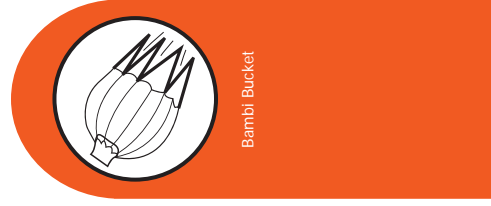
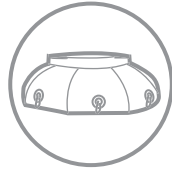


SACKSAFOAM III MANUAL



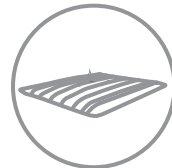
Bambi Bucket



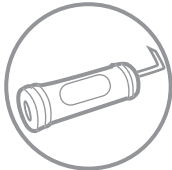
Fireflex



Dragon



Remote Site



Environmental



Emergency Response



SACKSAFOAM III MANUAL - Version C

Issue Date: July 2008

PLEASE READ BEFORE USING.

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Sacksafoam III Operations Manual (Version C)

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Section 1: Sacksafoam III Overview

Introduction to the Sacksafoam III

This manual provides helicopter operators with important information on the operation and maintenance of the Sacksafoam dispensing system for use with the Bambi bucket.

The Sacksafoam III has advanced features to enhance the efficiency of helicopter fire fighting.

The control box has a quartz digital timer to control delivery of an accurate percentage of foam concentrate. The timer circuit has crowbar over-voltage protection and its own circuit breaker.

An optional foam transfer pump for easily filling the Sacksafoam III is available from SEI Industries. This portable pump greatly facilitates the filling of the Sacksafoam III and is powered by 24-volts DC, either from the aircraft or from an auxiliary power source.

The operation of the Sacksafoam III can be quickly mastered by users with no prior experience. Several dumps with foam will provide familiarity with the use of the system.

Please read this manual prior to flying the bucket, particularly the sections on installation, filling and dispensing. If problems are experienced, please refer to the manual.

For your own protection and for longer system life, always heed the instructions and warnings. Ignoring them could result in damage to the Sacksafoam III, Bambi bucket or aircraft or personal injury.

SEI offers complete parts supply and repair facilities for the Sacksafoam III. For maintenance and repair purposes, parts diagrams and descriptions are provided in this manual. When ordering parts, please provide the model and serial number of the unit which is printed on the back of the controller and on the inside of the container lid that is normally removed during operation. The lid location also shows the Sacksafoam model number.

Additional copies of this manual are available from SEI Industries Ltd.



System Description

Sacksafoam III model SF3-6698 is intended for use with Bambi bucket models 5566 through HL9800.

Sacksafoam III model SF3-6698 will hold up to 25 USG (95 litres) of foam concentrate. The foam is held in one 5 gal. pail and one 20 gal. tank containers within a large plastic case. The unit is self-contained and designed to prevent foam from contacting the helicopter.

The Sacksafoam pump is operated by a controller box which is mounted on the side of the main enclosure. A timer on the controller determines the amount of foam concentrate that is pumped into the Bambi bucket. The crew member aboard the helicopter fills the foam tank, controls the dispensing of foam and triggers the Bambi bucket dump.

Unpacking

Whether receiving the Sacksafoam III for the first time, or unpacking it at the start of the season, ensure that you have the following:

1. Sacksafoam III unit with integral control box
2. 6 ft. (1.8 m.) breakaway hose
3. 1 male / 1 female garden hose fitting
4. Webbing tie-down straps (two).
5. 3 -10 Amp Fuses
6. This manual.

The following operator-supplied equipment is also required:

1. Longline electrical cable for standard Bambi and Torrentula Bambi buckets.
2. Dump hose to supply foam to the Bambi bucket (5/8" hose with 5/8" female garden hose fitting on one end).

Important Note

Cable and hose lengths must be determined by the operator. They will depend on the helicopter model, Bambi bucket model and length of the cargo line/longline in use. Please refer to the Bambi bucket operator's manual.

Section 2: Installation

Installation Procedures

1. Place the Sacksafoam unit inside the helicopter. Remove the lid.
2. Unlatch the case lid on the side of the drain fitting to expose the inside of the Sacksafoam unit.

Important Note

Make sure the circuit can carry a load of 11-amps at 24VDC.

3. Tie the supplied webbing straps on the Sacksafoam cleats. Secure the "D" rings to cargo tie-downs on the floor of the helicopter.



4. Uncoil the stored breakaway hose and wiring harnesses. The wiring harnesses included are:
 - Two 28-volt DC power cables
 - Bambi bucket dump cable

5. Ensure that the harnesses are connected to the electrical box. Store the loose case lid securely or remove it from the helicopter. You can now see the control panel. This is the time to familiarize yourself with it.



6. Connect the Sacksafoam power and Bambi dump power input cables (cables 6 and 7) to the helicopter electrical system: white is positive, black is negative. Double check the polarity before turning on the power.



7. Connect the breakaway hose to the foam outlet fitting. Push the garden hose fitting into the free end of the breakaway hose.



Warning

Do not secure the garden hose fitting to the breakaway hose with a clamp. It is intended for safe jettisoning of the Bambi bucket.

8. Secure the breakaway hose to the helicopter. Run your 5/8" (16 mm) ID female garden hose from the end of the breakaway hose down to the Bambi bucket. Attach the hose to the suspension lines using tie wraps. Take care not to pinch or kink the hose as this will restrict the flow of foam.

