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IFD-NET GYROCOMPASS



NEVER LOSE YOUR BEARINGS

USER AND INSTALLATION MANUAL

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FEATURES

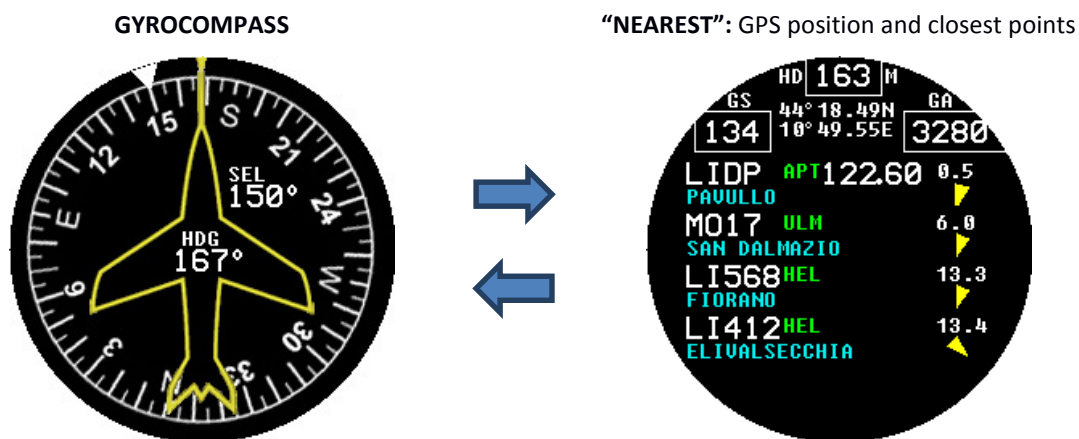
- Standard 80mm diameter installation shape
- Very bright screen, sunlight visible, up to 1000 cd/m².
- Low power consumption down to 2.3W (200mA @ 12Vdc).
- Ergonomic interface with rotary encoder / knob
- High integration level (all sensors embedded)
- Multi-environment software with simple switch menu
- Several functions in color / graphic display:
 - 3D magnetic compass, gyro-assisted
 - GPS navigation in “ADF” mode (bearing pointer)
 - Wind vector
 - Direct navigation to more than 10000 POIs (navigation points) in the internal database
 - Database coverage: Europe or USA

ELECTRICAL AND MECHANICAL SPECIFICATION

- Main power 10 - 30Vdc 200mA with internal filter and peak transient protection.
- Functional temperature range -20°C to 80°C 90% Rh no condensation status.
- 64mm x 64mm x 75mm (width, height, depth).
- 2 x 1/8 NPT Pitot and Static pneumatic connectors.
- SMA female connector for GPS passive antenna.
- Standard 9 SUB-D female connector for power and BUS connection.

BASIC FUNCTIONS

Switch between the two main pages (environments) by pressing **the rotary encoder / knob** (short-press):

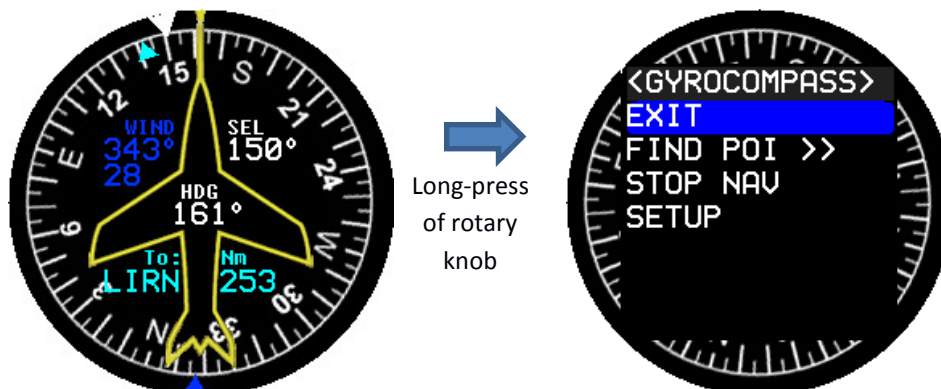


If the user does not touch the knob for 2 minutes, the instrument goes back to the GYROCOMPASS page

This instrument always shows “magnetic” angles (referred to the Magnetic North).

The GPS ground track, when displayed, is corrected according to the local magnetic variation.

Each page has its own "Environment menu", which can be accessed **pressing and holding the rotary knob** (long-press, about 1 sec):



WORKING WITH MENUS

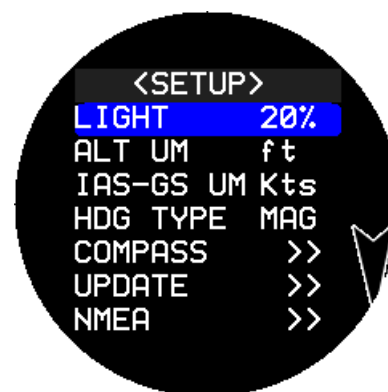
Once a menu is displayed on the screen:

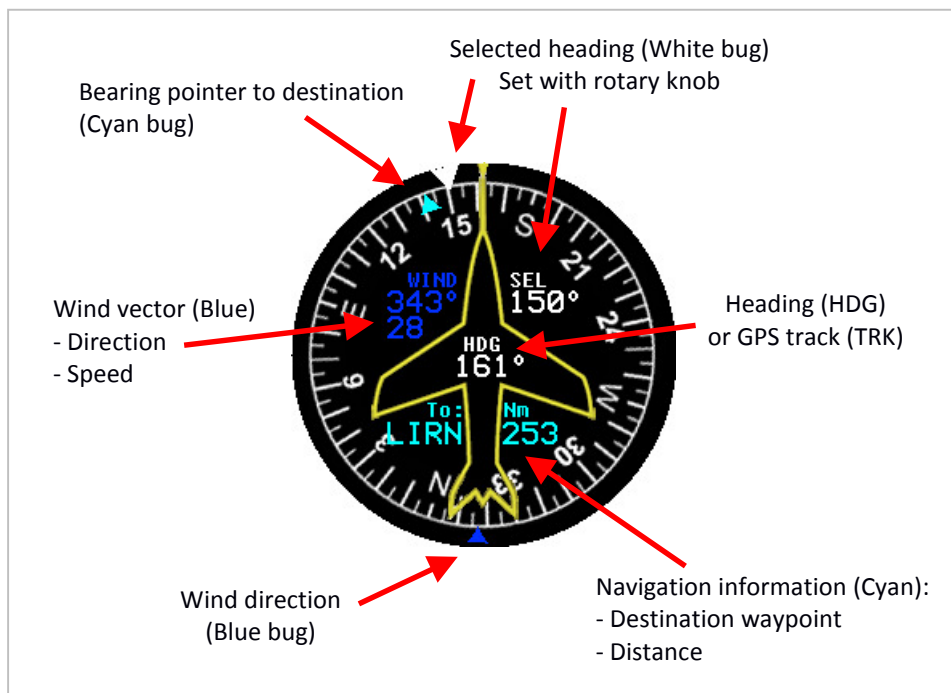
- Rotate the knob to highlight the desired menu item
- Press the knob to confirm the selection

If the highlighted item is an adjustable parameter:

- The parameter turns green
- Rotate the knob to adjust the value
- Press the knob to confirm the change
- The parameter turns white again

Menus usually have an EXIT item at the top or at the bottom.



GYROCOMPASS PAGE

NOTE: when the magnetometer is not calibrated the instrument displays three dashes (" - - ") instead of the numeric heading. You can either enable the GPS track (set HDG TYPE "AUTO" in SETUP) or **calibrate the magnetic compass** as described below.

A fault is indicated with "XXX". In case a fault indication appears permanently, try to power-cycle the unit. If the problem persists the instrument may need maintenance.

GYROCOMPASS MENU

Press and hold the knob for about one second to access the menu.

EXIT - Returns to the Gyrocompass screen.

FIND POI >> - Allows searching for navigation points by name or identification (see paragraph "FIND POI" FUNCTION below)

STOP NAV - Cancels the navigation to a point.

The bearing pointer disappears and navigation data is not shown anymore.

SETUP - Opens the setup menu, described below in detail.

**WIND VECTOR**

The Gyrocompass can estimate the actual wind speed and direction during flight.

The display of the Wind Vector can be activated or deactivated via: **SETUP - WIND VECT** (ON or OFF).

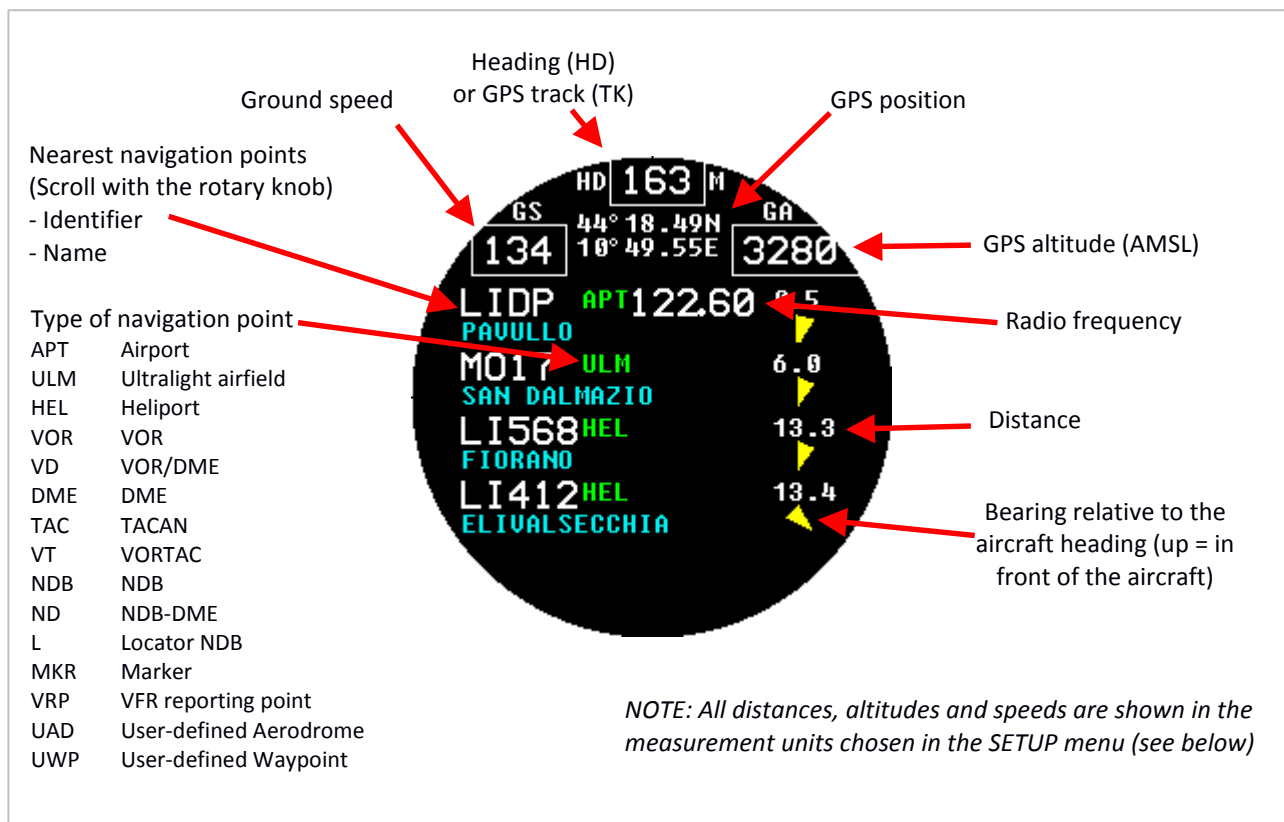
The wind speed is shown in the same measurement unit as the airspeed and ground speed indications.

