



D-90410

MA-12

mBar & InHg Models

User Manual

Rev A

December 12, 2017



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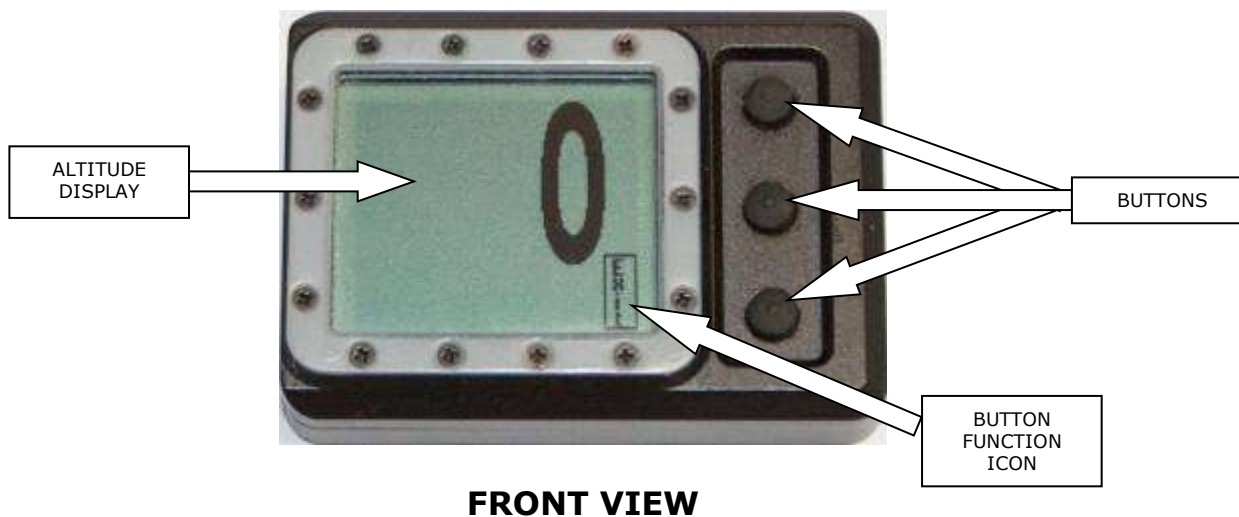


SPECIFICATIONS

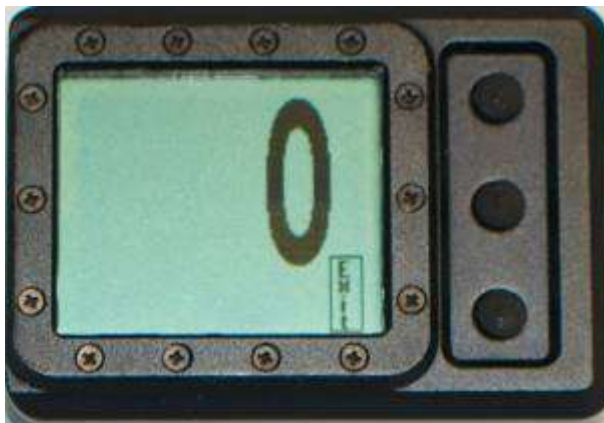
Model	MA-12 mBar Model (FP-02150)
	MA-12 inHg Model (FP-02146)
	NSN: 6660016624428
Dimensions	Length = 2.36 in (5.99 cm)
	Width = 1.69 in (4.29 cm)
	Height = .57 in (1.45 cm)
Weight	1.5 oz. (42.52 g) (without mount)
Operating Temp Range	-40C* to +80C
	<i>*With chemical hand warmer inserted</i>
Case Material	Machined Aluminum, Black Anodized
Battery Type	Rechargeable Lithium Ion

Note: The MA-12 now auto-zeros.
Please contact us for the latest firmware update.

