FLYBOX

INNOVATIVE AVIONICS

Eclipse NG

Electronic Flight Instrument System

User Manual

User Manual, Safety Instructions and Warning Booklet

This product is not TSO'd and cannot be installed into traditional FAA Part 23 and similarly Type-Certificate Aircraft

Document U2024ECLNG
Revision#1.0, 03/2025
For firmware version 1.1.6

This booklet is suitable for printing in A5 format.

Symbols used in the User Manual

NOTE: Used to highlight important information.

CAUTION: Used to warn the user, it indicates 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.

FAILURE TO DO SO MAY RESULT IN SERIOUS INJURY OR DEATH.

WARNING: These instructions must be provided to users before use, and retained for ready reference by the user. The user must read, understand (or have explained) and heed all instructions and warnings supplied with this product and with those products intended for use in association with it. Always keep a copy of the Installation and User Manual, Safety Instructions and Warning Booklet on the aircraft. In case of change of ownership, the Installation and User Manual, Safety Instructions and Warning Booklet must be delivered together with all of the other papers.

WARNING: Read the Installation and User Manual, Safety Instructions and Warning Booklet before installing the device on your aircraft and follow the procedure described therein.

WARNING: This device is intended to be installed on NON-TYPE CERTIFIED AIRCRAFT ONLY, as it does NOT require any air operator's certificate. Refer to your national aviation authorities to check if this device can be installed on your aircraft.

WARNING: It is the owner's responsibility to test this device before operating the aircraft and to make sure nobody is using it unless properly instructed and authorized to do so.

WARNING: Once the installation process is completed, it is extremely important to test the device before taking off to make sure it works properly. Therefore, we strongly suggest to double check all of the electronic instruments available on the aircraft and to turn them on to verify they function correctly.

WARNING: This device is operated through a software which from time to time can be updated and/or subject to change. Please, always refer to the Installation and User Manual, Safety Instructions and Warning Booklet for the last updated version of the software available on www.flyboxavionics.it

WARNING: It is the responsibility of the installer to properly install the device on the aircraft. In case of calibration, or any technical or functional customization of the device, the responsibility lies with the individual who carried out such operation.

WARNING: If this product is not used correctly, or it is subjected to additions or alterations, the effectiveness of this device may be considerably reduced.

WARNING: Alterations, additions, or repairs not performed by the instrument manufacturer or by a person or organization authorized by the manufacturer shall negate any warranty.

WARNING: The unit isn't waterproof. Serious damage could occur if the unit is exposed to water or spray jets.

WARNING: Installation and configuration of this instrument should only be carried out by trained and authorised professionals. See the Flyboxavionics website for a list of authorised installers.

NOTE: The consumer decides of his own free will if the purchased product is suitable and safe for his need. If the consumer does not agree with the notices contained in this Installation and user Manual, Safety Instructions and Warning Booklet, do not install this instrument in his aircraft.

NOTE: Flybox Avionics reserves the right to change or improve its products as well as terms, conditions, and notices under which their products are offered without prior notice.

NOTE: The Installation and User Manual, Safety Instructions and Warning Booklet will be updated annually if needed.

All changes or updates will be published on our website www. flyboxavionics.com in the "support" section.

NOTE: Check the website www.flyboxavionics.it periodically for software and manual updates.

NOTE: For some products, registration may be required to receive important news or information on available firmware updates or to receive security information.

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1.1 - Primary action after installation

WARNING: Do not fly until you have performed at least the actions indicated below:

1. **Choose startup mode:** it's necessary setup the working mode in wich *Eclipse NG* will start up. See chapter *1.3.10 - Configuration*.

2. **Choose engine model**: this choice will set in *Eclipse NG* what the source for reading the engine data will be. See chapter *1.3.10 - Configuration*.

3. **Correct panel misalignment:** it's necessary to correct any mounting error. If not the attitude indication may not be correct. See chapter *1.3.10.2 - Flight parameters.*

4. **Magnetic calibration:** (PFD or IFIS). The magnetic calibration after the installation of your *Eclipse NG* is an essential procedure that you must perform before you fly. Not only the heading, but also the attitude indicator depends on a correct magnetic calibration. See chapter *1.3.4.19 - Compass*.

5. **Tank level sensors** *(if connected)*: It's indispensable to perform the calibration for all the tank level sensors connected to *Eclipse NG*. Without performing calibration and settings no indication will be furnished. It is responsibility of the user to check during the first flights and over time the goodness of the calibration and therefore the instrument indications. The verification can be done in any moment, for example by simply checking the quantity put to fill the tank: if you know that the tank filled contain 40 liters and *Eclipse NG* indicate as remaining quantity 10.0 liter, you know

that to fill the tank you must put approximately 30 liters. Of course keeping in mind that in ground the indications will be different that in flight because of the flight's attitude. This problem is present also in the traditional analog gauge indicators, but is more difficult to detect because of the non-numeric indication. Another verification is, in case of low remaining quantity (i.e. 4~5 liters), drain and measure it.

6. **Fuel computer** *(if installed)*: If it's installed the fuel flow transducer, *BEFORE* rely on informations provided by the fuel computer section you must:

- Verify that the K-factor set in *Eclipse NG* is pertinent to the installed fuel flow transducer.

- Execute the fuel flow transducer calibration as explained in chapter *1.3.5 - Fuel Computer*. Without calibration the fuel computer informations may be wrong, even if the nominal K-factor is correct for the fuel flow transducer used. After calibration, the K-factor should have been calculated automatically and at best for every single installation. You must still check for some time if the remaining quantity indicated are reliable compared to the refuelling performed. For example, if the instrument indicate a remaining quantity of 35 liters and you know that the tanks capacity is 80 liters, filling the tanks should require approximately 45 liters; in case of much difference redo the calibration. Consider also that, during use, little errors accumulate and if you never fill the tanks you never “reset” all these errors.

6. **Servo(s) calibration** *(if installed)*: this operation is mandatory. If you try to engage the autopilot without first calibrate the servo(s), *Eclipse NG* will show the error message "*AUTOPILOT DISENGAGE! ROLL/ PITCH SERVO CALIB*". See chapter *1.3.8 - Autopilot*

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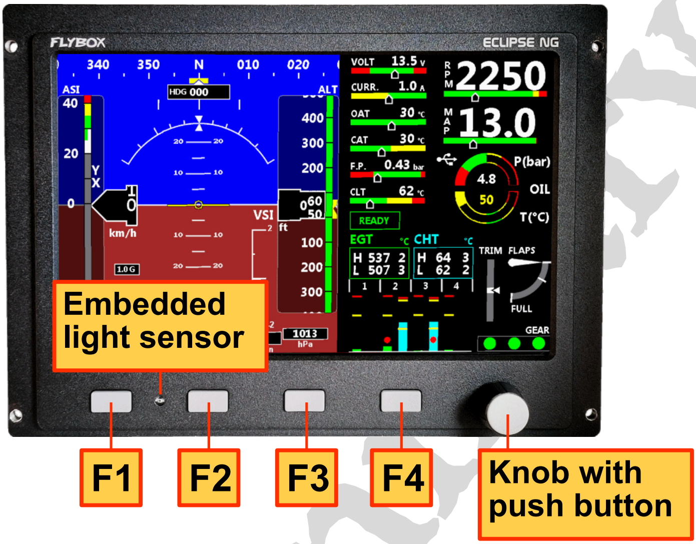
1.2 - Panel indicators and commands



Pushbuttons are used to switch between different screens and perform different action within them. When inside a menu, or a popup menu is visible, the meaning of the pushbuttons is always indicated.

The knob is used to scroll between menu items and changing their value. The push button is used to perform different actions within menus and during value editing.

1.3 - Instruments configuration

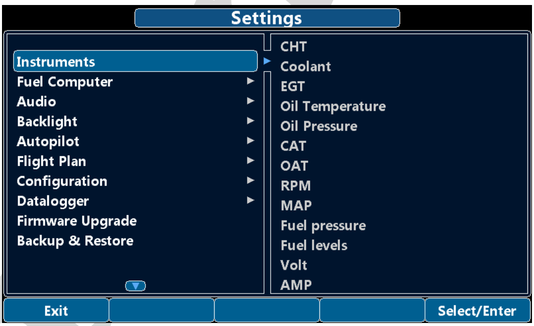
Before using the *Eclipse NG* you need to configure it; read completely this chapter and follow step by step the sections to completely configure all the sensors, alarms and preferences available.

1.3.1 - Menus

Eclipse NG operate with the main menu and on screen popup menus.

1.3.1.1 - Main Menu

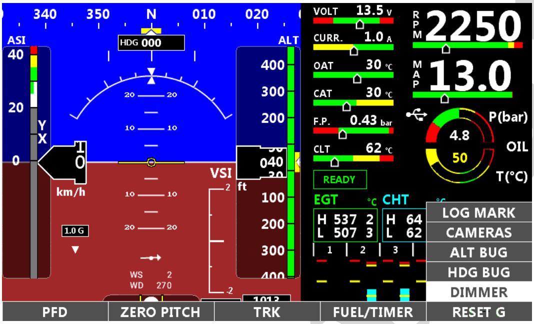
To enter the main menu press and hold the F1 and F4 buttons for 3 seconds.



The labels near the button indicate their function within the menu. Use the knob to scroll between items then push the button to select it. If the higlighted item is a submenu, in the right side of the screens, a preview of its items is visible.

1.3.1.2 - Popup menu

This kind of menu is accessible from every main screen pressing one of the 4 button.



The labels near the button indicate their function within the menu. Use the knob to scroll between items in the right list, then push the button to select it. For example if DIMMER is selected the popup menu will change as in the picture below.

In this case you can change the Dimmer value by rotating the knob then pressing DONE to confirm and close the menu.

NOTE: When the popup is first opened, if no action is performed it will automatically close. This duration is user-settable.

1.3.2 - Common items descriptions

To avoid repetitions, common menu items are described in the current section. Only functionality is described, any other options will be specifically when required.

In gauges menus common items are:

- **Filter:** assigns the strenght of the digital filter in a range from 1 to 100. If the measure is affected by noise, increase the value. If there is a delay between the input change and the measurement, the value should be decreased.

- **Unit:** assigns the measurement unit.

In alarms menus commons items are:

- **Enable:** enable or disable the alarm on measurement check, can be YES or NO (*default YES*).

- **Out:** enable one of the two outputs available on *Eclipse NG* when the alarm is activated, useful for example to turn on an alarm light on the cockpit, can be NONE, OUT1 or OUT2 (*default NONE*).

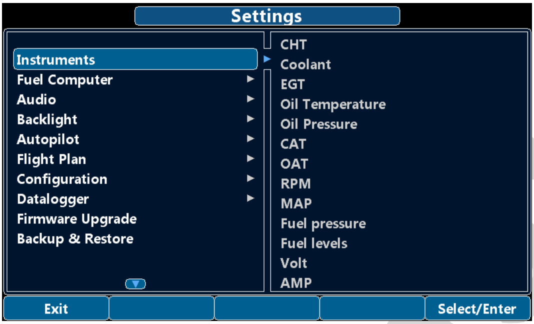
- **Audio:** if set to VOICE it plays an aural warning if *Eclipse NG* audio line out is connected to an intercom. Can be NONE or VOICE (*default VOICE*).

- **Voice repeat count:** set how many times the aural message must be repeated. The range is 1 to 5 times (*default 2*).

- **Voice repeate pause:** set the pause in seconds between the audio repetitions (*default 0.5*).

- **Activation delay:** set how many second the condition must persist before trigger the alarm (*default 0.5*).

1.3.3 - Main menu

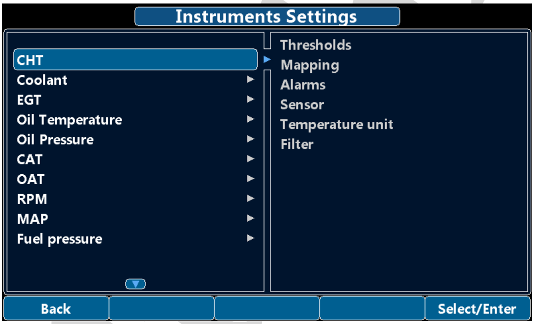


- **Instruments**: enter the *Instruments* menu.
- **Fuel computer:** enter *Fuel computer settings* menu.
- **Audio:** enter *Audio settings* menu.
- **Backlight:** enter *Backlight settings* menu.
- **Autopilot:** enter *Autopilot setup* menu.
- **Flight Plan:** available only if F*lybox Connect Wi-Fi activation key Cod. 801021* has been purchased and activated, enter the *Flight Plan* menu and waypoints list.
- **Configuration:** enter *Configuration* menu.
- **Datalogger:** enter to choose between *Flight log* or *Peaks log*.
- **Firmware Upgrade:** start the firmware update function from USB flash drive.

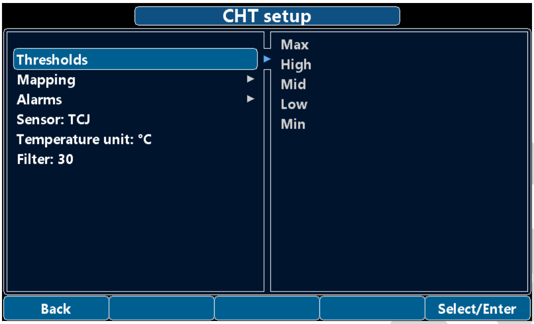
- **Backup & Restore:** starts the functionality for saving or restoring instrument settings to USB flash drive.
- **Password:** enter the *Password* menu to enable protected features.
- **About:** shows device information.

1.3.4 - Instruments

In this menu is possible to set parameters for all available engine or flight parameters.



1.3.4.1 - CHT



- **Sensor:** sets the probe type according to your electrical installation. Options available are:

- **Temperture unit:** as in chapter *1.3.2 - Common*

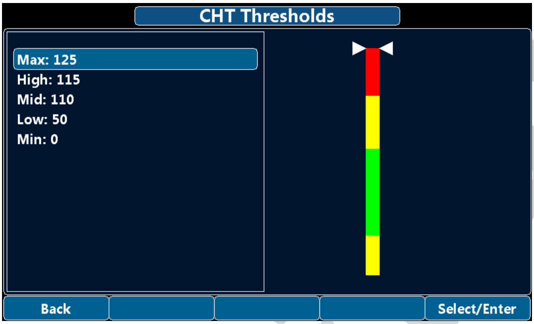
Menu Label	*Description*
TCJ (default)	Thermocouple type J
P1K	PT1000 sensor
VDO	Rotax VDO 323-057 150°C
TCK	Thermocouple type K

items description. Option available are *°C* or *°F* (*default °C*).

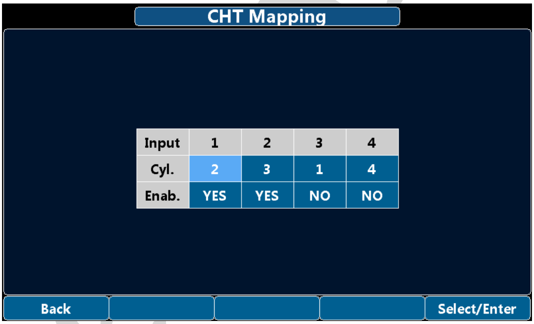
- **Filter:** as in chapter *1.3.2- Common items description* (*default 30*).

Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range).



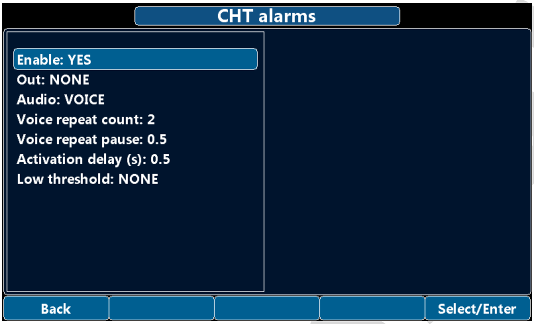
Mapping



Although we recommend to perform a clean installation, with this feature it’s possible to reassign or disable the different CHT inputs: for example you can assign the *Input #1* to the engine *Cylinder #3* and so on. You can also disable each inputs, useful for example if a sensor fails and you don’t want to display the indication for that sensor.

Alarms

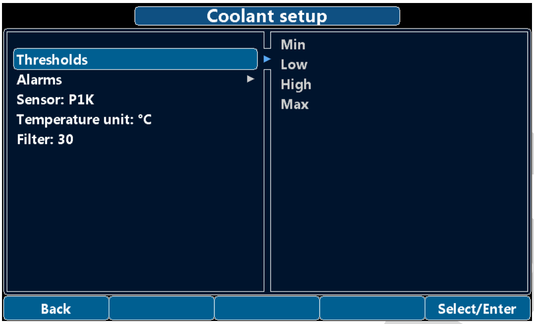
Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold or drop below the *Low threshold.*



- **Low thresholds:** select which thesholds will trigger low temperature alarm. Option available are NONE (disable the low temperaure alarm), LOW or MIN (*default NONE*).

