

**ASTRA AUTOMATIC ACTIVATION DEVICE OWNER'S
MANUAL
P/N 811-00356-1**

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DISCLAIMER

THE ASTRA IS A BACK-UP SAFETY DEVICE. IT IS NOT DESIGNED TO BE THE PRIMARY MEANS TO DEPLOY THE PARACHUTE SYSTEM.

FAILURE TO MAINTAIN AND OPERATE YOUR ASTRA IN ACCORDANCE WITH THE OWNER'S MANUAL MAY CAUSE IMPROPER OPERATION.

THE OCCURRENCE OF A MALFUNCTION CANNOT BE EXCLUDED. WE ACCEPT NO RESPONSIBILITY FOR DAMAGES AND CONSEQUENCES RESULTING FROM A MALFUNCTION.

3.0 COMPONENTS

The ASTRA consists of three major components: the Altitude Control Assembly, the Power Pack, and the Cutter Assembly.

3.1 Altitude Control Assembly

3.1.1 The Altitude Control Assembly contains a pressure sensor which converts ambient air pressure into an electronic signal. This signal is amplified and converted into a digital value.

3.1.2 The Altitude Control Assembly also contains a microcontroller circuit which has an EEPROM programmed with FXC's custom software. The microcontroller reads the digital value of air pressure, stores the initial value, and determines the rate of descent and altitude AGL.

NOTE
THE ASTRA IS NOT MOISTURE-PROOF

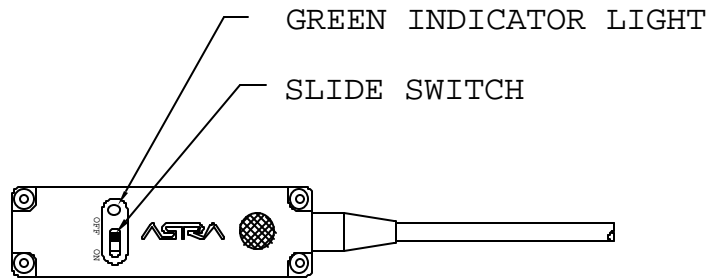


FIGURE 2
ALTITUDE CONTROL ASSEMBLY

3.2 Power Pack

The Power Pack contains a Battery Pack and a capacitor which provides enough energy to actuate the cutter until the battery voltage is too low. The minimum battery life is 150 hours of continuous normal operation.

3.3 Cutter Assembly

The Cutter Assembly contains a pyrotechnic cartridge which cuts a standard parachute locking loop when unsafe air pressure conditions are detected by the Altitude Control Assembly. Contact the container manufacturer to obtain approved locking loops. **DO NOT USE KEVLAR LOOPS.**

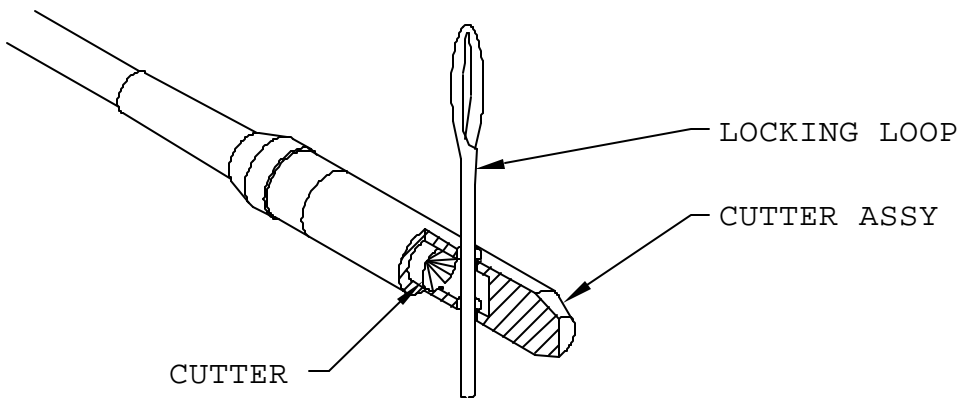


FIGURE 3
CUTTER ASSY AND LOCKING LOOP DETAILS

4.0 OPERATION

4.1 GENERAL OPERATION PROCEDURES

4.1.1 Before entering the aircraft, turn the ASTRA ON at the ground level of the drop zone and WAIT at least 20 seconds for the ASTRA to finish calibrating. No other operation is required except to turn the ASTRA OFF after each jump is completed.

