SAFT
711 INDUSTRIAL BOULEVARD
VALDOSTA, GEORGIA 31601

COMPONENT MAINTENANCE MANUAL

WITH

ILLUSTRATED PARTS LIST

Nickel Cadmium Battery

MODEL NO. 5347CH1

Part No. 024797-000

RECORD OF REVISIONS

REV NO.	ISSUE DATE	INSERT DATE	BY	REV NO.	ISSUE DATE	INSERT DATE	BY

RECORD OF TEMPORARY REVISIONS

TEMPORARY REV NO	PAGE NUMBER	ISSUE DATE	BY	INSERT DATE	BY

SERVICE BULLETIN LIST

SERVICE BULLETIN NUMBER	REVISION NUMBER	DATE BULLETIN INCORPORATED INTO MANUAL

PRODUCT IMPROVEMENTS

Product Improvements have been incorporated using service bulletins entered in the service bulletin list. Service bulletin highlights are as follows:

LIST OF EFFECTIVE PAGES

SUBJECT	PAGE	DATE
Title Page	T-1	Mar 15/99
	T-2	Blank
Record of Revisions	RR-1	Mar 15/99
	RR-2	Blank
Record of Temporary Revisions	RTR-1	Mar 15/99
	RTR-2	Blank
Service Bulletin List	SBL-1	Mar 15/99
	SBL-2	Blank
List of Effective Pages	LEP-1	Mar 15/99
	LEP-2	Blank
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INTRODUCTION

The instructions in this manual provide the information necessary for an experienced shop technician to perform shop type repair.

The manual is divided into separate sections:

1. Title Page
2. Record of Revisions
3 Record of Temporary Revisions
4. List of Effective Pages
5. Table of Contents
6. Introduction
7. Procedures and IPL Sections

The Disassembly, REPAIR, and Assembly sections generally contain only specific instructions to be used on the equipment covered herein. Most standard aerospace practices are not described in this manual.

An explanation of the use of the Illustrated Parts List (IPL) is provided in the Introduction to that section.

Every effort has been taken to provide complete and accurate component maintenance instructions. However, if a situation should arise that is not adequately covered by this manual, please contact Saft at one of the following addresses:

Saft
711 Industrial Boulevard
Valdosta, Georgia 31601

Telephone: (912) 247-2331
FAX: (912) 247-8486

Saft
156 Avenue de Metz
93230 Romainville, France

Telephone: 33 1 49 15 36 00
FAX: 33 1 49 42 91 15

DESCRIPTION AND OPERATION

1. Description

The 5347CH1 is a nickel-cadmium type with sintered and plastic bonded electrode plate construction, and uses a potassium hydroxide electrolyte. The battery consists of a case and cover, 20 cell assemblies, and a temperature sensor harness assembly.

2. Operation

The battery is charged on the aircraft by the electrical system. The temperature sensor harness assembly provides a signal to the cockpit to indicate the battery temperature. The thermostat will cut off the charger if the battery temperature has exceeded a safe operating limit.

Voltage:	
Nominal	24 Volts
Open Circuit Voltage, fully charged	31 Volts
Weight	89.3 lb. (40.59 kg)
Dimensions (Maximum):	
Height	10.50” (266.70 mm)
Length (Base)	9.76” (247.90 mm)
Width (Base)	11.05” (280.67 mm)
Cell Assembly Terminal	M10 x1.25
Number of Cell Assemblies	20
Cell Model	CVH 530 KA
Cell Maximum Consumable Electrolyte	78 cm^3
Rated Capacity	53 Ah (1 hour rate)
End of Life Capacity	53 Ah (1 hour rate)
Venting Pressure	2 to 10 psi (0.14 to 0.7 bar)
Cell Assembly Case Material	Polyamide
Battery Case Material	Stainless Steel
Electrolyte	Potassium Hydroxide

Leading Particulars
Figure 2

TESTING AND FAULT ISOLATION

1. General

This section contains battery functional tests and fault isolation information. Test procedures are written in a step-by-step format. Fault isolation information is presented in chart form.

NOTE: All ( ) part identification numbers herein are IPL Fig. 1 item numbers.

2. Required Test Equipment

Figure 101 covers the electrical test equipment that may be needed during maintenance in addition to the items contained in the Battery Maintenance Kit (P/N 024629-000) (refer to SPECIAL TOOLS, FIXTURES AND EQUIPMENT).

NOTE: Test equipment having equivalent specifications can be used.

NOMENCLATURE	APPLICATION
DC Power Supply, regulated, 35 Vdc 60 A minimum	Testing / Fault Isolation
Precision Multimeter (precision ±0.5%), 0-2 V, 0-5 V, and 0-50 V scales required	Testing / Fault Isolation
DC Load Bank 0-60 A	Testing / Fault Isolation
Thermometer, Immersion	Testing / Fault Isolation
Megohmmeter 250 Vdc (analog)	Testing / Fault Isolation

Required Test Equipment
Figure 101

3. Testing

A. Test Conditions

(1) Facilities and equipment

(a) Service facilities for Ni-Cd batteries must be entirely separate from those for lead acid batteries. Fumes from lead acid batteries or small traces of sulfuric acid entering a Ni-Cd battery can cause permanent damage.

(b) Equipment used to service lead acid batteries must not be used to maintain Ni-Cd batteries.

(2) For optimum results, conduct all tests with the battery temperature at 77°F (25°C).

B. Test Equipment

Refer to Special Tools, Fixtures, and Equipment for a list of test equipment required for proper maintenance of a Ni-Cd battery.

C. Initial Discharge

The purpose of this discharge procedure is to bring the battery to a known state of charge; i.e. 1.0 volt per cell.

(1) Discharge the battery at one of the rates listed in Fig 102 until each cell in the battery reaches 1.0 V.

NOTE: If it is desired to perform a capacity check, refer to the procedures found under Second Discharge in this section.

NOTE: It is not a cause for concern if a cell goes to zero volts or reverses polarity during the discharge. Simply short the terminals of that cell for the remainder of the discharge.

Constant Current Discharge Rate	Discharge Time (For capacity check)
53 Amps	60 Minutes
26.5 Amps	122 Minutes

Discharge Rates
Figure 102

D. Residual Discharge

The Residual Discharge is designed to drain all electrical energy from the battery. This is typically referred to as the “deep cycle”.

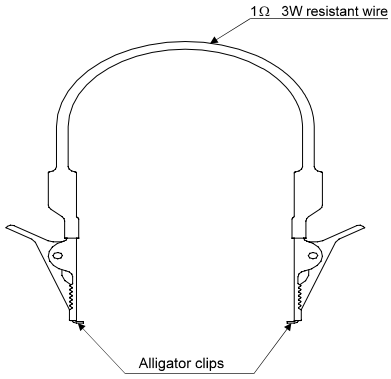
(1) Discharge each cell in the battery to zero volts using one of the following two procedures.

NOTE: It is not necessary to have a rest period between discharge and residual discharge.

(a) Continue to discharge the battery. After battery voltage drops to <1.0 V, connect a 1.0 ohm (3.0 watt minimum) shorting resistor across each cell’s terminals. Leave the resistor in place for 12 to 16 hours to allow each cell to completely discharge and the battery to cool. The resistors should be fitted with alligator clips to ensure a firm connection (see Fig 103).

(b) Continue to discharge the battery. After battery voltage drops to <10 V, insert a shorting clip between the main battery connector terminals. Leave this clip on for 12 to 16 hours to allow all cells to completely discharge and the battery to cool.

(2) Remove the shorting devices before charging.



Shorting Clip (1Ω - 3 Watt Minimum)
Figure 103

E. Charge

CAUTION: ATTEMPTING TO CHARGE BATTERIES WITH LOW ELECTROLYTE LEVELS IN ANY CELL MAY CAUSE PERMANENT DAMAGE TO THAT CELL.

(1) Remove the cover and pad assembly.

(2) Loosen, but do not remove, all vent valves.

NOTE: Check individual cell voltages at the beginning of the charge. If any cell indicates an immediate voltage rise above 1.55 V, add about 10 cm^3 of distilled or demineralized water through the vent valve opening of that cell.

(3) Charge using one of the methods shown in Fig. 104.

(4) During the last 15 minutes of the overcharge cycle, adjust the electrolyte level (see Electrolyte Level Adjustment - Sect J).

CONSTANT CURRENT CHARGE	
Main Charge	Overcharge
Method 1: 5.3 Amps ($0.1C_1A$) until battery reaches 31 V Time: Minimum: 10 hours Maximum: 12 hours	Overcharge at 5.3 Amps ($0.1C_1A$) for 4 hours after main charge with all cells ≥1.55 V. Total charge not to exceed 16 hrs.
OR	
Method 2: 26.5 Amps ($0.5C_1A$) until battery reaches 31.4 V Time: Minimum: 2 hours Maximum: 2 hours 30 min.	Overcharge at 5.3 Amps ($0.1C_1A$) for 4 hours after main charge with all cells ≥1.55 V. Total charge not to exceed 6.5 hours.
OR	
Method 3: 53 Amps ($1C_1A$) until battery reaches 31.6 V Time: Minimum: 1 hour Maximum: 1 hour 15 min.	Overcharge at 5.3 Amps ($0.1C_1A$) for 4 hours after main charge with all cells ≥1.55 V. Total charge not to exceed 5.25 hours.

Charge Rates
Figure 104

F. Second Discharge (Capacity Test)

The purpose of this discharge procedure is to verify battery will deliver the minimum capacity (in amps) and determine its airworthiness.

NOTE: It may be necessary to perform a deep cycle several times to correct a severe imbalance or loss of capacity.

(1) Discharge the battery at a rate listed in Fig 102 until the battery reaches 20.0 V.

(2) Record the time at the start of the discharge and the discharge current.

(3) Monitor individual cell voltages periodically during the discharge.

(4) Record the time that the first cell reaches 1.0 V.

NOTE: It is not a cause for concern if a cell goes to zero volts or reverses polarity during the discharge. Simply short the terminals of that cell for the remainder of the discharge.

(5) When the battery terminal voltage reaches 1.0 volt per cell (20.0 V), stop the discharge and record the time.