NOTE: Items not described are common in all alarms menus, see chapter *1.3.2 - Common items description.*

1.3.4.2 - Coolant



- **Sensor:** sets the probe type according to your electrical installation. Options available are:

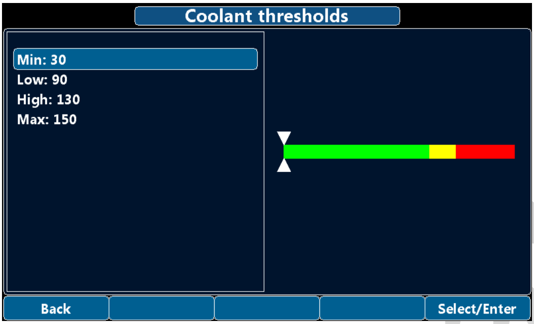
Menu Label	Description
NONE	Disable the gauge
P1K	PT1000 sensor
VDO (*Default*)	Rotax VDO 323-057 150°C

- **Temperture unit:** as in chapter *1.3.2 - Common items description*. Option available are *°C* or *°F* (*default °C*).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 30*).

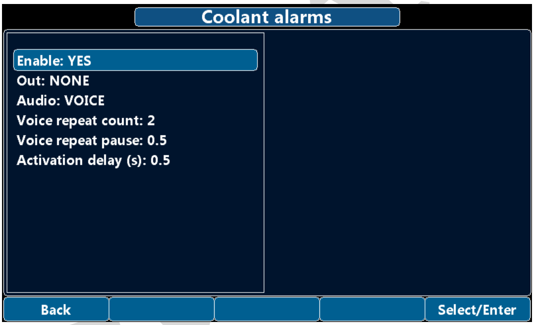
Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



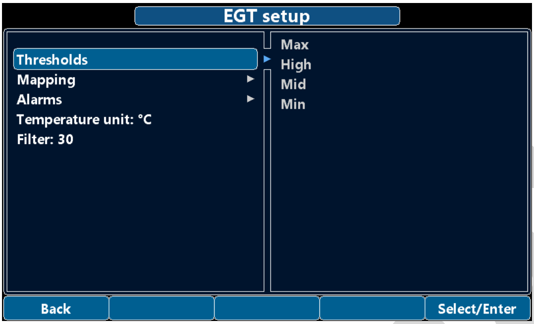
Alarms

Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold.



NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

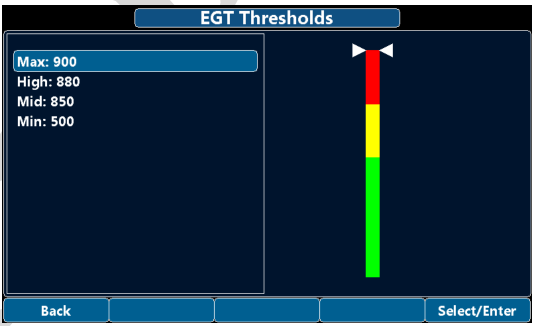
1.3.4.3 - EGT



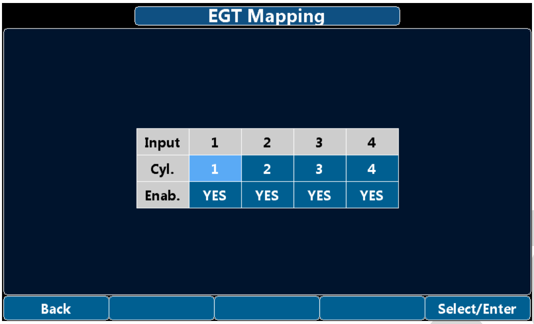
- **Temperture unit:** as in chapter *1.3.2 - Common items description*. Option available are *°C* or *°F* (*default °C*).
- **Filter:** as in chapter *1.3.2- Common items description* (*default 30*).

Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



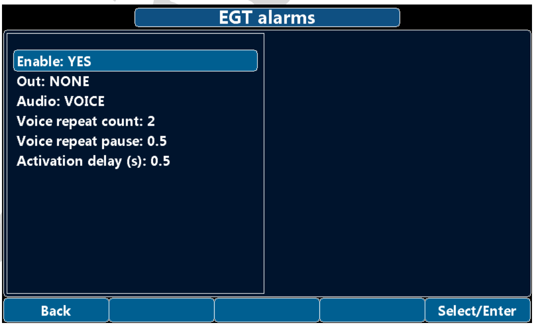
Mapping



NOTE: Like the Mapping function of CHTs explained on page 20.

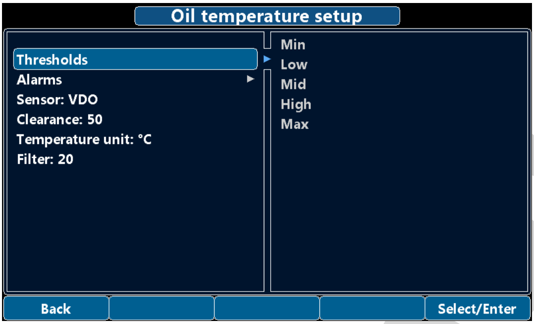
Alarms

Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold.



NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

1.3.4.4 - Oil temperature



- **Sensor:** sets the probe type according to your electrical installation. Options available are:

Menu Label	*Description*
NONE	Disable the gauge
VDO (*Default*)	Rotax VDO 323-057 150°C
JAB	Preinstalled sensor on Jabiru
P1K	PT1000 sensor

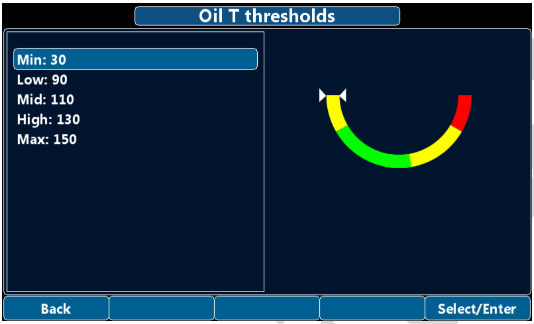
- **Clearance:** assigns the temperature above which the ready motor condition can be triggered (*defaut 50°C - 122°F*).

- **Temperture unit:** as in chapter *1.3.2 - Common items description*. Option available are *°C* or *°F* (*default °C*).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 20*).

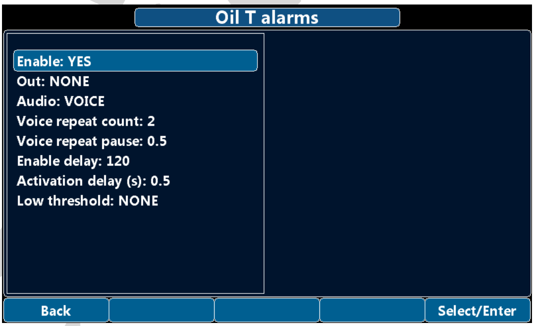
Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



Alarms

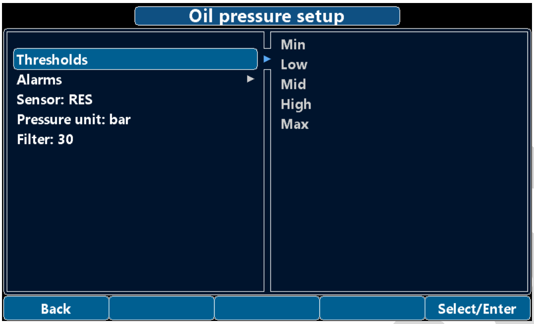
Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold or drop below the *Low threshold.*



- **Low thresholds:** select which thesholds will trigger low temperature alarm. Option available are NONE (disable the low temperaure alarm), LOW or MIN (*default NONE*).

NOTE: Items not described are common in all alarms menus, see chapter *1.3.2 - Common items description.*

1.3.4.5 - Oil pressure



- **Sensor:** sets the probe type according to your electrical installation. Options available are:

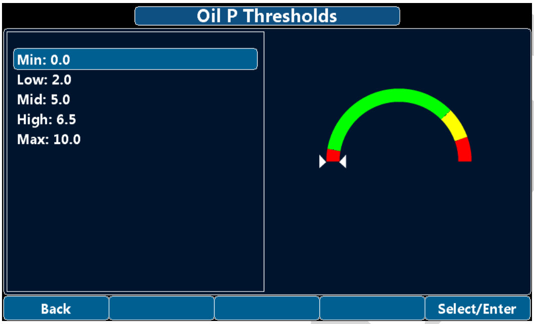
Menu Label	*Description*
NONE	Disable the gauge
RES (default)	Resistive sensor usually installed on Rotax 10bar fullscale
4-20	Sensor with 4-20mA current loop

- **Pressure unit:** as in chapter *1.3.2 - Common items description*. Option available are *bar* or *psi* (*default bar*).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 30*).

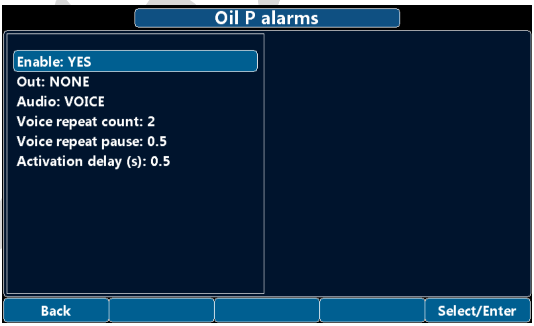
Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



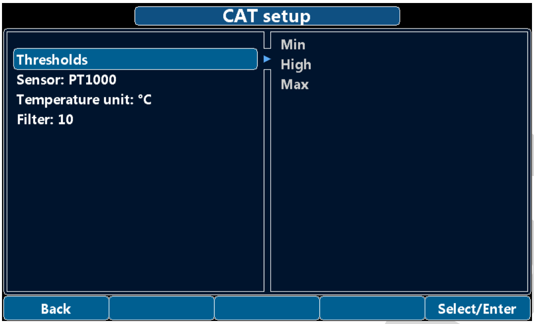
Alarms

Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold or drop below the *Low* threshold.



NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

1.3.4.6 - CAT



- **Sensor:** sets the probe type according to your electrical installation. Options available are:

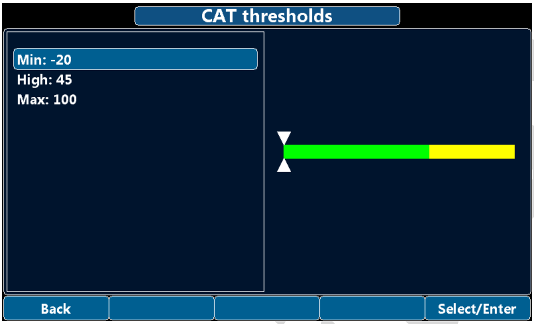
Menu Label	*Description*
NONE	Disable the gauge
PT1000	PT1000 sensor

- **Temperture unit:** as in chapter *1.3.2 - Common items description*. Option available are °*C* or °*F* (*default* °*C*).

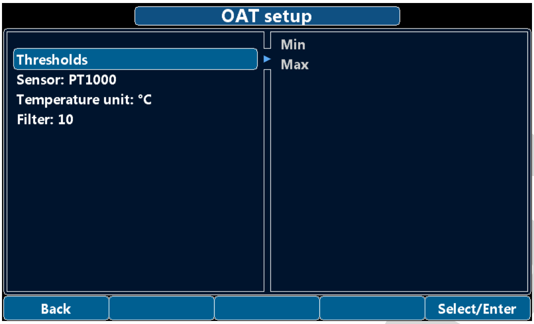
- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).

Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



1.3.4.7 - OAT



- **Sensor:** sets the probe type according to your electrical installation. Options available are:

Menu Label	*Description*
NONE	Disable the gauge
PT1000	PT1000 sensor

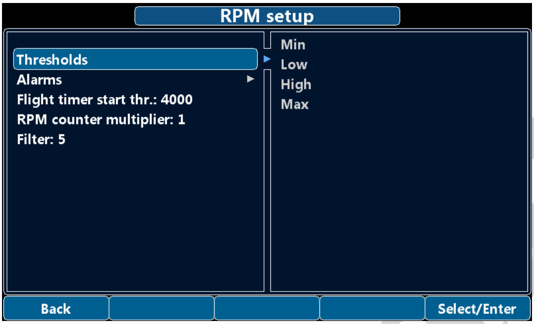
- **Temperture unit:** as in chapter *1.3.2 - Common items description*. Option available are °C or °F (*default* °C).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).

Thresholds

Assigns the outer limits of the indicator. (*Min and Max*)

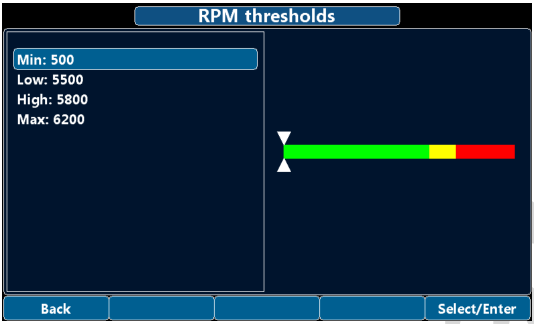
1.3.4.8 - RPM



- **Flight timer start thr:** the flight timer start automatically when the engine's RPM meets or exceeds this parameter for 30 seconds (*default 4000*).
- **RPM counter multiplier:** this is the number of pulses the sensor counts for each revolution of the engine. This value doesn't affect the RPM calculation if the data is read from an ECU (*default 1*).
- **Filter:** as in chapter *1.3.2- Common items description* (*default 5*).

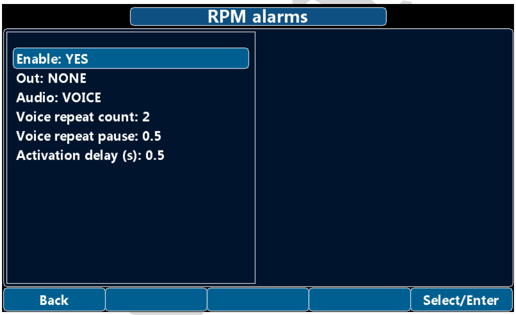
Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



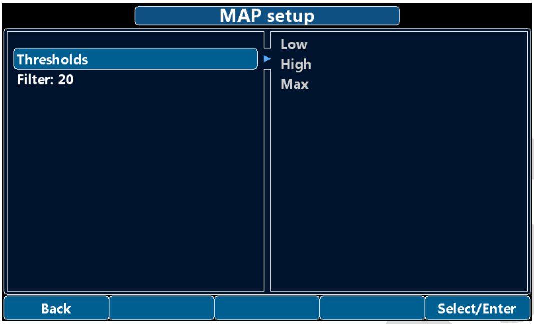
Alarms

Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold.



NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

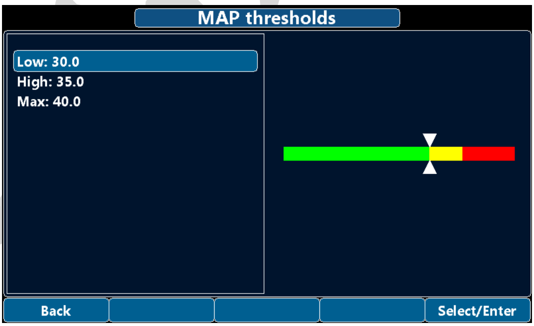
1.3.4.9 - MAP



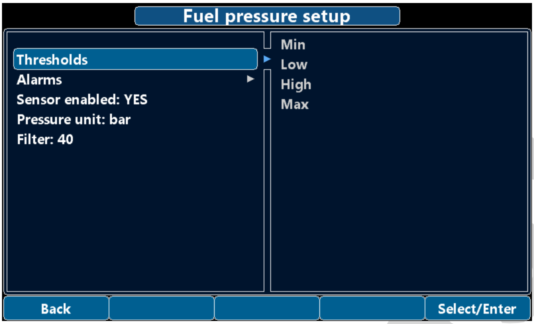
- **Filter:** as in chapter *1.3.2- Common items description* (*default 20*).

Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



1.3.4.10 - Fuel pressure



- **Sensor enabled:** enable or disable reading of the sensor.

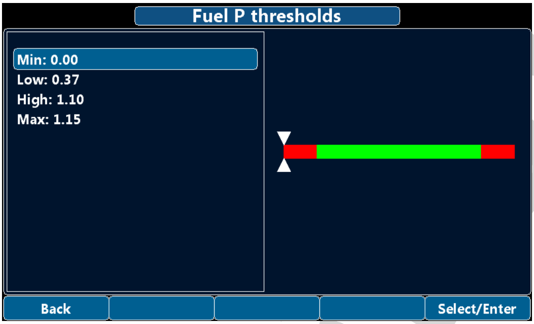
NOTE: The fuel pressure transducer+fitting is supplied by *Flybox cod. 601041*.

- **Pressure unit:** as in chapter *1.3.2 - Common items description*. Option available are *bar* or *psi* (*default bar*).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 40*).

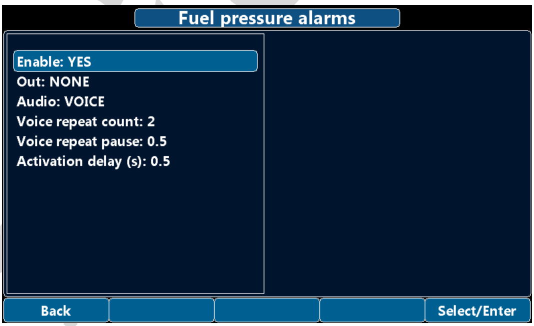
Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



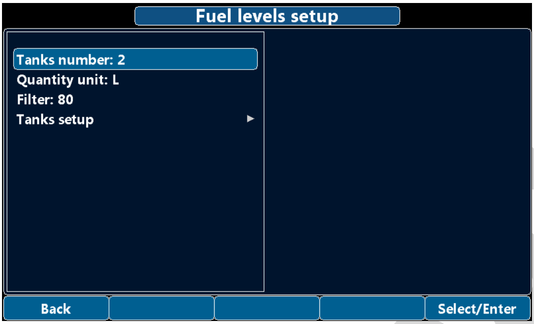
Alarms

Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold or drop below the *Low* threshold.



NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

1.3.4.11 - Fuel levels

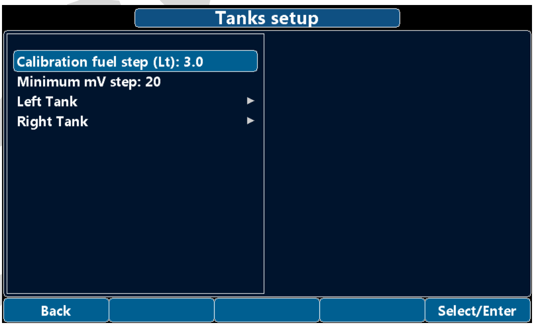


- **Tanks number:** set the number of fuel level sensors installed and connected to *Eclipse NG.* Settings zero will disable the indication (*default 2*).

- **Quantity unit:** as in chapter *1.3.2 - Common items description*. Option available are *L* or usg (*default L*).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 80*).

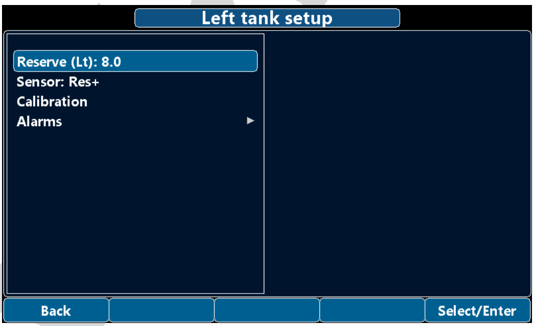
Tanks setup



- **Calibration fuel step:** with this parameter it's possible to choose the fuel quantity to add at each calibration step. Choose a proper value considering the tanks capacity and how many calibration steps you want to execute. For example with a 40 liters tank and *Calibration fuel step* set to 2 it's required 40 / 2 = 20 calibration steps. Consider also that the maximum number of calibration steps that is possible to store in memory for every tank is 50. The *Calibration fuel steps* parameter is used for all the tanks calibrations, don't modify it once you have choosed a value (*default 3L*).

- **Minimum mV step**: minimum thresold to detect fuel sensor movements (*default 20*, <u>it is preferable to leave this value unchanged</u>).

Selecting the *Left tank*, *Main tank* or *Right tank* menu items takes you to the individual tank settings submenus. The menu items are the same for all tanks, so to avoid repetition only one of the three will be explained.



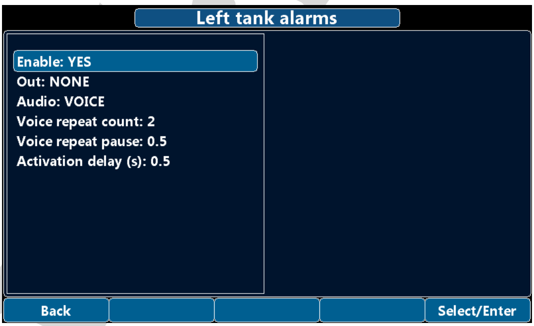
- **Reserve:** set the amount of fuel below which is activated the alarm of low fuel level for the selected tank (*default 8L*).

- **Sensor**: selects the type of level sensor. Option available are:

Menu Label	*Description*
Res+ (default)	Resistive fuel sensors that increase resistance as you add fuel.
Res-	Resistive fuel sensors that decrease resistance as you add fuel.
Cap	Capacitive with output between 0 and 5 volts.

Alarms

Configure the measurement checking system to trigger an alarms if the measure drop below the *Reserve* value.



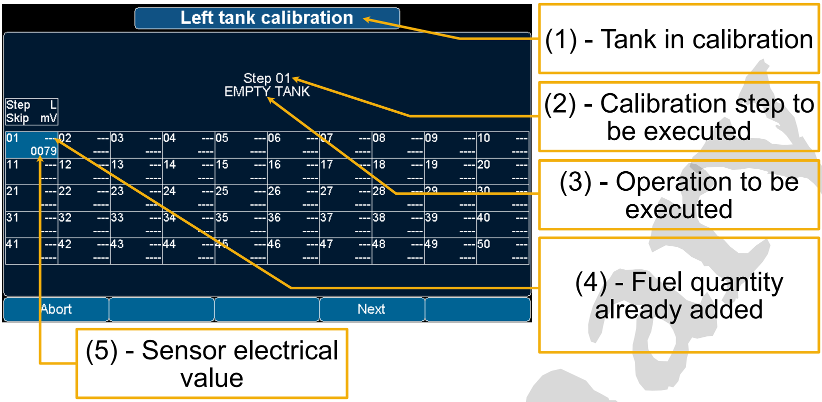
NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

Calibration

NOTE: If a calibration of the selected tank has never been done. The table will be all blank as in the image.

NOTE: Calibration must be performed with the aircraft in flight attitude so you will need to raise or lower the tail depending on whether it is, a taildragger or a tricycle. Empty the tank so that only the unusable fuel remain in the tank. To reach the maximum accuracy in the calibration, It's important that the fuel quantity is exactly measured. A good practice to make the float stabilize on the fuel is to give a shake to the plane. This can sometimes overcome the friction of some floats that tend to be sticky. Calibration is divided into several calibration steps, in each step a predetermined amount of fuel (x liters/gallons) will be added to the tank.

Press *Start* to begin a new calibration, following information will appears.



NOTE: Before executing the following procedure prepare the aircraft with a normal angle of attack and mantain it for all the calibration duration.

1. EMPTY TANK: Drain the tank such that only the fuel unusable remain in the tank. Wait until the indication (5) is stable and click on *Next*.

2. Add to the tank the indicated fuel quantity (*Calibration fuel step* value), in this example it's required to add 3 liters of fuel:

NOTE: It's important that the fuel quantity is exactly measured, to reach the maximum accuracy in the calibration. Verify that the indication (5) of the second cell is stable and click on *Next.*

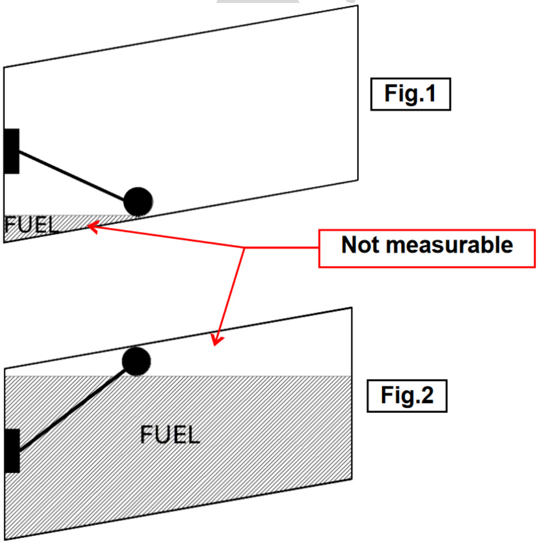
3. Repeat step number 2 until tank is completely filled.

4. TANK FILLED: click on *Next* to confirm the last calibration step and then click on *End* to end the calibration. (When asked on display *END CALIBRATION ARE YOU SURE?* choose *Yes*). If you wish to know the tank capacity read the indication (4) of the last step on the calibration summary table. Calibration for the selected tanks is now completed. It's recommended to write down on paper the data.

NOTE: A common problem for many fuel level sensors is that they can't completely measure the tank capacity, so one or both of this conditions can occur:

- As you add fuel to an empty tank it takes a certain amount of fuel before the fuel sensor starts moving from the bottom.

- As you drain fuel to a filled tank it takes a certain amount of fuel before the fuel sensor starts moving from the top.



NOTE: <u>This is not a problem of the instrument but a situation that can occur if the sensor travel does not cover the entire fuel travel from botton to top.</u>

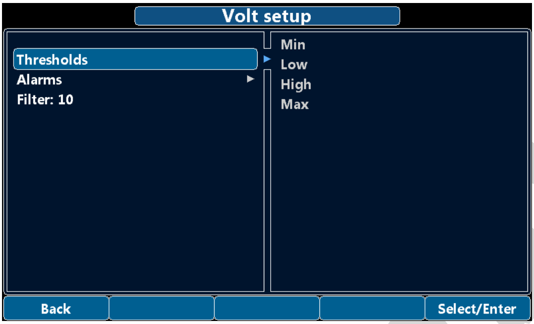
If one of these conditions occurs during the calibration, *Eclipse NG* notices that the fuel sensor doesn't produce an electrical change and asks the user if fuel is already added for that calibration step:

SMALL mV CHANGE
CONFIRM FUEL ALREADY ADDED ?

If you are sure to have already added the fuel, confirm on *YES* otherwise press *NO* to go back to previous calibration step.

NOTE: Consider that all fuel additions that will not give any sensor movement will not be counted.

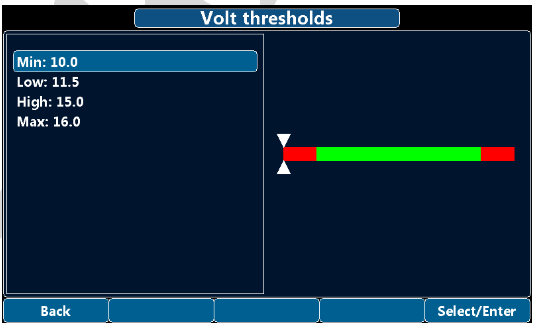
1.3.4.12 - Volt



- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).

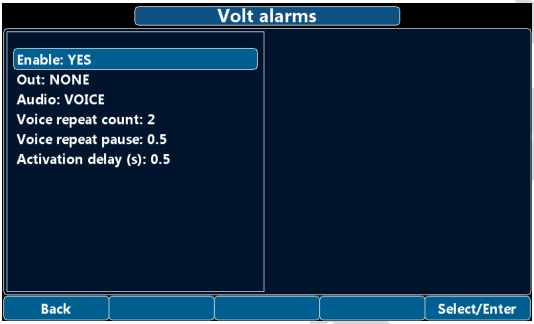
Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range).



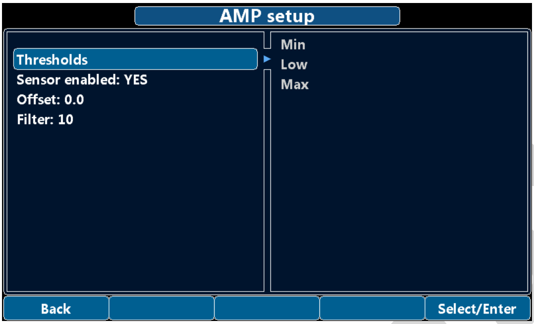
Alarms

Configure the measurement checking system to trigger an alarms if the measure exceed the *High* threshold or drop below the *Low* threshold.



NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

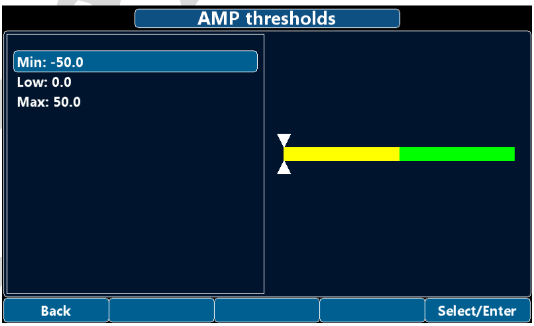
1.3.4.13 - AMP (Ammeter)



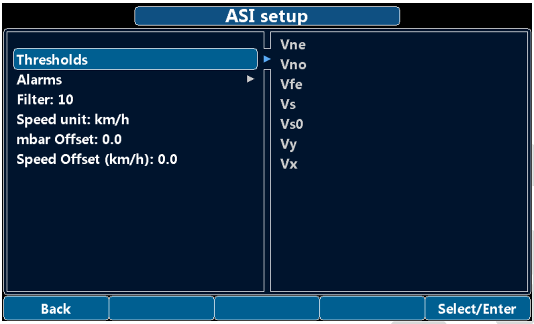
- **Sensor enable:** enables or disables the visibility of the gauge on the display (*deafult YES*).
- **Offset:** assigns the offset value when calibrating the current sensor. Refer to installation manual for the calibration procedure.
- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).

Thresholds

Assigns the outer limits of the indicator and the ranges of the various thresholds (example yellow range, red range)



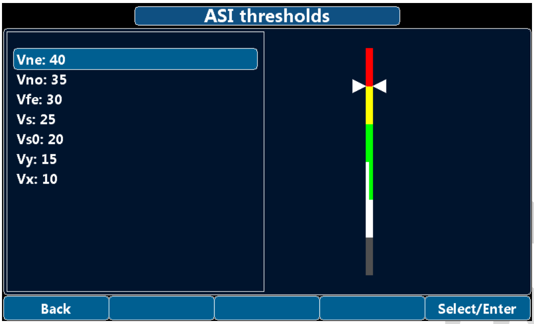
1.3.4.14 - ASI (Air Speed Indicator)



- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).
- **Speed unit:** as in chapter *1.3.2 - Common items description*. Option available are *km/h, kts* or *mph* (*default km/h*).
- **mbar Offset:** corrects the pressure value read by the sensor. Use if over time the value read deviates from 0.
- **Speed Offset:** corrects the indication read on the anemometer.

Thresholds

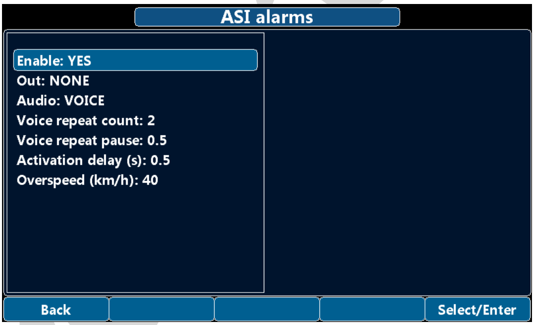
Assigns the characteristic speeds of the aircraft. These values affect the ranges indicated on the anemometer.



CAUTION: the values set should refer to those of your own aircraft, indicated in the POH.

Alarms

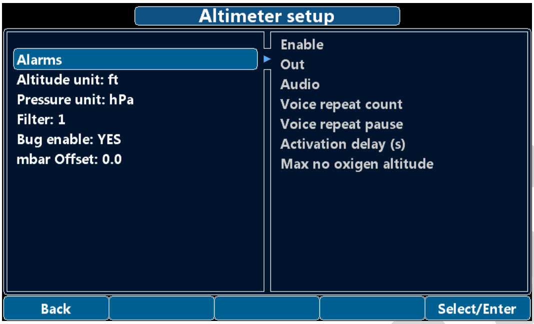
Configure the measurement checking system to trigger an alarms if the measure exceed the *Overspeed* value.



- **Overspeed:** speed above which the alarm is triggered.

NOTE: Items not described are common in all alarms menus, see chapter *1.3.2 - Common items description.*

1.3.4.15 - ALT (Altimeter)



- **Altitude unit:** as in chapter *1.3.2 - Common items description*. Option available are *ft* or *m* (*default ft*).

- **Pressure unit:** as in chapter *1.3.2 - Common items description*. Option available are *hPa or inHg* (*default hPa*). This value refers to the QNH.

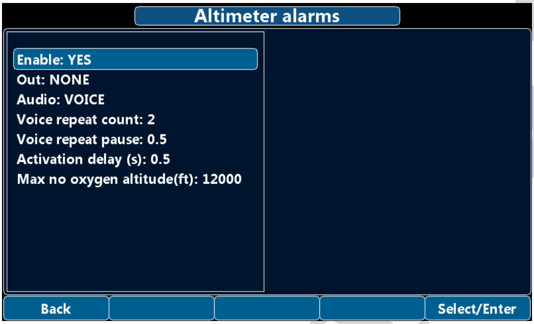
- **Filter:** as in chapter *1.3.2- Common items description* (*default 1*).

- **Bug enable:** enable or disable the visibility of the bug on the altimeter tape (*default YES*).

- **mbar Offset:** corrects the atmospheric pressure value shown on the right side of the display. Use a reliable measuring instrument to correct the reading. Change the value until the value shown on the display matches that of the reference instrument.

Alarms

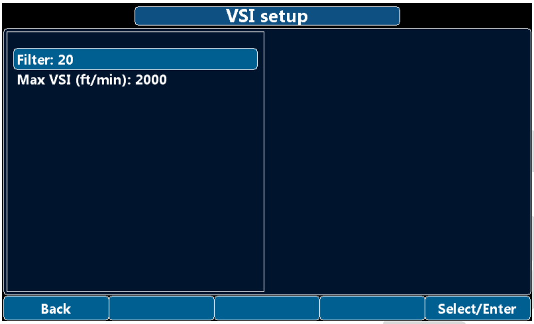
Configure the measurement checking system to trigger an alarms if the measure exceed the *Max no oxygen altitude* value.



- **Max no oxygen altitude:** altitude above which the alarm is triggered. The value refers to the maximum height at which the engine has no power decays. <u>Refers to engine manual to set the correct value</u> (*default 12000 ft*).

