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EVO

USER GUIDE AND INSTALLATION MANUAL

EVOLUTION, THE BEST EVER!

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REVISIONS HISTORY

Revision	Description
06/08/2019	Initial release
27/04/2020	Add functionality description of NAV/MAP/PLUS/SLAVE models
19/04/2021	Minor fixes on powering and expansion bus section

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Summary

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1. INTRODUCTION

- 80mm (3'' 1/8) standard diameter installation shape
- Adjustable brightest screen ever, sunlight visible, up to 1200 cd/m².
- Special Release under request to reach up to 2000 cd/m².
- Low power consumption down to 3.5W (300mA @ 12Vdc).
- Ergonomic interface with double aeronautical rotary knob and switch
- High integration level (totally embedded sensors) *
- Multi-environment software with simple switch menu
- Several functions in color/ graphic display:
    - Artificial horizon
    - IAS and TAS indication
    - Airspeed trend vector
    - Rotation, stall and max efficiency speeds indication
    - Altimeter with settable Reference Pressure
    - Vertical speed indicator
    - 3D Magnetic compass
    - Slip indicator
    - Turn coordinator
    - G-Meter with peak recording
    - GPS Altitude
    - Wind vector with wind speed estimation

1.1. ELECTRICAL AND MECHANICAL SPECIFICATION

- Main power **10 - 30Vdc** 0.8A max with internal filter and peak transient protection.
- Functional temperature range -10°C to 70°C 90% Rh no condensation status.
- 85.4mm x 89mm x 67.5mm (width, height, depth).
- 3 x 1/8 NPT AOA, Pitot and Static pneumatic inlets.
- SMA female connector for GPS passive or active antenna.
- Standard 9 SUB-D female connector for power and BUS connection.

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2. SYSTEM DECRIPTION

2.1. IFD-NET EVO OVERVIEW

Big Knob
Little Knob
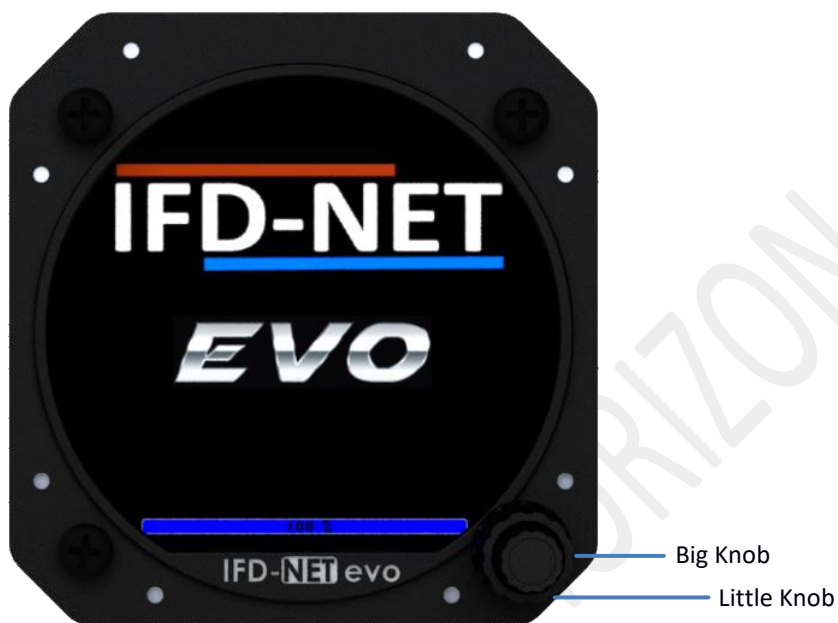
EVO Bezel overview

The IFD-NET EVO EFIS PFD is part of a large range of instruments. In the follow sections will be described how to use the new aeronautical interface based on a high force double rotary knob with push switch.

Action	Effect
Tap the rotary switch button	Engage the actual focused feature. Use it to edit parameters or save those after their modification.
Rotate big rotary knob crown	Has different effects depending on the environment the user is. Please refer to below descriptions to deeply understand about this feature.
Rotate little rotary knob crown	Has different effects depending on the environment the user is. Please refer to below descriptions to deeply understand about this feature.
Long tap on switch button	Recall of the environment menu. Keep pressed for 2 seconds to obtain the options menu displayed on screen.

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3. UNIT DESCRIPTION

The IFD-NET EVO interface is based on a double concentric rotary knob with a push switch that gives access to all the settings the pilot needs during the flight, and allow to adjust the setup's parameters.
On the right side of this page is shown an instrument in "Primary Flight Display" configuration (AVIONIC).   Spinning the big crown rotary knob 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 small crown rotary knob rotation add decimal value to the pressure reference.
The pilot can access the main menu by keeping pressed the knob for about 2 seconds until the screen, shown on the right, appears.
Within menus, by rotating the bigger rotary knob's crown, moves the selection up and down, and tapping button confirms the highlighted selection.

Explanation of main menu:

- **Back**: Close context menu.
- **Sel**: By turning the small knob it is possible to select one of the three settable references (see image "Page PFD ATTITUDE" ⑩,⑯,①).
- ***Synt**. **View:** Switch from 2D attitude to 3D view or vice versa**.**
- **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 currently calculated PITCH is greater than +/-30.0 degrees 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).
- **G_Reset**: highlight this option in order to read the G-meter minimum and maximum recorded peak values. These peak values are zeroed at the startup of the system (power up).
  You can manually reset the G-meter by pressing the rotary knob button over this menu option.
- **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 MAP and PLUS models, some parameters listed in the "4.8 SETUP PARAMETERS" may not appear. To change a SETUP parameter, highlight it rotating the big knob, press the button to enter edit mode (the parameter turns green) and use the big crown rotary knob to change its value. Finally confirm the change tapping the button (the parameter becomes white again).
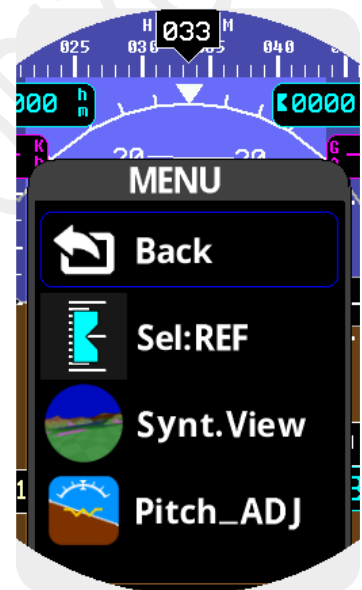
PFD Menu page 1

PFD Menu page 2

*Available only on MAPS/PLUS/SLAVE models

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4.   OPERATION

PFD Page
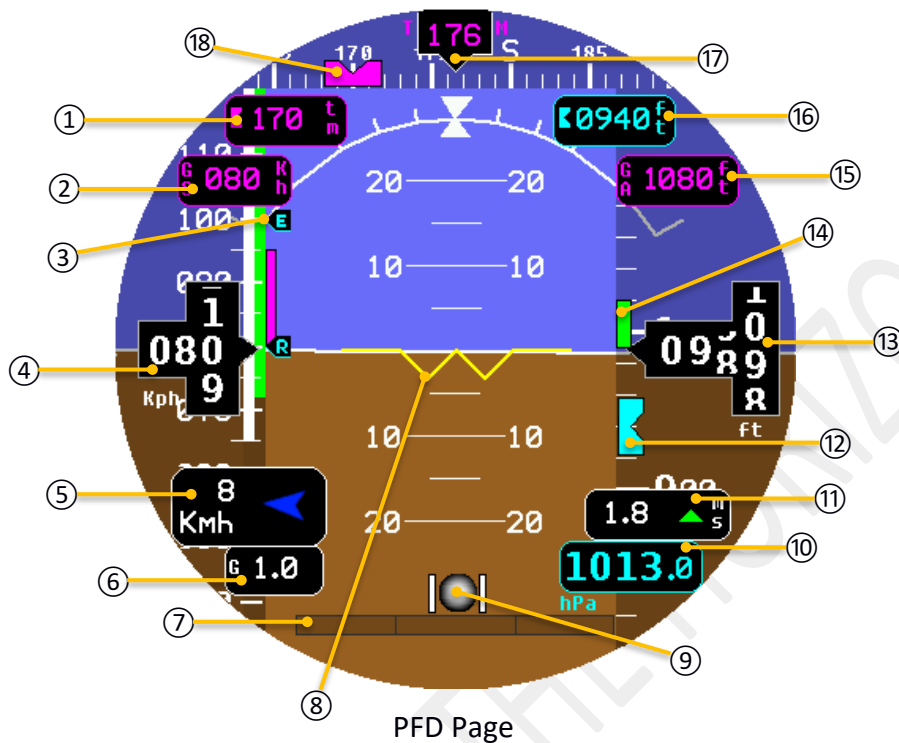
4.1.   PAGE PFD ATTITUDE

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 within three layouts. Refer to the setup description for details.

