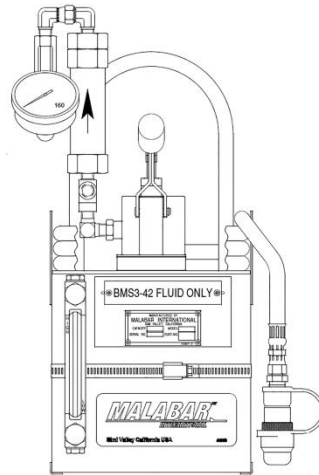




OPERATION & SERVICE MANUAL



Model: PF56266 Coolant Top-Off Unit (C-TOU) For B787

12/2018 – Rev. 01

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TABLE OF CONTENTS

	<u>PAGE</u>
1.0 PRODUCT INFORMATION	4
1.1 DESCRIPTION.....	4
1.2 MODEL & SERIAL NUMBER.....	4
1.3 MANUFACTURER	4
1.4 SPECIFICATIONS	4
2.0 SAFETY INFORMATION.....	4
2.1 USAGE AND SAFETY INFORMATION	4
3.0 PREPARATION PRIOR TO FIRST USE	4
4.0 TRAINING	5
4.1 TRAINING REQUIREMENTS	5
4.2 TRAINING PROGRAM	5
4.3 OPERATOR TRAINING	5
5.0 OPERATION	5
6.0 MAINTENANCE	5
6.1 SERVICING	5
6.2 REPAIR AND REPLACEMENT	5
7.0 PROVISION OF SPARES.....	5
7.1 SOURCE OF SPARE PARTS.....	5
7.2 RECOMMENDED SPARE PARTS LISTS	5
8.0 IN SERVICE SUPPORT.....	5
9.0 GUARANTEES/LIMITATION OF LIABILITY	6

This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.



CAUTION!

Aircraft manufacturer's specifications and instructions must be followed. In the event of contradiction between aircraft manufacturer's specifications and Malabar's, aircraft manufacturer's will prevail.

1.0 PRODUCT INFORMATION

1.1 DESCRIPTION

The Malabar Model PF56266 is a Coolant Top-off Unit (C-TOU) used to top off fluids and fill/drain/bleed individual Line Replaceable Units (LRUs) in the B787 Liquid Coolant System (LCS). The unit consists of a clean fluid reservoir, hand pump assembly, filter assembly, pressure gauge, fluid supply hose with sight glass. The female coupler on the delivery hose connects with a mating male nipple on top of the clean reservoir to permit purging of air in the hose prior to use. The level gauge on front of the clean reservoir indicates the fluid level in the reservoir. Remove the waste tank fill cap for K21016-8 waste applications.

1.2 MODEL & SERIAL NUMBER

Reference nameplate on unit

1.3 MANUFACTURER

Malabar International
1 Air Cargo Pkwy East
Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301
E-mail: sales@malabar.com
Website: www.malabar.com

1.4 SPECIFICATIONS

Fluid	BMS3-42
Clean fluid capacity	2 gal (7.6 l)
Waste fluid capacity	2 qts (1.9 l)
Filter rating	3 micron absolute
Pump outlet pressure	65 psig (448 kPa)
Relief valve set at	70 psig (482 kPa)
Volume per stroke	1.8 cubic in (29.6 cc)
Supply hose length	120 in (3048 mm)
Unit net weight (dry)	30 lbs (13.6 kg)
Clean and waste fluid tank	Stainless Steel

1.5 OPTIONAL EQUIPMENT

A B787 aircraft adapter kit (K21016-129 or Boeing approved equivalent) is required to connect the Malabar C-TOU for any aircraft service operation. Consult the Boeing 787-8, -9 maintenance documentation for adapter kit and servicing information. Boeing adapter kits must be purchased from Boeing approved sources. Malabar is a Boeing approved source. Refer to sheet 10 for K21016-129 adapter kit parts list.

2.0 SAFETY INFORMATION

2.1 USAGE AND SAFETY INFORMATION

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment manufacturer's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.



WARNING!