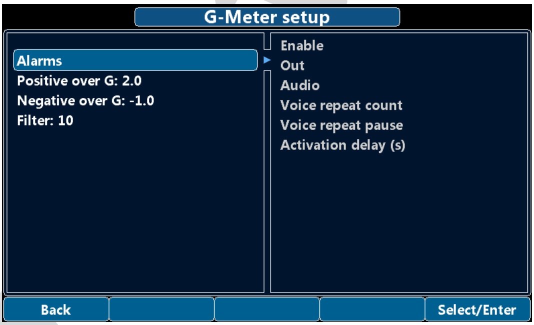
NOTE: Items not described are common in all alarms menus, see chapter *1.3.2 - Common items description.*

1.3.4.16 - VSI



- **Filter:** as in chapter *1.3.2- Common items description* (*default 20*).
- **Max VSI:** sets the limit of the indicator (*default 2000*).

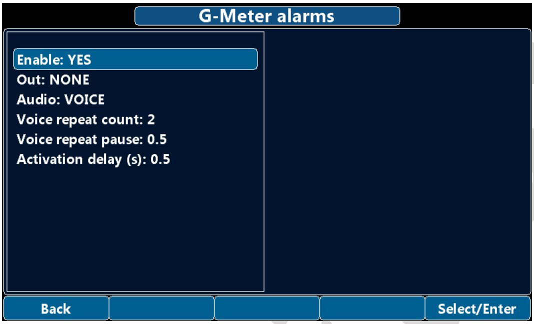
1.3.4.17 - G-Meter



- **Positive over G:** positive over G alarm trigger threshold (*default 2.0*).
- **Negative over G:** positive over G alarm trigger threshold (*default -1.0*).

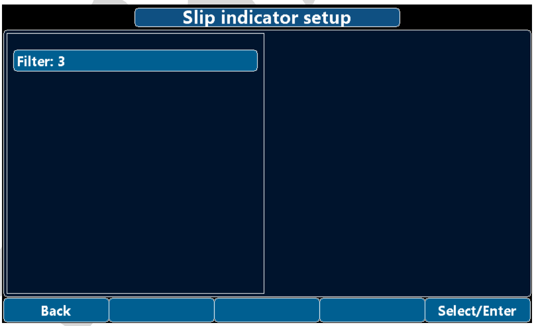
- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).

Alarms



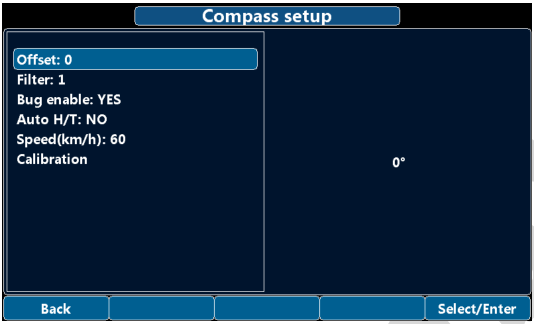
NOTE: Items are common in all alarm menus, see chapter *1.3.2 - Common items description.*

1.3.4.18 - Slip indicator



- **Filter:** as in chapter *1.3.2- Common items description* (*default 3*).

1.3.4.19 - Compass



- **Offset:** corrects degrees indicated on the compass.
- **Filter:** as in chapter *1.3.2- Common items description* (*default 1*).
- **Bug enable:** enable or disable the visibility of the bug on the compass tape (*default YES*).
- **Auto H/T:** enable or disable the automatic switch between magnetic heading and tracking from GPS (*default NO*).
- **Speed:** set the threshold to switch magnetic heading and tracking. If the IAS exceed this value it automatically switch from magnetic heading to tracking, only if a GPS is connected and is receiving valid data.

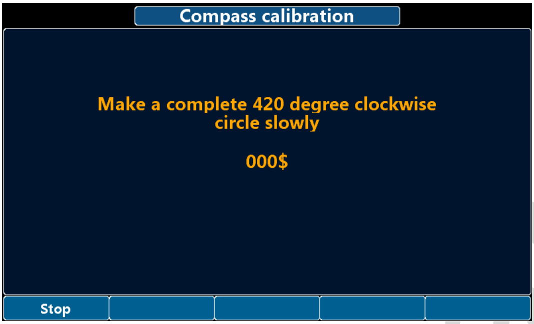
Calibration

Before using *Eclipse NG* in flight it's necessary to calibrate the magnetic sensors integrated in the instrument.

The heading readings is affected by magnetic field: to ensure accuracy it's necessary to perform correctly the calibration steps indicated below. Magnetic field are generated for example by ferro magnetic materials (iron, ferrites) or by large electric current in cables. The calibration can compensate for all static magnetic fields.

After completing the installation of your *Eclipse NG*, perform the calibration following this steps:

- Turn on the engine and go in a place far from possible magnetic fields (metallic shed, concrete floors with metal armatures, etc..) and where is possible to execute more turn with the aircraft (on the ground).
- Turn on all the electric load usually used in flight.
- Press the *Start* button.
- Wait the indication *MAKE A 420 DEGREE CLOCKWISE CIRCLE SLOWLY* on the display then start, with the aircraft on ground, a continuous slow circular movement toward right.



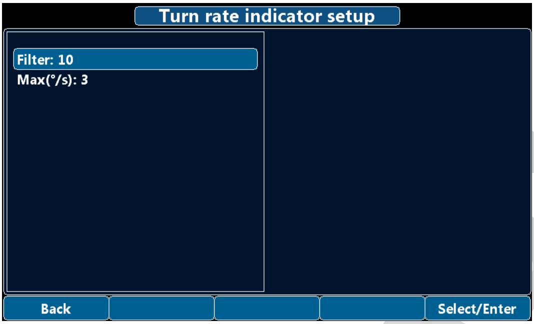
- Continue the slow circular movement: the calibration end automatically when the number reach a value of 420 and the indication *CALIBRATION DONE!* appear on the display.

IMPORTANT: To complete the turn required for the calibration you must take from 1 to 2 minutes.

- If you want to stop the calibration before the end without saving the calibration data press the button *Stop.*

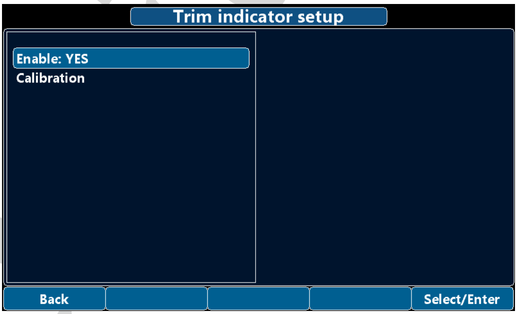
- After completing the calibration execute this check: with the Eclipse NG displaying the heading turn the aircraft exactly at North, South, West and East verifying the correct indication on display.

1.3.4.20 - Turn rate indicator



- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).
- **Max(°/sec):** sets the full scale of the turn rate indication, from 3 to 10 degrees per seconds (*default 3*).

1.3.4.21 - Trim indicator



- **Enable:** enable or disable the indicator (*default YES*).

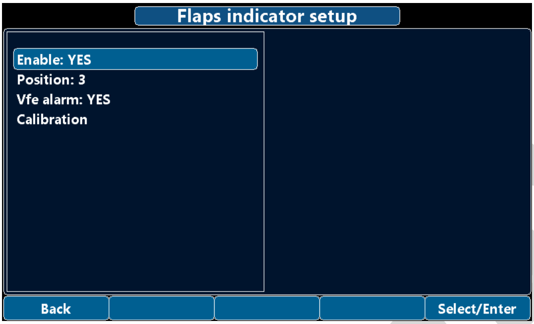
Calibration

Perform the following steps to calibrate trim position indicator:

- Press *Start* to begin calibration.
- Move trim to maximum nose up then press *Next*.
- Move trim to neutral position then press *Next*.
- Move trim to maximum nose down then press *Done*.

NOTE: on the right side of the display is always visible the input value. If the value doesn’t change during calibration it is possible that an electrical issue is present.

1.3.4.22 - Flaps



- **Enable:** enable or disable the indicator (*default YES*).
- **Position:** sets the number of flaps positions 2, 3 or 4 (*default 3*).
- **Vfe alarm:** enable or disable the alarms when flaps are extended and the IAS exceed Vfe (*default YES*).

Calibration

NOTE: the calibration steps may be different for intermediate steps depending on the number of positions. <u>Read carefully indications on display.</u>

Perform the following steps to calibrate flaps position indicator.

- Press *Start* to begin calibration
- Set flaps to retracted position then press *Next*.
- Set flaps to first position then press *Next* (*only if the position value is 3 or 4*).

- Set flaps to second position then press *Next (only if the position value is 4*)
- Set flaps to full extended position then press *Done.*

NOTE: on the right side of the display is always visible the input value. If the value doesn't change during calibration it is possible that an electrical issue is present.

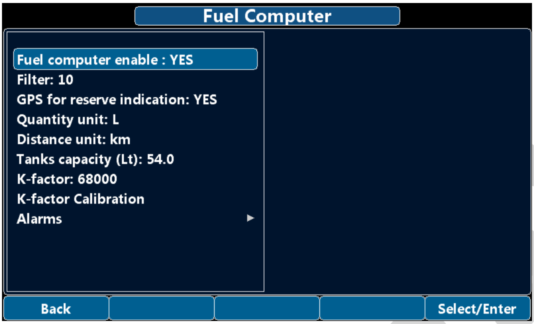
1.3.4.23 - Landing gear

- **Enable:** enable or disable the indicator (*default YES*).
- **Alarm trigger:** sets the trigger function for the gear down alarm.

Menu Label	Alarm trigger description
NONE	No alarm active
SPEED (default)	Speed below *GD minimum speed* and gears up
FLAPS	Flaps extended and gears up

- **GD minimum speed:** sets the speed threshold if the alarm trigger is set to SPEED (*default 0*).
- **Gear down at:** sets if the input for the switch must be at 0 or 12V to identify gear down position (*default 12V*).

1.3.5 - Fuel computer



- **Fuel computer enable:** enable or disable the fuel computer function, this will affect also the startup screen (*default YES*).

- **Filter:** as in chapter *1.3.2- Common items description* (*default 10*).

- **GPS for reserve indication:** enable or disable the use of GPS data from RMB sentence for the calculation of the Reserve value (*default YES*).

- **Quantity unit:** as in chapter *1.3.2 - Common items description*. Option available are *L* or *usg* (*default L*).

- **Distance unit:** as in chapter *1.3.2 - Common items description*. Option available are *km* or *NM* (*default km*).

- **Tanks capacity:** sets the total capacity on-board as the sum of all the usable fuel in all tanks (*default 0*).

- **K-factor:** the K-factor of a fuel flow transducer is the number of electric pulses for 1 gallon of fuel flown (if you have the K-factor in liters you must multiply this value by 3.78 before set *K-factor* parameter in the instrument). Make sure about fuel flow transducer compatibility of the electrical signals of amplitude and frequency and follows the manufacturer instructions to set the right *K-factor* value. The *K-factor* can be manually modified or automatically calculated with the *K-factor calibration* function. It's recommended also to execute the *K-factor* calibration as soon as possible to have the maximum accuracy.

K-factor calibration

NOTE: it's recommended to perform the calibration right after installing the instrument. Not necessary if data is provided by the ECU.

1. With the aircraft in level attitude, fill the tank/s of fuel; note that in the step #4 it's required to refill the tank/s at the exact level reached here.

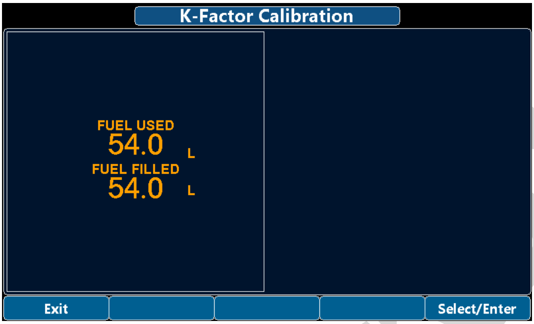
2. Turn-on the instrument and select ***FILLED*** when asked for the fuel quantity.

3. Burn at least 1/2 of fuel in the tank/s: a greater amount of burned fuel will increase the accuracy, and you can do this step in more flights: at the beginning of each flight you must not add fuel in the tank/s and you must select ***NO REFUEL*** when asked after turning on the instrument.

4. Fill the tank/s with the exact same level reached in the step#1, accurately measuring the quantity of fuel added in the tank/s.

5. Turn on *Eclipse NG* and select ***NO REFUEL*** (even though you have refilled it's required to select ***NO REFUEL***).

6. Enter *menu→Fuel Computer→K-factor Calibration*, the following screen will appear:



7. In the FUEL FILLED field, now insert the exact quantity of fuel you have added and measured in step #4; probably it doesn't correspond exactly to the FUEL USED because this is the measurement from the transducer not yet calibrated and it's showed for reference only. To insert the value rotate the knob then press on *Enter* to calculate the new value.

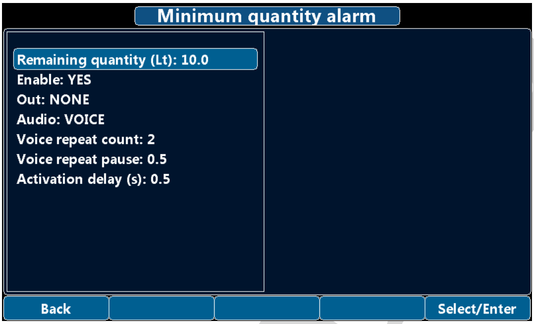
8. As soon as confirmed, the display will briefly show the newly calculated K-factor and return to the Fuel Computer menu. The transducer is now calibrated and the K-factor is automatically stored in memory.

During later refuelling, it will be important to check that the fuel computer indication is correct. If the indication is very far from reality you can re-calibrate or manually change the *K-Factor.*

Alarms

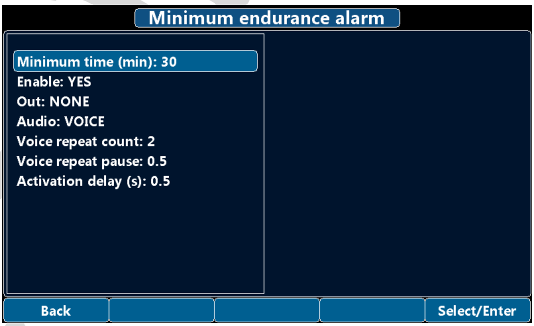
Configure the measurement checking system to trigger alarms for *Minimum quantity*, *Minimum time* and *Balance* conditions.

Minimum quantity



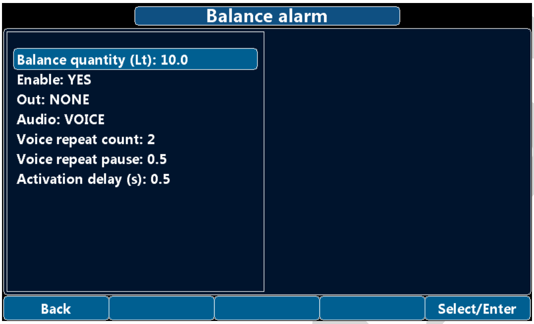
- **Remaining quantity:** sets the fuel quantity for the *Minimum quantity alarm*. When the remaining quantity is below this setpoint, the alarm is activated.

Minimum time



- **Minimum time:** sets the minimum time, in minutes, for the *Minimum time*. When the endurance time is below this setpoint the alarm is activated.

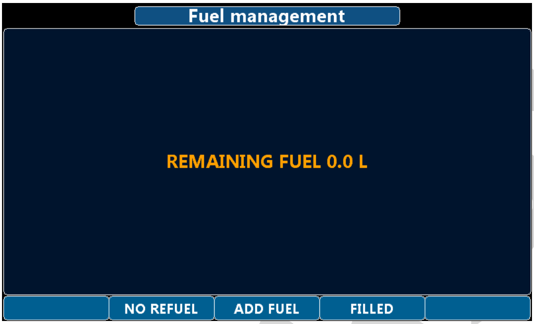
Balance



- **Balance quantity:** sets the fuel quantity for the *Balance alarm*. Every time the quantity of fuel used equals this value, *Eclipse NG* will activate an alarm showing *TANK SWITCH* on the display. This function is useful to keep balanced two wing tanks, switching from one to the other after using a certain quantity of fuel.

NOTE: Items not described are common in all alarms menus, see chapter *1.3.2 - Common items description.*

If the Fuel Computer function is enabled, at every startup of the instrument you will be asked if refueling has been done, one the following options must be selected:



- **NO REFUEL:** Select this option if you have not refuelled the tank.
- **ADD FUEL:** Select this option if you have added fuel to the tank(on the next screen that appears you can insert the exact amount of fuel added).
- **FILLED:** Select this option if you have filled the tank; the display will show the quantity that has been added to reach the full level. Before using this option you must have already set the tank/s capacity in the fuel computer setup.

NOTE: If you need to correct a wrong fuel quantity add, select *ADD FUEL* and insert a negative value.

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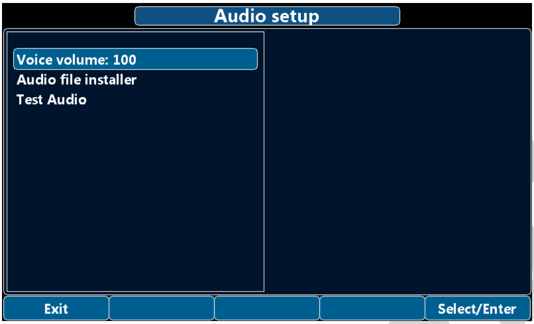
1.3.6 - Audio

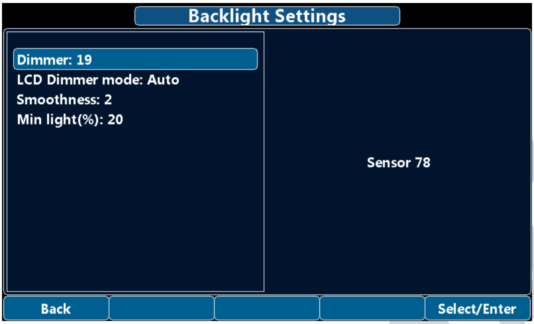


- **Voice volume:** increase or decrease the volume of the audio output.

