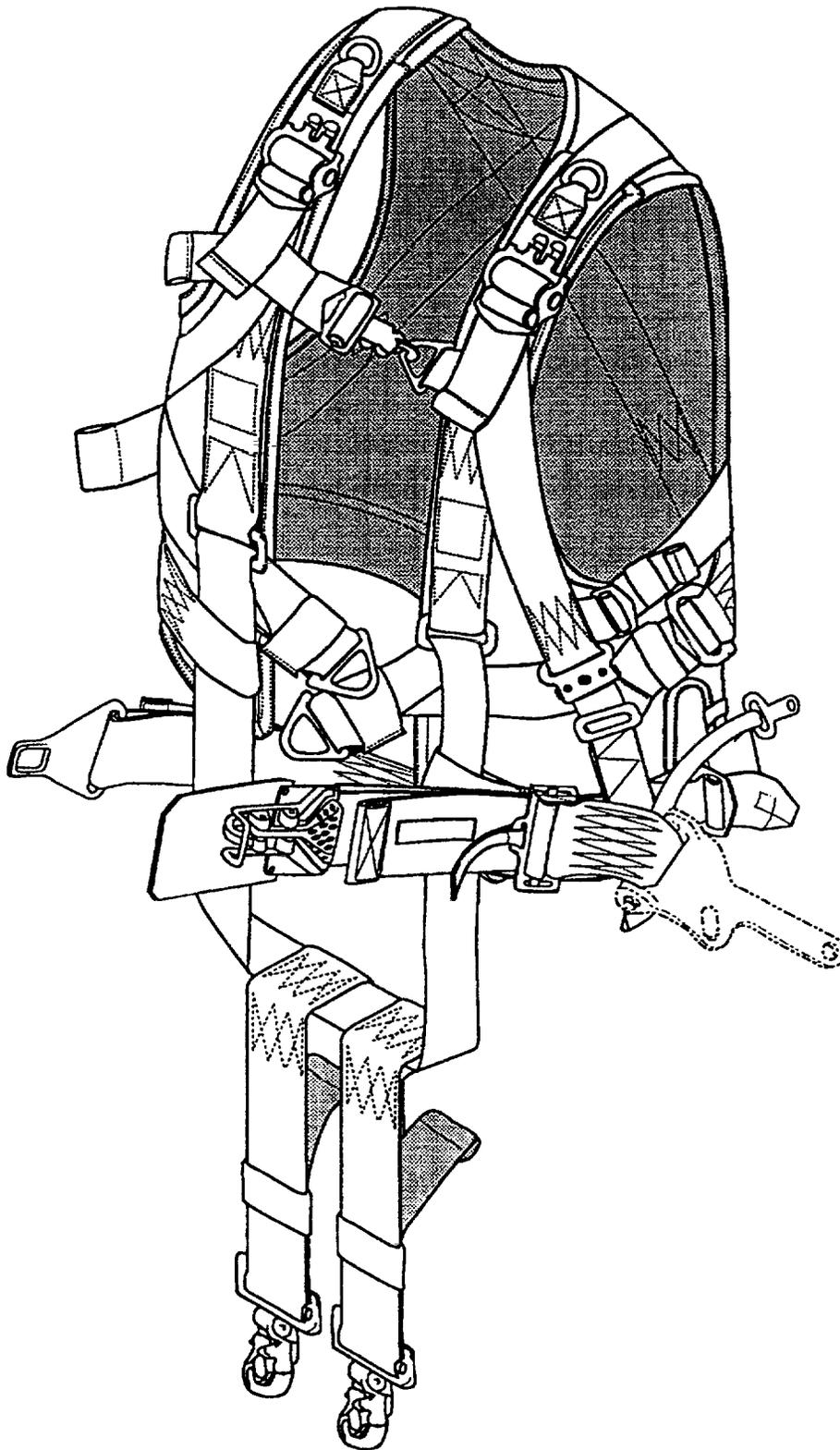
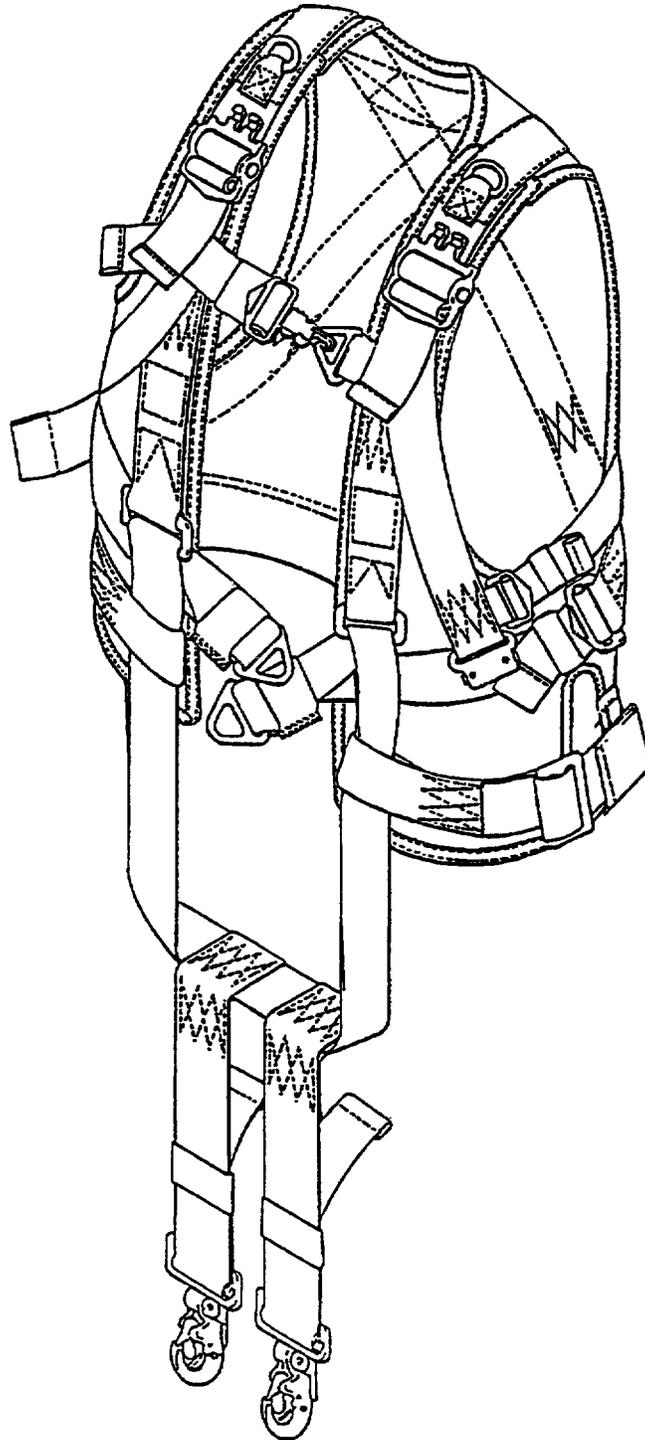


Figure 1. PCU-26/P Personnel Parachute Torso Suit Harness Assembly and HBU-18/A Aircraft Safety Lap Belt Assembly





