

**Model: PF56180
B787
Coolant Top Off Pack (CTOP)**

10/2018 – 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
1.5 OPTIONAL EQUIPMENT.....	4
2.0 SAFETY INFORMATION.....	4
2.1 USAGE AND SAFETY INFORMATION	4
3.0 PREPARATION PRIOR TO FIRST USE	5
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 RELIEF VALVE ADJUSTMENT.....	5
6.3 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.....	6
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 PF56180 is a Coolant Top-off Pack (CTOP) 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 and return hoses with sight glasses and end couplings that interface with various (LCS) adapter assemblies which can be kept in the storage compartment. 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 top of the clean reservoir indicates the fluid level that reservoir. Remove the waste tank fill cap for K21016-8 waste applications. The sight gauge on the front of the waste reservoir indicates the fluid level in that reservoir. There is a ground stud located on top of the storage compartment for grounding the (CTOP) to the aircraft. The two-wheel hand cart design has a 3" lunette eye integrated in the handle. This allows for ease of manual portability or vehicle towing.

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	6 U.S. gal (22.7 l)
Waste fluid capacity	3 U.S. gal (11.4 l)
Filter rating	3 micron absolute
Pump outlet pressure	65 psig (448 kPa)
Relief valve set at	70 psig (482 kPa)
Volume per stroke	3.0 cubic in (49 cc)
Supply hose length	240 in (6096 mm)
Return hose length-	240 in (6096 mm)
Maximum towing speed	5 mph (8 kph)
Unit net weight (dry)	100 lbs (45.4 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 CTOP 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.

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 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 CTOP supply hose coupler and connect to appropriate LCS adapter.
3. Remove dust cap on CTOP return hose nipple and connect to appropriate LCS adapter.
4. Use full steady pumping strokes when operating CTOP hand pump assembly during fluid cycling.
5. Disconnect CTOP supply and return hoses from LCS adapter(s) and replace dust caps.
6. Stow hoses on CTOP hose racks and store the CTOP in a dry, 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 more than normal resistance is felt on the pumping stroke at low pressure. Refer to items 1 and 18 in figure 1D to change element.

NOTE: The relief valve should not be removed. The relief valve is set to by-pass oil back to the reservoir at 125 ± 10 PSIG.

6.2 RELIEF VALVE ADJUSTMENT

1. Refer to items 17 and 19 in figure 2 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. Remove item 17 plug and turn item 19 set screw 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. Replace item 17 plug 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 14) and rod seal (item 15) 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 14) and rod seal (item 15) immediately if leakage is discovered. A repair parts kit (P/N PF56180PK) is available and recommended to keep on hand at your facility. Refer to repair parts kit for the complete list of parts contained in the repair parts kit.

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 AND 1D for unit assembly or figure 2 for pump assembly.