<p>CAUTION NEVER TURN THE ASTRA ON IN AN AIRCRAFT</p>

4.1.2 When the green light stays OFF or ON continuously, either the battery voltage is too low or the cutter connection is faulty. The ASTRA must be removed from service until the cause is eliminated.

4.1.3 When the green light pulses slowly, the ASTRA is calibrating.

4.1.4 When the green light pulses quickly once per second, the ASTRA is done calibrating and will ARM itself after reaching 1700 feet AGL.

4.1.4 If a jump is ABORTED, turn the ASTRA OFF before descending so that it will NOT ACTUATE inadvertently.

4.1.5 The ASTRA will NOT ACTUATE above 1700 feet AGL regardless of the parachutist's rate of descent.

4.1.6 The ASTRA will NOT ACTUATE at any altitude if the rate of descent is less than 115 feet per second.

4.1.7 The ASTRA will ACTUATE if the rate of descent is greater than 145 feet per second and the altitude is less than 1000 feet AGL.

4.1.8 The green light will stay ON continuously after the ASTRA ACTUATES until the cutter is replaced.

4.1.9 If high rates of speed are intended below 3500 feet AGL, turn the ASTRA OFF before releasing the main canopy. Just the increase in air pressure caused by travelling through the air at 250 feet per second can reduce the altitude reading by 1000 feet.

<h4>STEPS TO OPERATE YOUR ASTRA</h4>

<p>STEP 1</p>

<p>Slide the ON/OFF switch to ON only at the ground level of the drop zone.</p>

<p>STEP 2</p>

<p>Observe that the green indicator light pulses slowly about ten times.</p>
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<p>STEP 3</p>

<p>Observe that the green indicator light periodically pulses quickly at any time during the climb.</p>

<p>STEP 4</p>

<p>After each jump, slide the ON/OFF switch to OFF.</p>

4.2 MANDATORY OPERATION PROCEDURES

4.2.1 Before each jump, the ASTRA must be calibrated by turning it OFF and then back ON at the ground level of the drop zone before entering the aircraft. This is done to insure that the barometric pressure change, which occurs throughout the day, does not make the ASTRA altitude setting unsafe.

4.2.2 Never turn the ASTRA ON in an aircraft in flight. Serious injury can result by the recalibration that will occur at that height.

4.2.3 For the same reason, if the ASTRA is observed to be recalibrating (the green light pulses slowly for awhile) during the flight, turn it OFF and have it serviced before using it again.

5.0 INSTALLATION

5.1 SPECIAL CARE WHEN INSTALLING THE ALTITUDE CONTROL ASSEMBLY

Extreme care must be taken when the Power Pack needs to be opened to install the Altitude Control Assembly cable. ALWAYS FOLLOW THESE STEPS EXACTLY TO PREVENT THE CUTTER FROM ACTUATING AND TO PREVENT THE PRINTED CIRCUIT FROM BEING DAMAGED.

PROCEDURE WHILE POWER PACK IS OPEN

STEP 1

Remove the battery and protect its terminals from being shorted.

STEP 2

Carefully remove the Cutter cable (see Figure 9).

STEP 3

Carefully remove the Altitude Control cable (see Figure 9).

STEP 4

Discharge the capacitor in the Power Pack (see Figure 10).

STEP 5

After routing the cables in the parachute pack, carefully plug the Altitude Control cable back into its proper location (5 pin side of Power Pack).

STEP 6

Carefully plug the Cutter cable back into its proper location (3 pin side of Power Pack).

STEP 7

Make sure the polarity is correct, and slide the Battery Pack back in.

5.2 MOUNTING LOCATIONS

The ASTRA fits easily into most of the existing mounting configurations and locations of the Cypres*. The power pack mounts in a pocket inside the reserve chute pack (Fig. 4), and the cutter mounts in tubing at the reserve chute release loop (Fig. 5). The mounting of the Altitude Control Assembly is optional. It may be placed under a flap at the top of the pack or on the front strap (Fig. 6). To prevent excessive strain on the Altitude Control cable when it is mounted on the front strap, approximately 6 inches of slack in the cable should be provided outside the reserve chute pack.