Important Note

If the bucket has to be jettisoned, the hose will pull apart at the unclamped fitting. Since the breakaway hose is secured, there will be no tendency for the garden hose to pull the Sacksafoam from the helicopter. In this event, any foam in the hose will drip safely outside the helicopter.

Section 3: Testing

Testing the Sacksafoam III

Important Note

The testing procedure should be performed before every use to check the operation of the Sacksafoam unit.

Dry Test

Important Note

A dry test can be done to determine if all power hook-up is correct. Simply turn on unit, set controller to 10 seconds, take one dip tube out and lift float on the end of the dip tube. If the pump starts, the hook-up is correct.

Wet Test

1. Place a full 5 USG container of fire-retardant foam in the space provided within the Sacksafoam case.
2. Insert the dip tube into the foam container and press the rubber stopper down to seal the filler neck. Push the dip tube down to contact the bottom of the container.



3. Switch the fill pump ON. Three lights will come on:
 - Pump power ON (green light)
 - Can loading ON (yellow light)
 - Tank loading ON (red light)
4. The fill pump automatically pumps foam into the main tank and will stop when the container is empty.
5. Turn on the Sacksafoam controller box and set the run time to 10 seconds. See *Section 5: Controller Box Installation*.
6. Place the end of the breakaway hose into an empty foam container or bucket. Operate the dispense switch. Foam should be pumped out of the breakaway hose.
7. Once the test is finished, store the dip tube as shown in the photo.



Important Note

If you have difficulty identifying components, please refer to the parts list section.

Section 4: Safety

Preflight Safety Check

The Bambi bucket and Sacksafoam III system should receive a preflight inspection in the same manner as a pilot preflights the aircraft before use. To preflight the system, start at the bottom and work up.

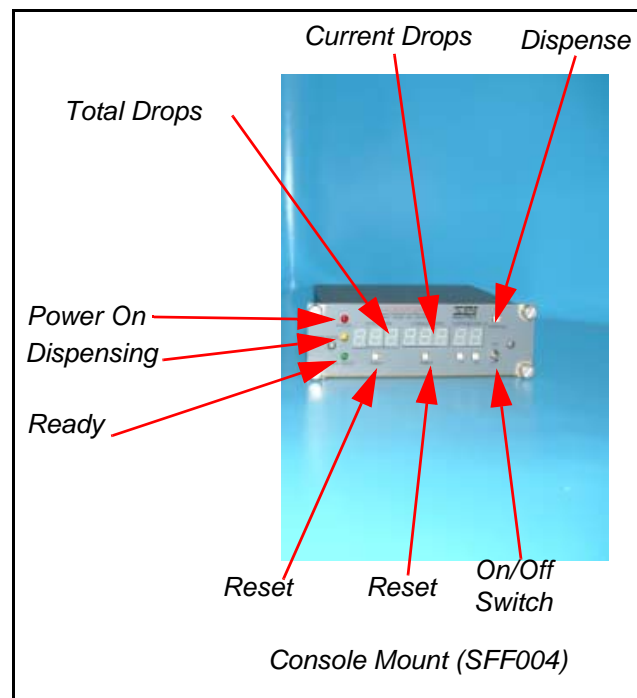
1. Is the unit plugged into the helicopter's power source?
2. Is the controller secured inside the cockpit and plugged into the electrical box in the unit?
3. Is the Sacksafoam case secured with the tie down strap?
4. Is the breakaway hose secured to the Bambi bucket and the short hose to the helicopter?
5. Are the wires in the helicopter secured to avoid tripping and tangling?

Refer to the Bambi bucket manual for the preflight check on the Bambi bucket itself.

Section 5: Controller Box Installation

Control Box Installation and Description

The Sacksafoam controller box is the brains of the system and contains an accurate quartz digital timer to control delivery of foam concentrate to the Bambi bucket. Since the Sacksafoam unit pumps foam at a fixed rate, the dispense time set on the controller relates directly to the foam concentration in the Bambi bucket. Circuit protection for the controller consists of a crowbar over-voltage protector and a 3-amp circuit breaker.



Installation

Operators of Sacksafoam III models have the controller box already mounted in the Sacksafoam case.

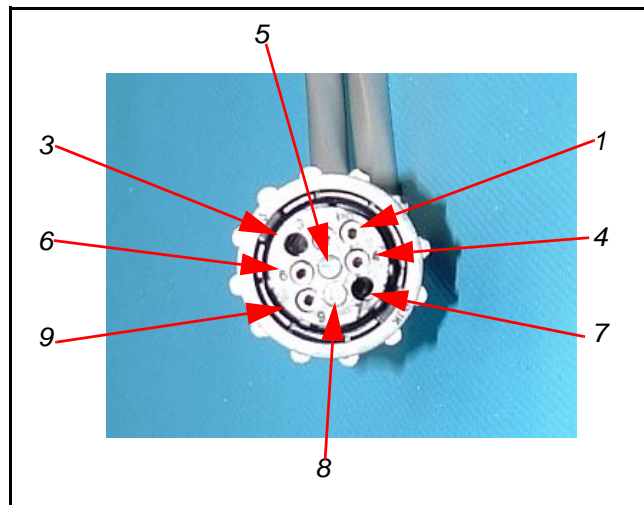
**Sacksafoam Controller Box Functions**

Item	Function
On/off switch	Toggle up to turn ON. Toggle down to turn off and reset.
Dispense switch	Press/push button to begin dispensing foam.
Dispense time switch	Push buttons to set run time of foam injection pump.
Current drops counter	Both counters increment every time dispense switch is pressed up (on). Current drops counter should be reset when Sacksafoam is refilled. Zero counter by pressing reset button.
Total drops counter	Both counters increment every time dispense switch is pressed up (on). Total drops counter can be used to count the total number of drops per day or shift. Zero counter by pressing reset button.
Red power light	Red light is on when power is on.
Orange dispense light	Orange light is on when unit is dispensing foam.
Green mix ready light	Green light is on when unit is ready for next dispense cycle or mixer (if installed) is running. The green light (and mixer; if installed) will go off when the Bambi bucket is dumped if green wire is hooked up to Bambi dump circuit.

