R44-series Fuel System Upgrade Kit Instructions

Upgrades earlier bladder tank fuel systems to include fuel line breakaway couplings. Applicable to R44 S/N 2604 & prior, R44 II S/N 14378 & prior (except S/N 14364), and Cadet S/N 30063 & prior (except 30061), with either factory-installed bladder tanks or bladder tanks installed per KI-196 Revision A or B; contents of this kit are included in KI-196 Revision C or subsequent. Helicopter must be equipped with hydraulic flight controls, bladder tanks, & D743-3 aux fuel pump. Previous compliance with R44 Service Bulletins SB-67 and SB-69 required. This kit meets the standards of Section 317 of the FAA Reauthorization Act of 2018 (see: FAA SAIB SW-17-31R2).

NOTE

Visit www.robinsonheli.com to verify kit instructions are current revision. Review instructions before installation; contact RHC Technical Support with questions. Verify kit contents match list; contact RHC Customer Service if parts are missing or damaged.

ITEM	PART NUMBER	KIT CONTENTS	(R44) QTY PER KI-196-3A	(R44 II) QTY PER KI-196-3B
1	KI-196-3Instr.	Kit Instructions	1	1
2	A226-11-3	Trim (3 in. length)	1	1
3	A226-15-1.6	Trim (1.6 in. length)	1	1
4	A457-19	Cap	2	2
5	A729-17	Tube - Drain	1	1
6	A729-63	Tube	2	2
7	A729-79	Tube	2	2
8	A731-10	Tube Assembly	1	1
9	A880-536	Adapter (CRES; alternate p/n A880-566, steel)	2	1
10	A880-736	Elbow (CRES; alternate p/n A880-766, steel)	1	0
11	A880-836	Elbow (CRES; alternate p/n A880-866, steel)	0	2
12	A880-933	Union (CRES; alternate p/n A880-963, steel)	1	1
13	A880-936	Union (CRES; alternate p/n A880-966, steel)	1	1
14	A880-1003	Nut (drain)	1	1
15	A880-1136	Tee (CRES; alternate p/n A880-1166, steel)	1	0
16	B161-4-12	Spirap - 0.25 inch diameter (1 foot length)	2	2
17	C141-5	Washer	0	1
18	C595-2	Hose Assembly (tank interconnect)	1	0
19	C595-3	Hose Assembly (tank interconnect)	0	1
20	C595-4	Hose Assembly (relief valve-to-tee)	0	1
21	D205-38	Hose Assembly (tank-to-valve)	1	1
22	D255-5	Support	1	1
23	D277-6	Clamp	6	6
24	D319-4	Fitting	0	1

ITEM	PART NUMBER	KIT CONTENTS (Cont'd)	(R44) QTY PER KI-196-3A	(R44 II) QTY PER KI-196-3B
25	D453-4	Tee	0	1
26	D453-5	Jet (black; 0.128–0.130 inch diameter bore)	0	1
27	D663-1	Clamp	1	1
28	MS21042L08	Nut	1	1
29	MS27039C0806	Screw	1	1
30	MS29512-03	Packing	1	1
31	MS29512-06	Packing	1	4
32	MS3367-4-9+	Ty-rap (Note: "+" in part number indicates 20-qty pack)	1	1
33	MS3367-5-9+	Ty-rap (Note: "+" in part number indicates 20-qty pack)	2	2
34	MS3367-6-0	Ty-rap	1	1
35	MS35489-6	Grommet	3	3
36	NAS1149FN816P+	Washer (Note: "+" in part number indicates 20-qty pack)	1	1
37	NAS1149F0632P+	Washer (Note: "+" in part number indicates 20-qty pack)	1	1

Consumables

Refer to R44 Maintenance Manual (MM) § 1.400 for approved materials list.

- A257-6 Grease
- B270-6 Sealant

Kit Instructions

CAUTION

Temporarily cap fuel fittings when opened.

WARNING

Fuel vapors are explosive. Do not use electric tools in vicinity of an opened fuel system.

1. Turn battery switch OFF. Defuel helicopter per MM § 1.150. Remove tailcone cowling, left, right, & aft cowlings, and aft belly panel. R44 II only: remove air box assembly.

2. Refer to R44 Illustrated Parts Catalog (IPC) Figure 28-5. Open mast fairing and and disconnect pitot line from pitot tube. Cut & discard safety-wire securing (2) A729 tubes to C731-2 vent lines and discard tubes. Remove & discard MS21919WDG4 clamp and hardware securing A729-49 (crossover) tube to lower rib; remove and discard tube. Remove & discard (2) MS21919WDG4 clamps and hardware securing vent lines to middle rib. Cut & discard ty-raps securing vent lines to pitot line. Slowly pull pitot line and vent lines thru lower rib grommets and remove vent lines; discard vent lines and grommets.

