Service Bulletin SB-0067

Epic Aircraft, LLC ◆ 22590 Nelson Road ◆ Bend OR 97701
Phone: 541-318-8849 ◆ Fax: 541-382-5125 ◆ Web: www.epicaircraft.com

Subject: Hydraulic Pump Retrofit

ATA-Code: 29-10

Labor: 12 Hours

Effectivity: K003 and On

Affected Model(s): E1000

Due: Upon Request

Compliance: Recommended

Recurrence: No

1 BACKGROUND AND PURPOSE:

This service bulletin was written to explain how to exchange the hydraulic pump, suppressor and hose assemblies, on the E1000 to the new inline filter and hydraulic gear pump design. While updating to the new hydraulic pump design, the hardware on the hydraulic reservoir should be replaced with longer hardware. This will require removal of the hydraulic reservoir.

2 REFERENCES:

- Epic E1000 Aircraft Maintenance Manual, P/N SK05000000
- Illustrated Parts Catalog for the Epic E1000 and E1000GX and AX, P/N SK05000004
- Main Hydraulic Power Installation FK29000000

3 WARRANTY:

Compliance with this Service Bulletin is optional. Parts and labor costs incurred as a result of voluntary compliance are the responsibility of the aircraft owner. In the event of a confirmed hydraulic pump failure requiring replacement within the applicable warranty period, Epic Aircraft LLC will cover labor costs only for the corrective action when performed by an appropriately certificated Airframe and Powerplant mechanic or FAA-approved repair station. Replacement parts, including the hydraulic pump, are not covered and remain the responsibility of the owner.

4 APPROVAL:

The engineering aspects of this service document have been shown to comply with the applicable Federal Aviation Regulations and are FAA approved.

5 REVISION:

B:

- Corrected pump part number in step (13)(l).
- Removed duplicate part from parts list.
- Miscellaneous procedural updates.

6 TOOLS:

No.	Description	Qty	Epic Aircraft Supplied	Customer Supplied
1.	Basic Hand Tools	A/R	☐	☒
2.	Hydraulic Service Cart, (MIL-PRF-83282 or MIL-PRF-87257) 2500 psi, 3.5 gpm capacity.	1	☐	☒
3.	Airplane Jacks	A/R	☐	☒
4.	Ground Power Unit	A/R	☐	☒
5.	M5498-2 Accumulator or equivalent with pressure gauge	1	☐	☒

7 PARTS/MATERIALS:

No.	Part Number	Description	Qty	Epic Aircraft Supplied	Customer Supplied
1.	AK29107001	Hydraulic Gear Pump Assembly	1	☒	☐
2.	PK99290001	Filter, Inline, Hydraulic	1	☒	☐
3.	PK99005221	Pressure Regulator, Miniature, 60 PSI	1	☒	☐
4.	PK99005225	Panel Mount Nut, Aluminum	1	☒	☐
5.	PK71400039	Bracket, Mount, Inline Filter, Hydraulic System	1	☒	☐
6.	PK99005235	Relief Check Valve, 10 psi	1	☒	☐
7.	NAS1149F0332P	Washer, Flat #10 x .032	5	☒	☐
8.	NAS1149C0432R	Washer, Flat, cres 1/4 x .032	4	☒	☐
9.	MS35338-44	Washer, Lock-spring, ø.190	4	☒	☐
10.	MS21042L3	Nut, Self-Locking, 450°, reduced #10-32	2	☒	☐
11.	AS3491-01	Gasket, Engine Accessory Drive	2	☐	☒
12.	AN4-6A	Bolt, 1/4-28 x 25/32" Undrilled	4	☒	☐
13.	AN3-6A	Bolt, 10-32 x 25/32" Undrilled	3	☒	☐
14.	AN3-5A	Bolt, 10-32 x 21/32" Undrilled	2	☒	☐
15.	NAS1352-08H10P	Screw, Socket Head, Drilled .164-32 x .625	4	☐	☒

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16.	AE2463532H0133 171J005-8CR-0133 Or AE2463532H0137 171J005-8CR-0137	Eaton/Parker: Hose Assy, Integral Firesleeve, -8 x 13.375", straight to 90 Eaton/Parker: Hose Assy, Integral Firesleeve, -8 x 13.875", straight to 90	1	☒	☐
17.	AE2463530G0093 171J001-6CR-0093	Eaton/Parker: Hose Assy, Integral Firesleeve, -6 x 9.375", straights	1	☒	☐
18.	8 F5OX-SS	Parker: Fitting, Straight, SAE-ORB / 37 deg flare	1	☒	☐
19.	6 C5OX-SS	SAE-ORB / 37 degree flare, 90 degree	1	☒	☐
20.	4 HP5ON-SS	Parker: Plug, Male SAE-ORB, 7/16-20	1	☒	☐
21.	4 FNTX-SS	Cap, Fitting, JIC, -4	2	☒	☐
22.	229-4-2	Parker: Fitting, Elbow, push connect to 1/8 npt	1	☒	☐
23.	AS21919WCJ28	Clamp, Loop Type, Cushioned, CRES, ø 1.750	2	☒	☐
24.	TYZ525M	Cable Tie, High Temp, 302°f, Adjustable	10	☒	☐
25.	SLUBE 884-2	Parker: Super O-Lube, O-Ring Lubricant	A/R	☐	☒
26.	MS20995C32	Safety Wire, .032 DIA.	A/R	☐	☒
27.	MIL-PRF-83483	Thread Compound, Antiseize	A/R	☐	☒
28.	MIL-PRF-83282, MIL-PRF-87257	Hydraulic Fluid	A/R	☐	☒
29.	LOCTITE 567	Henkel: Thread Sealant with PTFE	A/R	☐	☒
30.	LOCTITE 242	Threadlocking Adhesive	A/R	☐	☒
31.	AA58092-2-2	Tape, Antiseize, Ptfe	A/R	☐	☒
32.	MIL-G-21164	Aeroshell 64 Grease MIL-G-2116	A/R	☐	☒
33.	PK99005112	Tubing, Polyurethane	A/R	☐	☒
34.	4 F6X-SS	Parker: Fitting, Female JIC Swivel to Male 1/8 NPT	1	☒	☐
35.	AN816-4D	Fitting, Adapter, Straight, Pipe to Tube	1	☒	☐

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8 INSTRUCTIONS

CAUTION:

READ ALL INSTRUCTIONS BEFORE BEGINNING ANY WORK.