Important Note

If the power supply polarity is reversed, the controller box will not operate. However, the Sacksafoam dispense pump will operate at a greatly reduced flow rate. If reverse polarity occurs, correct it immediately.

Connector Pin Descriptions



Pin	Description	Wire Color
1	+ 24 VDC supply	red
2	- 24 VDC supply	black
3	+ 24 VDC to remote dispense switch (option)	blue
4	+24 VDC to foam dispense pump	white
5	plugged	
6	- 24 VDC to foam dispense pump	white with blue tracer
7	+ 24 VDC 0.5 AMPS to mixer solenoid (option)	yellow
8	plugged	
9	+ 24 VDC from Bambi dump button	green

Section 6: Operations

Operating the Sacksafoam III

Please perform the installation, testing and preflight inspection as previously described before operating the Sacksafoam III. This section should be read in conjunction with the Bambi bucket operator's manual.

1. Place a full five gallon container of foam into the Sacksafoam case.
2. Insert the dip tubes into the containers. Press in the rubber stoppers.
3. Fill the main tank by pumping foam from the five gallon container. The fill pump will automatically run when the dip tube is placed into a full container. The fill pump will stop and the yellow light on the electrical box will turn off when the main tank is full. If desired, a reserve container of foam can be left in the case for topping-up of the main tank while in flight (after filling the Bambi bucket and lifting clear of the water source).
4. Refer to the *chart on the Sacksafoam case* to set the controller box with the correct foam dispense time. The dispense time will vary with the size of the Bambi bucket you are using and the desired foam concentration.
5. Activate the dispense switch on the controller box to pump foam to the Bambi bucket. The orange dispense light on the controller box will go out when dispensing is complete.
6. Dump the Bambi bucket by depressing the dump switch.
7. When finished your run, disconnect the dump hose, wrap it around the hose hanger on the case lid and screw the hose ends together. Screw the brass cap onto the open dispense line fitting and stow the wiring harnesses by wrapping them around the hose hanger.

Model SF3-6698 Specifications

Sacksafoam III	Bambi Bucket Model	Foam Concentrate Capacity			Empty and Full Weights			
		USG	Imp. Gal	L	Lbs	Kgs	Lbs	Kgs
SF3 - 6698	5566 HD-HL9800	25	20	94	100	45	314	138

Container Size

Sacksafoam III	Inches	Centimeters
SF3 - 6698	33" X 21" X 26"	84cm X 53cm X 66cm

Model SF3-6698 Run Times

Use the following chart to set the run time on the Sacksafoam controller for the foam concentration desired.

Select your bucket size and concentration. The intersection of the row and column gives the run time in seconds. Set this time using the small push buttons on the front of the controller box. For run times over 99 seconds, use two or more cycles to get the total run time needed.

Bambi Model	Foam Concentration (%)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
5566	10	20	30	40	50	60	70	80	90	100
6578	12	24	35	47	59	70	82	94	105	117
7590	14	28	42	54	68	81	95	108	122	135
HL5000	20	40	60	80	99	119	139	159	178	198
HL7600	30	60	90	120	150	180	210	240	270	300
HL9800	38	78	117	156	195	234	273	312	X	X

Section 7: Maintenance

Maintenance and Servicing

The Sacksafoam III unit requires no maintenance other than cleaning. Daily, after use, and prior to storage, the white tank should be flushed out with clean water.

Important Note

Proper cleaning of the sack prior to storage will increase the life span of the unit.

Flushing Procedure

1. Insert one dip tube into a container of clean water.
2. Place the breakaway hose into a bucket and operate the Sacksafoam controller until the water runs clean.
3. Drain any remaining water from the piping and pump by alternately holding the dip tubes upside-down and operating the Sacksafoam controller.
4. Foam or water in the Sacksafoam case can be drained by removing the drain cap and tipping the unit. Wipe out the case with a damp cloth.
5. Remove the drip tube to drain any residual foam.

Caution

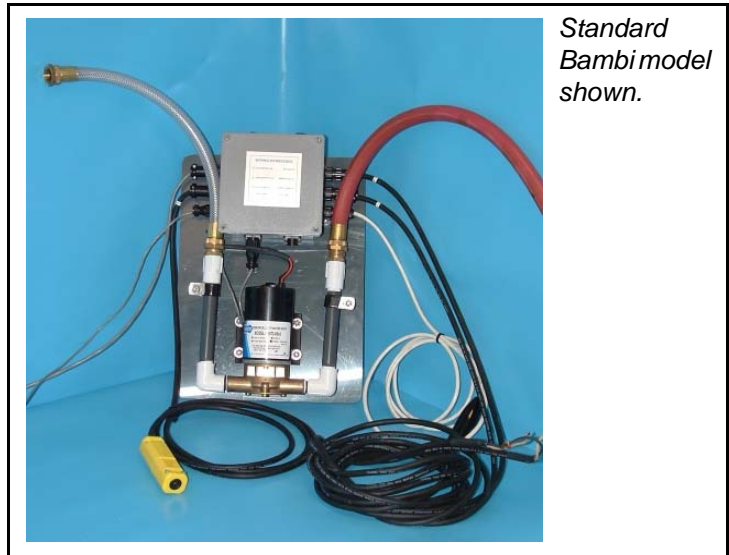
Residual foam will form a waxy substance that can prevent proper operation of the Sacksafoam.