- **Audio file installer:** start the audio package installer. Vocal alarms are already pre installed in *Eclipse NG*, this function is needed only if an audio package update is necessary.

- **Test Audio:** used to play an aural message. This can be usefull to verify if the connection with the intercom has been properly made.

1.3.7 - Backlight



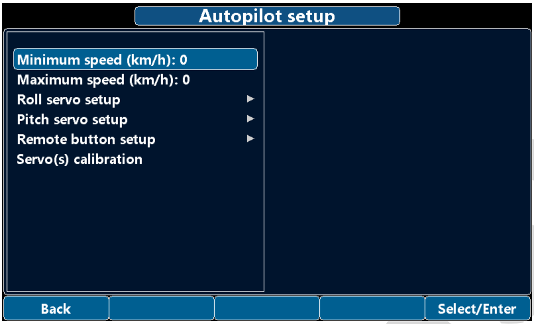
- **Dimmer:** sets manually the display brightness.

- **LCD Dimmer mode:** sets the way to change display backlight. Options are *Auto* or *Manual (default)*. *Manual* mode allow to vary the light intensity by changing the *Dimmer* paramater.

- **Smoothness:** sets how fast the backlight changes when there is a variation of light on the sensor. It has a range from 1 to 3 *(default 2).*

- **Min light(%)**: sets the minimum backlight when the environment is dark. It has a range from 1 to 20 *(default 20).*

1.3.8 - Autopilot

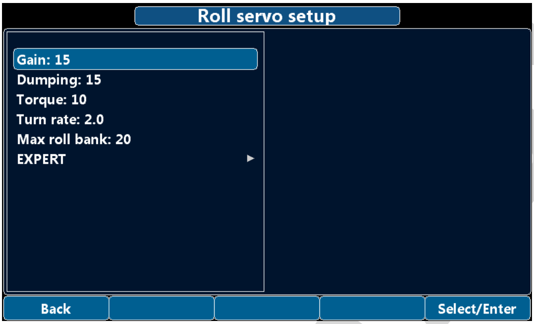


NOTE: the autopilot system measures the airspeed and allows the pilot to set the minimum and maximum operating speed to ensure that the aircraft is in safe conditions when the autopilot is engaged.

- **Minimum speed:** sets the minimum airspeed at which the autopilot will fly the aircraft. The autopilot cannot be engaged at airspeed below Minimum speed, with the exception of 0 for allowing ground testing (for *Eclipse NG IFIS* the engine also must be turned off for ground testing). With autopilot engaged, if the airspeed drops below the minimum, it enters to an airspeed hold mode, to restore and maintain approximately the minimum airspeed. Minimum speed should be at least 20% above the Vfe of the aircraft.

- **Maximum speed:** Select the maximum airspeed at which the autopilot will fly the aircraft. With autopilot engaged, if the airspeed rises above the maximum, it enters to an airspeed hold mode, to restore and maintain approximately the maximum airspeed. The choice of the Maximum speed value must be made according to the characteristics of the aircraft, it should be below the Vne speed of the aircraft but above the normal cruise speed. Maximum speed parameter cannot be set to a value above 95% of Vne so it should first checked the correctness of the ASI speeds set.

Roll servo setup



- **Gain:** sets how fast or slow the autopilot responds to deviations between commanded and actual heading/ tracking (*default 15*).

- **Dumping:** reduces control oscillations due to turbulence (*default 15*).

- **Torque:** sets the desired torque of the servo when engaged. A correct value must be strong enough to give a fairly good control authority to the servos, but not so strong as to be difficult to override with the control stick (*default 10*).

- **Turn Rate:** sets target rate of turn when autopilot is engaged (*range 0.5~6.0 default 2.0°/s*).

- **Max roll bank:** sets the maximum bank angle which the autopilot will not exceed during turns. Use an appropriate bank limit (*range 5~30 default 20°*).

Enter the *EXPERT* submenu allows the setting of the item:

- **XTE Gain:** sets how fast or slow the autopilot responds to distance variation between the aircraft and the active leg (*default 100*). This value affects navigation only if an RMB sentence has been received from an external GPS or a flight plan has been received through Flybox WI-FI dongle.

Pitch servo setup

- **Gain:** sets how fast or slow the autopilot responds to deviations between commanded and actual altitude (*default 10*).

- **Dumping:** reduces control oscillations due to turbulence (*default 30*).

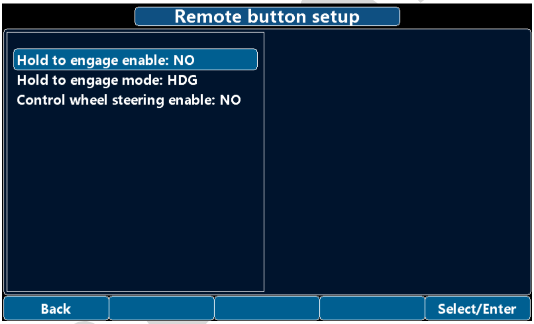
- **Torque:** sets the desired torque of the servo when engaged. A correct value must be strong enough to give a fairly good control authority to the servos, but not so strong as to be difficult to override with the control stick (*default 20*).

- **VS climb rate:** this parameter sets the average vertical speed for autopilot-commanded climbs. The unit of measurement depends on the one set in ALT menu *chapter 1.3.4.15 - ALT* (*range 50~2000 ft/min or 0.2~10 m/s*).

- **VS descend rate:** this parameter sets the average vertical speed for autopilot-commanded descents. The unit of measurement depends on the one set in ALT menu *chapter 1.3.4.15 - ALT* (*range 50~2000 ft/min or 0.2~10 m/s*).

- **Max pitch angle:** sets the maximum pitch angle which the autopilot will not exceed during climbs or descents. <u>Use an appropriate bank limit</u> (*range 5~20 default 10*).

Remote button setup



- **Hold to engage enable:** enable or disable the function to engage the autopilot when the button is pressed for 2 seconds. The default value is *NO* so the remote button will only serve to disengage the autopilot when already engaged.

- **Hold to engage mode:** sets the autopilot engage mode using the remote button.

Menu Label	Description
HDG	Engage the autopilot in horizontal navigation (roll)
ALT	Engage the autopilot in vertical navigation (pitch)
HDG/ALT	Engage the autopilot in both axes

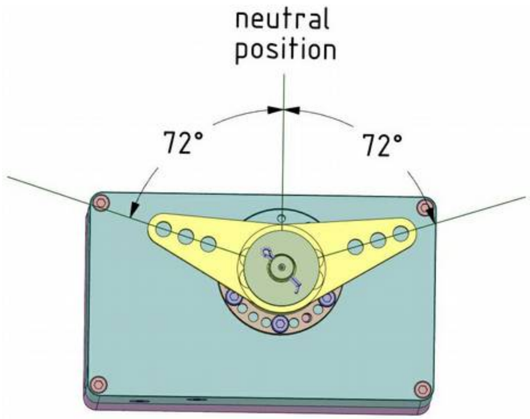
- **Control wheel steering enable:** enable or disable the following auxiliary function of the remote button: during autopilot control, press and hold for more than 2 seconds the button (on the display will be displayed *AP:CWS*) and fly to a new heading and/or altitude, then release the button to engage again the autopilot. By default this function is disabled.

Servo(s) calibration

The calibration procedure is mandatory: if you try to engage the autopilot without first calibrate the servo, *Eclipse NG* will show the error message *AUTOPILOT DISENGAGE! ROLL/PITCH SERVO CALIB*.

THE CALIBRATION MUST ALSO BE REPEATED IN THE EVENT OF ANY CHANGES TO MECHANICAL INSTALLATION OF THE SERVO/S.

NOTE: The *neutral position* term used in the following explanation means the center of the servo arm travel relative to the position of the limiting bracket:



To begin the calibration procedure:

- From the Autopilot setup menu select and enter the Servo(s) Calibration menu. The display shows the word *IDENTIFICATION* or, if instead it was already made a previous calibration, the display shows the data of the previous calibration.

NOTE: If appears the message *NO SERVO(S) FOUND* it means that the servos are not properly connected.

- Press *Start* and follow the onscreen instructions; if you have installed the servos on both axis the complete procedure will be as follows:

1. Center the control stick in neutral position and then press *Next*.

2. Move the control stick to the left limit (without forcing), paying attention to not move it in the pitch axis during the motion. After doing so, the calibration automatically switch to the next step.

3. Center the control stick in neutral position and then press *Next*.

4. Move the control stick to the forward limit (without forcing), paying attention to not move it in the roll axis during the motion. The calibration automatically switch to the next step or, if there's no pitch servo installed, press *Next*.

5. Center the control stick in neutral position and then press *Next*.

6. Move the control stick to the left limit (without forcing). Press *Next* or the remote button to store the position and go to the next step.

7. Move the control stick to the right limit (without forcing). Press *Next* or the remote button to store the position and go to the next step.

8. Move the control stick to the forward limit (without forcing). Press *Next* or the remote button to store the position and go to the next step.

9. Move the control stick to the backward limit (without forcing).Press *Next* or the remote button to store the position and end the calibration.

At the end of the calibration procedure the display briefly shows the confirmation message *Servo Calib Done*.

NOTE: If the message *BAD MECHANICAL INSTALLATION! NOT ENOUGH SERVO TRAVEL* appears it means that the servo is not correctly installed, as the travel of the servo arm is too small to function properly. In this case you should modify the mechanical installation, for example by using an outer hole of the servo arm.

Once finished the calibration you must execute this check (ground based):

- With Eclipse NG on the attitude indicator screen and ACU control unit turned on, insert the autopilot by pressing the *HDG/TRK* button on the ACU. Rotate clockwise the *HDG/TRK* knob (so that the heading bug is at the right of the actual heading) and check that the flight control move as to turn the aircraft right. Rotate counter clockwise the *HDG/TRK* knob (so that the heading bug is at the left of the actual heading) and check that the flight control move as to turn the aircraft left. Check also that the servo pitch does not move.

- Engage the autopilot on pitch axis by pressing the *ALT* button on the ACU. Using the *ALT* knob set the altitude bug to a higher value than the actual altitude and check that the flight control move as to increase the aircraft altitude; set the altitude bug to a lower value than the actual altitude and check that the flight control move as to decrease the aircraft altitude.

If movement direction of one or both servos is reversed it means that the calibration is wrong, so NEVER ENGAGE THE AUTOPILOT IN FLIGHT but repeat the servos calibration procedure and check again.

1.3.8.1 - Flight test and configuration

This sub-chapter gives indication how to calibrate the servo response to match your aircraft flight dynamics. Although flight testing may be carried out in different ways, it's recommended to follow the procedures indicated in the following sub-chapter.

Any test and configuration during flight must be executed in VFR conditions, with good weather and visibility conditions, at an adequate altitude and no traffic or obstacles in the flight path. It's also recommended to have another pilot on board during first flight configuration.

NOTE: In case of need to instantly disengage the autopilot you can use either one of this way:

- Turn off the *ON/OFF* switch on the *ACU* control unit.
- Press shortly the remote button
- Press the *HDG/TRK* button on the *ACU*, if autopilot is in heading/tracking mode, or press the *NAV* button if autopilot is in navigation mode.

These actions should be remembered so that they can be used instinctively in case of difficulty or emergency.

Before starting the first test flight verify once more for safety that all the parameters are correctly set:

- Enter *menu→Autopilot→Roll servo setup*.
- Verify that the *Gain* parameter is set to default value, that is 15.

- Verify that the *Torque*, *Turn rate* and *Max Roll Bank* parameters are configured correctly and consistently for the current installation, as explained in previous chapter *1.3.8 - Autopilot*.

- Press *Back* then enter *Pitch servo setup.*

- Verify that the *Gain* parameter is set to default value, that is 10.

- Verify that the *Torque*, *VS climb rate*, *VS descent rate* and *Max pitch angle* parameters are configured correctly and consistently for the current installation, as explained in previous chapter *1.3.8 - Autopilot*.

1.3.8.2 - Autopilot setup - Roll axis

Autopilot engage and “Gain” parameter set

Start the flight and when in safe condition insert the autopilot by pressing the *HDG/TRK* button on the *ACU* control unit (the led will turn on as confirmation). Note that the autopilot will only hold the current heading by controlling the roll axis, so the pitch axis must be controlled by the pilot; ensure that you are not affecting the roll axis, so that you can determine the autopilot performance.

If the autopilot behavior is sufficiently stable keep it engaged for some minutes and observe the way in which it mantains the heading/tracking:

- If the autopilot deviates heavily from the desired headign/tracking or make very slow adjustments, *Gain* parameter needs to be increased.

- If the autopilot is too aggressive with excessively fast adjustments, *Gain* parameter needs to be decreased.

The *Gain* parameter selects the amount of autopilot activity for a given roll angle error (that is the difference between the desired heading/tracking and the actual heading/tracking). With low *Gain* values (minimum=1) the autopilot system is very slow with few corrections, with high *Gain* values (maximum=40) the autopilot is more “aggressive” with a lot of fast corrections. Above a certain upper limit, however, the system becomes unstable and start to oscillate.

To change the *Gain* parameter:

- Enter *menu→Autopilot→Roll servo setup*.
- Select *Gain* item.
- Rotate the knob to change it then press *Enter* to store new value in memory.

NOTE: any change in value will instantly affect the behavior of the autopilot, it is recommended to make small changes (1 or 2 points).

Heading/Tracking change

This step is used to monitor the behavior of the autopilot during a turn, further optimizing the *Gain* value.

With the autopilot engaged in *HDG/TRK* mode, start an autopilot commanded turn by rotating the *HDG/TRK* knob on the *ACU* control unit.

Repeat again some heading/tracking change, observing the behavior of the autopilot:

- If the autopilot will cause excessive oscillations (fast left/right bank movements) and seems too “aggressive” in the regulation, *Gain* parameter needs to be decreased.

- If the autopilot is too “smooth” and slow to reach the heading/tracking set (or cannot reach it) you need to increase the *Gain* parameter.

The optimal setting depends largely on the flight controls and the type of aircraft, so several flights will be required before an optimal configuration is found. During these flights it will also be possible to learn how the autopilot controls the aircraft.

It will be possible to find an acceptable “Gain” value for both heading-holds and turns in still air; in the case of turbulence, it may be necessary to modify this value (increasing it by a bit).

Check of Turn Rate and Max roll bank

It's possible to check if the values set for the turn rate and for the maximum bank angle are compatible by measuring the time the autopilot takes to complete a turn: for example if in the *Turn Rate* parameter you have set a value of 2°/s, the aircraft must take nearly 45 seconds to complete a 90° turn. If it takes more time it means that the *Max Roll Bank* parameter are set too low, so the autopilot is forced not to exceed this angle and as a result also the turn rate become slower than what set in *Turn Rate* parameter.

Now that all parameters have been checked and configured, it is possible to disengage the autopilot by pressing the *HDG/TRK* button on the *ACU* (the LED will turn off to confirm).

1.3.8.3 - Autopilot setup - Pitch axis

Start the flight and when you are in safe condition, at the desired altitude and trimmed for level flight, insert the autopilot by pressing the *ALT* button on the ACU control unit (the led will turn on as confirmation). Note that the autopilot will only hold the current altitude by controlling the pitch axis, so the roll axis must be controlled by the pilot; ensure that you are not affecting the pitch axis, so that you can determine the autopilot performance.

If the autopilot behavior is sufficiently stable keep it engaged for some minutes and observe the way in which it mantains the altitude:

- If the autopilot deviates heavily from the altitude set or make very slow adjustments, *Gain* parameter needs to be increased.

- If the autopilot is too aggressive with excessively fast adjustments, *Gain* parameter needs to be decreased.

The *Gain* parameter selects the amount of autopilot activity for a given altitude error (that is the difference between the desired altitude and the actual altitude). With low *Gain* values (minimum=1) the autopilot system is very slow with few corrections, with high *Gain* values (maximum=40) the autopilot is more “aggressive” with a lot of fast corrections. Above a certain upper limit, however, the system becomes unstable and start to oscillate.

To change the *Gain* parameter:

- Enter *menu→Autopilot→Pitch servo setup*.
- Select *Gain* item.
- Rotate the knob to change it then press *Enter* to store new value in memory.

NOTE: any change in value will instantly affect the behavior of the autopilot, it is recommended to make small changes (1 or 2 points).

Altitude change

This step is used to monitor the behavior of the autopilot during altitude change, further optimizing the *Gain* value.

With the autopilot engaged in *ALT* mode, start an autopilot commanded altitude change by rotating the *ALT* knob on the *ACU* control unit.

Repeat again some altitude change, observing the behavior of the autopilot:

- If the autopilot will cause excessive oscillations (fast pitch angle movements) and seems too “aggressive” in the regulation, *Gain* parameter needs to be decreased.