LIMITATIONS

- The Wind Vector appears only if the magnetic compass is calibrated.
- The instrument does not have an air temperature sensor to derive the TAS (True Air Speed). Thus the wind calculation can become inaccurate if the air temperature at altitude deviates significantly from ISA conditions (Standard Atmosphere)
- The accuracy of the wind vector is also heavily influenced by the accuracy of the compass calibration. Especially if the compass has been calibrated only on the ground, the wind calculation will degrade when the aircraft is not flying level.

“NEAREST” PAGE

This page shows the closest aerodromes and navigation points according to the current GPS position.



Rotate the knob to scroll through the list of nearest points.

When a point is highlighted, pressing the knob opens a menu which allows to view more details (**View info**) or activate the navigation to that same point (**Set GO-TO**)

**“NEAREST” MENU**

EXIT - Returns to the Gyrocompass screen.

NRST TYPE - Selects which point types are shown in the NEAREST page

ALL - All aerodromes and navigation points

AD - Aerodromes, including ultralight airfields

NAV - Only navigation points and radio aids

HELI - Only heliports

FIND POI >> - Allows searching for navigation points by name or identification (see paragraph "FIND POI" FUNCTION below)

SETUP - Opens the setup menu, described below in detail.



"FIND POI" FUNCTION

The navigation database contains more than 10000 aeronautical points of interest (POI) available for search and navigation.

Once the FIND POI command is activated, a black window appears on the screen with a "Search: " prompt on top.

Enter the search text, one character at a time:

- Rotate the knob to scroll through the alphabet and numbers
- Push the knob to confirm each single character

As soon as 2 characters or more have been entered, the search results appear instantly under the "Search" prompt.

When enough characters have been entered, just press the knob without selecting any character.

NOTE: If the system detects that there is only a single search result, the selection is automatic.

The cursor will move to the list of search results and the knob rotation is then used to select the desired navigation point.

Push the knob again to confirm the selection of a result from the list.

A menu with the following items will appear:

- **Cancel** - No action, goes back to the search function
- **View info** - shows additional information about the selected point and also the closest points around
- **Set GO-TO** - starts navigation toward the selected point and switches to the gyrocompass screen

NOTE: The search results are ordered first by relevance and second by identifier.

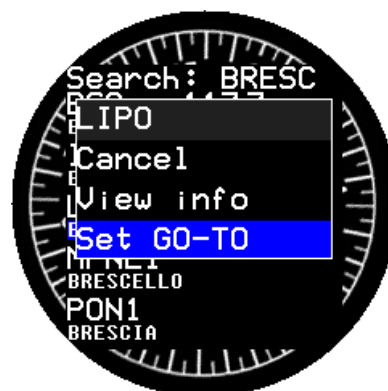
There are three levels of relevance:

1. Exact match either on the identifier or the name of the point.
Example: a search for "LIPO" matches exactly the ICAO code of the Brescia / Montichiari airport in Italy. Other matches, for example "EGBC / Cheltenham Heliport", will have lower relevance even if the identifier comes before in alphabetical ordering (EGBC is alphabetically before LIPO)
2. Search term is at the beginning of the identifier or the name of the navigation point.
3. All other matches

FIND POI - EXAMPLE 1

We want to navigate to Brescia/Montichiari airport (ICAO code: "LIPO").

