



Structural Composites Industries

Harsco

325 Enterprise Place
Pomona, CA 91768 USA
Telephone (909) 594-7777
Facsimile (909) 594-3939

823D SERVICE BULLETIN 04 – 001 (12-6-04)
Pressure Relief Device (prd) Retrofit Instructions

Step I: Remove Aft End (Non-Valve End) Prd Assembly

Referring to Figure I of Retrofit Schematic 1, the original (non-compliant) pressure relief device assembly consists of the original O-ring (1), tank-to-prd adapter (2), crushwasher (3), prd (4), and vent tube (5). After bus de-fueling, all of these items will be removed and only the original prd (4) and the rubber vent tube end cap will be saved. The other items should be discarded to avoid confusion with the new parts described in Step II.

A: Defuel the bus

De-fuel the bus in accordance with local regulations and the Orion Bus de-fueling procedure.

Note: Some residual fuel will remain in the fuel system after de-fueling. All subsequent work performed on the fuel system should be conducted in a well ventilated and spark free area that is free from heat sources (space heaters, etc).

B: Remove and discard the original vent tube (5), BUT SAVE THE RUBBER VENT TUBE CAP

C: Remove and SAVE THE ORIGINAL PRD (4)

D: Remove and discard the original copper crushwasher (3):

The original copper crush washer (3) will likely be within the inlet end (nut end) of the prd.

E: Remove and discard the original tank-to-prd adapter (2) and original O-ring (1)

Step II: Install the New (Compliant) Mid-Span Prd Assembly

Referring to Figure II of Retrofit Schematic 1, the new (compliant) mid-span prd system consists of a new O-ring (6), a tank-to-tube adapter (7), a high pressure tube (8), a tube-to-prd adapter (9), a new copper crushwasher (10), the original prd (4), a left hand vent tube (11L) with a color coded rubber cap (12L) or a right hand vent tube (11R) with a color coded rubber cap (12R), and a pair of mounting straps (13). The mounting straps are only placed on the four outboard tanks as shown in Figure II.

SCI also provides cutting templates (14) and ink (15) for cutting new vent tube holes in the fuel system enclosure door as explained below, and a container of O-ring lubricant (16) for proper installation of the new O-ring.

A: Pre-connect the tube-to-prd Adapters (9) and original prds (4)

Connect the tube-to-prd adapter (9) and the original prd (4) using the new crushwasher (10). TO AVOID LEAKS, it is critical that the crushwasher is centered within the inlet (nut end) of the prd so the crushwasher makes full, all-the-way-around contact with the pair of concentric seal rings on the end of the tube-to-prd adapter. To accomplish this, the prd should be placed in a vice with the prd inlet facing upward so the crushwasher can be placed in a centered position therein. Then hand tighten the tube-to-prd adapter down into the prd inlet to assure good all-around contact between the crushwasher and adapter seal rings. After hand tightening, the tube-to-prd adapter must be torqued to 50-55 Ft x Lbs.

For the above operation, it is recommended that persons take a group of prds, tube-to-prd adapters, and crushwashers to a work bench having a vice for assembling the parts. For a single bus, this would be 8 of each part.

Note: The prd connection to the adapter will have unacceptable leakage if it is not properly made. The installer should be careful that: (a) the concentric seal rings on the adapter have not been damaged or gouged from improper handling/bumping/dropping, (b) there is all-around contact between the adapter's concentric seal rings and the crushwasher, and (c) the connection torque is sufficient.

Note: SCI recommends to mark this joint, and all other torqued connections, with paint or torque stiple to indicate a finished joint.

B: Pre-connect the Vent Tubes (11L, 11R) to the prd (4)

Referring to the tank end view of Figure II, the discharge ends of the left hand vent tubes (11L) and right hand vent tubes (11R) are designed to be aligned substantially vertical, parallel, and in close proximity with each other. The left hand vent tube will be installed on the left most tank in each tank row when viewed from the bus rear. The left hand vent tube will also be installed on the 3rd tank from the left in each tank row when viewed from the bus rear. At this point in the assembly process, uscrs can hand tighten an equal number of left hand vent tubes and right hand tubes onto the externally threaded prd discharge ports. To make this easier, SCI provided different colored rubber caps for the left and right vent tubes. Later, the vent tube caps will be replaced with the original rubber caps, and the vent tube positions will be adjusted so that only one vent hole must be drilled in the fuel system canopy for each pair of vent tubes.