Warning is used to indicate the presence of a hazard that can cause **severe personal injury, death, and/or substantial property damage** if the Warning Notice is ignored.



CAUTION!

Caution is used to indicate the presence of a hazard, which will or can cause **minor personal injury or property damage** if the Caution Notice is ignored.

3.0 PREPARATION PRIOR TO FIRST USE

The unit is shipped fully assembled. Fill clean reservoir at fillport with approved fluid. Remove dust cap and connect supply hose coupler to clean reservoir male coupler. Operate hand pump assembly a few strokes to bleed all air out of the supply hose as indicated by the sight glass. The unit is now ready for use.



4.0 TRAINING

4.1 TRAINING REQUIREMENTS

The employer of the operator is responsible for providing a training program sufficient for the safe operation of the unit.

4.2 TRAINING PROGRAM

The employer provided operator training program should cover safety procedures concerning use of the unit in and around the intended aircraft at the intended aircraft servicing location.

4.3 OPERATOR TRAINING

The operator training should provide the required training for safe operation of the unit.

NOTE: Maintenance and Trouble Shooting are to be performed by a skilled and trained technician.

5.0 OPERATION

1. Attach appropriate LCS adapter(s) to the aircraft LCS or LRU per Boeing recommended operating procedures.
2. Remove dust cap on C-TOU supply hose coupler and connect to appropriate LCS adapter.
3. Use full steady pumping strokes when operating C-TOU hand pump assembly during fluid cycling.
4. Disconnect C-TOU supply hose from LCS adapter(s) and replace dust cap.
5. Stow supply hose on C-TOU hose rack and store the C-TOU in a dry, dark, dust free location.

6.0 MAINTENANCE

6.1 SERVICING

The frequency of filter change depends on operating conditions. Generally, changes should be made every 3-4 months or sooner if increased resistance is felt on the pumping stroke at low pressure. Refer to items 31 and 50 in figure 1A to change element.

6.2 RELIEF VALVE ADJUSTMENT

1. Refer to 45 in figure 1C to adjust relief valve. The relief valve can be adjusted to 70-75 psi.
2. Adjustment of the relief valve is performed with the delivery hose end QD not connected to anything (deadhead).
3. Loosen item 45 cap jam nut and turn item 45 cap clockwise to increase pressure or counterclockwise to decrease pressure while pumping the hand pump moderately (not too fast and not too slow) and observing the pressure gauge.
4. Tighten item 45 cap jam nut and loosen the hose end QD to bleed the pressure after the relief valve has been adjusted. Tighten hose end QD.

6.3 REPAIR AND REPLACEMENT

No definite time schedule can be established for the overhaul of the pump assembly for the replacement of the various moving parts. The number of times the pump assembly is operated materially affect the life of the working parts. The moving piston seal (item 19) wiper (item 18) and rod seal (item 16) are typically the first to wear. This is usually indicated by leakage of fluid past the piston or rod. It is advisable to change piston seal (item 19), wiper (item 18) and rod seal (item 16) immediately if leakage is discovered. A repair parts kit (P/N PF56266PK) is available and recommended to keep on hand at your facility.

7.0 PROVISION OF SPARES

7.1 SOURCE OF SPARE PARTS

Spare parts may be obtained from the manufacturer:

Malabar International

1 Air Cargo Pkwy East

Swanton, Ohio 43558 USA

Telephone: (419) 866-6301 or 800-426-6301

E-mail: sales@malabar.com

Website: www.malabar.com

7.2 RECOMMENDED SPARE PARTS LISTS

Reference the following page(s) for Replacement Parts and Kits available.

Refer to figure 1A, 1B & 1C for unit assembly or figure 2 for pump assembly.

