BASEWEST

Operating & Maintenance Manual

Model TS-420 Test Set

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BaseWest Inc.
4240 116th Ave N, Clearwater, FL 33762
Tel: 727 / 573-2700 • Fax: 727 / 573-4307
E-mail: info@basewest.com
www.basewest.com

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1.0 General

This operating and maintenance instruction covers the BaseWest Model TS-420 test set - a rechargeable, handheld instrument with a digital LCD readout designed specifically for testing airline escape slide lighting systems and their components. The Model TS-420 comprises the following functions:

- Voltmeter with built-in load bank - This mode is used to test battery condition. A rotary switch on the instrument panel allows the selection of closed circuit test under selectable resistive loads as well as an open circuit (no load) test.

- Ammeter with integral power supply - This mode is used to verify the current draw of the slide light harness through an internal regulated 5VDC power supply. Current readings can be used to verify proper function of the light harness and, in some cases, can be used as an indicator of a light-out condition. The ammeter function has a built-in timer that allows hands-free, walk-around inspection and automatic instrument shut-down after 20 seconds.

Slide manufacturer component maintenance manuals should be consulted to determine appropriate test parameters and loads.

Figure 1. TS-420 Test Set with Charger

2.0 Theory of Operation

2.1 General

The Model TS-420 provides for voltage testing of escape slide lighting system battery packs, and electrical current testing of escape slide lighting harnesses. A special interface connector provides for full system test of an installed battery pack and lighting harness system through a mating test connector found on most battery packs. The voltmeter and ammeter modes are selected by a Mode Selector (rocker switch) mounted on the instrument panel. The voltmeter mode is provided with a multi-value resistive load bank that can be selected by a panel-mounted Load Selector (rotary switch). The ammeter mode measures current through the lighting harness provided by a built-in regulated 5VDC power supply. Tests are initiated through a guarded Press-To-Test switch

2.2 Voltmeter Mode

The voltmeter mode is used to test battery condition. The voltmeter mode is selected when the Mode Selector switch is in the VOLTMETER position. In this mode, the Press-To-Test switch is a momentary push button - the instrument is ON only so long as the switch is depressed. When the test switch is pressed, the Self-Test indicator illuminates GREEN and the voltage of a connected battery pack is displayed on the digital meter. The battery under test is subjected to the resistive load selected by the panel-mounted rotary switch. Positions A through F are resistive loads exactly matching those of test equipment described in slide manufacturer manuals; a NO LOAD position is offered to allow open circuit voltage testing of the battery. The Battery Status indicator is not active in this mode.

2.3 Ammeter Mode

This mode is used to measure the amount of current being drawn through the lighting harness under a 5VDC regulated input. The ammeter mode is selected when the Mode Selector switch is placed in the AMMETER position. Activating the Press-To-Test switch in this mode provides 5VDC regulated power to the output connectors, and initiates a 20 second timer. The power supply and meter turn off automatically approximately 20 seconds after the test switch is pressed. The device will remain on and active so long as the momentary switch is pressed in, but will return to the OFF condition if the switch is released after the initial 20 second period. In the ammeter mode, the Self-Test indicator illuminates GREEN, indicating that the internal power supply is providing 5.0 VDC and the unit is OK for test; if the Self-Test indicator illuminates RED, the test set must be removed from service and recharged. The Battery Status indicator, if illuminated, indicates that the internal battery pack is low and recharging is required.

> **NOTE**: The device is OK for test and can continue to be used in either mode so long as the Self-Test illuminates GREEN when the Press-To-Test switch is activated.