ORIENTATION

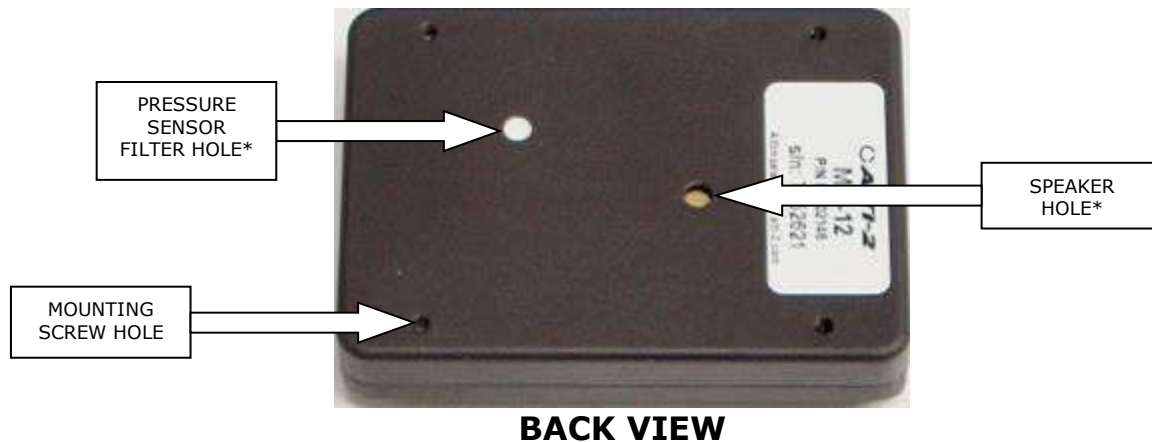


The mbar version is identified by a grey bezel (shown above), the inHg model has a black bezel (shown below)



LEFT SIDE VIEW (BOTH VERSIONS)

Note: Older models have a reset switch, newer models do not



*Ensure that the Pressure Sensor Filter Hole and Speaker Hole are not sealed by obstructions such as tape, Velcro, labels, etc.

SCREENS

MA-12 uses a proprietary mode detection algorithm to determine its current activity and corresponding need for display output. The unit will auto-detect and switch between Ground/Aircraft/Free Fall/Canopy Modes automatically.



Altitude Screen (Default)



Ground Screen (Ground Mode)



Climb Screen (Aircraft Mode)

MA-12 automatically switches to this mode when takeoff conditions are detected.



Free Fall Screen (Free Fall Mode)

When MA-12 detects freefall conditions it automatically switches to freefall mode.

The altimeter screen is displayed.

The buttons are disabled

The backlight is illuminated if it has been selected.



**Canopy Screen (Canopy Mode)
(9,500 FT AGL and below)**

BASIC OPERATION

1. Charging



Before using MA-12 for the first time, **charge it overnight.**

Using the Micro-USB cable supplied, connect MA-12 to a USB wall charger or computer. Remove the cling label from the lens and discard.

Allow 2 hours for a full charge on subsequent charges. If charged from empty, press any key after disconnecting from the USB cable.

Note: The O-Ring on the charge cable is used to ensure proper seating of the cable to the USB port. Removal of the O-ring may damage the MA-12.

Note: The micro USB connector requires minimal insertion force. If the connector does not insert easily;

- 1) check that it is the right way up**
- 2) check that the connector is correctly aligned**
- 3) check that the socket is clear of debris**

The body of male connector does not have to be touching the MA-12 for the connector to be fully seated.

DO NOT PUSH ON THE CONNECTOR UNDER ANY CIRCUMSTANCES

Battery Meter

MA-12 Battery Meter is graduated to show remaining battery life. Alti-2 recommends: if the battery meter does not show black within its borders, re-charge the battery before jumping. In extreme cold, fully charge the battery before jump operations.

2. Powering On/Off



MA-12 does not have an On/Off switch. If the battery is charged, pressing any button will activate the display.

In Ground Mode, MA-12 has a 30-minute timeout to conserve battery power. Press any button to reactivate the display.