8.0 IN SERVICE SUPPORT

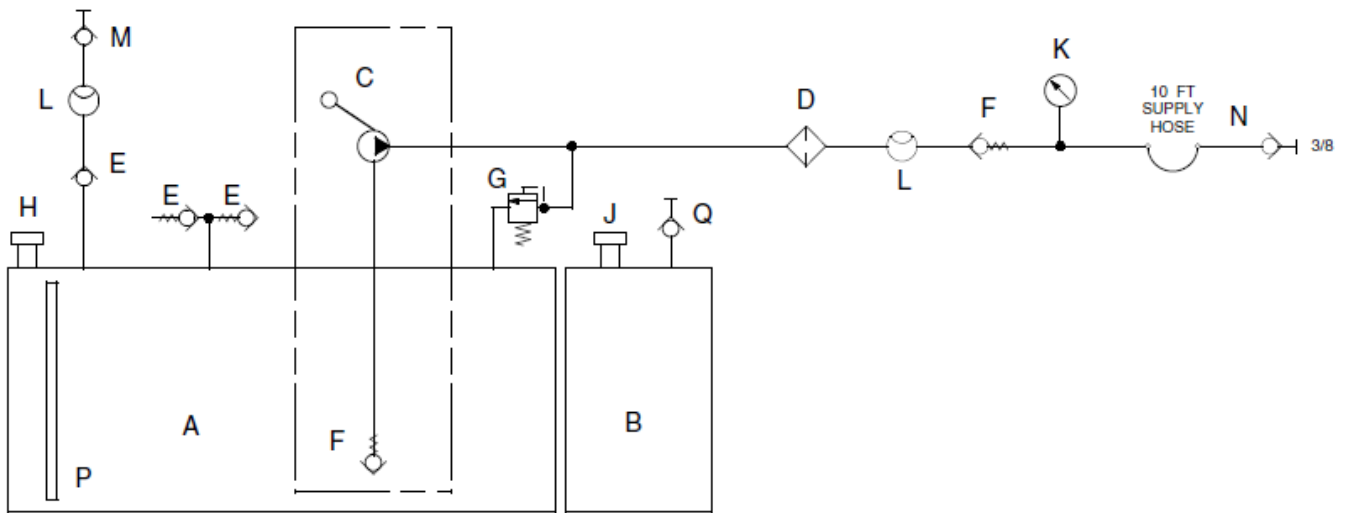
Contact Malabar, Inc. for technical services and information. See Section 1.3 – Manufacturer.



9.0 GUARANTEES/LIMITATION OF LIABILITY

- I. Seller warrants each new product of its manufacture to be free from defects in material or workmanship, under proper, reasonable, and normal use and service.
- II. The warranty period shall be as follows:
 - A. For Malabar equipment, with the exception of Tripod Jacks, the warranty period is one (1) year after date of shipment.
 - B. For Malabar Tripod Jacks, the warranty period is three (3) years after date of shipment.
- III. Where Buyer claims an alleged defect in material or workmanship and so advises Seller in writing within ten (10) days after discovery thereof, then and in such event, Buyer shall return said equipment, transportation prepaid, to the Seller, provided such return is timely and within the above-mentioned warranty period. This warranty and liability of the Seller is expressly limited solely to replacement or repair of defective parts or goods, and return at Buyer's expense to Buyer after finding by Seller the product was defective prior to original shipment or, at the option of Seller, to providing refund to Buyer of the purchase price for said product.
- IV. It is further expressly understood and agreed that:
 - A. THERE IS NO WARRANTY, REPRESENTATION OF CONDITION OF ANY KIND, EXPRESS OR IMPLIED, (INCLUDING NO WARRANTY OF MERCHANTABILITY OR OF FITNESS) EXCEPT THAT THE MATERIAL SHALL BE OF THE QUALITY SPECIFIED IN APPLICABLE SPECIFICATIONS, AND NONE SHALL BE IMPLIED BY LAW. Except as otherwise provided herein, quality shall be in accordance with Seller's specifications. Final determination of the material for the use contemplated by Buyer is the sole responsibility of Buyer and Seller shall have no responsibility in connection with such suitability, and
 - B. Buyer's sole and exclusive remedy shall be repair or replacement of defective parts or goods by the Seller. Should the goods, in the judgment of Seller, preclude the remedying of the warranted defects by repair or replacement, the Buyer's sole and exclusive remedy shall be the refund of the purchase price, and
 - C. Seller shall not be liable for prospective profits or special, indirect or consequential damages, nor shall any recovery of any kind against Seller be greater in amount than the purchase price of the specific material sold and causing the alleged loss, damage or injury. Buyer assumes all risk and liability for loss, damage or injury to persons or property of Buyer or others arising out of use or possession of any product or part sold hereunder, and
 - D. Seller shall in no way be deemed or held to be obligated, liable or accountable upon or for any guarantees or warranties, express or implied, or created by statute or by operation of law or otherwise, in any manner of form beyond its express agreement above set forth, and
 - E. No warranty herein shall apply to any product which shall have been repaired or altered, unless such alteration or repair has been made by Seller or if, after return to and inspection by Seller, the product is found by Seller to have been subject to misuse, negligence or accident, and
 - F. No warranty of any nature is made by Seller as to any component forming a part of the product sold and Buyer shall receive only such warranties offered by such other manufacturer of such component, and
 - G. Seller does not assume nor does Seller authorize any other person to assume for it any other liability or make any warranty in connection with the sale of its products.

