

# General Canopy Folding and Packing Instructions

## for H-X Series™ Personnel Parachute Canopies

Manufactured by Butler Parachute Systems, Inc.  
 Issued 24 July 1998

This set of instructions is for the routine maintenance of all H-X Series personnel parachute canopies manufactured by Butler Parachute Systems, Inc. and for the normal flaking, folding and line stowage of Butler canopies equipped with a BPS deployment diaper in the P/N 103 series. The H-X Series Canopies utilize the BAT Sombrero Slider™ (patent pending) which is a major advancement in parachute technology. Most of what you will see is routine. However, we do utilize a slightly different method to flake and fold the skirt. We also require that a break tie be used to tie the lowest bight of the suspension lines to the pack tray and that a break tie be used to form a loop to keep the pilot chute bridle centered on the vent lines. Further, we use an "incremental tear-strip bridle" which must be properly assembled and packed. None of our parachute canopies have been tested without these features and we feel that they each add a small increment of reliability to our parachutes (and to any other round parachute for that matter).

All H-X Series personnel parachute canopies manufactured by Butler Parachute Systems, Inc. have been approved under TSO C23d with limitations appropriate to the particular canopy size. All canopies manufactured by Butler Parachute Systems, Inc. will have a warning stamped on the data panel similar to the one shown here. This data must be shown on the packing data card and on the outside of the pack for items approved under TSO C23d in any category.

### WARNING!!!

Canopy Model	Nominal Diameter (ft)	# of Gores	Surface Area (ft <sup>2</sup> )	Canopy Weight (lb)	Manufacturer's Recommended Maximum Limits	FAA TSO C23d Certificated (USA) Maximum Limits	Demonstrated Overload Test @180 KEAS	O
HX-300	19.56	16	300	5.8	174 lb. @ 165 KTAS	250 lb. @ 150 KEAS	300 lb.	
HX-400	22.58	18	400	6.4	236 lb. @ 190 KTAS	340 lb. @ 170 KEAS	408 lb.	
HX-500	25.23	20	500	7.9	306 lb. @ 190 KTAS	440 lb. @ 170 KEAS	528 lb.	
HX-600	27.64	22	600	9.1	382 lb. @ 190 KTAS	550 lb. @ 170 KEAS	660 lb.	

Note: The manufacturer's maximum recommended weight and speed limitations may be applied in the absence of any regulatory requirements (i.e. outside the USA). In the US, the FAA C23d limits must be used.

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## General Information for the Parachute Rigger

Butler Parachute Systems, Inc. spares no effort in making the finest emergency parachutes available; however, parachute riggers in the field must also do their part to educate the users so that they may benefit fully from the advantages that this system offers. In addition, the parachute rigger has a moral responsibility to the user of a parachute to aid that person in understanding his parachute and its use. It is suggested that you review the basic procedures contained in the owner's manual with the customer and answer any questions he may have concerning the use, care and maintenance of this assembly. It is also suggested that you require the customer to actually pull the ripcord himself before each repack.

## **Maintenance and Repairs**

All routine maintenance and minor repairs that do not affect airworthiness may be performed by any FAA Licensed Senior Parachute Rigger (or foreign equivalent) with the proper facilities and equipment.

### **CAUTION**

**Any components requiring major repairs or alterations that may affect airworthiness must be returned to the manufacturer**

## **Closing Loop Length**

All BPS packs use adjustable soft closing loops. In general, the closing loops should be short enough to fully compress the pilot chute and keep it firmly in place. This not only ensures that the spring will get a good solid launch, but it will also keep the spring from shifting off center. For an initial assembly of a parachute, the force to pull the loops up and insert the pins can be quite high and still result in a pull force within limits (15 for chest packs and 22 lb. for all others) after several days. This is because the pack tray area where the loops are attached changes shape under the tension from the loops, allowing the loop tension (and thus the pull force) to drop off. This effect only occurs after the initial assembly and packing or an extreme increase in the loop tension. Closing loops must be replaced with 225 Dacron/Polyester braided cord only. No other type of closing loop material is authorized! Please contact Butler Parachute Systems for replacement cord.