Kit Instructions (continued)

3. Remove main & auxiliary tanks per MM § 12.111 & 12.121.

4. Refer to IPC Figure 28-5. Remove and discard:
   a. D205-28 (tank-to-shut-off valve) hose.
   b. D205-29 (tank interconnect) hose, AN815-6D union & packing, and 900506 elbow (at aux tank, R44 only).
   c. R44 II only: D205-31 (relief valve-to-tee) hose, D453-3 tee, and D453-2 jet.
   d. A226-11 trim, two places (Detail C).
   e. MS21919WDG3 clamp & hardware (Detail D) and ty-raps (Detail C) securing D205-30 hose; AN815-3D union & packing (at main tank drain fitting); AN924-3D nut, washer, A729-17 (or-7) tube, and D663-1 clamp (Detail B).

> NOTE
>
> Unless replacement or service of A761-1 drain valve is necessary, disassembly of drain valve from D255-1 connector is not required.

5. Refer to Figure 1, Detail A. Lay out and drill (1) 0.170-inch diameter hole in C385-1 doubler, one inch aft of existing hole. Deburr hole and clean up drilling debris. Thoroughly clean horizontal firewall. Install A226-11-3 trim on doubler, centered above drilled holes as shown.

6. Refer to Figure 1, Detail B. Install A226-15-1.6 trim on bulkhead lip as shown. Install D255-5 support using (1) MS27039C0806 screw, (1) NAS1149FN816P washer, and (1) MS21042L08 nut to horizontal firewall.

7. R44 II only: Refer to Figure 2. Disconnect B283-11 hose assembly at connector under horizontal firewall. Do not loosen relief valve at connector. Remove AN316-7R nut and NAS1149F0732P washer; retain nut & discard washer. Position relief valve (at loosened connector) so relief valve fitting points 55° ± 5° aft; install C141-5 washer (provided) & retained nut and special torque AN316-7R nut to 150 in.-lb. Connect B283-11 hose assembly, special torque to 140 in.-lb, and torque stripe both nuts per MM Figure 2-1.

8. Refer to IPC Figure 28-1. Perform the following prior to installing main tank on helicopter:
   a. Lubricate (1) MS29512-03 packing using A257-6 grease and assemble to new A880-933 union. Install union with packing to main tank drain fitting and special torque to 100 in.-lb. Connect D205-30 hose assembly to union. Special torque hose nut to 100 in.-lb and torque stripe per MM Figure 2-1.
   b. Lubricate (1) MS29512-06 packing using A257-6 grease and assemble to new A880-936 union. Install union with packing to main tank interconnect fitting and special torque to 200 in.-lb. Connect new C595-2 (R44) or C595-3 (R44 II) hose assembly to union and special torque hose nut to 120 in.-lb and torque stripe per MM Figure 2-1.
   c. Connect new D205-38 hose assembly to fuel shut-off valve. Special torque hose nut to 120 in.-lb and torque stripe per MM Figure 2-1. Route hose up through C259-1 panel cut-out.

> NOTE
>
> Installation of A457-19 cap and D277-6 clamp (see Figure 5) may be accomplished prior to installing tanks on the helicopter.

Kit Instructions (continued)

9. Refer to Figures 3 and 4. Position main tank in helicopter, carefully routing hose assemblies over D255-5 support. Verify hoses are not pinched. Install screws securing tank to cabin bulkhead and horizontal firewall.

10. Complete main tank installation per MM § 12.112, steps 2 thru 4, and 7.

11. Refer to Figure 3. Connect D205-38 hose assembly to main tank outlet (forward fitting). Special torque hose nut to 120 in.-lb and torque stripe per MM Figure 2-1. Install MS3367-5-9 ty-rap around hose thru drilled holes in C351-1 brace (IPC Figure 28-1, Detail C). Cinch ty-rap until snug without over-tightening, and trim tip flush with head.

12. Refer to Figure 1, Detail C. Install new A880-1003 nut and NAS1149F0632P washer, and retained D255-1 connector (with installed A761-1 drain valve) in D255-2 angle as shown, and special torque nut to 100 in.-lb. Connect D205-30 hose assembly to nut and (using a backup wrench on nut) special torque hose nut to 100 in.-lb. To install drain valve (if removed): apply B270-6 sealant sparingly to A761-1 drain valve tapered threads (do not apply sealant to first thread) and connect valve to connector. Hold connector and standard torque valve [1/8-27 tapered pipe thread] per MM § 1.320, and torque stripe per MM Figure 2-1. Install A729-17 tube and D663-1 clamp.

13. Refer to Figure 3 and IPC Figure 28-1. Install B161-4 spirap around D205-30 hose assembly to cover three inches of hose, where hose routes near C385-1 doubler left-side vertical flange; trim spirap. Install B161-4 spirap around D205-30 hose assembly, to cover six inches of hose, where hose routes near doubler right-side vertical flange; trim spirap. Secure D205-30 hose (at left side) to D255-5 support, and (at right side) to C385-1 doubler flange. Cinch ty-raps until snug without over-tightening, and trim tips flush with head.

