BASEWEST

Operating, Installation & Maintenance Manual

Battery Power Unit, Escape Slide Lighting System P/N 7-1096-Series P/N 7-1097-Series

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1.0 INTRODUCTION

1.1 Scope

This manual covers the installation, test, and maintenance of BaseWest P/N 7-1096-Series and 7-1097-Series escape slide lighting battery power unit (hereinafter "battery") manufactured by BaseWest. These devices are designed for installation on aircraft escape slides and slide/rafts to provide power to integral lighting systems. They are authorized by the FAA under Technical Standard Order (TSO) C142a. Refer to the corresponding OEM escape slide or slide/raft manual for instructions relative to operation and installation on specific escape slides.

1.2 Lithium Battery

These batteries contain lithium-iron disulfide "AA" cells manufactured by Energizer® and, as such, has been tested, qualified, and authorized under Federal Aviation Administration (FAA) TSO-C142a and its underlying minimum operational performance specification, RTCA document number RTCA/DO-227, published on June 23, 1995.

2.0 THEORY OF OPERATION

2.1 General Description

BaseWest's P/N 7-1096- and 7-1097-Series batteries comprise a series arrangement of four lithium- iron disulfide AA cells in a cylindrical package with external switching means and power and test leads. Activation of the battery is accomplished upon inflation of the host device via an activating lanyard and switch plug. The switch plug, when installed and captured by a retaining clip in the battery end cap renders the battery power circuit OPEN, and the system OFF. The activating lanyard is short-rigged and tied-off, so that inflation and extension of the escape slide causes the switch plug to be pulled from the battery, allowing the battery to go to the CLOSED circuit (ON) condition, providing power to the installed slide light harness. A nylon tie-cord is provided to secure the battery to its mounting on the escape slide structure.

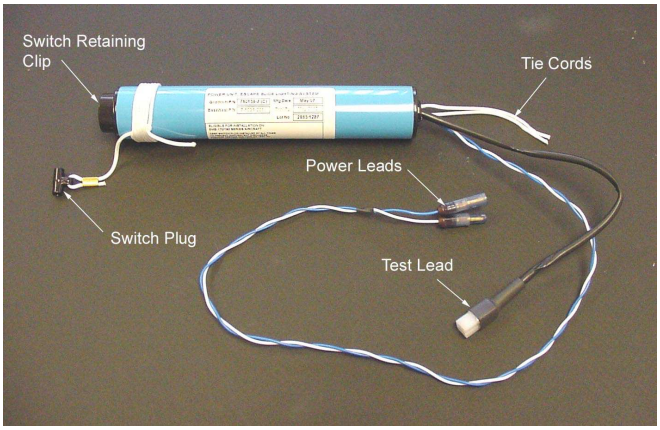


Fig. 1 General Configuration

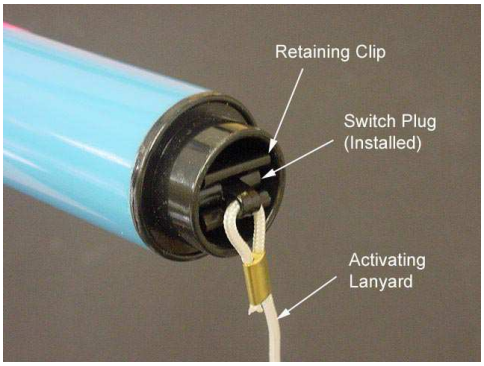


Fig. 2 Installation of Switch Plug in Retaining Clip

The primary distinctions between the 7-1096-Series and the 7-1097-Series batteries are summarized below. The 7-1097-Series battery is designed for applications such as off-wing installations where waterproofness is required.