Servicing

The gray plastic mounting panel carrying the pump, valves and electrical control box can be removed for servicing.

To remove the mounting panel:

1. Disconnect the hoses.
2. Remove the two bolts holding the mounting panel.
3. Lift the assembly straight up with the wires attached. Lay the panel on top of the container.



The pump impeller can be serviced without removing the pump from the mounting panel. Remove the four brass screws on the bottom of the pump to access the impeller. A spare impeller and seal are supplied with each Sacksafoam III unit.

If a solenoid valve does not operate properly, remove the blue coil by pulling off the securing clips (do not lose the wave washer installed under the coil).

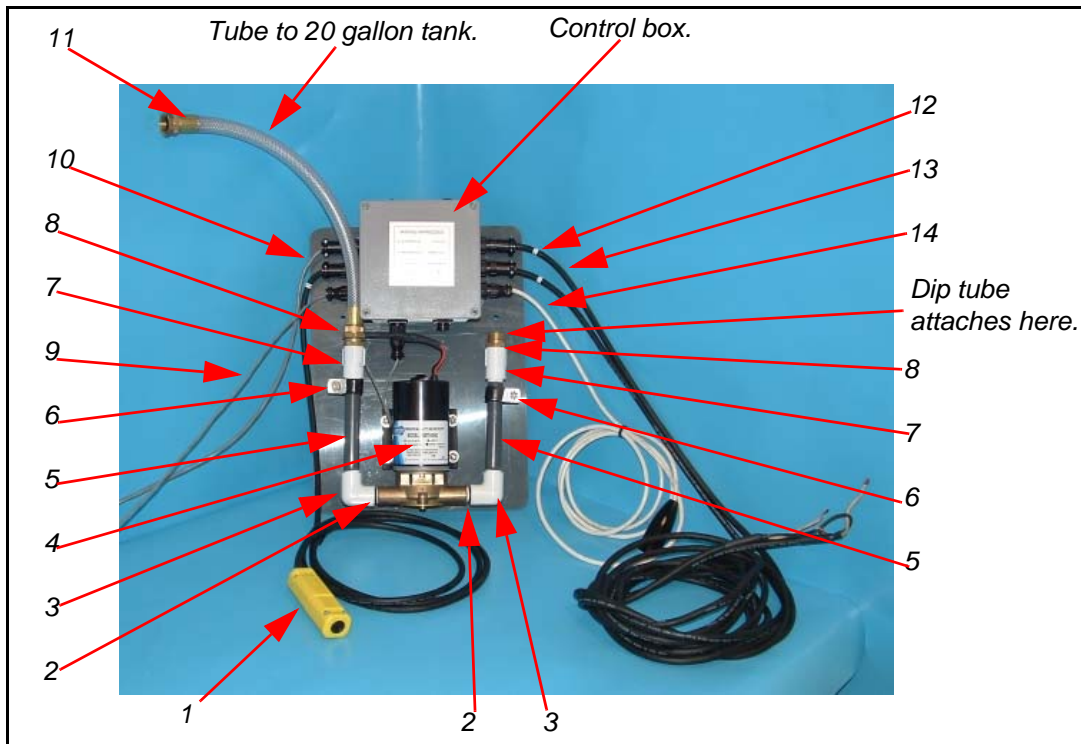
Undo the four bolts and gently remove the top of the valve from the diaphragm. Clean the inside of the valve and the diaphragm using mild soap and water (do not lose the small spring that fits inside the metal stem attached to the diaphragm).

Test the unit after any servicing.