14. Install aux tank per MM § 12.122, steps 1 thru 3, 5, 6, and 9.

15. I. R44 only: Refer to Figure 3 and IPC Figure 28-1.

    a. Connect C595-2 hose assembly elbow to aux tank outlet fitting and special torque to 120 in.-lb, and torque stripe per MM Figure 2-1. Secure hose (at left side) to D255-5 support, and (at right side) to C385-1 doubler flange. Cinch ty-raps until snug without over-tightening, and trim tips flush with head.

    b. Remove and discard blue, aluminum AN823-6D elbow from carburetor fuel inlet. Apply light coat B270-6 sealant to A880-736 elbow (do not apply sealant to first thread), and install in carburetor. Standard torque elbow [1/4-18 tapered pipe thread] per MM § 1.320 and apply torque stripe per MM Figure 2-1. Connect B283-3 hose assembly and special torque to 120 in.-lb.

Kit Instructions (continued)

15. I. (continued)

c. Drain and remove A666-1 gascolator. Remove blue, aluminum fittings from gascolator top. Apply light coat B270-6 sealant to A880-536 adapter (do not apply sealant to first thread) and install in inlet (engraved "IN") port on A666-1 gascolator; repeat procedure for gascolator outlet and install either A880-1136 tee (if optional primer installed), or A880-536 adapter. Standard torque adapter(s) & tee [1/4-18 tapered pipe thread] per MM § 1.320 and apply torque stripe per MM Figure 2-1. Position gascolator assembly drain valve thru hole in belly panel. Insert A455-1 plug in A454-1 support (see IPC Figure 28-21), then connect C741-1 line assembly to inlet nipple (marked "IN"), finger-tight. Install washer and nut on plug and special torque to 70 in.-lb, and torque stripe per MM Figure 2-1. Special torque C741-1 line assembly to 285 In.-lb, and torque stripe per MM Figure 2-1. If installed, connect primer line to bushing on gascolator outlet tee, special torque nut to 25 in.-lb, and torque stripe per MM Figure 2-1. Connect B283-3 hose assembly and special torque nut to 120 in.-lb, and torque stripe per MM Figure 2-1.

15. II. R44 II only: Refer to Figure 4 and IPC Figure 28-1.

a. Install new D453-4 tee on aux tank outlet fitting, orient fitting in line with D321-1 pressure relief valve assembly within 5°, and special torque to 200 in.-lb. Install new D453-5 jet in tee inlet (outboard side). Connect C595-4 hose assembly elbow to tee inlet and straight fitting to pressure relief valve, special torque nuts to 120 in.-lb, and torque stripe per MM Figure 2-1. Connect C595-3 hose assembly elbow fitting to D453-4 tee and special torque hose nut to 120 in.-lb; verify 0.5-inch minimum clearance from C595-4 hose assembly. Secure C595-3 hose (at left side) to D255-5 support, and (at right side) to C385-1 doubler flange (see Figure 3, Detail A). Cinch ty-raps until snug without over-tightening, and trim tips flush with head.

b. Remove inlet (inboard) fitting from engine fuel pump. Lubricate (1) MS29512-06 packing using A257-6 grease and assemble to D319-4 fitting. Install fitting in engine fuel pump inlet, special torque to 150 in.-lb, and torque stripe per MM Figure 2-1. Connect B283-3 hose assembly and special torque to 120 in.-lb.

c. Examine D743 aux fuel pump and determine location of B426-2 fuel pressure switch.

i. If pressure switch is above motor, obtain and install KI-206-3 Revision D (or subsequent) Aux Fuel Pump Assembly Upgrade Kit.

ii. If pressure switch is opposite motor, then verify:
– Elbows in pump, and
– Fittings in gascolator inlet & outlet are stainless steel (non-magnetic) and/or blackened steel (magnetic).

Replace all blue, aluminum fittings with steel fittings using online instructions for KI-206-3.

16. Refer to Figure 5. Install A457-19 cap(s) on lower fuel (main & aux) tank vent fittings and secure using D277-6 clamp(s). Install (3) new MS35489-6 grommets in lower ribs. Observe orientation markings and install (2) D251-1 rollover vent valve assemblies through lower rib grommets and attach A729-48 (tank vent) tubes using (2) B277-4 clamps. Install (2) A729-79 tubes to valve assemblies and secure using (2) D277-6 clamps.

Kit Instructions (continued)

NOTE

Refer to MM § 12.210 for description of vent valve function.