1. Set the BATT 1 and BATT 2 switches to OFF.

WARNING:

THE HYDRAULIC LINES CAN CONTAIN HIGH PRESSURES AFTER ENGINE SHUTDOWN. THE SUDDEN RELEASE OF HYDRAULIC FLUID UNDER PRESSURE COULD CAUSE SERIOUS INJURY OR DEATH. THE SYSTEM MUST BE DEPRESSURIZED BEFORE IT IS OPENED FOR MAINTENANCE.

2. Remove all external electrical power from the airplane (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-10).
3. Raise the airplane using jacks (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 7-10).
4. Depressurize the hydraulic system (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 29-10).
5. Remove the top and side engine cowls (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-10).
6. Remove both intercoolers and associated tubing to the extent necessary to gain access to the hydraulic suppressor (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-10).
7. If necessary, remove the standby alternator for ease of access to the hydraulic piston pump (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 24-30).
8. Remove the blast shield (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 32-20).
9. Remove the left and right belly panels (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 57-10).

Note:

Install fasteners and fitting per Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 20-60.

10. Remove hydraulic piston pump (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 29-10).

- **a.** Disconnect pump inlet, outlet, and case drain hoses and shaft seal drain line.
- **b.** Remove the fasteners as follows:
  - **i.** For drilled head bolts, cut and remove the safety wire. Remove and discard the x4 bolts and x4 washers.
  - **ii.** For non-drilled head bolts, remove and discard the x4 bolts, x4 lockwashers, and x4 washers.
- **c.** Remove the pump.
- **d.** Remove and discard the gasket.

11. Remove hydraulic suppressor (refer to figure 5).

- **a.** Carefully release the internal pressure of the suppressor through the valve on the side.
- **b.** Disconnect the tubing from both ends of the suppressor.
- **c.** Remove and discard the x2 AN3-5A bolts and washers attaching each saddle clamp to the suppressor support plate.
- **d.** Remove the suppressor.
- **e.** Remove and discard saddle clamps.

12. Remove case drain lines (refer to figure 4).

- **a.** Disconnect and remove the case drain flexible line for bulkhead fitting at RH battery box. Install cap, 4 FNTX-SS, on bulkhead fitting using MIL-PRF-3483 or AA58092-2-2 anti-seize and torque to 135-150 in-lbs.
- **b.** Disconnect and remove the case drain flexible line from spar saddle bulkhead to reservoir lower pressure end cap. Install cap, 4 FNTX-SS, on bulkhead fitting at spar saddle bulkhead using MIL-PRF-83483 or AA58092-2-2 anti-seize and torque to 135-150 in-lbs.

13. Install gear pump (refer to figure 6 and figure 7).

- **a.** Remove accessory pad cover, AS3221, and hardware from Pad H.
- **b.** Remove and discard gasket. Clean pad cover and mating surface of Pad B.
- **c.** Install cover, AS3221, new gasket, AS34491, and hardware from previous pad location. Torque to 65-75 in-lbs.
- **d.** Install MS20995C32 safety wire or safety cable on bolt heads if bolts are provisioned as such.

e. Locate gear pump, AK29107001. Remove storage caps and spin driveshaft by hand, ensuring the pump operates freely.

f. Lubricate o-ring of pump outlet elbow fitting, P/N ~8 F5OX-SS, with SLUBE 884-2, or MIL-PRF-83282 or MIL-PRF-87257 hydraulic fluid. Install into RH port of gear pump and torque fitting, 37-44 ft-lbs.

g. Lubricate o-ring of pump outlet elbow fitting, P/N ~6 C5OX-SS, with SLUBE 884-2, or MIL-PRF-83282 or MIL-PRF-87257 hydraulic fluid. Install into LH port of gear pump and torque fitting, 24-26 ft-lbs.

h. Apply Loctite 567 to threads of elbow drain fitting, P/N 229-4-2. Install into drain port on bottom of gear pump. Tighten 1.5-3 turns past hand tight, such that the fitting is clocked appropriately to route its mating nylon shaft seal drain line.

i. Apply MIL-PRF-83483 or AA58092-2-2 anti-seize, to inlet fitting threads. Install -8 inlet hose assembly with straight fitting on pump and elbow fitting clocked 90° down in relation to mounting pad. Torque fitting, 450-500 in-lbs.

j. Clean mounting pad H of grease and any remaining gasket material (refer to FK29000000, sheet 4).

k. Fill coupling shaft spline features in pump drive shaft ⅓ full and coat mating splines with MIL-G-21164 grease.

l. Install hydraulic gear pump assembly, AK29107001, with accessory drive gasket, AS3491-01, on mounting pad H (refer to FK29000000, sheet 4).

m. Install 4x AN4-6A bolts, 4x MS35338-44 lock washers, and 4x NAS1149C0432R flat stainless washers. Torque bolts to 50-70 in-lbs.

n. Connect nylon shaft seal drain line to elbow. Replace line PK99005112 as required if existing line does not reach pump at new location.