HYDRAULIC DIAGRAM



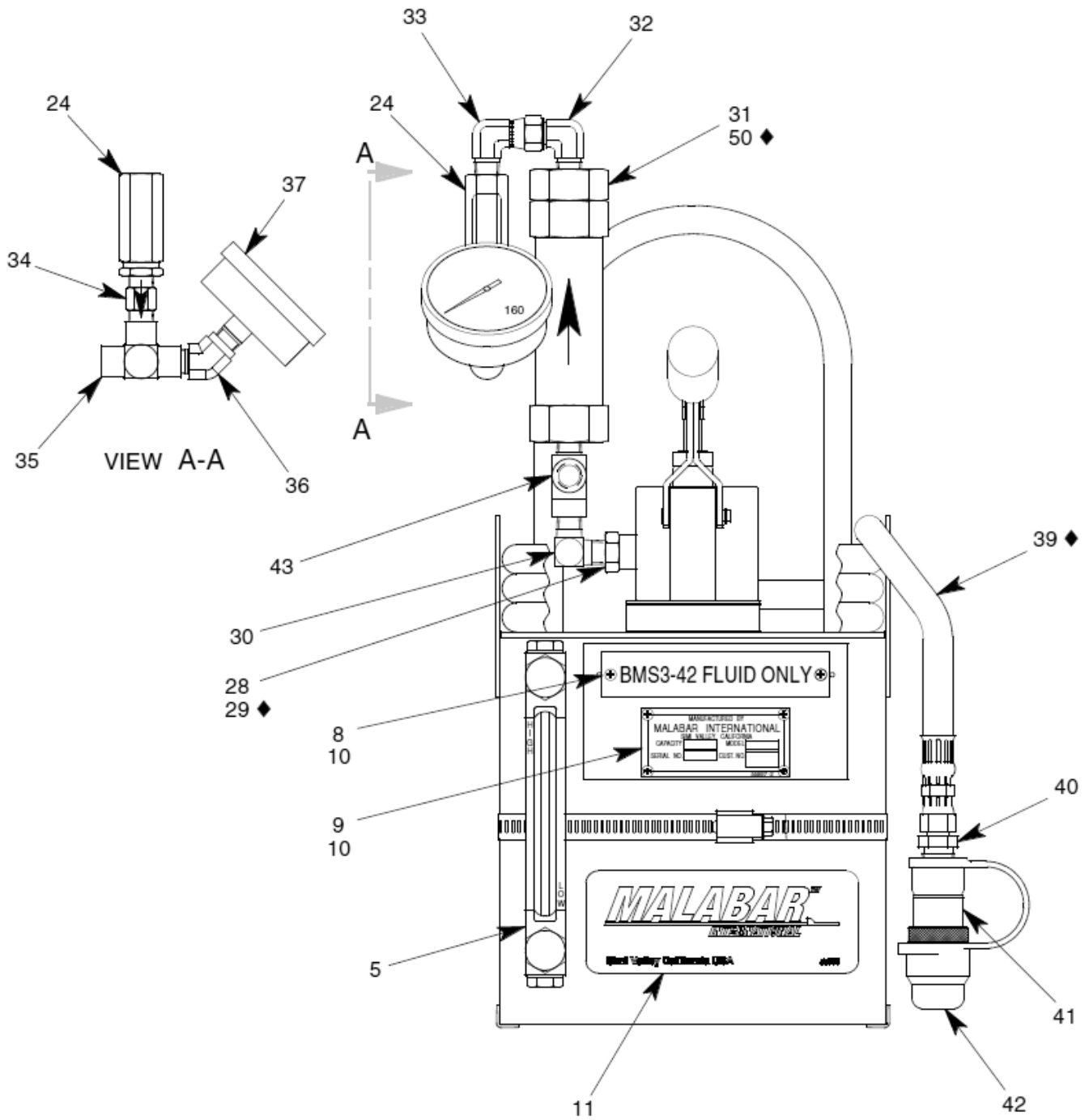
- A - 2 GALLON CLEAN FLUID RESERVOIR
- B - 2 QUART WASTE FLUID RESERVOIR
- C - HAND PUMP
- D - 3 MICRON ABSOLUTE SUPPLY FILTER
- E - 1/3 PSIG CHECK VALVE
- F - 1 PSIG CHECK VALVE
- G - PRESSURE RELIEF VALVE
- H - NON VENTED RESERVOIR FILL CAP