17. Install A731-10 tube assembly and connect A729-79 tubes using (2) D277-6 clamps as shown. Install A729-63 tube between A729-48 tubes using (2) MS3367-4-9 ty-raps as shown. Secure A731-10 tube assembly to gearbox mast tube using (1) MS3367-6-0 ty-rap. Cinch ty-raps until snug without over-tightening, and trim tips flush with head.

18. Perform vent system check as follows:

NOTE

A hand-operated inflation pump, such as bicycle tire pump, may be used to create air flow necessary for system check.

a. Attach a temporary hose to open end of one tube of A731-10 tube assembly. Temporarily cap open end of adjacent tube.

b. With fuel caps installed, blow into temporary hose (do not use compressed air) and verify no air leaks.

c. Remove fuel cap from main tank. Blow into temporary hose and verify air flow from main tank neck opening. Secure cap on main tank.

d. Remove fuel cap from aux tank. Blow into temporary hose and verify air flow from aux tank neck opening. Secure cap on aux tank.

e. Remove temporary cap from tube end. Blow into temporary hose and verify air flow out open vent tube. If no air flow from vent, remove obstruction(s) in vent assembly and/or in fuel bladder(s) and repeat check.

f. Remove temporary hose.

19. Refer to Figure 5. Route pitot line through grommet in rib. Create stand off and secure pitot line to A731-10 tube assembly (left-side tube) using A729-63 tube and ty-raps as shown. Position MS21919WDG4 clamp around pitot line and secure clamp to C261-7 & -8 mid ribs using hardware shown. Connect pitot line to pitot tube. Perform pitot system leak test per MM § 13-10.

20. Perform minimum fuel flow check per MM § 12.600.

21. R44 II only: Install airbox per MM § 6.430. Inspect induction hose per Service Bulletin SB-100; replace hose as required and install.

22. Install aft belly panel, left, right, & aft cowlings, tailcone cowling, and mast fairing. Secure access doors.

Kit Instructions (continued)

23. Revise helicopter's Weight and Balance Record in R44 Pilot's Operating Handbook (POH) Section 6 to reflect this installation by incorporating the following data:

R44 I and Cadet

Add:

Item	Weight	Long. Arm	Long. Moment	Lat. Arm	Lat. Moment
KI-196-3A Fuel System Upgrade Kit	+0.8 lb	96.8 in.	+77.44 in.-lb	1.5 in.	+1.2 in.-lb

R44 II

Add:

Item	Weight	Long. Arm	Long. Moment	Lat. Arm	Lat. Moment
KI-196-3B Fuel System Upgrade Kit	+1.2 lb	97.6 in.	+117.12 in.-lb	5.6 in.	+6.72 in.-lb

24. Have a qualified person run-up and shutdown helicopter per Pilot's Operating Handbook.

25. Turn fuel valve OFF. Remove and clean gascolator bowl and filter screen. Verify no deterioration of gasket. If gascolator bowl is secured by threaded collar and ring, lightly lube threads and ring with A257-6 grease. Reassemble and turn fuel valve on. Safety wire after ensuring no leaks occur. Verify drain valve is secure and torque-striped.