Characteristic	P/N 7-1096-Series	P/N 7-1097-Series
Waterproof	No	Yes
Epoxy end cap sealant	No	Yes
Gore-Tex Pressure Vent	No (naturally vented)	Yes
Activation Switch	Otto Engineering Microswitch (Unsealed)	Cherry Reed Switch (Sealed)
Test Lead Connector	Molex (Unsealed)	SureSeal (Waterproof)
Weight	5.64 oz	7.75 oz

2.2 Standard vs. “Smart” Batteries

These batteries are part of a series of “smart” batteries designed by BaseWest specifically for use with LED-based escape slide lighting systems, but they differ from other “smart” batteries in the series in that they are based on lithium versus alkaline primary cells. “Smart” batteries include electronics which regulate battery output and thus do not operate or test in precisely the same way that earlier generation “standard” escape slide lighting batteries. Specific distinctions between standard and “smart” batteries are as follows:

a) Both smart and standard batteries provide power to the escape slide lighting system via the battery power leads.

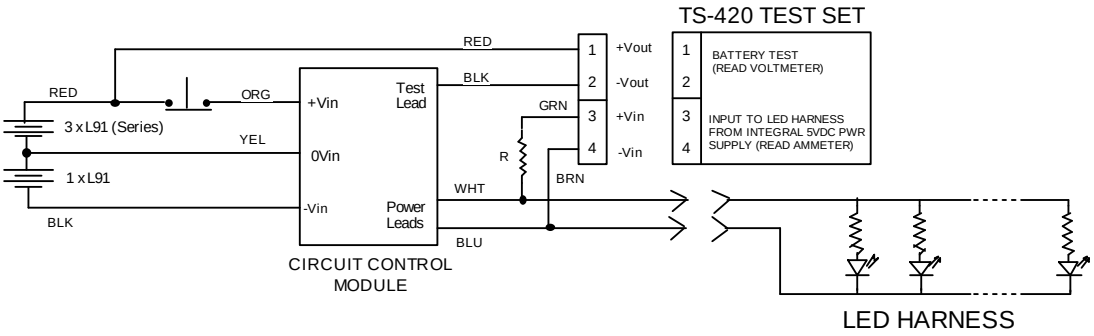
b) Smart batteries, the two batteries covered by this document, provide power from the individual battery cells through an internal electronic regulator circuit which conditions the voltage and current to be compatible with the LED-based lighting harness. Outputs from this circuitry remain relatively constant throughout the useful discharge life of the smart battery. Standard batteries provide unregulated

power directly from the individual battery cells which results in a relatively linear degradation in output voltage and current through the discharge cycle.

c) In both the standard and smart battery configuration, testing of the installed escape slide lighting system (with a battery) is accomplished by connecting the battery's test lead to a BaseWest Model TS-420 test set. An integral 5VDC power supply provides power directly through the battery power leads and into the lighting harness; the battery, itself, does not provide power for this test. This test circuit is equipped with a set of dropping resistors designed to condition the 5VDC input to an acceptable test voltage level.

2.3 Schematic and Wiring Diagram

The following is a schematic of a complete escape slide lighting system, including the battery, a representative LED-based lighting harness, and the Model TS-420 test set.



2.4 Limitations

2.4.1 The conditions and tests of TSO approval of these articles are minimum performance standards. The installer of these batteries on or in a specific type or class of aircraft must determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. Lithium cell and battery safety concerns include the possibility of fire and venting of toxic gases.

2.4.2 These batteries are designed only for use with escape slide lighting systems specifically identified by the escape slide manufacturer's component maintenance manual (CMM). No other use of these batteries is intended or authorized.

2.4.3 These batteries contain lithium-iron disulfide battery cells, part number L91, manufactured by Energizer®. The user is encouraged to refer to Energizer technical publications on this particular cell for specific information regarding limitations, usage, storage, and disposal. The following publications are recommended with respective internet links:

- Energizer Lithium L91 Product Data Sheet:
  http://data.energizer.com/PDFs/l91.pdf
- Energizer Lithium L91 Application Manual
  http://data.energizer.com/PDFs/lithiumcoin_appman.pdf
- Energizer Product Safety Data Sheet (Lithium-Iron Disulfide)
  http://data.energizer.com/PDFs/lithiumirondisulfide_psds.pdf

2.4.3 These batteries are non-rechargeable. DO NOT recharge these batteries.

2.4.4 Any battery can pose a potential fire, explosion, or burn hazard. Do not open the battery or the individual cells, and do no expose to heat above 212°F (100°C).