If the unit is timed out (inactive display) and senses a pressure change (i.e. aircraft takeoff), it will activate the display and choose the appropriate mode and display output.

3. Buttons & Navigation



The bottom button is used to exit the Altitude Screen and access info screens/menus or to return to the Altitude Screen from info screens.

Top and bottom buttons scroll the menus and increase/decrease values.

The center button is used to enter the Main Menu and to select individual menu items.

To return to the previous screen press and hold the center button until the screen changes.

4. Accessing the Main Menu



Exit>>Menu

To exit the Altitude Screen, press and hold* bottom button.

Press and hold* the center button to access the Main Menu.

View Last Jump appears at the top of the Main Menu.

Press and hold the center button to return to the Altitude Screen if desired.

***Note:** "Press and hold" provides two layers of protection against inadvertent button pushes.

MOUNTING, FITTING, AND WEARING



MA-12 is designed as an externally mounted visual altimeter.

Note: At temperatures below -20C, a chemical handwarmer **MUST** be used to prevent freezing of the LCD.

The altimeter does not need to be “warm”, a small chemical hand warmer is more than sufficient to maintain the temperature above -20C.

With chemical handwarmer inserted the altimeter will operate well below the design spec of -40C and has continued to function at -55C

Each unit ships with a wrist mount with a bracket designed to accommodate a chemical hand warmer in between the bracket and the Velcro strap to provide ambient heat to the unit during extreme cold weather jump operations.

Recommended use of MA-12 wrist mount:



Attach the mounting bracket to the bottom of the unit with the screws and washers provided, buttons to the right.

Route the wrist strap through the slots in the mounting bracket from top to bottom, smooth side down.

Place the unit on the wrist, wrap the strap around the wrist, through the plastic loop, tighten securely, and mate the Velcro. MA-12 has four screw holes on the bottom of the case that allow the user to mount the unit on a Navigation Board, Instrument Panel, etc.



Mounting on Navigation Boards

The display can be flipped to provide easy access to buttons when mounted with other components (see page 28).

DEVICE SETUP

1. Change Display Contrast



CAUTION

Exit>>Menu>>Display Opt>>Chg Contrast

From the Main Menu choose **Display Options**, then **Change Contrast**.

Choose **Increase** or **Decrease Contrast**.

Press the center button repeatedly until the display can be read clearly.

Take care not to increase contrast to the point that the text is no longer readable.

2. Set Time Format



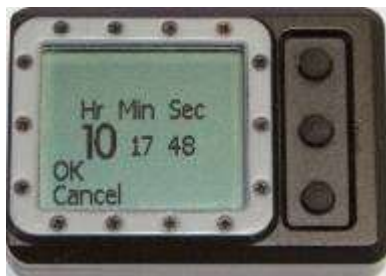
Exit>>Menu>>Display Opt>>12Hr Time Fmt

12 Hour Time Format is set by default. 24 Hour Time Format may be set as follows.

From the Main Menu, choose **Display Opt** then **12/24Hr Time Format**.

Menu Item will change to **24Hr Time Fmt**.

3. Set Time



Exit>>Menu>>Clk Timers>>Set Time

From the Main Menu choose **Clock Timers**, then **Set Time**.

Press the center button to select **Hr/Min/Sec**; press the top/bottom buttons to choose a value.

Choose **OK** to confirm setting, the top button to change values again, or **Cancel** to return to Main Menu.

4. Set Date Format



Exit>>Menu>>Display Opt>>USA Date Fmt

USA Date Format is set by default. International Date Format may be set as follows.

From the Main Menu, choose **Display Opt** then **USA Date Format**.

Menu Item will change to **International Date Fmt**.

5. Set Date



Exit>>Menu>>Clk Timers>>Set Date

From the Main Menu choose **Clk Timers**, then **Set Date**.

Press the center button to select **Yr/Mo/Day**; press the top/bottom buttons to choose a value.