26. Make appropriate maintenance record entries.

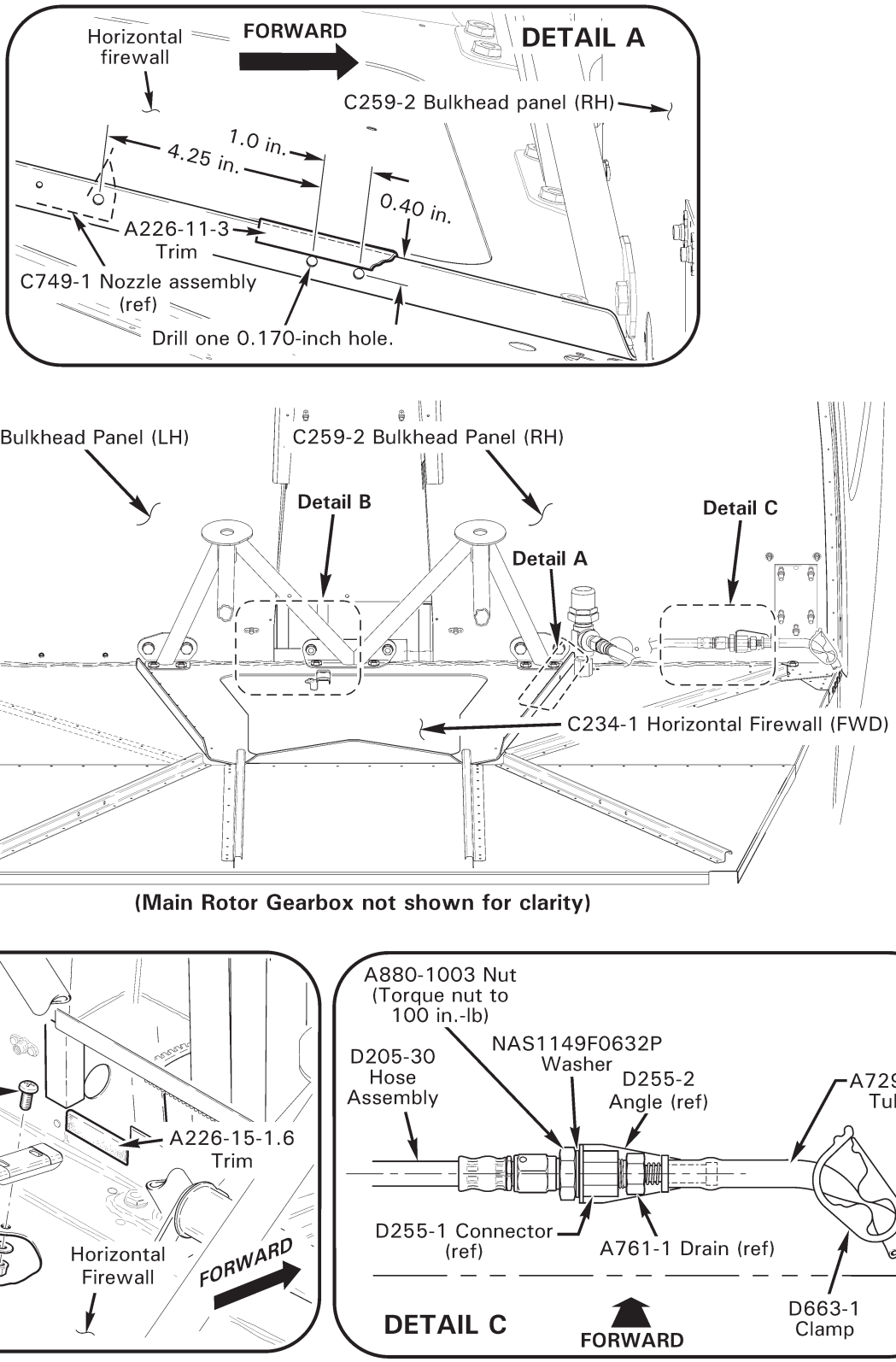


