

# FLYBOX®



## ***Multifunction Altimeter/Variometer AV1***

Revision#3.0, 21/11/2014  
For firmware version 2.2

Page intentionally left blank

# ***SECTIONS***

**MECHANICAL INSTALLATION**

**ELECTRICAL INSTALLATION**

**USE OF THE INSTRUMENT**

**INSTRUMENT SETTINGS**

**TECHNICAL SPECIFICATIONS**

Thank you for purchasing a Flybox® product. We hope it fully satisfy you and makes your flights pleasant and secure.

Developing AV1, our intent was to create a compact and lightweight digital altimeter, easy to install and quick to consult.

---

### **SYMBOLS USED IN THE MANUAL**



**NOTE:** Used to highlight important informations.

---



**CAUTION:** Used to warn the user and indicate a potentially hazardous situation or improper use of the product.

---



**WARNING:** Used to indicate a dangerous situation that can cause personal injury or death if the instruction is disregarded.

---



**NOTE:** Keep this manual in the aircraft.

This document must accompany the instrument in the event of change of ownership.

---



**NOTE:** This device is intended for installation onto non type certified aircraft only, because it has no aviation certifications. Refer to your local aviation authorities to check if this device may be installed in your aircraft.

---



**CAUTION:** Read entirely this manual before installing the instrument in your aircraft, and follow the installation and operating instructions described here.

---



**CAUTION:** Using this instrument over the maximum allowable ranges can cause malfunction or wrong indications.

---



**CAUTION:** Microel s.r.l. reserves the right to change or improve its products. Information in this document is subject to changes without notice.

**INDEX**

**SECTION 1 - Mechanical installation**

- 1.1 - Mechanical installation ..... 7
  - Pressure port connection ..... 7
- 1.2 - Dimensions ..... 8

**SECTION 2 - Electrical installation**

- 2.1 - Electrical installation ..... 10

**SECTION 3 - Use of the instrument**

- 3.1 - Use of the instrument ..... 12

**SEZIONE 4 - Instrument settings**

- 4.1 - Functions menu ..... 14
- 4.2 - Setup menu ..... 17
- 4.3 - Edit airports ..... 19

**SEZIONE 5 - Technical specifications** ..... 21

**Warranty** ..... 22

## **SECTION 1**

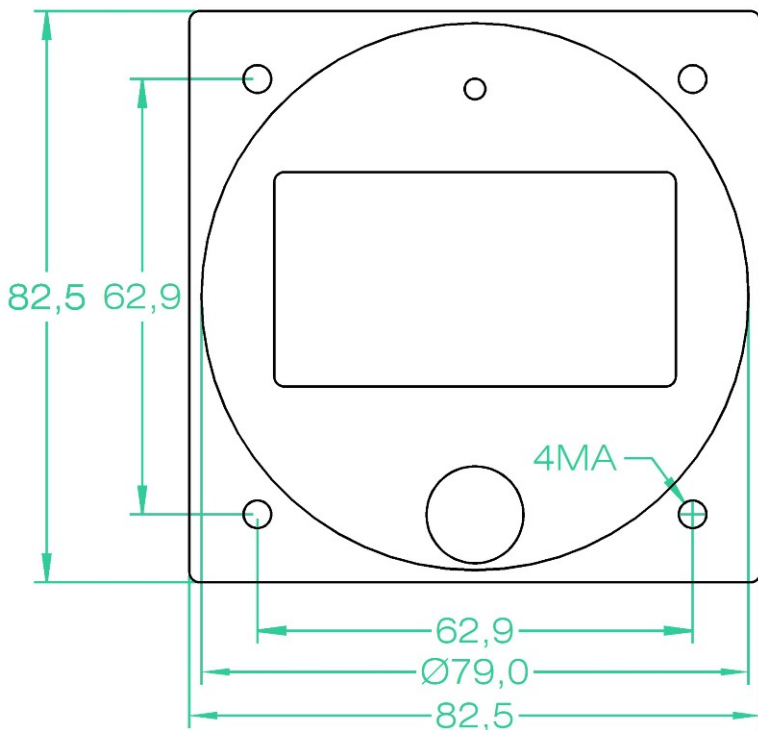
### **1.1 MECHANICAL INSTALLATION**

- 1) The AV1 fits in a standard 3 1/8" (80mm) panel cutout.
- 2) It's recommended to choose a position that permits optimal visibility.

#### **PRESSURE PORT CONNECTION:**

Connect the pipe fitting on the back of the instrument to a static air pressure lines; the furnished pipe fitting is suitable for pipe with internal diameter of 5 mm.