**NOTE: It is the rigger's responsibility to ensure that ripcord pull force meets the requirements.**

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## **Tools Required for General Inspection & Packing**

- 2 or 3 ea. pull-up cords 36" long; made from MIL-C-5040, Type 3, sheathing only
- 2 or 3 ea. temporary pins with safety flag
- 4 to 6 packing weights; minimum weight 1 lb.
- 1 ea. line separator
- 1 ea. packing paddle
- 1 ea. tacking needle with waxed 6-cord or equivalent

- 2 ea. fabric clamps per Parachute Industry Association Technical Standard 108 (PIA TS 108)
- 1 ea. spring scale per PIA TS 108
- 80# Break Tape per MIL-T-5661, Type 1, 1/4"

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## General Inspection and Packing Procedures for Butler Parachute Systems H-X Series™ Parachute Canopies

These instructions assume that the parachute has already been inspected and assembled in accordance with the appropriate instructions which are issued for each type. Throughout these packing instructions the pack tray and the harness are oriented with the wearer face down, head toward the apex of the canopy. Inspect the following items prior to packing: Record serial number, date of manufacture and manufacturer of all components.

- Check layout and line rotation. Line #1 and its next adjacent line going counter-clockwise (#1 & 24 for example) are on top with the center mesh vent on top when laid out correctly. Perform a standard "4-line check" as a minimum.
- Pilot Chute - snags, spring, solid ferrules, cloth and mesh in good condition.
- Incremental Bridle - inspect as noted in Figure 1.
- Apex - lateral band, straighten vent hem.
- Canopy - radial seams and cross seams, general condition.
- Perform a 40# strength test on MIL-C-44378, Type 1 Cloth using the methods of PIA TS 108 in randomly selected location. Mark test location with date and rigger symbol or loft ID.
- Lower lateral band - skirt hem, line attachments.
- Suspension lines - snags, kinks, stitching.
- Connector links - general condition, threads not exposed, barrel nut tight.
- Risers - general condition.
- Cross connectors - if required, present and good condition, proper orientation.

**NOTE: When inspecting the connector links, ensure that all Rapide Brand Links actually have the name**

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## Introduction

Lay the parachute assembly on the packing table as though the wearer were fastened in the harness, face down, with their head towards the canopy. Release all fasteners, snaps, hardware, Velcro, and tackings on the container so that the assembly lays flat on the table. Stretch out the canopy and ensure that the back center gore (with mesh) is on top. See the table below for the proper gore. Once you are certain of proper orientation, apply adequate tension between the apex and connector links to hold the canopy and suspension lines taut for packing. Having done so, grab the skirt of the slider and pull it 3 to 4 feet towards the connector links.

CANOPY	BACK CENTER GORE
H-X 300	16
H-X400	18
H-X 500	20
H-X 600	22
H-X 500/24	24

Figure 1. Straighten the apex and vent lines. Tie a 15" piece of 80# cotton break cord around the vent lines 4" to 6" from the top. Pull this as tight as you can without breaking the tape, and tie off with a surgeon's knot and locking knot. Trim the tail to 1".

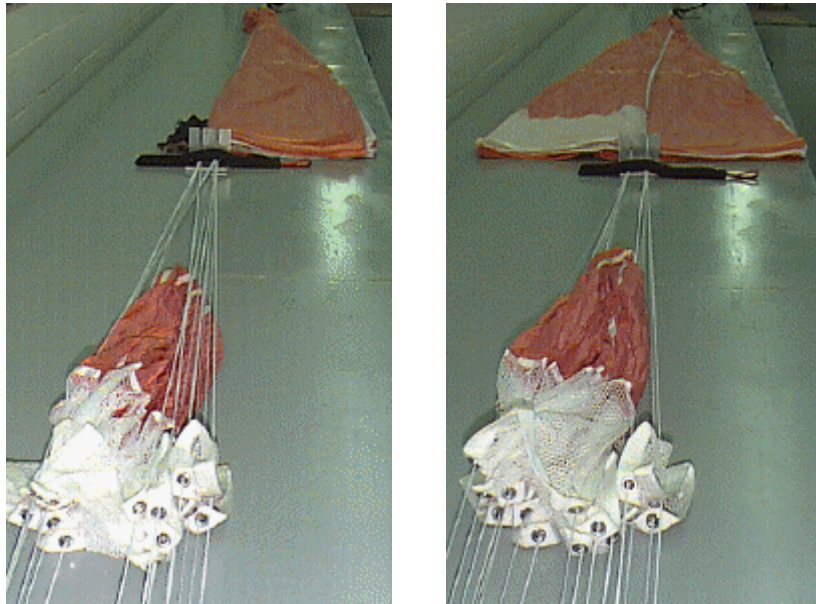
Note: This break tie serves to keep the pilot chute bridle centered on the vent lines during deployment and **MUST** be installed. The parachute has not been tested without this tie installed.