- J - VENTED PORT WITH BREATHER
- K - PRESSURE GAUGE
- L - FLUID FLOW SIGHT
- M - DEAERATION/CLEAN BLEED CONNECTION POINT
- N - SUPPLY HOSE WITH 3/8 QD COUPLER
- P - FLUID LEVEL SIGHT
- Q - RETURN BLEED PORT

Parts List – Figure 1A

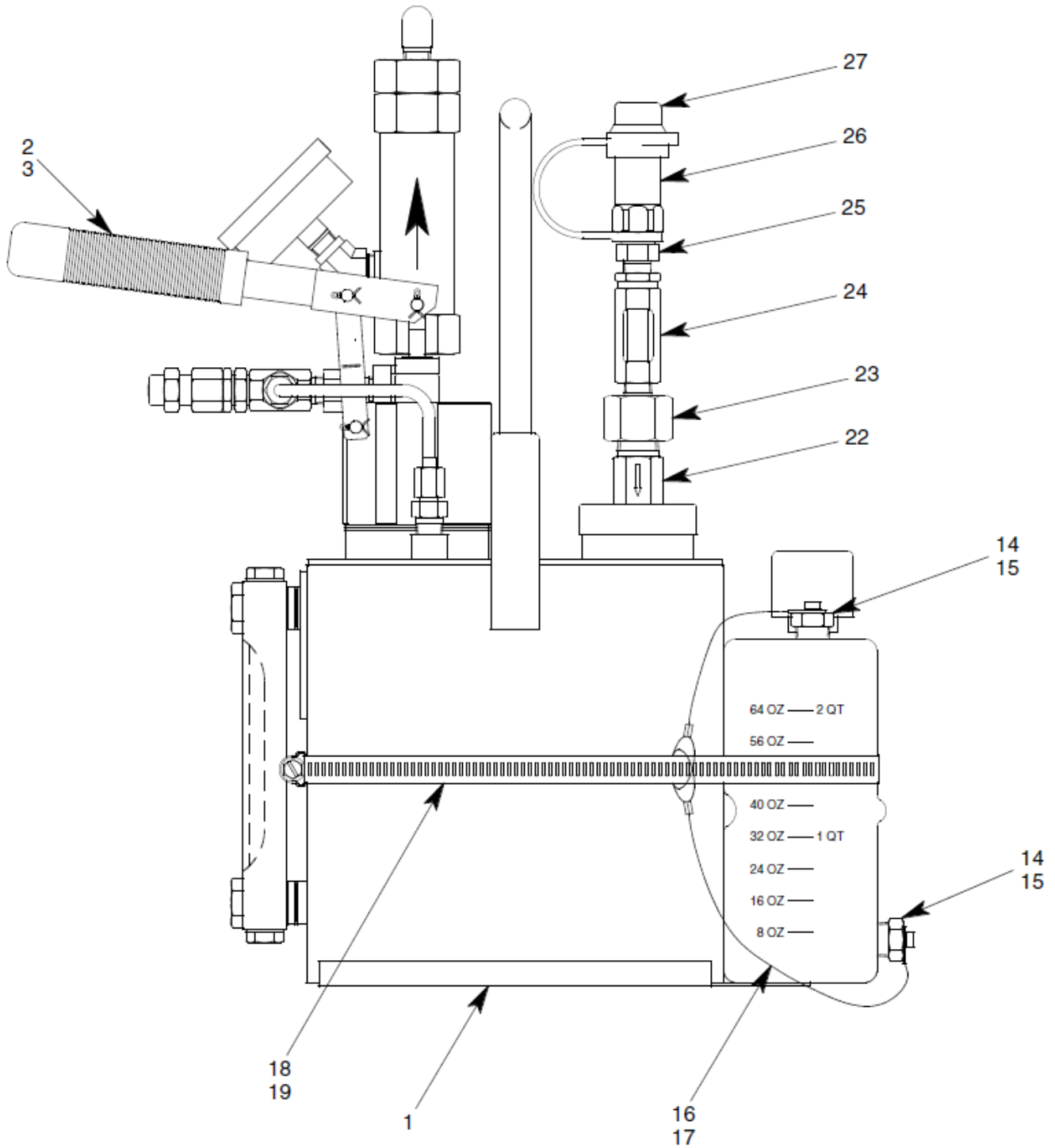
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