- Press and hold down the rotary knob for about one second.
- Rotate the knob to select "FIND POI >>" and push it (short press)
- Rotate the knob right to scroll through the alphabet, up to "L" (the first character of the ICAO code), push the knob
- Repeat until the text "Search: LIPO" is shown.
- As soon as the system detects that there is only a single point in the database matching "LIPO", it will propose the choices "View information" and "Set GO-TO"
- Rotate the knob to "Set GO-TO" and push it
- The Gyrocompass screen will appear, and a cyan bug (triangle) will indicate the direction to destination. Additional navigation data is shown in cyan color - destination point: "LIPO" and distance



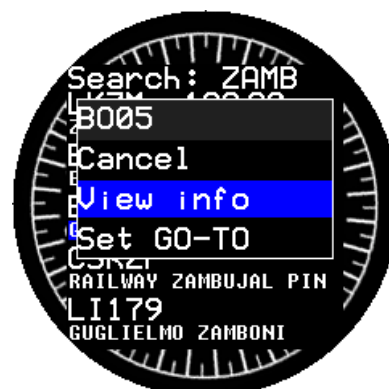
FIND POI - EXAMPLE 2

We want to get informations about the "Guglielmo Zamboni" airfield (Italy). The search will be done on a partial match of the name, by entering the search term "ZAMB"

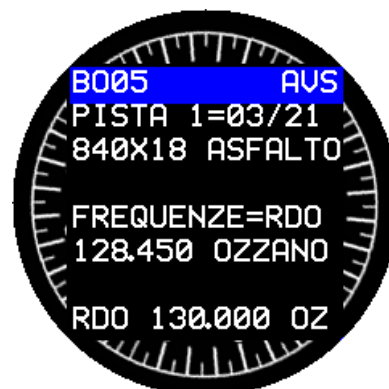
- Press and hold down the rotary knob for about one second.
- Rotate the knob to select "FIND POI >>" and push it (short press)
- Rotate the knob right to scroll through the alphabet, up to "Z". Push the knob.
- Repeat until "ZAMB" has been entered near the "Search: " prompt
- Rotate the knob left until the asterisk "*" is shown (will look like: "Search: ZAMB*"), then push the knob.
(the asterisk is an alternative way to end the text input)



- Rotate the knob to the right to scroll down to the desired result "B005 - Guglielmo Zamboni", push the knob.
- A menu will appear, select "View info"



- Scroll the text information up/down by rotating the encoder; press the knob to close the window



SETUP MENU**LIGHT** [20% .. 100%]

Adjusts the brightness of the screen; the selected backlight intensity is maintained on next power up.

ALT UM [m, ft]

Selects the measurement unit for altitude

IAS-GS UM [Kph, Kts]

Selects the measurement units for the GPS ground speed and the distance (Kts/Nm or Kmh/Km)

HDG TYPE [AUTO, GPS, MAG]

Heading source: AUTO - Use magnetomer when not moving, GPS otherwise
GPS - Use GPS track only
MAG - Use magnetometer only

WIND VECT [ON, OFF]

Activates or deactivates the calculation of wind speed and direction

COMPASS >>

see "MAGNETIC COMPASS CALIBRATION"

UPDATE >> (sub-menu)**SW VER** xxxxxx

Indicates the software release (same as "SW xxxxxx" in main setup menu)

UP NAV AIR [yyymm]

yyymm =Year/month of installed navigation database

This item is used to start a database update from the SD card.
 The manufacturer will provide instructions with the update.

UP FW

To be used for firmware update.
 Follow instructions provided by the manufacturer with the update.

IMPORT USR

Import user waypoints from SD card (user_wpt.txt)

REBOOT

Restarts the instrument

EXIT

Returns to the main screen

NMEA >> (sub-menu): Defines the parameters for the NMEA RS-232 data output from the instrument

BAUD [4800 .. 115200]

Sets serial port speed for NMEA output

There is an entry for each supported NMEA sentence. It is possible to enable (ON) or disable (OFF) the output of each sentence individually. By default, all sentences are disabled.

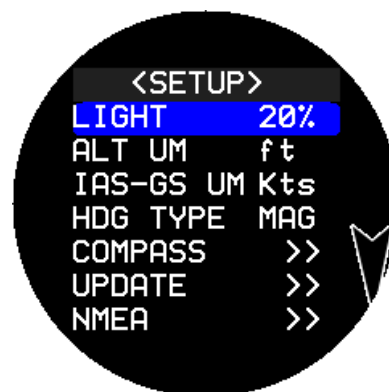
The typical usage of the NMEA output is to drive an autopilot or a MODE S transponder.

INSTALL >> (Only for factory usage)**SW xxxxxx**

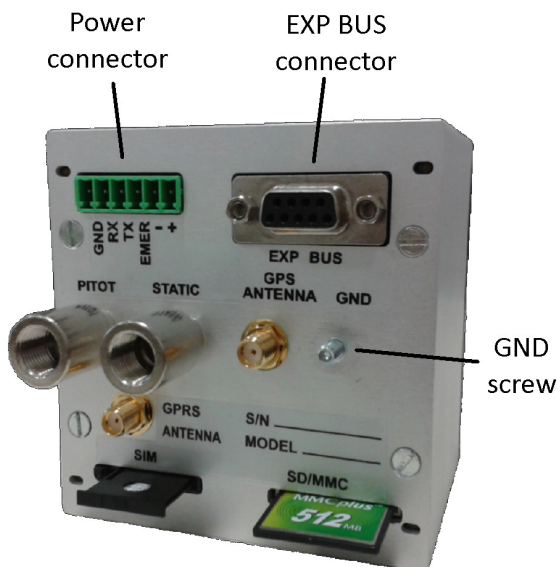
Indicates the software release, e.g. "SW 280716"