The following flight instruments are displayed on the "PFD Page":

① Selected heading (cyan) or ground track (purple)

② Ground speed (GPS)

③ Vspeed reference

④ Indicated air speed

⑤ Wind vector, speed and direction

⑥ G-meter

⑦ Turn rate indicator

⑧ Aircraft symbol

⑨ Slip indicator

⑩ Reference pressure trim

⑪ Vertical speed indicator

⑫ Selected altitude bug

⑬ Current altitude

⑭ Altitude trend vector

⑮ GPS Altitude

⑯ Selected Altitude

⑰ Magnetic heading (cyan) or Ground track (purple)

⑱ Selected heading (cyan) or Ground track (purple) Bug

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4.1.1. Heading Ground Track
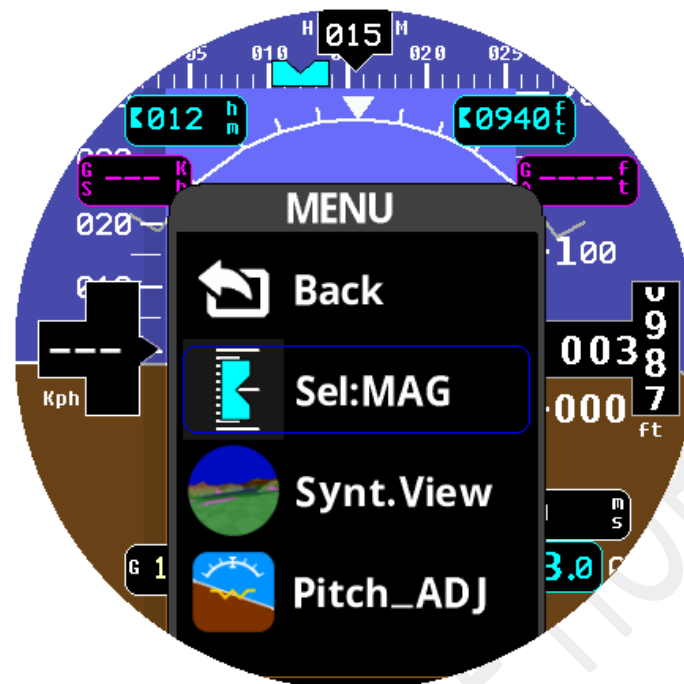
Heading track

On top of the screen is displayed a Heading/Ground track tape with mayor ticks every 5 degrees while minor ticks are displayed every 1 degree.

On the sides of the numerical indication there are two letters which indicate the source of heading track.

When "H M" is displayed it means that the internal sensor is used for calculate the heading track, otherwise if "T M" is displayed, a GPS source is used for heading.

It is possible to force the source by changing the "HDG TYPE" parameters in the setup.

When displaying Selected Heading, a light blue marker on the tape corresponds to the selected heading. When displaying Ground Track (GPS), a magenta marker is displayed on the heading tape.

Adjust the selected heading or ground track:

Long press on knob for at least 2 seconds, turn big knob to select "Sel:" after that turn little knob until "MAG" is not displayed (see "Heading track" picture). Now by clicking on knob it will be possible to change it, by using big knob for increase or decrease of 10 degrees and little knob for each 1 degree.

Syncing to the current heading or ground track:

Long press on knob for at least 2 seconds, turn big knob to select "Sel:" after that turn little knob until "MAG" is not displayed (see "Heading track" picture). Now by long click (> 2 sec) the current selected heading or ground track will be sync.

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4.1.2.   Airspeed and Vspeed Indicators

Below is shown the IAS representation displayed as a classic anemometer screen to easily explanation. In the setup menu it is possible to configure the entire colored arc. Full scale speed is automatically determined by Vne parameter plus 40 Km/h.

Airspeed Indicators
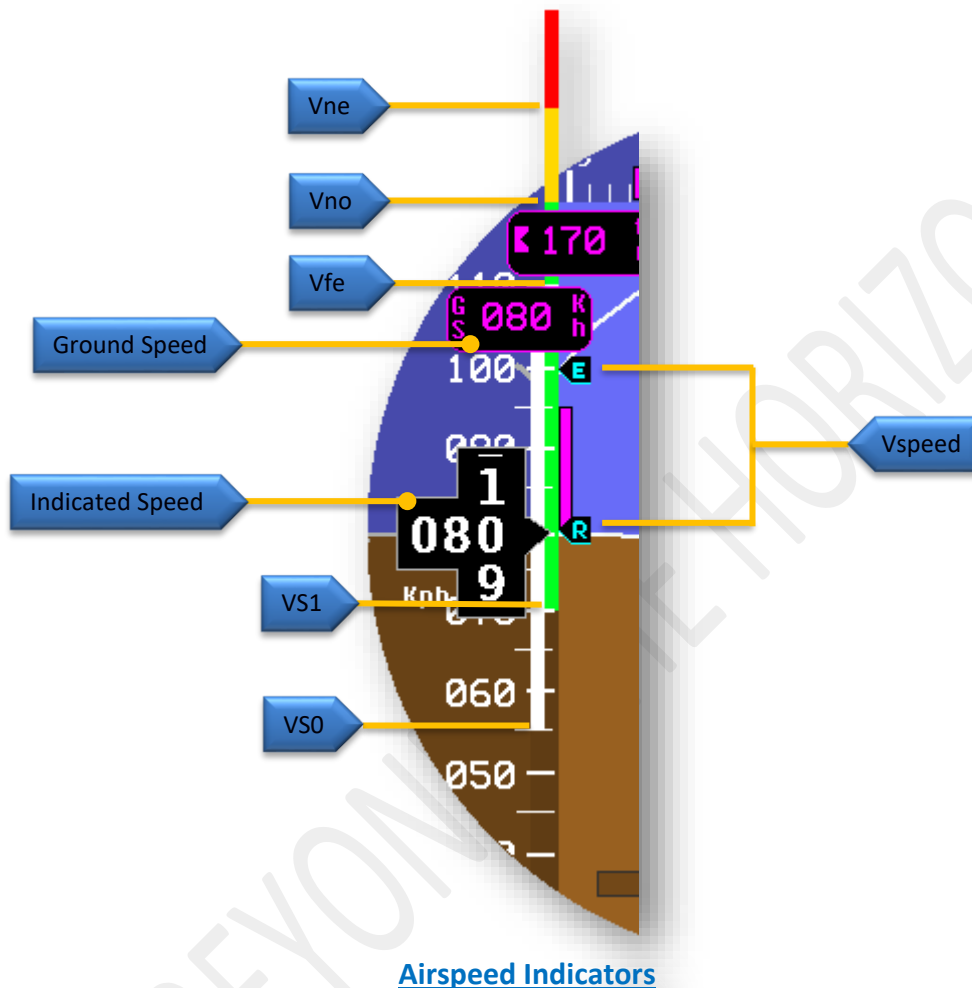
The color ranges in the speed arc are determined by setting the parameters listed in the SETUP.