◆ PART OF REPAIR PARTS KIT



Parts List – Figure 1B

When ordering replacement parts/kits, please specify model, serial number and color of your unit.





Parts List – Figure 1A, 1B & 1C

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	PF56272	FLUIDTANK	1
2	PF55734	PUMP ASSEMBLY	1
3	PF55672	GASKET	1
4	324-002	SHCS, 1/4-28 x 1 3/4 LG	4
5	484-021	FLUID SIGHT	1
6	483-027	CAP	1
7	483-028	STRAINER	1
8	PF56160	PLACARD, BMS3-42 FL ONLY	1
9	55997-2	NAMEPLATE	1
10	397-010	SELF TAP SCREW, 6-32	4
11	55998	STICKER, MALABAR	1
12	PF56117-1	WASTE TANK	1
13	483-017	VENT WITH BAFFLE	1
14	PF56176	PLUG	2
15	330-016	SHSS, 3/16 DIA x 1/4 LG, 8-32	2
16	491-027	CABLE, NYLON COVER	AR
17	491-028	CRIMP SLEEVE	4
18	PF56125	HOSE BAND	1
19	394-060	HOSE BAND CLAMP	1
20	713-050	TEE, 1/4 NPT	1
21	422-086	CHECK VALVE, 1/4 MPT	2
22	422-091	CHECK VALVE, 1/2 MPT	1
23	714-066	REDUCER, 1/4 MPT x 1/2 FPT	1
24	484-036	FLOW SIGHT, 1/4 FPT	2
25	714-027	NIPPLE, 1/4 MPT x 3/8 MPT	1
26	735-072	QD NIPPLE, 3/8 FPT	1
27	735-073	DUST CAP	1
28	751-052	ADAPTER, 1/4 FPT x 3/8 SAE	1
29	55933-906	O-RING	1
30	712-096	ELBOW, 1/4 MPT	1
31	481-111	FILTER ASSEMBLY, 3 MIC AB	1
32	722-069	ELBOW, 3/8 37° x 1/4 MPT	1
33	722-174	ELBOW, 3/8 37° SW x 1/4 MPT	1
34	422-072	CHECK VALVE, 1/4 MPT	1
35	713-006	TEE, 1/4 FPT	1
36	712-117	ELBOW, 45°, 1/4 NPT	1
37	482-120	GAUGE, 1/4 MPT, 0-160 PSIG	1
38	721-124	CONN, 3/8 37° x 1/4 MPT	1
39	PF56273	HOSE ASSEMBLY, 10' LG	1
40	721-160	CONN, 3/8 37° x 3/8 MPT	1

Continued on following page.



