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IFD-NET EFIS   IFD-microNET EFIS

THE NEXT GENERATION EFIS

USER AND INSTALLATION MANUAL

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FEATURES

- Standard 57mm (IFD-microNET) or 80mm (IFD-NET) 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 three buttons (rotary knob for IFD-NET)
- High integration level (all sensors embedded) *
- Multi-environment software with simple switch menu
- Several functions in color/ graphic display:
  - Artificial horizon
  - IAS
  - Altimeter with settable REF Pressure
  - VSI
  - 3D Magnetic compass
  - Slip indicator
  - Turn coordinator
  - G-Meter with peak recording
  - GPS navigation in ADF mode
  - More than 8000 POIs (navigation points) in the internal Database

MODELS AND FUNCTIONALITIES

The IFD-microNET and IFD-NET EFIS are sold in two different configurations and the differences between the models are explained below.

- **EFIS Base 57mm and 80mm**: this BASIC model is capable of displaying only one environment screen; Primary Flight Display (PFD) that consists of a complete AVIONIC platform intended as part of a backup or complementary system. The ultra-bright sun readable color screen shows information regarding altitude (barometric and GPS value), adjustable reference pressure, Vertical Speed (VSI), Slip indicator, G-meter indication (with peak recording), Air Speed (IAS) with colored safety adjustable ribbon, GROUND Speed with same unit of measure of IAS, magnetic or GPS heading indicator and, finally, an effective Turn Coordinator. All of this information is displaying on a very accurate and responsive Artificial Horizon with bank angle indicator.

- **EFIS PLUS 57mm**: The advanced PLUS version of IFD-microNET can display other environment screens as an auxiliary function of the primary one. Pilots can choose amongst seven auxiliary functions:

  1. **GOTO ADF**
  2. **GYRO COMPASS**
  3. **ALTIMETER GAUGE**
  4. **VERTICAL SPEED INDICATOR**
  5. **AIRSPEED INDICATOR**
  6. **G-METER WITH PEAK RECORDING**
  7. **AUTOPILOT INTERFACE**

> **NOTE: the 80mm EFIS PLUS** is available as a more powerful product with its own specific manual.
>
> Please see the EFIS PLUS documentation on **http://www.ifd-net.com**

NOTE: All information below refers to the IFD-microNET (57mm) and apply as well to the IFD-NET (80mm) unless otherwise noted. The IFD-NET (80mm) has a **rotary knob** while t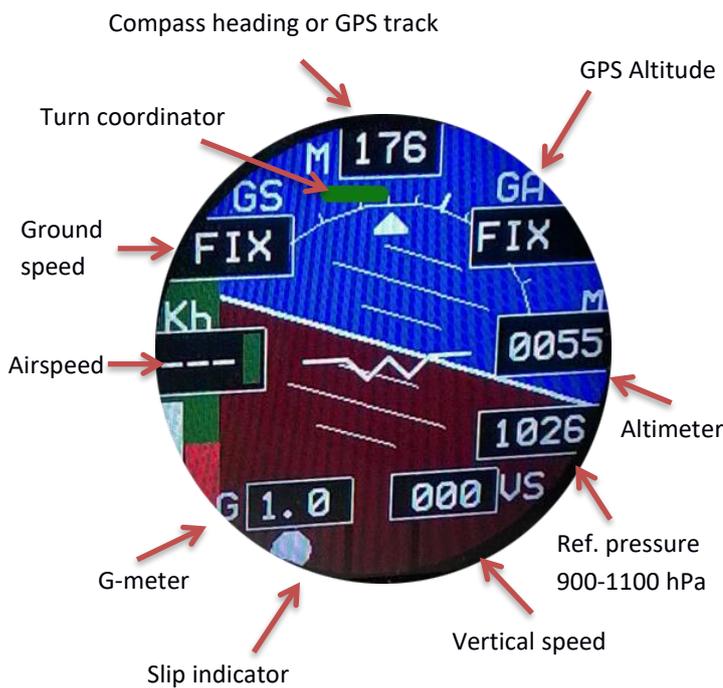he IFD-microNET (57mm) has **three buttons**. Whenever the documentation below refers to the IFD-microNET buttons, the corresponding IFD-NET actions are:

Action	IFD-microNET EFIS	IFD-NET EFIS (80mm)
Move up in menus, or decrease values	Left button	Rotate knob left
Confirm menu selection or confirm values	Middle button	Push knob
Move down in menus, or increase values	Right button	Rotate knob right

ELECTRICAL AND MECHANICAL SPECIFICATION

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- 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.

FUNCTIONALITY INTRODUCTION

Compass heading or GPS track

Turn coordinator

GPS Altitude

Ground speed

Airspeed

G-meter

Slip indicator

Vertical speed

Altimeter

Ref. pressure 900-1100 hPa

The Primary Flight Display (PFD) contains avionic data mainly concerning flight speed and aircraft attitude. In order to maximize screen clarity, it is possible to configure which parameters to display through the setup menu.

NOTE: out-of-range or otherwise unavailable values are displayed as dashes (" - - - ")

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

Limited to EFIS PLUS model, pilots can select the AUXILIARY function among seven screens:

1. **GOTO ADF**
2. **GYRO COMPASS** (shown on the right)
3. **ALTIMETER GAUGE**
4. **VERTICAL SPEED INDICATOR**
5. **AIRSPEED INDICATOR**
6. **G-METER WITH PEAK RECORDING**
7. **AUTOPILOT INTERFACE**

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ENVIRONMENTS DESCRIPTION AND SCREENSHOTS

The IFD-microNET interface is based on three front buttons that give access to all the settings pilots need during flight, and possibility to adjust setup parameters.

As explained above the IFD-NET (80mm) provides a rotary knob instead, which works similarly to the three buttons on the IFD-microNET (knob rotation = left/right buttons, knob push = middle button)

On the right is shown an instrument in "Primary Flight Display" configuration (AVIONIC).   Pressing the right or left button will increase or decrease the reference pressure respectively. The reference pressure affects the value of the barometric altitude; setting the exact local pressure (QFE) in the reference pressure causes the altimeter to display zero altitude. Setting the pressure to the sea level (QNH), the barometric altitude will display the exact altitude AMSL.

The pilot can access the main menu by pressing the center button (or pressing the knob on the 80mm) for about 1 second until the screen shown on the right appears.

MAIN MENU

Within menus, the left button moves the selection up, the right button moves the selection down, and the middle button confirms the highlighted selection.

On the IFD-NET (80mm) rotate the knob to move the selection and confirm by pushing the knob itself.