Section 8: Sacksafoam III Parts

Parts and Diagrams

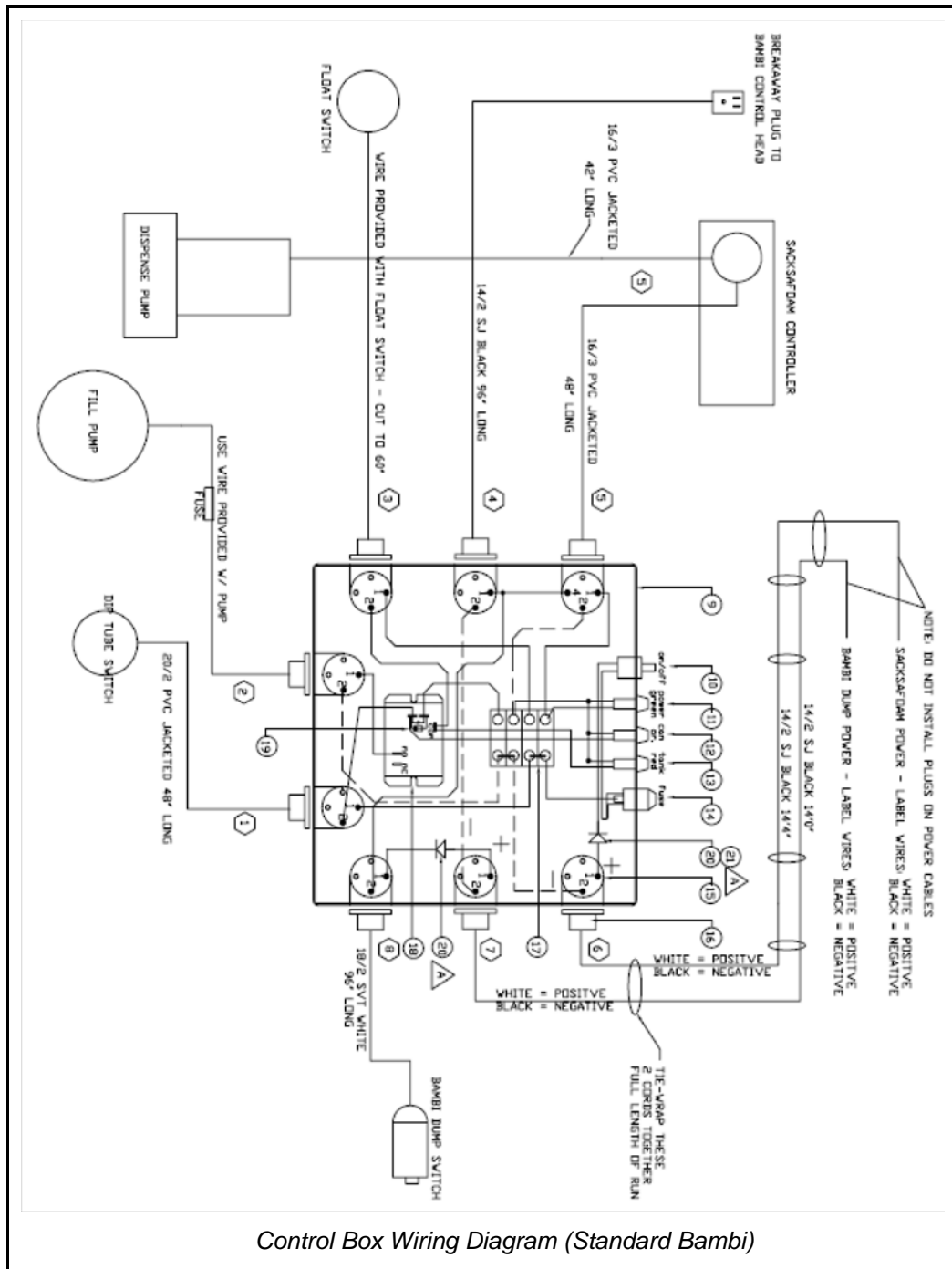
Control Panel (Bambi)



ITEM #	PART #	DESCRIPTION	QTY.
1	SF073	Harness wire #4 Bambi breakaway	1
2	PLP005C	Nipple PVC sch.80 1/2" MNPT close	2
3	PLP030	Elbow 90 deg. PVC 1/2" FNPT	2
4	SF3FILLPUMP	Pump fill	1
5	PLP0056	Nipple PVC sch.80 1/2" MNPT 6" long	2
6	PP027	Clamp cable rubber lined 3/4"	6
7	PLP080	Coupling PVC sch.40 1/2" FNPT	2
8	PLB002	Adapter brass MGHT X 1/2" MNPT	2
9	SFA006	Dip tube assembly SF 2 & 3	1
10	SF074	Harness #5 SF controller	1
11	SF026	Hose assembly 5/8" x 18" 2 X FGHT c/w swivels	1
12	SF075	Harness wire sacksafoam power	1
13	SF075B	Harness wire Bambi power	1
14	SF099	Harness wire Bambi dump switch	1

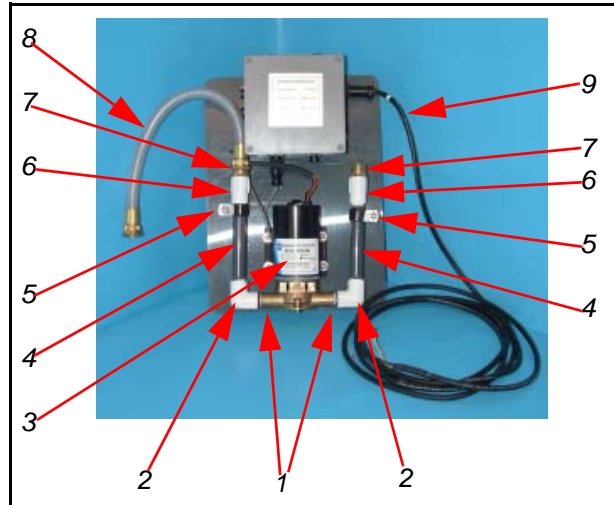
Wiring Harness (Bambi)

ITEM #	PART #	DESCRIPTION	QTY.
1	SF070	Harness wire #1 (dip tube)	1
2	SF071	Harness wire #2 (fill pump)	1
3	SF072	Harness wire #3 (float switch)	1
4	SF073	Harness wire #4 (breakaway plug Bambi head)	1
5	SF074	Harness wire #5 (bilge pump)	1
6	SF075	Harness wire #6 (SF power)	1
7	SF075B	Harness wire #7 (bambi power)	1
8	SF099	Harness wire #8 (dump switch)	1
9	SF013	Electrical box	1
10	ESTC010	Toggle switch on/off	1
11	ELAMP2	Pilot lamp (power on)	1
12	ELAMP3	Pilot lamp (can)	1
13	ELAMP1	Pilot lamp (tank)	1
14	EFUS100	Fuse holder	1
14A	EFUS003	Fuse 10 Amp	1
15	ECON032	Receptacle 4 pin	8
16	ECON023	Seal d-ring receptacle	8
17	ETERM002	Terminal strip 4 place	1
17A	ETERM010	Jumper terminal strip 2 post	1
18	EREL005	Relay float switches	1
19	EDIO003	Diode on relay coil	1
20	EDIO100	Rectifier	2
21	SF091	Rectifier heat sink	1