C: Install the tank-to-tube adapter (7) in tank ALT823D

Generously lubricate the new O-ring (6) with the O-ring lubricant (16) provided by SCI or with an equivalent lubricant suitable for use with Nitrile material. Place the O-ring onto the 1.125" threaded tank end of the tank-to-tube adapter (7). Torque the tank-to-tube adapter into the open tank port at 125-130 Ft x Lbs.

D: Place the tube mounting straps (13)

Place one mounting strap (13) around the outboard tank about 30 inches from the tank end. Rotate the mounting strap so the top edge of triangular tube shelf (13c) is horizontal as shown in Figure II. Referring now to Figure III of Retrofit Schematic 2, the mounting strap is secured onto the tank body by tightening the torque spring (13b) with the 7/16" lock nut (13f) on the mounting strap screw (13a). At this point, do not fully tighten the mounting strap so it can later be positioned within 1 inch of the tube-to-prd adapter. Likewise, place the second mounting strap about 2 inches from the tank shoulder and loosely secure it onto the flat cylindrical surface and not the tank dome end curvature.

E: Install the high pressure tube (8)

Thread the pre-set nut and ferrule of the high pressure tube (8) onto the tank-to-tube adapter (7). Tighten the pre-set nut about 3/4 turn past hand tight, then back off the nut and inspect the ferrule to ensure all-around contact with the beveled rim of the tank-to-tube adapter. Once good contact is confirmed, close and tighten the pre-set nut about 1/3 – 1/2 turn past hand tight.

Similarly, thread the prd/vent tube/tube-to-prd adapter assembly into the pre-set nut at the other end of the high pressure tube, but only loosely at first. With the assembly loose on the high pressure tube, rotate the assembly so the discharge end of the vent tube (11a or 11b) can be positioned substantially vertical and parallel to the discharge end of the adjacent vent tube. Once the vent tubes are positioned, tighten the pre-set nut on the high pressure tube about 3/4 turn past hand tight, then back off the pre-set nut and inspect the ferrule for all-around contact with the beveled rim of the tube-to-prd adapter. Once good contact is confirmed, close and tighten the pre-set nut about 1/3 – 1/2 turn past hand tight. Finalize the vent tube so that its discharge end is substantially vertical as shown in Figure II and then tighten the vent tube compression nut about 1/2 turn past hand tight.

Tighten the first mounting strap (13) around the tank at a position 1 inch away from the tube-to-prd adapter. Tighten the second mounting strap about 2 inches from the dome shoulder. The straps must be tightened so there will be no slippage of the strap across the tank surface.

Referring to Retrofit Schematic 2, secure the high pressure tube on the triangular tube shelf of the mounting straps with the hose clamps (13e), the locknuts (13f), washer (13g), and the #12 Hex Head bolt (13d). The hex head bolt and locknut must be tightened until they force the hose clamp flanges closed and into solid contact with the triangular tube shelf.

F: Cut the vent tube holes

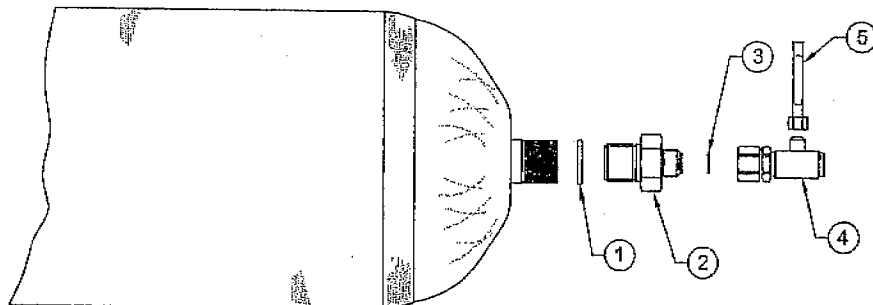
Place the cutting template (14) on top of the vent tubes (11L and 11R) as shown in Retrofit Schematic 1. Wet the felt pad of the cutting template with the ink (15). Gently close the fuel system enclosure door to make a cutting imprint stain. Raise the enclosure door and cut a vent tube opening around the ink stained area. When doing so, tape the top side of the enclosure door in order to minimize paint chipping or excessive tearing of the no-slip footing strip. File down any sharp burrs that may result during hole cutting. There will be four of these holes per bus.