6.2-260

Figure 2. PCU-26/P Personnel Parachute Torso Suit Harness Assembly (Front View)

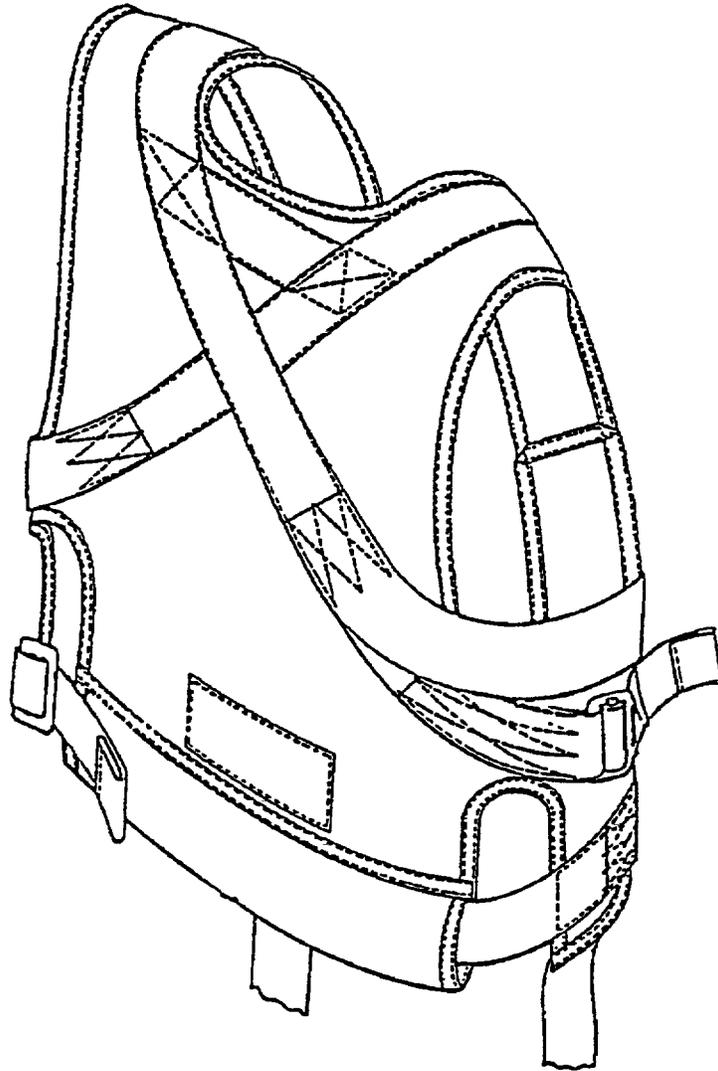
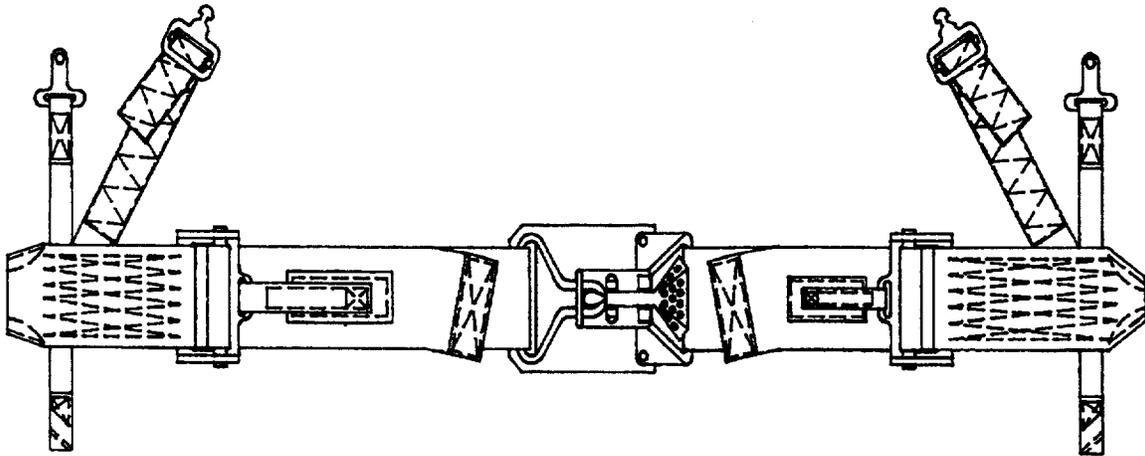


Figure 3. PCU-26/P Personnel Parachute Torso Suit Harness Assembly (Back View)





6.2-261

Figure 4. HBU-18/A Aircraft Safety Lap Belt Assembly

ORGANIZATIONAL MAINTENANCE
INSPECTION AND REPAIR PROCEDURES
PCU-26/P PERSONNEL PARACHUTE TORSO SUIT HARNESS ASSEMBLY

PART NO. 814AS101-1

AND

HBU-18/A AIRCRAFT SAFETY LAP BELT ASSEMBLY

PART NO. 814AS105-1

List of Effective Work Package Pages

<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>	<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>	<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>	<u>Page</u> <u>No.</u>	<u>Chg.</u> <u>No.</u>
1 thru 10							9

Reference Material

Parachute Loft Requirements/Administration	WP 003 00
Support Equipment	WP 005 00

Alphabetical Index

<u>Title</u>	<u>Page</u>
Introduction	2
Application of Markings	2
General	2
Preliminary Procedures	2
Rigging	2
Attachment of Canopy Release Adapter	2
Attachment of LPU-36 Flotation Collar to PCU-26/P	6
Fitting and Adjustment Procedures	4
General	4
Gusset Tear Repairs	5
Harness Inspection	5
Replacement of Chest Strap Ejector Snap	3
Replacement of Elastic Retainer Webbing	4
Replacement of Harness Tacking	4
Replacement of Leg Strap Ejector Snap	3
Service Life Check	5

Record of Applicable Technical Directives

None

1. INTRODUCTION.

2. GENERAL.

a. This work package (WP) contains instructions for organizational level repair and inspection to ensure that the Personnel Parachute Torso Suit PCU-26/P Assembly Harness and HBU-18/A Lap Belt Assembly remains in ready-for-issue (RFI) status.

b. When performing repairs detailed in the WP, refer to these guidelines:

(1) Review all applicable instructions prior to starting repair.

(2) Ensure that all necessary material required and support equipment are available prior to starting repair.

(3) When required, remove enough material from its source for immediate use only. Ensure that material identification ticket/label remains with the source material at all times.

(4) Quality Assurance (QA) points have been included in the procedures. When a procedural step is followed by "(QA)" there is a quality assurance requirement. Witnessing of QA steps may be delayed by QA if their satisfactory completion is verified in later steps.