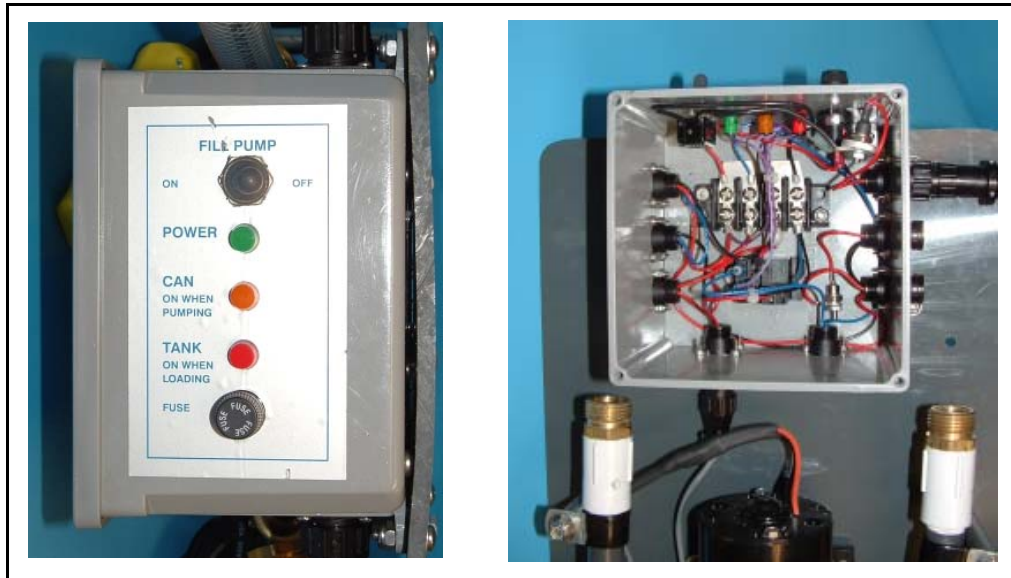


Control Box Wiring Diagram (Standard Bambi)

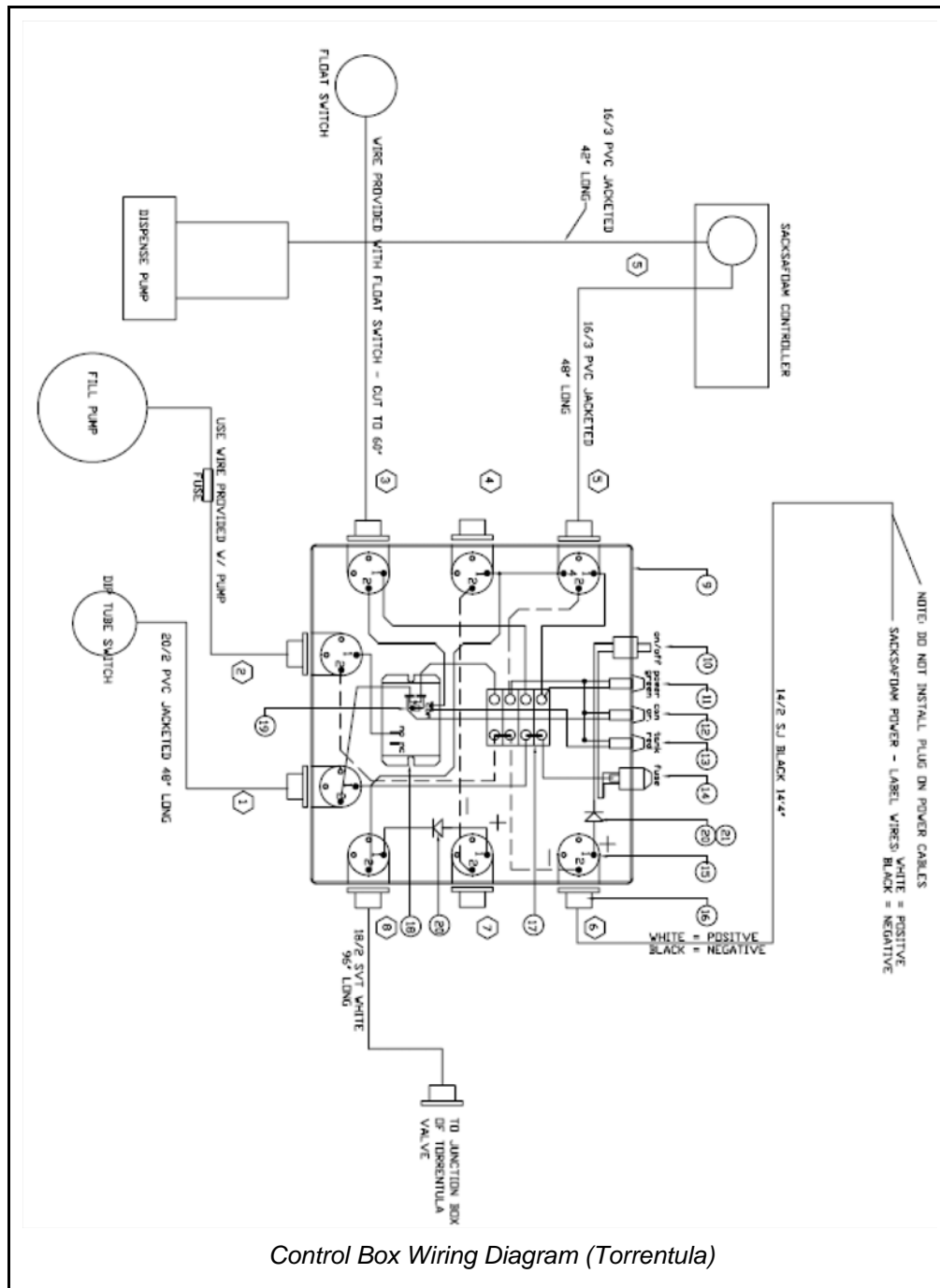
Control Panel (Torrentula)