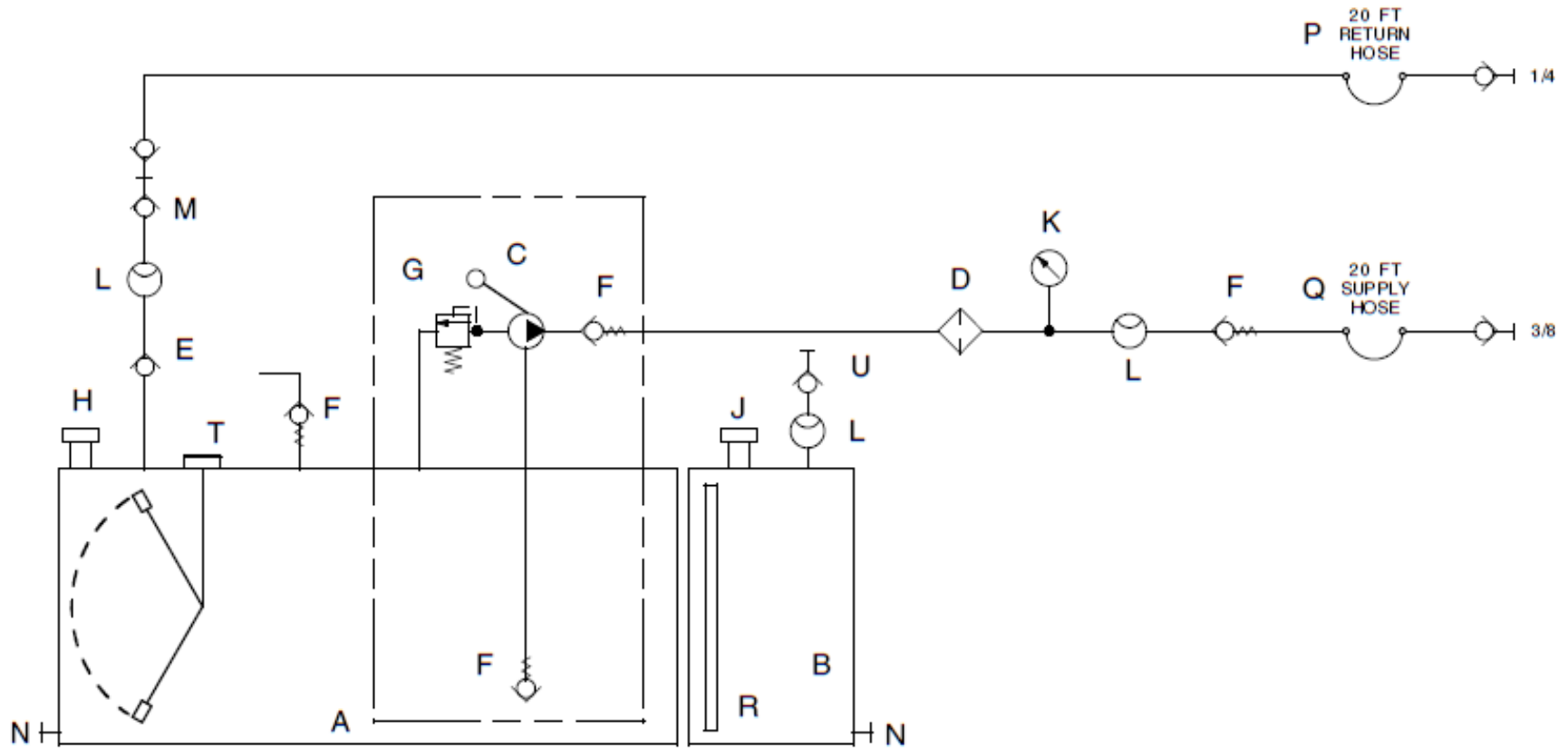
8.0 IN SERVICE SUPPORT

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

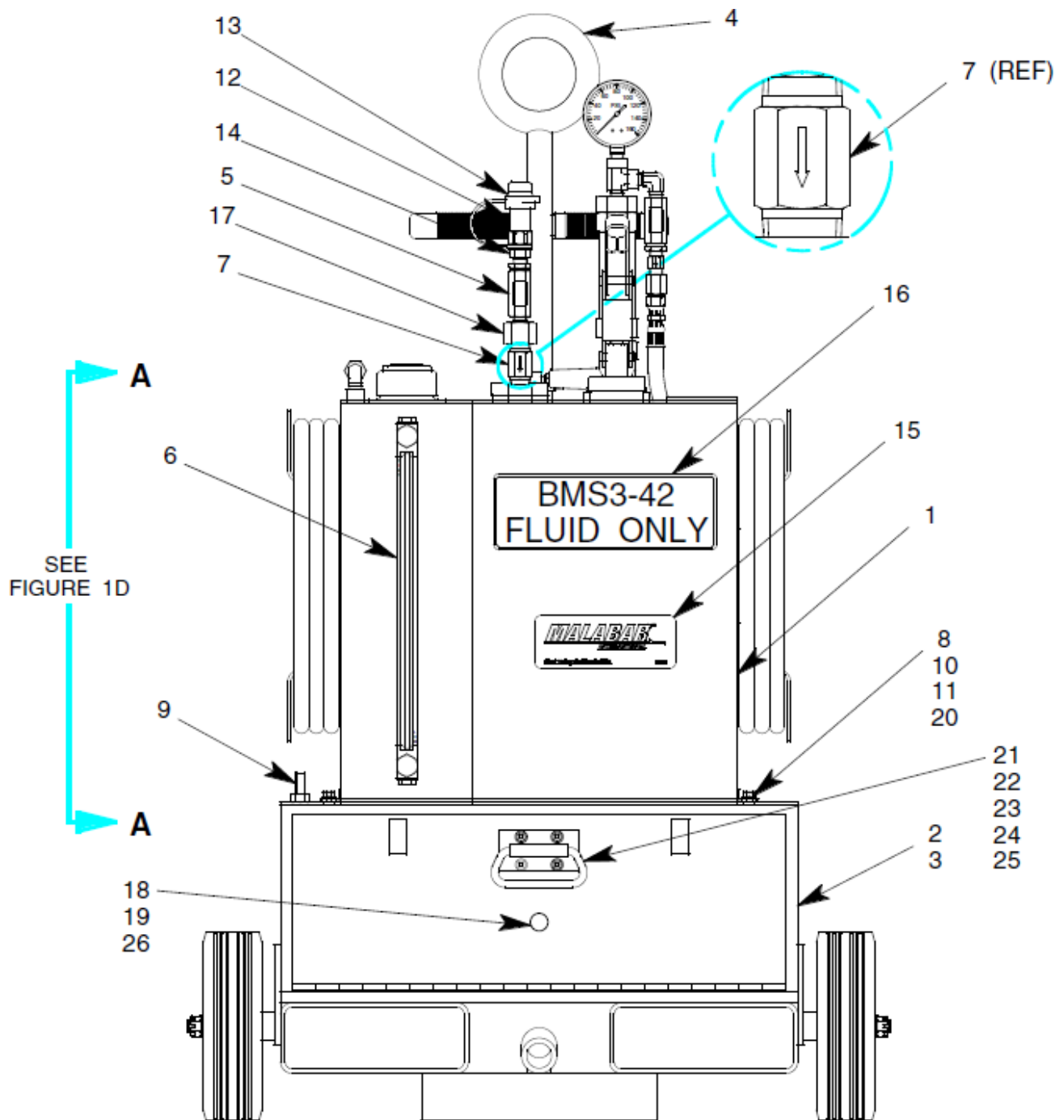


- A - 6 GALLON CLEAN FLUID RESERVOIR
- B - 3 GALLON WASTE FLUID RESERVOIR
- C - HAND PUMP
- D - 3 MICRON ABSOLUTE SUPPLY FILTER
- E - 1/2 PSIG CHECK VALVE
- F - CHECK VALVE
- G - PRESSURE RELIEF VALVE
- H - NONVENTED RESERVOIR FILL CAP
- J - VENTED CLEANOUT PORT

- K - PRESSURE GAUGE
- L - FLUID FLOW SIGHT
- M - DEAERATION/CLEAN RETURN CONNECTION POINT
- N - DRAIN PLUG
- P - RETURN HOSE WITH 1/4 QD COUPLER
- Q - SUPPLY HOSE WITH 3/8 QD COUPLER
- R - FLUID LEVEL SIGHT
- T - FLUID LEVEL GAUGE
- U - BLEED CONNECTION POINT