Choose **OK** to confirm setting, the top button to change values again, or **Cancel** to return to Main Menu.

6. Set Units



Using the same flow as **SET TIME FORMAT** choose:

Display altitude units in (ft or m).

Display temperature units in (F or C).

Log speed in (mph or kph).



DROPZONE PROGRAMMING METHODS

1. Definitions

DAF	DAF = Departure AirField.
Target DZ	Target DZ = Landing site.
Aircraft Altimeter Setting (QNH)	Aircraft Altimeter Setting (QNH) = Pressure value obtained from weather data source in the vicinity of (IVO) Target DZ.
	Aircraft Altimeter Setting (QNH) can be had from any local weather station IVO the Target DZ.
Aircraft Altimeter Setting (QNH)	Aircraft Altimeter Setting (QNH) - measured current pressure reduced down to Mean Sea Level pressure.
	An altimeter in an aircraft set to QNH will show the runway elevation in feet/metres.

2. Auto-Zero

Scenario:

DAF & Target DZ are the same location.

**Exit>>Menu>>DZ/AC
Setup>>Zero Altitude**



MA-12 will monitor barometric pressure and maintain zero altitude on the DZ

From the Main Menu, choose **DZ/AC Setup**, then **Zero Altitude**.

This sequence clears any preprogrammed DZ information and returns the MA-12 to Auto-Zero mode.

The display returns to the Altitude Screen which now displays 0.

"Auto Zero" now appears on the Ground Screen.



Note: Auto-Zero mode is designed for convenience of the operator during training jumps. It provides the same functionality used in Alti-2 sport altimeters.

The auto-zero function is designed to look for "normal" freefall parachuting activity. MA-12 will auto-zero after a period of time if the aircraft maintains low altitude, or descends near to DZ altitude.

If a non-standard flight profile is expected, program absolute DZ information as described in later sections, do not rely on auto-zero.

3. Set Manual Offset

(Manual Offset Method)

DAF & Target DZ are in different locations with different field elevations.

Scenario:

The difference between the two locations is referenced and MA-12 setting is entered manually.

Note:

Auto Zero is still active in this mode

CAUTION:

This programming method ***cannot*** be used in-flight. MA-12 ***must*** be set at the take-off location using this method.

Note:

Before proceeding, Zero Altimeter as in Step 2 Above.



Exit>>Menu>>DZ/AC Setup>>Set DZ Offset

From the DZ/AC Setup Menu, choose **Set DZ Offset**.



Use the center button to highlight each digit and to scroll between them.

Use the top/bottom buttons to select the correct value for each digit.



Using the DAF as the point of reference, tell MA-12 that the Target DZ elevation is **Lower** or **Higher** than the DAF location.



The Altitude Screen now shows the setting as +/- your chosen offset.



"DZO" now appears on the Ground Screen indicating that the DZ Offset (rounded to the nearest ten foot increment) has been set.

To remove the DZ Offset, **Zero Altitude**.

4. Set QNH Offset

(QNH Offset Method)

This programming method **can** be used in-flight regardless of cabin pressurization.

DAF and Target DZ are in different locations with different field elevations.

Target DZ field elevation in MSL and Aircraft Altimeter Setting (QNH) are obtained from a local weather station within one hour of Time on Target (TOT) and programmed into MA-12.

Scenario:

CAUTION:

Before proceeding, Zero Altimeter as in Step 2 Above



Exit>>Menu>>DZ/AC Setup>>Set QNH Alt



Enter the Target DZ elevation.

Use the center button to highlight each digit and to scroll between them.

Use the top/bottom buttons to select the correct value for each digit.



Tell MA-12 that the Target DZ elevation is **Above MSL** or **Below MSL**.



mBar Model

Enter the Aircraft Altimeter Setting (QNH) in mBar or inHg (depending on MA-12 model) IVO the Target DZ.

Use the center button to highlight each digit and to scroll between them.