EXIT

Exits the SETUP menu



REAR CONNECTORS VIEW AND DESCRIPTION



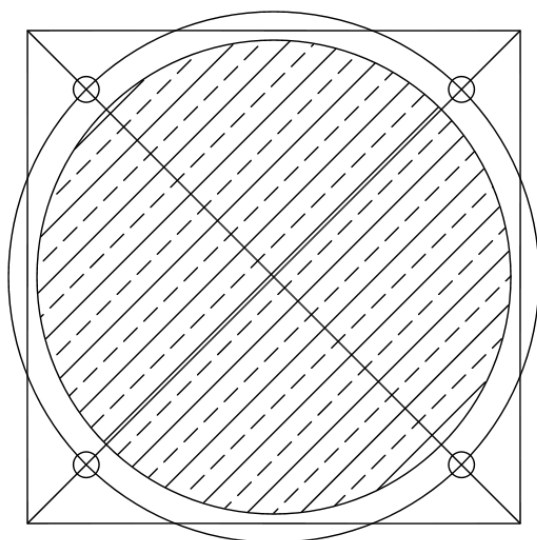
POWER CONNECTOR:

- +12V (10 to 30Vdc) 250mA: use 5A Fuse
- - 0V -> connect to GND
- EMER -> close to GND to engage emergency status.
- TX -> RS232 transmission line for internal GPS
- RX -> RS232 transmission line for internal GPS
- GND -> GND for internal GPS

EXP BUS CONNECTOR:

- 12/24 Vdc out (max 500mA)
- RS232 TX out to external Autopilot (NMEA)
- RS232 RX in from external Autopilot
- RS485 A+ signal for FLY BUS®
- GND
- +5 Vdc out (max 250mA)
- +5 Vdc out (max 250mA)
- GND
- RS485 B- signal for FLY BUS®

INSTALLATION GUIDE



3 1/8 (80mm) Instrument Hole

1. Draw a 3.25" X 3.25" Square
2. Scribe 2 diagonal lines corner to corner
3. Using the center of the lines, scribe a 3.5" diameter circle.
4. At the intersection of the diagonals and the 3.5" dia circle drill 4 holes to clear #8 screw (.170" dia.)
5. Using the center of the diagonal lines cut a hole with a hole saw 3.125" dia.

The IFD-NET has a standard 80mm aeronautical panel shape.

This means the installer should observe the standard way in order to obtain a correct installation on the unit. Refer to the hole template on the left in case your panel doesn't have 80mm holes already prepared.

The IFD-NET is installable in a standard hole, keeping in account that the lower-right screw hole shall be enlarged to a diameter of 7.41mm to accommodate the rotary knob.

The screws on the remaining three holes shall be tightened with appropriate torque, in a way to keep the instrument fixed and not introduce any vibration which would decrease the accuracy of the gyro sensors.

Remove the aluminum knob by turning on the little screw. This is because the encoder shaft need to pass throw the 7.5mm diameter hole in the bottom right corner of the 80mm hole.

After putting the instruments in the reworked slot, install the aluminum knob and turn its screw to lock it; use the plastic profile template to obtain a thickness of about 1.5mm between the cockpit surface and the bottom part of the aluminum knob.

Use the provided 4mm MA black screws (length 10mm) to fix the instrument to the panel. Do not over-tighten the screws in order to avoid damage to the IFD-NET chassis. Use a medium thread locker to ensure screws will not come off due to vibrations.

GPS ANTENNA

The Gyrocompass uses the GPS antenna for navigation, to get the GPS track over the ground, and finally to increase the reliability of the tilt-compensated compass.

In the figures below there are two different types of GPS antenna. These are terminated by a SMA MALE standard connector.



There are some precise rules to observe on how to install GPS antenna:

- Choose between magnetic or adhesive type in order to obtain a perfect coupling between the parts, antenna and aircraft.
- Choose a location where no electromagnetic noise is present.
- GPS antenna must not be covered by metallic or conductive shields. Keep in account that carbon fiber is a conductive material and may reduce the sensitivity of the antenna.
- GPS antenna cable must not pass near electromagnetic noise generators like radio, transponder or ELT.

Please refer to safety aeronautical rules in order to make a reliable antennas installation. Consider all the radio frequency based installed equipment needs in order to avoid electromagnetic conflicts.

SELECTING AN APPROPRIATE INSTALLATION POSITION

The IFD-NET is a multi-sensor system based on a variety of sophisticated transducers. Every sensor has a sensitive element, which measure a different physical quantity. For this reason, the embedded three axis magnetometer must be as far as possible from strong magnetic fields, as much as the three-axis accelerometer could be located in a zone not directly subjected to resonant unwanted vibrations of the body of the plane. Some rules must be observed in order to select an appropriate installation position:

- Mobile headset, phone or other electronic equipment may generate unwanted magnetic fields that interact with magnetometer sensor at the base of the embedded digital compass; this results, firstly, in an incorrect value of the magnetic heading, and then, in an erroneous calculation/estimation of the wind direction and speed. Metallic objects (especially ferromagnetic) can disturb the normal functionality of the magnetic compass. We suggest to use a hand-held compass to verify the magnetic disturbance in the area selected for installation. If the needle shows relevant changes or unstable indication, the location is not suitable for installation. Make sure to perform this test with all on-board electronic devices switched ON.
- GPS unit is embedded in the body of the instrument IFD-NET EFIS/MAP. For this reason, a high level of electromagnetic radiations may cause a degradation of its sensitivity and performance. Choose an install position not so close to radio-frequency emitter units like radios, ELTs or transponders. Pay attention in antennas position also in order not to compromise the proper operation of all the aircraft instruments.
- As the unit contains GYROSCOPE and ACCELEROMETER sensors, we recommend to install the instrument as much aligned as possible with the aircraft axes. A maximum tilt of 5 degrees in roll and pitch should be respected.