Parts List – Figure 1A

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



Parts List – Figure 1A

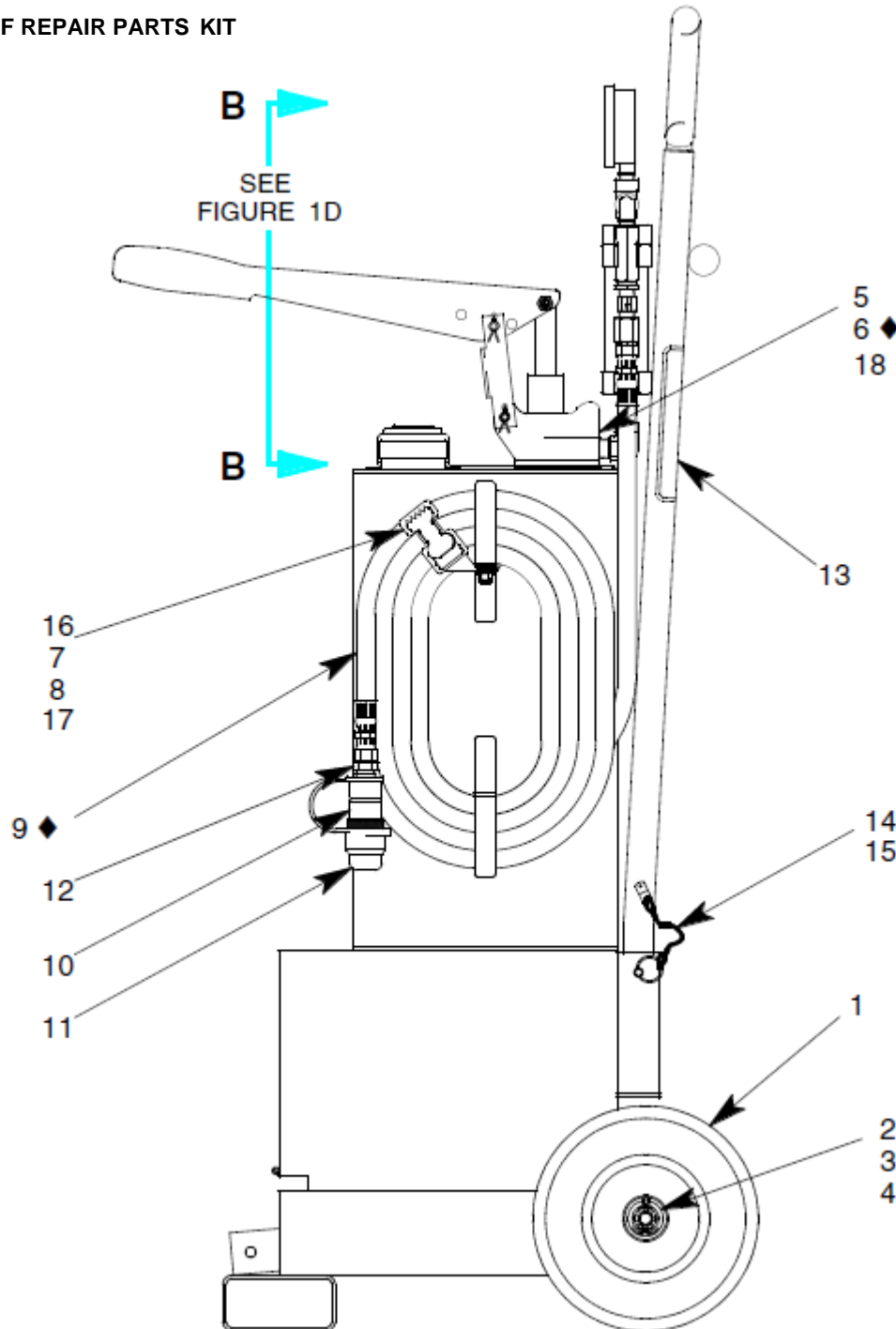
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	PF56190	RESERVOIR WELDMENT	1
2	PF56188	TOOL BOX	1
3	PF56186	TOOL BOX MAT	1
4	PF56191	HANDLE	1
5	484-036	INLINE FLOW SIGHT, 1/4 FPT	3
6	484-032	FLUID SIGHT GAUGE, 1/2-20	1
7	422-091	CHECK VALVE, 1/2 PSIG	1
8	324-017	HHCS, 1/4-20 x 3/4 LG	6
9	329-015	STUD, 3/8-16 x 1 1/4 LG	1
10	359-027	RIVNUT, 1/4-20, BLIND	6
11	362-038	FLAT WASHER, 1/4 SAE	6
12	735-072	QD NIPPLE, 3/8 FPT	1
13	735-073	DUST CAP	1
14	PF56190	RESERVOIR WELDMENT	1
15	PF56188	TOOL BOX	1
16	PF56186	TOOL BOX MAT	1
17	PF56191	HANDLE	1
18	484-036	INLINE FLOW SIGHT, 1/4 FPT	1
19	484-032	FLUID SIGHT GAUGE, 1/2-20	1
20	422-091	CHECK VALVE, 1/2 PSIG	6
21	324-017	HHCS, 1/4-20 x 3/4 LG	1
22	329-015	STUD, 3/8-16 x 1 1/4 LG	4
23	359-027	RIVNUT, 1/4-20, BLIND	4
24	362-038	FLAT WASHER, 1/4 SAE	4
25	735-072	QD NIPPLE, 3/8 FPT	4
26	735-073	DUST CAP	1