* White arc starts from Vs0 value and ends on Vfe, defining the safe area of operation for flaps and gears.

* Green arc starts from Vs1 and ends on Vno

* Yellow arc starts from Vno and ends on Vne.

Additionally, if enabled in setup, Vspeed indicators are displayed on right of the IAS tape.

(Vspeed Vx, Vy, Vr, Ve, Va, Vg: see ias-speed setup for descriptions).

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

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4.1.3. Turn Rate indicator

Turn rate indicator is shown on bottom of PFD page.

A pink turn rate trend vector shows the current turn rate while a green turn rate trend vector shows the standard turn rate (3 deg/sec).

Turn Rate Indicator

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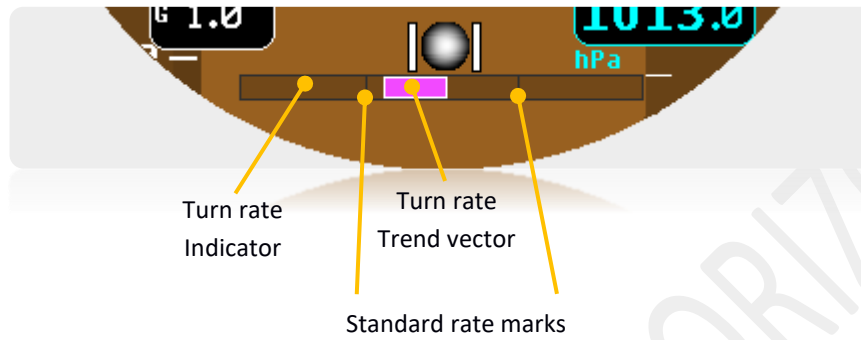
4.1.4.   Attitude Indicator

Attitude indicator symbology is displayed on PFD and includes roll and pitch indicators and a slip indicator.

On roll indicator, major tick marks are 30 and 60 degrees and minor tick marks are 10, 20 and 45 degrees.

On pitch indicator, marks occur every 5 degree.

Attitude Indicator
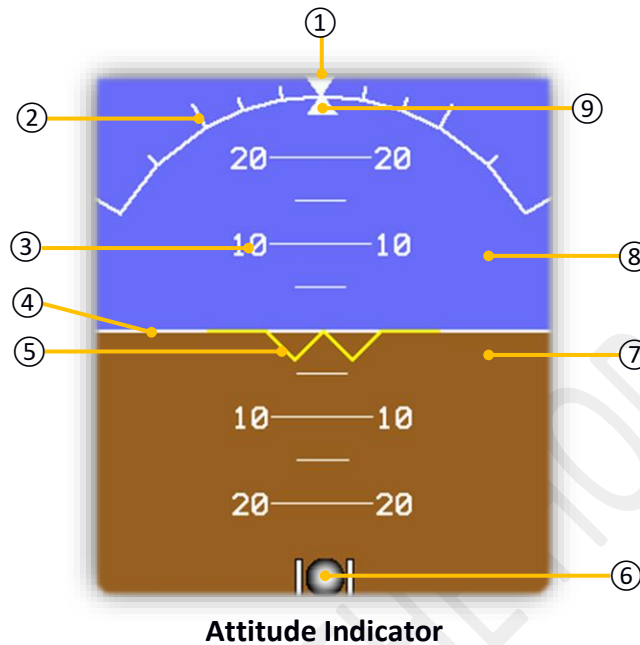
① Roll Zero reference

② Roll scale

③ Pitch scale

④ Horizon line

⑤ Aircraft symbol

⑥ Slip indicator

⑦ Land

⑧ Sky

⑨ Roll pointer

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4.1.5.   Altimeter

Altimeter indicator display numeric labels and ticks.

Major tick marks are at intervals of 50 meters or 100 feet while minor tick marks are at intervals of 10 meters or 20 feet. The current altitude is displayed in the black pointer where a drum style is used.

After 10'000 feet, on the tape, is show only the flight level while on the black pointer is displayed the current altitude divided by 10 (ex: Alt 12034 ft. -> on tape FL12, into the black pointer 1203 ft.*10).

Adjust the selected Altitude (①):

> Long press on knob for at least 2 seconds, turn big knob to select "Sel:" after that turn little knob until "ALT" is not displayed. Now by clicking on knob it will be possible to change it, by using big knob for increase or decrease of 50 units and little knob for each unit.

Syncing to the current altitude:

> Long press on knob for at least 2 seconds, turn big knob to select "Sel:" after that turn little knob until "ALT" is not displayed. Now by long click (> 2 sec) the selected altitude ① will be sync.
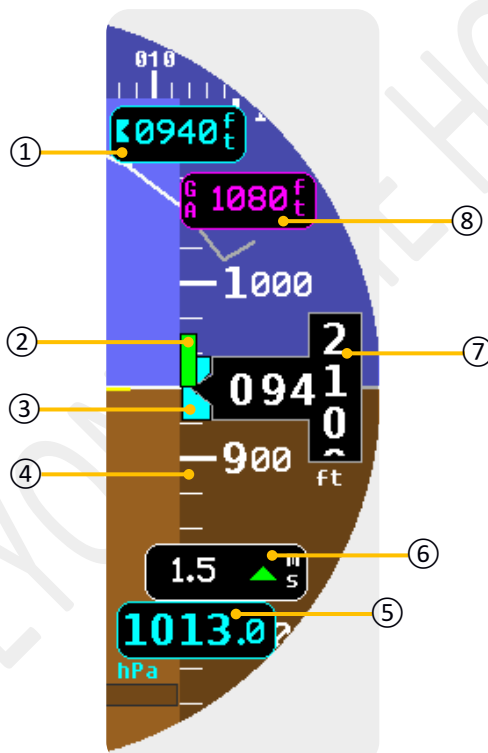
Altimeter

① Selected Altitude	⑤ Barometric Pressure reference
② Altitude trend vector	⑥ Vertical speed indicator
③ Selected Altitude marker	⑦ Current Altitude, drum style
④ Altitude Tape	⑧ GPS Altitude

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4.1.6.   Attitude 3D (MAPS/PLUS/SLAVE models only)
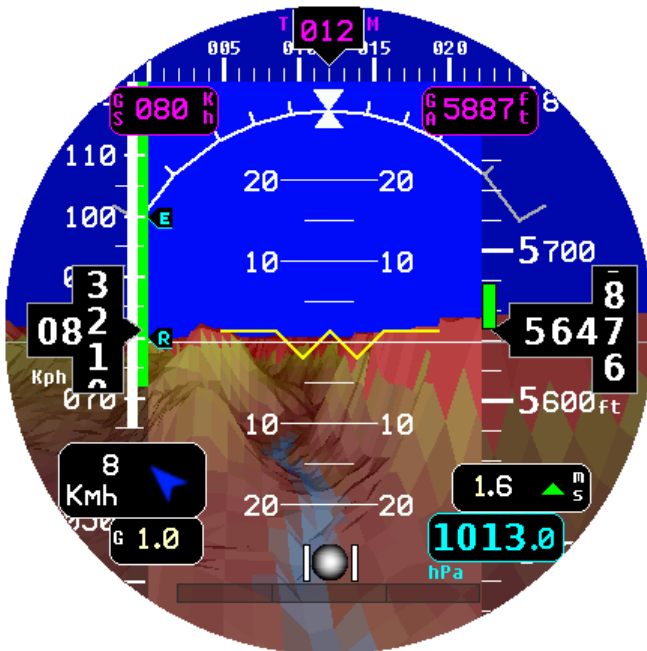
NOTE: out-of-range or otherwise unavailable values are displayed as dashes ("- - -")

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.