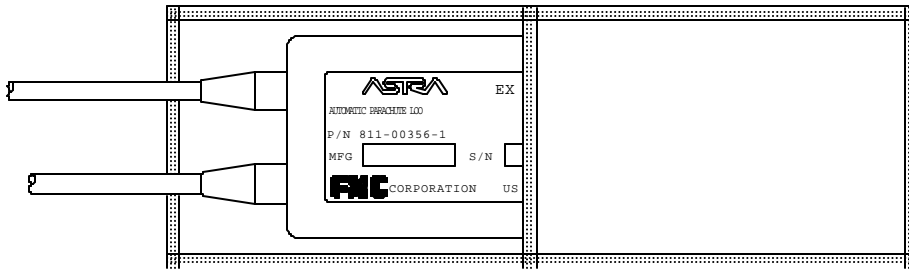


FIGURE 4
POWER PACK INSTALLATION

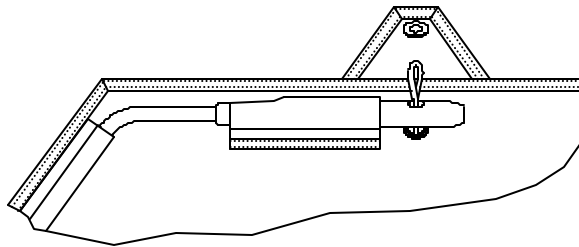


FIGURE 5
CUTTER INSTALLATION

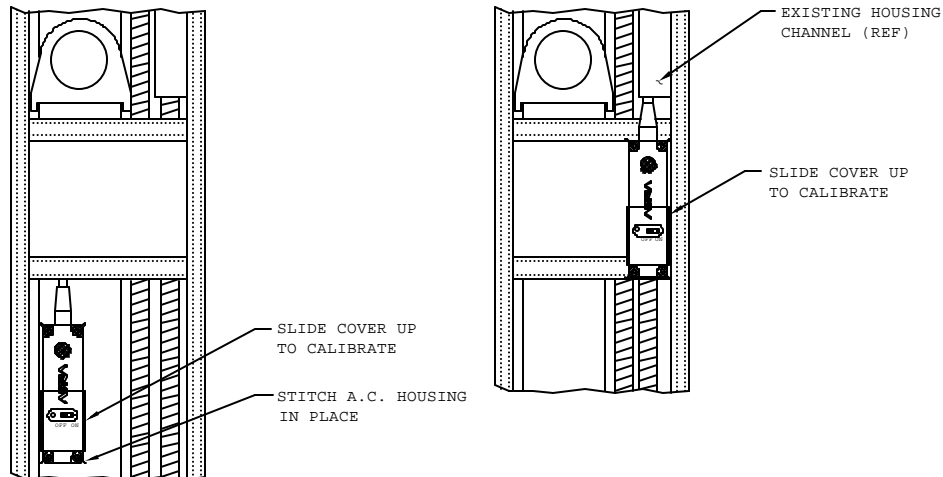


FIGURE 6
TYPICAL ALTITUDE CONTROL ASSEMBLY INSTALLATIONS

*All trade marks whether stated or not are of their respective holders

6.0 THEORY OF OPERATION

6.1 ALTITUDE

The computer inside the ASTRA takes 16 pressure readings each second and stores the last pressure reading approximately 20 seconds after the ASTRA is turned ON. The computer compares all subsequent readings of pressure to this value to obtain altitude AGL based on the U. S. Standard Atmosphere Table of geometric altitude versus pressure.

6.2 RATE OF DESCENT

After the pressure readings have been above 1700 feet and then indicate an altitude of 1400 feet or less, the pressure reading change is monitored during 3 second intervals. At the moment the pressure change indicates that the altitude has decreased 400 feet since the beginning of the interval (rate of descent is greater than 133 feet per second) the Altitude Control Assembly actuates the Cutter.

6.3 PROFILE OF A JUMP

Figure 7 shows a typical sequence of events that occur during a jump and includes an area of disturbance where the ASTRA may inadvertently actuate the Cutter during the climb. This disturbance can be caused by air pressure changes due to flying patterns or buffeting and turbulence inside the aircraft while the door is open. Similar disturbances, such as air pressure changes due to velocity through the air and canopy "bubbles", can occur during the descent, but are not shown. In any event, the Cutter can only be actuated when the ASTRA is in the rate mode.