Use the top/bottom buttons to select the correct value for each digit.



inHg Model



The Altitude Screen now shows the setting as +/- your chosen offset.

Note: the Altitude Display will continue to reflect changes in ambient pressure. Correct settings can be confirmed on the Ground Screen.



mBar Model

Aircraft Altimeter Setting (QNH) and the Target DZ Elevation (rounded to the nearest ten foot increment) now appear on the Ground Screen.

To remove DZ Offset, **Zero Altitude**.



inHg Model

5. Set Standard Altitude Offset

(Standard Altitude Offset Method)

This programming method **can** be used in-flight regardless of cabin pressurization.

Scenario:

DAF and Target DZ are in different locations with different field elevations.

Standard Pressure (1013 mBar or 29.92 inHg) is used by default due to actual QNH IVO Target DZ being unobtainable.

CAUTION:

Before proceeding, Zero Altimeter as in Step 2 Above.

Exit>>Menu>>DZ/AC Setup>>Set Std Alt



Enter the Target DZ elevation.

Use the center button to highlight each digit and to scroll between them.

Use the top/bottom buttons to select the correct value for each digit.



Tell MA-12 that the Target DZ elevation is **Above MSL** or **Below MSL**.

Standard Pressure (1013 mBar) is entered by default.



The Altitude Screen now shows the setting as +/- your chosen offset.

Note: the Altitude Display will continue to reflect changes in ambient pressure. Correct settings can be confirmed on the Ground Screen.



Standard Pressure and the Target DZ Elevation (rounded to the nearest ten foot increment) now appear on the Ground Screen.

To remove the DZ Offset, **Zero Altitude**.

mBar Model



inHg Model

NOTE:

The greater the difference between Target DZ QNH and Standard Pressure, the greater the effect on accuracy. Since devices may not read exactly zero upon landing when 1013 mBar is used, a nominal increase in altitudes for main parachute deployment, emergency procedure decision altitude, and pattern altitudes is recommended.

CANOPY ALARMS

1. Alarm Basics



MA-12 includes Canopy Alarms for use during training jumps. Alarms can be disabled for tactical jumps requiring noise discipline.

MA-12 was designed as an externally mounted visual altimeter and does not have Free Fall Alarms.

2. Alarm Groups

MA-12 has eight groups of programmable Canopy Alarms, each with three individually selectable alarm altitudes.

Only one Canopy Alarm group can be enabled at a time.

3. Alarm Icons

The Ground screen displays a symbol indicating Canopy Alarms are enabled or disabled.



Canopy Alarms enabled.



Canopy Alarms disabled.

Alarm Types

Audible Alarms: with Canopy Alarms enabled and Backlight off, Audible Alarms are activated.

Visual Alarms: with Canopy Alarms enabled and Backlight on, Visual Alarms are activated.

4. Enable/Disable Alarms



Exit>>Menu>>Alarms>>Disable All Alarms

From the Main Menu, choose **Alarms** then **Disable(Enable) All Alarms**.

5. Audible Alarm Volume



Exit>>Menu>>Alarms>>CP Alrm V Loud

Use the center button to toggle between **CP Alarm Level Normal** and **CP Alarm Very Loud**.

6. Set Alarm Altitudes



Exit>>Menu>>Alarms>>Edit Alarms

When you enter the Alarms menu, the currently active Canopy alarm groups and the pre-set alarm altitudes will appear.

Scroll to and select **Edit Alarms**.



To change the altitudes of a group, select it from the list.

MA-12 alarm group names are Canopy1-8.



Use the top/bottom buttons to scroll to the desired altitude.

Select using the center button.



Use the top and bottom buttons to change the alarm altitude. Once you have the correct altitude, press the center button to highlight **OK**.



Repeat this process for the other alarm altitudes, then choose **Save**.

7. Canopy Alarm Altitude Spacing

Canopy alarms may be set no closer than 100 feet/30 metres.

The first canopy alarm may not be set at more than 20,000 feet/6095 metres.