3. PRELIMINARY PROCEDURES.

a. To prepare the crew restraint harness assembly for original issue proceed as follows:

Support Equipment Required

Part Number	Nomenclature
—	Needle, Sewing
PX-0	Pen, Marking
3233K83 McMaster-Carr 6100 Fulton Industrial Blvd. Atlanta, GA 30336-2852 www.mcmaster.com	Pot, Melting, Electric
—	Screwdriver

Materials Required

Specification or Part Number	Nomenclature
990065-1 -or- 015-710001-1	Adjuster Assembly, Strap

Specification or Part Number	Nomenclature
MIL-L-63460	Cleaner, Lubricant (Breakfree)
MIL-A-9962	Mat, Abrasive
MS22018	Snap Parachute Harness, Quick-Fit Ejector
MIL-S-22473	Sealing, Compound
122-10935-3	Setscrew
H-B-491	Soft Brush
V-T-295	Thread, Nylon, Size E, Type I or II, Class A
V-T-295	Thread, Nylon, Size 6, Type I or II, Class A
PIA-T-5038	Tape, Nylon, Type III, 1-in. Wide, Class 1 or 1A
F-900 Torque Seal (Color Optional)	Sealing Compound
MIL-W-5664	Webbing, Elastic, Cotton, Type I, Class 2

4. APPLICATION OF MARKINGS.

a. When a harness or lap belt assembly is placed in service, the month/year of opening manufacturer's individual shipping container shall be stenciled on the applicable subassembly.

b. Verify correctness of all markings. (QA)

c. Record on Aircrew Systems Record (OPNAV 4790/138), date of manufacture and date placed in service.

5. RIGGING.

6. ATTACHMENT OF CANOPY RELEASE ADAPTER.



Harness webbing must be properly routed thru release adapter.

a. Place canopy release adapter on harness with notch facing outward.

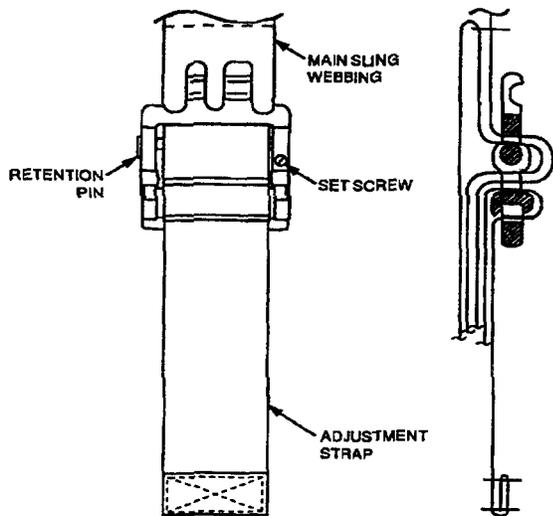
b. Form a loop in adjustment strap and place loop thru adapter from back to front.

WARNING

Insure friction slide bar is correctly installed, the word stamped FRONT will face outboard (same direction as notches).

c. Place friction slide bar thru loop of adjustment strap (word FRONT forward) and turn to an angle to allow insertion into adapter.

d. Form loop in main sling harness webbing, using two forward layers. Place loops thru adapter above adjustment strap loop (Figure 1).



007-01

Figure 1. Attachment of Canopy Release Adapter

NOTE

Setscrew is a one time use item (if a new set-screw is not available reuse of a setscrew shall require application of sealing compound MIL-S-22473 Grade A to threads).

e. Install retention pin and setscrew. (QA)

f. Apply torque seal to screwhead. (QA)

7. REPLACEMENT OF CHEST STRAP EJECTOR SNAP.

a. Remove stitching at end of adjustment strap, using care not to damage webbing.

b. Remove defective ejector snap by unreeving chest strap from adapter and ejector snap.

c. Inspect replacement ejector snap for proper function, corrosion, sharp edges, and damage.

d. Reeve chest strap thru adapter and ejector snap (Figure 2). Ejector snap must be facing wearer.

NOTE

Ensure the ejector snaps are installed so that the latch arm mechanism opens outward.

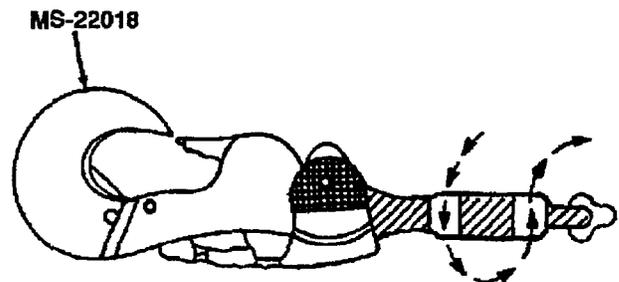
8. REPLACEMENT OF LEG STRAP EJECTOR SNAP.

a. Remove stitching at end of adjustment strap, using care not to damage webbing.

b. Remove defective ejector snap by unreeving leg strap from adapter and ejector snap.

c. Inspect replacement ejector snap for proper function, corrosion, sharp edges, and damage.

d. Reeve leg strap thru adapter and ejector snap. Ejector snap must be facing wearer.



6.2-5412

Figure 2. Leg Strap Ejector Snap Replacement

NOTE

Ensure the ejector snaps are installed so that the curvature of male end conforms to crewmembers torso. Also, verify that the latch arm mechanism opens outward.

9. REPLACEMENT OF ELASTIC RETAINER WEBBING.

- a. Remove damaged elastic retainer from harness.
- b. Cut a 5-in. length of 1-in. wide cotton elastic webbing for retainer. Dip ends in a wax melting pot to prevent raveling.
- c. Fold webbing in half and wrap webbing around harness, and align ends. Sew a row of stitching 1/4-in. from the aligned ends, sewing the entire width of the webbing.
- d. Turn retainer inside out, so ends are on the inside, and slide it into position.

10. REPLACEMENT OF HARNESS TACKING.

NOTE

Tie off all tackings with a surgeon's knot topped with a square knot, followed with a binder knot per WP 002 00. Trim off excess leaving 1/2-in.

- a. Remove damaged tacking from harness.
- b. Hand tack with one turn of size 6 thread, doubled and waxed; tie off. Trim end to 1-in.

11. FITTING AND ADJUSTMENT PROCEDURES.

NOTE

Tie off all tackings with a surgeon's knot topped with a square knot, followed with a binder knot per WP 002 00. Trim off excess leaving 1/2-in.

12. GENERAL.

- a. The harness is designed so that any-one can adjust them. Proper fit, however, depends on knowing how a harness should look and feel as well as how it is adjusted. This is especially important with the torso harness since they are integrated into the upper torso restraint system. To prefit or size the harness means primarily to determine the proper mainsling length for the aircrew torso.
- b. There are three quick-adjustment points. In addition, two secondary adjusters are provided adjacent to the hip links. Normally about 4-in. of the seat sling webbing will extend thru these adjusters.

c. If the user is of very small stature, it may be necessary to extend the seat sling thru these adjusters as much as 8-in. In this event, it may be better to use the smaller size harness. Size adjustment guides are indicated on the mainsling webbing at points near the ends of the sectional seat sling webbing that passes thru the secondary adjusters.

- d. Slip harness over shoulders.
- e. Assume a forward leaning stance.

f. Take up sling adjustment webbing uniformly at each secondary adjuster until seat sling is tight against buttocks. Ensure that size adjustment guides are set identically on both secondary adjusters.