- If the autopilot is too “smooth” and slow to reach the altitude set (or cannot reach it), *Gain* parameter needs to be increased.

The optimal setting depends largely on the flight controls and the type of aircraft, so several flights will be required before an optimal configuration is found. During these flights it will also be possible to learn how the autopilot controls the aircraft.

It will be possible to find an acceptable “Gain” value for both altitude-holds and altitude change in still air; in the case of turbulence, it may be necessary to modify this value (increasing it by a bit).

1.3.8.4 - Autopilot operation

Autopilot status indicator

Following indication will appears (in the left bottom corner of the display) when the ACU is turned on:

NOTE: in *NAVx* term, used in the following explanation, “x” could be *GPS* or *WIFI*. This doesn’t affect the behavior of the autopilot but only the source of navigation data.

- **AP:OFF** when autopilot is not engaged.
- **AP:HDG** when autopilot is engaged and follow/holds the magnetic heading.
- **AP:TRK** when autopilot is engaged and follow/holds the GPS tracking.
- **AP:NAVx** when autopilot is engaged and follow a GOTO or flight plan from an external GPS.
- **AP:180** when autopilot is currently in automatic course reversal (180°) mode.
- **AP:ALT** when autopilot is engaged in altitude mode.
- **AP:CWS** when autopilot is currently in “Control wheel steering” mode.

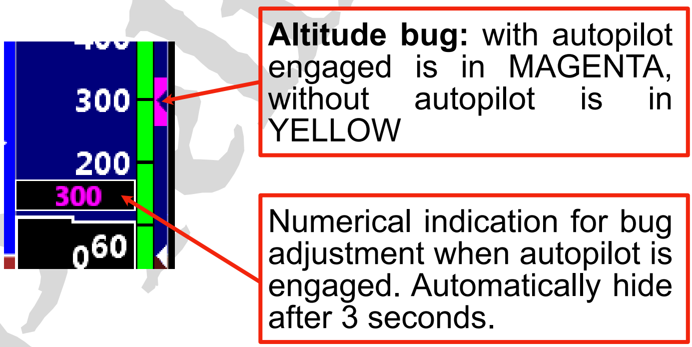
If both servos (roll and pitch) are installed, following indications are also available:

- **AP:HDG/ALT** when autopilot is engaged in both *HDG* and *ALT* mode.
- **AP:TRK/ALT** when autopilot is engaged in both *TRK* and *ALT* mode.
- **AP:NAVx/ALT** when autopilot is engaged in both *NAV* and *ALT* mode.

Altitude bug

The altitude bug is a graphical representation, on the altimeter indicator, of the targer altitude. The bug can be set by turning the *ALT* knob on the *ACU* control unit. While setting the altitude with the *ALT* knob, it also appears a numeric window to allow fine adjustment. This window automatically hide after 3 seconds.

With autopilot engaged the bug color turns from yellow to magenta.

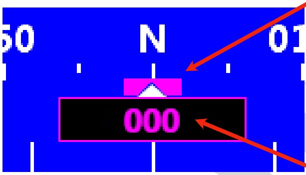


If the bug is set on an altitude outside the indicator area (higher or lower than the values currently displayed by the altitude tape), it appears a numerical indication with an arrow pointing up or down.

Heading/Tracking bug

The heading/tracking bug is a graphical representation on the compass, of the target heading/tracking. The bug can be set by turning the *HDG/TRK* knob on the *ACU* control unit. While setting the heading/tracking with the *HDG/TRK* knob, it also appears a numeric window to allow fine adjustment. This window automatically hide after 3 seconds.

With autopilot engaged the bug color turns from yellow to magenta.



Heading bug: with autopilot engaged is in MAGENTA, without autopilot is in YELLOW

Numerical indication for bug adjustment when autopilot is engaged. Automatically hide after 3 seconds.

1.3.8.5 - Engage/Disengage autopilot

The autopilot system can be engaged in several ways:

- Pressing the *HDG/TRK* button on the *ACU* control unit (the led will turn on).
- Pressing the *NAV* button on the *ACU* control unit (the led will turn on).
- Pressing the *ALT* button on the *ACU* control unit (the led will turn on).
- With the remote button, if installed and enabled.

NOTE: Before to engage the autopilot on both axis, be sure to trim the aircraft for level flight.

The autopilot cannot be engaged if any of the following conditions occurs:

- *ACU* control unit is turned off.
- Faulty communications between *Eclipse NG* and *ACU* or between *ACU* and servos.
- If the airspeed measured is out of the minimum/maximum range (*Minimum speed* and M*aximum speed* parameters).
- A servo reports a fault condition.
- A servo reports a position beyonds its control limits (limits stored during the calibration procedure).
- The attitude indicator of *Elipse NG* reports invalid data.

- The actual bank or pitch angle is out of the maximum.
- Only for *NAV* mode, if no valid data are received or no flight plan/GOTO has been done on the external GPS.

NOTE: A display alert comes when the autopilot cannot engage for any of the above conditions. Press the *F1* button on *Eclipse NG* to cancel this alert.

If engaged, the autopilot will automatically disengage if any of the following conditions occurs:

- The ACU control unit is turned off.
- Loss of communication between Eclipse NG and ACU or between ACU and servos.
- A servo reports a fault condition.
- A servo reports a position beyonds its control limits (limits stored during the calibration procedure).
- The attitude indicator of Eclipse NG reports invalid data.
- Only for NAV mode, if no valid data are received or the flight plan on the external GPS is removed.
- Pilot taking control of the stick and overriding the servos for more than 1 second.

NOTE: A display alert comes when the autopilot cannot engage for any of the above conditions. Press the *F1* button on *Eclipse NG* to cancel this alert.

The autopilot system can be disengaged by the pilot via the following actions:

- If engaged in *HDG/TRK* mode: by pressing the *HDG/TRK* button on the *ACU* control unit (led will turn off).
- If engaged in *NAV* mode: by pressing the *NAV* button on the *ACU* control unit (led will turn off).
- If engaged in *ALT* mode: by pressing the *ALT* button on the *ACU* control unit (led will turn off).
- By briefly pressing the remote button, if installed.
- **Turning off the *ACU* with the *ON/OFF* switch.**
- **Opening the circuit breaker which provides power to the *ACU*.**

CAUTION: the *ACU* control unit **MUST** be turned off during landing and takeoff.

1.3.8.6 - Details of operation

PREFLIGHT CHECK:

Everytime the use the autopilot system is intended, perform the following checks on ground:

1. Move to its limits the flight controls (with autopilot disengaged) and check that full manual control is allowed.

2. Check the servos torque: with the autopilot engaged, manually force the control stick to its limits and check that it's possible to override the force applied by the servos.

CAUTION: <u>if any of the previous checks is not successful, turn off the autopilot via the *ON/OFF* switch on the *ACU* control unit and never turn it on during flight until the problem has been fixed.</u>

Engage autopilot in *HDG/TRK* mode (heading or tracking hold/change)

- Once in flight and with *Eclipse NG* already turned on, turn on the *ACU* control unit via the *ON/OFF* switch.

- Choose between heading or tracking (open popup menu on *Eclipse NG* then press *F3* button).

- Trim the roll and pitch of the aircraft, if present.

- Press the *HDG/TRK* button on the *ACU* control unit (led will turn on) or press for 2 seconds the remote button (if installed and enabled).

- Set the desired heading/tracking by rotating the *HDG/TRK* knob on the *ACU*.
- If the *HDG/TRK* knob is pressed during an autopilot commanded turn, the autopilot will maintain the actual heading/tracking (the heading/tracking bug is centered).

Automatic course reversal

The automatic course reversal mode may be used as an emergency aid to pilot who inadvertently enters IMC conditions and need to execute an immediate course reversal.

- With autopilot engaged in *HDG/TRK* or *NAV* mode, press for 3 seconds the *HDG/TRK* button on the *ACU* to start a counter clockwise course reversal, or press for 3 seconds the *NAV* button to start a clockwise course reversal. During the maneuver the autopilot status indicator will show *AP:180*. After completing the maneuver the autopilot return engaged in the *HDG* or *TRK* mode.
- Course reversal function can be cancelled by pressing the *HDG/TRK* knob. Note that the autopilot remains engaged in the *HDG/TRK* mode.

Engage autopilot in nav mode (flight plan or goto navigation)

- Once in flight and with the *Eclipse NG* already turned on, turn on the *ACU* control unit via the *ON/OFF* switch.
- Set a flight plan or a GOTO into the external GPS.

- Press the *NAV* button on the *ACU* control unit (led will turn on). Now the autopilot willl follow the flight plan or GOTO. When the flight plan is completed or the GOTO has been reached you need to manually disengage the autopilot.

NOTE:

- The autopilot disengages in case of failure or loss of GPS signal; the display will show the message *AUTOPILOT DISENGAGED! NAV DATA TIMEOUT.*

- With autopilot engaged in *NAV* mode, if you press the *HDG/TRK* knob it will be set in *HDG/TRK* mode, centering the heading/tracking bug at the current value; the display will show the message *AUTOPILOT BASIC MODE.*

Engage autopilot in alt mode (altitude hold/change):

- Once in flight and with the *Eclipse NG* already turned on, turn on the *ACU* control unit via the *ON/OFF* switch.

- Trim the aircraft for level flight.

- Press the *ALT* button on the *ACU* control unit (led will turn on) or press for 2 seconds the remote button (if installed and enabled).

- Set the desired altitude by rotating the *ALT* knob on the *ACU*. The autopilot maintain a vertical speed as set in the *VS climb rate* and *VS descent rate* parameters.

- If the *ALT* knob is pressed during an autopilot commanded altitude change, the autopilot will maintain the actual altitude (the altimeter bug is centered on the actual altitude).

Autopilot disengage

- If engaged in *HDG/TRK* mode, press the *HDG/TRK* button on the *ACU* control unit (led will turn off) or press the remote button (if installed).
- If engaged in *NAV* mode, press the *NAV* button on the *ACU* control unit (led will turn off) or press the remote button (if installed).
- If engaged in *ALT* mode, press the *ALT* button on the *ACU* control unit (led will turn off) or press the remote button (if installed).

NOTE: In case of emergency or malfunction, turn off the autopilot via the ON/OFF switch on the ACU control unit or open the circuit breaker which provides power to it.

1.3.8.7 - Autopilot related alarms

The autopilot disengage automatically if it detects any anomaly; at the same time it will show an error message on display and, if enabled, activate the audio and alarm outputs. To reset an alarm press *F1* button on *Eclipse NG*.

The alarm messages that may appear on display are the following:

- **AUTOPILOT DISENGAGED! ACU COM** : appears when communication between *Eclipse NG* and ACU is lost (check wirings) or if you turn off the ACU when autopilot is engaged.
- **AUTOPILOT DISENGAGED! (ROLL) or (PITCH) SERVO COM**: appears when communication between the ACU and the indicated servo (roll or pitch) is lost. Check the wirings.

- **AUTOPILOT DISENGAGED! (ROLL) or (PITCH) SERVO ERROR**: appears in case of failure or malfunction of the indicated servo (roll or pitch). If this message appears repeatedly, contact the manufacturer.
- **AUTOPILOT DISENGAGED! (ROLL) or (PITCH) SERVO SLIPPING**: this message may means that the pilot took control of the control stick OR it can occur in case of strong turbulence, when the force to apply to the flight controls are excessive. If this message appears frequently during normal use of the autopilot, it's recommended to adjust the torque of the indicated servo (roll or pitch).
- **AUTOPILOT DISENGAGED! (ROLL) or (PITCH) SERVO LIMIT**: appears when a servo detects that the control stick is outside the operating limits. Can occur if the pilot force the control stick to the limits or can occur if the pilot try to engage the autopilot when the control stick is close to the limits.
- **AUTOPILOT DISENGAGED! BANK LIMIT**: appears if you try to engage the autopilot when the bank angle of the aircraft is outside the maximum limit.
- **AUTOPILOT DISENGAGED! PITCH LIMIT**: appears if you try to engage the autopilot when the pitch angle of the aircraft is outside the maximum limit.
- **AUTOPILOT DISENGAGED! AIRSPEED LIMIT**: appears if you try to engage the autopilot when the airspeed is outside the minimum or maximum limits.
- **AUTOPILOT DISENGAGED! (ROLL) or (PITCH) SERVO CALIB**: appears if you try to engage the autopilot before completing the servos calibration procedure.

- **AUTOPILOT DISENGAGED! (ROLL) or (PITCH) CLUTCH ERROR**: Appears in case of malfunction of the indicated servo (roll or pitch). If this message appears repeatedly, contact the manufacturer.
- **AUTOPILOT DISENGAGED! NAV DATA TIMEOUT**: Appears when the autopilot does not receive any data from the external GPS. Check that the wiring between external GPS and *Eclipse NG* or check that in *Eclipse NG* is set the correct baudrate for GPS.
- **AUTOPILOT DISENGAGED! NO VALID NAV DATA**: Appears when there is no flight plan or no GOTO set into the external GPS.

1.3.8.8 - Important notices

Never use the autopilot without first conduct satisfactory pre-flight check of the autopilot system and its components. Autopilot operations should be verified for correctness before flight.

After every software update of the *Eclipse NG* or a servos, check the correctness of the setup as explained in sub-chapter 1.3.8.6.

The autopilot system require a correct measurement of the airspeed. Check that the speed indicated by the *Eclipse NG* is correct.

The circuit breaker that powers the *ACU* control unit and therefore the servos must be easily accessible to the pilot and clearly identified so that in case of emergency can be instantly disconnected.

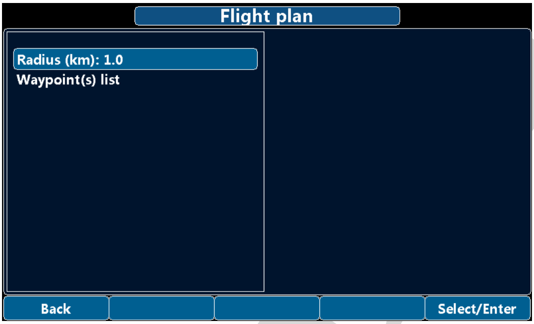
Every pilot that will use the autopilot system must be trained in the use and limitations.

All parts related to the autopilot system must be installed using aviation standards and must comply with safety requirements. All components, including linkages between servos and flight controls, must be accessible for regular pre-flight checks.

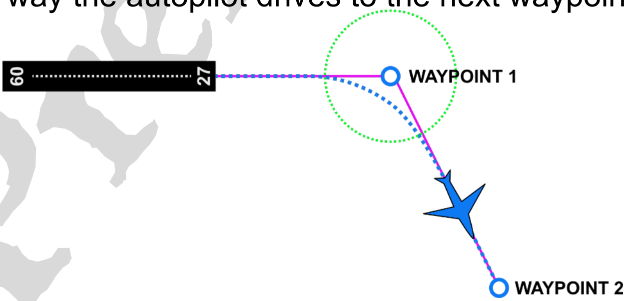
The autopilot system MUST be TURNED OFF during takeoff and landing of the aircraft.

1.3.9 - Flight plan

NOTE: this sub-menu is active only if the *Flybox Connect Wi-Fi activation key* (***cod. 801021***) has been purchased and activated. See chapter *1.3.10.6 - Wi-Fi navigation activation*.

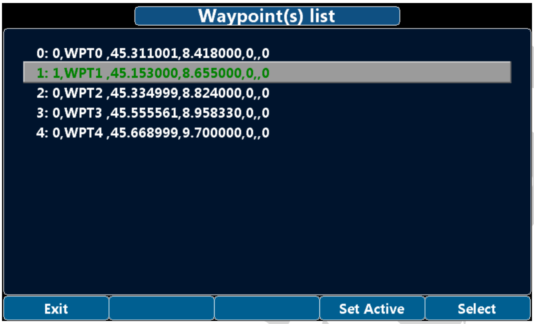


- **Radius:** sets the diameter of a circle around the active waypoint. When the navigating aircraft intercepts this circle it activates the next leg. If any turns are present during the transition to the active leg, this allows the autopilot to perform a fly-by of the point and join the active leg more smoothly. In the next image, you can see this circle around the waypoint (green circle) and the way the autopilot drives to the next waypoint.



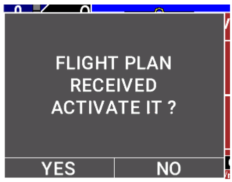
Waypoint(s) list

Displays the list of points received from the navigation application.

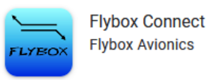


It's possile to scroll through the list and change the active waypoint by pressing *Set Active.* This operation will change the active leg, and the autopilot will follow this change.

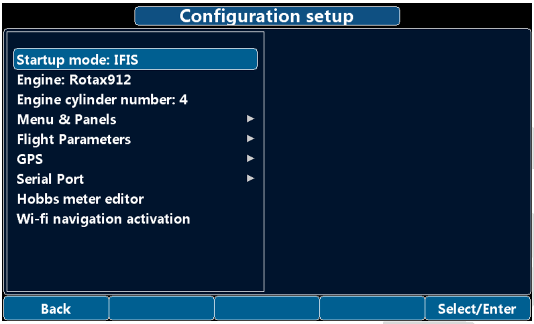
NOTE: the list is visible only if, when receiving the flight plan, *YES* was selected at the activation request.



NOTE: for more information regarding the uploading of flight plans from navigation apps, you should consult the guide contained within the **Flybox Connect** app, which can be downloaded from *Google Play* or *App Store*.