(6) Calculate cell capacity and battery capacity:

(a) Calculate, in hours, the elapsed time (T_C) required to discharge the first cell to 1.0 V.

(b) Calculate, in hours, the elapsed time (T_D) required to discharge the battery to an average of 1.0 V/cell.

(c) Calculate minimum cell capacity (C_C):

$C_C = T_C$ * Discharge Current

(d) Calculate battery capacity (C_D):

$C_D = T_D$ * Discharge Current

(7) Interpretation of the Second Discharge (Capacity Test) Results

(a) Regardless of the results obtained in the first discharge, the battery is considered airworthy if both:

1 C_C was equal or greater than 100% of the Rated Capacity of the battery.

2 The end of charge voltage of all cells was between 1.55 and 1.82 V.

Therefore, continue with procedures necessary prior to re-installation onto the aircraft.

(b) Either of the following two results are indications that the battery requires Special Testing, or refer to Fault Isolation:

1 C_C was less than 100% of the Rated Capacity of the battery.

2 The end of charge voltage of any cell was less than 1.55 volts or greater than 1.82 volts.

G. Cell-to-Case Insulation Test

A breakdown in electrical insulation between the cells and the battery case will result in a “leakage” current, which over a period of time can discharge the battery. The most common cause for the loss of insulation is the leakage of electrolyte from the cells that can act as a conductor between the cell plates and the battery container. Because the leakage current can affect battery performance, it is necessary that it be kept to a minimum. The cell-to-case insulation test should be carried out using one of the following methods:

(1) On a completely assembled battery, use a megohmmeter to measure the insulation resistance between the positive terminals of each cell and the outer metal case. On a battery from service, the value should be at least 250 KΩ under 250 Vdc. Failure to meet this value indicates a need for disassembly and cleaning (DISASSEMBLY/CLEANING). On a new battery, or an in-service battery following disassembly and cleaning, the value must be at least 10 MΩ under 250 Vdc. Any cell with less than 10 MΩ resistance should be considered defective and marked for replacement.

(2) On a completely assembled battery, use an analog multifunction meter capable of measurement in the 250 mA range. Adjust the meter and input leads for measurement of 250 mA. Connect the negative lead to the battery container. Touch the positive lead to the positive terminal of each cell, then to the positive terminal of the battery. If there is any deflection in the needle from zero, the insulation is inadequate and the battery should be disassembled and cleaned. Following a thorough cleaning, if there is still a leakage current (indicated by a deflection in the needle from zero), the leakage should be traced to the failed cells, and those cells marked for replacement.

H. Polarization Test

(1) Charge the battery at 5.3 A for 1.5 hour.

(2) Leave the battery in open circuit condition for 1 hour.

(3) Measure the open voltage of each cell.

(a) If the cell open voltage is 0 V or reversed polarity, carry out a special test and refer to fault isolation.

(b) If each cell's voltage is above 0 V, charge the battery.

I. Special Testing

These procedures are normally used to diagnose a potential problem with one or more cells in a battery. The test is designed to stress the battery so that any faults may be uncovered. It is very important that continual monitoring be performed on the cells during this test.

NOTE: If three cells are replaced during a service cycle, or five cells are replaced over the life of the battery, it is recommended that all the cells in the battery be replaced.

NOTE: It is recommended that if a battery requires Special Testing more than three times in one service cycle that the battery be replaced.

NOTE: For a battery from long term storage, several complete charge/discharge cycles may be required to restore performance.

(1) Fully charge the battery per Fig 104.

(2) Continue to charge the battery at $0.1C_1A$ (5.3 Amps) for an additional 5 hours.

(3) Monitor individual cell voltages each 15-30 minutes during additional overcharge and record voltage readings.

(4) Note any cells that express a continual drop in voltage during overcharge and mark those cells for replacement.

NOTE: A continual drop in voltage during overcharge indicates a failure of the gas barrier that is neither recoverable nor repairable. A cell with a defective gas barrier must be replaced.

(5) Replace marked cells (if required) (DISASSEMBLY, ASSEMBLY).

J. Electrolyte Level Adjustment

Electrolyte level adjustment is to be performed during the last 15 minutes of the charge cycle.

WARNING: USE CARE NOT TO TILT CELLS WHILE VENT VALVES ARE LOOSENED OR REMOVED; CONTACT OF ELECTROLYTE WITH SKIN CAN CAUSE SEVERE BURNS.

NOTE: Battery must be fully charged before adjusting electrolyte level.

(1) Remove the vent valves with vent valve wrench (P/N 093365-000).

(2) Immerse the vent valves and their o-rings in distilled or deionized water and let them soak to dissolve any salts.

(3) Cover the cells with a clean damp cloth to prevent entry of foreign matter.

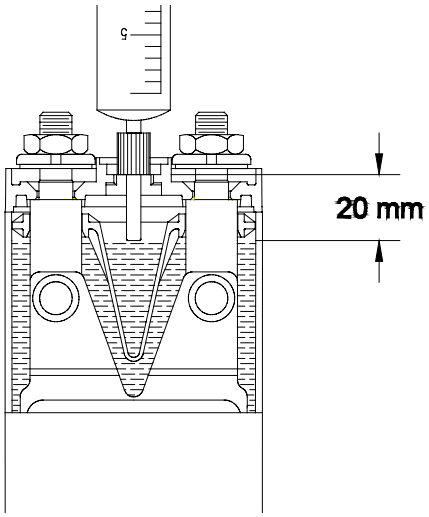
(4) Check the liquid level in the cell:

(a) Insert the syringe (P/N 020916-001) into the cell opening until the shoulder of the nozzle rests on the valve seat (Fig. 105).

(b) Withdraw the plunger and check for any liquid in the syringe.

1 If the liquid level is too low, the syringe will remain empty, indicating that the end of the syringe nozzle did not reach the liquid in the cell.

2 Any excess liquid in the cell will be drawn into the syringe until the electrolyte is level with the end of the nozzle. This is the correct level for the electrolyte.



Position of Syringe in Cell Vent Seat
Figure 105

(5) Replenish low electrolyte:

CAUTION: USE ONLY DISTILLED OR DEMINERALIZED WATER. USE OF ANYTHING OTHER THAN DISTILLED OR DEMINERALIZED WATER WILL RESULT IN PERMANENT CELL DAMAGE.

CAUTION: DO NOT INTENTIONALLY OVERFILL THE CELLS. THE AMOUNT OF WATER REMOVED FROM EACH CELL DURING THE ELECTROLYTE ADJUSTMENT PROCESS SHOULD BE KEPT TO A MINIMUM.

Note: The quantity (in cm^3) of distilled water required to fill the cell to the correct level will serve as an approximate guide to the amount required for the remaining cells. The water in each cell, however, must be adjusted individually to the correct level. If the quantity of water added per cell is above 70 cm^3 (max consumable level is 78 cm^3), check the charging system. If the charger is functioning properly, shorten the period between servicing.

(a) Draw 5 cm^3 of the distilled water into the syringe and inject it into the cell.

(b) With the syringe nozzle resting on the valve seat, slowly withdraw the plunger in the syringe.

(c) If the syringe remains empty, repeat steps (a) and (b), counting the number of 5 cm^3 injections required to achieve the correct level.

(d) At the point in step (b) when some excess liquid is drawn into the syringe, the correct level for that cell has been reached. Expel the excess liquid into a separate container for later disposal.

K. Temperature Sensor Harness Assembly Test

Disassembly of a portion of the battery is required to test the Temperature Sensor Harness Assembly (refer to Disassembly). Check the function of the Temperature Sensor Harness Assembly as follows:

WARNING: TECHNICIANS PERFORMING THIS OPERATION WILL BE EXPOSED TO TEMPERATURES IN EXCESS OF 70°C/160°F. PROTECTIVE EQUIPMENT, SUCH AS GLOVES, MUST BE USED DURING THIS PROCEDURE.

(1) Insert the temperature sensors (T1 and T2) into a plastic bag with a temperature measuring device in close proximity to the sensors. Immerse the bag with the sensors in a beaker of water.

(2) Using a multi-meter, check the continuity between pins A and B, and C and D of the temperature sensor harness connector. The contacts associated with pins A and B, and C and D are normally **OPEN** (resistance > 1MΩ) below 123°F (50.6°C).

(3) Raise the temperature of the water slowly and stabilize the temperature of the sensors at 146°F ± 4°F (63.3°C ±2.2°C). Check the continuity between pins A and B, and C and D of the temperature sensor harness connector. The contact should be **CLOSED** (resistance < 1MΩ).

(4) Allow the temperature of the water to slowly drop until the temperature of the sensors is 127°F ± 4°F (52.7°C ± 2.2°C). At this temperature the contacts should again be **OPEN**. Check continuity at the temperature sensor harness connector between pins A and B, and C and D for resistance > 1MΩ.

Failure of any of the above continuity checks at the specified temperatures indicates a defective temperature sensor. Replace the unit with a factory new unit.

L. Vent Valve Pressure Test

Check the operation of the vent valve assemblies as follows:

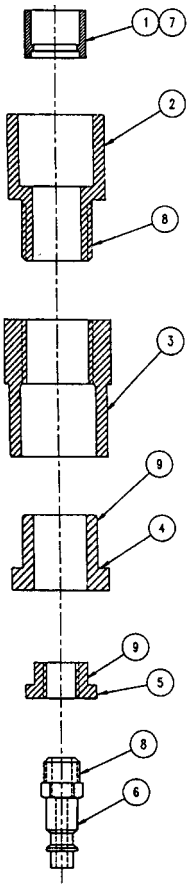
(1) Prepare a fixture from PVC pipe and fittings with an end adapter configured on the inside to match the vent valve lugs. The adapter can be made from PVC pipe and fittings per Fig 106.

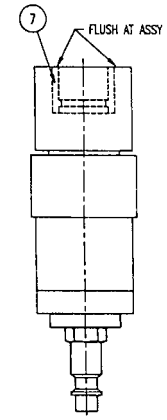
(2) Affix the vent valve with its O-ring into the adapter end of the pressure test fixture.

(3) Attach the fixture to a compressed air line through an adjustable pressure-reducing valve limited to 20 psi (1.4 bar).