NOTE

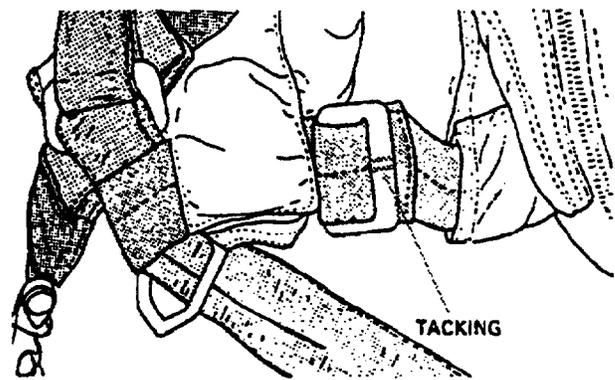
Take particular care to avoid excessive length in the lower sling. If the length is excessive, the sling slides so far under the buttocks that it loosens excessively as the body bends to a seated position and the adjusters are less effective in tightening the sling for best upper torso restraint.

g. Check mainsling, legstraps and hardware for twists and improper positioning.

h. Fasten chest strap and leg straps and adjust as required.

i. Stow all excess webbing ends in elastic keepers provided.

j. Adjust horizontal backstrap webbing so it is snug against lumbar region of back. Route webbing thru buckle, tackings can be made thru two piles of webbing, tack in two places with one turn size 6 thread, doubled and waxed (Figure 3); tie off.



6.2-262

Figure 3. Tacking at Buckle

13. SERVICE LIFE CHECK.

a. The service/total life for the restraint harness and lap belt is 5 years from date it was placed in service or 15 years from the date of manufacture, whichever occurs first.

NOTE

When harness is removed from service, all parachute and lapbelt adapter hardware shall be removed and screened, if still serviceable retain for future use.

b. Check markings for completeness, legibility and agreement with assembly records.

c. Compare configuration of restraint harness assembly to that presented in WP 007 02 Illustrated Parts Breakdown.

14. HARNESS INSPECTION.

a. The Torso Suit Harness Assembly used as in-flight safety/restraint device shall be given a special inspection every 90 days, plus or minus 30 days to coincide with aircraft inspections.

b. Inspect harness webbing for fraying, discoloration, cuts, tears, loose stitching, contamination, and general serviceability.

c. Inspect harness hardware for damage, corrosion, security of attachment, ease of operation, and proper installation.

d. Each harness assembly will have serviceable elastic excess webbing keepers on each chest, back, and leg strap. If keepers are unserviceable or missing, they will be replaced.

e. Life preserver retention system for cuts, rips, frayed or weakened webbing, security of stitching.

f. LPA D-Ring attachment tabs for proper installation, condition and security of attachment.

g. Webbing for cuts, tears, fraying, contamination, deterioration and security of stitching.

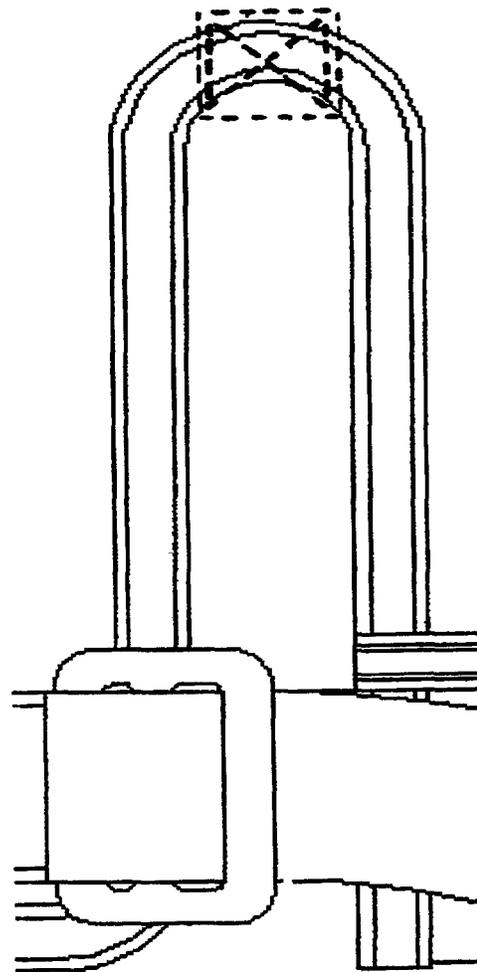
NOTE

When the harness lacks a legible date of manufacture or date place in service and a service/total life check cannot be verified, the harness shall be considered not (RFI) and removed from service.

15. GUSSET TEAR REPAIRS.

a. Cut a length of 1-in. Type III nylon tape, 2-in. long and sear ends.

b. Fold nylon tape in half, place folded material on either side of tear, in gusset and sew with a 1-in. box-X stitch, backstitch 1/2-in. (Figure 4).



6.2-266

Figure 4. Folding of Nylon Tape Around Gusset

16. ATTACHMENT OF LPU-36 FLOTATION COLLAR TO PCU-26/P.

Materials Required

Part Number	Nomenclature
PIA-T-5038	Tape, Nylon Type IV, Class 1 1-in. Wide
PIA-T-5038	Tape, Nylon Type IV, Class 1 1 1/2-in. Wide
PIA-W-4088	Webbing, Nylon Type IV, 3-in. Wide Class 1, 1A, or 2
PIA-W-5664	Webbing, Elastic Cotton, 1-in., Type 1 Class 2
V-T-295	Thread, Nylon Size E, Type I or II Class A
V-T-295	Thread, Nylon Size 6, Type I or II Class A
- or -	
A-A-52080-B-2	Tape, Lacing And Tying Finish B, Size 2, Type I Black
Open Purchase	Bar Slide, Single, 1-in. (See Note) Item Number H2053Quantity (4)

NOTE: Para-Gear Equipment Co., Inc.
3839 West Oakton St.
Skokie, IL 60076-3438
(847) 679-5905
Order Desk Toll Free: 877-272-4327 or
800-323-0437
www.para-gear.com (all lower case)

a. Modification and layout for the attachment of the LPU-36 life preserver.

(1) Lay out torso harness with the outside back surface facing up.

(2) Using a white pencil or equivalent, mark a centerline on the back of the harness.

(3) Mark the intersecting points of the back and shoulder cross straps.

(4) Mark parallel lines both to the left and right of the centerline measuring 3 3/4-in. from the line (Figure 5).

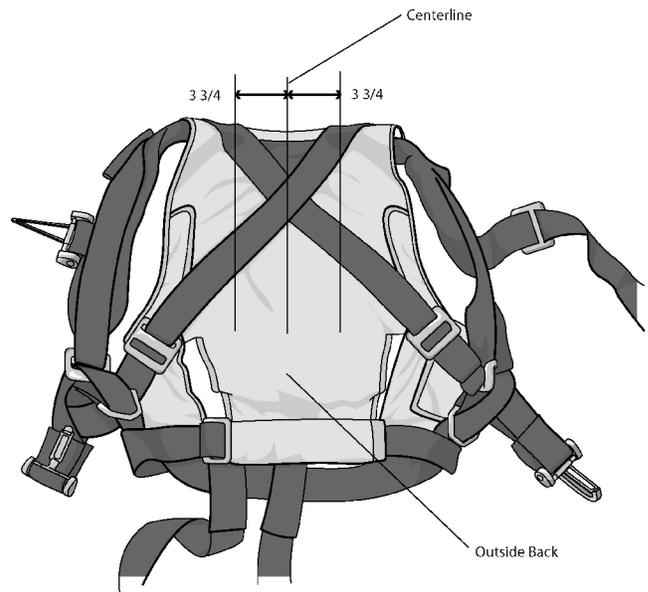


Figure 5. Marking Location of Outer Guide Straps

(5) Turn harness over with the inside back surface facing up.