Explanation of main menu:

- **AVIONIC**: The EFIS switches to the primary flight display. The screen displays the entire set of avionic data calculated by the internal processor using the inertial and pneumatic sensors as well as GPS data from the embedded receiver. The layout of the AVIONIC page is configurable by accessing the SETUP feature.

- **G RESET**: highlight this option in order to read the G-meter mimimum and maximum recorded values. These peak values are zeroed at the startup of the system (power up). You can manually reset the G-meter by pressing the middle button over this menu option (IFD-NET: push the knob)

AVIONIC (PFD) SCREEN

- **PITCH ADJ**: Use this option to zero the pitch/roll attitude of the artificial horizon. The aircraft must be in a level attitude. This function is active both in flight and on the ground. Once "PITCH ADJ" is selected and confirmed, the EFIS returns to the PFD screen. However the system refuses to reset the level attitude if the

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currently calculated pitch and/or roll is greater than +/-7.5
degrees; in this case pushing the button over this option has
no effect (the menu remains on the screen).

- **AUXILIARY**: the auxiliary function is available on the EFIS PLUS model only. The possible configurations for auxiliary function are:
    - **GOTO ADF**
    - **GYRO COMPASS**
    - **ALTIMETER GAUGE**
    - **VERTICAL SPEED INDICATOR**
    - **AIR SPEED INDICATOR**
    - **G-METER WITH PEAK RECORDING**
    - **AUTOPILOT INTERFACE**

SETUP MENU

- **SETUP**: the setup page lists all the configuration parameters that influence the instrument behavior. The Display will appear like the image on the right. As the BASE model of the instrument doesn't offer all the features of the PLUS model, some parameters listed below may not appear.
  To change a SETUP parameter highlight it with the left/right buttons, press the middle button to enter edit mode (the parameter turns green) and use the left/right buttons to change the value. Finally confirm the change with the middle button (the parameter becomes white again).
  On the IFD-NET (80mm) the rotary knob works similarly: push to edit, then rotate to change value, push again to confirm final value.

    - **EXIT:** goes back to main MENU.

    - **START PAGE:** the possible choices are "PFD" or "AUX". This parameter indicate which page will appear on screen immediately after a power up sequence. In case of "AUX" is selected, the screen will display the auxiliary function selected in the "AUX FUNC." parameter.

    - **BRIGHTNESS:** Sets the display brightness. Set it between 5 and 30 on the IFD-microNET (range is between 20 and 100 on the IFD-NET). Select this value according to environment lighting conditions and also keeping in account that a lower value means a lower power consumption.

    - **PFD LAYOUT:** chose between "FUL", "CLR" or "AH". In CLR configuration, the Primary Flight Display screen will be de-cluttered by hiding the G-meter, the TURN COORDINATOR bar, the GROUND SPEED, the GROUND ALTITUDE and the VERTICAL SPEED indicator. In AH configuration (Artificial Horizon) only the bank indicator, heading and slip indicator are visible.

    - **AUX FUNC.:** select the desired auxiliary function switchable directly from the main MENU. The auxiliary functions pilots can select are GOTO ADF, GYRO COMPASS, ALTIMETER GAUGE, VERTICAL SPEED INDICATOR GAUGE, INDICATED AIR SPEED GAUGE, G-METER GAUGE and AUTO PILOT INTERFACE. Please refer to the next section to learn more about the auxiliary functions detail and operation mode.

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o   **HDG TYPE:** select "AUTO", "GPS" or "MAG" to set the behavior of the "heading indicator" in the PrimaryFlightDisplay (Avionic) screen.
   "GPS" results in an indication of true ground track.
   "MAG" shows magnetic heading.
   "AUTO" shows uses GPS ground track when available and falls back to MAG (e.g. if the aircraft is not moving or the GPS fix is lost).

o   **UOM ALT:** define the unit of measure for barometric altitude and GPS altitude between meter or feet.

o   **UOM IAS:** define the unit of measure for IAS and GPS ground speed indicators between KPH (Km/h) and KNOTS.

o   **UOM VSI:** define the unit of measure of vertical speed indicator between meters per second or 100 feet per minute.

o   **UOM PRESS:** define the unit of measure of reference pressure in the relative indicator between mBar or inches of mercury. The normalized value after the power up sequence of the unit is 1013mB or 29.92 IN/HG. Pilots can vary this value by pressing the right or left button in order to increase or decrease pressure respectively.

o   **UOM DIST:** define the unit of measure for distance.

o   **ROLL TILT:** by activating this function the installer can adjust for the exact roll installation error. Please refer to the section "ARTIFICIAL HORIZON CALIBRATION" for more details.

o   **PITCH TILT:** by activating this function the installer can adjust for the exact pitch installation error. Please refer to the section "ARTIFICIAL HORIZON CALIBRATION" for more details.

o   **PRES TRM:** Change this value (initially 0.0 hPa) to introduce an offset in the altimeter reference pressure. Can be used to re-calibrate the EFIS altimeter to match another reference altimeter.

o   **IAS Vs0:** indicate the value of Vs0 speed corresponding to the white arc start. The *speeds are indicated entered in Km/h* here, regardless of the "UOM IAS" parameter setting. Please refer to section "IAS COLORED ARC DESCRIPTION" to learn more about the colored arc on IAS gauge screen.

o   **IAS vs1:** indicate the value of Vs1 velocity

o   **IAS Vfe:** indicate the value of Vfe velocity.

o   **IAS Vno:** indicate the value of Vno velocity.

o   **IAS Vne:** indicate the value of Vne velocity.

o   **GM Pred:** define the positive full scale of the G-meter.

o   **GM Pyel:** define the initial of red arc of the G-meter scale.

o   **GM Pgrn:** define the initial point of the yellow arc and the final point of the green arc. The green arc starts from 1G value.

o   **GM Ngrn:** define the initial point of the yellow arc in the G meter negative scale. The green arc continues from the value of +1G.

o   **GM Nyel:** define the initial point of the red arc in the negative G meter scale.

o   **GM Nred:** define the negative full scale in the G meter arc.

o   **COMPAS ->:** this is the way to access to magnetic compass calibration sub menu'. Please refer to section "MAGNETIC COMPASS CALIBRATION" to find the exact calibration sequence steps.

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- o **LOGIN ->:** Use this sub menu to enter the technical credentials in order to unlock the "CALIB" submenu.

- o **CALIB. ->:** Accesses the hardware calibration menu, which contains many important settings that can compromise the functionality of the entire system if mismanaged. Please contact the vendor before accessing this menu.