Synth 3D

In the picture "Synth 3D" is represented a special feature, available in the IFD-NET EVO MAP and PLUS versions. The 3D vision, also called synthetic vision, perform a tridimensional rendering of the terrain instead of the standard 2D artificial horizon. Please contact vendor for more information on how to move your unit into the MAP or PLUS version in case of PFD or NAV one. Refer to chapter "ORDERING INFORMATION" for more on available models.

4.1.7.   Wind vector:

The wind vector auto calculation permits to detect a wind component by analyzing data as IAS, GS, HDG and GPS Tracking. This task estimates even speed and direction of the wind component. In case pilot engaged this feature in the instrument SETUP, it will be displayed automatically in case the calculation result would be greater than a fixed trig. Please refer to the "PFD Page" figure in order to understand how it will be displayed in the PFD layout. Keep in account that this feature produces an estimation of the wind component vector and haven't to be used in a different way as a pure estimation.

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4.2.　PAGE MAPS (MAPS/PLUS/SLAVE MODELS ONLY)

The MAPS page, display the current GPS position on an aeronautical chart preloaded inside the memory storage.
The map is always aligned with the direction of the airplane ("Track up / Heading up").
By rotating big knob will increase or decrease the zoom factor from 250 m minimum to 128 km maximum, while rotating the little knob it will change the selected heading or selected ground track (②).
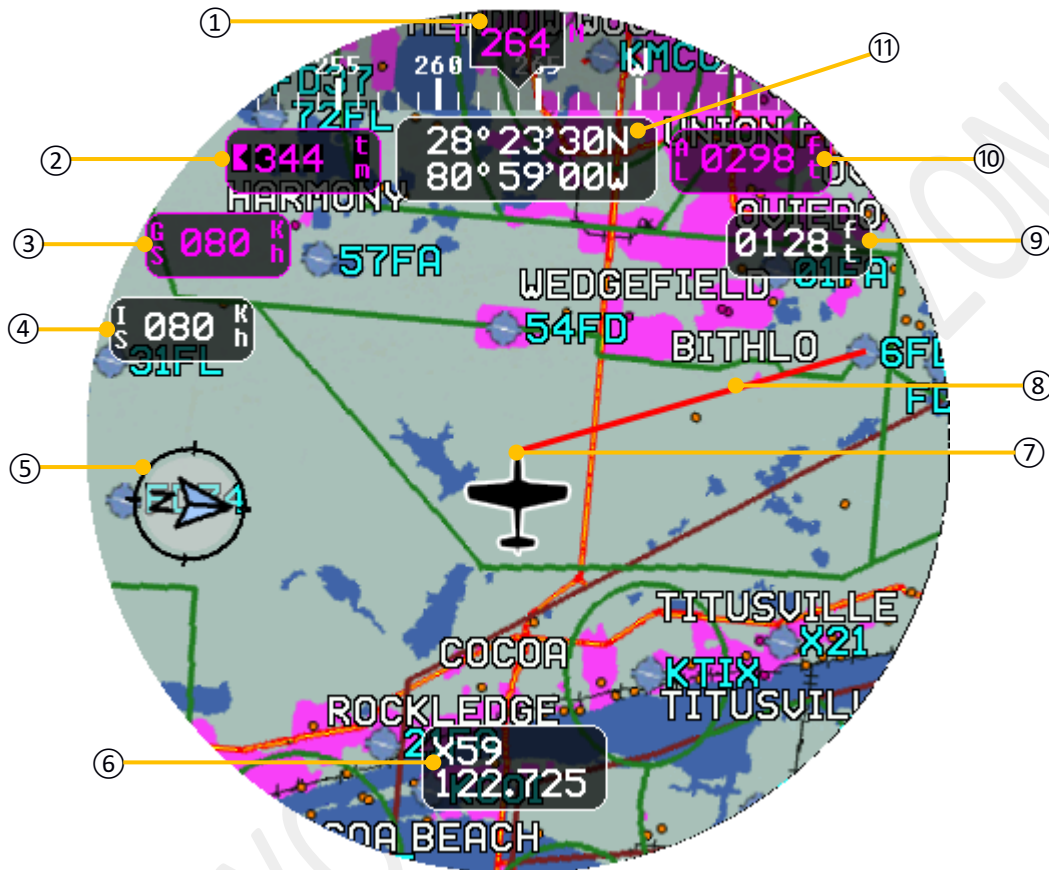
MAPS Page

① Heading or ground track	⑦ Current position on the map
② Selected heading (cyan) or ground track (purple)	⑧ Track of navigation
③ Ground speed (GPS)	⑨ Barometric altitude
④ Indicated air speed	⑩ Altitude above ground
⑤ North direction	⑪ Current GPS coordinates
⑥ Local Radio frequency	

Point's ②, ③, ④ and ⑥ can be disabled via setup.

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4.2.1. MAPS Menu

A long click for at least 2 seconds it will allow to access to the current page menu.
Rotating the big knob it be possible to change the selection.
On the image, a full menu representation (instrument menu is divided in 3 or 4 pages):

- **BACK**: Close maps menu window

- **Stop NAV**: Ends active navigation

- **Routes**: Go to route capture page (see route capture section)

- **Airspace**: Show air space information, if present.

- **Info POI**: Show the nearest points information.

- **Find POI**: Find a desired point using the text box.

- **Frequency**: Display/Hide the local frequency (⑥ **MAPS Page**)

- **Terrain**: Display/Hide terrain on maps, colors depended by "MAP SKIN" parameter in map setup.

- **Taws**: Display/Hide **Terrain Awareness Warning System,** the color map is based on ground altitude if enabled (no circle crossed out on the icon) else color map is based on "MAP SKIN" parameter.

- **Profile**: Display/Hide elevation profile (see section "Elevation Profile").

- **Cust Maps**: User cartography (see section "User Cartography" for details).

- **Quick WPT**: Stores a user waypoint at the current position of the plane. The waypoint name is set automatically (WPT001, WPT002... in sequence) and can be automatically included in the ROUTE CAPTURE page.

- **Setup**: Enter in the setup.

Maps menu

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4.2.2.   Info POI

In the EVO maps page is possible to show the information on nearest points.

From the environment menu, clicking on "Info POI", it is show a drop list with some information on the nearest points (sorted by distance).

Rotating the big knob it is scroll up or down the list and the next nearest points while, clicking again, to exit.

① ICAO code

② Point name

③ Runway orientation and size (L x W)

④ Radio type and frequency

⑤ Point type
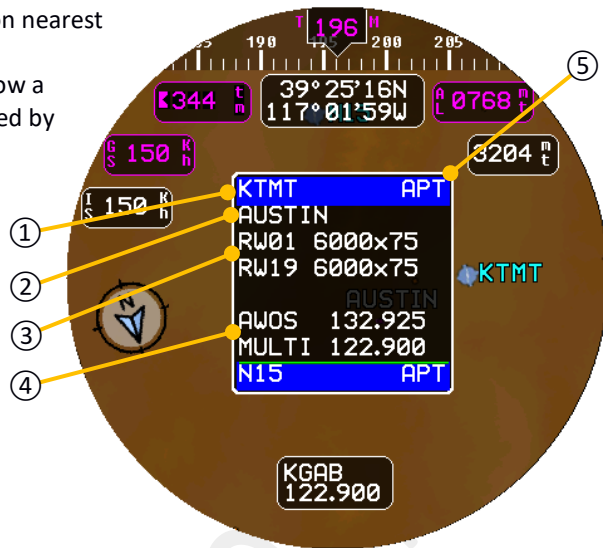
Info POI

4.2.3.   Find POI

In the EVO maps page is also possible to find a point of interest using manual search.

To do that, in the environment menu, clicking on "Find POI", it is show an empty text box where on top of that is possible to insert desired point name using the ICAO code or the of the point (use big knob for scroll the alphabet).

During text insert (after two letters) a drop list of points is showed which are the related to the text just inserted.