(6) Using a white pencil or equivalent, mark a centerline on the inside surface.

(7) Mark the intersecting points of the back and shoulder cross-straps.

(8) Mark parallel lines both to the left and right of the centerline measuring 3 3/4-in. from the line (Figure 6).

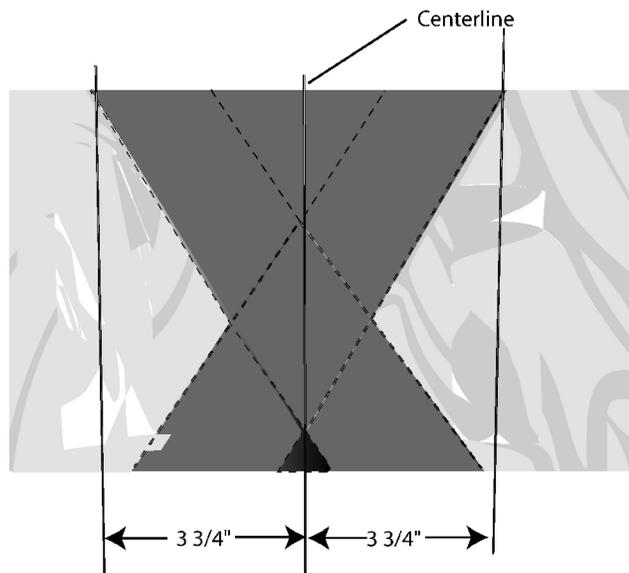


Figure 6. Marking Location of Inside Reinforcement Patches

(9) Measure and sear cut four pieces of nylon tape (PIA-T-5038, Type IV, Class 1A, 1 1/2-in. wide) 4 3/8-in. long.

(10) Using a white pencil or equivalent, mark a centerline (3/4-in. on center) through the length of each piece of nylon webbing.

(11) Position the harness with the outside back facing up.

(12) Position the centerline of back strap guide on the layout mark, with the inboard corners approximately touching the harness webbing (Figure 7).

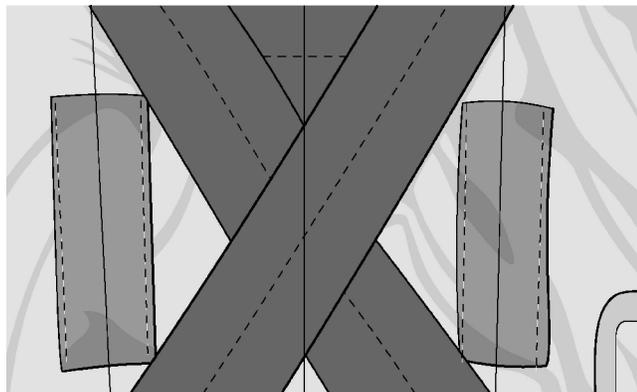


Figure 7. Location of Back Strap Guides

(13) Sew down the edges of the back strap guide. Leaving the top and bottom open, repeat for other side.

(14) Lay torso harness with the inside of the back facing up.

(15) Position the centerline of two reinforcement patches on the layout marks, sew down the edges of the back strap reinforcement patch. Ensure that reinforcement patches are located in same position as the back strap guides on the back of the harness (Figure 8).

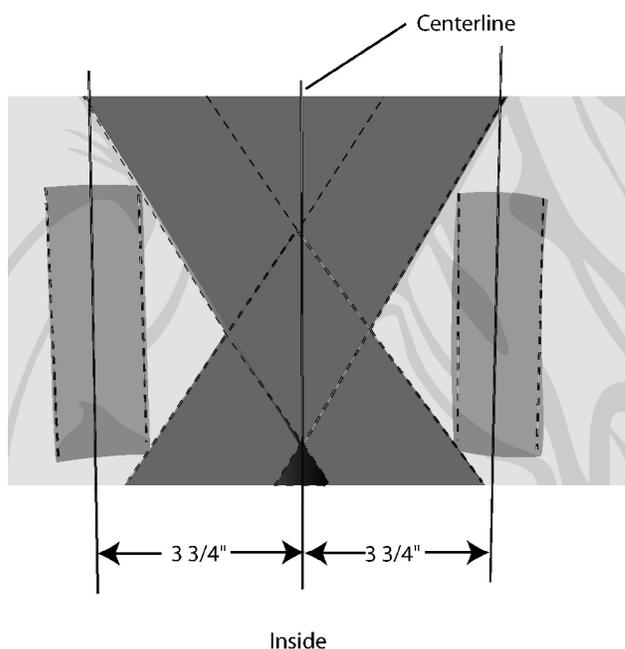


Figure 8. Attachment of Reinforcement Patches

(16) Measure and sear cut 4 pieces of 1-in. wide nylon webbing (PIA-T-5038, Type IV, Class 1A) 4-in. long.

(17) Route a piece of nylon webbing around the center bar of a single bar slide, aligning the seared ends of the webbing.

(18) Sew a tack stitch 1/8-in. from the aligned ends on each bar slide sub-assembly.

(19) Using a white pencil or equivalent, mark a centerline (1/2-in. on center) through the length of each piece of nylon webbing (Figure 9).

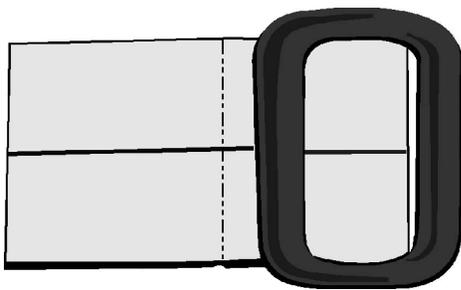


Figure 9. Single Bar Slide

(20) With the outside back facing up, align the centerline of the single bar slide assemblies with the centerline of the back strap guides. Sew in place approximately as shown in Figure 10.

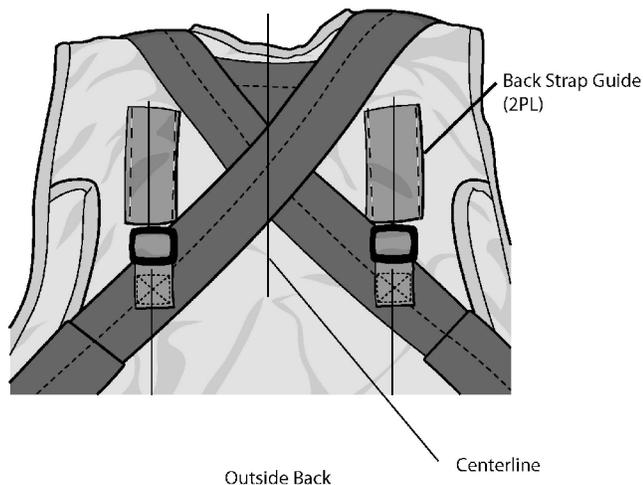


Figure 10. Attachment of Single Slide Bars

(21) Sear cut 2 pieces of 3-in. webbing 3 1/2-in. long.