14. Install hydraulic in-line filter (refer to figure 6).

a. Remove storage caps from in-line hydraulic filter, PK99290001 (see markings on body of filter for flow direction). Install -6 hose assembly onto filter inlet port using MIL-PRF-83483 or AA58092-2-2 anti-seize. Torque fitting to 110-130 in-lbs.

b. Mount the in-line hydraulic filter to mounting bracket, PK71400039, using 2x Adel clamps AS21929WCJ28, x2 AN3-5A bolts, x2 NAS1149F0332P flat washers, and x2 MS21042L3 self-locking nuts. Torque nuts to 20-25 in-lbs.

c. Install filter assembly utilizing existing nutplates on the aft debris shield for the hydraulic suppressor. Refer to FK29000000 sheet 5 for orientation. Install x3 AN3-6A bolts and x3 NAS1149F0332P washers. Torque bolts to 20-25 in-lbs.

d. Connect -6 stainless steel solid line to outlet port of in-line filter using MIL-PRF-83483 or AA58092-2-2 anti-seize. Torque fitting to 110-130 in-lbs.

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Note:

The reservoir can be modified without removal. However, removal is recommended to simplify component replacement.

15. Modify the hydraulic reservoir (refer to figure 1).

- **a.** Verify hydraulic system is depressurized.
- **b.** Remove hydraulic reservoir drain plug. Drain hydraulic fluid and inspect for contamination. Inspect magnetic drain plug for material.
- **c.** Remove hydraulic system filter. Cut open filter and inspect for contamination.
- **d.** Remove the hydraulic reservoir.
  - **i.** Disconnect the -6 pressure line at the reservoir.
  - **ii.** Disconnect the -8 suction line at the reservoir.
  - **iii.** Disconnect the -4 retract line at the reservoir.
  - **iv.** Disconnect the -6 extend line at the reservoir.
  - **v.** Disconnect the -4 bleed air line at the reservoir.
  - **vi.** Disconnect pressure switch harness at J392, pressure solenoid at J393, extend solenoid harness at J394, and retract solenoid harness at J395.
  - **vii.** Remove the x4 MS24694-S50 screws attaching the reservoir bracket to the spar saddles.

Note:

Exercise caution while removing the reservoir to not damage the pressure relief vent.

  - **viii.** Swing the aft end of the reservoir outboard first and then remove the entire assembly.
- **e.** Cut existing safety wire and remove x4 screws retaining the solenoid. Replace with x4 NAS1352-08H10P screws. Torque to 12-15 in-lbs and safety wire.
- **f.** Reinstall the magnetic drain plug and torque to 20-25 ft-lbs.
- **g.** Replace the regulator.

WARNING:

USE CAUTION WHEN LOOSENING THE T-FITTING, THE REMAINING AIR PRESSURE IN THE HYDRAULIC RESERVOIR WILL BE RELEASED.

i. Disconnect the bleed air supply line from the AN816-4D fitting on the regulator (refer to figure 2).

ii. Disconnect the 4 F6X-SS fitting from the air in line (refer to figure 2).

iii. Loosen the panel mount nut from the regulator and uninstall the regulator assembly (40 psi) from the support bracket.

Note:

The new regulator will be marked, torque-striped and set to 6 +/- 2 PSI. Ensure that the torque stripe is not broken during installation.

iv. Install the new regulator in the support bracket and install the panel nut 1/16 to ½ turn past hand tight. Apply Loctite 242 adhesive to panel nut (refer to figure 3).

v. Connect the female 4 F6X-SS fitting to the air in line (refer to figure 2).

vi. Connect the bleed air supply line to the AN816-4D fitting on the new regulator (refer to figure 3).

h. Remove -4 F5OX-SS case drain fitting from reservoir lower pressure end cap. Lubricate o-ring of -4 HP5ON-SS case drain plug with SLUBE 884-2, or MIL-PRF-83282 or MIL-PRF-87257 hydraulic fluid. Install plug into case drain receptacle on reservoir lower pressure end cap and torque to 14-16 ft-lbs.

i. Remove drain tube from check valve. Remove check valve (60psi), PK99005211, from air vent elbow. Install new check valve (10psi), PK99005235, and torque to 50-65 in-lbs. Install drain tube onto check valve with clocking pointed down and torque to 50-65 in-lbs.

16. Reinstall the hydraulic reservoir (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 29-10).

17. If hydraulic system contamination was found in step (15.b), perform hydraulic system flush. Drain reservoir and inspect fluid for contamination. Remove hydraulic filter and inspect for contamination. Install new filter and service reservoir, (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 29-10).

18. Cycle landing gear 5 times (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 32-30).

19. Perform 7 second dry motor to prime the hydraulic pump (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-00).

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20. Service the hydraulic reservoir, as needed (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 12-10).

21. Perform 30 second dry motor leak check (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-00).

22. If removed, reinstall the standby alternator (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 24-30).

23. Reinstall the blast shield (refer to Epic E1000 Aircraft Maintenance Manual, P/ N SK05000000, Chapter 32-20).

24. Reinstall both intercoolers and any removed tubing (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK050000000, Chapter 71-10).

25. Reinstall the top and side engine cowls (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-10).

26. Install the left and right belly panels (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 57-10).

27. Lower the aircraft (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 7-10).

28. Ground run the engine and do a leak check of the hydraulic lines (refer to Epic E1000 Aircraft Maintenance Manual, P/N SK05000000, Chapter 71-00).

