



**D-90073**

**OPERATION and MAINTENANCE MANUAL  
MILITARY ALTIMASTER  
MA-10  
(12,000 foot LINEAR SCALE: FP-02096)**

April 8, 2013

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1. **DESCRIPTION**

**ROBUST** stepper motor mechanism

**0 – 12,000'** scale. **0-40,000'** operation.

Use in simple "zero" mode for training, or preset DZ altitude and DZ barometric pressure for operational use

Easily accessible batteries (Type AA - Lithium)

Electro-luminescent dial face

Robust aluminum frame

**Waterproof** down to 6 feet of water

One piece wrist strap, no tools required to change

-40 to +80 deg C operation

Weight and dimensions are smaller than the original MA2-30 military Altimaster design

The MA-10 is designed for high altitude (40,000'+) military operation.

For training purposes the instrument has a simple zero function. For operational use the DZ altitude and barometric pressure may be preset, the MA-10 will display the correct AGL altitude above the DZ.

The unit is based on a stepper motor design and is extremely robust; dropping the instrument will not damage the mechanism.

The embedded software is updateable.

2. **SPECIFICATION**

<b>Model</b>	<b>MA-10 (FP-02096)</b>
<b>Mechanism</b>	ELECTRONIC - solid state pressure sensor with ROBUST stepper motor driven pointer
<b>Scale</b>	Linear
<b>Feet per pointer revolution</b>	12,000' (programmable to customer requirements)
<b>Max. Operating Altitude</b>	40,000 feet MSL +
<b>Min. Operating Altitude</b>	-2,000 feet MSL
<b>Ability to preset remote DZ altitude and barometric pressure</b>	DZ altitude and pressure may be set at anytime before exit without loss of accuracy either manually or with Infrared Updater-Refer to D-90169 Operations and Maintenance Manual MA-10UD Transmitter.
<b>Case Material</b>	Aluminum
<b>Dimensions</b>	3.27" x 3.20" x 1.37" 83mm x 81mm x 34mm
<b>Weight</b>	9.1 oz (255g) (including batteries and wrist strap)
<b>Lens Material</b>	High impact 1/16" thick extruded lexan
<b>Lens Replacement</b>	Supplied with self adhesive lens protector - field replaceable. Lens is factory replaceable.
<b>Operating Temp Range</b>	-40 to +80 deg C -40 to +172 deg F
<b>Dial Face</b>	Black print on electro-luminescent white face, with red warning sector (2500' - 0').
<b>LED Status Indicator</b>	Three status modes: On/Off/Sleep.
<b>Dial face illumination</b>	Electro-luminescence
<b>Smart Light Monitor</b>	LED status indicator intensity is adjusted to ambient light level and turns off when backlight is activated. Backlight is automatically turned on in low light conditions when MA-10 is active.
<b>Back-up Illumination</b>	Not Required
<b>Batteries Required</b>	2 x AA Lithium Batteries. (Regular AA batteries may be used but will result in

<p><b>Battery Life</b></p> <p><b>Low Battery Warning</b></p> <p><b>Automatic power saving mode</b></p> <p><b>Automatic Shut-off</b></p> <p><b>Tools required to change batteries or wrist strap</b></p> <p><b>Waterproof Depth / Duration</b></p> <p><b>Metric Available?</b></p>	<p>shorter battery life.)</p> <p>100 Hrs +</p> <p>Battery state indication during self test</p> <p>The system will turn off the motor and backlight if the altitude is below 7000' MSL and there is no significant change in altitude for a period of 30 minutes. The Power On LED at the 12 o'clock position will flash to indicate power saving mode. If altitude activity is sensed, the unit will automatically revert to full function.</p> <p>System shuts down after 18 hrs from turn-on, all settings are retained and the system may be turned on at any time without loss of information or accuracy.</p> <p>None</p> <p>6 feet / 1 hour</p> <p>Yes</p>
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3.



**BUTTONS**

The MA-10 Altimeter has a total of 5 buttons.

The single button marked "SEL" near the 6 o'clock position simply activates the other buttons. This eliminates the possibility of accidental button pushes.

4.

**TURN ON/OFF**

The needle parks at approximately 10,000' when the unit is off.

To turn the unit on press and hold the Activate Button marked "SEL" and then press ON/OFF Button marked "I/O".

The needle will first show battery status, 7 - 4 = OK

3.5 - 4 = Be ready to change battery.

<3.5 = Change battery before next jump.

The needle will move to the current altitude / pressure.

The Power On LED at the 12 o'clock position will be illuminated.