The H-X series canopies utilize a breakaway/incremental pilot chute bridle consisting of the main (channel) bridle, and the incremental bridle.

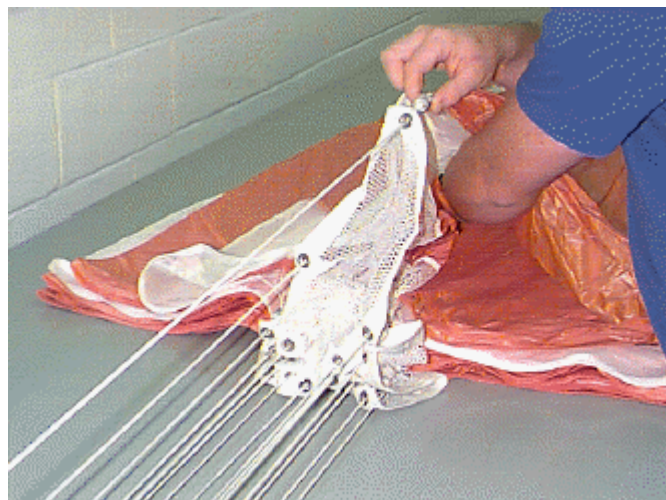
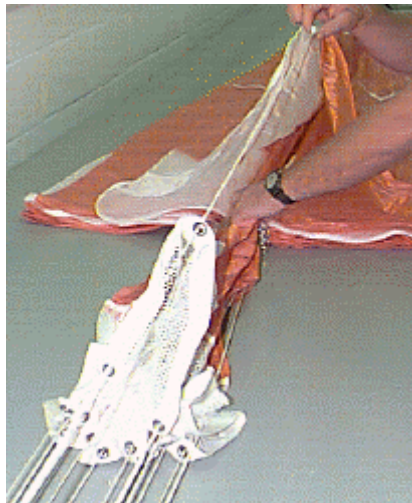
- a. The top end of the channel bridle is attached to base of pilot chute and bar tacked in three places;
- b. The bottom end of channel bridle is formed into a small loop and bar tacked in three places;
- c. One end of the incremental bridle is routed through vent lines and double bar tacked;
- d. One end of the incremental bridle is routed through the small loop of channel bridle and double bar tacked;
- e. One 8" piece of 1/2" type 3 nylon is routed through apex lines and small loop of channel bridle. Tie with a surgeon's knot and locking knot with safety knots.



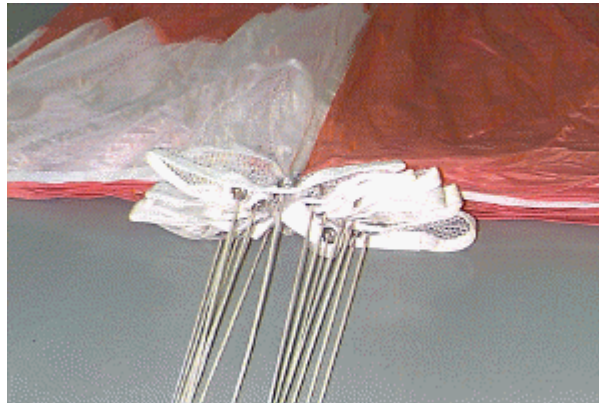
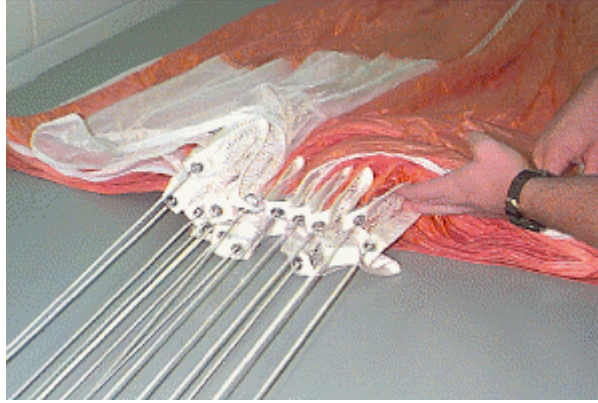
**Figure 2. Perform a continuity check to ensure proper routing of the suspension lines through the slider and rotation on the connector links.**