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9 TABLES AND FIGURES:

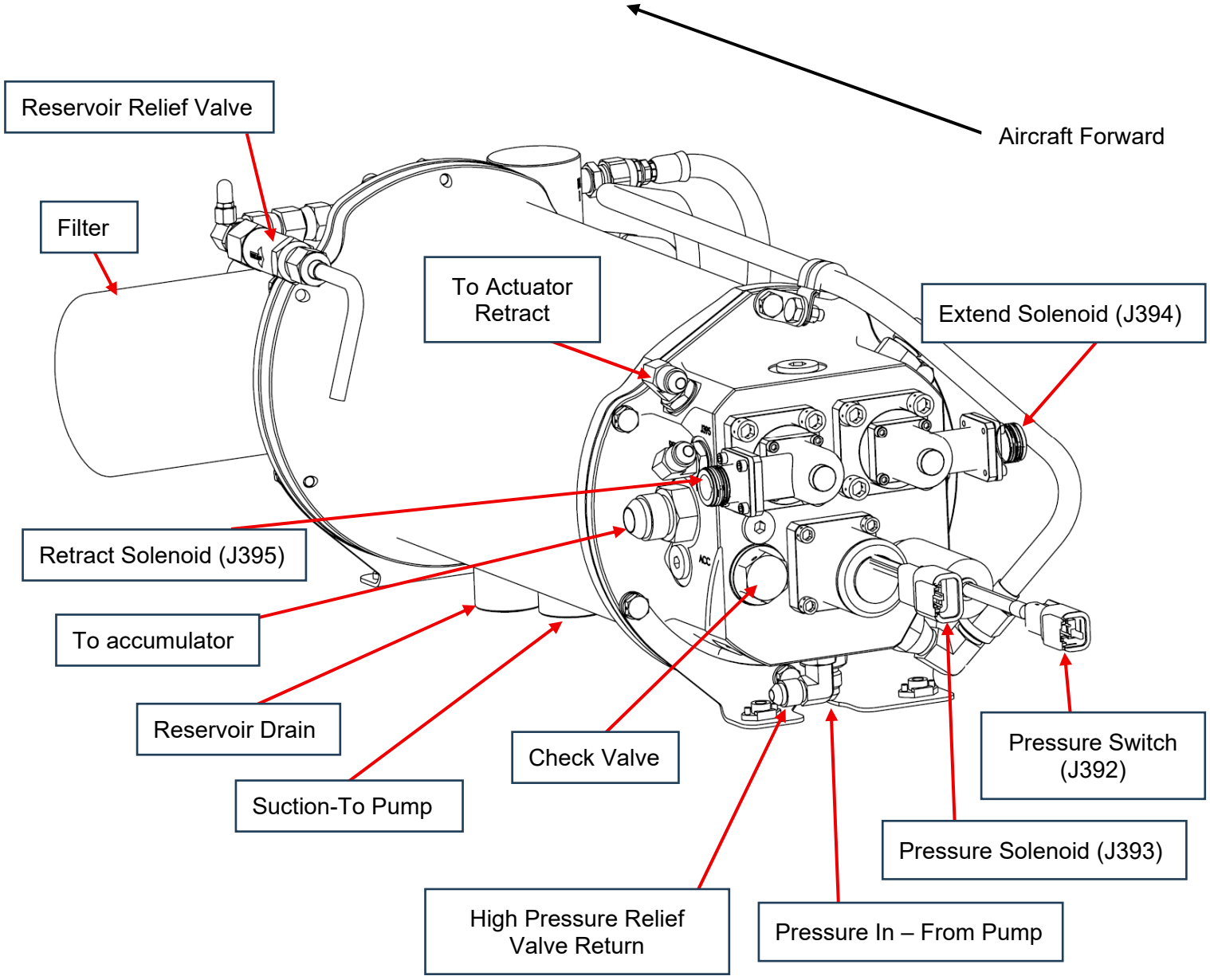

Figure 1: Hydraulic Reservoir AFT view

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