(4) Immerse the valve and end of fixture in water, and slowly raise the pressure. Make sure the valve opens between 2 psi and 10 psi (0.14 to 0.7 bar).

(5) Reuse only those vent valves that open in the 2 psi to 10 psi (0.14 to 0.7 bar) range. Discard valves that are not gas tight at low pressure.





1	SEAT, VENT VALVE,	1
2	ADAPTER, 3/4" EXTERNAL THREAD TO 3/4" INTERNAL SLIP	1
3	ADAPTER, 3/4" INTERNAL THREAD TO 3/4" INTERNAL SLIP	1
4	BUSHING, 3/4" EXTERNAL SLIP TO 1/2 INTERNAL SLIP	1
5	BUSHING, 1/2" EXTERNAL SLIP TO 1/4 INTERNAL THREAD	1
6	ADAPTER, 1/4" MALE, QUICK DISCONNECT	1
7	EPOXY	.25
8	SEALANT, TEFLON, PIPE	.10
9	CEMENT, MULTIPURPOSE PVC	.13

Vent Valve Testing Apparatus (Typical Setup)
Figure 106

4. Fault Isolation

Fault isolation information is presented in Figure 107 as a guide in locating a cause of malfunction and isolating the cause to a specific component.

FAULT	POSSIBLE CAUSES	REMEDIES
Zero volt with battery set to "charge"	Defective electrical connector (not making contact)	Check electrical contacts, links and tightness of nuts (CHECK)
	Link loose or broken	Replace if necessary; torque all upper terminal nuts (Page 801)
Zero volt with battery set to "discharge"	Battery fully discharged	Recharge battery (TESTING AND FAULT ISOLATION)
	Battery circuit open or defective contacts	Check insulation (TESTING AND FAULT ISOLATION)
		Check contacts, links and tightness of terminal nuts
	Cell(s) completely dry	Adjust electrolyte level (TESTING AND FAULT ISOLATION)

Fault Isolation (Sheet 1 of 5)
Figure 107

FAULT	POSSIBLE CAUSES	REMEDIES
Leakage of electrolyte	Incorrect adjustment of electrolyte level	Disassemble and clean the battery (DISASSEMBLY, CLEANING and TESTING AND FAULT ISOLATION) Check electrolyte level (TESTING AND FAULT ISOLATION)
	Cell polarity reversed during high rate discharge (e.g. during starting)	Disassemble and clean the battery (DISASSEMBLY, CLEANING) Check electrolyte level (TESTING AND FAULT ISOLATION)
	Overcharge at high temperatures or excessive charge current	Check the on-board charging circuit and if necessary adjust Disassemble and clean battery (DISASSEMBLY, CLEANING) Check electrolyte level (TESTING AND FAULT ISOLATION)
Traces of electrolyte in battery box	Damaged cell case	Check sealing of cells (CHECK)
	Leakage of electrolyte	Disassemble and clean the battery (DISASSEMBLY, CLEANING) Check electrolyte level (TESTING AND FAULT ISOLATION)

Fault Isolation (Sheet 2 of 5)
Figure 107

FAULT	POSSIBLE CAUSES	REMEDIES
Excessive water consumption in all battery cells	Heavy overcharge or overcharge at high temperatures	Check the on-board charging circuit and adjust if necessary
One or several cells whose water consumption differs significantly from that of other cells in the battery:		
more than 30% above average	Leaking cell(s)	Check sealing of cell(s) (CHECK) Disassemble and clean the battery (DISASSEMBLY, CLEANING) Check electrolyte level (TESTING AND FAULT ISOLATION)
25% or less of the average value	Cell(s) with damaged separator(s)	Perform special testing (TESTING AND FAULT ISOLATION). If necessary, replace with new Saft cell (DISASSEMBLY, ASSEMBLY)
Corrosion on links	Operation in acid atmosphere	Make sure that battery test bench and storage areas are free from materials which may produce acid fumes
	Mechanical damage to nickel plating	Replace damaged links (DISASSEMBLY, ASSEMBLY)
Indications of link overheating (discoloration)	Loose terminal nuts	Check torque - replace hardware with factory new

Fault Isolation (Sheet 3 of 5)
Figure 107

FAULT	POSSIBLE CAUSES	REMEDIES
Cell with abnormally high voltage at start of charge	Cell dry or insufficient electrolyte level	As soon as the fault is observed add 10 cm^3 of distilled water to the cell. Do not adjust precisely until the end of charge. NOTE: A cell charging with insufficient electrolyte may also show considerable temperature rise
Main charge cut-off voltage reached before minimum time or not reached at the maximum time	Battery not fully discharged or strongly unbalanced	Perform a regular check (CHECK)
Cell with abnormally low voltage at end of charge (<1.55V)	Exposure to high temperatures, high charge rates or separator damage	Replace cell (DISASSEMBLY, ASSEMBLY)
Low capacity cell (reversed polarity, or a normal polarity voltage of less than 1V at the end of a 1 hour discharge at $1C_1A$)	Normal wear after long service	Perform Regular Check (CHECK) Replace with new Saft cell (DISASSEMBLY, ASSEMBLY)
	Exceptionally heavy use (frequent self-starting; operation at high temperatures, with low electrolyte level, etc.)	Perform Regular Check (CHECK) Replace with new Saft cell (DISASSEMBLY, ASSEMBLY)

Fault Isolation (Sheet 4 of 5)
Figure 107

FAULT	POSSIBLE CAUSES	REMEDIES
Cell with zero voltage when battery circuit is open	Short circuited cell	Replace with new Saft cell (DISASSEMBLY, ASSEMBLY)
Low insulation	Leakage of electrolyte	Disassemble and clean battery (DISASSEMBLY, CLEANING) Check electrolyte level (TESTING AND FAULT ISOLATION)

Fault Isolation (Sheet 5 of 5)
Figure 107

DISASSEMBLY

1. General

This section covers detailed instruction needed to disassemble the Saft battery for maintenance and/or repair. Disassemble only to the extent necessary to effect repair and/or replacement.

NOTE: All ( ) part identification numbers herein are IPL Fig. 1 item numbers.

2. Detailed Instructions

WARNING: BATTERY CELLS DELIVER VERY HIGH CURRENTS WHEN SHORT-CIRCUITED. EXERCISE CAUTION. REMOVE RINGS, WATCHES OR OTHER JEWELRY.

WARNING: BATTERY MUST BE COMPLETELY DISCHARGED BEFORE CELLS CAN BE REMOVED OR ELECTRIC SHOCK MAY OCCUR.

WARNING: DO NOT TILT BATTERY WHILE VENT VALVES ARE LOOSENED. CONTACT OF ELECTROLYTE WITH SKIN CAN CAUSE SEVERE BURNS.

A. Completely discharge the battery per instructions in TESTING AND FAULT ISOLATION.

B. Remove cover and pad (2) by opening latches and lifting from case (1).

C. Remove upper nuts (10a) and washers (11) from terminals of cells (3) and connector-receptacle (14).

D. Remove links (4 through 9) from terminals of cells (24) and connector-receptacle (14), being careful not to damage the nickel plating.

E. Remove Temperature Sensor Harness Assembly thermoswitches (23a and 23b) from the links by removing the attaching nut from the underside of the link.

NOTE: Removal of thermoswitches (23a and 23b) from the links is not necessary unless the links are to be soaked for cleaning.

F. Remove the connector-receptacle (14) from the battery case (1) by removing screws (12).

G. Remove connector-receptacle gasket (13) from the battery case (1).

H. Using the vent valve wrench (P/N 093365-000), loosen the vent valves (29) of all cells to relieve any pressure; then re-tighten vent valves (use only finger pressure on wrench when installing).

I. Using cell puller (P/N 017557-000), remove cells (24) from the case (1) by tightening the cell puller on cell terminal and removing cell with a steady straight upward pull.

J. Disassembly of the cell (24) is restricted to the removal of all hardware (10a & 10b, 11, 25 through 30).

K. Remove the jam nut (23c) and temperature sensor harness assembly (23).

L. Remove all liners (15-21) from the battery case (1).

CLEANING

1. General

CAUTION: DO NOT USE PETROLEUM SPIRITS, TRICHLOROETHYLENE OR ANY OTHER SOLVENTS CONTAINING CHLORIDE FOR CLEANING THE BATTERY. USE OF THESE SOLVENTS MAY DEGRADE THE INTEGRITY OF METAL PARTS.

NOTE: All ( ) part identification numbers herein are IPL Fig. 1 item numbers.

A. The following items are required to perform the cleaning procedures (equivalent substitutes can be used):

Stiff bristle brush (non-metallic)
Small paintbrush (non-metallic)
Dry compressed air source, less than 20 psi (1.4 bar)
Safety goggles
Lubricant (non-acid petroleum jelly)
Soft, clean cloth (two required)
Isopropyl alcohol (or non petroleum-based) degreasing agent
Running water
Soap
Distilled or deionized water

2. Light Cleaning (Assembled Battery)

A. Discharge the battery (TESTING AND FAULT ISOLATION).

B. Remove the battery cover and pad (2).

WARNING: USE CARE NOT TO TILT BATTERY WHILE VENT VALVES ARE LOOSENED; CONTACT OF ELECTROLYTE WITH SKIN CAN CAUSE SEVERE BURNS.

CAUTION: VENT VALVES MUST BE CLOSED TO PREVENT DIRT AND FOREIGN MATTER FROM ENTERING CELLS DURING CLEANING. VENT VALVES SHOULD BE CLOSED AT ALL TIMES (TO AVOID EXPOSURE TO CO_2), EXCEPT AS DIRECTED OTHERWISE HEREIN. OVEREXPOSURE TO CO_2 WILL AFFECT BATTERY PERFORMANCE OVER TIME.

C. Using vent valve wrench (P/N 093365-000), ensure that the vent valve (29) of each cell (24) is closed and secure. Do not over-tighten.

CAUTION: DO NOT USE A WIRE BRUSH TO CLEAN CELL TOPS. CELLS MAY BE DAMAGED.