The special character "<" delete the character just inserted and "*" terminate the insertion, moving down the selection to the list, if results are present, otherwise it move the cursor to the start.

By long click is possible to go back or exit from search.

Find Point Of Interest

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4.2.4. Elevation Profile

Elevation profile can help pilot to evaluate a possible impact with the ground in a predetermined altitude and distance range.
In the map setup, under F.C.W sub-setup, is possible to adjust altitude and distance.
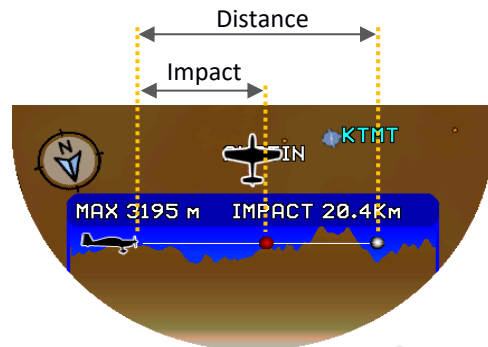
Elevation Profile

4.2.5. User Cartography

The EFIS-MAP can display maps created by the user and loaded into an SD or MMC card. This cartography is composed of one or more JPEG files (JPG extension), named according to a specific format that describes their geographical coverage.
User cartography is always shown without rotation (North always up), while the airplane icon rotates according to the orientation with respect to the North.
Each JPG file should cover one geographic degree (1 degree latitude by 1 degree longitude).
Example of file name:

cmap42N_12E_41N_13E.jpg

42N_12E = Coordinates of the northwest corner.
41N_13E = Coordinates of the southeast corner.
To view the user cartography:

- The SD or MMC card containing the JPG files described above must be inserted in the SD / MMC slot on the back of the instrument.
- In maps menu the item "CUST MAPS" must be set to "ON" (no circle crossed out on the icon).
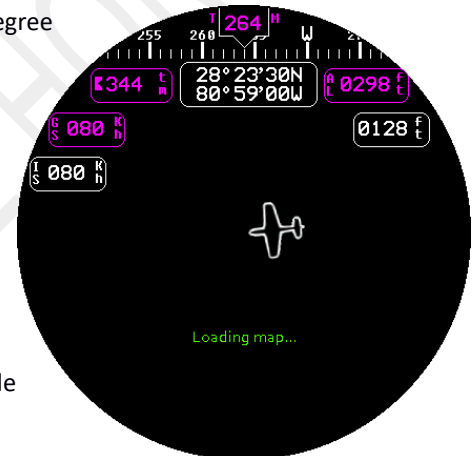
Custom maps

In this condition, the instrument immediately starts searching for the cartography files on the SD / MMC card.
If there are usable data on the SD / MMC card, the message "Loading map ..." appears.
As soon as the EFIS-MAP has loaded enough data, the cartography appears on the screen.
The map screen remains black if no JPG files that can be used on the SD / MMC card are found (in this case the message "Loading Map" disappears).
It is advisable, then, to disable the "CUST MAPS" option from the maps menu, or remove the SD/MMC card from the slot.
IMPORTANT - Some functions are not working on the user cartography:

Function	Availability on custom maps
Route	Yes, the route is drawn and can be used to navigate
TAWS	Not supported
Points of the navigation database	Not displayed, but "FIND POI" and "INFO POI" find them equally
User waypoints	Not displayed, but "FIND POI" and "INFO POI" find them equally
Airspace	Not displayed, but "INFO AIRSPACE" still shows the information
Altitude Profile	Not supported

Practical example: If the user cartography covers the area around the Catania airport (LICC) and the pilot uses the "FIND POI" function to search for the same point, the system will correctly center the view on the Catania airport (provided that the user cartography is correctly georeferenced).

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4.3.   PAGE ROUTE CAPTURE (MAPS/PLUS/SLAVE MODELS ONLY)

Through this environment it is possible to view the whole map at each geographical position. The map can be moved horizontally or vertically by turning the two knobs (the small one for left/right movements and the big one for up/down movements).

① Coordinates at cursor position

② Cursor position (center of screen)

③ Route name (if loaded)

④ Terrain elevation at cursor position
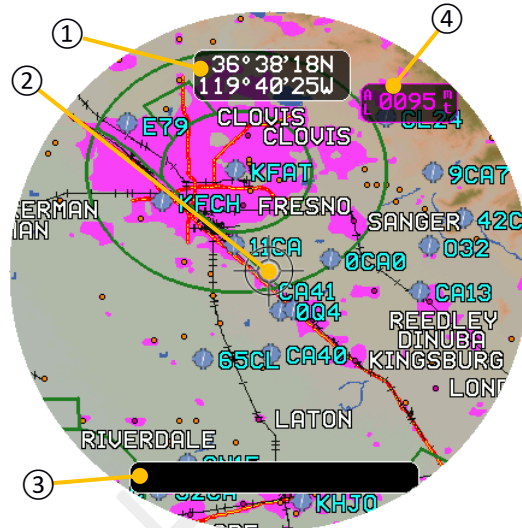
Route Capture

4.3.1.   Action List

The click allow to display the action list:

ADD RTE WPT: Add route waypoint on current position
ALTITUDE: Set waypoint altitude
RENAME ROUTE: Rename the current route
ZOOM: Change zoom level
SET LAST FIX: Set current position as last known position
EXIT: Exit from action list

 Note: Renaming route using big knob for moving cursor position
         and little knob for change character.

When the list of actions is opened on an "RTE WPT" it is possible to modify or delete it.

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4.3.2.   Route Capture Menu

A long click for at least 2 seconds it will allow to access to the current page menu.
Rotating the big knob it be possible to change the selection.
On the image, a full menu representation (instrument menu is divided in 3 pages):

- **Back:** Close menu window.

- **Exit:** Exit from route capture page.

- **Load Trace:** Load a route stored in the internal memory.

- **Save Trace:** Save a just planned route in the internal memory.

- **Clear Trace:** Clear the planned route.

- **Find POI:** Find a point of interest using a manual research.

- **Airspace:** Show information on nearby airspace.

- **Quick WPT:** Insert a user waypoint on current position.

- **Setup:** Open setup.
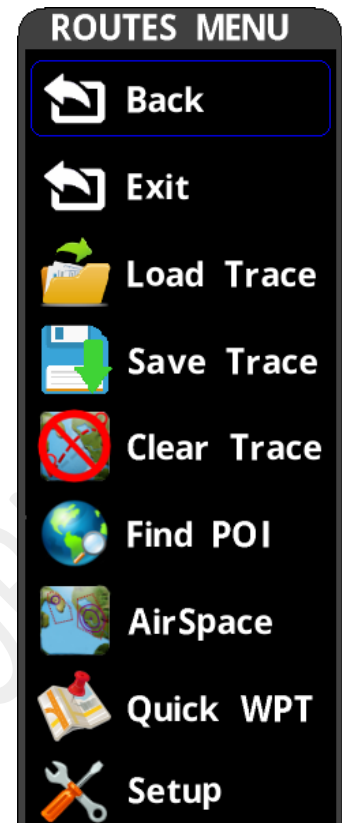
Route Capture Menu

4.3.3.   Load Trace

Loading a trace stored in the internal memory:

- Engage environment menu

- Click on "Load Trace"

- Click on desired route in the list

- Select "load"
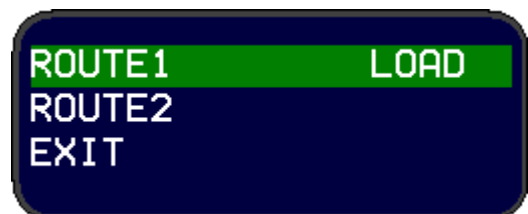
Load Trace

4.3.4.   Delete Trace

Deleting a trace stored in the internal memory:
- Engage environment menu

- Click on "Load Trace"