Parts List – Figure 1B

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

◆ PART OF REPAIR PARTS KIT



Parts List – Figure 1B

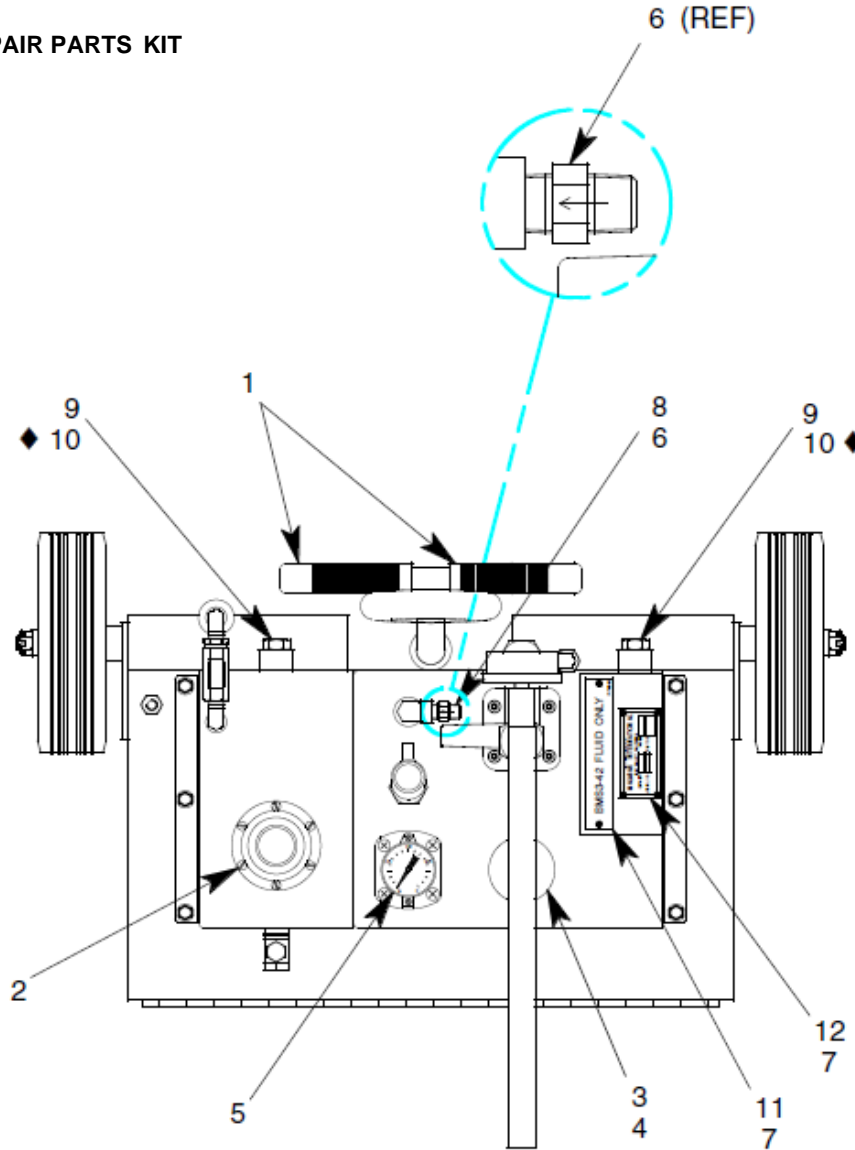
When ordering replacement parts/kits, please specify model, serial number and color of your unit.