IAS COLORED ARC DESCRIPTION

Below is shown the IAS representation displayed when the classic anemometer screen is selected as auxiliary function. In the setup menu it is possible to configure the entire colored arc. Full scale speed is automatically determined by Vne parameter plus 30KPH or KNOTS.
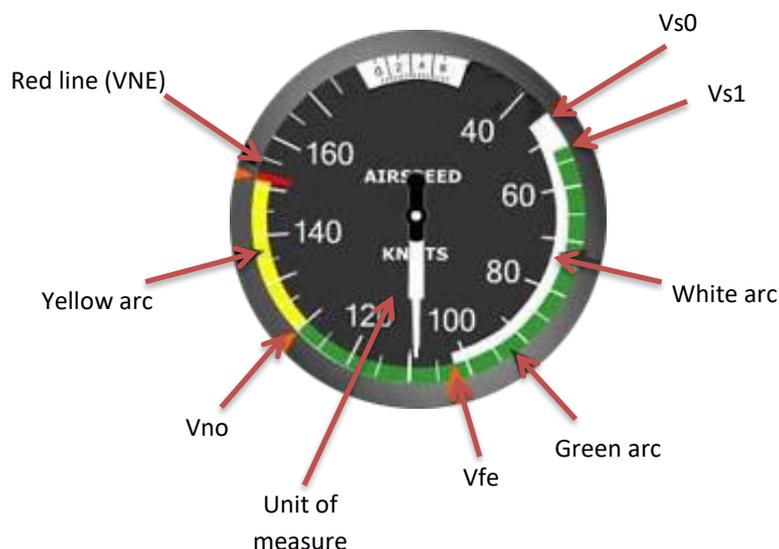
White window indicates the numeric value of the aircraft air speed in the same unit of measure selected by the appropriate setup parameter.

The color ranges in the speed arc are determined by setting the parameters listed in the SETUP menu of the EFIS PLUS model only:

* The white arc starts from Vs0 value and ends on Vfe, defining the safe area of operation for flaps and gears.
* The Green arc starts from Vs1 and ends on Vno
* Yellow arc starts from Vno and ends on Vne.

Please refer to your aircraft manual in order to set all V-speeds accurately.

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AUXILIARY FUNCTIONS FEATURES

The auxiliary functions are present in the EFIS PLUS model only.
Please find below a description of each function. Press the central
button longer than two seconds to exit from auxiliary functions and
go back to PFD screen.

GOTO ADF

The GOTO ADF (**A**utomatic **D**irection **F**inder) auxiliary function is a very useful
tool considerable like an indispensable basic navigation backup system. A user
friendly interface united to a complete embedded database of more than
8000 POI (**P**oints **O**f **I**nterest) make it very easy to use even in emergency,
dangerous or normal flight conditions.

Press the central button more than two seconds to engage menu and select
the auxiliary function slot "GOTO ADF". In case the function GOTO ADF is not
present on the screen choices, please refer to SETUP parameters and modify
the setting of "AUX FUNC." to "ADF".

Entering the GOTO ADF screen, pilot can follow white heading bug in order to
navigate in the target direction.

In case no target is selected (TRG: NO TARGET), pilots can press shortly the
central button in order to enter the NEAREST TARGET LIST (figure on the right)
and select one, otherwise the pilots can vary the heading bug position by
pressing the left and right button in a known direction. In this case the system
automatically finds the nearest POI in respect to aircraft position and displays
on screen its main radio frequency.

In both "NO-TARGET" and "GOTO" navigation the system displays the latitude
and longitude coordinates of the aircraft as well as GPS altitude, ground speed
and IAS using the same units of measure selected by SETUP parameters. In
case of target selection done, the system displays the distance in Km or
nautical miles (depending of distance unit of measure "UOM DIST").

GYRO COMPASS

The GYRO COMPASS auxiliary function displays on screen the exact heading
direction of the aircraft basing the angle computation on an algorithm that
involve gyroscopes, accelerometers and magnetic compensation. In case of
the data from sensors are suited for detect the theta angle between magnetic
north and GPS tracking direction, the screen display an estimation of the wind
direction and speed. The blue heading bug indicates the direction of the wind.

By pressing right or left button, the pilot can adjust the white heading bug
position on the angles arc in order to select a desired heading to follow. This
setting will be zeroed at the next power up.

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ALTIMETER GAUGE

Altimeter gauge auxiliary function display a typical analog altimeter gauge. The unit of measure is written on gauge and depends of the setting in the SETUP parameters "UOM ALT" and "UOM PRES".

The user can adjust the reference pressure by pressing right button to increase its value or left button for decrease. After a power up sequence the value of the reference pressure will be 1013mB or 29.92InHg in accordance to the parameter "UOM PRES".

VERTICAL SPEED INDICATOR

The vertical speed indicator auxiliary function reproduces an analog gauge which indicates the climb or descent ratio in the unit of measure selected by "UOM VSI" parameter in the SETUP list. This data is based on a derivative calculation of the barometric altitude and for this reason its accuracy depends on the optimal status of the pitot-static system of the aircraft. The available units of measure are m/s or hundreds of ft/min.

AIRSPEED INDICATOR

The IAS screen displays the airspeed of the aircraft calculated by converting the pressure sampled from the PITOT inlet (differential between STATIC and DYNAMIC pressure). By setting some SETUP parameters, the installer can vary the full scale and the position of the colored arc. Please refer to "IAS COLORED ARC DESCRIPTION" section in order to find more details on how to set these parameters.

G METER WITH PEAK RECORDING

G meter auxiliary function is a useful tool helping the pilot during some particular maneuvers where the acceleration forces may reach dangerous levels and the aircraft structure could be damaged. In the SETUP parameter list, the installer can define the ranges of the colored arc. Applying long pressure on the right button, pilots can reset the positive peak indicator and applying long pressure on the left button can reset the negative peak indicator. Resetting the peak indicators means to put its value to the normalized value of +1.0G.

AUTOPILOT INTERFACE

The Autopilot interface auxiliary function is intended as a redundant control platform for the M.A.V. Avionic AP called IFD-AP.

The IFD-AP contains already all the sensors and drivers to control up to three digital servos and can work alone without any external sensors. IFD-AP even has an embedded GPS receiver.

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Because of its basic interface, it is suggested to connect another unit in order to control the auto pilot engine with a powerful graphics dashboard. IFD-microNET EFIS PLUS provide this auxiliary function and can remotely control the entire set of function of the IFD-AP engine. It can even steer the autopilot to follow a route or a direct track to a point in the database.