Altitudes are adjustable in 10 foot/5 metre increments.

The third canopy alarm may not be set lower than 100 feet/30 metres.

For example, if the third alarm is set for 600 feet, and the first alarm is set for 4500 feet, the second alarm is adjustable from 700 to 1400 feet, in 10 foot increments.

The canopy alarms start sounding 150 feet/50 metres before the altitude you set. The tone finishes sounding just as you reach the set altitude.

Visual Alarms provide 3 half-second flashes of the Backlight beginning 150 feet/50 metres before the altitude you set. Backlight returns to continuous illumination as you reach the set altitude.

LAST JUMP LOGBOOK

1. Last Jump Summary



NOTE:



Exit>>Menu>>View Lst Jump

Each Summary shows the date and time of the jump, the total freefall and canopy times, exit and deployment (fully open canopy) altitudes, average speed, speeds at four altitudes, etc.

The speeds shown are calculated at four altitude ranges (Speed Bands): 12,000, 9,000, 6,000 and 3,000 FT, starting 500 FT before each altitude.

MA-12 logs data for the last jump only

Summary screen #1 Date, Time, Alarm Group settings, exit & fully open canopy altitudes.

Press the bottom button to get to the second View screen.

Summary screen #2 shows free fall and canopy time, average speed, and the first two speed band values.

Press the bottom button to get to the third View screen.

Summary screen #3 shows all four speed band values.

Hold the center button to return to the Main Menu.

Press the top button to return to the previous Summary screen.

OTHER FEATURES

1. Sleep Timer



Exit>>Menu>>Clk/Timers>>Set Sleep Timer

The Sleep Timer allows you to turn MA-12 off for a specified period.

This optional feature is handy for air transport – while asleep, MA-12 will conserve battery power until you arrive. Cancel the Sleep Timer when you arrive and prepare your unit(s) for jumping.



From the Main Menu, select **Clock/Timers**.



Choose **Set Sleep Timer**.



SLEEP

Press the center button to start the process.

Use the top/bottom buttons to adjust the number of hours.

Use the center button to scroll to **OK**.

Or, scroll to and select **Cancel** to abort setting the Sleep Timer.

On the Ground Screen the **SLeep** icon is displayed once MA-12 is in Sleep Mode.

The display will go blank after one minute.

2. Backlight

An electroluminescent backlight is included for night jumps. The backlight requires more battery power; we recommend you leave it *disabled* unless jumping at night.

On the ground, the backlight will go out shortly after the last button push to conserve battery power. Pushing any button reactivates the backlight. Backlight stays on in free fall and under canopy.



In aircraft mode, the backlight will remain on for 10 minutes after a button is pushed.

In freefall and canopy mode, the backlight will remain illuminated.

Note: The alarm requires more battery power and cannot be active at the same time as the backlight, therefore, if both backlight and alarm are selected, the backlight will flash as a visual alarm.

Before night jumps, fully charge the battery to ensure full power throughout jump operations.

From the Ground Screen, press and hold top button to turn on the backlight.

The backlight icon will appear on the Ground Screen (see below).

Press and hold top button to turn off the backlight.





The top button backlight on/off function is disabled in Climb Mode.

If backlight settings must be adjusted from the Climb Screen onboard the aircraft, use the menus as follows . .



**Exit>>Menu>>Display
Opt>>Backlight On/Off**

From the Main Menu, choose **Display Opt**.



The current state (backlight On or Off) is displayed.



On the Ground Screen, the backlight icon is displayed.

3. Flip LCD



From the Main Menu, choose **Display Opt.**



Choose **Flip LCD**.



The display is now re-oriented.

4. Set Aircraft Exit Altitude



The Climb Screen shows time to altitude, time of day, current altitude, and climb rate. Aircraft exit altitude is set by default at 13,000 FT (3km).

The exit altitude can be manually changed to allow for better time management onboard the jump aircraft.