1.3.10 - Configuration



- **Startup mode:** Sets the startup mode of the instrument.

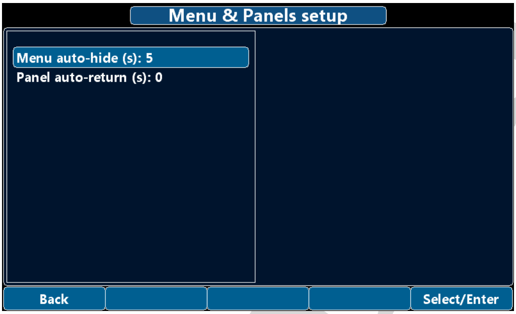
Menu Label	*Description*
IFIS *(default)*	Flight and engine data
PFD	Only flight data
EIS	Only engine data

- **Engine:** assigns the aircraft engine; this is intended to identify the source of engine data, sensor reading or from ECU.

Menu Label	*NOTE*
Rotax912	n.a
Rotax914	n.a
Rotax iS	Supports 912, 915, 916 iS
Lycoming	n.a

- **Engine cylinder number:** sets the number of cylinders for the selected engine. This value is used to increment the number of inputs in the mapping functions of *EGT* and *CHT* and for related gauge design.

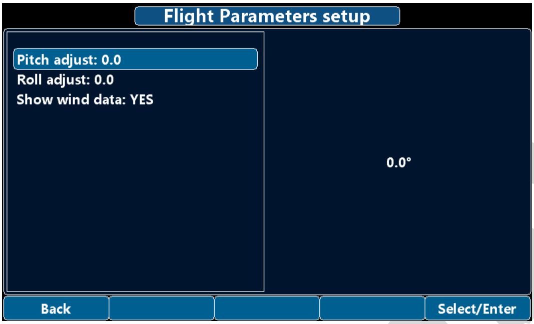
1.3.10.1 - Menu & Panels



- **Menu auto-hide:** sets the timeout in seconds to hide automatically the popup menu in the main screen.

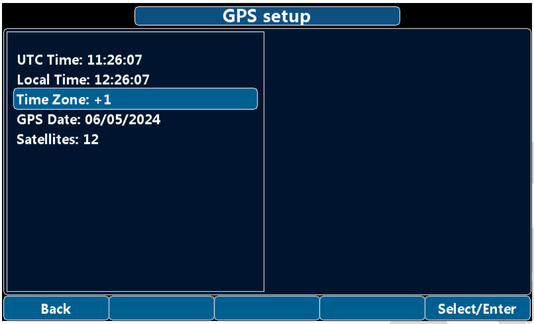
- **Panel auto-return:** sets the timeout to return to *Engine* page from *Fuel/Timer.* If the value is left at zero *(default)*, this function is disabled.

1.3.10.2 - Flight parameters



- **Pitch adjust:** sets the correction for misalignment on the panel on the pitch axis. Modify this value until the indication on the right side reaches 0.
- **Roll adjust:** sets the correction for misalignment on the panel on the roll axis Modify this value until the indication on the right side reaches 0.
- **Show wind data:** change the visibility of the wind data indication *(deafult YES).*

1.3.10.3 - GPS

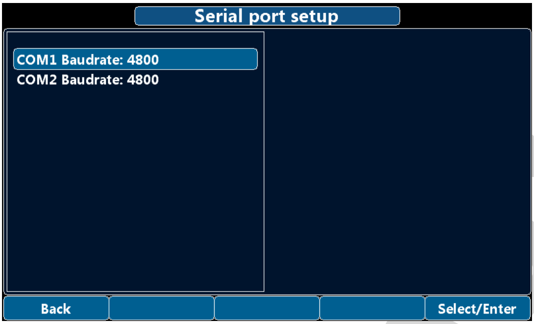


This page can be used to verify the correct functionality of the GPS. In case of incorrect baud rate, or no communication on the serial port, the time information (date and time) will not be displayed.

- **Time zone:** sets the actual time zone, this value affects the Local time indication.

NOTE: all other items displayed in the menu are not editable.

1.3.10.4 - Serial port

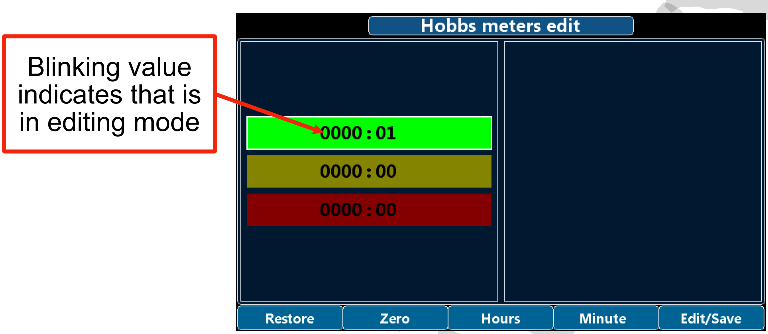


- **COM1** : sets the baudrate for the *Eclipse GPS TX (PIN17)* serial port.
- **COM2**: sets the baudrate for the *External GPS TX (PIN6)* and *Altitude Serial Out for Transponder (PIN18) serial port.*

NOTE: if both a GPS and a Transponder have been connected to *COM2* it will be necessary to set a baudarte that satisfies both communications.

1.3.10.5 - Hobbs meter editor

This feature allows the modification of engine hours.



1. Rotate the knob to select the desired range to edit then press the knob button to confirm.

2. The value of the hours will begin to blink.

3. Change the value with the knob.

4. To change between *Hours* and *Minute* press the relative button. The value will start blink when ready for editing.

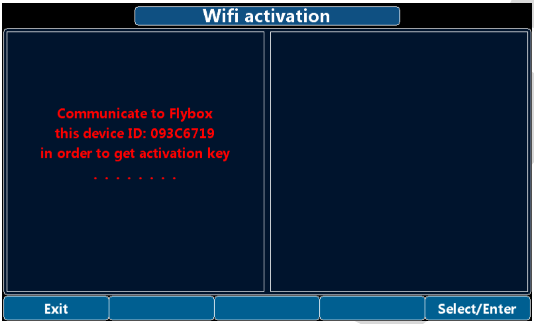
5. To save the timer in memory confirm by pressing the knob button.

6. Press *Zero* to reset both hours and minute.

7. Press *Restore* to exit the edit mode and return the timer to its original value. *Original value is considered to be the one present before starting editing.*

1.3.10.6 - Wi-Fi navigation activation

Use this function to activate the navigation function via Wi-Fi communication. Purchase of *Flybox Connect Wi-Fi activation key code* ***801021*** is required.



1. Write down the ID code that appears and communicate it to your Flybox® dealer.

2. After you have received the activation key code from your Flybox® dealer you can reenter in this screen and insert the received key. (Rotate knob to increase or decrease the digit, then push knob button to confirm).

3. If the code is correct *Eclipse NG* shows on display *"Wifi Enabled!"*.

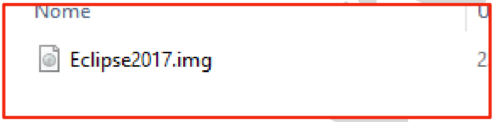
4. Press *Exit* to close the screen.

1.3.11 - Firmware Upgrade

This menu is used for upgrading the firmware versions of the *Eclipse NG*, using a USB 2.0 flash drive.

If you have received the upgrade file for the *Eclipse NG* copy it in the root folder of a USB 2.0 flash drive.

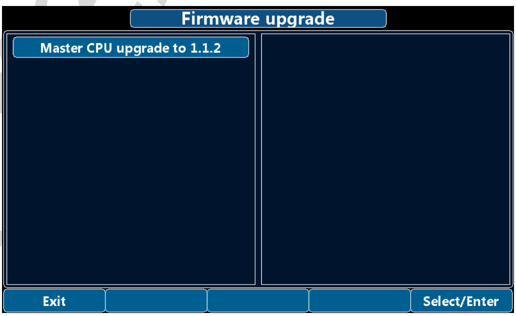
NOTE: If you received the bundle in zip format, unzip the content (without folder creation) in the root folder. The image below shows how will look the folder.



CAUTION: DON'T RENAME THE FILE OR CHANGE EXTENSION, otherwise the system won't be able to recognize them.

1. Insert the USB 2.0 flash drive with the upgrade file to the rear connector.

2. If the files are correctly recognized the upgrade list will populate as in the next image.

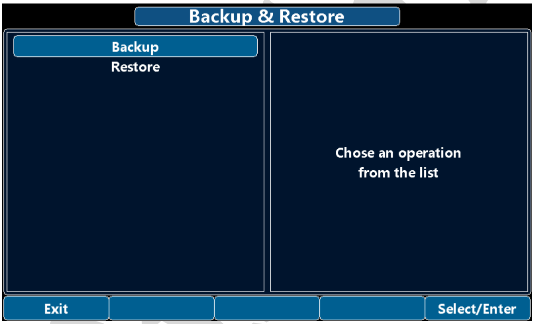


3. Select *Master CPU upgrade.*

4. Wait until the firmware upgrade is completed then turn off the power and remove the flash drive.

1.3.12 - Backup & Restore

This menu is used to save or restore all the settings and user calibrations of *Eclipse NG*.



Backup: insert a USB flash drive in the USB rear connector on the *Eclipse NG* and then press *Enter* with this item selected to save all the settings on the USB 2.0 flash drive. The file is *ECLIPSE_NG_<ID>.par* (where ID is the unique ID of the device).

NOTE: It's recommended to perform the backup right after finishing to set the instrument and copy the *ECLIPSE_NG_<ID>.par* file in a safe place to have the opportunity to recall the settings if needed.

Restore: Insert the USB flash drive where a previously backup has been performed (or manually copy the backup file *ECLIPSE_NG_<ID>.par* in a USB 2.0 flash drive). Press *Enter* with this item selected to restore all the settings on the *Eclipse NG*.

NOTE: all current parameters will be overwritten after the restore

1.3.13 - Password

This menu allows passwords to be entered to perform extra functions. Flybox technical support will provide any passwords if needed.

1.3.14 - About

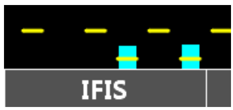
This screen displays information regarding hardware and software of the instrument.

2.0 - Using Eclipse NG

Eclipse NG has 3 working modes:

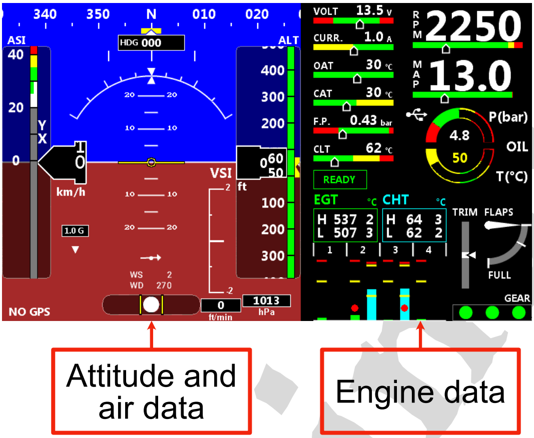
- **IFIS:** used to simultaneously monitor flight data and engine data.
- **PFD:** only displays flight and air data.
- **EIS:** only displays engine data.

After power-on *Eclipse NG* shows the working mode set during initial configuration. It's possible to switch between the working mode by pressing any of the push buttons to show popup, then on the first button (*F1*) is visible the next working mode.



NOTE: in this manual is presented the full version of the pages but your *Eclipse NG* may differ depending on the optionals and sensors installed in your aircraft.

2.1 - IFIS



IFIS (*Integrated Flight Information System*) working mode divide the display in two areas of monitoring. On the left side are present all attitude and air data, allowing monitoring of flight parameters. Availble indication are:

- **Heading/Tracking:** placed in the upper part of the screen, the heading/tracking indication is represented with both tape and numeric indicator. The tape indicator shows numbers in degrees except for the four cardinal points which are shown as N, S, W, E. It can show the HEADING (magnetic compass, indicated with *HDG*) or the TRACKING (track of the GPS, indicated with *TRK*). Note that after power-on the compass is set to heading and is switched to tracking when airspeed exceeds the *Speed* parameter in *Compass menu chapter 1.3.4.19*. It's however possible to switch between the two indications: press any buttons to display the menu then press F3 button.

NOTE: Heading is valid either stationary or moving and during aircraft turns the indicator is fluid and continuous. It compensate for aircraft attitude so that the indication is valid also with pitch or roll inclination. **Tracking** is read form GPS receiver and is updated once per second, so in case of fast turns it may not have a continuous and fluid indication. Provided that GPS receiver have a good satellites reception, the tracking indication (also called as Course) is very accurate and compensated from wind.

NOTE: GPS tracking is not valid when stationary or for speed below 20 km/h, in this case the indication remains fixed to the last valid received data.

To change the bug select *HDG BUG/AP* in the menu bar or rotate the *HDG/TRK* knob in the ACU panel, if the autopilot system is installed.

- **Turn rate:** graphical indications of the turn rate.

- **Airspeed:** represented with both tape and numeric indicator. The unit of measure can be km/h, mph or knots. The measurement range is from 30 to 470 km/h (16~254 knots or 18~292 mph). Below 30 km/h of air speed the indication remain fixed to zero. The speed thresolds that define the coloured zone of the tape indicator are those previously set in *ASI menu chapter 1.3.4.14*. There are also the two indication marks for the Vx and Vy speeds. If a GPS is connected, *Ground Speed* value is visualized near the tape indicator.

- **Attitude:** with 360° continuous operation in both pitch and roll. Above and below the horizon line, major pitch marks and numeric indicators are shown for every 10°, up to +/- 40°. Minor pitch marks are shown for every 5°. The roll scale show inclinations from -60 to +60°.

IMPORTANT NOTES ON USING attitude indicator:

The attitude indicator may loose accuracy during the flight for the following causes:

- Aircraft exceeded the maximum allowable turn rate on one or more axis (150° per second).
- Rapid temperature changes or temperature outside the operating limit (-20°C~+70°C).
- Continuous maneuvering at high accelerations, with absence of leveled flight attitude for long periods of time.

Never use the attitude indicator as a reference for flight manoeuvres.

Never use the attitude indicator as a reference in absence of visibility.

- **G-Meter:** shows accelerations in G, with both graphical bar (-2 ~ +4G) and numeric indicator (absolute value in G). It also indicate the maximum and minimum peak accelerations reached (values at the limits of the gauge). To reset the peaks press any buttons to display the menu and then select with the knob the *RESET G* function.
- **Slip indicator:** graphical indication of the lateral accelerations.
- **Vertical speed indicator:** graphic bar and numeric indications (absolute value). The upper part of the graphic scale indicate an ascent rate, the lower part indicate a descent rate. The unit of measure can be ft/min or m/s.

- **Altimeter:** tape and numeric indicator. The unit of measure can be feets or meters, the range of measure is -1000~25000 feets (-300~ +7600 m). On the tape indicator the thousands digits are shown every 500 while the numeric indications is always displayed completely.

To change the PRESSURE REFERENCE (*QNH*) press the knob button and then rotate it to change the value.

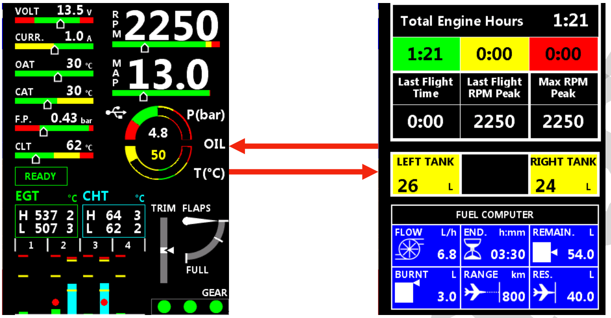
- **Local time (L.T):** indication of the time from GPS adjusted with time zone. If data is not available *NO GPS* will be shown.

- **Flight time (F.T):** indication of the duration of the flight, automatically shown after take-off.

- **Autopilot status:** see *chapter 1.3.8.4 - Autopilot operation.*

- **Wind vector:** indicates numerically the direction and the speed in knots. The vector arrow, indicates from where the wind is blowing and is relative to the current heading/track of the aircraft. For the proper operation of this indicator it's necessary a correct magnetic calibration and a correct installation and calibration of the pitot line.

On the right side all the important engine data are clearly displayed in both graphical and numerical indications. The green, yellow and red zones of the various gauges is completely customizable as explained in *chapter 1.3 Instruments configuration;* when a measurement is on a yellow or red zone the corresponding numerical indication change it's color to yellow or red. This section is divided into 2 secondary pages: one for the engine and second for the fuel indication and timers. This change can be quickly done by pressing any button to display the menu than press F4 button (*FUEL/TIMER* or *ENGINE*).



Available indication are:

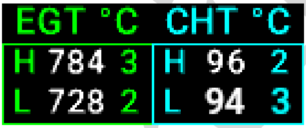
- **Tachometer:** graphical and numerical indication.
- **MAP:** graphical and numerical indication, expressed in *inches of mercury*.
- **Oil pressure:** graphical and numerical indication, expressed in *bar* or *psi* depending on user settings.
- **Oil temperature:** graphical and numerical indication, expressed in *°C* or *°F* depending on user settings.
- **Coolant temperature:** graphical and numerical indication, expressed in *°C* or *°F* depending on user settings.
- **Fuel pressure:** graphical and numerical indication, expressed in *bar* or *psi* depending on user settings.
- **OAT:** graphical and numerica indication, expressed in *°C* or *°F* depending on user settings.