In the Autopilot interface environment, pilots can manage altitude, heading and all the settings concerning the max climb or descend ratio, normalized steering ratio, max pitch and roll angle, max slip/lateral acceleration and more.
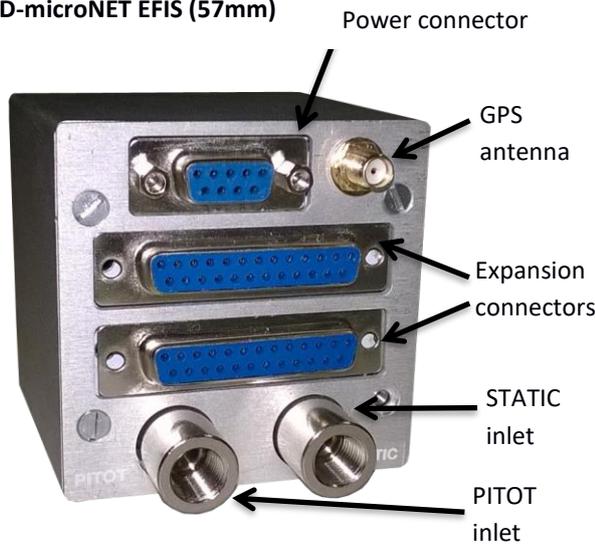
Please refer to IFD-AP manual in order to learn more about the graphic interface to control the auto pilot engine.

IFD-AP can be controlled by IFD-microNET EFIS PLUS, IFD-NET (all models except the BARO version), IFD6000, IFD7000 and IFD10000.

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REAR CONNECTORS VIEW AND DESCRIPTION

IFD-microNET EFIS (57mm)

The power connector is the only electrical connection needed. The details about this connector are explained in the next section "POWERING AND EXPANSION BUS". The expansion connectors are not used in IFD-microNET EFIS BASE or PLUS models. Pneumatic inlets, STATIC and PITOT pressures, are provided by two nickel-plated brass 1/8 NPT female plugs. **Use adequate adapters with rubber O-rings and do not turn hoses with too much force to avoid damage to internal parts of the unit.** GPS connector antenna accepts any SMA male standard connector and several types of GPS band antenna. Please observe the right policy during the selection of the antenna position on your aircraft. Contact the vendor to obtain more information on this point.

IFD-NET EFIS (80mm)
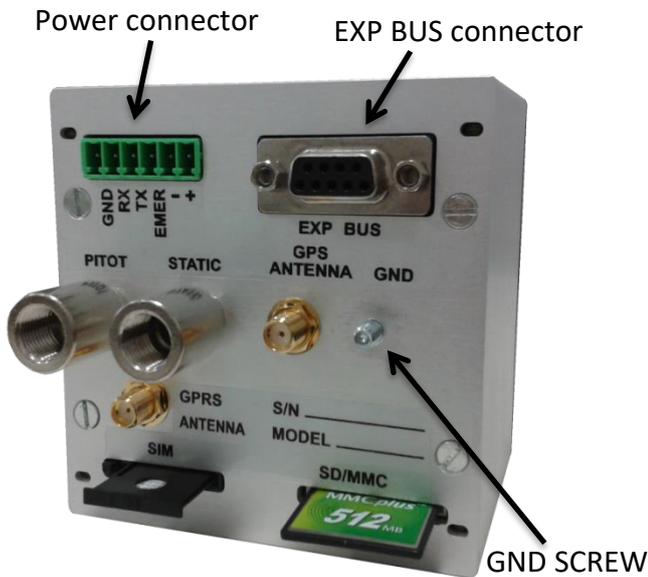
POWER CONNECTOR:

- **+12V** (10 to 30Vdc) 250mA: use 5A Fuse
- **– 0V** -> Same as GND
- **EMER** -> not used in this model
- **TX** -> Not used in this model
- **RX** -> Not used in this model
- **GND** -> Ground

EXP BUS CONNECTOR:

- **Pin 1**: 12/24 Vdc out (max 500mA)
- **Pin 2**: NMEA RS232 TX (not available on EFIS BASE)
- **Pin 3**: NMEA RS232 RX (not available on EFIS BASE)
- **Pin 4**: RS485 A+ signal for FLY BUS®
- **Pin 5**: GND
- **Pin 6**: +5 Vdc out (max 250mA)
- **Pin 7**: +5 Vdc out (max 250mA)
- **Pin 8**: GND
- **Pin 9**: RS485 B- signal for FLY BUS®
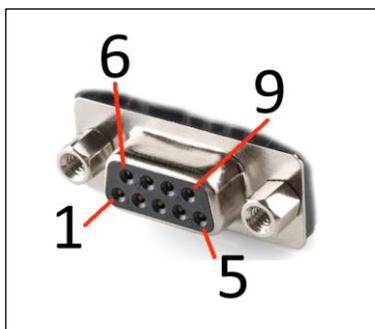
> **NOTE:** The GPRS Antenna and the SIM slot are not fitted on the EFIS BASE models. They will be available as an option on higher models.

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INSTALLATION GUIDE

The IFD-microNET EFIS PLUS and BASE models have a standard 57mm aeronautical shape, while the IFD-NET EFIS PLUS/BASE is designed for an 80mm hole.

This means the installer should observe the standard way in order to obtain a correct installation on the unit. Refer to the hole templates below in case your aircraft doesn't have 57/80mm holes already prepared.
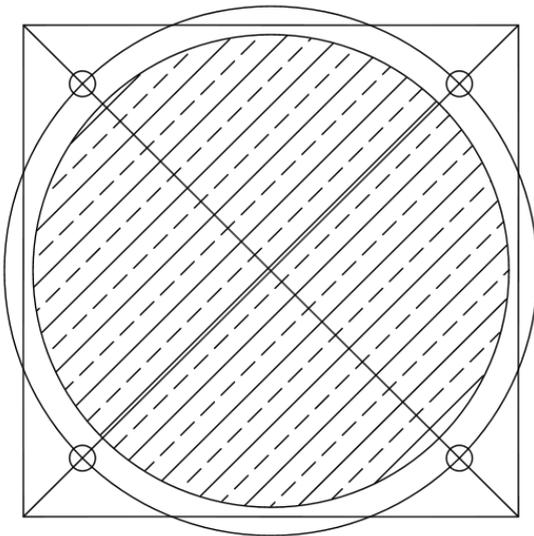
3 1/8 (80mm) Instrument Hole

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.
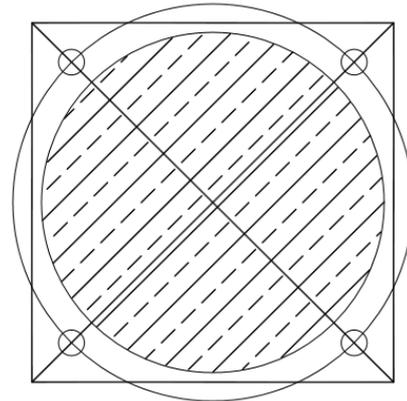
2 1/4 (57mm) Instrument Hole

1. Draw a 2.375" X 2.375" Square
2. Scribe 2 diagonal line corner to corner
3. Using the center of the lines, scribe a 2.625" diameter circle.
4. At the intersection of the diagonals and the 2.625 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 2.250" dia.