Item	Part Number	Description	Qty
1	492-219	WHEEL, SEMI-PNEUMATIC	2
2	372-002	COTTER PIN	2
3	357-002	CASTLE NUT, 1/2-13	2
4	492-220	THRUST WASHER	2
5	PF55847-5	PUMP ASSEMBLY	1
6	PF53602	GASKET, PUMP ASSEMBLY	1
7	326-033	BHSCS, 1/4-20 x 3/4 LG	1
8	362-038	FLAT WASHER, 1/4 SAE	1
9	PF56216	HOSE ASSEMBLY	1
10	736-136	QD COUPLER, 3/8 FPT	1
11	736-137	DUST PLUG	1
12	721-160	CONN., 3/8 MPT x 3/8 37° MALE	1
13	75940	STICKER, TOWING	1
14	370-053	QUICK RELEASE PIN	1
15	326-032	BHCS, 10-32 x 1/2 LG	1
16	837724	STRAP	1
17	353-020	LOCKNUT, 1/4-20	1
18	324-084	BHSCS, 1/4-28 x 3/4 LG	4

Parts List – Figure 1C

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

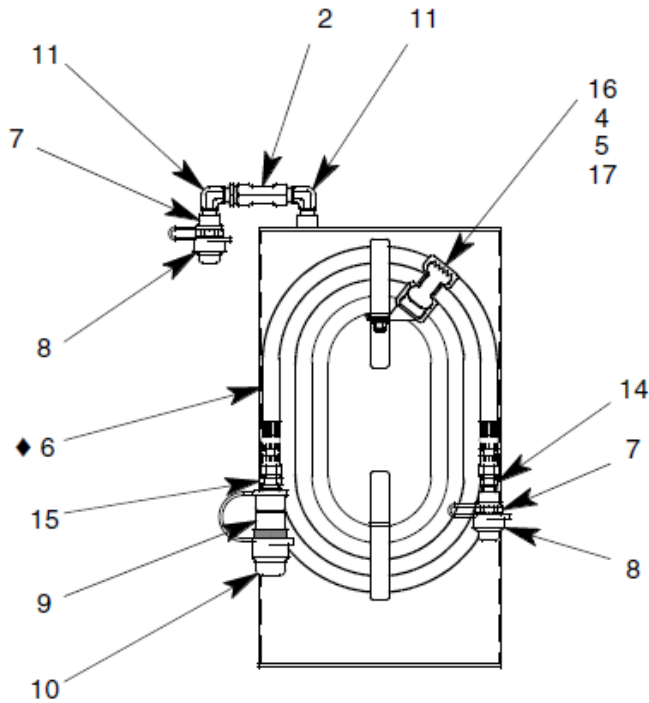
♦ PART OF REPAIR PARTS KIT



Item	Part Number	Description	Qty
1	494-006	HANDLE GRIP	2
2	PF55447	FILLPORT ASSEMBLY	1
3	483-027	CAP	1
4	483-028	STRAINER	1
5	482-098	LIQUID LEVEL INDICATOR	1
6	422-086	CHECK VALVE, 1/2 PSIG	1
7	397-010	SELF TAPPING SCREW, 6-32	6
8	712-077	ELBOW, 1/4 MPT x 1/4 FPT	1
9	717-095	HEX HEAD PLUG, 1/2 SAE	2
10	55933-908	O-RING, 1/2	2
11	PF56160	PLACARD, BMS3-42 FLUID	1
12	55997-2	NAMEPLATE	1