G: Replace the Color Coded Vent Tube Caps with the Original Vent Tube Rubber Caps

H: Perform a System Leak Test

The fuel system shall be leak tested with at least 1000 psi pressure. The leak test must be a liquid film bubble test unless Harsco agrees in writing to another test method. For the liquid film bubble test, the vendor must squirt leak test solution onto each joint and check for the presence of bubbles. Any bubbling indicates the presence of a leak which must be corrected/eliminated.

**FIGURE I (NON-COMPLIANT)
ORIGINAL PRESSURE RELIEF DEVICE ASSEMBLY**

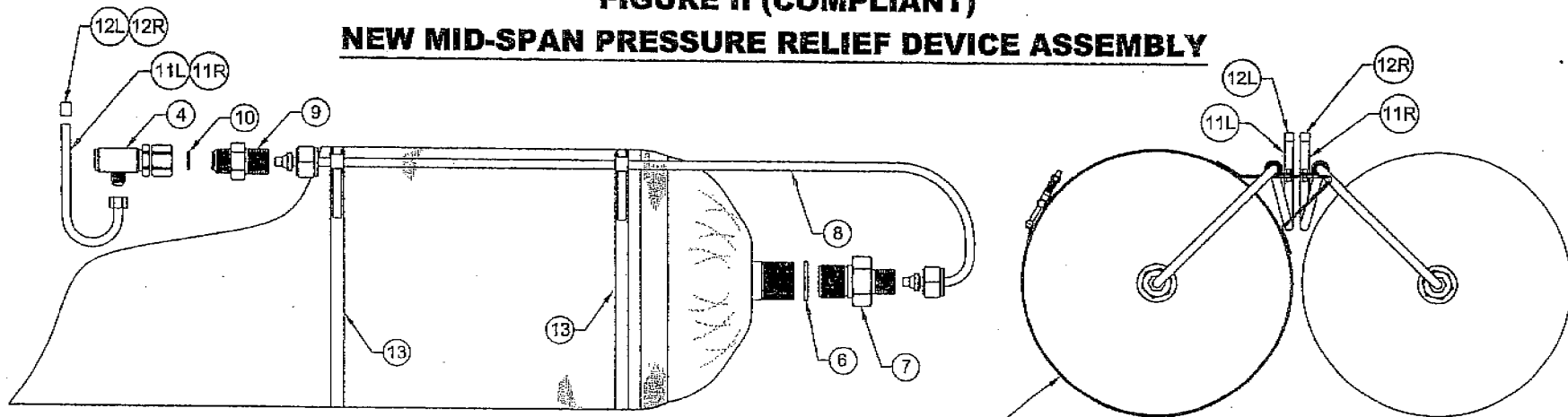


NOTE:

1. SAVE ORIGINAL PRD FOR USE ON NEW SYSTEM
2. SAVE THE ORIGINAL RUBBER CAP FROM THE VENT TUBE FOR INSTALLATION ON THE NEW SYSTEM

ORIGINAL VENT TUBE (DISCARD)	5
ORIGINAL P1750-30W PRD (SAVE)	4
ORIGINAL COPPER CRUSH WASHER (DISCARD)	3
ORIGINAL TANK-TO-PRD ADAPTER (DISCARD)	2
ORIGINAL O-RING (DISCARD)	1
DESCRIPTION	ITEM NO.

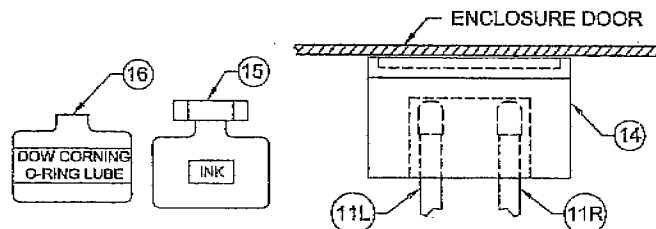
**FIGURE II (COMPLIANT)
NEW MID-SPAN PRESSURE RELIEF DEVICE ASSEMBLY**



NOTES:

1. THE TOP EDGE OF THE TRIANGULAR TUBE SHELF MUST BE SUBSTANTIALLY HORIZONTAL, AND THE VENT TUBE DISCHARGE ENDS CAPPED AND SUBSTANTIALLY VERTICAL