D. Remove white deposits (potassium carbonate) from top of all cells (24) using a stiff bristle non-metallic brush.

WARNING: TO PREVENT INJURY WHEN USING COMPRESSED AIR, DIRECT STREAM AWAY FROM BODY. USE SAFETY GOGGLES TO PREVENT INJURY TO EYES FROM FINE DUST PARTICLES.

E. Disperse residual dust and particles from the battery with blasts of clean, dry, compressed air not over 20 psi (1.4 bar).

F. Coat cell nuts (10a & 10b) and all links (4 through 9) with a light film of non-acid petroleum jelly using a small paintbrush.

G. Clean the exterior surfaces of the battery cover (2) and battery case (1) using a soft, clean cloth moistened with water. Dry with compressed air or a dry, clean cloth.

3. Thorough Cleaning

A. Discharge the battery (TESTING AND FAULT ISOLATION).

B. Disassemble the battery (DISASSEMBLY).

C. Remove any greasy residue from connector-receptacle (14) with isopropyl alcohol.

D. After ensuring that the vent valves (29) are closed, wash each cell (24) in running water. Do not allow any water to enter the cell. Dry with compressed air or a dry, clean cloth.

E. Wash the battery case (1), cover and pad (2), liners (22), connector-receptacle gasket (13), and cell hardware (10a & 10b, 11, 25 through 30) in warm, soapy water to remove dirt and salt deposits. A plastic scraper or a stiff bristle brush (non-metallic) may be used to aid in the removal of heavy deposits. Rinse away all soap, and dry with compressed air or a dry, clean cloth.

CAUTION: THE LENGTH OF TIME VENT VALVES ARE REMOVED FROM THE CELLS SHOULD BE KEPT TO A MINIMUM. OVEREXPOSURE OF THE ELECTROLYTE TO THE ATMOSPHERE WILL AFFECT BATTERY PERFORMANCE DUE TO CO_2 CONTAMINATION.

F. Remove the vent valves (29) from the cells (24) using vent valve wrench, and submerge them and their O-rings (30) in a clean container of distilled or deionized water. This treatment will dissolve any salt deposits that may have accumulated in the vents of the valves or around the O-ring seat. Cover the cells (24) with a damp, clean cloth or take other precautions to prevent any foreign particles from falling into the cells while the valves are removed.

G. Test the vent valves (29) to ensure they operate within the correct pressure range.

H. Install vent valves (29) with vent wrench (P/N 093365-000).

I. Assemble battery (ASSEMBLY).

CHECK

1. Initial Commissioning

A. Before the initial charge, thoroughly inspect the battery assembly to insure no damage has occurred during shipping or storage:

NOTE: All ( ) part identification numbers herein are IPL Fig. 1 item numbers.

(1) Inspect the battery case (1) and cover (2) for dents, distortion, or other damage. Minor dents may be straightened with a small rubber mallet after disassembly.

(2) Remove the battery cover and pad (2).

(3) Visually verify the connector-receptacle (14) is installed and undamaged.

(4) Visually verify all cells (24) are positioned for proper polarity.

(5) Visually verify all cells (24) are equipped with a vent valve (29).

(6) Torque all upper nuts (10a) per Fig. 801.

(7) Visually verify the temperature sensor harness assembly (23) is installed and undamaged.

(8) Charge the battery using one of the methods listed in Fig 104.

(9) Level electrolyte using instructions found in TESTING AND FAULT ISOLATION.

(10) Perform cell-to-case insulation test per TESTING AND FAULT ISOLATION.

(11) Torque all upper nuts (10a) per Fig 801.

2. Assembled Battery

The following procedures are for an assembled battery with battery cover (2) removed.

A. Visually inspect battery for evidence of damage or electrolyte leakage. If damage to any part is visible, refer to REPAIR and/or TESTING AND FAULT ISOLATION for applicable procedures.

B. Check the cell-to-case insulation (TESTING AND FAULT ISOLATION).

NOTE: A breakdown in electrical insulation between the cells and the battery case will result in “leakage” current, which over time will discharge the battery.

C. Check the torque on each upper nut (10a) per Fig. 801.

D. Check all ventilation openings to make sure that they are clean and clear.

3. Disassembled Battery

A. Visually check each cell carefully for evidence of electrolyte leakage, cracks, corrosion, burns, holes, or cross-threaded terminals. Excessive salt around a terminal post indicates leakage.

B. Visually check each cell vent valve (29) for defective O-rings, cracks, or other physical damage. Replace defective O-rings (30). Vent valves that visually appear damaged should be tested in accordance with the procedures in TESTING AND FAULT ISOLATION and replace with factory new if necessary.

C. Inspect links (4 through 9) for distortion, tarnish, loss of nickel plating, corrosion or burns. Tarnish can be polished off with a fine wire brush. Replace any defective intercell links.

D. Liners (22) should be clean and free of cracks or holes. Replace any that are defective.

CAUTION: A DEFECTIVE CONNECTOR RECEPTACLE CAN CAUSE DANGEROUS OVERHEATING WHICH MAY CAUSE DAMAGE TO THE BATTERY.

E. Check the connector-receptacle (14) for evidence of arcing, corrosion, cracks or cross-threaded terminals. Using the Cell-to-Case Insulation Test in TESTING AND FAULT ISOLATION, check the insulation between the positive pin and the connector shell, and the negative pin and the connector shell. Discard any receptacle that is found to have any of the above noted damage or fails the insulation test.

NOTE: A defective connector-receptacle can cause battery discharge, as well as low voltage in service.

F. Visually check the temperature sensor harness assembly (23) as follows:

(1) Inspect electrical connector for bent or loose pins, corrosion, cracks, faulty wire connections and evidence of arcing. Any evidence of the above conditions, however minor, is cause for replacement.

(2) Inspect thermoswitches for damaged, loose or broken wire connections, cracks, dents, or other physical defects. Any evidence of the above conditions, however minor, is cause for replacement.

(3) Visually check all wiring for damage to insulation, cracked or broken wire and other physical defects. Any evidence of the above conditions, however minor, is cause for replacement.

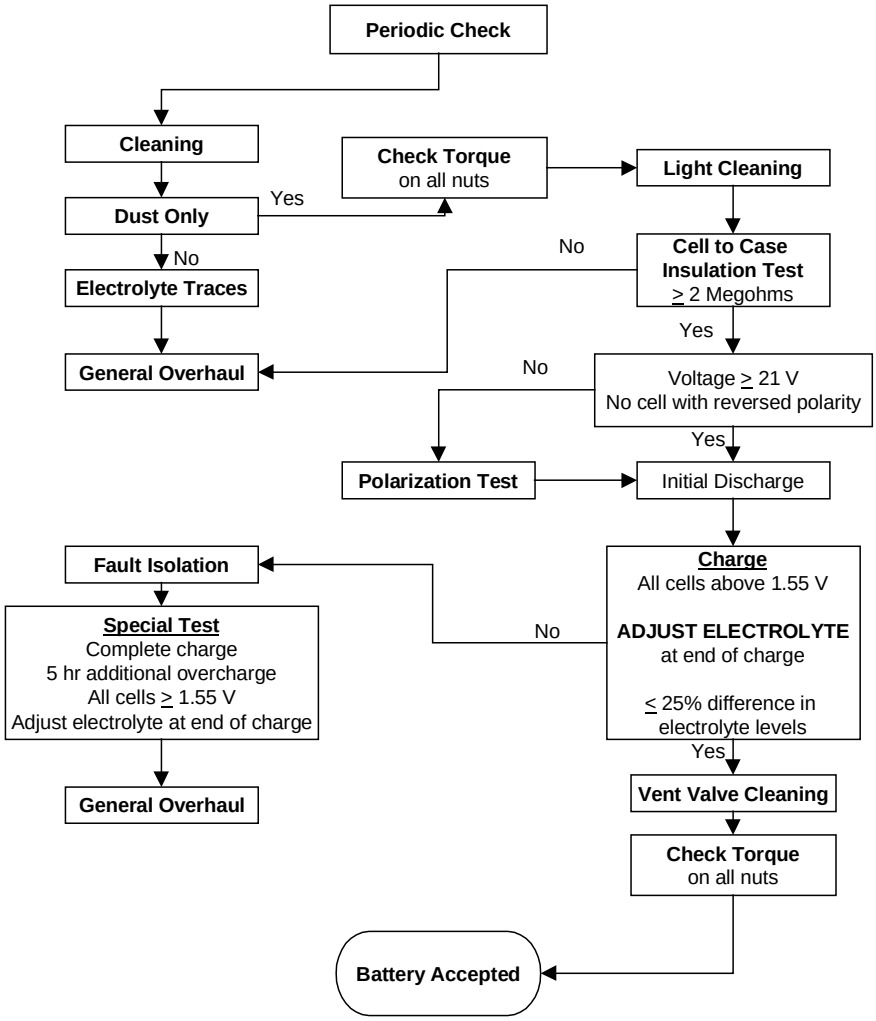
NOTE: Temperature sensor harness assembly (23) is a non-repairable item, and should be discarded if defective and replaced with factory new.

G. Check all hardware items for damage.

H. Check battery cover (2) and battery case (1) for damage.

4. Scheduled Maintenance

Figures 501, 502 and 503 are guidelines that may be used in the performance of specific maintenance cycles. Consult the airframe manufacturer for specific maintenance intervals or special procedures to be followed.



Maintenance Diagram
Periodic Check
Figure 501

A. Periodic Check: At specific watering intervals according to aircraft use, or every 6 months, perform the following using Figure 501 as a guide:

NOTE: Periodic and Regular maintenance checks may be combined if operating hours do not meet intervals listed.

(1) Remove battery assembly from aircraft.

(2) Perform a light cleaning (CLEANING). If excessive electrolyte deposits or salts are present, perform a thorough cleaning (CLEANING).

(3) Discharge the battery to 1 volt/cell (TESTING AND FAULT ISOLATION).

(4) Recharge the battery (TESTING AND FAULT ISOLATION).