2.5 Transport by Air

It is recommended that the user review the guidelines for the air transportation of lithium batteries published by Energizer in the following document, as well as review the regulator site link provided in that document (http://www.gpoaccess.gov/fr/index.html) :

- Energizer Notice of Primary Lithium Battery Transportation Regulation
  http://data.energizer.com/PDFs/lithiumirondisulfide_psds.pdf

2.6 Disposal

It is recommended that the user following the guidelines for the disposal of batteries containing lithium cells published by Energizer in the following document:

- Disposal of Energizer AA and AAA Lithium L91 and L92 Battery:
  http://data.energizer.com/PDFs/l91.pdf

3.0 INSTALLATION, RIGGING & OPERATION

3.1 Installation

Install the battery with escape slide manufacturer's component maintenance manual (CMM) procedures.

3.2 Rigging

Secure the end of the activating lanyard to the escape slide structure and route it to the battery in accordance with the escape slide manufacturer's CMM. Fully install the switch plug (located on the end of the activating lanyard) into the clip in the switch end of the battery per Fig. 2. DO NOT safety-tie switch plug in place.

3.3 Operation

These batteries, when properly installed, secured and rigged in accordance with the escape slide manufacturer’s instructions, will operate automatically upon inflation of the escape slide. The activating lanyard is “short-rigged” to the escape slide such that the activating switch plug will be pulled from the battery when the escape slide is fully inflated, closing the activation circuit and rendering the battery ON.

4.0 TEST PROCEDURES

4.1 General

4.1.1 BaseWest escape slide light systems are designed to be tested with BaseWest's Model TS-420 test set. Refer to the escape slide manufacturer’s manuals for specific instructions relating to the use of the TS-420 test set.

4.1.2 The procedures in this section include independent testing of the battery, and functional tests of the device in association with the mating escape slide lighting system.

4.2 Battery Test

This test is designed to verify the serviceability of the battery, only. This test is suitable for receiving inspection, pre-installation or pre-packing test

(a) Set the TS-420 Mode Selector to “Voltmeter”, and Load Selector to “D”.

(b) Connect the connectors on the power output leads (blue/white twisted pair) to the connector block on the TS-420 as follows (polarity must be observed):

- BLUE wire (+) to TS-420 connector block labeled “Voltmeter (+)”
- WHITE wire (-) to TS-420 connector block labeled “Voltmeter (-)”

(c) Ensure the activating switch plug is installed in the battery under test.

(d) While pressing and holding the RED push-to-test button, remove the activating lanyard switch plug from the battery. Observe and record the battery regulator output voltage (3 to 5 seconds, maximum). An acceptable reading is 4.240-4.360 VDC. (Note: Figure 3 below provides one method of accomplishing this task – holding the battery and pushing the button with one hand and pulling the activation lanyard with the other.)

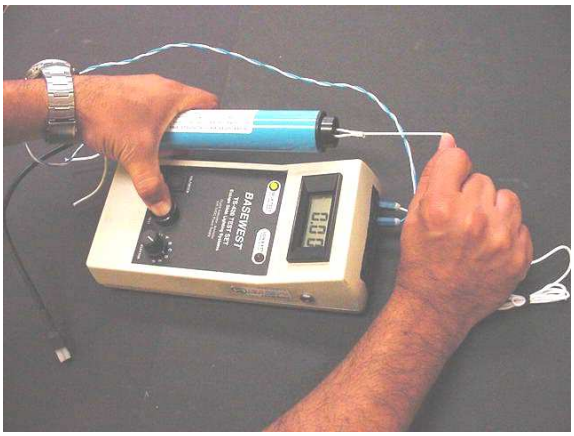


Fig. 4 - Battery Test with TS-420 Test Set

(e) After the voltage reading is taken, release the push-to-test button and replace the activation switch plug. Refer to the escape slide manufacturer’s CMM for specific test requirements.