FIGURE 1 Bulkhead upgrades

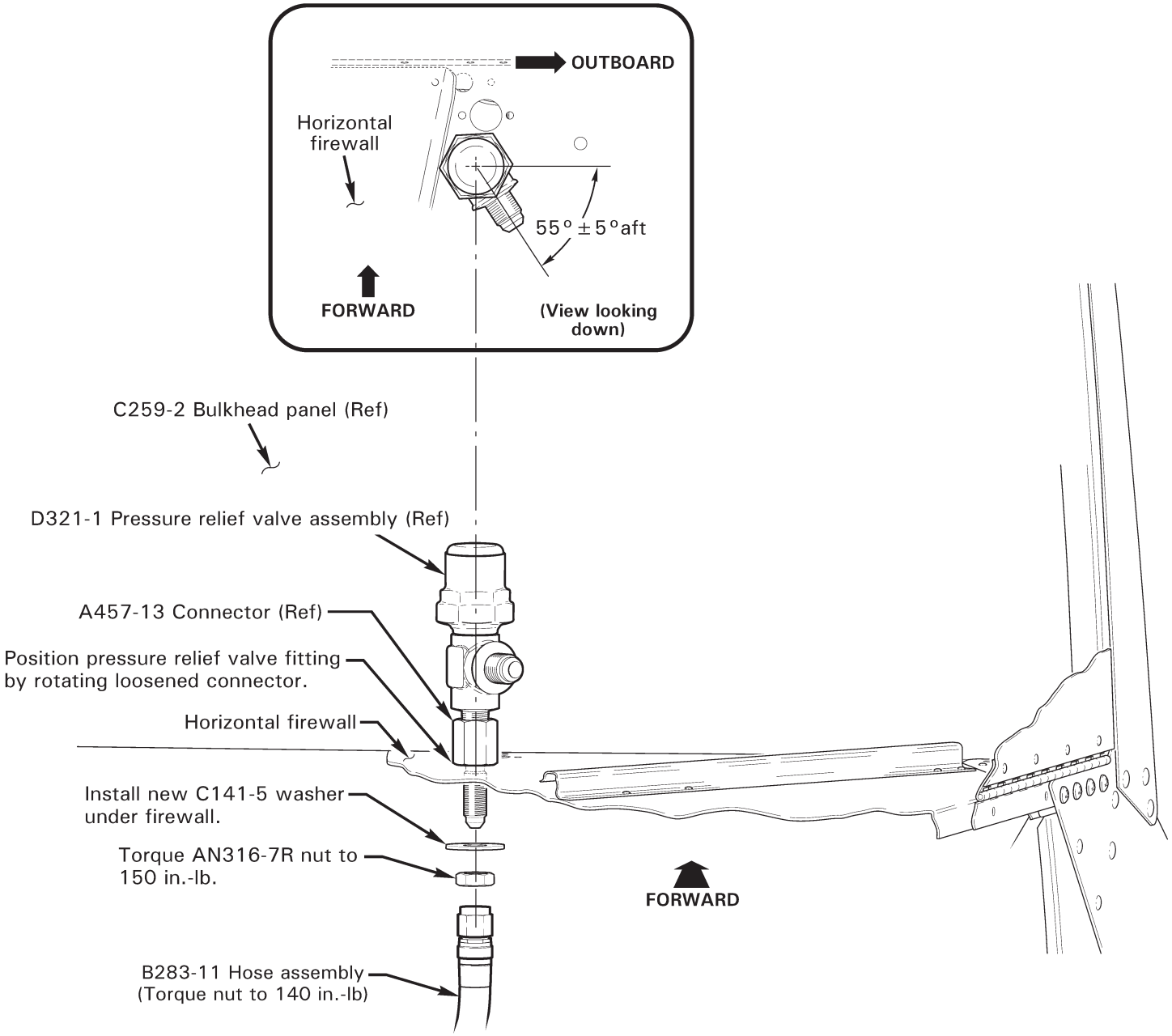
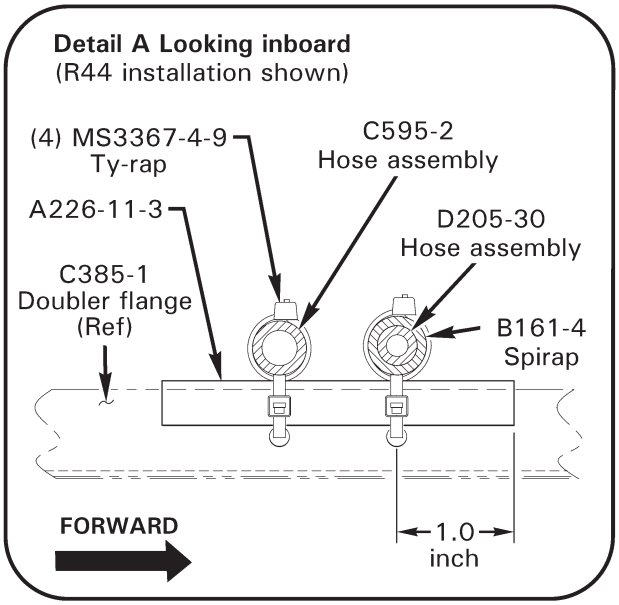