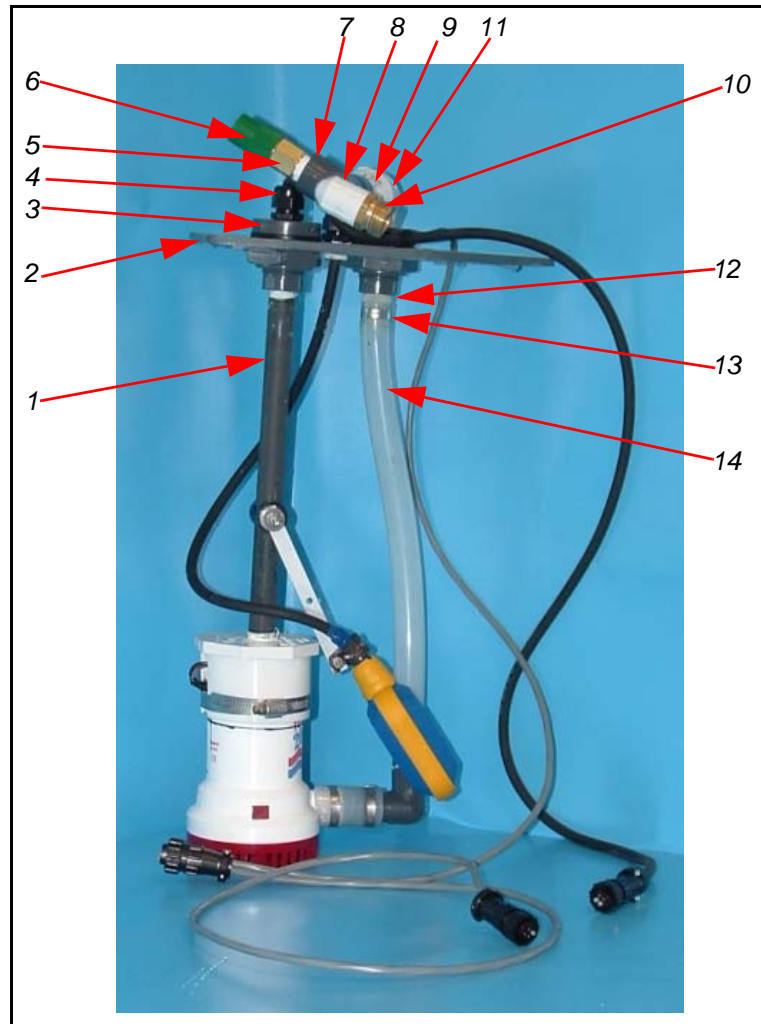
ITEM #	PART #	DESCRIPTION	QTY.
1	PLP005C	Nipple PVC sch.80 1/2" MNPT close	2
2	PLP030	Elbow 90 deg. PVC 1/2" FNPT	2
3	SF3FILLPUMP	Pump fill	1
4	PLP0056	Nipple PVC sch.80 1/2" MNPT 6" long	2
5	PP027	Clamp cable rubber lined 3/4"	6
6	PLP080	Coupling PVC sch.40 1/2" FNPT	2
7	PLB002	Adapter brass MGHT X 1/2" MNPT	2
8	SF026	Hose assembly 5/8" x 18" 2 X FGHT c/w swivels	1
9	SF075	Harness wire sacksafoam power	1

Wiring Harness (Torrentula)

ITEM #	PART #	DESCRIPTION	QTY.
1	SF070	Harness wire #1 (dip tube)	1
2	SF071	Harness wire #2 (fill pump)	1
3	SF072	Harness wire #3 (float switch)	1
4	SF073	Harness wire #4 (not used this model)	1
5	SF074	Harness wire #5 (bilge pump)	1
6	SF075	Harness wire #6 (SF power)	1
7	SF075B	Harness wire #7 (not used this model)	1
8	SF099	Harness wire #8 (junction box)	1
9	SF013	Electrical box	1
10	ESTC010	Toggle switch on/off	1
11	ELAMP2	Pilot lamp (power on)	1
12	ELAMP3	Pilot lamp (can)	1
13	ELAMP1	Pilot lamp (tank)	1
14	EFUS100	Fuse holder	1
14A	EFUS003	Fuse 10 Amp	1
15	ECON032	Receptacle 4 pin	8
16	ECON023	Seal d-ring receptacle	8
17	ETERM002	Terminal strip 4 place	1
17A	ETERM010	Jumper terminal strip 2 post	1
18	EREL005	Relay float switches	1
19	EDIO003	Diode on relay coil	1
20	EDIO100	Rectifier	2
21	SF091	Rectifier heat sink	1