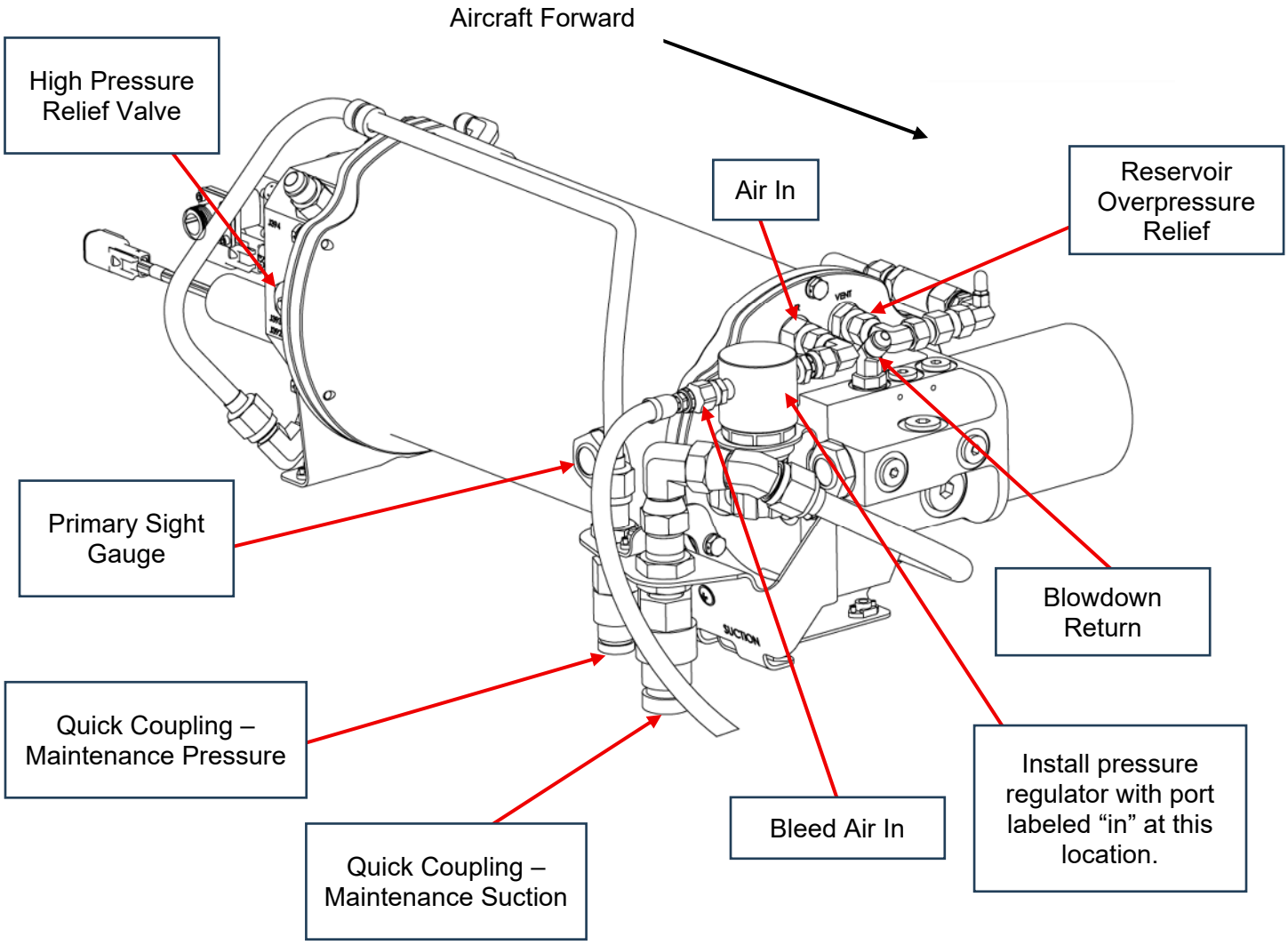

Figure 2: Hydraulic Reservoir FRONT view

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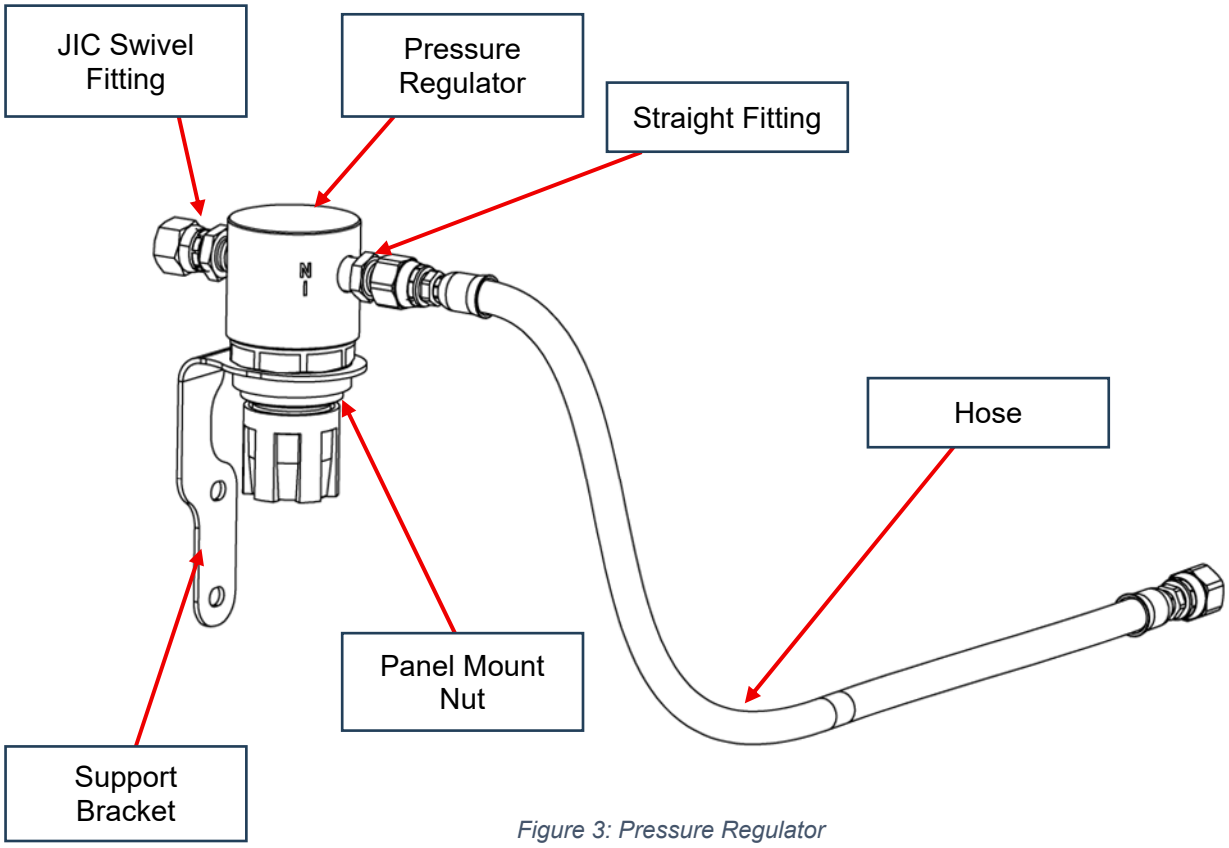