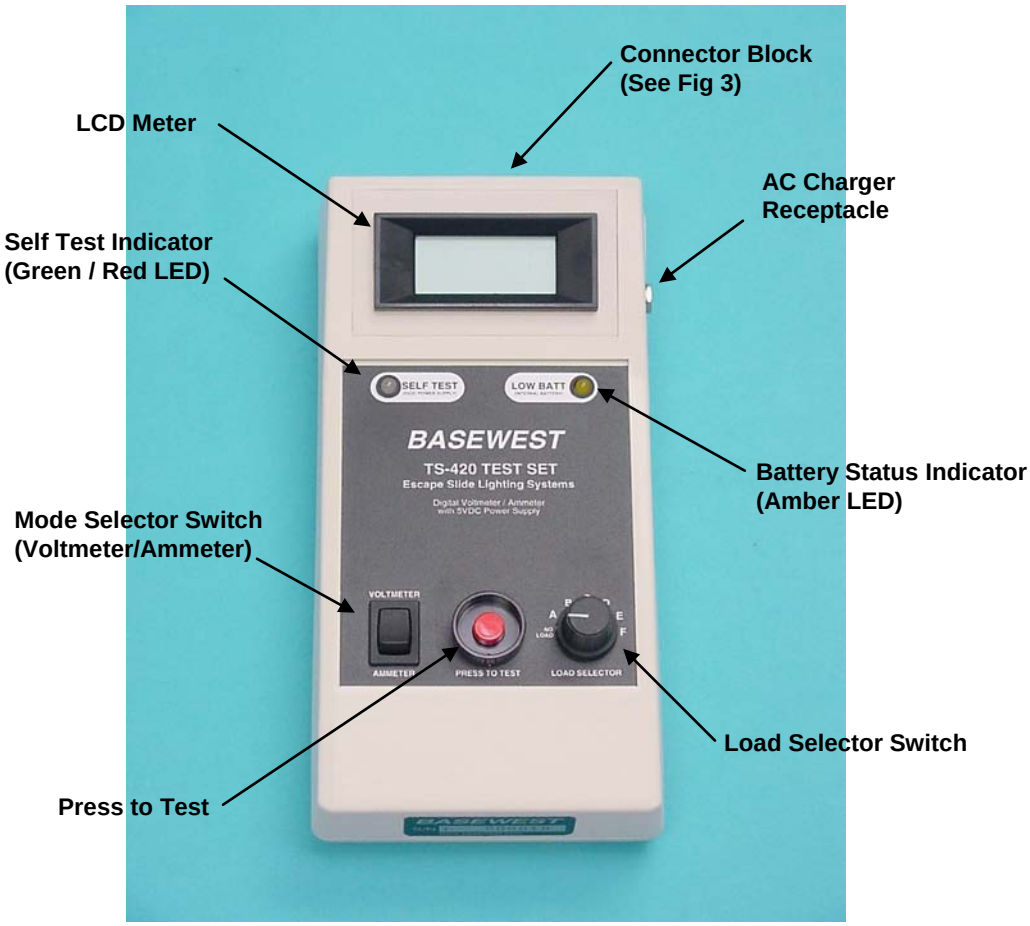

Figure 2. TS-420 – General Arrangement

3.0 Battery Testing (Voltmeter Mode)

3.1 Move the Mode Selector switch to VOLTMETER.

3.2 Connect the 4-contact test lead on the battery pack to the mating receptacle on the connector block of the instrument (See Figure 3). Note that the connector is keyed for proper alignment.

3.3 Select the proper test load (Positions A through F) on the Load Selector switch in accordance with Table 1, below. (NOTE: The NO LOAD position provides an open circuit test of the battery pack).

3.4 Press-To-Test; record voltage of the battery pack under the selected condition. The Self-Test indicator must illuminate GREEN at this point. If not, see Section 6.

3.5 Release the Press-To-Test switch when the voltage is recorded. The test set will return to the OFF condition. **NOTE**: This test can also be accomplished by connecting one set of the battery power leads to the VOLTMETER inputs on the connector block (see Figure 3).

3.6 The battery tests OK If the battery test voltage is at or above the acceptable level provided by Table 1, below, for the battery under test on the properly selected load.