To lock the IFD-microNET (57mm) unit on you cockpit use the four black screws provided in the purchase box, otherwise select different screws with same dimension of 3MA x 10mm MAX.

No modifications to standard 2 ¼ inches (57mm) holes are required to obtain a perfect unit installation.

The IFD-NET (80mm) 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.

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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
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
IFD-microNET EFIS 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-microNET EFIS. For this reason, a high level of electromagnetic radiations may cause a degradation of its sensitivity and performance. Choose an install

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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. It is possible to compensate for this directly and easily when the aircraft is in a level attitude using the PITCH ADJ function.

- 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.
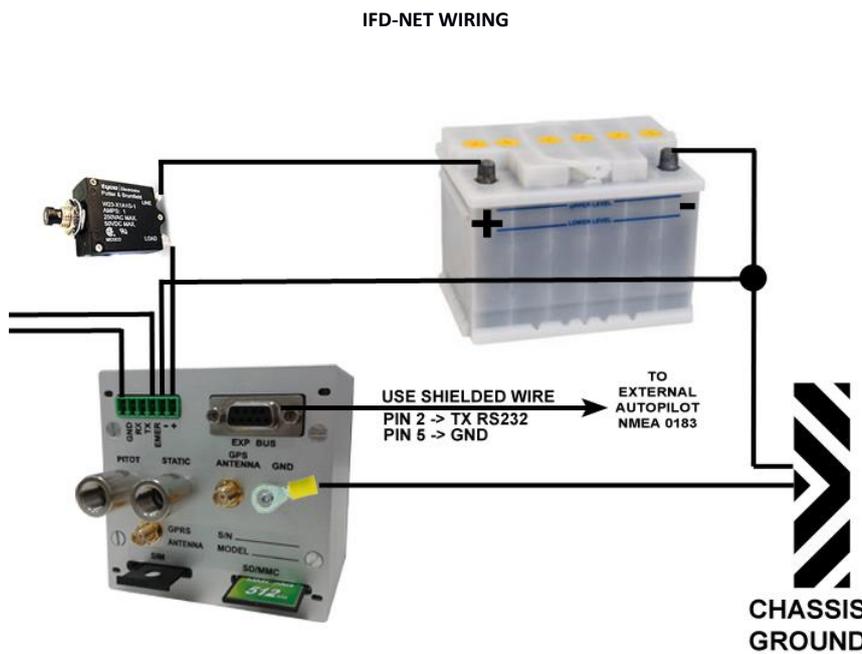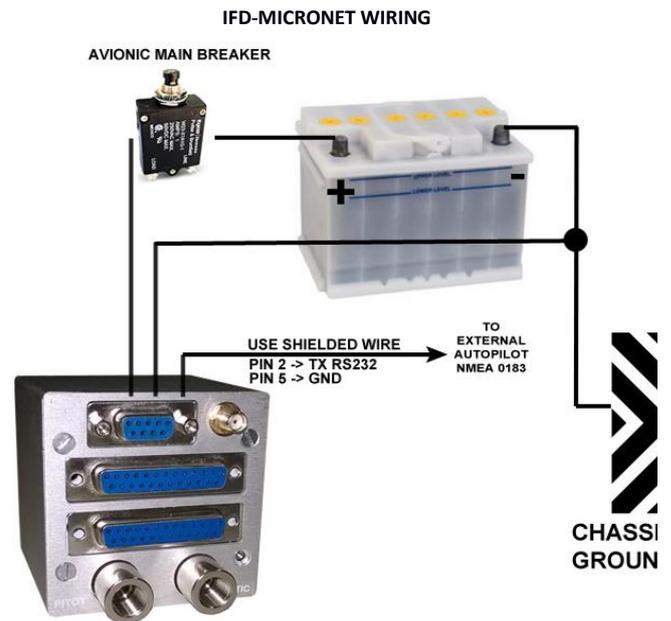
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POWERING AND EXPANSION BUS

The electrical connection of the EFIS BASE and PLUS models is very simple. As all of the sensors are inside the metal housing, the only electrical connection it needs 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.

On the right is a simple wiring diagram for electrical connection of the IFD-microNET.

See below for the IFD-NET wiring diagram.

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

IFD-MICRONET WIRING

AVIONIC MAIN BREAKER

USE SHIELDED WIRE
PIN 2 -> TX RS232
PIN 5 -> GND

TO EXTERNAL AUTOPILOT NMEA 0183

CHASSIS GROUND

IFD-NET WIRING

USE SHIELDED WIRE
PIN 2 -> TX RS232
PIN 5 -> GND

TO EXTERNAL AUTOPILOT NMEA 0183

CHASSIS GROUND

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IFD-microNET J1 connector pins

1. Main power supply (accepts voltages 10 - 28Vdc).
2. (TX output) pole of RS232 BUS. [NOT USED]
3. (RX input) pole of RS232 BUS. [NOT USED]
4. (A) pole of RS485 BUS.
5. Ground. Connect to Ground chassis of aircraft or to negative pole of electric circuit.
6. Main power supply (accepts tension between 10 to 28Vdc).
7. Not connected. Leave unplugged.
8. Ground. Connect to Ground chassis of aircraft or to negative pole of electric circuit.
9. (B) pole of RS485 BUS.
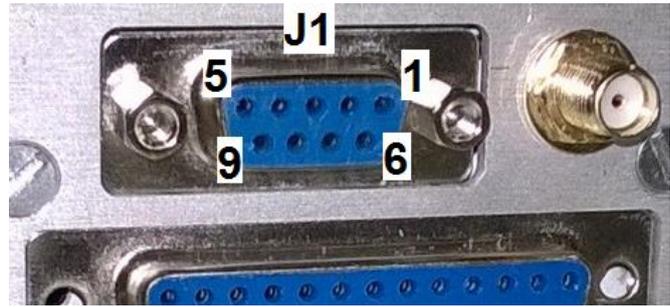
Pins 1 and 6 must be connected both to the positive pole of aircraft electric circuit. Pins 5 and 8 must be connected both to negative pole of aircraft electric circuit.