Figure 3: Pressure Regulator

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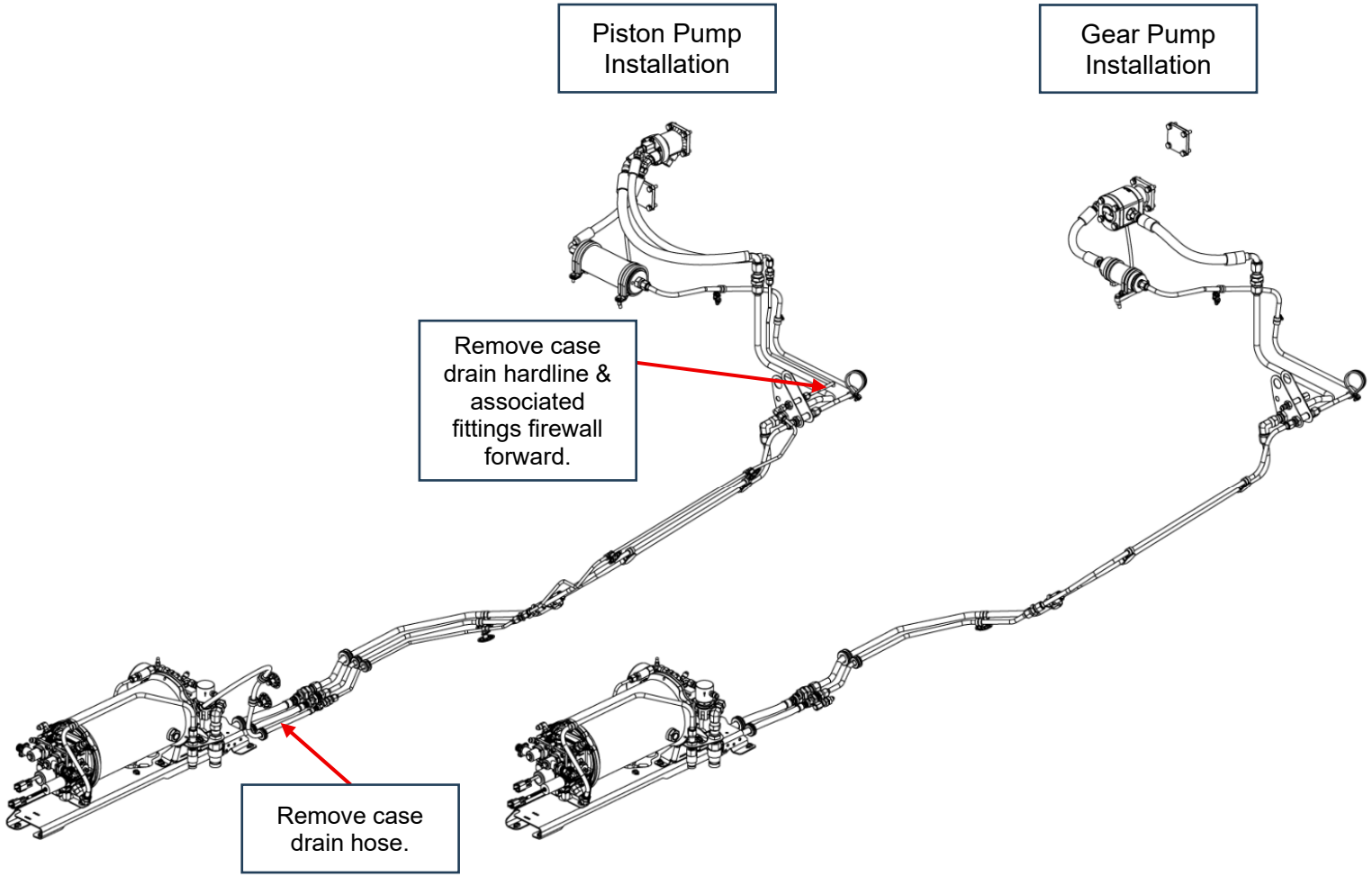