- **CAT:** graphical and numerica indication, expressed in *°C* or *°F* depending on user settings.

- **Voltage:** graphical and numerica indication, expressed in *Volt.*

- **Ammeter:** graphical and numerica indication, expressed in *Ampere.*

- **EGT and CHT**: graphical and numerical indication, expressed in *°C* or *°F* depending on user settings. An indication of the hottest and coldest is provided within the gauge, with also the associated cylinder numbering.



- **Trim:** graphical indication of the trim position.

- **Flaps:** graphical indication of the flaps position.

- **Gear:** graphical indication of the gear status.

- **Engine status indicator:** this is a useful indicator that should be checked before takeoff. When the essential measurements are not in a safe area the indicator shows *WARMUP* in red; When all the measures becomes in its safe zone the indicator change state to *READY* in green, that automatically disappear 30 seconds after take-off.

- **Total engine hours:** total time accumulated by the engine. This time is further divided in total time accumulated in green, yellow and red zones.

- **LAST flight time:** duration of the last flight. This counter is reset when the engine is started, and starts to increase when the *Flight timer start thr* menu item (*Chapter 1.3.4.8 - RPM*) is exceeded for 30 seconds.

- **Last flight RPM peak:** maximum RPM peak reached by the engine during the last flight.

- **Max RPM peak:** maximum RPM peak reached by the engine during its life.

- **Fuel levels:** graphical and numerical indication, expressed in *L* or *usg* depending on user settings. The fuel level indications here are obtained by reading the fuel level sensors installed in your aircraft and connected to *Eclipse NG*. The indications are approximated, do not solely rely on *Eclipse NG* to determine the fuel available in the tanks but always refer to primary instrument installed in your aircraft.

- **Fuel flow:** numerical indication, expressed in *L/h* or *usg/h* depending on user settings.

- **Endurance:** display the time to empty, calculated considering the fuel remaining and the actual fuel flow. If it is not possible to calculate the time to empty (for example when the engine is not running) the display shows “--:--”.

- **Remaining:** display the fuel remaining in the tank(s). According to the selected unit of measure the quantity is indicated in liters (L) or gallons (usg).

WARNING: the remaining fuel displayed here is not a measurement of the fuel in the tank, but it is calculated from the initial quantity entered by the user and the burned quantity measured by the fuel flow transducer (or measured by the ECU for fuel injected engines).

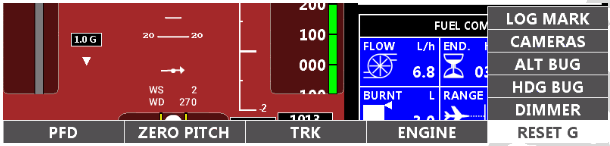
- **Burnt:** display the fuel burned from the starting. According to the selected unit of measure the flow is indicated in liters (L) or gallons (usg).

- **Range:** display the range calculated considering the fuelremaining, the actual fuel flow and the ground speed from GPS. If the display shows *WAITING GPS RMC* it means that the GPS is not connected, turned off or it don't have the fix. If it is not possible to calculate the range (for example when the engine is not running) the display shows “- - - -”.

- **Reserve:** display the fuel remaining at destination; the destination is intended as the approaching GPS waypoint. If the number is negative it means that there is not enough fuel to reach the destination. To enable this indication you must connect an external GPS and enable the “RMB” sentence on it. If the display shows *WAITING GPS RMB* it means that the GPS is not connected, turned off or it don't have the fix. If it is not possible to calculate the reserve (for example when the engine is not running) the display shows “--.--”.

2.1.1 - IFIS popup menu

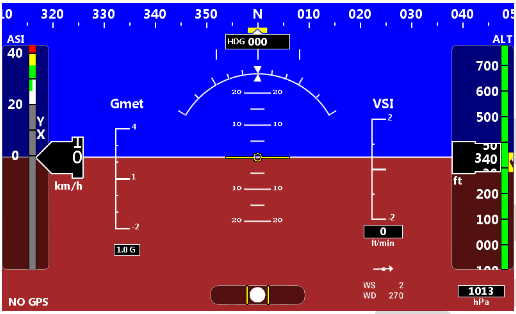
Press any button to display the menu.



- **PFD:** to switch to PFD page.
- **ZERO PITCH:** reset the pitch (only graphically) on the attitude indicator. This function must be used only during leveled flight, never use it to reset the horizon during other flight attitude.
- **TRK or HDG:** to switch between Heading/Tracking compass indications.
- **ENGINE or FUEL/TIMER:** to switch right page between engine or fuel/timers data.
- **RESET G:** to reset the peak accelerations.
- **DIMMER:** display brightness adjustment.
- **HDG BUG/AP:** to set the position of the bug related to compass indication or insert autopilot system (if installed). Turn the knob to adjust in steps of 1° the bug position on the compass tape indicator and press Done to confirm. Alternatively it's possible to press the On Course button to set bug to the actual Heading/ Tracking. If the actual bug is out of the displayed scale a numeric indication is shown on the left or right limit, that indicate the actual position of the bug.

- **ALT BUG:** to set the position of the bug related to altimeter indication. Turn the knob to adjust in steps of 50 feets the bug position on the altimeter tape indicator and press Done to confirm. Alternatively it's possible to press the Actual button to set bug to the actual altitude. If the actual bug is out of the displayed scale a numeric indication is shown on the high or low imit, that indicate the actual position of the bug.
- **CAMERAS:** to switch to cameras page.
- **LOG MARK:** to create a mark that will be visible in the datalog and in KML file for Google Earth.

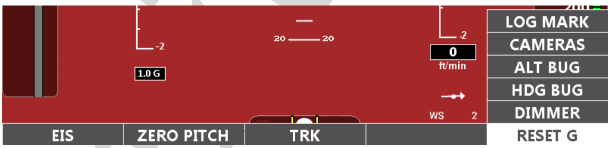
2.2 - PFD



PFD (*Primary Flight Display*) working mode is used to monitoring only flight data. All available indications are the same of the IFIS mode (left side).

2.2.1 - PFD popup menu

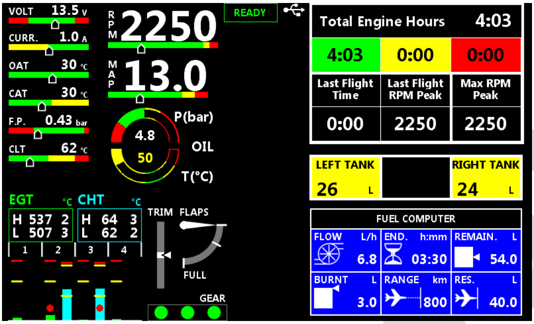
Press any button to display the menu.



- **EIS:** to switch to EIS page.
- **ZERO PITCH:** reset the pitch (only graphically) on the attitude indicator. This function must be used only during leveled flight, never use it to reset the horizon during other flight attitude.

- **TRK or HDG:** to switch between Heading/Tracking compass indications.
- **RESET G:** to reset the peak accelerations.
- **DIMMER:** display brightness adjustment.
- **HDG BUG/AP:** to set the position of the bug related to compass indication or insert autopilot system (if installed). Turn the knob to adjust in steps of 1° the bug position on the compass tape indicator and press Done to confirm. Alternatively it's possible to press the On Course button to set bug to the actual Heading/ Tracking. If the actual bug is out of the displayed scale a numeric indication is shown on the left or right limit, that indicate the actual position of the bug.
- **ALT BUG:** to set the position of the bug related to altimeter indication. Turn the knob to adjust in steps of 50 feets the bug position on the altimeter tape indicator and press Done to confirm. Alternatively it's possible to press the Actual button to set bug to the actual altitude. If the actual bug is out of the displayed scale a numeric indication is shown on the high or low imit, that indicate the actual position of the bug.
- **CAMERAS:** to switch to cameras page.
- **LOG MARK:** to create a mark that will be visible in the datalog and in KML file for Google Earth.

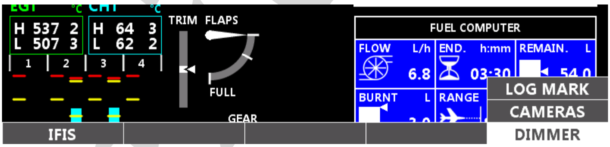
2.3 - EIS



EIS (*Engine Information System*) working mode is used to monitoring only engine data. All available indications are the same of the IFIS mode (right side).

2.3.1 - EIS popup menu

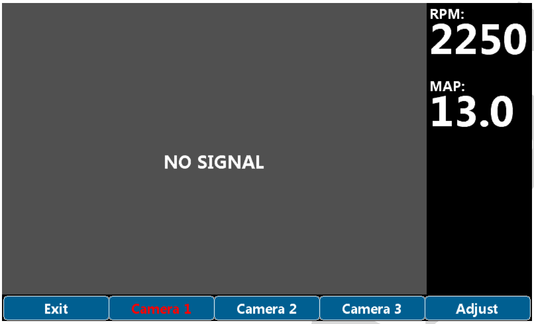
Press any button to display the menu.



- **IFIS:** to switch to IFIS page.
- **DIMMER:** display brightness adjustment.
- **CAMERAS:** to switch to cameras page.
- **LOG MARK:** to create a mark that will be visible in the datalog and in KML file for Google Earth.

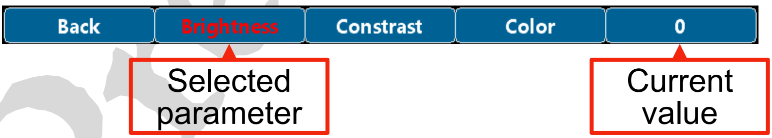
2.4 - Camera page

Displays the image of the selected video input togheter with RPM and MAP indication.



- **Camera 1:** select input 1.
- **Camera 2:** select input 2.
- **Camera 3:** select input 3.
- **Adjust:** open menu for the selected input settings.

When you go to the *Adjust* menu, you can change the value of the video input parameters.



1. Press the button of the desired parameter.
2. Rotate the knob to change the value.

3. Press *Back* to return at input selection menu.

NOTE: if the camera is turned off or the signal is not received correctly, NO SIGNAL will appear within the video area.

3.0 - Alarms

Eclipse NG continuously monitor all the sensors and when a measurement exceed its setpoint, either the probe/ sensor making the measurement disconnects, the corresponding alarm is activated (if enabled by the user).

An alarm condition is indicated in this ways:

- The gauge value will turn red.

- The message of the error appears at the bottom of the display.

- If one of the two alarm outputs has been enabled it will be turned on.
- If audio is connected and enabled a voice message will be played

Giving acknownledge by pressing the F1 button will make the message. In case of multiple alarms relative messages will be displayed sequentially.

If Err"is indicated next to the gauge, it means the sensor/ probe is disconnected, while CAN indicates that the data from an ECU was not received.

4.0 - Datalogger

NOTE: this page is not accessible while the engine is running.

The datalogger is a useful data recording tool that permits later viewing in both graphical or numerical representation. It also allow the download of the data in a USB flash drive.

Data are organized in separate recording sessions, each time the engine is started a new recording session will be initiated.

The memory can store 100 hours of data, with a sample rate of 1 second. Older data are automatically erased to make room for the new ones. Datalogger menu is the list of all recorded flight sorted by date or by hobbs if the date is not available (recent flights are at the top of the list). The date, UTC, hobbs and duration (flight time) are visible for each flight.

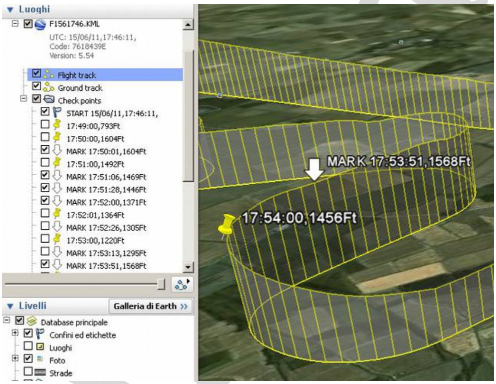
NOTE: date and UTC are only available if a GPS has been connected and a fix has been made.

Turn the knob to select the desired flight in the list.

Press the button associated to desired operation:

- **Save:** begin the export process, of the selected flight, on the USB flash drive. Saved files are in CSV (comma-separated values) format, if GPS valid data are recorded inside the flight an addition KML file will be exported. This file can be opened in *Google Earth*. Refer to the software help for more details.

NOTE: Google Earth is a free software that may be updated and

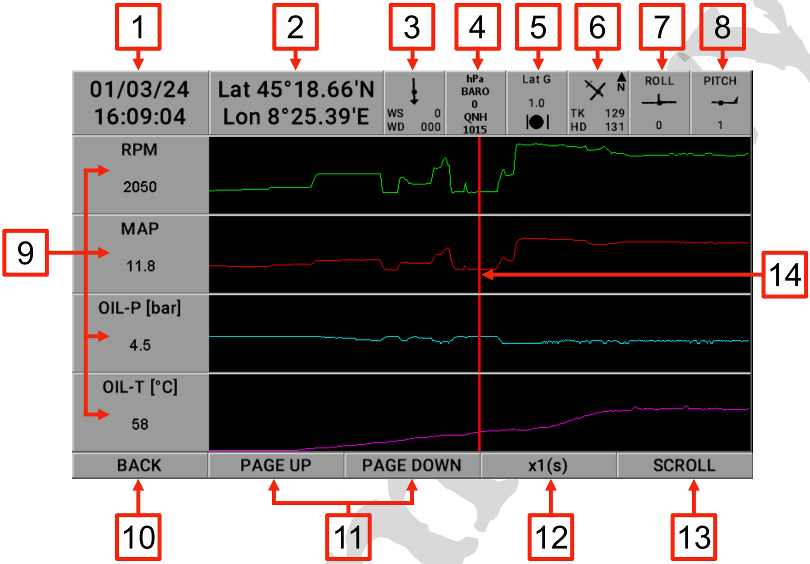


changed at any time by Google© Google

- **Save all:** exports all flights in the list, the format is the same as described for the Save function.

- **Enter:** open the flight in view mode.

View mode allows you to view charts of the data recorded in the selected flight. The interface will look like the image below:



NOTE: all values are referred to the cursor position (14)

1. **Date and time:** date and time.
2. **Coordinate:** latitude and longitude.
3. **Wind vector:** wind speed and direction.
4. **Air pressure**: barometric pressure and reference pressure set by the pilot.
5. **Acceleration:** vertical and lateral (slip) acceleration.
6. **Aircraft orientation:** heading and tracking of the aircraft.

7. **Roll:** roll angle of the aircraft. Positive value indicates roll to the right while negative roll to the left.

8. **Pitch:** pitch angle of the aircraft. Positive value indicates nose up while negative nose down.

9. **Graphics and numerics data:** 4 charts per page.

10. **Back:** return to the flight list.

11. **Page Up/Down:** scroll throught all the available charts.

12. **Time multiplier:** increase the scroll step size by 1, 10 or 60 seconds.

13. **Scroll:** move the cursor through the values by the selected increment step.

14. **Cursor:** current position in flight.

The datalogger records all measurements displayed on *Eclipse NG* screens. The charts displayed therefore depend on what measurements the user has set in the instruments settings.

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5.0 - Technical specifications

- Graphic TFT LCD with backlight and coated glass, 7”.
- Powder painted aluminium case.
- Dimensions: 188 x 136 x 45 mm. (body)
- Weight: 695 g.
- Supply voltage: 10 ~ 30 V=.
- Power supply: ~6 W.
- Operating temperature range: -20 ~ +70°C.
- Storage temperature range: -30 ~ +80°C.
- Humidity: 90% max (without condensation).
- Communication through 2 CAN bus and 2 RS232
- USB port: for USB 2.0

Display cleaning

To clean the display use the supplied smooth cloth, slightly moistened with cleaner. Use a cleaner that is specified as safe for anti-glare coatings.

CAUTION: Avoid any chemical cleaners or solvents that can damage the display anti-glare coating or plastic components. Do not use cleaners containing ammonia. Do not spray water or cleaner directly onto the display.

One Year Warranty:

Product support and warranty information can be found at www.flyboxavionics.it.
Flybox® warrants this Product to be free from defects in materials and workmanship for 12 months from date of delivery. The inactivity of the Products determined by periods of repair does not involve the extension of the warranty period.
This warranty covers only defects in material and workmanship found in the products under normal use and service when the product has been properly installed and maintained. This warranty does not cover failures due to abuse, misuse, accident, improper maintenence, failures to follow improper instructions or due to unauthorized alterations or repairs or use with equipments with which the Products is not intended to be used. Flybox®, after verification of the complaint and confirmation that the defect is covered by warranty, at its sole discretion, will either replace or repair the Products at no costs for the customer. Alterations, additions, or repairs not performed by the manufactuter shall negate any warranty. This warranty doesn't cover cosmetic or incidental damages. Shipping costs, taxes, custom fee, any other duties and any costs incurred while removing, reinstalling or troubleshooting the Products, shall be at customer's charge.
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Date	Revision	Description
March 2025	1.0	First release

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Important

Do not send your instrument for repair until you have filled out the request form on the support page at www.flyboxavionics.it. After filling out the form you will receive an authorization email with the RMA number.

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www.flyboxavionics.it

MICROEL s.r.l.
Via Mortara 192-194
27038 Robbio (PV) - ITALY
Tel +39-0384-670602 - Fax +39-0384-671830