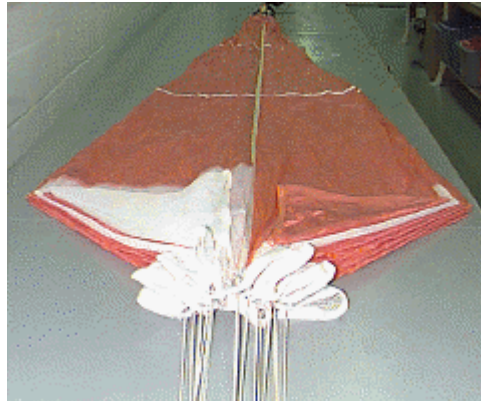
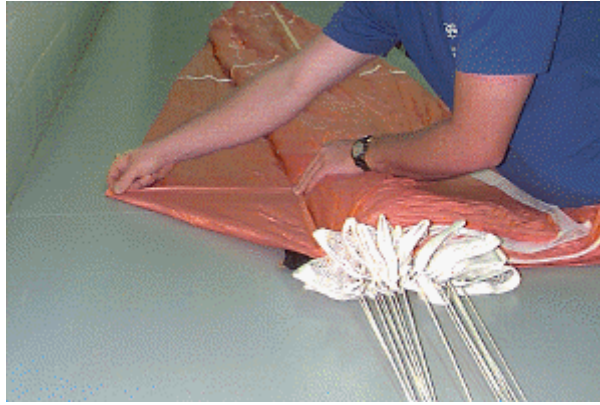
**Figures 3 & 4. Flake the canopy in the usual manner, then lay the canopy on the table with an equal amount of gores on each side. This will leave the back center gore (with mesh) on top.**



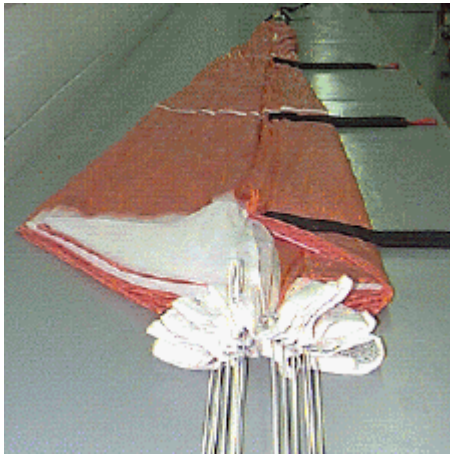
**Figures 5 & 6. Holding the apex of the slider in one hand and the suspension line of the top center gore in the other, place the slider into the wind channel of the canopy, ensuring the grommets on the slider are against the slider stops on the suspension lines.**

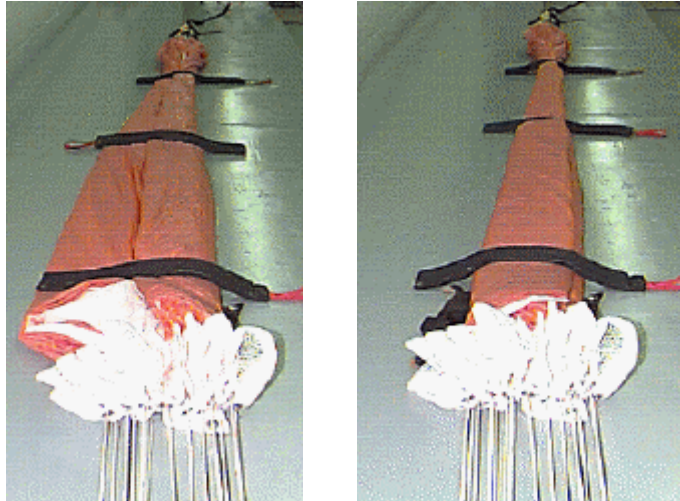


**Figures 7 & 8. After inserting the slider into the main canopy, flake each gore of the slider into the corresponding gore of the canopy.**

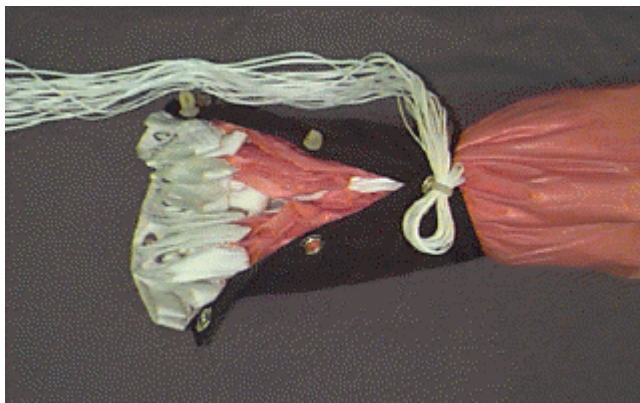
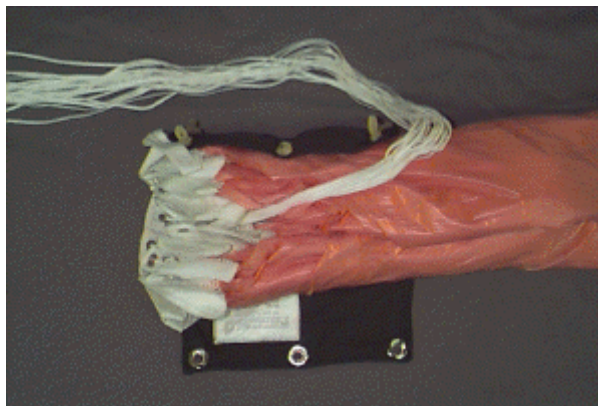