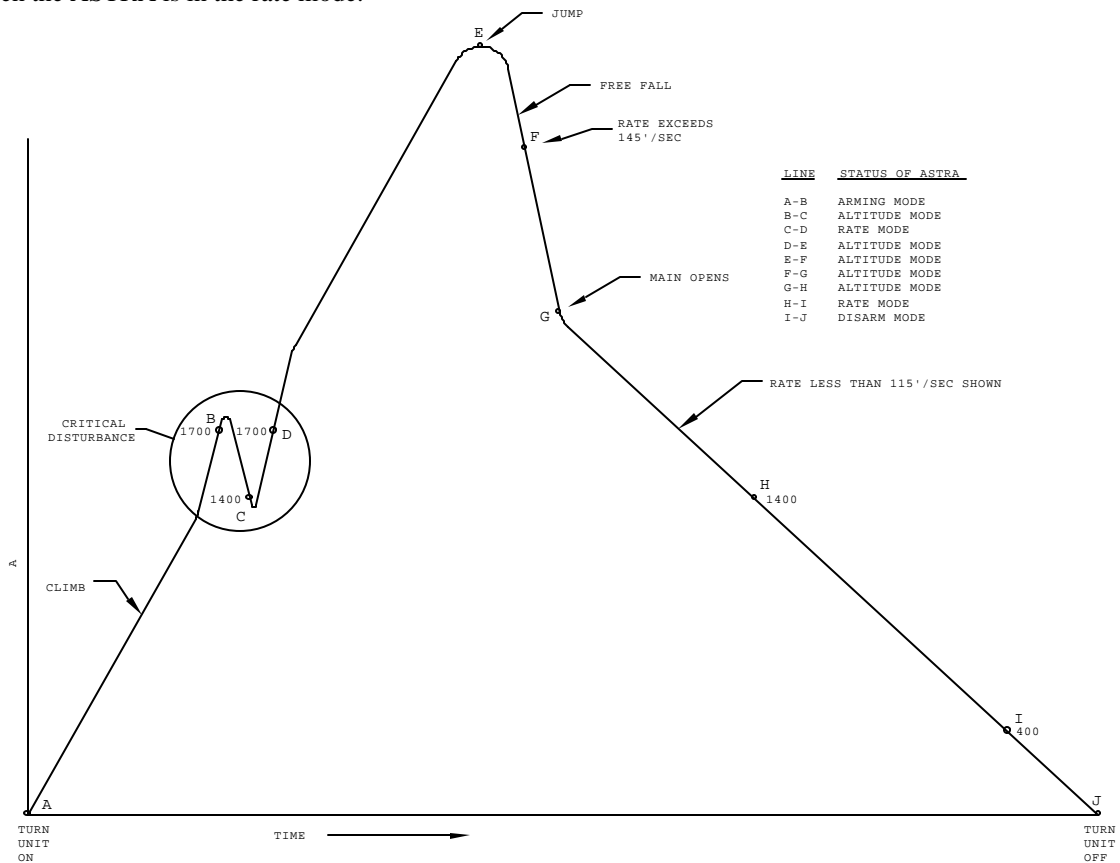


FIGURE 7
PROFILE OF A JUMP

7.0 MAINTENANCE

The only maintenance required is to replace a weak Battery Pack or a Cutter that has been actuated.

7.1 BATTERY REPLACEMENT (Fig. 8)

7.1.1 Slide the ON/OFF switch to OFF.

7.1.2 Remove the four (4) screws on the Power Pack cover, and remove the cover.

7.1.3 Remove the Battery Pack (P/N 811-00374) by pulling up on its lifting tab, and install a new one.

7.1.4 Slide the ON/OFF switch to ON, and observe proper operation of the green indicator light.

7.1.5 Slide the ON/OFF switch to OFF, and reinstall the Power Pack cover and 4 screws.

7.2 CUTTER REPLACEMENT (Fig. 8, 9, and 10)

CAUTION
ALWAYS REMOVE THE BATTERY PACK FIRST AND INSTALL IT LAST
WHENEVER THE POWER PACK IS OPEN.
TAKE CARE NOT TO SHORT THE TERMINALS OF THE BATTERY