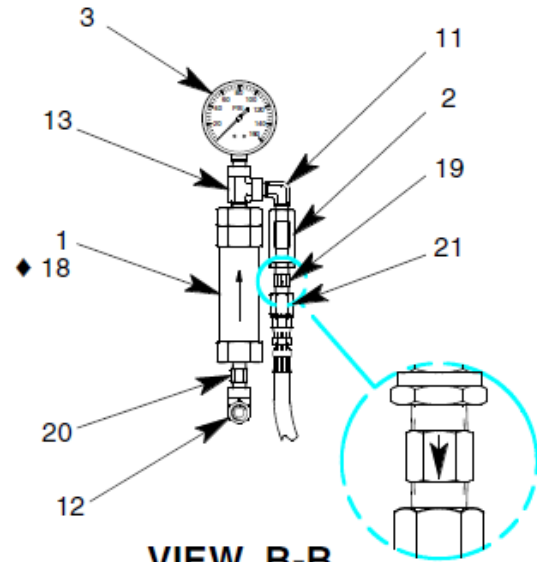
Parts List – Figure 1D

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



VIEW A-A

♦ PART OF REPAIR PARTS KIT

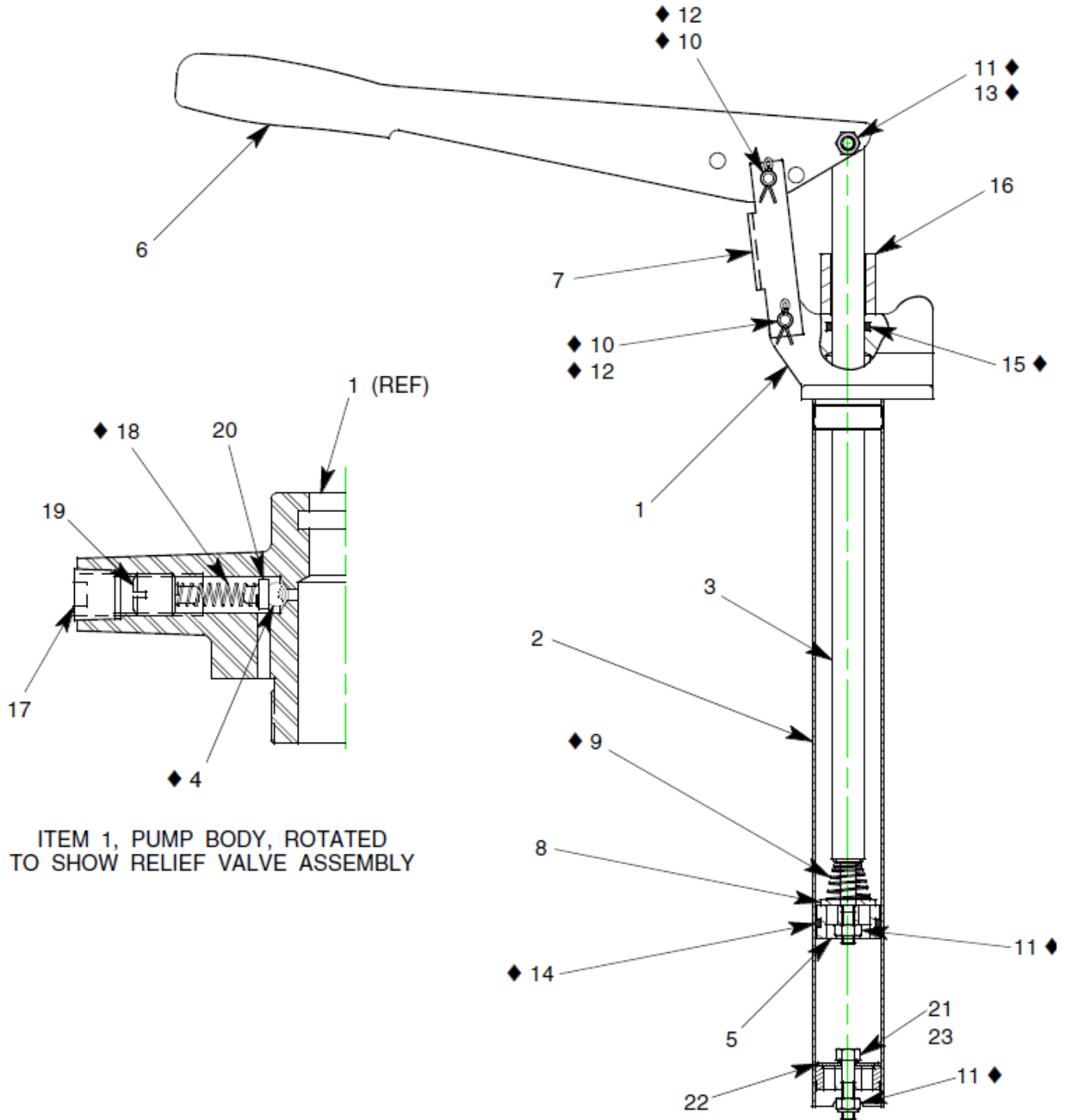


VIEW B-B

Item	Part Number	Description	Qty
1	481-111	FILTER ASSEMBLY	1
2	484-036	INLINE FLOW SIGHT, 1/4 FPT	2
3	482-088	PRESSURE GAUGE, 0-160 PSIG	1
4	326-033	BHSCS, 1/4-20 x 3/4 LG	1
5	362-038	FLAT WASHER, 1/4 SAE	1
6	PF56216	HOSE ASSEMBLY	1
7	735-070	QD NIPPLE, 1/4 FPT	2
8	735-071	DUST COVER	2
9	736-136	QD COUPLER, 3/8 FPT	1
10	736-137	DUST PLUG	1
11	712-096	ELBOW, 1/4 MPT x 1/4 MPT	3
12	712-112	ELBOW, 3/8 MPT x 1/4 FPT	1
13	713-026	TEE, 1/4 F x 1/4 F x 1/4 MPT	1
14	721-124	CONN., 1/4 MPT x 3/8 37° M	1
15	721-160	CONN., 3/8 MPT x 3/8 37° M	1
16	837724	STRAP	1
17	353-020	LOCKNUT, 1/4-20	1
18	481-112	ELEMENT (PART OF ITEM 1)	1
19	422-072	CHECK VALVE, 1/4 MPT	1
20	711-101	NIPPLE, 1/4 MPT	1
21	721-121	CONN., 3/8 37° x 1/4 FPT	1

Parts List – Figure 2

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



Parts List – Figure 2

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

Item	Part Number	Description	Qty
	PF55847-5	PUMP ASSEMBLY ; <i>consists of:</i>	
1	PF55846	PUMP BODY	1