(22) Fold length wise, creating the shoulder strap guide.

(23) Measure 2 1/4-in. up from the chest strap and sew shoulder strap guide to binding tape of harness garment (Figure 11).

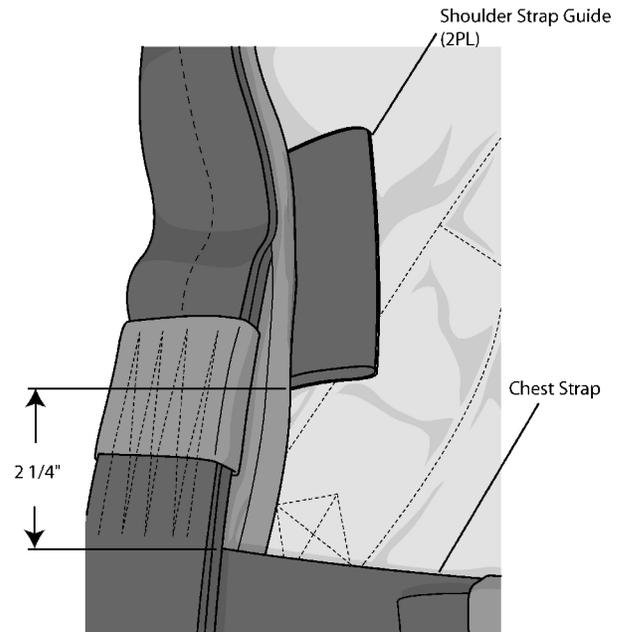


Figure 11. Attachment of Shoulder Strap Guides

(24) Repeat procedure on other side.

(25) On front of harness measure and mark 5-in. up from harness D-Ring, repeat for other side.

(26) Slightly angle (approximately 30 degrees) the front lower single bar slides with the inside corner of the webbing on the 5-in. mark. Sew in place with a 3/4-in. box X stitch (Figure 12).

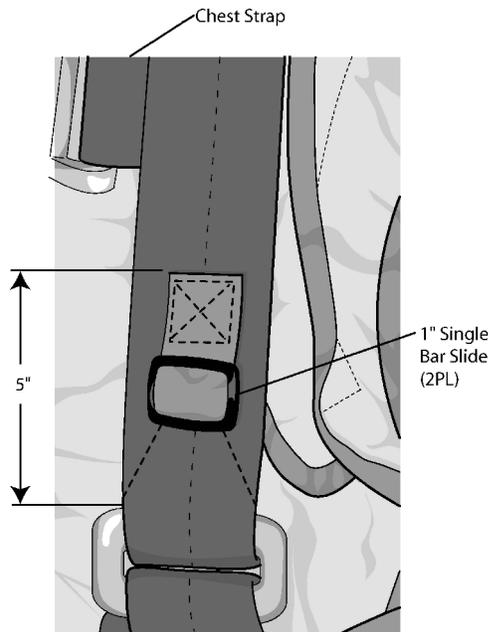


Figure 12. Attachment of Front Lower Single Slide Bars

(27) Cut one piece of 1-in. elastic webbing 4 1/2-in. long.

(28) Wrap elastic retainer around harness webbing on right side, above D-Ring but below single bar slide.

(29) Align edges of elastic webbing and sew 1/8-in. from the edge.

(30) Turn elastic webbing inside out, placing seam on inside (Figure 13).

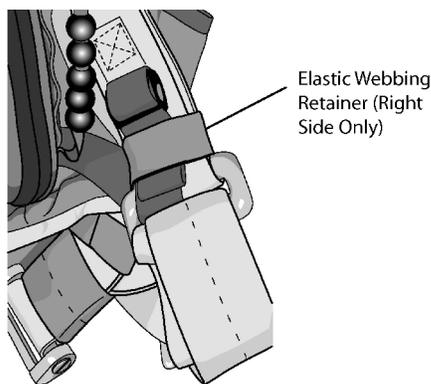


Figure 13. Elastic Retainer Webbing

b. Attachment of the LPU-36 to the PCU-26 torso harness.

(1) Align the LPU-36 with the top of the PCU-26 harness with harness front down and collar label up (Figure 14).

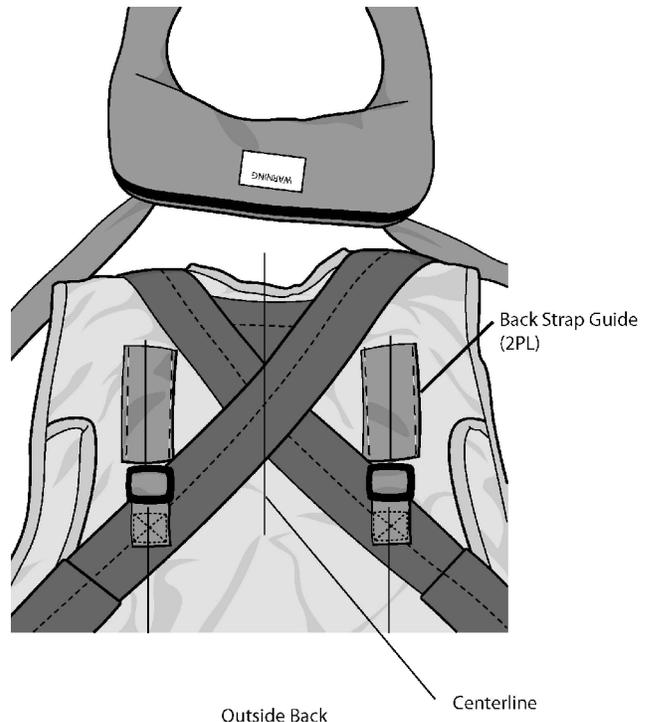


Figure 14. LPU-36 Layout

(2) Using a packing fid or equivalent, thread left hand LPU-36 strap through left back guide strap. Pull the left strap LPU-36 until grommet on preserver is tight against back guide strap (Figure 15).



Figure 15. LPU-36 Back Attachment

(3) Route through single bar slide as shown (Figure 16).

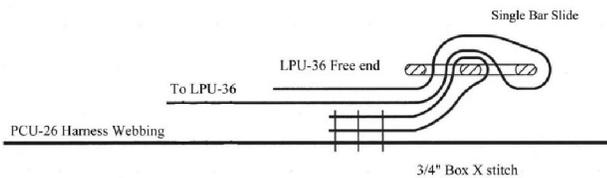


Figure 16. Single Bar Slide Routing

(4) Repeat for right side.

(5) Turn harness over. Unsnap left attachment strap on LPU-36. Using a fid or equivalent, route attachment strap up through shoulder strap guide and re-snap.

(6) Repeat for right side.

(7) Attach lower left hand attachment strap of the LPU-36 by routing the strap from the inside, through D-ring (Figure 17).