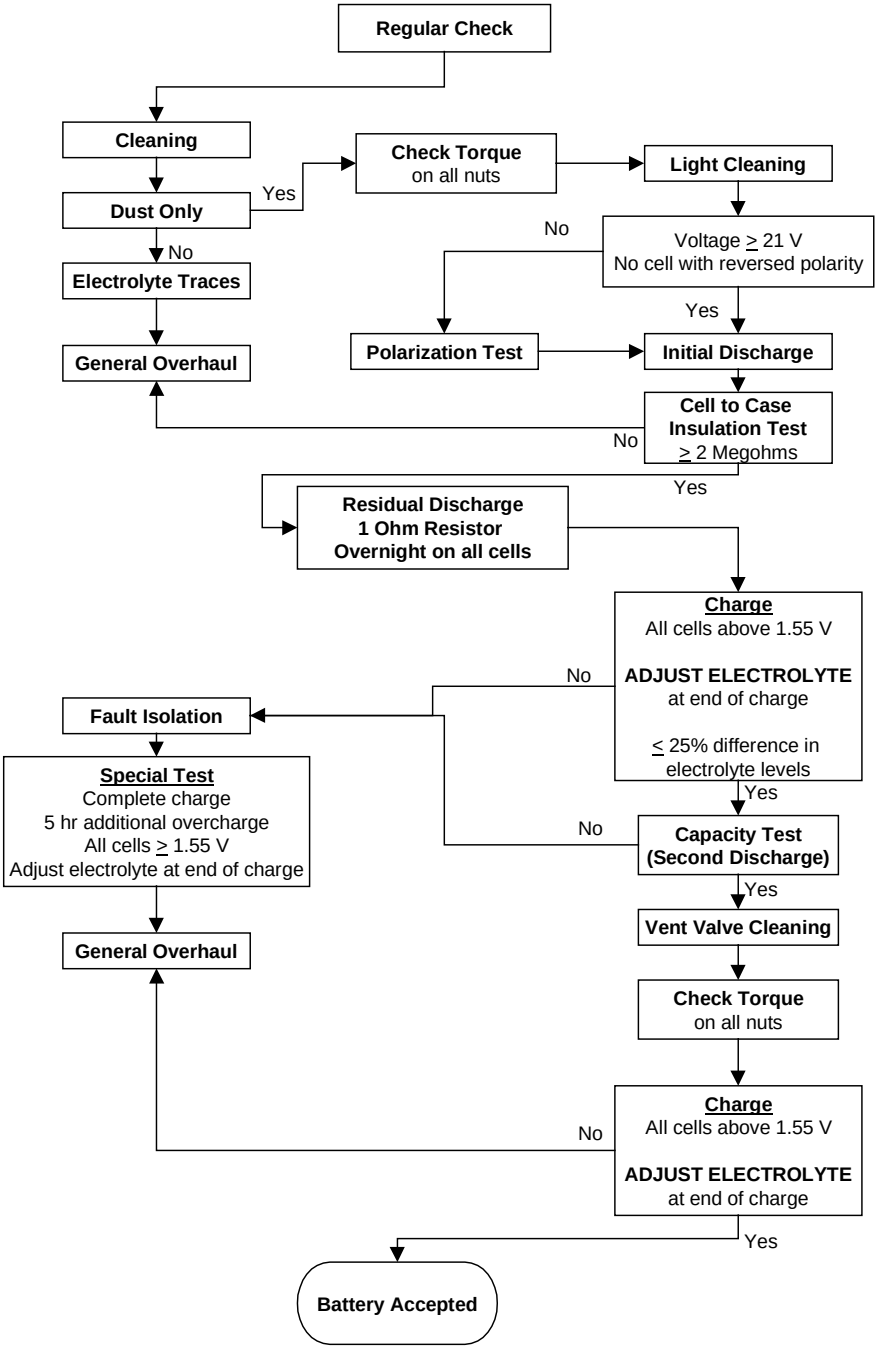
(5) Adjust electrolyte level (TESTING AND FAULT ISOLATION).

(6) Clean vent valves (CLEANING).

(7) Check upper nut torque per Fig 801.

(8) Perform cell-to-case insulation check (TESTING AND FAULT ISOLATION).

(9) Return battery to service.



Maintenance Diagram
Regular Check
Figure 502

B. Regular Check: At least once every 12 months, perform the following: (refer to Fig. 502)

NOTE: These periods are given as an indication; modify in accordance with operational experience.

NOTE: Periodic and Regular maintenance checks may be combined if operating hours do not meet intervals listed.

(1) Remove battery assembly from aircraft.

(2) Perform a light cleaning (CLEANING). If electrolyte deposits or salts are present, perform a general overhaul.

(3) Perform a visual inspection.

(4) Discharge the battery to 0 volts (TESTING AND FAULT ISOLATION).

(5) Test temperature sensor harness assembly (TESTING AND FAULT ISOLATION).

(6) Perform cell-to-case insulation check (TESTING AND FAULT ISOLATION).

(7) Recharge the battery (TESTING AND FAULT ISOLATION).

(8) Adjust electrolyte level (TESTING AND FAULT ISOLATION).

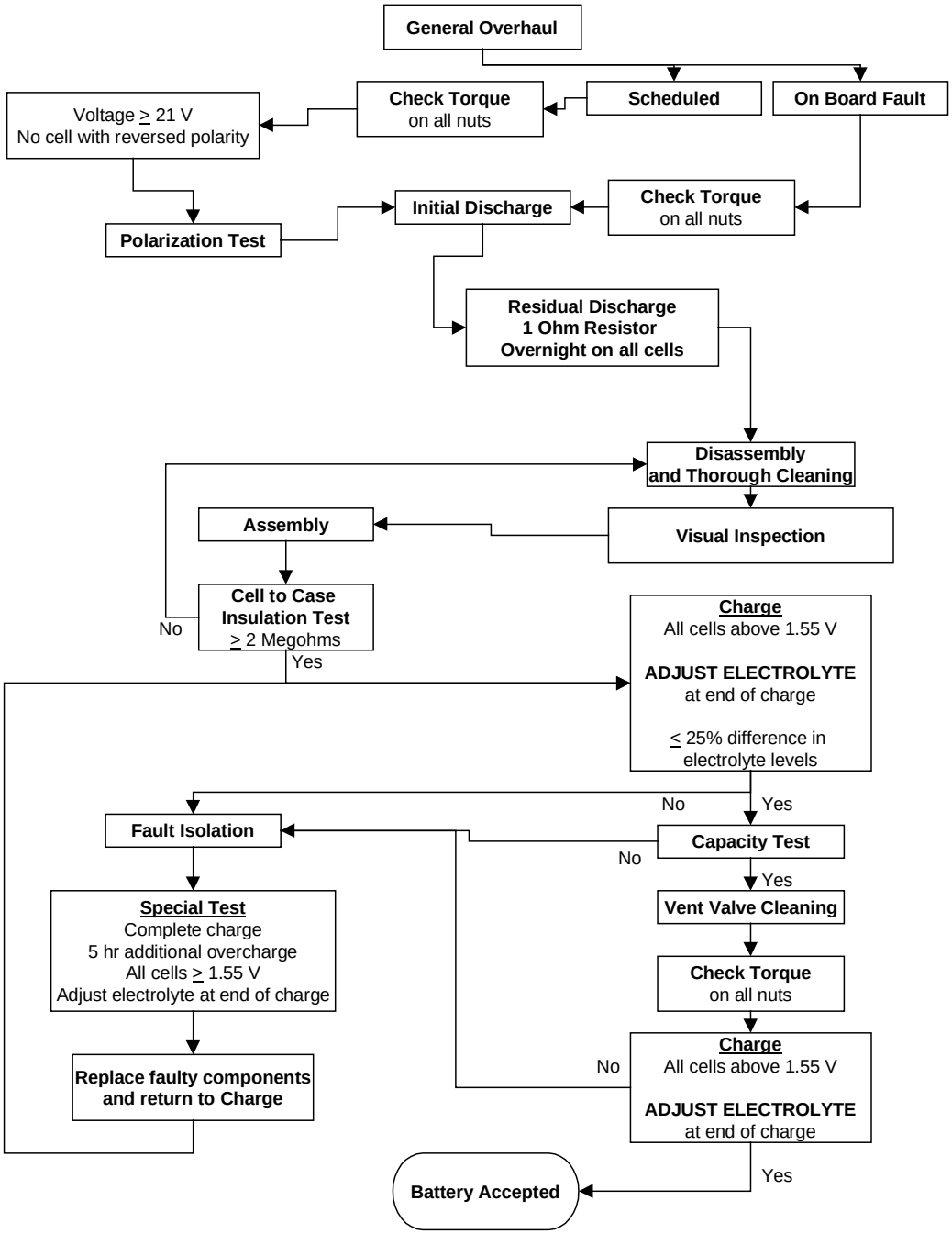
(9) Perform capacity test (TESTING AND FAULT ISOLATION).

(10) Clean and test vent valves (CLEANING, TESTING AND FAULT ISOLATION).

(11) Check upper nut torque per Fig 801.

(12) Recharge the battery (TESTING AND FAULT ISOLATION).

(13) Return battery to service.



Maintenance Diagram
General Overhaul
Figure 503

C. General Overhaul: At 24 months perform the following: (refer to Fig 503)

(1) Remove battery assembly from aircraft.

(2) Inspect the battery case (1) and cover (2) for dents, distortion, or other damage. Straighten with a small rubber mallet if necessary.

(3) Remove the battery cover and pad (2).

(4) Verify all cells (24) are positioned for proper polarity.

(5) Verify all cells (24) are equipped with a vent valve (29).

(6) Discharge the battery to 0 volts/cell (TESTING AND FAULT ISOLATION).

(7) Disassemble the battery (DISASSEMBLY).

(8) Thoroughly clean and inspect the battery (CLEANING and CHECK).

(9) Test temperature sensor harness assembly (TESTING AND FAULT ISOLATION).

(10) Assemble the battery (ASSEMBLY).

(11) Perform Cell-to-Case Insulation Test (TESTING AND FAULT ISOLATION).

(12) Charge the battery (TESTING AND FAULT ISOLATION).

(13) Level electrolyte (TESTING AND FAULT ISOLATION).

(14) Perform a Capacity Test (TESTING AND FAULT ISOLATION).