Figure 4: Piston and Gear Pump Installations

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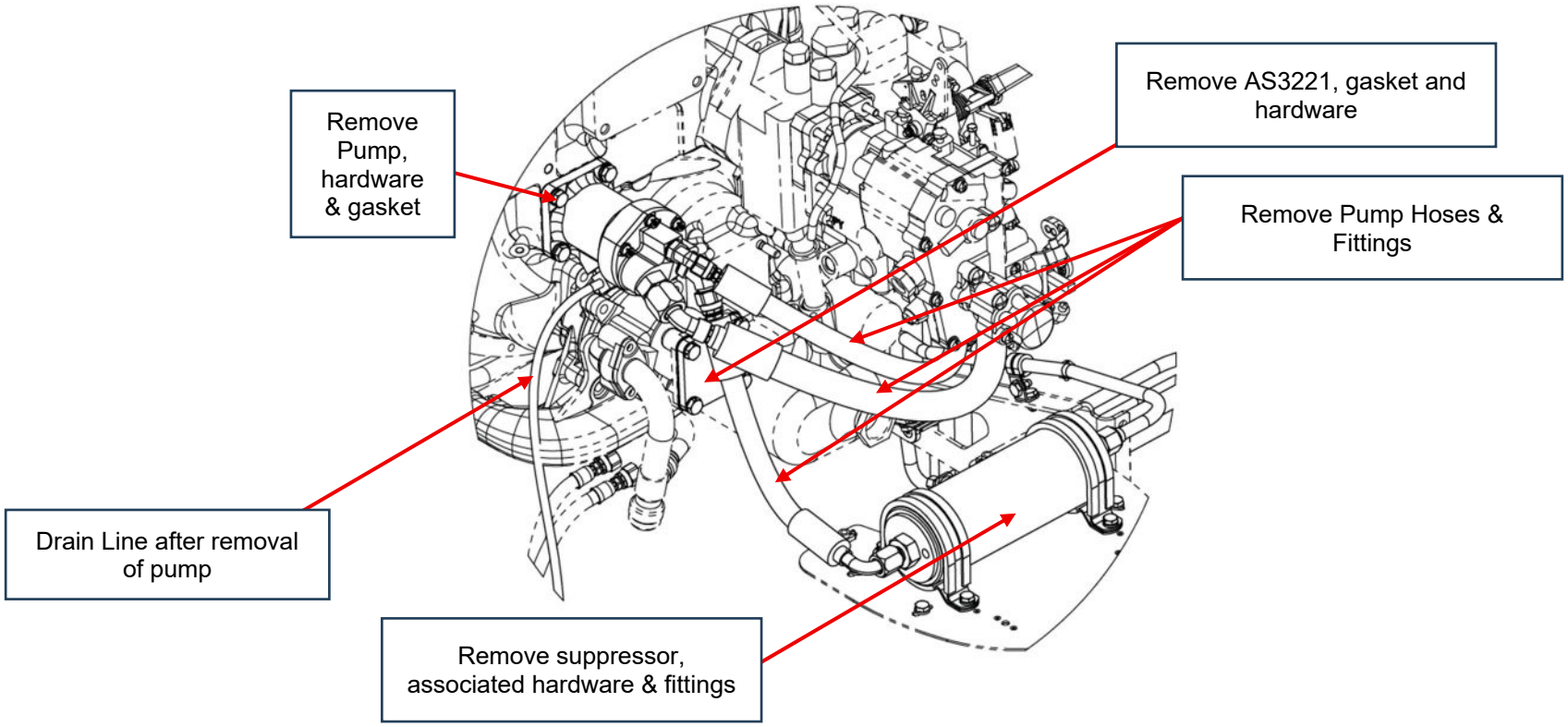

Figure 5: Piston Pump Assembly

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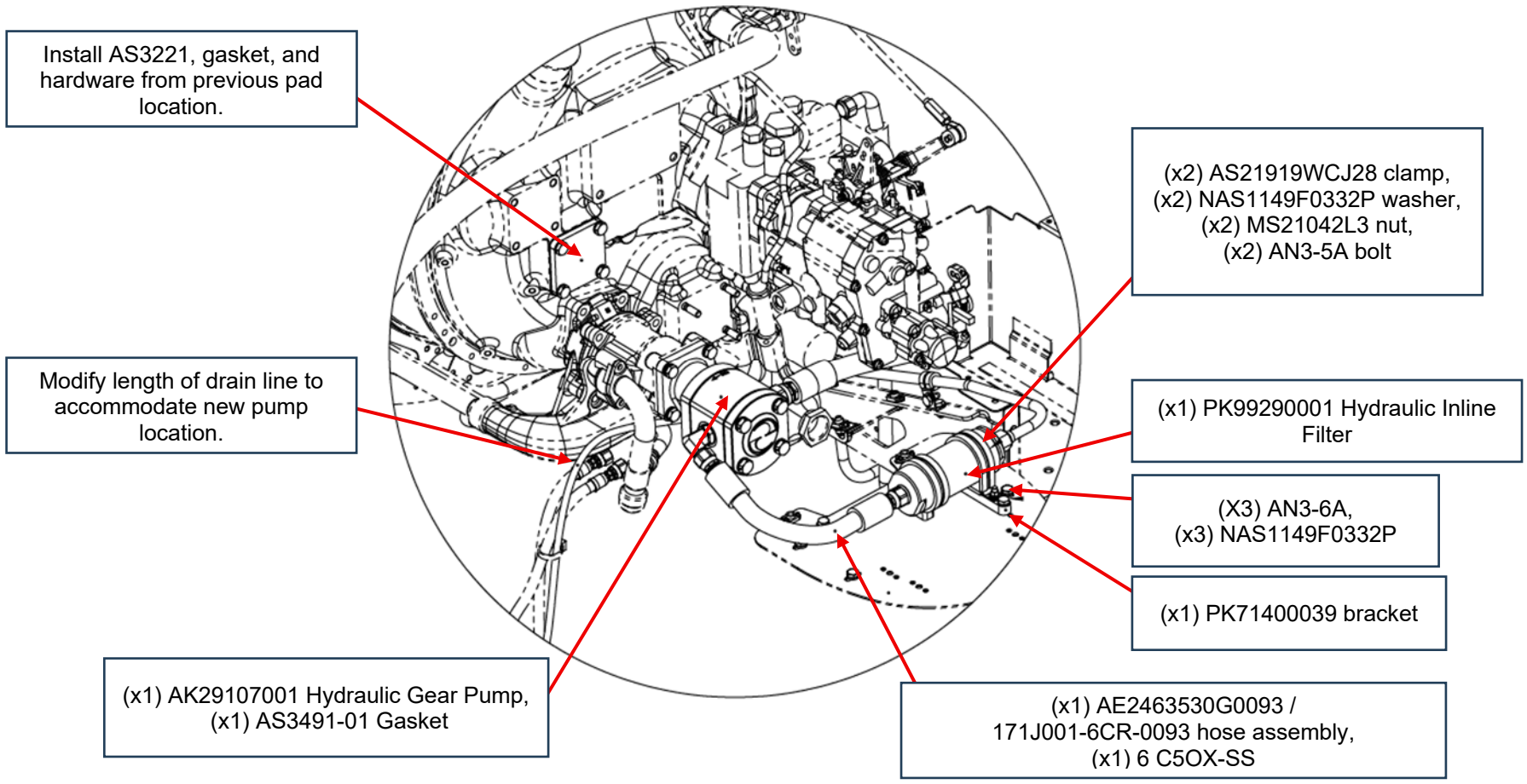