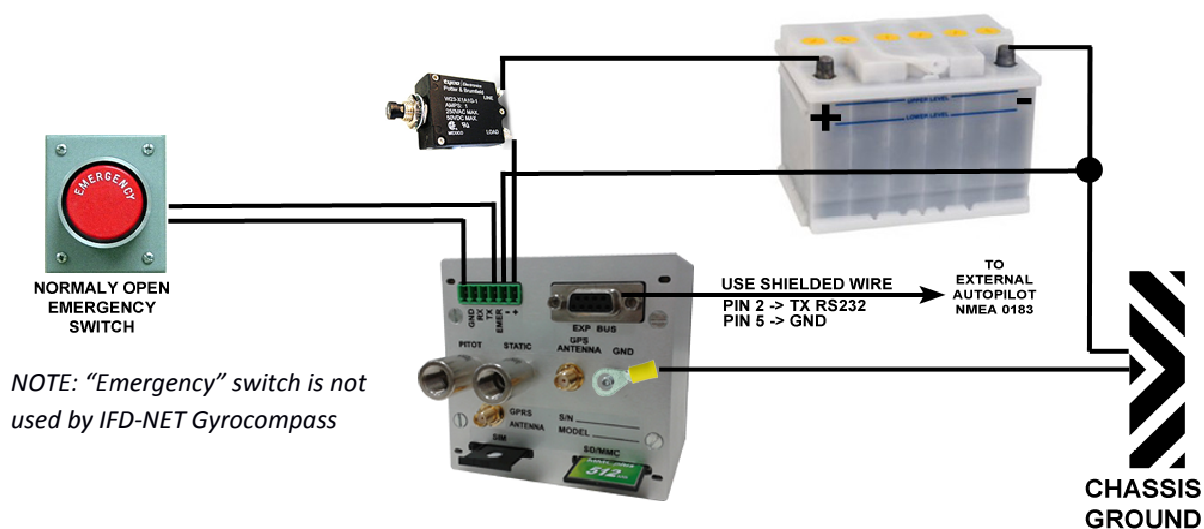
- Choose a position not affected by residual and unwanted vibration. The instrument uses a sophisticated algorithm to determine the real gravity vector from the total sensed acceleration. Too much resonant vibration can further complicate the computation resulting in reduced performance of this compensation.
- The pitot-static system contributes to the attitude calculation (it determines the frontal acceleration) and also for this reason must be in good condition and without leaks. No high pressures are involved in this circuit but, when selecting the install position, leave enough space on the rear of the instrument to allow the rubber pipes to flow without too tight bends.
- Avoid installing the equipment near hot surfaces. A good idea could be to ventilate the rear of the cockpit in order to protect instruments from overheating during exposure of the aircraft to direct sunlight.

There is plenty of documentation available that explains how to correctly install avionic instruments. Please refer to technical literature for more information.

POWERING AND EXPANSION BUS

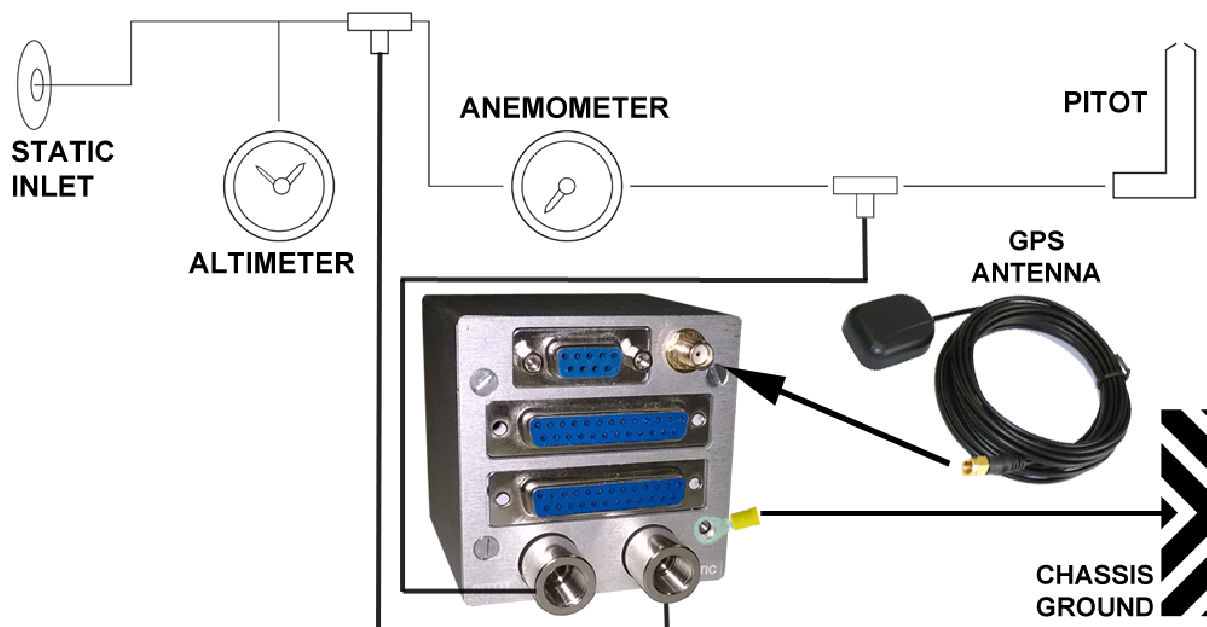
The electrical connection of the Gyrocompass is very simple. As all of the sensors are inside the metal housing, the only electrical connection needed is the main power line (10 to 28Vdc using an aeronautical safety breaker) and an optional connection to the expansion BUS. Please contact vendor in order to find out more details on the expansion accessories designed for this unit.