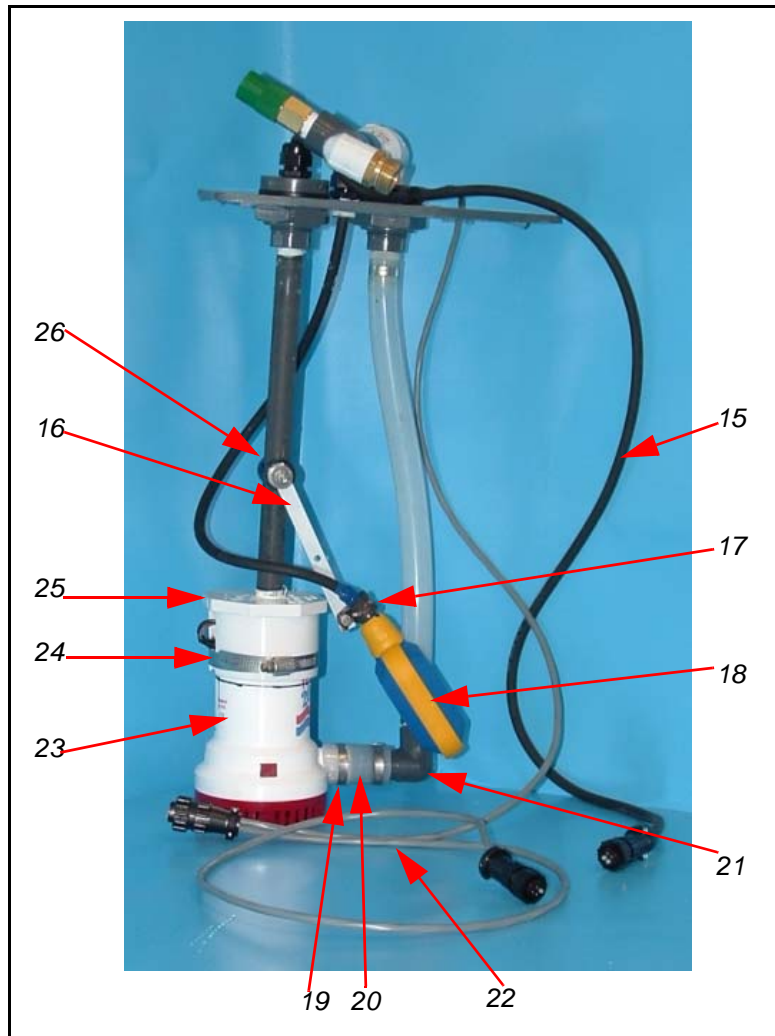


Bilge Pump Assembly SF077-BP



ITEM #	PART #	DESCRIPTION	QTY.
1	PLP00512	Nipple PVC sch.80 ½" MNPT X 12"	1
2	SF068	Panel bilge pump SF 2 & 3	1
3	PLP060	Bulkhead fitting PVC ½" FNPT	2
4	PLP103	Strain relief nylon ½" MNPT	2
5	PLV0012	Check valve ½ FNPT 1/3 PSI	1
6	PLV001C	Deflector cap for ½" check valve	1
7	PLP1005	Tee sch.80 ½" FNPT	1
8	PLP0205	Elbow street 90 deg. ½" NPT	2
9	PLP005C	Nipple PVC sch.80 ½" NPT close	2
10	PLB002	Adapter brass MGHT X ½" MNPT	1
11	PLV00305	Valve spring check ½" FNPT x ½ PSI	1
12	PLP131	Adapter reducing PVC ½" MNPT X ¾" slip	2
13	PP401	Clamp oeteker S/S 1 1/16"	2
14	PLT0050	Tubing clear PVC ¾" ID	1.5

Bilge Pump Assembly SF077-BP (continued)



ITEM #	PART #	DESCRIPTION	QTY.
15	SF072	Harness wire #3 SF 2 & 3 float switch	1
16	SAA066	Lever float switch SF 2 & 3	1
17	PP015	Clamp cable 1/2" lined	1
18	SF3FLOATSWITCH	Switch float level SF 2 & 3	1
19	PP404	Clamp oetiker S/S 1 1/2"	2
20	PLT004	Tubing clear PVC 1" id	3
21	PLP055	Elbow 90 deg. PVC 1" slip 1/2" FNPT	1
22	SF074	Harness wire #5 bilge pump to controller	1
23	SF002	Pump 24 volt Rule	1
24	PP403	Clamp gear S/S 4"	1
25	PLP075	Plug pipe sch. 40 3"	1
26	PP017	Saddle 1" tubing SF 2 & 3	2

Section 9: Warranty

Warranty

- a) Warranty is limited to repairing or replacing, at the company's sole discretion, any product approved to be defective.
- b) The company's products are not guaranteed for any specific length of time or measure of service, but are warranted only to be free from defects in workmanship and material for a period of one year to the original purchaser.
- c) To the extent allowable under applicable law, the company's liability for consequential, incidental and environmental damages is expressly disclaimed. **The company's liability in all events is limited to and shall not exceed, the purchase price paid.**
- d) This warranty is granted to the original purchaser and does not extend to a subsequent purchaser or assignee.
- e) The company must receive notification in writing of any claims of warranty from the original purchaser which must give details of the claimed defect in the product.
- f) Where the original purchaser is claiming under warranty, the product must be returned to the company for inspection with all transportation and duty charges prepaid.
- g) The warranty does not extend to any product that has been accidentally damaged, abraded, altered, punctured, abused, misused or used for a purpose which has not been approved by the company.
- h) This warranty does not apply to any accessories used with the product such as pumps, filters, hoses, etc., that are not supplied by the company, and any warranty on such accessories must be requested from the manufacturer or dealer of the accessories.
- i) In the event the original purchaser does not give notice of a warranty claim within one year of the original purchase of the product, it is understood that the purchaser has waived the claim for warranty and the purchaser and/or any subsequent purchaser must accept the condition of the product as it may be, without warranty.
- j) Any technical information supplied by the company regarding the product is not a condition of warranty but rather is information provided by the company to the best of its knowledge.
- k) There are no implied warranties nor is there any warranty that can be assumed from any representation of any person, except the company itself.

Exclusions

This warranty is void if the product is not assembled, used and/or maintained in accordance with the operator's manual supplied by SEI.