Figure 6: Gear Pump Assembly

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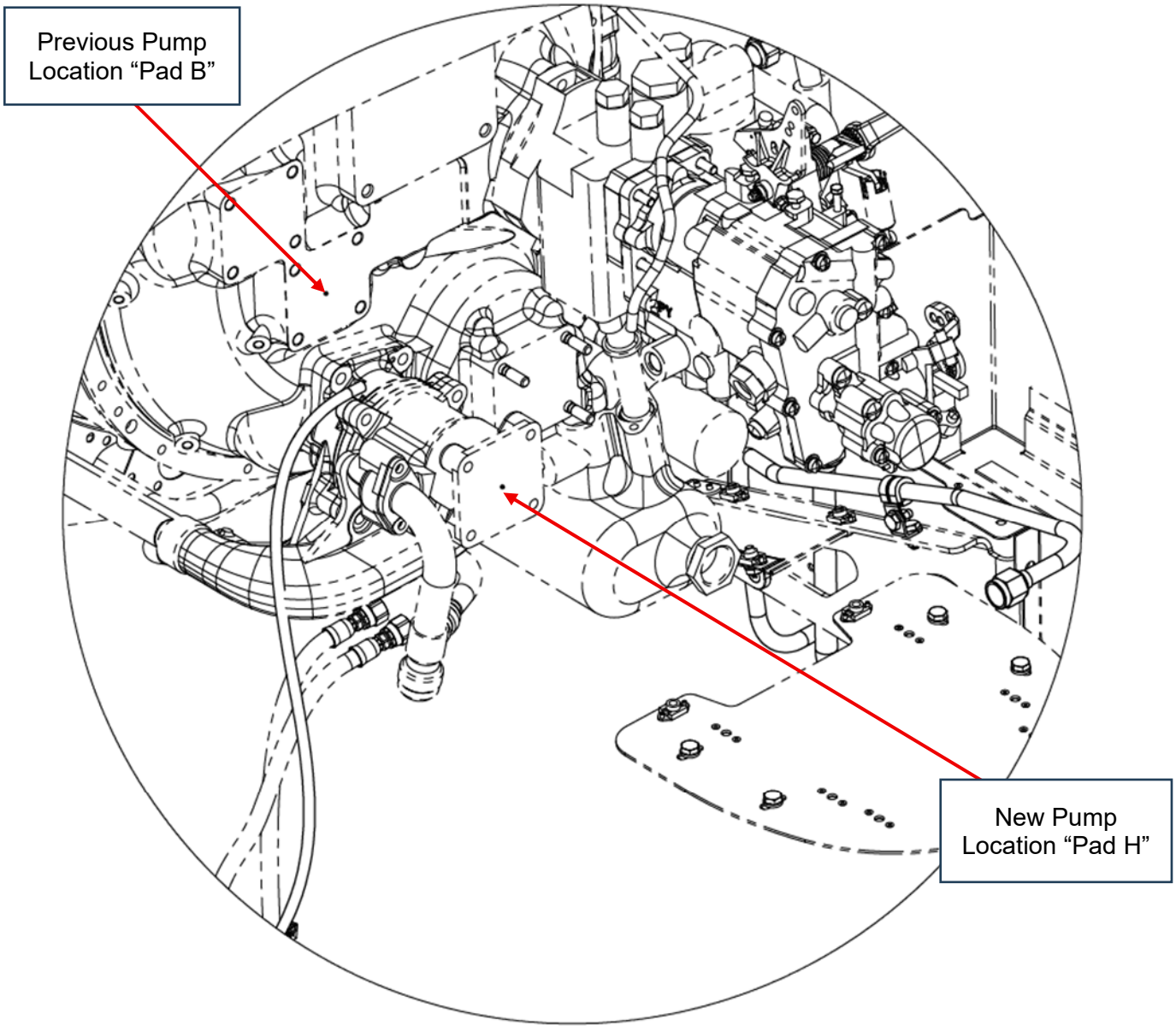

Figure 7: Hydraulic Pump Locations

10 WEIGHT AND BALANCE:

Refer to Epic E1000 Pilot's Operating Handbook and FAA Approved Airplane Flight Manual, Section 6:
P/N SK05000001 K004 – K010
P/N SK05001001 K003, K011 – K085 excluding K014
P/N SK05003001 K014, K086 and On
Perform a new weight and balance check given the following information:

Removed Components:
Weight (lb): -10.7
Arm (in): 108.0

Installed Components:
Weight (lb): 3.9
Arm (in): 106.9

Net Effect:
Weight (lb): -6.8
Arm (in): 108.5

11 PUBLICATIONS AFFECTED:

None.

12 RECORD COMPLIANCE:

Make appropriate entry in airplane maintenance records.

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Appendix A: Compliance Letter

Please complete and mail this form to Customersupport@epicaircraft.com

This is to certify that I have completed the work in accordance with the Epic Aircraft, LLC Service Bulletin.

Aircraft Owner Information:
Date: _____ Aircraft Serial Number: _____ Aircraft Reg. Number: _____ Owner's Name: _____
Maintenance Entity Information
Name of Shop Performing the work: _____ Name of Person(s) Performing inspection and/or work: _____ Phone Number: _____ Email: _____