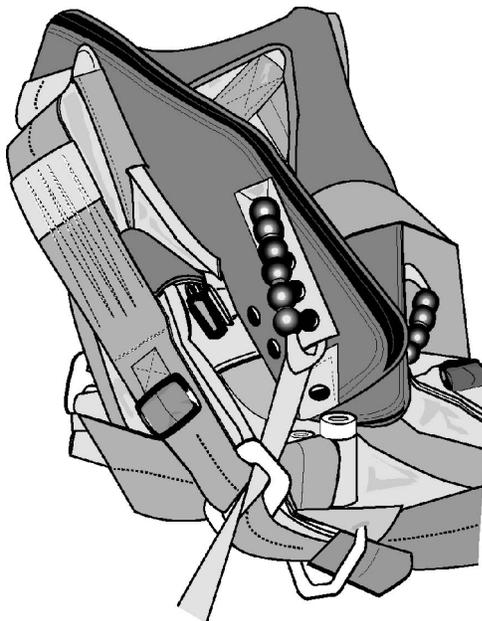


Figure 17. LPU-36 Front Attachment Strap Routing

(8) Route through single bar slide as shown in (Figure 16). Leave slack in strap. This will be adjusted during fitting of the harness/LPU-36.

(9) Repeat for the right side.

c. Fitting of the LPU-36 to aircrew.

(1) Have aircrew don harness and adjust harness for proper fit.

(2) Adjust the length of the left side front LPU-36 attachment strap until all slack is removed. The attachment strap should be snug but not tight.

(3) Repeat for right side.

NOTE

A properly fitted life preserver should not interfere with helmet or the aircrew's ability to move head/neck in the full range of motion. Adjust as necessary.

(4) Carefully remove harness from aircrew without disturbing the four adjustment straps.

(5) Using a curved needle, tack the four adjustment webbings with one turn of 6 cord or lacing tape single. Tacking shall pass from the back of single bar slide and up through all layers of strap and back down through. Knots will be on the inside, towards harness webbing. Do not pierce harness. Tie off with a surgeons knot followed by a square knot, trim ends.

(6) Fold and stow excess strap under elastic keepers on right side.

(7) On the left side, fake excess webbing and tack both ends.

ORGANIZATIONAL AND INTERMEDIATE MAINTENANCE
ILLUSTRATED PARTS BREAKDOWN
PCU-26/P PERSONNEL PARACHUTE TORSO SUIT HARNESS ASSEMBLY
PART NO. 814AS101-1
AND
HBU-18/A AIRCRAFT SAFETY LAP BELT ASSEMBLY
PART NO. 814AS105-1

List of Effective Work Package Pages

<u>Page No.</u>	<u>Chg. No.</u>						
1	10	2 thru 4	9	5	10		

Reference Material

Organizational and Intermediate Maintenance Description and Principle of Operation, PCU-26/P Personnel Parachute Torso Suit Harness Assembly, and HBU-18/A Aircraft Safety Lap Belt Assembly WP 007 00

Alphabetical Index

<u>Title</u>	<u>Page</u>
Introduction	1
Usable On Codes	1

List of Figures

<u>Title</u>	<u>Page</u>
PCU-26/P Personnel Parachute Torso Suit Harness Assembly	2

Record of Applicable Technical Directives

None

1. INTRODUCTION.

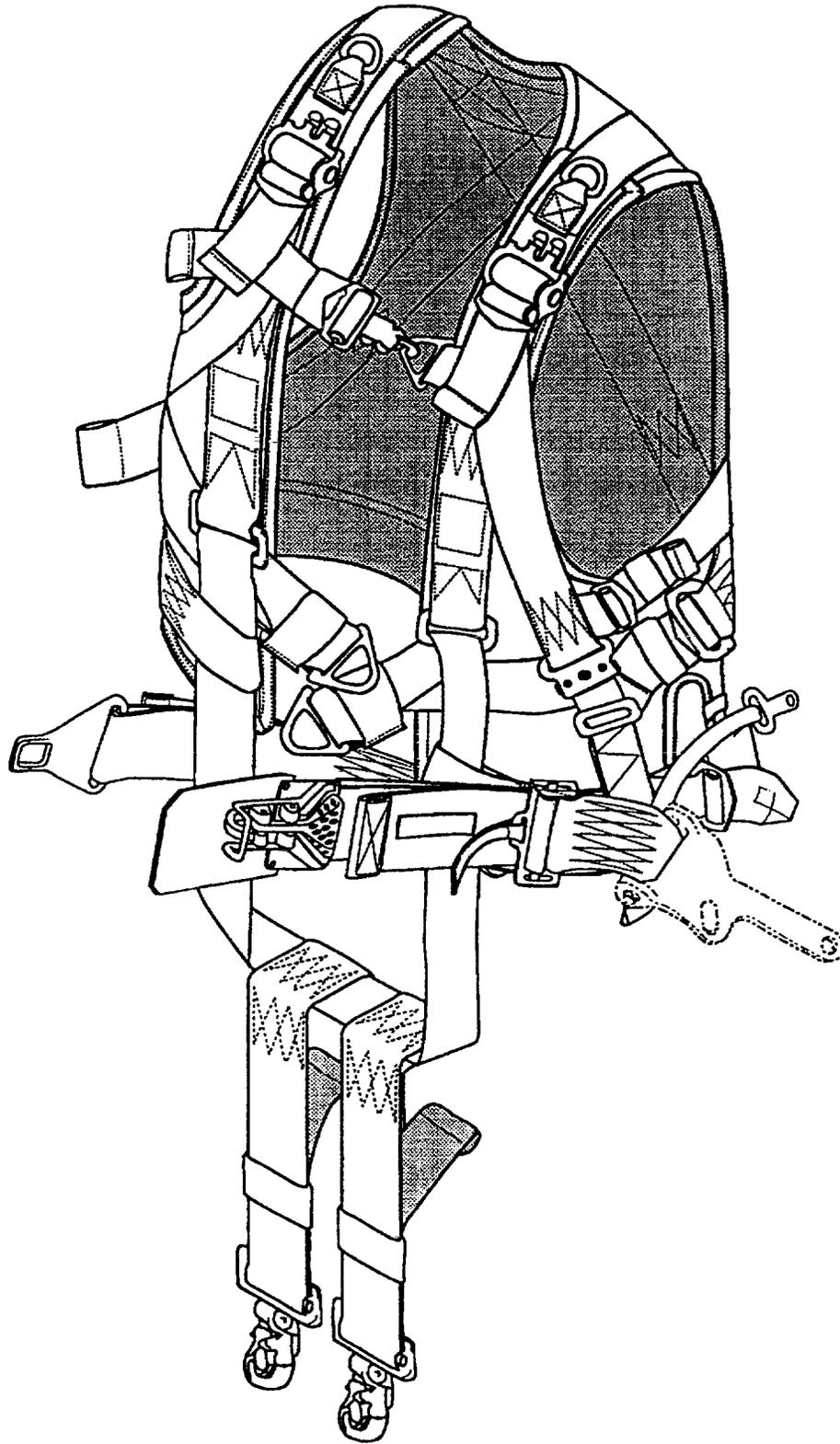
a. This Work Package (WP) contains information for ordering and indentifying parts for the PCU-26/P Parachute Restraint Harness and HBU-18/A Aircraft Safety Lap Belt (Figure 1).

b. The following usable on code apply to this WP.