A good idea would be to connect one of four screws on the rear of the instrument directly to the metal ground chassis of the aircraft by a dedicated "faston terminal" and by a black cable with 2.5 square millimeters section. This practice may decrease radio frequency noises generated by the device and improve the filtering efficiency of internal electronic components (see "Pneumatic, GPS and Ground chassis connections" figure below).

PNEUMATIC AND GPS ANTENNA CONNECTION

The pneumatic circuit functionality is very important in order to obtain correct avionic data. Please observe normal safety rules by connecting rubber pipes to the STATIC and PITOT inlet. Contact vendor for any questions regarding the right way to setup the aircraft plant. See below a diagram of pneumatic and GPS antenna connections.

Pneumatic, GPS and Ground chassis connections

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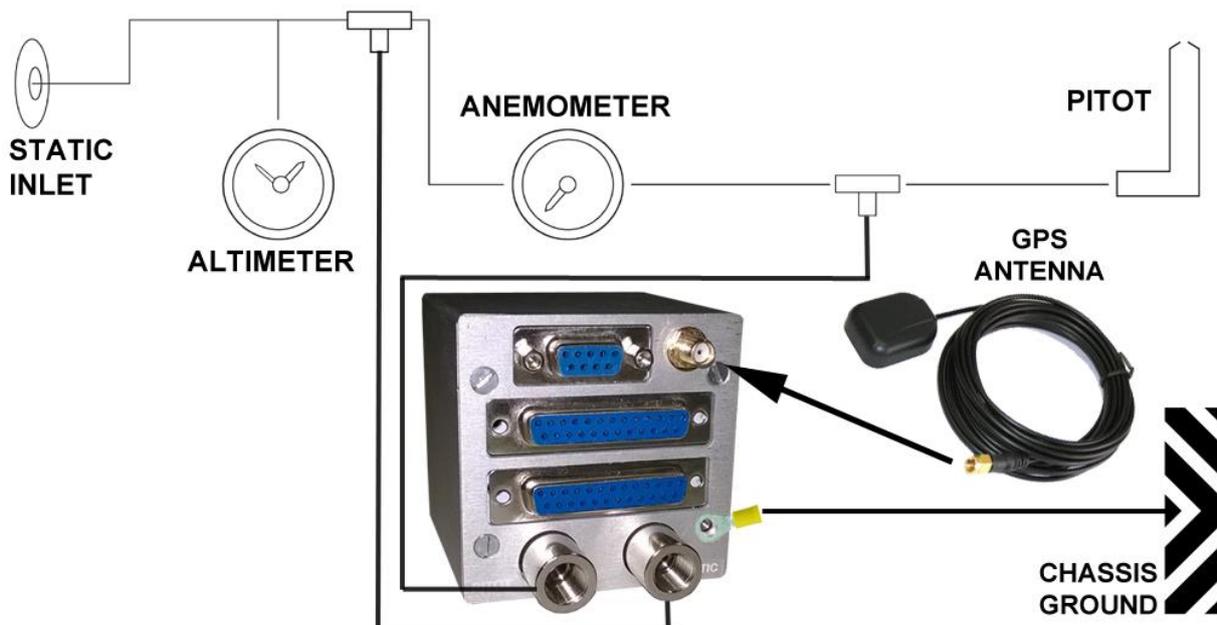
IMPORTANT NOTES ON PITOT/STATIC CONNECTION

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 particularly 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 rubber 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 the assembly too strongly.

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

ARTIFICIAL HORIZON CALIBRATION

The gyroscopes and accelerometers are already factory calibrated and don't need further adjustments during installation.

It is however possible to compensate for a mounting orientation that is not perfectly aligned with the aircraft axes using the following procedure:

- Park the aircraft on a flat and level surface

- Enter the SETUP menu and adjust the parameters: ROLL TILT, PITC TILT

- When one of these parameters is highlighted, a vertical bar will appear on the left of the screen

- Change each of the parameter values in a way that the corresponding vertical bar becomes fully red

- Select EXIT to leave the SETUP menu and save the calibration

The system then computes the actual pitch and roll, and creates a compensation value in order to zero the mounting errors. This procedure is even possible during a flight but will be less accurate.

There is another setting for pitch adjustment in the main menu (**PITCH ADJ**, described previously) which is intended as a pilot preference adjust. This is only a graphical setting which is remembered and restored on the next power-up.

Please refer to your aircraft instruction manual in order to obtain information regarding the attitude angle during cruise at different speed or about best attitude condition to obtain a zero pitch indication.

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MAGNETIC COMPASS CALIBRATION

The purpose of this procedure is to compensate magnetic disturbances affecting the EFIS, due to aircraft metallic structures and electromagnetic components. These disturbances, if not compensated, will alter the heading value provided by the system.

Even if the factory performs a preliminary calibration, after installing the instrument a re-calibration will be probably required due to the unique electromagnetic environment of each aircraft cockpit.

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

COMPASS CALIBRATION - IFD-NET EFIS (80mm)

 The 80mm EFIS compass is designed to be calibrated in flight with simple maneuvers. We suggest to perform two 360° turns, one to the left and one to the right, with a bank angle of at least 30°.

Proceed as follows:

- Ensure that the avionics and radios are powered, so that the magnetic field generated by the aircraft is representative of a normal cruise flight condition.

- Take off and fly to an area where you can maneuver freely.

- Enter the **SETUP** menu, then select "**COMPASS >>**"

- Select "**RESET**" and press the knob, to delete any previous calibration.

- Select "**START R**" and press the knob to start the calibration. This menu item usually reads "START R 0". The "**0**" will change to "**2**" (red color) to indicate that the calibration process has been started.

- Fly the aircraft along a right turn, we suggest to maintain a bank angle of 30° or more.
  Once you have completed the 360° turn to the right, invert the turn direction for another 360° turn to the left. Again, we suggest to maintain a bank angle of 30° or more.

- Once you have flown the turns, you can stop the calibration in two ways:
  a. Continue turning until the "**Rel.YAW**" value reaches +/- 420°, or
  b. Select "START R" and press the knob again
  You will notice that the "2" near "**START R**" changes back to "0". Also, the top-right item on the screen should read "**C1**" instead of "**C0**".

  - o In case the "**C0**" never turns to "**C1**", the magnetometer is not working correctly. It may be saturated by a very strong magnetic field.