(15) Clean and test all vent valves (TESTING AND FAULT ISOLATION).

(16) Recharge the battery (TESTING AND FAULT ISOLATION).

(17) Check upper nut torque per Fig 801.

(18) Return battery to service.

REPAIR

1. Temperature Sensor Harness Assembly

NOTE: All ( ) part identification numbers herein are IPL Fig. 1 item numbers.

If any part of the temperature sensor harness assembly (23) is damaged, the entire assembly must be replaced with factory new.

2. Cell Assembly

NOTE: If three cells are replaced during a service cycle, or five cells are replaced over the life of the battery, it is Saft's recommendation that the battery be replaced.

A. Repair of cell (24) is limited to replacement of defective hardware (10a & 10b, 11, 25 through 27) the vent valve (29) and the lower terminal O-ring (28). Defects to the cell itself require cell replacement with factory new.

B. When inspection reveals electrolyte leakage from the cell at the vent hole opening, replace the defective O-ring (30) as follows:

(1) Using the vent-valve wrench (P/N 093365-000), loosen and remove the vent valve (29) from the cell (24)

(2) Cover the cell with a damp, clean cloth to prevent any foreign particles from falling into the cell.

(3) Remove the defective O-ring (3) from the vent valve (29 and install a new O-ring (30) onto the vent valve (29).

(4) Remove the cloth from the cell, and insert the vent valve (29) into the cell (24). Using the vent valve wrench, tighten the vent valve securely in place. To ensure they are tightened properly, use only finger pressure on the wrench.

(5) Clean cell (24) in accordance with CLEANING.

C. Replacement of the lower terminal O-ring is accomplished as follows:

CAUTION: DO NOT WASH CELL, OR OTHERWISE ALLOW ANY SUBSTANCES TO ENTER THE CELL WHILE O-RING IS REMOVED. ELECTROLYTE CONTAMINATION MAY OCCUR.

(1) Remove all hardware (25 through 27) from cell. Remove and immediately replace O-ring (28).

(2) Clean cell hardware (CLEANING) and reassemble cell.

(3) Torque lower nut per Fig. 801.

NOTE: Cell terminal should be lightly greased with a non-acid petroleum jelly prior to installation of nut.

3. Physical damage

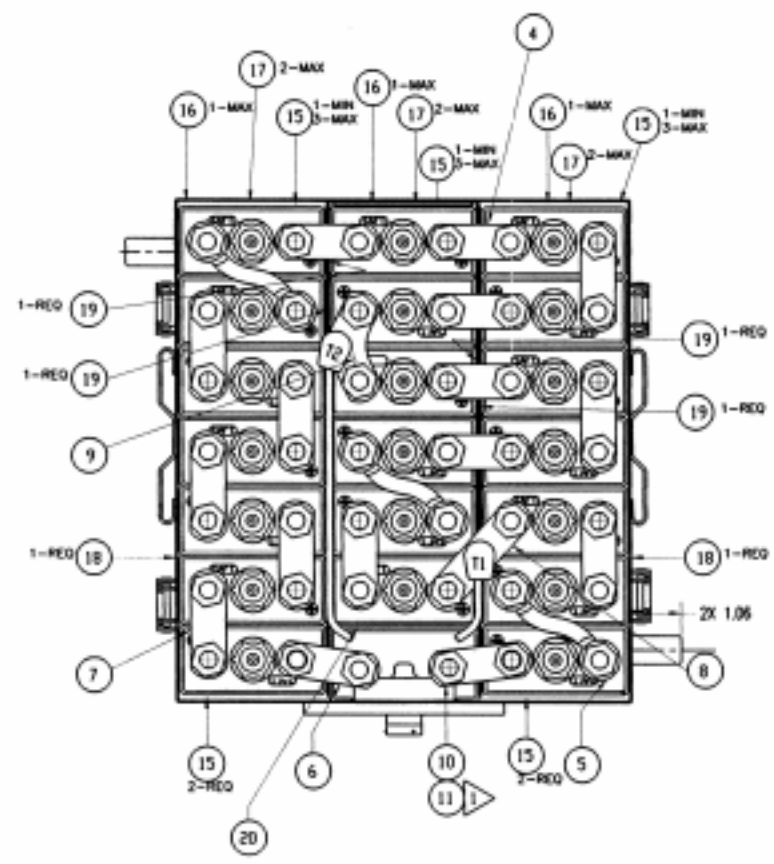
When necessary, remove minor dents in the battery cover (2) and battery case (1) using a small rubber mallet. Polish out minor pits or scratches using a piece of emery cloth.

ASSEMBLY

1. General

This section contains assembly instructions necessary after disassembly.

NOTE: All ( ) part identification numbers herein are IPL Fig. 1 item numbers.



Cells, Liners and Intercell Connector Links
Figure 701

2. Assembly

A. Make sure components are clean and dry before assembly.

B. Torque the lower nut (10b) on each cell terminal (Fig. 801).

C. Install the temperature sensor harness assembly (23) by:

(1) Insert the temperature sensor harness assembly connector through the hole provided in the case (1) from the inside.

(2) Install and tighten the jam nut onto the temperature sensor harness assembly connector and lay the two sensors (23a and 23b) with the wire harness over the side of the case for installation after the cells are in place.

D. Install the cells (24) and liners (22) into the case per Figure 701 using the following steps:

(1) Position the cells (24) to maintain correct polarity per Fig 701.

(2) Insertion of the last cell (24) in each row may be assisted by pushing down on its terminals with a block of softwood.

(3) The cells (24) should be tight enough to require some effort (18 - 25 lb-ft // 12.98 - 18.04 N•m) to remove them.

E. Install the connector-receptacle (14) in the case (1) using the following steps:

(1) Assemble connector-receptacle gasket (13) to the connector-receptacle (14).

(2) Insert terminals of the connector-receptacle (14) through the oval mounting hole in the front of the battery case (1).

(3) Attach the connector-receptacle (14) to the battery case (1) with sems screws (12). Tighten the screws (12) per Fig 801.

F. Install the intercell connecting hardware using the following steps:

(1) Recheck all cell polarities.

(2) Attach the temperature sensors (23a and 23b) to the intercell connector links (8 and 9). Torque nuts per Fig 801.

(3) Mount all links (4 through 9) onto the cell terminals per Fig 701.

(a) Replace any links that are bent, burnt, or have damaged nickel plating.

(b) Using a small brush, lightly coat cell terminals and links with neutral, non-acid petroleum jelly.

NOTE: Excessive use of petroleum jelly on the hardware will contribute to current leakage in high ambient temperature operations.

(4) Mount the washers (11) and upper nuts (10a).

NOTE: Threads of the terminals should be lightly greased with a non-acid petroleum jelly prior to installation of nuts (10a).

(5) Torque upper nuts per Fig. 801.

5. Storage

A. General

The storage room should be free of acid, dust, or dampness. No corrosive liquids or gases should be stored in the same room. Temperatures may range from -75°F (-60°C) to +140°F (+60°C) without harming the battery. The most desirable range for storage is between 32°F (0°C) to 86°F (30°C).

B. Active stand-by storage

NOTE: Nickel-cadmium batteries automatically self-discharge at varying rates according to ambient temperature.

(1) Saft vented-cell aircraft batteries may be stored charged, ready for service in the normal upright, or vertical position for 90 days under the following conditions:

(a) Battery fully serviced and charged prior to storage.

(b) Storage temperature of $\leq$68°F (20°C).

(c) Atmosphere free of acid, dust and dampness.

(d) No corrosive liquids or gases stored in the same room.

(e) After 90 days the battery, a Periodic Check must be performed (CHECK - see Fig 501).

(2) As an alternative to (1), the battery may be kept at any temperature below 95°F (35°C) and be “topped up” by charging until the battery has reached the voltage specified in Fig 702.

CAUTION: THE BATTERY MAY BE "TOPPED UP" TWO TIMES, ON THE THIRD TIME A PERIODIC CHECK MUST BE PERFORMED. FAILURE TO PERFORM THE PERIODIC CHECK MAY RESULT IN LOW WATER AND PERMANENT DAMAGE TO BATTERY.

CHARGE RATE	VOLTAGE TO TERMINATE CHARGE
5.3 Amps	30 Volts
21.5 Amps	31 Volts
53 Amps	31.4 Volts

Topping Up Charge Guide
Figure 702

C. Inactive long term storage

Saft Nickel Cadmium Aviation Batteries can be stored in the original cardboard packaging for a period of two years, and up to 10 years in sealed packaging under the following conditions:

(1) Ambient temperature of +68°F ±27°F (20°C ±15°C)

(2) Humidity less than 70%

(3) Normal upright, vertical position

(4) Atmosphere free of dust, dirt, vibration or corrosive agents.

D. Preparation for use after storage (other than active standby storage)

STORAGE TIME	SERVICE PROCEDURE
Less than 3 months	Perform a Periodic Check (CHECK – Fig 501)
More than 3 months	Perform a Regular Check (CHECK – Fig 502)

Return to Service Procedures
Figure 703

E. Packing and Transporting

The normal packing for shipment of Saft Ni-Cd batteries is with fiberboard or injected foam packing enclosed in fiberboard or wooden outer containers. For overseas shipments, wrapping in sealed plastic is recommended. Precautions must be taken to keep batteries upright while in transit. All markings and documentation should conform to current IATA regulations (UN2795 or UN2800 as applicable) governing the shipment of vented Ni-Cd batteries.

FITS AND CLEARANCES

1. Torque Table

Figure 801 is a listing of all torque values needed to assemble and service the battery.

NOTE: The values listed in Figure 801 are “lube torque” values. The threads should be lightly greased with a non-acid petroleum jelly prior to attaching nuts or screws.

Figure / Item Number	Torque Value	Name, Location
IPL Fig. 1 10a	110-115 lb-in (12.64-13.21 N•m)	Nut, Terminal, Upper
IPL Fig. 1 10b	55-65 lb-in (6.32-7.47 N•m)	Nut, Terminal, Lower
Not Shown	5 lb-in (2 N•m)	Nuts, Thermoswitch
IPL Fig. 1 070	20 lb-in (2.48 N•m)	Screw, Sems

Torque Values
Figure 801

2. Fits and Clearances Table

No fits and clearances required.