Parts List – Figure 1A, 1B & 1C

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
41	736-136	QD COUPLER, 3/8 FPT	1
42	736-137	DUST CAP	1
43	713-026	TEE, 1/4 NPT	1
44	714-073	ADAPTER, 1/4 NPT	1
45	423-094	RELIEF VALVE, 1/4 NPT	1
46	721-138	CONN, 1/4 37° x 1/4 MPT	2
47	729-107	SLEEVE, 1/4 37°	2
48	729-106	NUT, 1/4 37°	2
49	732-003	TUBE, 1/4 OD x .035 WALL	AR
50	481-112	ELEMENT (PART OF ITEM 31)	1



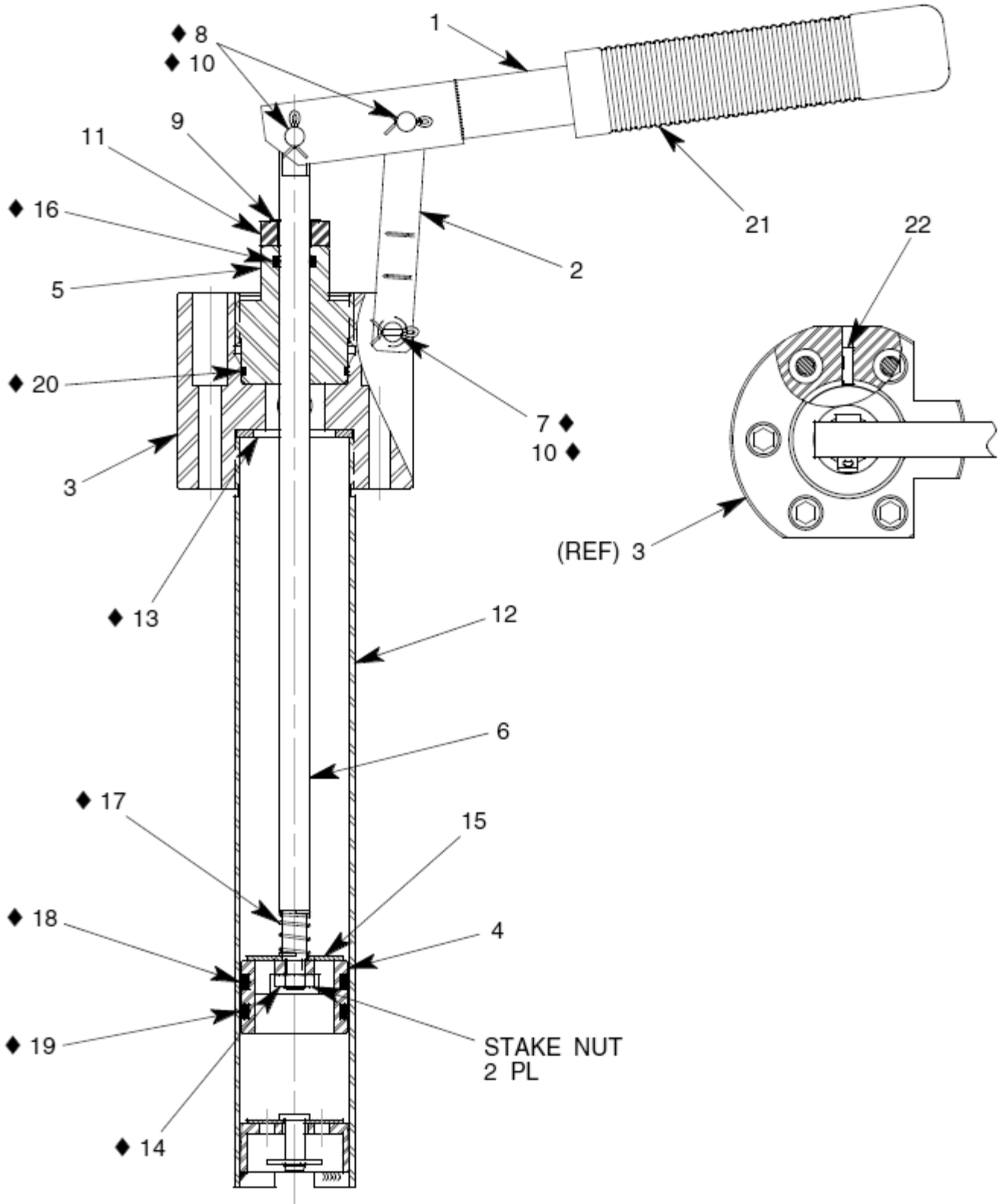
Model: PF56266
B787 Coolant Top-Off Unit (C-TOU)