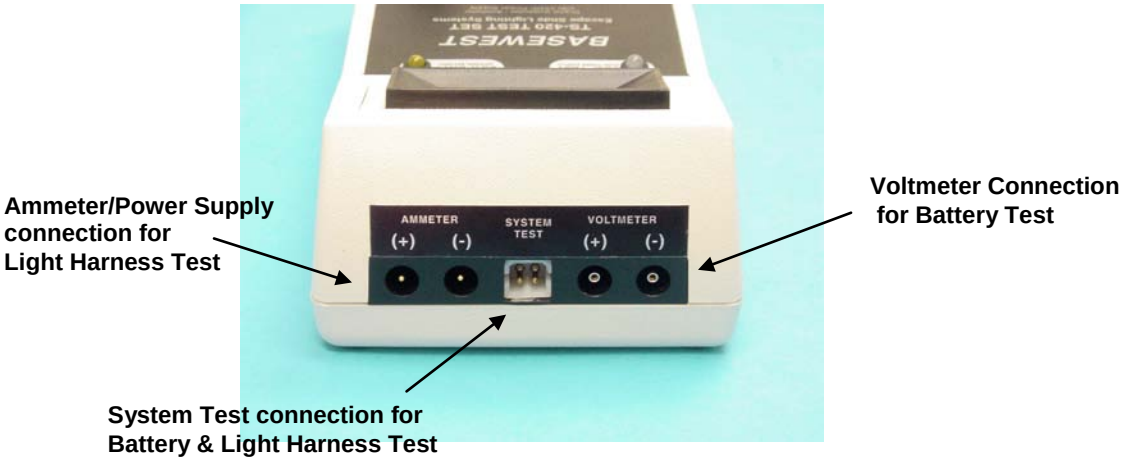

Figure 3. Connector Block Arrangement

Battery Part No.	TS-420 Load Selector Setting (See Fig. 2)	Acceptable Test Voltage (VDC)
7-1025-201	B	10.4
7-1030-201	B	8.9
7-1035-Series	B	8.9
7-1040-Series	B	8.9
7-1045-201	B	7.2
7-1050-201	C	10.4
7-1055-Series	B	8.9
7-1060-201	B	8.9
7-1065-Series	B	10.4
7-1070-201	B	10.0
7-1071-201	B	10.0
7-1075-201	B	7.5
7-1080-201	C	10.4
7-1085-201	B	8.9
7-1090-201	A	4.5
7-1092-201	D	9.4
7-1093-201	D	7.7
7-1094-201	D	7.6
7-1095-201	D	7.9
7-1096-201	D	7.0

Figure 3. Connector Block Arrangement

4.0 Light Harness Testing (Ammeter Mode)

4.1 Select the Mode Selector switch to the AMMETER position.

4.2 Connect the light harness to be tested to the connector block at the head of the instrument (See Figure 3) according to the following configuration options:

a) Installed slide light systems with battery packs - Connect the battery pack's 4-contact test lead plug to the 4-pin receptacle on the instrument's connector block

b) Installed slide light systems without battery packs - Connect harness to the instrument block via the OEM-identified power input; special test accessory cables may be specified.

c) Individual slide light harnesses with Amphenol-type connectors - Connect the Amphenol-type receptacle/socket into the recess pin terminals on the connector block marked AMMETER. Observe polarity on LED-based systems. BaseWest LED systems use the following convention: BLUE (+), WHITE (-).

d) Individual slide light harnesses without Amphenol-type connectors - Connect harnesses to the instrument block via an appropriate interface test lead, such as an alligator clip lead.

4.3 Actuate and release the Press-To-Test switch. Confirm that the Self-Test indicator illuminates GREEN. If this indicator is RED, remove unit from service for recharging (see Section 5.0).

NOTE: If the Self-Test indicator is on (GREEN) and the Battery Status indicator is on (AMBER), the test set is OK for test, but should be recharged at the next opportunity.

4.4 Read current (milliamperes) on the digital meter. Confirm that the current reading is within OEM-specified tolerances.

5.0 Internal Battery Recharging and Replacement

5.1 General

The TS-420 is provided with a rechargeable Ni-Cad pack, P/N 6-1035, which is designed to provide hours of service. When the Battery Status indicator comes on (AMBER), it is an indication that the internal battery is a low capacity, and recharging will soon be required. If the Self-Test indicator comes on RED, the internal battery voltage is too low to provide accurate test results and must be recharged before the unit is returned to service.

5.2 Battery Recharging

a) Connect the battery charger, P/N 36-1002, to a standard 115-120VAC outlet.

NOTE: International customers must use an appropriate adapter for 110VAC service, or a converter for 220VAC service, depending on the country.

b) Connect the charger output plug into the receptacle in the side of the TS-420 test set.