- Click on desired route in the list

- Turn big knob to select "delete" and click, this will delete the selected route

Delete Trace

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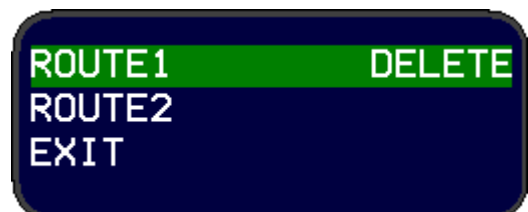
4.4.   PAGE HSI NAV (NAV/MAP/PLUS/SLAVE MODELS ONLY)

This environment shows the navigation data to a reporting point or a geographical location chosen on the map.
If there is no active navigation (no destination selected), the page becomes a gyrocompass.
As soon as a destination is selected, some additional elements appear on the monitor:

- Bearing pointer (cyan), which points directly to the destination

- HSI indicator (purple), which indicates the starting direction from the point of origin to the point of destination (Desired Route)

- Course Deviation Indicator (CDI), which shows (purple) the current lateral deviation from the desired course. When CDI moves to the right, the plane is to the left of the original leg, and the pilot must veer to the RIGHT to intercept the original route.

- Time to arrival (hours: minutes)

- Distance to the destination

- Selected heading

Rotating the knobs changes the selected heading (big knob makes 10 degrees steps while little knob makes 1 degree steps).

4.4.1.   HSI NAV Menu

A long click for at least 2 seconds it will allow to access to the current page menu. Rotating the big knob it be possible to change the selection.

- **Back:** Close menu window.

- **Find POI:** Find a point of interest using a manual research

- **Stop NAV:** Stop active navigation

- **Update DTK:** Update the navigation trace

- **Setup:** Open setup.

Route Capture Menu

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4.5.   PAGE VSI (PLUS/SLAVE MODELS ONLY)

EVO VSI page represent a typical vertical speed indicator that you may find on a small General Aviation aircraft.

Units	Major tick	Minor tick	Full Scale
m/sec	2	0,4	10
Feet/min	5	1	2500

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Gyrocompass

NOTE: when the compass 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.

① Heading Bug

② Selected Heading Bug

③ Wind vector information (orientation and speed)

④ Heading or ground track

⑤ Bearing pointer to destination

⑥ Navigation information (destination waypoint and distance to destination)

⑦ Wind vector

4.6.1.   Gyrocompass Menu

The related menu page has the same options of HSI NAV menu page, so please reference to section HSI NAV Menu.

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4.7.   PAGE NEAREST (NAV/MAPS/PLUS/SLAVE MODELS ONLY)
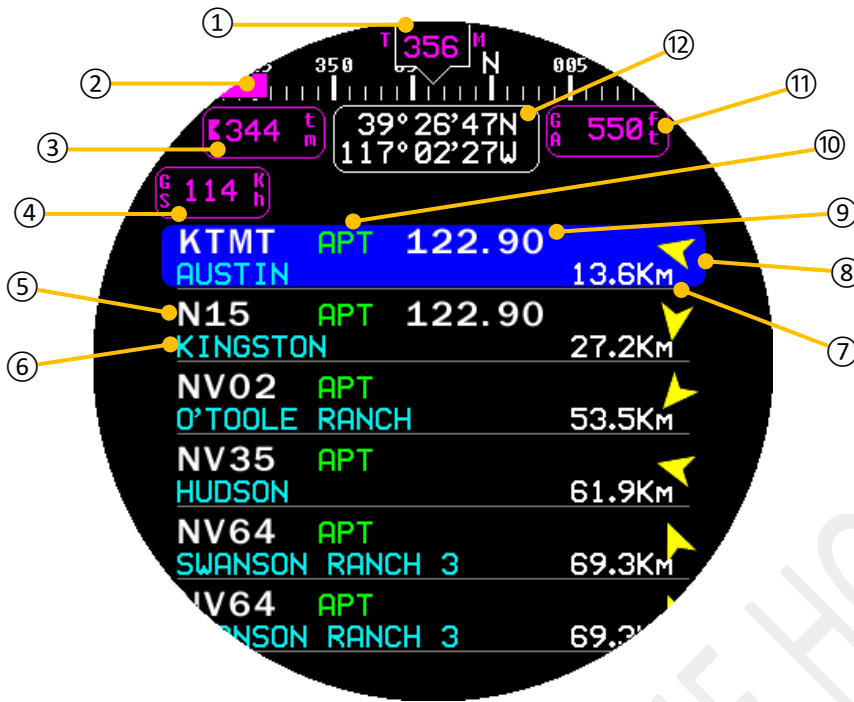
Nearest

NOTE: when GPS signal is not present the list is not displayed.

NOTE: Use big knob to scroll the list. A click when point is highlighted (blue color) open the related menu point.

Point menu

① Heading or ground track   ⑦ Distance from actual position

② Heading/Track bug   ⑧ Bearing relative to the aircraft heading (Up = front)

③ Selected heading/Track   ⑨ Radio Frequency

④ Ground speed   ⑩ Type of navigation point

⑤ Nearest point Identifier (ICAO)   ⑪ GPS Altitude (AMSL)

⑥ Nearest point name   ⑫ GPS position

4.7.1.   Nearest menu

A long click for at least 2 seconds it will allow to access to the current page menu. Rotating the big knob it be possible to change the selection.

- **EXIT:** Close menu window

- **ALL:** Filter nearest by type (Change by clicking and turn the small knob).

- **Find POI:** Find a point of interest using a manual research.

- **Stop NAV:** Stop active navigation.

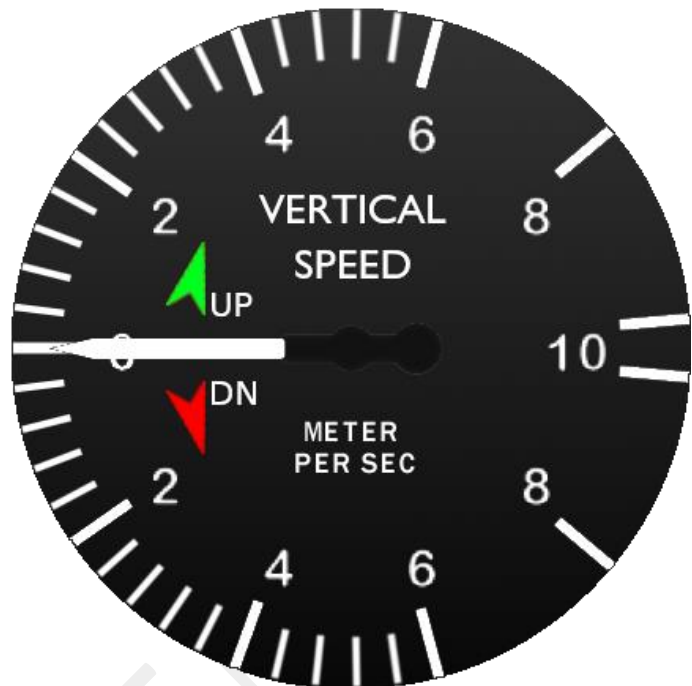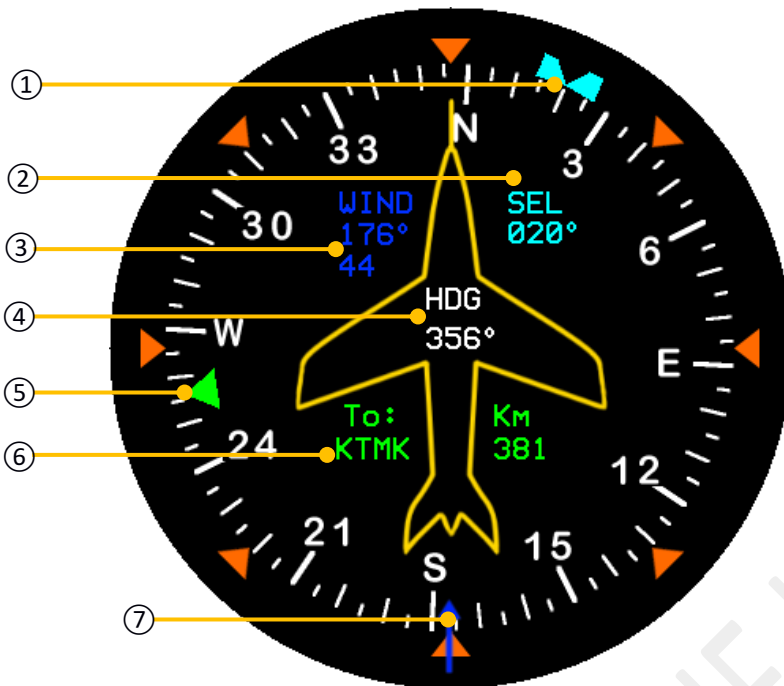- **Update DTK:** Update the navigation trace.