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

1. Special Tools

A. Battery Maintenance Kit

(1) The Battery Maintenance Kit (Saft P/N 024629-000) is required for performance of the TESTING AND FAULT ISOLATION and DISASSEMBLY procedures.

The syringe (P/N 020916-001) is used in the electrolyte level adjustment, and the cell puller (P/N 017556-000) is used in cell removal. Spare hardware, vent valves, and O-rings are provided.

(2) The following items are the contents of the Saft Battery Maintenance Kit.

Nomenclature	Saft Part Number
Cell Puller	017556-000
Syringe Assembly	020916-001
17 mm Socket (3/8” Drive)	093314-000
Vent Valve Wrench	093365-000
Washer, Belleville	022228-000
O-Ring, Terminal	091181-002
Vent Valve	023619-000
Nut, Terminal	015995-000
Screw, SEMS	093616-000

Battery Maintenance Kit
Figure 901

PART NUMBER	NOMENCLATURE	APPLICATION					
		TEST/FAULT	DISASSEMBLY	CLEANING	CHECK	REPAIR	ASSEM./STORE
093365-000	Wrench, Vent Valve	X	X	X	X	X	X
020916-001	Syringe, 20 cm^3 (1.22 in^3) (Fig. 104)	X			X	X	
017556-000	Cell Puller		X			X	
024398-000	Check Fixture, Vent Valve			X			
Ref Drawing only							
	Constant Current Power Unit (0-60 Amp)	X			X	X	
	Constant Current Load Bank (0-60 Amp)		X		X	X	X
	Equalizing resistors (1 Ω, 3 W Minimum)	X			X		
	Megohmmeter (0-50 MΩ, 0-250V continuous)	X			X		
	Precision Multimeter (volt, Ω, mA)	X			X	X	X
	Torque Wrench (0-250 lb-in)	X			X	X	X

ILLUSTRATED PARTS LIST

1. Introduction

A. Purpose

(1) This section provides illustrations and parts breakdown of the battery that can be disassembled, repaired, and reassembled.

B. Explanation and Usage of Section

(1) Assembly Order Indenture System

The Indenture System used in the parts list shows the relationship of one part to another. For a given item, the number of indentures depicts the relationship of the item to the associated next higher assembly.

(2) Effectivity Code

Reference letters (A, B, C, etc.) are assigned in the EFF CODE column for each top assembly. The reference letter of the applicable top assembly is also shown in the EFF CODE column for each detail part and subassembly except that no reference letter is shown for detail parts and subassemblies used on all top assemblies.

(3) Quantity Per Assembly

The UNITS PER ASSY column shows the total number of units required per assembly, per subassembly, and per sub-subassembly as applicable. The letters REF indicate the item is listed for reference purposes.

(4) Parts Replacement Data

Interchangeability information will be provided in a future manual revision if it becomes applicable.

(5) Service Bulletin Incorporation

Service Bulletin incorporation information applicable to the parts list will be provided in a future manual revision if it becomes applicable.

(6) Items Not Illustrated

Items not illustrated are indicated by a dash (-) ahead of the item numbers in the FIG. and ITEM column.

(7) Alpha Variant Item Numbers

(a) Alpha variants A - Z (except I and O) are assigned to existing item numbers when necessary to show:

1 Added items

2 Service Bulletin modifications

3 Configuration differences

4 Optional parts

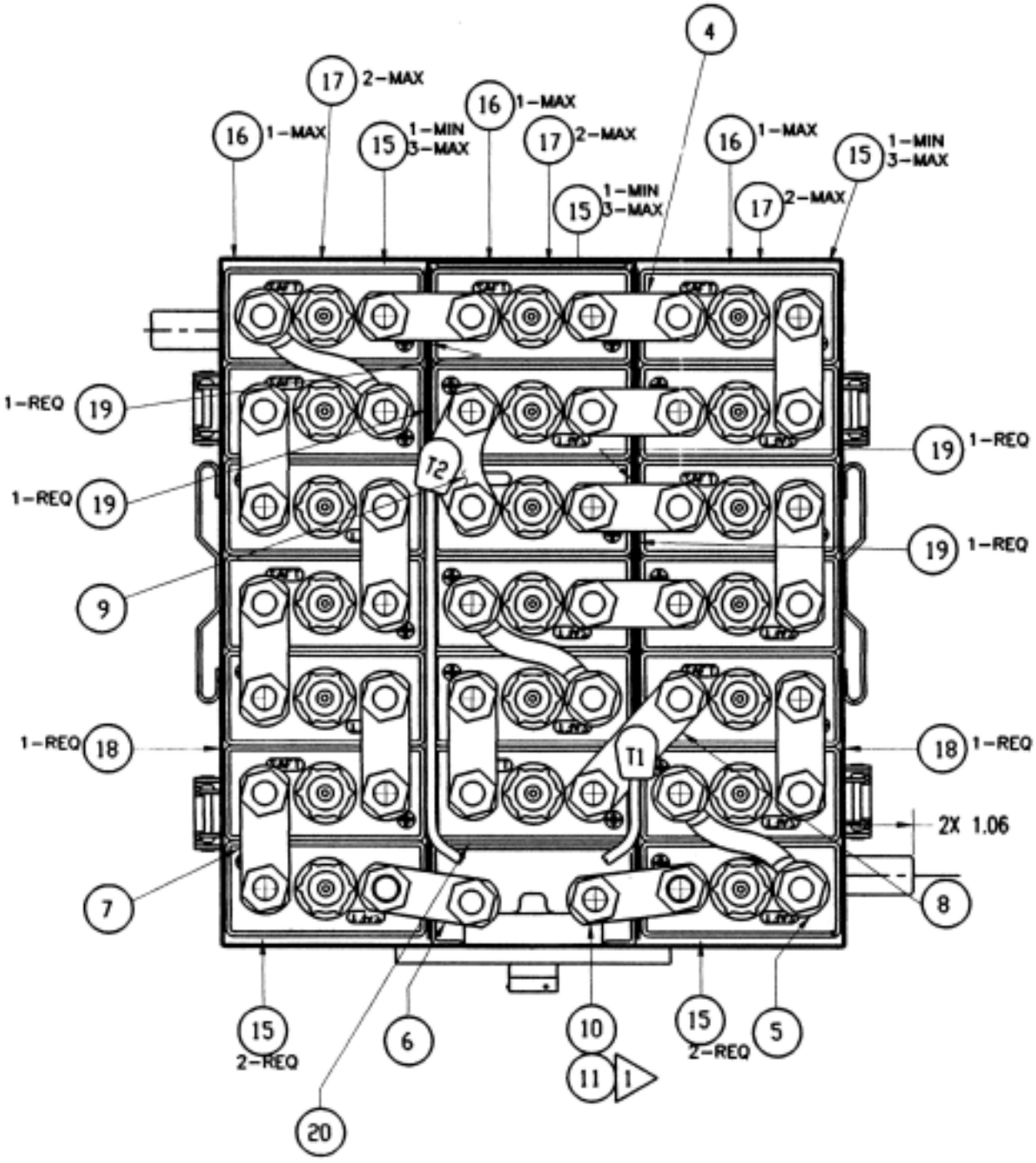
5 Product improvement parts (non-service bulletin)

(b) Alpha variant item numbers are not shown on the exploded view when the appearance and location of the alpha variant item is the same as the basic item.

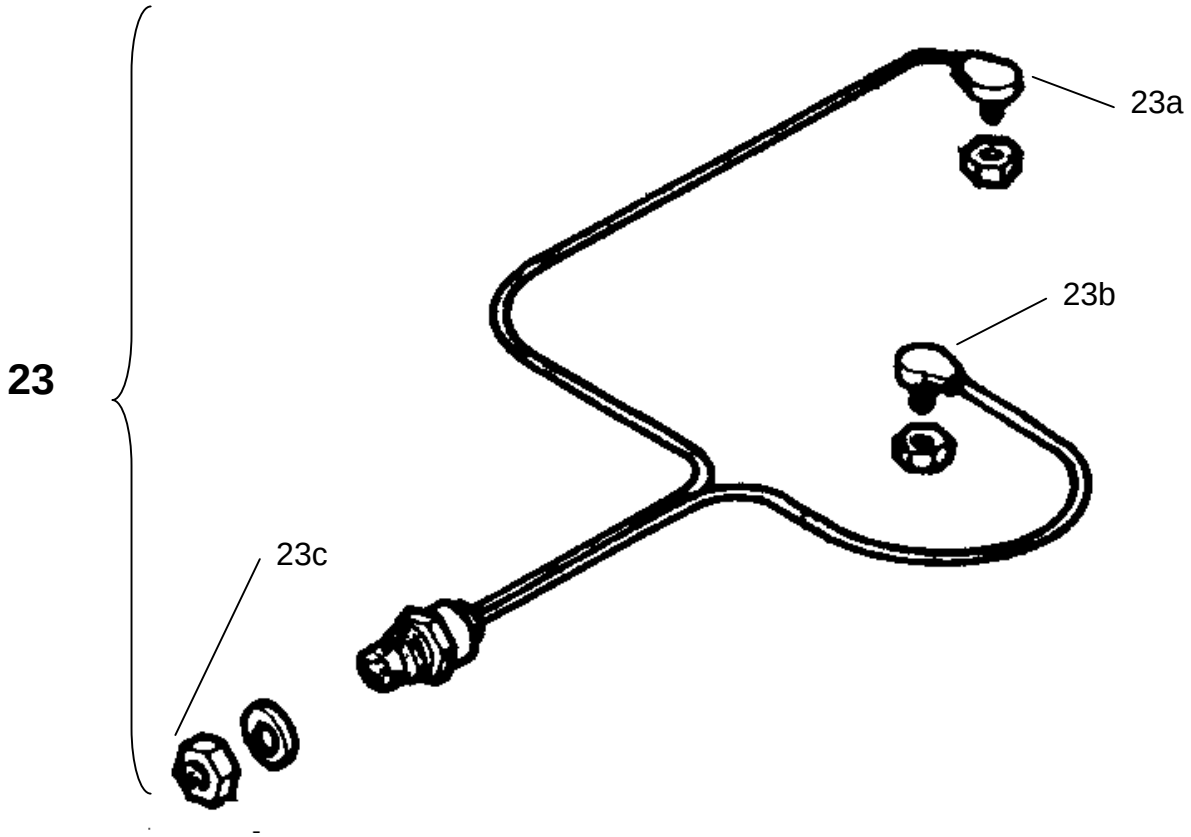
(8) Vendors

The vendors of all parts shown in the parts list are as follows:

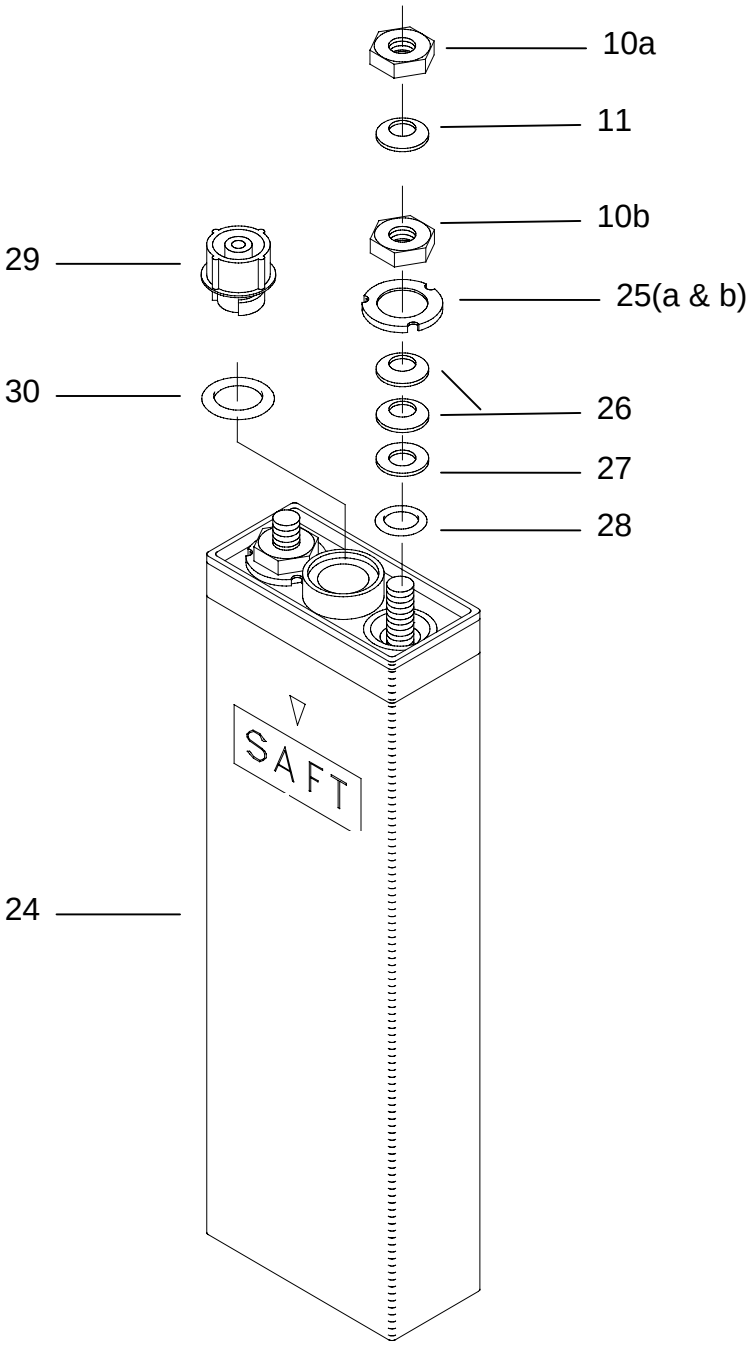
Vendor Code	NAME / ADDRESS	Vendor Code	NAME / ADDRESS
V09052	***Saft America Inc.*** 711 Industrial Boulevard Valdosta, GA 31601 USA	***F6177***	***Saft*** 156 Avenue de Metz 93230 Romainville France



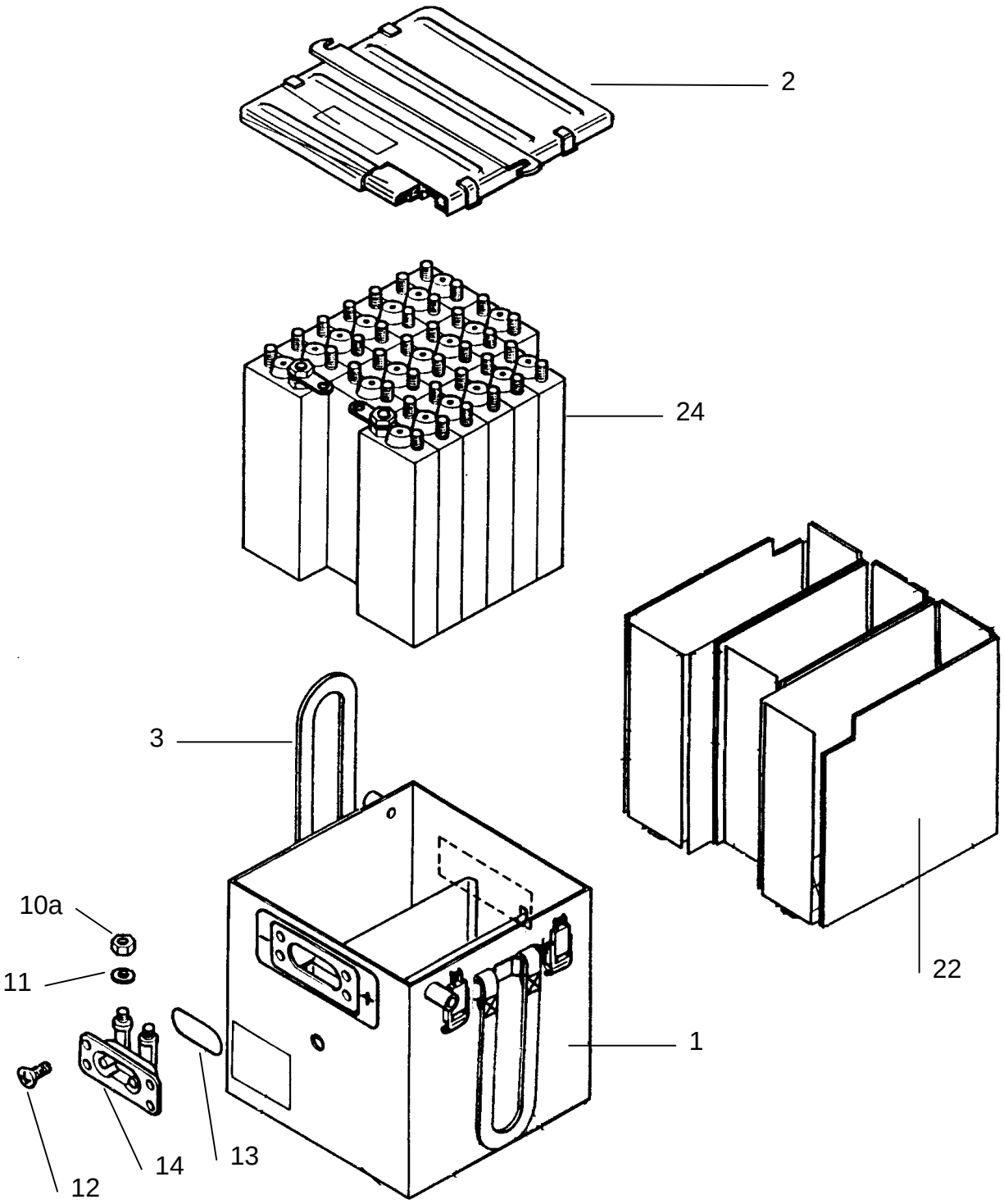
Liners, Hardware, and Polarity, Exploded View
Figure 1 (Sheet 1 of 4)



Temperature Sensor
Figure 1 (Sheet 2 of 4)



Cell, Exploded View
Figure 1 (Sheet 3 of 4)



Battery, Exploded View
Figure 1 (Sheet 4 of 4)

ILLUSTRATED PARTS LIST

FIG.	ITEM	PART NUMBER	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY
1	REF		**Battery, Nickel Cadmium (Type 5347CH1)**		REF
	1	024810-000	. Case, Marked 5347CH1		1
	2	024812-000	. Cover and Pad Assembly, Marked		1
	3	023707-000	. Handle, Web		2
	4	015575-000	. Link		5
	5	018569-000	. Link		3
	6	015577-000	. Link		2
	7	018567-000	. Link		9
	8	024798-000	. Link		1
	9	024799-000	. Link		1
	10a	015579-000	. Nut, Hex (Upper)		42
	10b	015579-000	. Nut, Hex (Lower)		40
	11	022228-000	. Washer, Belleville		42
	12	093616-000	. Screw, #8-32, SEMS		4
	13	009384-000	. Gasket, Connector-Receptacle		1
	14	022078-000	. Receptacle, Connector		1
	15	*017357-033	. Liner		7
	16	*017356-095	. Liner		3
	17	*017355-094	. Liner		6
	18	*024846-000	. Liner		2
	19	*013357-078	. Liner		4
	20	*013357-079	. Liner		1
	21	*017356-026	. Liner		1
	22	024875-000	. Kit, Liner (includes 15-21)		1
	23	023046-000	. Temperature Sensor Harness Assembly		1
	24	023456-000	. Cell, CVH530KA (Equipe)		20
	25a	023388-001	. . Washer, Polarity **Red**		1
	25b	023388-002	. . Washer, Polarity **Blue**		1
	26	021871-000	. . Washer, Belleville		4
	27	021870-000	. . Washer, Flat		2

FIG.	ITEM	PART NUMBER	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY
	28	091181-002	. . O-Ring, Lower Terminal		2
	29	023619-000	. . Valve, Vent		1
	30	012536-002	. . . O-Ring, Vent-Valve		1

* = Only procurable in kit (#22) – not sold separately.