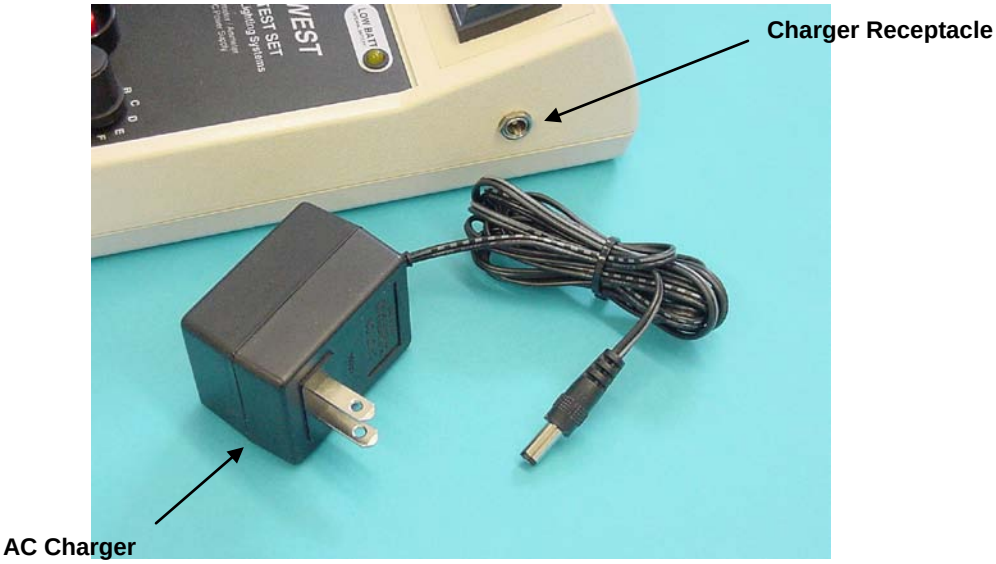

Figure 4. Internal Battery Charging Arrangement

c) The battery should be left on charge for approximately eight (8) hours, or overnight. After charging, disconnect the charger and place the Mode Selector switch into the AMMETER position and Press-To-Test. If the Self-Test indicator illuminates GREEN, and the Battery Status indicator is OFF, the unit is sufficiently charged to return to service.

NOTE: If the unit must be used before full charge is reached, the unit may be returned to service temporarily if the Self-test indicator and the Battery Status indicators are both on (GREEN and AMBER, respectively). The unit MAY NOT be returned to service if the Self-Test indicator is RED.

d) If the Self-Test indicator comes on RED after a full charge cycle, the test set should be returned to BaseWest for service.

5.3 Battery Replacement

The internal rechargeable Ni-Cad battery should provide several years of service. Use the following procedure to replace the battery when necessary.

a) Turn the test set face down on a stable surface. Remove four (4) screws on bottom of instrument case.

b) Carefully remove the bottom portion of the instrument case and lay aside.

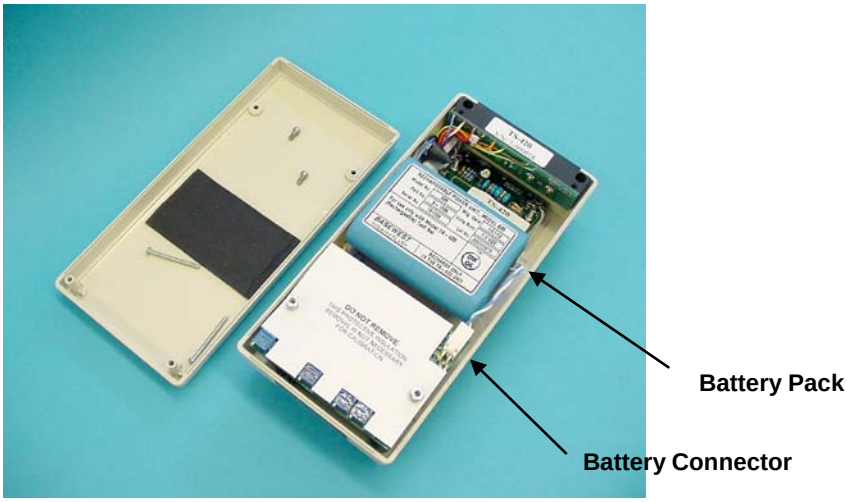

Figure 5. Internal Battery Access

c) Locate the battery lead wire, and follow it to the connector on the PC board. While securing the instrument with one hand, carefully disconnect the battery connector from the PC board and remove the battery. (**NOTE**: The battery is secured by mating patches of Velcro. Use care in removing the battery pack; do not use excessive force)