FIGURE 2 Pressure relief valve position



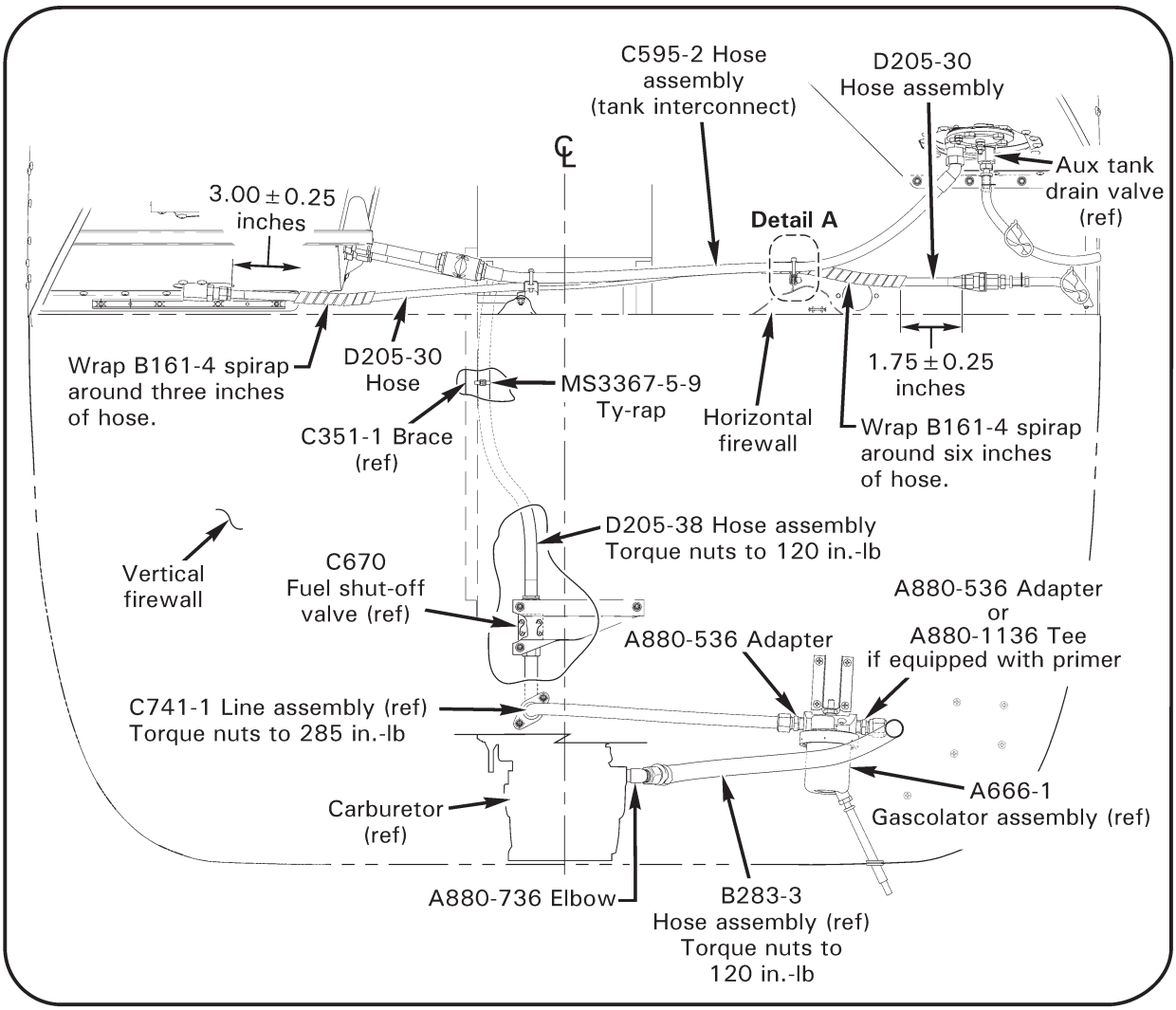


FIGURE 3 R44 Installation
(view looking forward; R44 II installation same, except as shown in Figure 4)