  - o When the magnetometer is saturated, one or more of the "MAG X", "MAG Y" and MAG Z" items show asterisks symbols instead of a number ("***"). In this case try to reduce magnetic interference before attempting another calibration.

- When the top-right of the screen shows "**C1**", the basic calibration procedure is complete. Look at the heading indication on the top of the screen ("Hxxx") and verify whether it reads correctly. You may compare it with a reference compass for accuracy.

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- If the GPS is connected and the aircraft is moving, the COMPASS screen shows also an indication "Gxxx". This is the ground track. If you are taxiing on the ground, or flying with a negligible wind, you may use this indication to check whether the compass heading is correct.

- Select "**EXIT**", then again "**EXIT**" to go back to the main screen.
  The heading indication may be initially wrong because the gyroscope needs some time to align with the compass. In any case when the IFD-NET is powered OFF and then ON, the gyroscope is aligned instantly to the magnetometer.

CALIBRATION ON THE GROUND

We recommend to perform the calibration in flight, however you may have acceptable results on the ground, too.

In this case, we suggest to perform a single 420° taxi turn instead of the two turns in the air. However, **the resultant heading indication will only be correct when flying level or taxiing on the ground**; moreover, the wind vector may be reliable only when cruising straight and level.

VERIFICATION OF COMPASS HEADING AGAINST GPS TRACK

On the ground, it is possible to verify the accuracy of the magnetic compass calibration using the GPS track indication.

Open the compass calibration page, as described above.

Taxi the aircraft on a straight line, ideally along a taxiway or the runway. Keep the speed around 10 kts (not below 5 kts); an indication "Gxxx" will appear on the bottom right of the screen, near the "**EXIT**" menu item. (for example, "**G189**" as in the picture on the right).

That number (189 in the example) is your GPS track, corrected for magnetic variation. It should be very close to the magnetic heading ("Hxxx" at the top of the screen, 186 in the example).

The Compass Calibration procedure must be executed either in an open field out of the hangar (to avoid interference from any metallic structure) or in flight, and requires to steer the aircraft toward 4 directions and execute some pitch up/down movements. The total duration for this procedure is about 5 minutes.

ADDITIONAL TECHNICAL NOTES (80MM EFIS ONLY)

The three values shown in the compass calibration page (MAG X, MAG Y, MAG Z) are proportional the sensed magnetic field components. On a correctly calibrated system their values should remain between -500 and +500.

You can press on the "MAG X" (fourth) item to show more parameters. This additional information may be used by a technician for problem resolution.

When the compass is not under calibration, the alternate display shows, for each axis, the calibrated offset and gain values.

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During calibration the alternate display shows the minimum, current and maximum readings for each of the three axes.

In case one or more axes are saturated by a strong magnetic field, the corresponding line on the display will show only askerisks ("***********")

```
        COMPASS
 RESET  H251  C0
 START R          2
 Rel.YAW          0
X -696 -683 -644
Y  203  208  249
Z  797  811  813
 HDG OFFSET     0
 EXIT
```

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

COMPASS CALIBRATION – IFD MICRONET EFIS (57MM)

During the calibration procedure the aircraft has to be turned through a 420 degrees heading change. This can be done either on the ground or in flight. For a tricycle gear aircraft we suggest to proceed as follows, on the ground:

- Start the aircraft and power up avionics and radio so that the magnetic field generated by the aircraft will be representative of the cruise flight condition.

- Taxi the aircraft to a level apron, as far as possible from metallic objects. There must be enough available space for the aircraft to complete a full 360° taxi turn.

- On the EFIS enter the SETUP menu, then "COMPASS ->".

- Select "START R" and confirm the selection. The text will then change to show "START R   2", with "2" shown in red color. This means that the calibration process has been started.

- Taxi the aircraft along a turn on the ground, in you preferred direction (left or right). Note that the "Rel.YAW" indication will move, increasing if you turn to the right, or decreasing if you turn to the left

- Continue turning; you will notice that the number near "START R" will turn back to a white "0" (zero) when the system has detected a full 420° turn.

- The calibration procedure is now complete. You can already verify the result as the heading is indicated on the first line of the screen ("Hxxx" where xxx is the heading). To save the calibration data and return to the normal EFIS functions, select "EXIT" to go back to the SETUP menu, then again "EXIT".

NOTE 1: The compass calibration can also be done in flight, in this case we suggest to perform the 420° turn with a very shallow bank angle (e.g. 5 degrees) as the aircraft must be as close as possible to the straight-and-level attitude during the calibration.

NOTE 2: In a tail-wheel aircraft there is a significant pitch component during taxi, very far from the cruising attitude. In this case you can either perform the calibration in flight (NOTE 1 above) or perform the 420° rotation on the ground while keeping the tail lifted by hand as close as possible to the normal cruising attitude.

NOTE 3: In the "COMPASS" screen you can "RESET" the calibration (first option of the menu). In this case the magnetic heading will remain unavailable (heading indicator always shows "---" unless in the SETUP menu you set "HDG TYPE" to either "AUTO" or "GPS").

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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 that may be contained in the GPS antenna. We do not provide any more GPS antennas containing a magnet, precisely for this reason.

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

NON-CALIBRATED COMPASS

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

The item on the top-right of the page reads either "C0" (compass is not calibrated) or "C1" (compass is calibrated).

When the compass is not calibrated, the heading indicator in the PFD/MAP/NAV pages will always show "---" unless in the SETUP menu you set "HDG TYPE" to either "AUTO" or "GPS".

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MECHANICAL DIMENSIONS (IFD-microNET EFIS 57mm)