7.2.1 Slide the ON/OFF switch to OFF.

7.2.2 Remove the four (4) screws on the Power Pack cover, and remove the cover.

7.2.3 Remove the Battery Pack (P/N 811-00374) by pulling up on its lifting tab.

7.2.4 Unplug the Cutter cable by holding the flex circuit down and pulling up on the connector housing.

7.2.5 Unplug the Altitude Control cable by holding the flex circuit down and pulling up on the connector housing.

7.2.6 Discharge the capacitor by shorting the cutter pins on the flex circuit.

7.2.7 Plug the Altitude Control cable into the control pins on the flex circuit (3 pins of 5 pin cluster). Take care to align the sockets with the pins before pushing down on the connector.

7.2.8 Plug the new Cutter cable into the cutter pins on the flex circuit (3 pin cluster). Take care to align the sockets with the pins before pushing down on the connector.

7.2.9 Reinstall the Battery Pack.

7.2.10 Slide the ON/OFF switch to ON, and observe proper operation of the green indicator light.

7.2.11 Slide the ON/OFF switch to OFF, and reinstall the Power Pack cover and 4 screws.

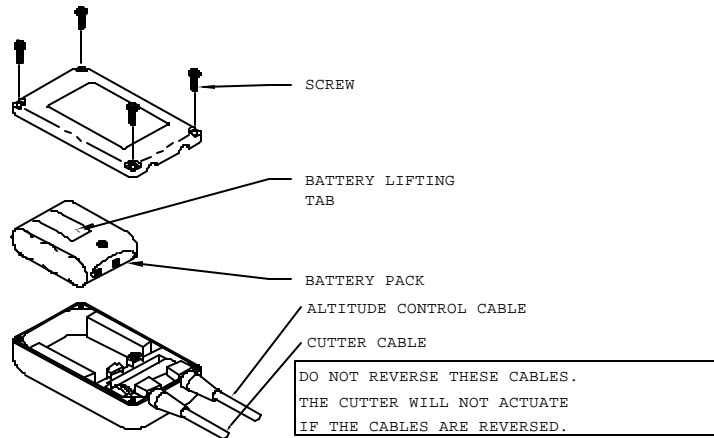


FIGURE 8
COVER REMOVAL

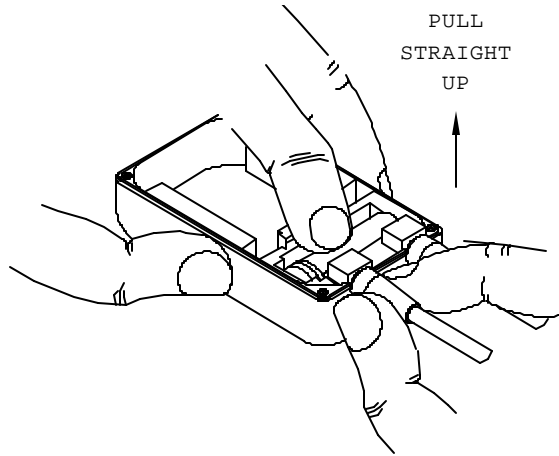
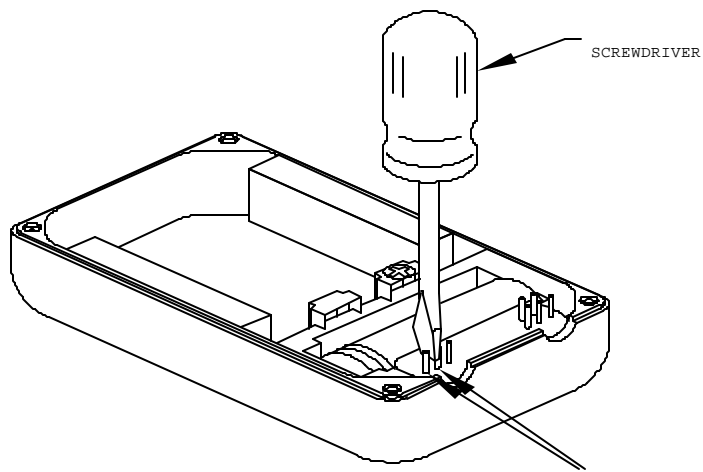


FIGURE 9
CABLE REMOVAL



SHORT THESE 2 PINS
BEFORE INSTALLING

FIGURE 10
DISCHARGING THE CAPACITOR

8.0 ILLUSTRATED PARTS BREAKDOWN

This section shows the illustrated parts breakdown (Fig. 11).