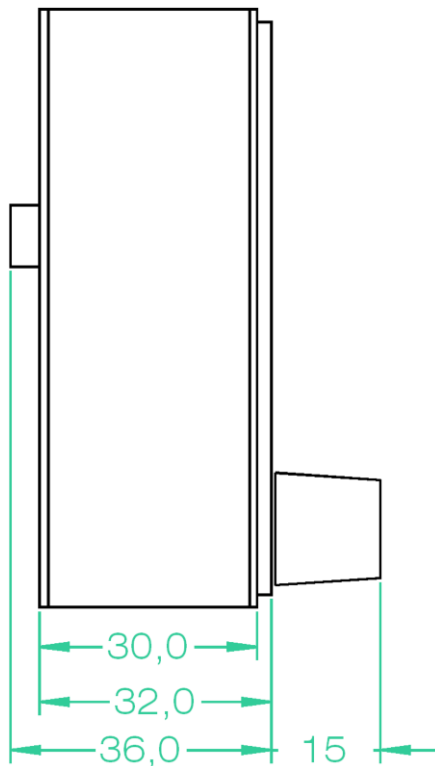
## 1.2 DIMENSIONS



Front view

Dimensions in millimeters.





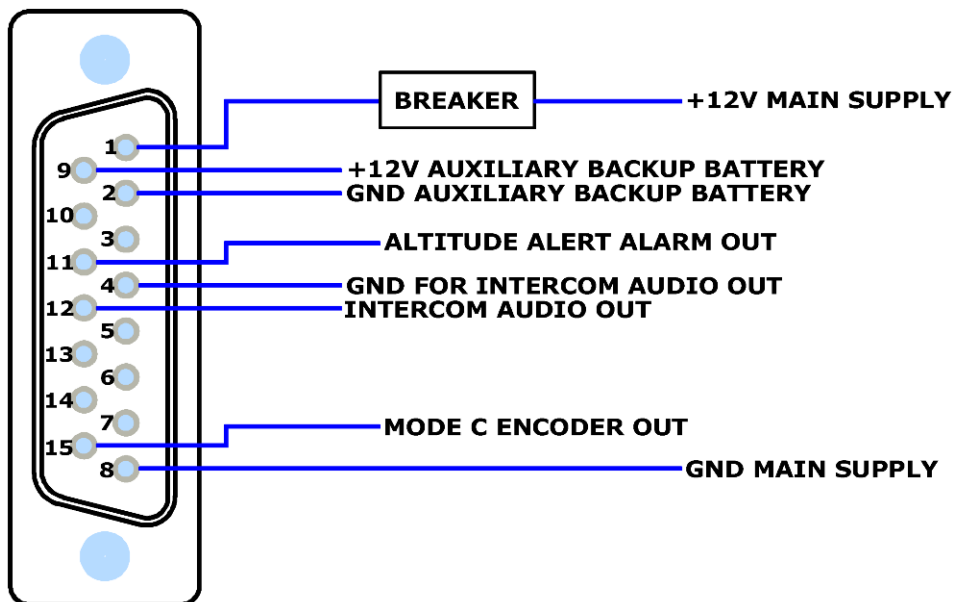
**Side view**

Dimensions in millimeters.

## SECTION 2

### 2.1 ELECTRICAL INSTALLATION

On the back of the AV1 altimeter there is a 15-pole male connector; with the AV1 is already furnished the corresponding 15-pole female connector. The connections are the followings:



15-pole female connector, view from wiring side.

### Connections detail:

- 1= +12V Main supply.
- 2= GND auxiliary backup battery (if present).
- 3= GND (not used).
- 4= GND for audio out.
- 5= GND (not used).
- 6= reserved.
- 7= reserved.
- 8= GND Main supply.
- 9= +12V auxiliary backup battery (if present).
- 10= reserved.
- 11= Altitude alert alarm out (300mA max). Connect the load (for example a lamp indicator) between out and +12V.
- 12= Low-level audio out for intercom (it's recommended to use shielded cable).
- 13= reserved.
- 14= reserved.
- 15= Mode C encoder out (open-collector) - OPTIONAL - actually not used.



**NOTE:** Insert a 1A circuit breaker or fuse to the power lead. (**+12V**).



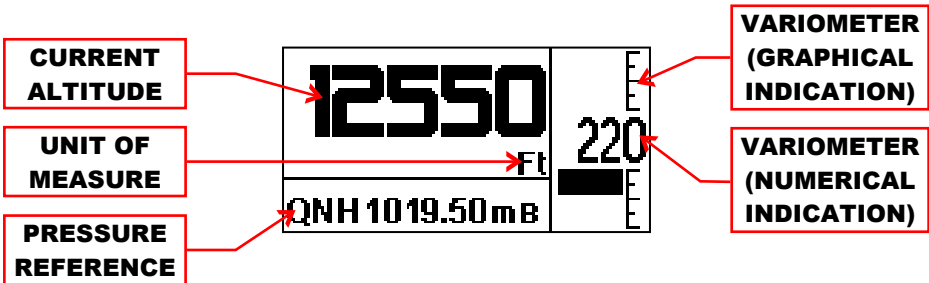
**CAUTION:** Voltage peaks on the supply line that exceeds the operating limits can damage the device.