Use wires with a cross section not less than 1.5 square millimeters. Keep connections as short as possible.



PNEUMATIC AND GPS ANTENNA CONNECTION

The Gyrocompass can use pitot/static connections to increase the reliability of its tilt-compensated compass.



IMPORTANT NOTES ON PITOT/STATIC CONNECTION

Ensure that during installation the PITOT and STATIC tubes don't develop any twist and/or kinks, otherwise the IAS and Baro-Altitude indications will not work correctly. A bad airspeed reading may also affect the reliability of the attitude indication.

When fixing the PITOT/STATIC pipes to the instrument, please be especially careful to not twist the 1/8 NPT female adapters on the back of the unit.

If a too strong torque is applied, these adapters may rotate and twist the internal silicon pipes, causing a malfunction.

We suggest to use pipe hose adapters with rubber o-ring in order to avoid pressure leaks, and in any case don't lock it too strongly.

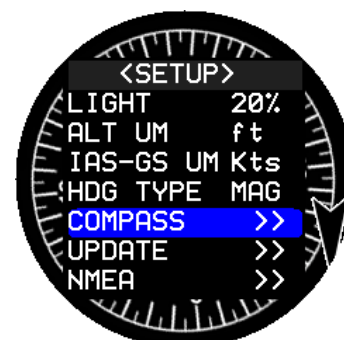
The hose adapters should be locked by hands and not by wrench. Otherwise, during screw operation, hold the 1/8NPT units adapter with a second wrench to avoid that they rotate and twist the internal pipes.

MAGNETIC COMPASS CALIBRATION

The compass is usually calibrated and tested at the factory; however we strongly advise to recalibrate the instrument after installation in the panel, due to the specific electromagnetic environment of each aircraft.

Please note that outside the compass calibration page (described below) the magnetic compass is used if the heading source is set to "MAG" or "AUTO". Otherwise the instrument will only use the GPS track when available (see paragraph **SETUP** above, **HDG TYPE**)

The Gyrocompass is designed to be calibrated automatically in flight.



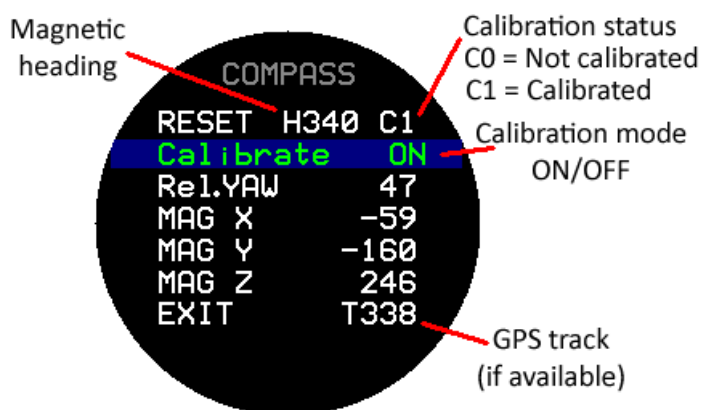
STEP 1: Activate the calibration mode

We suggest to start the engine and turn on avionics and radios, so that the electromagnetic field of the aircraft will be in a condition similar to normal cruise flight.

Enter the **SETUP** menu, then select "**COMPASS >>**" to enter the compass page.

If calibration mode is off ("Calibrate OFF"), select "Calibrate", and press the knob; the text will change to "**Calibrate ON**".

The calibration mode works in background, so if desired you can leave the COMPASS screen by selecting "EXIT".



Tip: The GPS track can be compared to the magnetic heading to check the accuracy of the compass while taxiing on the ground

STEP 2: Taxi around and/or fly to calibrate the compass

The compass calibrates **automatically**, both on the ground and in flight, as long as the aircraft performs at least a turn through 360 degrees or more.

To obtain a good calibration we suggest to take off and **fly at least two 360° turns**, first to the left and then to the right, keeping a good bank angle (between 30° - 45°).

The more maneuvers you fly (especially turns), the better the compass calibration should become. You can also fly some pitch up/down maneuvers in several directions, so the instrument has more data to refine the calibration.

If you choose to calibrate the compass only on the ground, it will still work but the heading indication will probably be inaccurate when the aircraft attitude is not level.

STEP 3: Optionally, switch off automatic calibration when done

The automatic compass calibration can remain always on, but if you prefer to keep the current calibration because you are happy with it, you can switch it off.

Enter again the COMPASS screen and set "**Calibrate: OFF**"

Note that the instrument will remember whether the automatic calibration is active or not, even after the electrical power is cycled OFF/ON.

MAGNETIC INTERFERENCE

Once your instrument has been installed on the panel and the magnetic compass is calibrated, pay special attention to avoid strong magnetic fields and/or magnets near the instrument. Some parts of the panel or the IFD-NET itself may become magnetized if exposed to a magnet, for example the one contained in some GPS antennas.