NOTE: ONLY THE FOUR OUTBOARD TANKS HAVE MOUNTING STRAPS



DOW CORNING O-RING LUBE	16
INK	15
CUTTING TEMPLATE	14
MOUNTING STRAP ASSY.	13
LEFT BLACK VENT TUBE CAP	12L
RIGHT YELLOW VENT TUBE CAP	12R
NEW LEFT SIDE VENT TUBE	11L
NEW RIGHT SIDE VENT TUBE	11R
NEW COPPER CRUSH WASHER	10
TUBE-TO-PRD ADAPTER	9
HIGH PRESSURE TUBE ASSY.	8
TANK-TO-TUBE ADAPTER	7
NEW O-RING	6


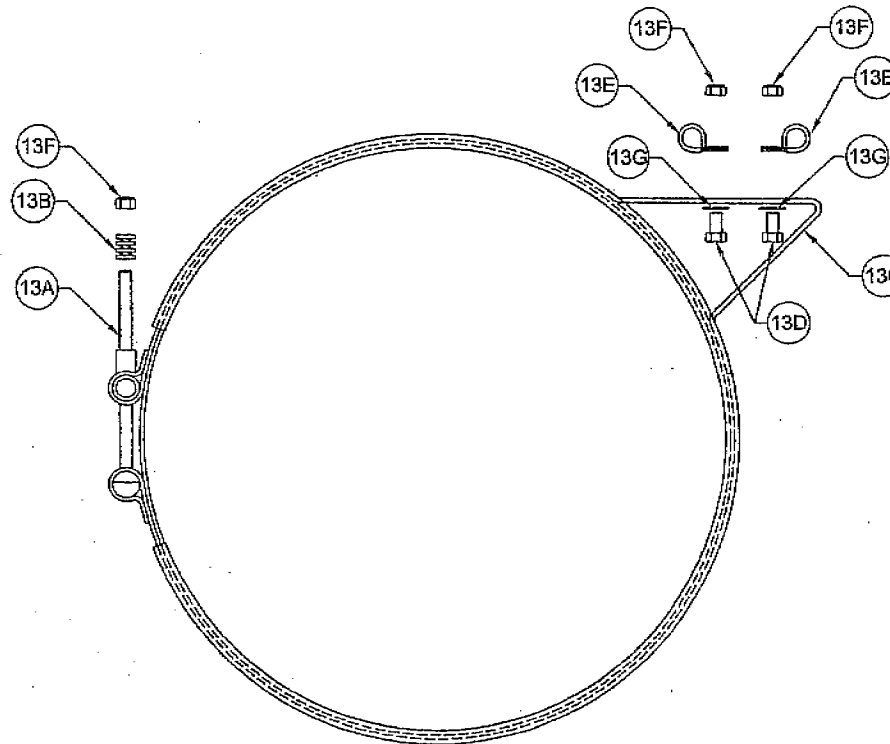

 HNI Structural Composites Industries Inc.	RETROFIT SCHEMATIC #1	
04-001	SHEET 1 OF 2	DESCRIPTION
		ITEM NO.

FIGURE III (COMPLIANT)
ITEM 13: RUBBER PADDED MOUNTING STRAP ASSEMBLY



 HFI Structural Composites Industries Inc.	FLAT WASHER	13G	
	#12 HEX. HEAD LOCK NUT	13F	
	TUBE CLAMP	13E	
	#12 HEX. HEAD BOLT	13D	
	TUBE SUPPORT BRACKET	13C	
RETROFIT SCHEMATIC #2		TORQUE SPRING	13B
		MOUNTING STRAP SCREW	13A
04-001	SHEET 2 OF 2	DESCRIPTION	ITEM NO.

Form FIRF:12-16-04 For Reporting Completion of PRD Retrofit Work Under Voluntary Recall 04E-038

Bus VIN	
Transit Agency Bus No. (Optional)	
Number of ALT823D Tanks Installed on Bus	8
Serial Number - tank 1	
Serial Number - tank 2	
Serial Number - tank 3	
Serial Number - tank 4	
Serial Number - tank 5	
Serial Number - tank 6	
Serial Number - tank 7	
Serial Number - tank 8	
Receiving Report Completed and Archived? Y/N	
Compliant PRD System Installed in accordance with Retrofit Schematics 1 and 2, 823D Service Bulletin 04-001 (12-6-04)? Y/N	
Leak Testing Successfully Completed On Compliant PRD System? Y/N	
Party Confirming Completion of Work	
Date	