**Figures 9 & 10. Fold each individual gore of the canopy 90 degrees, placing the skirt of each gore parallel to the radial seam.**





Figures 11 thru 14. Long fold the canopy into fifths. The first folds should generally be to the center without overlap, with the second folds overlapping completely. The width of the folds may be adjusted at the riggers discretion above the diaper, however, the canopy must be folded into fifths at the skirt in order for the diaper to close properly.



Note: The locking stows are "tube stows" with an outside diameter of 1.125" (ParaGear P/N S88-604.) The remaining stows are small rubber bands (ParaGear P/N S7100 or S7110)

Figures 15 & 16. Release tension, then fold all of the suspension lines up over the skirt of the slider past the top edge of the diaper. Make the first locking stow (at the top grommet) using all of the suspension lines. Note that the lines must come up the center of the diaper and out of the top edge as shown. This will cause the lines to open the diaper when the last locking stow is released during deployment. Ensure the locking stow bights are pointed



away from the remaining stows to allow clearance for stowing the remainder of the suspension lines.

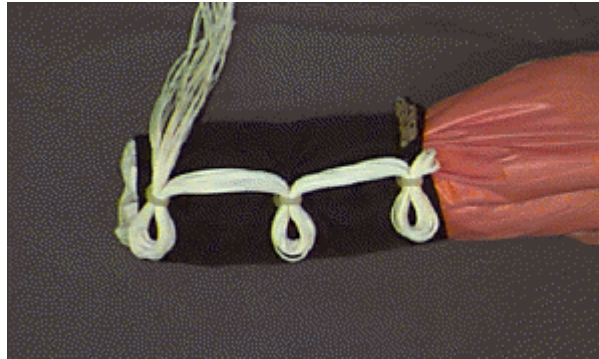
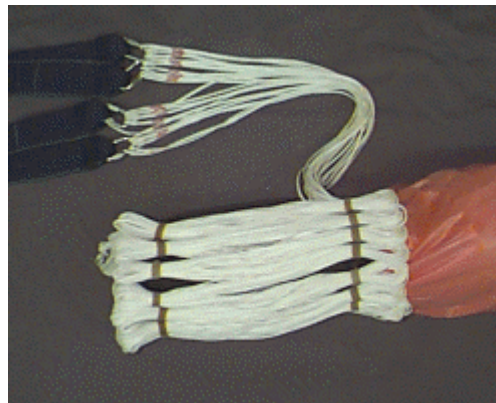
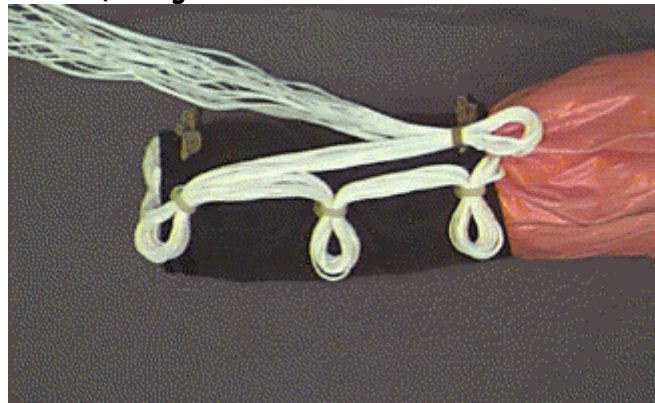


Figure 17. Make the next two locking stows in the same manner, working from top to bottom, using all the lines.



Figures 18 & 19. Continue stowing the suspension lines on the diaper, working away from the locking stows. Leave approximately 20 inches of the line unstowed. Figure 19 shows what the canopy, suspension lines, and upper risers should look like at this point in the packing procedure.

Note: From this point on, you must proceed with packing in accordance with the particular container system you are servicing.