2	PF56193	CYLINDER WELDMENT	1
3	PF56182	PLUNGER ROD	1
4	421-013	SST BALL, 1/4 DIA	1
5	PF53599	BODY, PLUNGER	1
6	PF53517	HANDLE	1
7	PF53533	LINK	1
8	PF56097	VALVE PLATE	1
9	PF53600	SPRING	1
10	PF53518	PIN	2
11	355-033	SELF LOCK NUT, 5/16-24	3
12	372-001	COTTER PIN, 3/32 x 3/4 LG	2
13	AN5-12A	HHCS, 5/16-24 x 1 11/32 LG	1
14	55936-218	O-RING	1
15	55936-210	O-RING	1
16	PF55867	HANDLE STOP	1
17	717-064	PLUG, 1/4 NPT	1
18	495-038	SPRING	1
19	55148	SET SCREW	1
20	55153	SPRING GUIDE	1
21	324-033	HHCS, 5/16-24 UNF X 1 1/4 LG	1
22	PF56099	PISTON CHECK DISK	1
23	55915-011	TEFLON O-RING	1

Parts List – PF56180PK Repair Parts Kit

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

Part Number	Description	Qty
485-087	HOSE ASSEMBLY	2
481-112	FILTER ELEMENT	1
PF53628	FILLPORT GASKET (5 GAL)	1
PF53602	PUMP GASKET	1
PF53600	SPRING	1
PF53518	PIN	2
355-033	SELF LOCKNUT, 5/16-24	2
372-001	COTTER PIN, 3/32 DIA x 3/4 LG	2
AN5-12A	HHCS, 5/16-24 x 1 11/32 LG	1
55936-218	O-RING (EPR)	1
55936-210	O-RING (EPR)	1
495-038	SPRING	1
412-013	STAINLESS STEEL BALL, 1/4 DIA	1
55933-908	O-RING (VITON)	2
PF56180PKDOC	REPAIR PARTS KIT LIST	1

Parts List – K21016-129 Adapter 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