Exit>>Menu>>DZ/AC Setup>>Set AC Exit Alt

From the Main Menu, choose **DZ/AC Setup**, then **Set AC Exit Altitude**.



Use the center button to highlight the altitude. Use the top/bottom buttons to choose the desired value.



Once the correct value is chosen, use the center button to choose **OK**; press the center button a second time to enter the new setting and return to the **DZ/AC Setup** menu.

5. Demo Mode



Exit>>Menu>>Demo Mode

Demo Mode is intended to familiarize the user with the device.

You can hear the alarm tone associated with each alarm altitude.

Demo Mode also displays a set of screens designed to illustrate MA-12's different functional displays.



Exit>>Menu>>Demo Mode>>CP1/CP2/CP3 Alarm

Listen to the sound of each Canopy Alarm at the chosen volume level.

Demo Alarms

NOTE:

Demo Mode is only available from Ground Mode.

Use the center button to scroll through the screens. Displayed in order:



Show Screens

Alti-2 splash screen
Device ID, firmware version, serial number
Ground Screen
Altitude Screen
Climb Screen
Free Fall Display
Canopy Display
End of Demo

TROUBLESHOOTING

1. Software Reset



**Exit>>Menu>>System
Admin>>SW Reset**

Cycles power and resets the unit without losing data or settings.

2. Hardware Reset (Switch)



In the unlikely event MA-12 becomes unresponsive to button input, use a paper clip to push the Hardware Reset switch.

Cycles power and resets the unit without losing data or settings.

Hardware Reset (Middle Button)



The new version of the MA-12 can be hard reset by pressing and holding the center button for at least 10 seconds.

The unit will cycle power and the ALTI-2 screen will appear.

The unit will power up in the serial number screen without losing data or settings.



3. **Format NVRAM**



**Exit>>Menu>>System
Admin>>Format NVRAM**

"Wipes" the unit of all stored data and restores all settings to factory defaults.

**Exit>>Menu>>System
Admin>>Show Status**

4. **Show Status**

On occasion during service calls we may ask you to access this screen to read us the data displayed to aid our Technicians in determining whether your device is performing as it should.

CARE AND MAINTENANCE

1. Care



Ensure that the Pressure Sensor Hole and Speaker Hole are not sealed by obstructions such as tape, Velcro, labels, etc. The mount, the strap, and jumper's clothing will NOT interfere with operation of the unit.

NOTE:

In between jump operations, do not store MA-12 plugged in on the charger. Ideal storage condition for the enclosed Lithium Ion battery is 40-50% charge for optimum long term battery life.

2. Cleaning

MA-12 should be kept free of dirt, mud, water and other contaminants. Dust may be removed with a dry cloth.

A mild cleaner such as Windex may be used; spray a soft cloth and wipe gently. Do not allow any cleaner to enter the Sensor Hole.

Low pressure compressed air may be used to clean debris from the Micro-USB port.

3. User Maintenance

User replaceable items:

Wrist Strap
Mounting Bracket
Mounting Screws
Washers
Micro USB Cable

Salt Water Immersion

If MA-12 has been immersed in salt water or an extremely dusty environment, rinse the unit thoroughly in fresh water, wipe with a dry cloth, and air dry.

CAUTION:

Repeated immersion in salt water without rinsing can cause salt buildup in the filter resulting in altimeter lag.

MA-12 does not require periodic maintenance (i.e. run-ups in a test chamber).

Periodic Maintenance Requirements

The electronic pressure sensor in MA-12 is much more accurate than the reference altimeter in most altitude test chambers. Zeroing the device also serves as a self-test of the pressure sensor. This makes periodic maintenance unnecessary.

If MA-12 will not zero, factory service is required.

For security reasons, MA-12 firmware updates are not downloadable from the Alti-2 website.

Firmware updates

Firmware updates will be provided directly to the end-user by Alti-2 via email or physical media (user choice).



SERVICE

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Return Material Authorization (RMA) may be obtained from our web site:

<https://www.alti-2.com/support-portal>

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