The Power On LED intensity adjusts automatically based on ambient light levels. In very low light conditions the LED is turned off to prevent loss of night vision and the electro-luminescent backlight indicates that the unit is active.

NOTE: If the needle pauses at 6 o'clock position this indicates that DZ Altitude and Pressure have been set.

5.

**POWER SAVING MODE**

The system will turn off the motor and backlight if the altitude is below 7000' MSL and there is no significant change in altitude for a period of 30 minutes.

The Power On LED at the 12 o'clock position will flash to indicate power saving mode.

If altitude activity is sensed, the unit will automatically sweep the pointer one revolution and revert to full function.

6.

**ZERO TO CURRENT ALTITUDE**

For training jumps when the Departure Airfield and the target DZ are the same location, zero the altimeter when standing on the DZ.

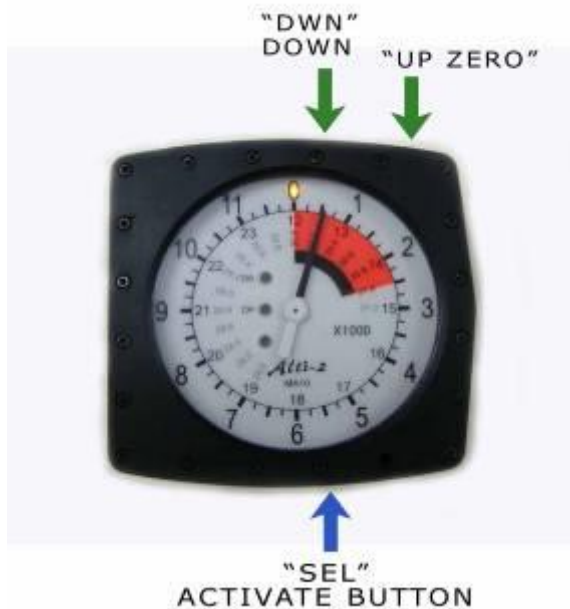
To zero the altimeter, press the two buttons shown; "UP ZERO" & the "SEL" Activate Button.

Do NOT hold the "UP ZERO" button; this will cause the set altitude to increase.

NOTE: This action will clear any preset DZ altitude and pressure settings.

NOTE: The manual zero altitude will be retained when the unit is turned off. The MA-10 acts like a mechanical altimeter, it will react to barometric changes and will need to be rezeroed when powered back on.

7.

**MANUAL DZ OFFSET**

When the Departure Airfield and the target DZ are at different altitudes, the DZ Offset may be set manually.

To manually offset the altitude reading, press and hold the "SEL" Activate Button and then use the "UP ZERO" or "DWN" buttons to set the desired altitude.

The rate of pointer movement will speed up (this helps with larger offsets). If you release the "UP ZERO" or "DWN" button and continue to hold the bottom button, the rate will start slowly again when you press up or down.

Note: This action will clear any preset DZ altitude and pressure settings.

8.

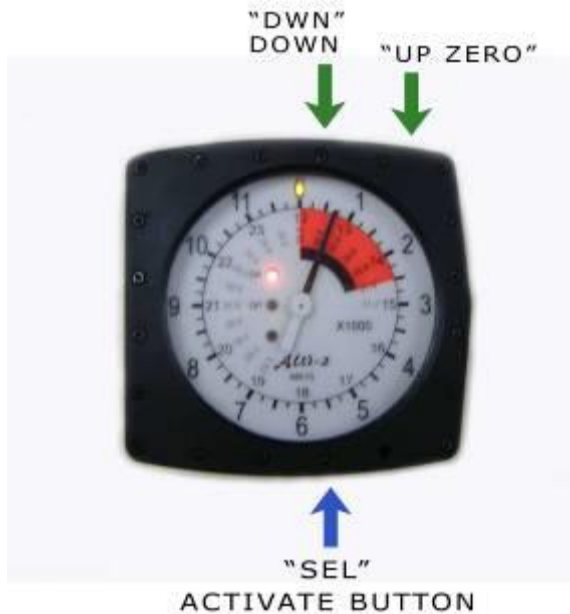
**SET DZ ALTITUDE AND BAROMETRIC PRESSURE**

When the Departure Airfield and target DZ are at different altitudes, the DZ Offset may be entered using the DZ Altitude and form of barometric pressure called "Altimeter Setting".

**Step 1**

Press the two buttons shown ("PRG" & "SEL" Activate Button), the DZ Altitude set light (DA) will be illuminated.

9.

**Step 2**

Use the "UP ZERO" or "DWN" buttons to set the altitude (feet MSL) of the target DZ.