- **Setup:** Open setup.

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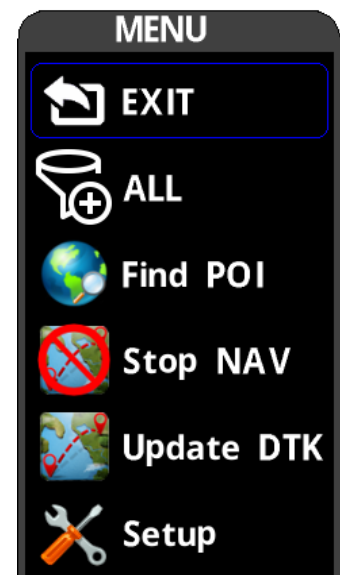
4.8.   SETUP PARAMETERS

- **EXIT:** Exit from setup.

- **BRIGHTNESS:** Sets the display brightness. Set it between 20% and 100% of the IFD-NET EVO PFD brightness level. Select this value according to environment lighting conditions and also keeping in account that a lower value means a lower power consumption and heating generation. In case of battery backup powering, a lower brightness means more autonomy.

- **PFD LAYOUT:** chose between "FUL", "CLR" or "AH". In CLR configuration, the Primary Flight Display screen will be re-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.

- **ALT Marker:** Select "ON" to show the selected altitude indicator.

- **MAG Marker:** Select "ON" to show the selected heading indicator.

- **HDG TYPE:** select "AUTO", "GPS" or "MAG" to set the behavior of the "heading indicator" in the Primary-Flight-Display (Avionic) screen.

  ➢ "GPS" results in an indication of true ground track.

  ➢ "MAG" shows magnetic heading.

  ➢ "AUTO" shows aircraft GPS ground track when available and falls back to MAG (e.g. if the aircraft is not moving or the GPS fix is lost).

- **WIND VECT:** select "ON" to engage the automatic wind direction calculation and wind speed estimation.

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

- **UOM IAS:** define the unit of measure for speed indicators in: KPH (Km/h), MPH (Mils/h) or KNOTS.

- **UOM VSI:** define the unit of measure of vertical speed indicator in: meters per second or feet per minute.

- **UOM PRESS:** define the unit of measure of reference pressure in the relative indicator between mBar or inHg. The normalized value after the power up sequence of the unit is 1013mB or 29.92 IN/HG. Pilots can vary this value by aging on the rotary knob big crown in order to increase or decrease reference pressure.

- **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.

- **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.

- **PRES TRM:** Change this value (initially 0.0 hPa) to introduce an offset in the altimeter reference pressure. Can be used to compensate the EFIS altimeter indication to precisely match another reference or installed altimeter.

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- **IAS SPEEDS ->:** enter to IAS colored arcs sub menu.

    - ➢ **IAS Vs0:** Indicate the value of Vs0 speed corresponding to the white arc start. The speeds are indicated according to the "UOM IAS" parameter setting. Please refer to section "Vspeed" to learn more about the colored arc on IAS gauge screen.

    - ➢ **IAS vs1:** Indicate the value of Vs1 speed corresponding to the start of the green arc.

    - ➢ **IAS Vfe:** Indicate the value of Vfe speed corresponding to the end of the white arc.

    - ➢ **IAS Vno:** Indicate the value of Vno speed corresponding to the end of the green arc and the start of the yellow arc.

    - ➢ **IAS Vne:** Indicate the value of Vne speed corresponding to the end of the yellow arc and the start of the red arc.

    - ➢ **IAS Vx:** Best-angle-of climb speed

    - ➢ **IAS Vy**: Best-rate-of climb speed

    - ➢ **IAS Vr:** Rotation speed.

    - ➢ **IAS Ve:** Maximum efficiency speed.

    - ➢ **IAS Va:** Design maneuvering speed.

    - ➢ **IAS Vg:** Minimum speed with which a maneuver with a negative load factor can be faced.

- ***MAP CONFIG ->:** enter to MAP configuration.

    - ➢ **GS on MAP:** choose to display or not the ground speed on the maps page.

    - ➢ **IAS on MAP:** choose to display or not the indicated speed on the maps page.

    - ➢ **TRACE REC:** Enable / Disable the track recorder, this will memorize the track traveled by the aircraft.

    - ➢ **TRACE BUFFER [0-10'000]:** Sets the number of GPS position samples stored in the trace buffer.

    - ➢ **MAP SKIN [0-7]:** Selects between several colors scales for display of terrain elevation in the moving map.

    - ➢ **POS. ICON:** Select which position icon to appear on the moving map.

    - ➢ **F.C.W:** Forward collision warning, setting altitude and distance.

    - ➢ **DETAILS:** For each type of map symbol, define whether it is shown

        - ▪ DIS - Disabled, not shown on map.
        - ▪ SYMB - Show the symbol without label.
        - ▪ SY/LA - Show both symbol and label.

    - ➢ **ZOOM:** For each type of map symbol, define the minimum zoom level to show the symbol itself and its label.

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- ***PAGE:** Configures which pages are active.

- **COMPASS ->:** 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.

- **LOGIN->:** Internal use

- **UPDATE:**

  ➢ **SW VER:** Indicates the software release.

  ➢ ***UP NAV:** YYMM Year/month of installed navigation database. This item is used to start a database update from the SD card.

  ➢ **UPDATE SOFTWARE:** This item is used to start a software update from the SD card.

  ➢ **IMPORT USR:** Import user waypoints from SD card (user_wpt.txt).

  ➢ **EXPORT USR:** Export user waypoints to SD card (user_wpt.txt).

  ➢ **REBOOT:** System reboot.

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5. CONNECTIONS

5.1. REAR CONNECTORS VIEW AND DESCRIPTION

IFD-NET EVO EFIS (80mm)
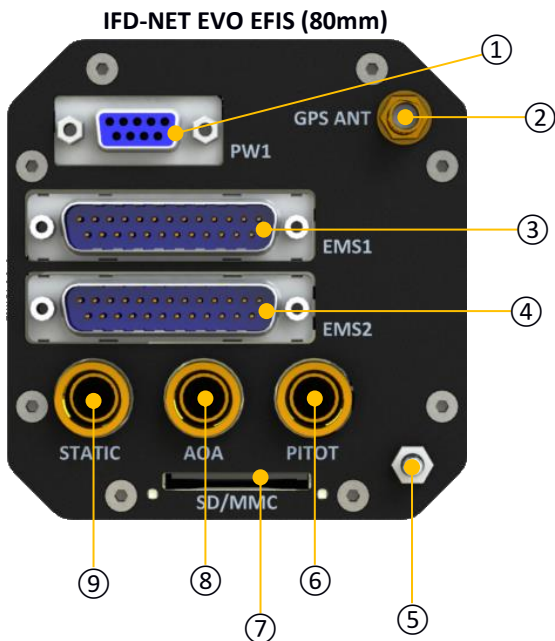
The power connector is the only electrical connection needed. The details about this connector are explained in the section "7.1 POWERING AND EXPANSION BUS". The expansion connectors are not used in IFD-NET EVO EFIS model. Pneumatic inlets, STATIC, AOA and PITOT pressures, are provided by three brass 1/8 NPT female plugs. **Use adequate adapters with rubber O-rings and do not turn hoses with too much force in order to avoid damage to unit's internal parts.** GPS connector antenna accepts any SMA male standard connector and several active or passive types GPS band antennas. Please observe the right policy during your aircraft antenna's position selection. Contact the vendor to obtain more information on this point.