## SECTION 3

### 3.1 USE OF THE INSTRUMENT

Using the AV1 altimeter is simple and intuitive; all the functions or settings are activated/modified using the knob (rotary switch) on the front panel: for example it can be rotated to increment or decrement a value or can be pushed to confirm, as explained in the following chapters.

At startup the display briefly shows the software version, then the main screen will appear with the altimeter and variometer:



The altimeter section includes the current altitude, the unit of measure and the pressure reference with its unit of measure (milliBAR/hPa or inches of mercury).

Rotating the knob changes the value of the pressure reference and consequently it also changes the altitude.

The variometer section includes both numerical and graphical indications; the amplitude of the bar varies in proportion to the vertical speed: the upper bar indicates a positive vertical speed (climb) while the lower bar indicates a negative vertical speed (descend).

The unit of measure of the variometer is feet/minute or m/s, depending on what is selected.

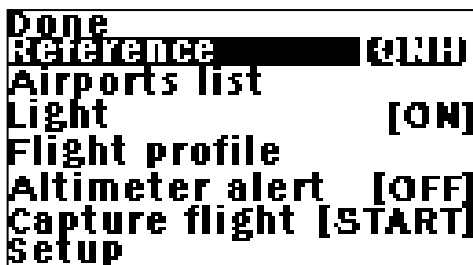


**CAUTION:** Before using the altimeter for the first time you must set-up the unit of measure for the altitude and for the pressure (read chapter 4.2 “Setup menu”); the default settings are Feet (altitude) and mBAR (pressure).

## SECTION 4

### 4.1 FUNCTIONS MENU

To enter in the functions menu press the knob for at least one second:



**DONE:** exit from the main menu and return to the altimeter/variometer screen.

**REFERENCE:** Set the pressure reference mode (QNH, QFE, QNE); press and then rotate the knob to choose the desired mode:

- choose **QNH** to manually adjust the pressure reference rotating the knob (when in main screen with altimeter and variometer).
- choose **QFE** to automatically set the pressure reference so that the altimeter shows zero.
- choose **QNE** to automatically set the standard pressure reference 1013.25hPa.

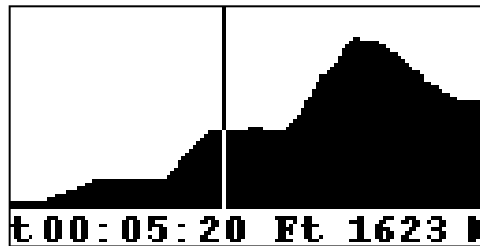
Press the knob again to confirm.

**AIRPORTS LIST:** allows you to choose the airport for automatic QNH and elevation setting. After pressing the knob a screen appears that allows you to select the initial letter of the airport and then you can select the airport from the list.

**LIGHT:** Turns on/off the display backlight.

**FLIGHT PROFILE:** shows the altimetric profile screen. This screen displays the altimetric profile of the last recorded flight (to begin a recording see the option "Capture flight").

Rotate the knob to slide the profile with the cursor; the line below the graphic shows the time elapsed from the start of the recording and the altitude reached at that moment. If the profile is divided into more screens it is indicated by an arrow on the right corner (as in the example picture); when the cursor reaches the end of the screen it automatically change to the next one.

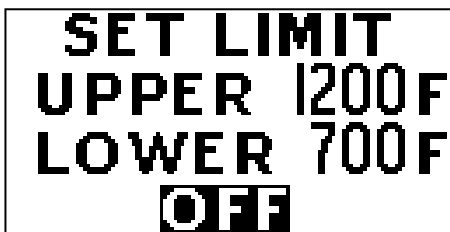


*Flight profile screen.*

**ALTIMETER ALERT:** enable/disable the altitude alert and set the limits.

Press the knob to display the alert screen where you can modify the upper and the lower limits; there is also the on/off option to activate/deactivate the alert (turn the knob clockwise to activate or counterclockwise to deactivate).

When the altitude exceeds this limit the AV1 activates a visual indication (blinking yellow LED) and an audio tone (on the intercom audio out). Furthermore the display shows the indication “CLIMB” or “DESCEND” (CLIMB when the altitude is below the lower limits and DESCEND when the altitude is over the upper limit).



*Altitude alert screen.*

**CAPTURE FLIGHT:** start/stop the altimetric profile recorder.

To start a recording press the knob and choose if you want to begin a new recording (by selecting “NEW”) or if you want to continue the last recording (by selecting “CONTINUE”).