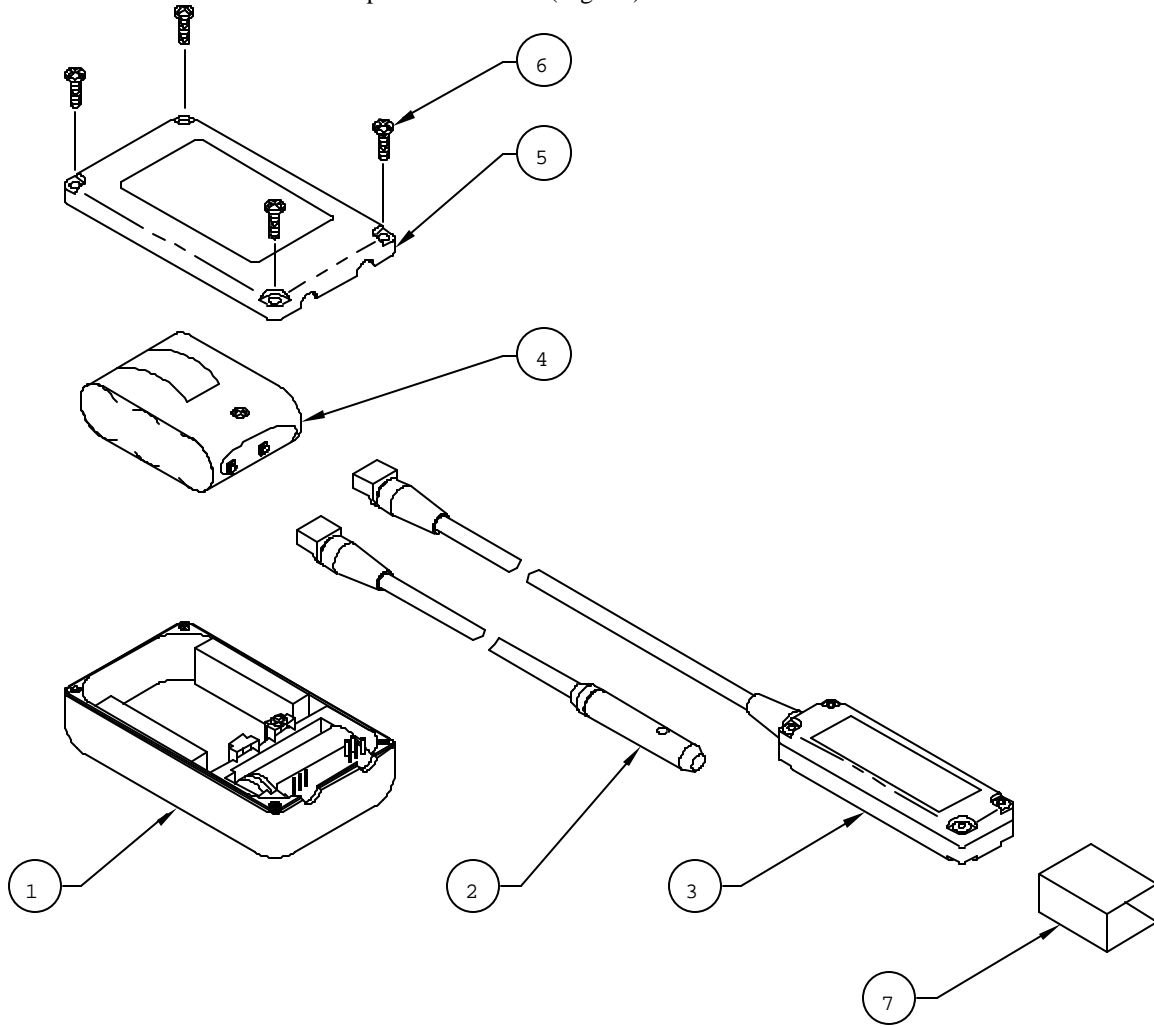


FIGURE 11
ASTRA ASSEMBLY

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	511-00543	POWER PACK ASSY	1
2	811-00375	CUTTER ASSY	1
3	511-00550	A.C.HOUSING ASSY	1
4	811-00374	BATTERY PACK	1
5	511-00549	POWER PACK ASSY COVER	1
6	311-80266-15	SCREWS	4
7	511-00555	SAFETY COVER	1