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Parts List – Figure 2

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

◆ PART OF REPAIR PARTS KIT



Parts List – Figure 2

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
	PF55734	PUMP ASSEMBLY ; <i>consists of:</i>	
1	PF55735	PUMP HANDLE ASSEMBLY	1
2	PF55739	PUMP LINK	1
3	PF55741	PUMP OUTLET	1
4	PF55743	PISTON	1
5	PF55738	BUSHING	1
6	PF55740	PISTON ROD	1
7	373-020	FH PIN, SS, 1/4 DIA x 1.484 LG	1
8	373-019	FH PIN, SS, 1/4 DIA x 1/2 LG	2
9	AN960C616	FLAT WASHER, SS, 3/8	1
10	372-027	COTTER PIN, 1/16 DIA x 1/2	3
11	PF55748	SPACER	1
12	PF55749	CYLINDER WELDMENT	1
13	PF54063	GASKET	1
14	359-010	HEX NUT, SS, 1/4-28	1
15	PF55744	PISTON CHECK DISC	1
16	55933-110	O-RING	1
17	495-020	SPRING, SS	1
18	55931-216	O-RING, TEFLON	1
19	55933-216	O-RING	1
20	55933-026	O-RING	1
21	494-006	HANDLE GRIP	2
22	331-037	SETSCREW, SS, 6-32 x 1/2 LG	2



Parts List – PF56266PK Repair Parts Kit

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Part Number	Description	Qty
PF56273	HOSE ASSEMBLY	1
481-112	FILTER ELEMENT	1
55933-906	O-RING	1
373-020	FLAT HD PIN, 1/4 DIA x 1.484 LG	1
373-019	FLAT HD PIN, 1/4 DIA x 1/2 LG	1
372-027	COTTER PIN, 1/16 DIA x 1/2 LG	3
PF54063	GASKET	1
359-010	HEX NUT, 1/4-28	1
55933-110	O-RING	1
495-020	SPRING	1
55931-216	O-RING, TEFLON	1
55933-216	O-RING	1
55933-026	O-RING	1



Parts List – K21016-129 Adapter Parts Kit

When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Part Number	Description	Qty
K21016-5	PECS, FCAC, & ICS TOP OFF PORT ASSEMBLY	1
K21016-131	PECS, FCAC, & ICS PUMP BLEED ASSEMBLY	1
K21016-7	PECS, FCAC, & ICS PUMP FILL HOSE ASSEMBLY	1
K21016-8	PECS, FCAC, & ICS BLEED HOSE ASSEMBLY	1
K21016-9	HVDC MC SERVICE ASSEMBLY	1
K21016-10	BLEED PLUG VALVE ASSEMBLY	1
K21016-12	SCU MC SUPPORT ASSEMBLY	1
K21016-111	PECS, FCAC, ICS & CRU MC LRU IN ASSEMBLY	1
K21016-112	PECS, FCAC, ICS & CRU MC LRU OUT ASSEMBLY	1
K21016-120	USAGE PLACARD	1
K21016-123	SCU MC IN ASSEMBLY	1