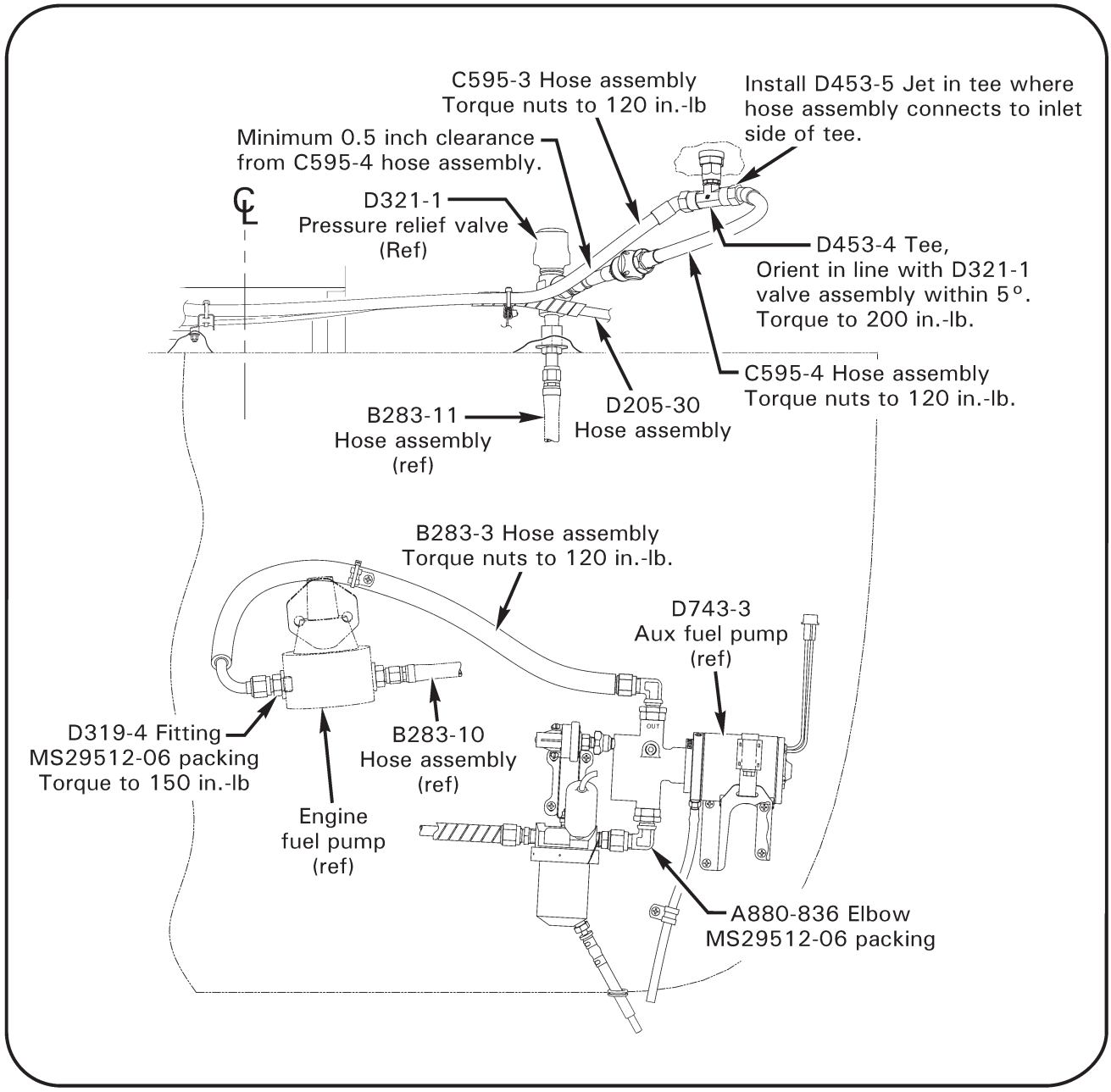


FIGURE 4 R44 II Installation
(view looking forward)

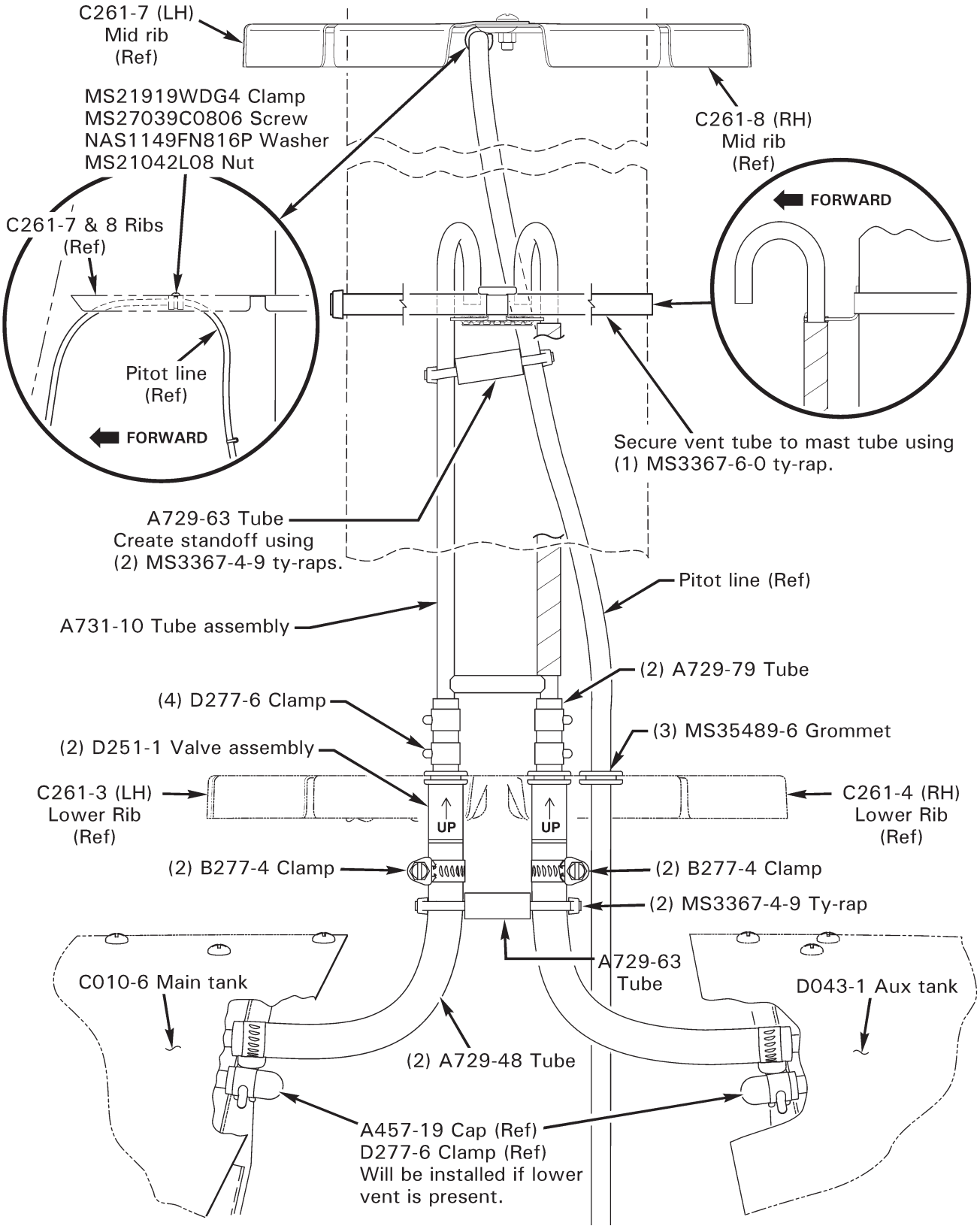


FIGURE 5 Fuel tank vent system installation
(view looking forward)