9.0 FUNCTIONAL TEST

A functional test of the ASTRA is recommended during every repack of the parachute. To test the ASTRA, perform the following steps using the Portable Altitude Test Chamber (Fig. 12).

- Step 1 Remove the four screws holding the Power Pack cover on, then remove the cover.
- Step 2 Carefully remove the Cutter cable (Fig. 9), and carefully install the Cutter Test Probe.
- Step 3 Turn the Test Chamber ON.
- Step 4 Turn the ASTRA ON.
- Step 5 Place the entire ASTRA inside the Test Chamber so that the green indicator light on the Altitude Control Assembly can be seen.
- Step 6 Close the control valve and wait for the ASTRA to finish calibrating (green indicator light changes from pulsing slowly to pulsing quickly).
- Step 7 Cover the Test Chamber, and use the hand pump to obtain the desired altitude.
- Step 8 Open the control valve to start the descent, and press the hold switch when the green indicator light changes from pulsing quickly to staying on. The readings of altitude and rate displayed are the conditions which caused the ASTRA to actuate.
- Step 9 Uncover the Test Chamber, remove the ASTRA, and turn the ASTRA and the Test Chamber OFF.
- Step 10 Remove the Battery Pack and Test Probe, and short the Cutter pins in the Power Pack (Fig. 10).
- Step 11 Reinstall the Cutter cable, then the Battery Pack.
- Step 12 Reinstall the Power Pack cover and the four screws. The test is completed.

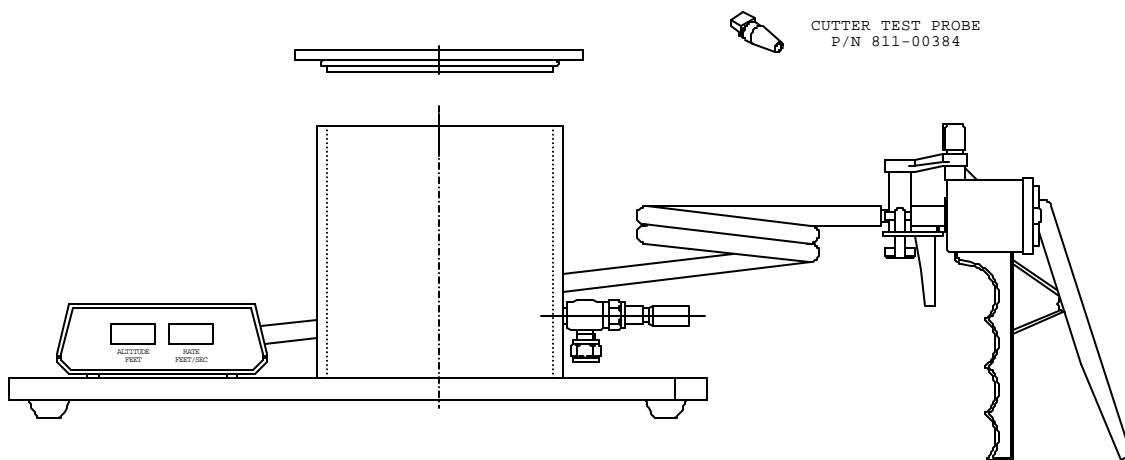


FIGURE 12
PORTABLE ALTITUDE TEST CHAMBER

-DANGER-

THIS AUTOMATIC ACTIVATION DEVICE SOMETIMES OPERATES OR ACTIVATES IMPROPERLY EVEN WHEN PROPERLY POSITIONED AND OPERATED, THEREFORE YOU RISK SERIOUS INJURY OR DEATH EACH TIME YOU USE THIS DEVICE.