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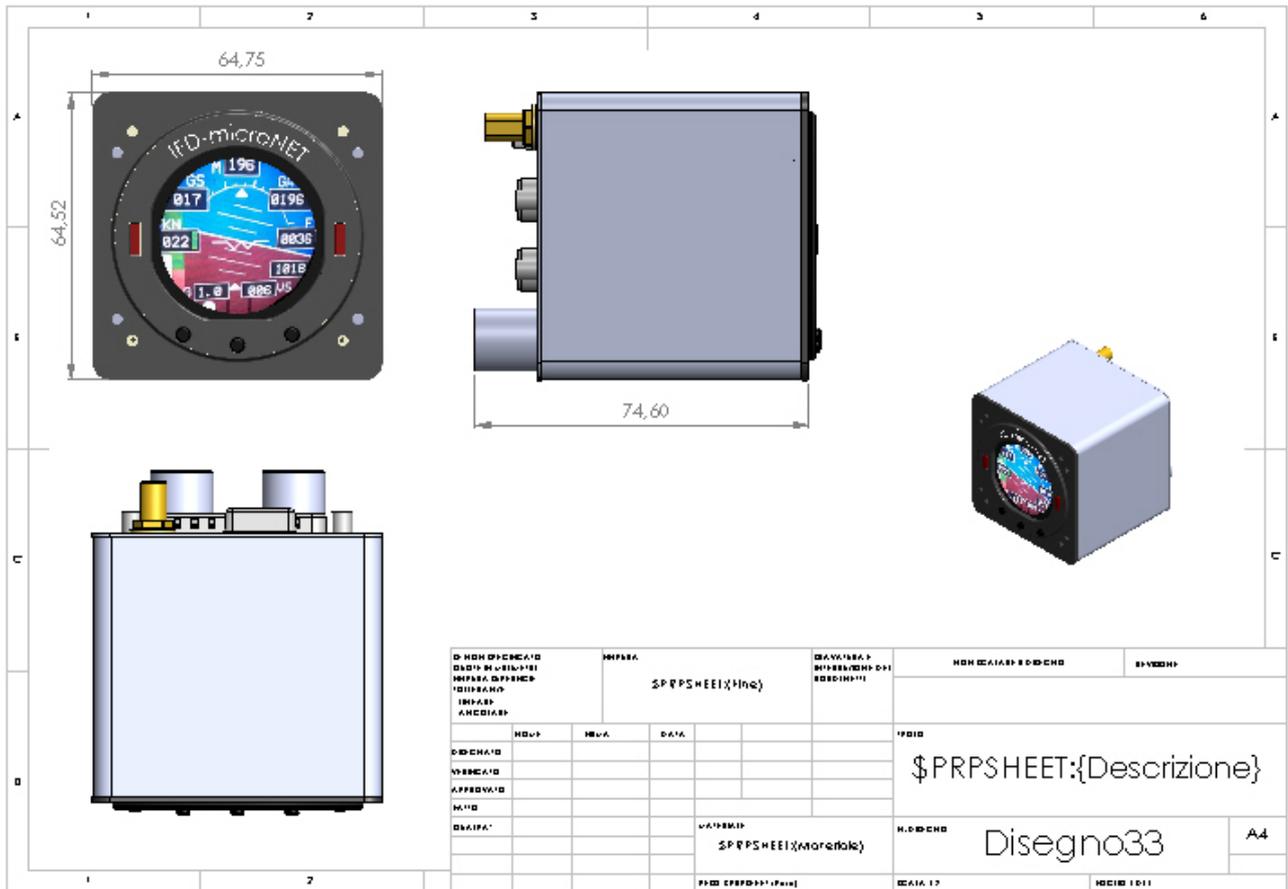
MECHANICAL DIMENSIONS (IFD-NET EFIS 80ᴍᴍ)

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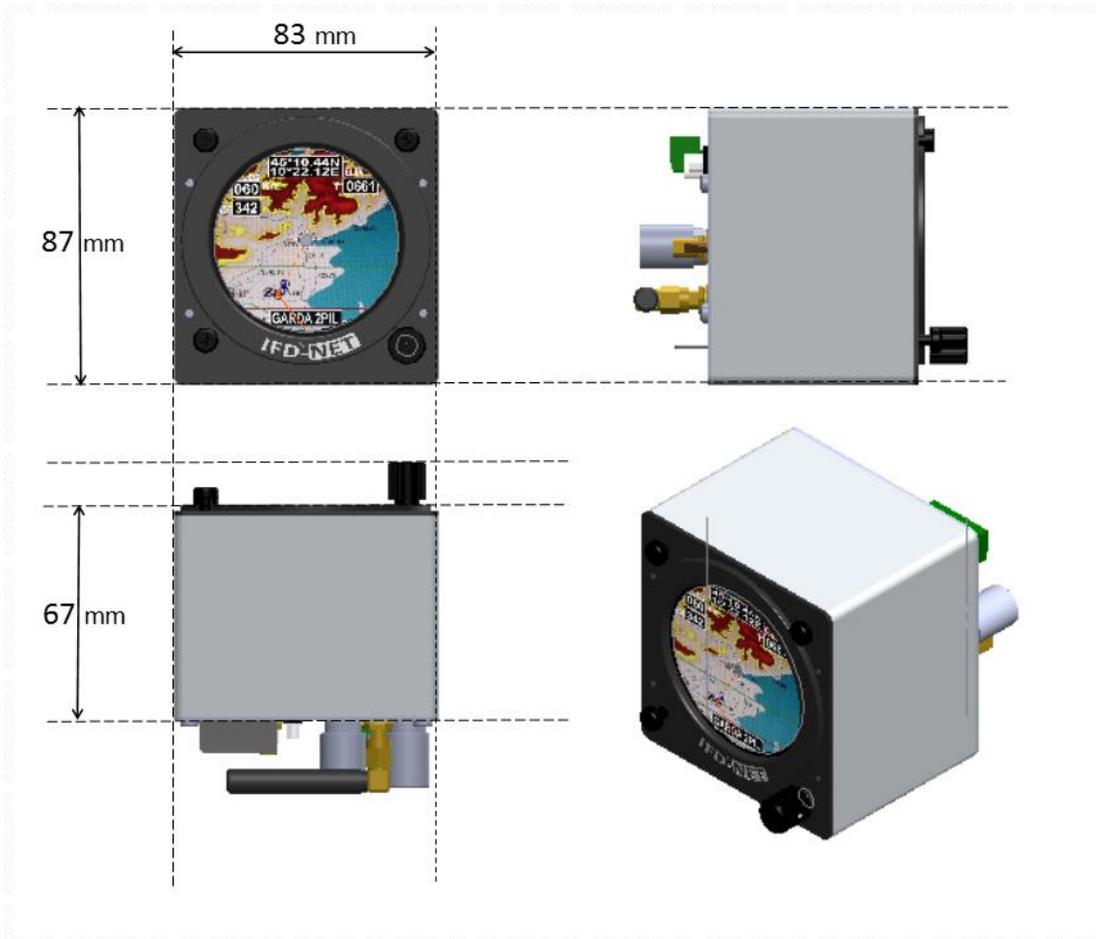
ORDERING INFORMATION

IFD-microNET and IFD-NET EFIS are both available in two models (BASIC and PLUS). 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 different versions of the EFIS and its optional tools/spare:

- IFD-microNET EFIS BASE (57mm)
- IFD-microNET EFIS PLUS (57mm)
- IFD-NET EFIS BASE (80mm)
- IFD-NET EFIS PLUS (80mm)
- GPS 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. Must observe VFR policy during your flight.