If the recording is already started, the only option available is “STOP” to stop it.

**SETUP:** enter in the setup menu (see next chap.).



## 4.2 SETUP MENU

```

Done
Contrast          [ 80]
Altimeter unit   [ FEET]
Pressure unit    [ inHg]
Calibration      [ 999.06]
Vario scale      [1000F]
Capture interval [10s]
Edit airports
    
```

Setup menu - page 1

```

Audio volume     [5]
    
```

Setup menu - page 2

**DONE:** Exit from the setup menu.

**CONTRAST:** adjust the LCD contrast.

**ALTIMETER UNIT:** Select which unit of measure will be used for the altitude (Feet or Meters); change also the unit for the variometer (Feet/min or Meters/sec).

**PRESSURE UNIT:** Select the unit of measure for the pressure reference: hPa(mBAR) or inches of mercury.

**CALIBRATION:** The altimeter has been calibrated at the factory and doesn't need further adjustments, but if you notice that the indication is not accurate you can follow these steps to calibrate the instrument:

- Read the current sea level barometric pressure from an altimeter/barometer used as reference.
- Adjust the value that appears in "Calibration" so that it coincides with the pressure read from the reference; to modify this value you must press and hold the knob for 5 seconds (the background changes from black to white) and then you can rotate to adjust the value.
- Press again the knob to confirm the value and exit from the calibration.

**VARIO SCALE:** Select the scale for the graphical indication of the variometer; the range is 500 to 8000 Ft/min.

**CAPTURE INTERVAL:** The altimetric graphic profile is drawn storing the altitude at fixed time intervals; this parameter allows you to select the time interval between two altitude samplings (value can be from 1 to 60 seconds).

The maximum number of samplings is 8900, so if you choose an interval of 1 second the graphic can store a 8900s flight (2hours and 28 minutes).

When the memory is full "MEMORY FULL" appears on the display (no more recordings will be made).

**EDIT AIRPORTS:** Allows you to modify the airports elevation database (see next chapter).

**AUDIO VOLUME:** Adjust the volume for the audio out.



<b>-MODIFY-</b>	
<b>Name</b>	
<b>ALESSANDRIA</b>	
<b>Altitude:</b>	<b>300 F</b>

The next screen allows you to adjust the altitude: rotate the knob and press it when you have reached the right altitude for the airport. To confirm the updating of the airport the display shows "MODIFIED" and returns to the setup menu.

<b>-NEW-</b>	
<b>Name</b>	<b>14</b>
■ ABCDEFGHIJKL	
MNOQRSTUVWXYZ	
Z 0 1 2 3 4 5 6 7 8 9 . ' ,	
DEL END	

To insert new airports follow the same steps described above for modifying the existing airports.

## SECTION 5

### 5.1 TECHNICAL SPECIFICATIONS

- Graphic LCD with backlight and coated glass, dimensions 58x31mm.
- Standard mounting 3 1/8" (80mm).
- Anodized aluminium case.
- Dimensions: 83 x 83 x 36 mm.
- Weight: 230g.
- Altimeter range: -1000 ~ +25000 Feet.
- Altimeter resolution: 10 feet.
- Variometer range: +/- 8000 Ft/min.
- Variometer resolution: 10 Ft/min.
- Operational temperature range: -20 ~ +70°C.
- Supply voltage: 10 ~ 30 V=.
- Supply current: 80mA.
- Audio level: 2Vpp (with 10Kohm load).
- Alarm out: open-collector, 300mA max current, active low.

**WARRANTY:**

---

This product is warranted to be free from defects for a period of 12 months from the user invoice date.

The warranty only cover the manufacture's defects; shall not apply to product that has been improper installed, misused or incorrect maintenance, repaired or altered by non-qualified person.

<b>Data</b>	<b>Versioni</b>	<b>Descrizione</b>
<b>12/2007</b>	2.3	First release
<b>11/2014</b>	3.0	Layout update

WARNING: All photos, data, drawings, instruments layouts, technical solutions and data representation you find in this document or watching at FLYBOX® instruments working and/or you can access by means of any other media, including web sites, are sole property of MICROEL s.r.l., cannot be copied or imitate without a written permission of MICROEL s.r.l. itself and are protected by law, even by means of extended international copyright and/or specific patents deposited. Any infringement of this statement and of MICROEL s.r.l. intellectual property will be prosecuted.

©2014 Microel s.r.l. – all rights reserved.

Page intentionally left blank

**MICROEL s.r.l.**  
Via Mortara 192-194  
27038 Robbio (PV) - ITALY  
Tel +39-0384-670602 - Fax +39-0384-671830  
**[www.flyboxavionics.it](http://www.flyboxavionics.it)**