If metallic components near the IFD-NET become magnetized, it may be necessary to re-calibrate the compass.

In case the magnetic field near the instrument is too strong, the compass will not calibrate and/or will not indicate correctly.

You can detect this situation in the COMPASS page. If any of the indications "MAG X", "MAG Y" or "MAG Z" shows three asterisks (***) instead a number, then the magnetometer is saturated by a too strong magnetic field and the compass will not work properly.

CLEARING THE COMPASS CALIBRATION

If for any reason you want to completely clear the compass calibration, press the knob over the "RESET" option in the COMPASS calibration page.

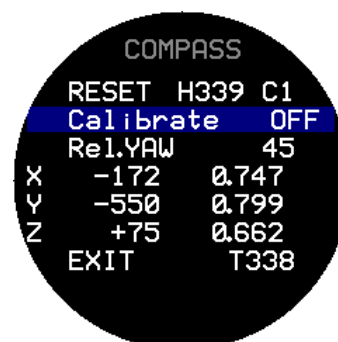
When you press "RESET" and then don't complete the calibration, the magnetic heading will remain unavailable outside the COMPASS page.

In this case the heading indicator in the PFD/MAP/NAV pages will always show "---" unless you set "HDG TYPE" to either "AUTO" or "GPS" in the SETUP menu.

ADDITIONAL TECHNICAL NOTES

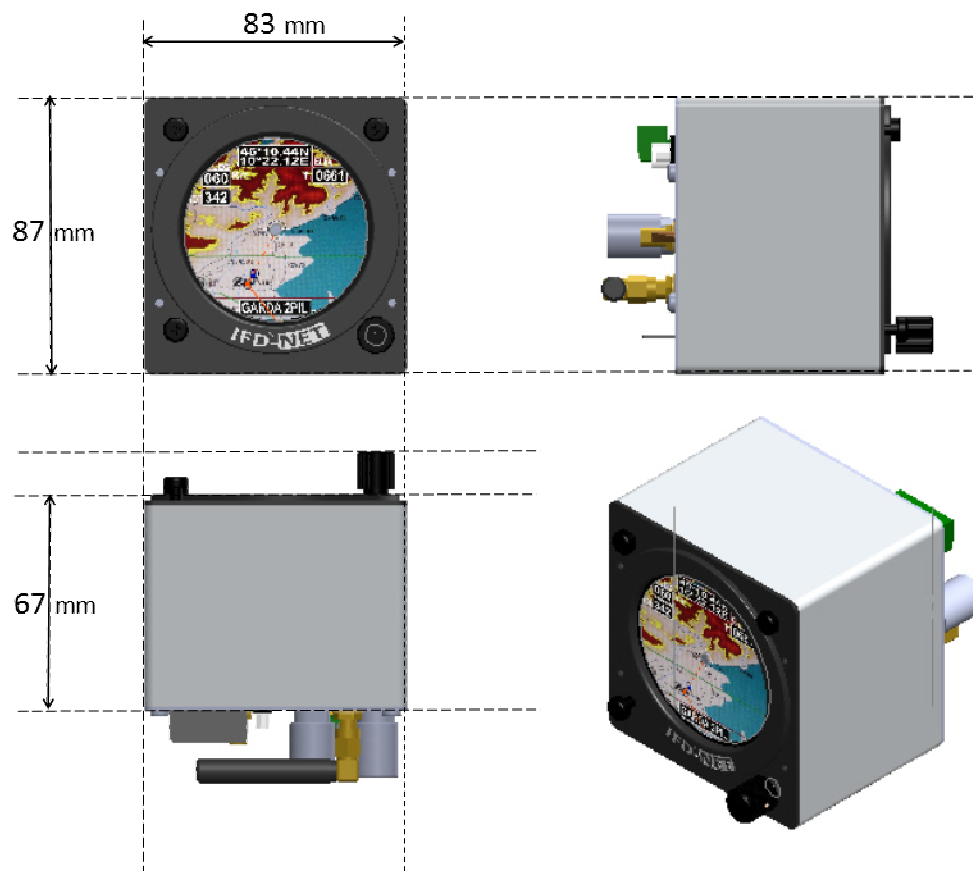
The three values shown in the compass calibration page (MAG X, MAG Y, MAG Z) are proportional the sensed magnetic field components.

You can press on the "MAG X" (fourth) item to show more parameters that may be useful for troubleshooting by a technician (X, Y, Z offsets and scale factors):



Press again on the fourth menu item to go back to the normal display (MAG X, MAG Y, MAG Z)

MECHANICAL DIMENSIONS



ORDERING INFORMATION

The IFD-NET series is available in several models (BARO, EFIS, EFIS/MAP ...). Because of their differing internal electronic configuration, is not possible to switch between the different models after final testing. Please select the model keeping in account your exact needs or talk to our technical department for guidance to meet your aircraft configuration.

Below you'll find the ordering codes for applicable to the product described in this manual, and its optional tools/spare:

- IFD-NET Gyrocompass
- GPS MAGNETIC AND ADESIVE ANTENNA
- 1/8 NPT MALE to RUBBER PIPE HOSE ADAPTERS

Note:

- Please contact vendor for more information about this product and other commercial offers.
- This equipment is not certified and was developed for ultralight and experimental aircraft. Users must observe VFR policy during flight.