A - F/A-18A/B (Blue Angels Only)

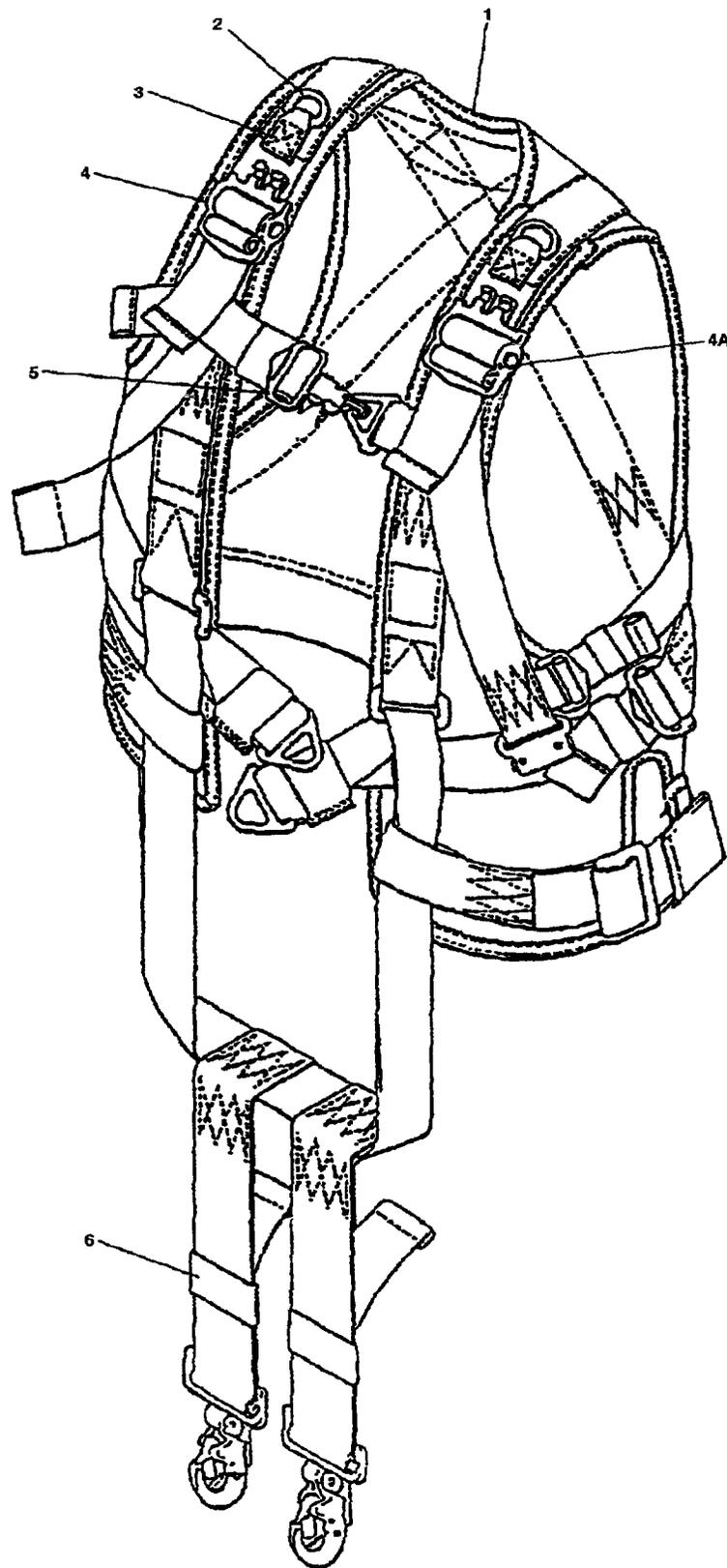
2. USABLE ON CODES.

a. The usable on codes in this WP refer to aircraft application for the Parachute Restraint Harness and Lap Belt.



6.2-263

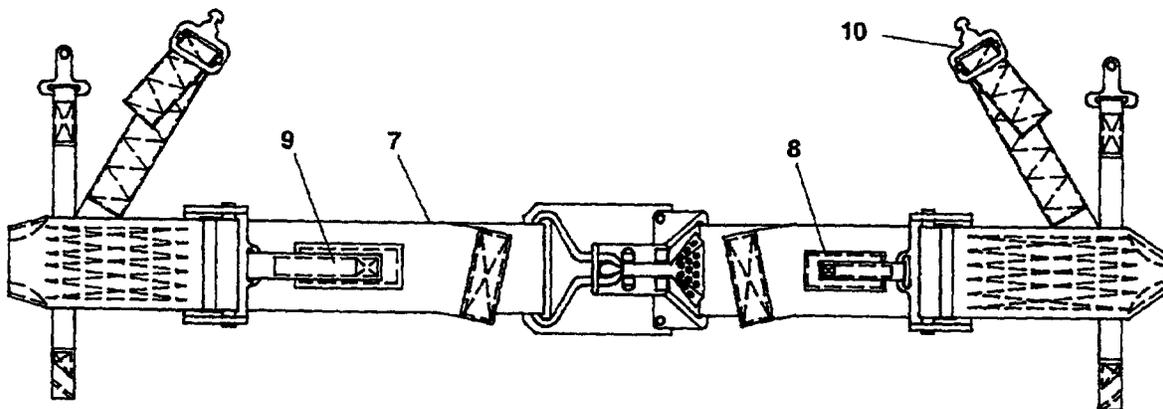
Figure 1. PCU-26/P Personnel Parachute Torso Suit Harness Assembly (Sheet 1 of 4)



6.2-264

Figure 1. PCU-26/P Personnel Parachute Torso Suit Harness Assembly (Sheet 2 of 4)





6.2-265

Figure 1. PCU-26/P Personnel Parachute Torso Suit Harness Assembly (Sheet 3 of 4)

INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USABLE ON CODE	SM&R CODE
		1	2	3	4	5	6	7			
1	814AS101-1	.	.	.	.	.	.	.	2	A	PFOOO
2	814AS101-22	.	.	.	.	.	.	.	2		PAGZZ
3	814AS101-15	.	.	.	.	.	.	.	2		MGOOO
4	990065-1	.	.	.	.	.	.	.	2	*	PAOGG
	015-710001-1	.	.	.	.	.	.	.	2	*	PAOGG
											RELEASE
4A	122-10935-3	.	.	.	.	.	.	.	2		PAOGG
5	MS22018	.	.	.	.	.	.	.	3		PAGZZ
											QUICK FIT EJECTOR
6	814AS101-19	.	.	.	.	.	.	.	7		MGOOO
7	814AS105-1	.	.	.	.	.	.	.	1		PFOOO
8	676AS100-1	.	.	.	.	.	.	.	2		PAGZZ
9	814AS105-10	.	.	.	.	.	.	.	2		PAGZZ
10	MBEU69389	.	.	.	.	.	.	.	2		PAGZZ

NOTE: 1. Not a Stock Item.

Figure 1. PCU-26/P Personnel Parachute Torso Suit Harness Assembly (Sheet 4 of 4)

THIS PAGE INTENTIONALLY LEFT BLANK.