NOTE: This action will clear any preset Manual DZ Offset.



10.



Step 3

Press the two buttons shown ("PRG & "SEL" Activate Button), the DZ Barometric Pressure set light (DP) will be illuminated.

11.



Step 4

Use the "UP ZERO" or "DWN" buttons to set the barometric pressure (in Hg.) of the target DZ.

Barometric pressure is marked in grey numerals inside the scale.

**WARNING:**  
**WHEN OBTAINING THE BAROMETRIC PRESSURE ALWAYS REQUEST THE "ALTIMETER SETTING" FOR THE DZ. DO NOT USE THE ACTUAL BAROMETRIC PRESSURE (STATION PRESSURE) OR SEA LEVEL CORRECTED PRESSURE FROM THE DZ.**

THE CURRENT "ALTIMETER SETTING" FOR THE DZ IN INCHES OF MERCURY (HG) WITHIN 100 MILES OF THE INTENDED DZ MUST BE DETERMINED BY USING THE MOST ACCURATE METHODS AVAILABLE. IF THERE ARE NO AVAILABLE MEANS TO CALCULATE THE CURRENT "ALTIMETER SETTING", THE COMBAT SETTING OF 29.92 INCHES OF MERCURY WILL BE USED.

12.



Step 5

Press the two buttons shown ("PRG" & "SEL" Activate Button).

This completes the DZ setup and the altimeter is in RUN mode.

The altimeter displays the DZ Offset between your current altitude and the target DZ.

NOTE: The DZ altitude and pressure settings will be retained when the unit is turned off.

13.



### BATTERY REPLACEMENT



Step 1




Remove the wrist strap




Locate the battery door lever.



Press firmly on battery door to release pressure on latch, and rotate latch 90 degrees past lever lock to unlocked position.

**NOTE: Do not use a screw driver or other sharp instrument to rotate battery door lever.**

14.	 A close-up photograph of the ALTI-2 device's battery compartment. The compartment cover is open, revealing two AA lithium batteries. The word "OPEN" is printed on the inside of the cover.	<p>Step 2</p> <p>Replace batteries with 2 type AA lithium batteries.</p> <p>NOTE: Alkaline batteries may be used, however battery life will be shorter and the unit may not function if soaked to temperatures below -20 deg C.</p>
15.	 Two photographs showing the battery door being closed. The top photo shows the door being pushed down, and the bottom photo shows the door fully closed and latched. The word "OPEN" is visible on the top photo's door.	<p>Step 3</p> <p>Press firmly on battery door and rotate latch 90 degrees past lever lock into locked position.</p> <p>Replace wrist strap.</p>

<p>16.</p>		<p><b>CLEANING AFTER SALTWATER SUBMERSION.</b></p> <p>Equipment needed to clean MA-10 altimeters.</p> <p>Tap, bottled or filtered water.</p> <p>Two (2) clean containers.</p>
<p>17.</p>		<p><b>STEP 1</b></p> <p>Fill two adequately sized containers (for the number of altimeters to be rinsed) with tap, bottled or filtered water.</p>
<p>18.</p>		<p><b>STEP 2</b></p> <p>Remove wrist strap</p> <p>Open battery compartment and remove batteries.</p> <p><b>NOTE:</b> Do not reuse these batteries.</p>

19.		<p>Step 3</p> <p>With the battery door open, completely submerge altimeters in the first container and let soak for 10 minutes.</p> <p>NOTE: Be sure to remove any air pockets from the battery compartment.</p>
20.		<p>STEP 4</p> <p>When soak time is completed, dunk the soaked altimeters at least five times in the same container.</p> <p>Shake off excess water by hand.</p>
21.		<p>STEP 5</p> <p>Place the drained altimeters into the second container and again dunk at least five times.</p>

22.		<p>STEP 6</p> <p>Place rinsed altimeters right side up with battery door open, on a stable surface to drip dry.</p>
23.		<p><b>CLEANING AFTER FRESH WATER SUBMERSION</b></p> <p>Follow the procedure for "Cleaning After Saltwater Submersion" using one rinse container.</p> <p>NOTE: The removed batteries may be reused.</p>

**Servicing**

If the altimeter behaves abnormally or unusually, discontinue use IMMEDIATELY and return to Alti-2, Inc.

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e-mail: [info@alti-2.com](mailto:info@alti-2.com)

Please be sure to include contact information such as Phone Number, Fax Number, and/or email address, and a description of the problem.



Status on your altimeter can be checked by contacting the Alti-2, Inc. Service Department, or by initiating a Request for Repair Status through the Alti-2, Inc. web-page.

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