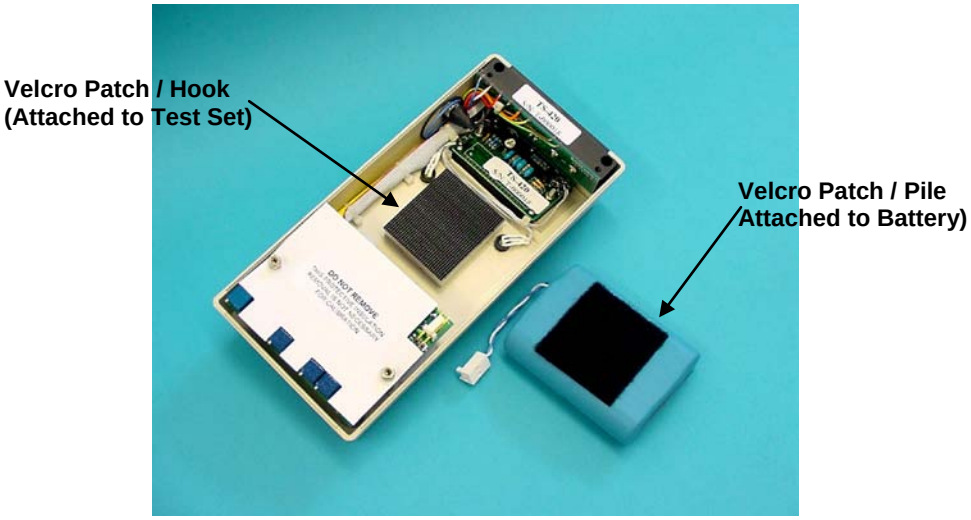

Figure 6: Battery Removed

d) Install the replacement battery exactly as before. Center the battery over the Velcro pad and gently press into place.

e) Carefully re-connect the battery connector to the PC board. Note that the connector is keyed to prevent misalignment.

f) Replace bottom portion of case and secure with four screws.

6.0 Indications & Troubleshooting

6.1 Voltmeter Mode

The following Indications apply when the VOLTMETER mode is selected and the Press-To-Test button pushed:

a) Self-Test indicator is GREEN - Test set is operational and OK for test

b) Self-test indicator does not illuminate - Test set requires servicing; return to BaseWest.

c) LCD meter displays DC volts in the range of 0.00 to 19.99; if not, return for repair.

6.2 Ammeter Mode

The following Indications apply with the instrument switched to the AMMETER mode and the Press-To-Test button is pushed:

a) Self-Test indicator is GREEN, Battery Status indicator is OFF - Test set is operational and OK for test; battery charge level is medium to high.

b) Self-Test indicator is GREEN, Battery Status indicator is AMBER - Test set is operational and OK for test, but internal battery is getting low. Recharge the internal battery at the next opportunity.

c) Self-Test indicator is RED, Battery Status indicator is AMBER – Remove from service and recharge. If normal indications do not re-appear, return to BaseWest for service.

d) Self-Test indicator is OFF - Test set requires servicing; return to BaseWest.

e) LED meter should display milliamperes in the range of 0 to 1999 mA (no decimal)

7.0 Care and Maintenance

7.1 The TS-420 test set is a sensitive electronic instrument; it should be treated and protected with appropriate care.

- **Do not drop or crush the instrument**
- **Do not apply external electrical inputs, except AC charger**
- **Keep instrument away from all fluids**
- **Protect from extreme temperatures, weather/rain, extended UV radiation**

7.2 The device is designed for handheld use in a shop and field environment but is not designed to withstand a drop to the ground or to survive excessive compression loads.

7.3 The device is splash resistant, but not waterproof; do not allow the device to sit in standing fluids or subject to rain. Excessive exposure to UV can affect the LCD meter.

7.4 Surface cleaning only with a slightly damped cloth (water or alcohol) is recommended. DO NOT use other solvents or cleaners.

8.0 Calibration and Repair

8.1 A separate BaseWest calibration manual (25-60-42) is available; contact BaseWest for copies, if required.

8.2 TS-420 test sets may be returned to BaseWest for calibration, but calibration by any NIST-traceable service is acceptable. BaseWest will provide any reasonable support required by outside calibration services. A separate BaseWest calibration manual (25-60-42) is available; contact BaseWest for copies, if required.

8.3 Unauthorized repairs are not recommended and may void warranty. It is recommended that the devices be returned to BaseWest for repair or servicing.