4.3 Battery Functional Test

This section provides a functional test of the battery while connected to an escape slide lighting harness. This test is recommended before packing the escape slide.

CAUTION: DO NOT PERFORM THIS PROCEDURE WITH TS-420 TEST SET CONNECTED TO THE BATTERY.

a) Ensure the battery is properly connected to the escape slide light harness in accordance with slide manufacturer instructions and Section 2.0 of this manual.

b) With the escape slide laid out fully (inflated or not) and all slide light luminaires visible, pull the activating switch plug from the battery. Observe that the slide lights function properly. IMMEDIATELY reinstall the switch plug to de-activate the lighting harness. If the system fails to operate properly, re-install the activating switch plug into the battery, and verify that the power lead connectors are properly engaged into the mating connectors on the LED lighting harness. Repeat the test.

CAUTION: PROLONGED OPERATION OF THE LIGHTING HARNESS WITH THE INSTALLED BATTERY CAN DEPLETE THE BATTERY BEYOND SERVICEABLE LIMITS.

4.4 System Functional Test

Functional testing of the entire escape slide lighting system with the battery connected to the LED harness may be specified by the slide manufacturer's CMM. If so, the instructions in the slide manufacturer's CMM should be followed. Please note that in this test, the power to the LED harness is provided by the TS-420 test set through the battery. This is NOT a test of the serviceability of the battery. The following guidance is provided:

a) Ensure the battery is properly connected to the slide light harness.

b) Connect the four-contact test lead connector to the connector block on the TS-420.

c) Set the TS-420 Mode Selector switch to "Ammeter".

d) Press and release the push-to-test button and record the current (mA) on the TS-420's display. Refer to the slide manufacturer's CMM for acceptable current levels.

NOTE: In the "Ammeter" mode, the TS-420 will remain ON for approximately 20 seconds and turn OFF automatically. Power can be interrupted at any time after the readings are recorded by removing the battery test lead connector from the TS-420).

5.0 INSPECTION & MAINTENANCE

5.1 Inspection

Inspection of the battery is recommended upon receipt from the factory, immediately prior to installation on an evacuation slide, and during post-pack procedures prior to releasing the evacuation slide to service, and immediately prior to installation of the packed evacuation slide on the aircraft is recommended. In-service inspection and/or test while the battery pack is installed and in-service with the evacuation slide on the aircraft is optional but not considered necessary.

5.2 Maintenance & Repair

These batteries are non-repairable; repairs are not authorized. No maintenance is required beyond storage recommendations, below

5.3 Storage

The P/N 7-1096- and 7-1097-Series batteries should be stored inside in a dry, protected area within a temperature range of -40°C to +60°C (-40°F to +140°F). Always store the battery with the activating switch plug/lanyard in place. Do not expose the power lead contacts to contact with conductive materials, or to contact with each other. Maintain connector housings on power lead wires at all times.

5.4 Service Life

5.4.1 These batteries are approved for a seven (7) year service life from date of manufacture. Care should be taken to use batteries on a first-in-first-out inventory rotation basis. The "replace by" date is clearly marked on the nameplate.

5.4.2 It is important to ensure that the battery expiration date is noted when setting the date for the next scheduled overhaul of the host evacuation slide or slide/raft. If the battery expiration date occurs before the next slide or slide/raft overhaul date, the overhaul date must be adjusted accordingly.

6.0 PARTS & ACCESSORIES

6.1 Replacement Parts

The following replacement parts are available from BaseWest for these batteries, but are not usually required because they come installed with the new device. Stocking of this particular replacement part is generally not required.

Part No.	Description	Applicable to
7-5014-101	Activation Lanyard Assembly	7-1096-201
7-5022-1	Activation Lanyard Assembly	7-1096-201
7-5018-1	Activation Lanyard Assembly	7-1097-201

6.2 Accessories

The following test set is available from BaseWest for testing the battery and the lighting systems that they power. This is the only test set recommended for use on the “smart” series of batteries (see Section 2.2).

Model No.	Description	Source
TS-420	Test Set	BaseWest Inc.