① Power Connector
② GPS Antenna
③ Expansion connector 1
④ Expansion connector 2
⑤ Ground chassis

⑥ Pitot connector
⑦ Slot for SD-Card
⑧ AOA connector (secondary pitot for angle of attack)
⑨ Static connector

5.2. POWER CONNECTOR
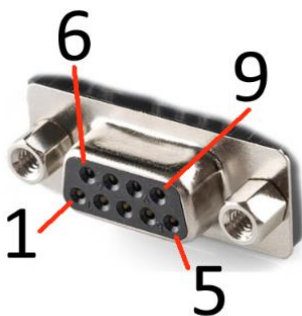
- **Pin 1**: Input 12/24 Vdc
- **Pin 2**: NMEA RS232 TX
- **Pin 3**: NMEA RS232 RX
- **Pin 4**: RS485 A+ signal for FLY BUS®
- **Pin 5**: GND
- **Pin 6**: Input 12/24 Vdc (internally connected to pin 1)
- **Pin 7**: NTC temperature sensor for TAS calculation (10K @ 25°)
- **Pin 8**: GND temperature sensor for TAS calculation
- **Pin 9**: RS485 B- signal for FLY BUS®

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5.3.   GPS ANTENNA

In the figure below, the GPS antenna provided in the box with terminated by a SMA MALE standard connector.

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

- Choose an adhesive type antenna 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 receiver's sensitivity.
- 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.

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5.4.   PNEUMATIC AND GPS ANTENNA CONNECTION DIAGRAM

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.
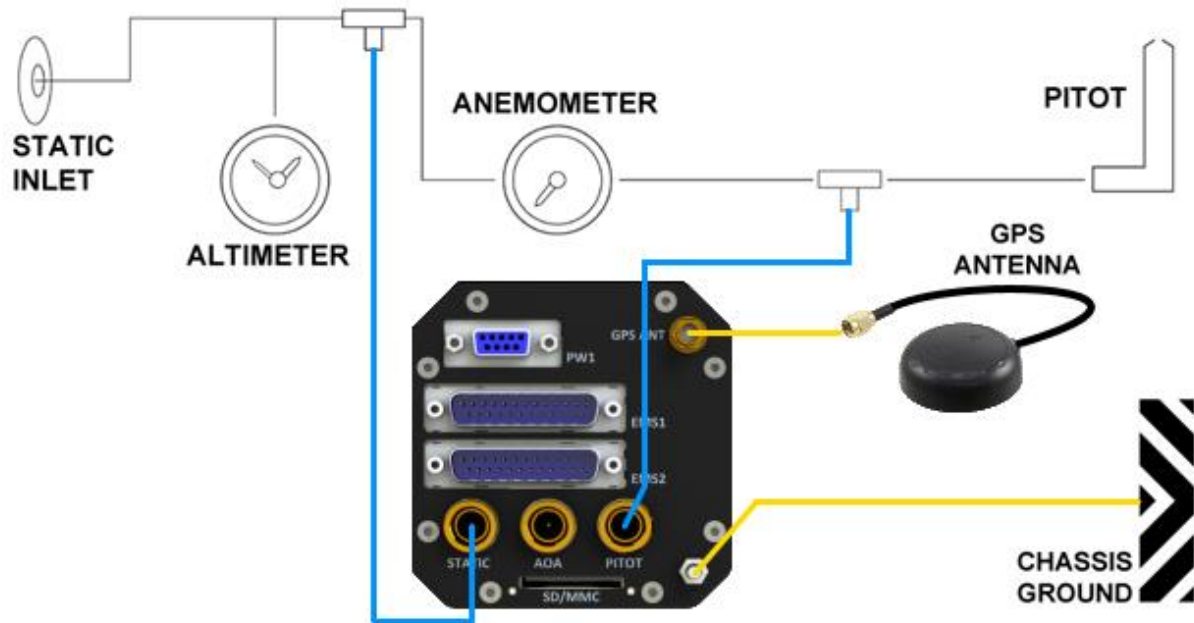
Pneumatic, GPS and Ground chassis connections

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 barometric 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.

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6. INSTALLATION GUIDE

The IFD-NET EVO EFIS model has a standard 80mm aeronautical shape and is intended to be installed into a standard 80mm hole (3.125'').

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 80mm holes already prepared.
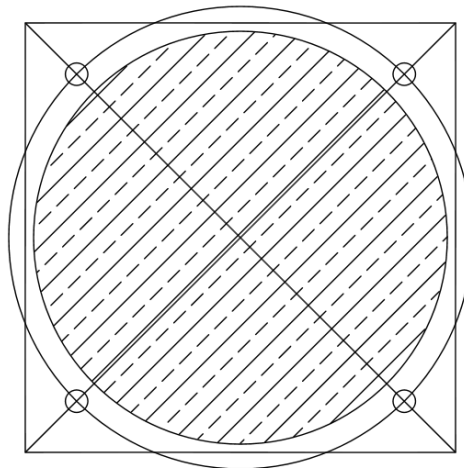
3 1/8 (80mm) Instrument Hole

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.

To lock the IFD-NET EVO EFIS (80mm) unit on your cockpit use the three black screws provided in the purchase box, otherwise select different screws with same dimension of 4MA x 10mm MAX.

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 7.5 mm 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 needs 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 a plastic profile to obtain a thickness of about 1mm 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.

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6.1.   SELECTING AN APPROPRIATE INSTALLATION POSITION

IFD-NET EVO 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 result, 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 EVO EFIS. 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. 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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7.   ELECTRICAL CONNECTIONS

7.1.   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 aluminum 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-NET EVO.

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

IFD-NET EVO wiring
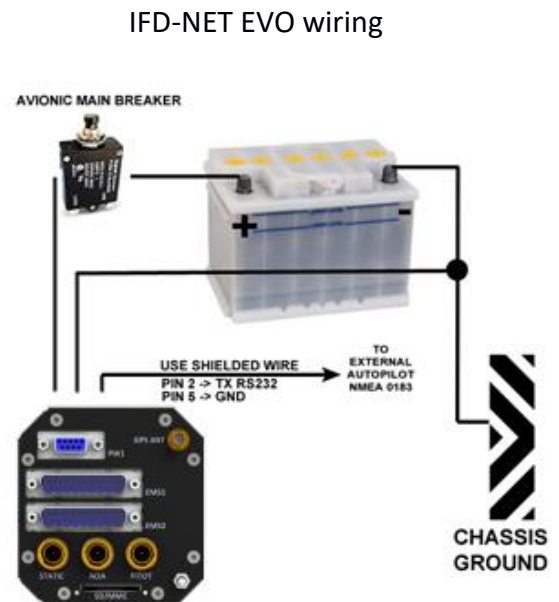
7.2.   IFD-NET EVO EFIS POWER CONNECTOR PINS

1. Main power supply (acceptable voltages 10 - 28Vdc).
2. (TX output) pole of RS232 BUS.
3. (RX input) pole of RS232 BUS.
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 (acceptable voltages 10 - 28Vdc).
7. NTC temperature sensor for TAS calculation.
8. Ground. Connect to Ground chassis of aircraft or to negative pole of electric circuit.
9. (B) Pole of RS485 BUS.
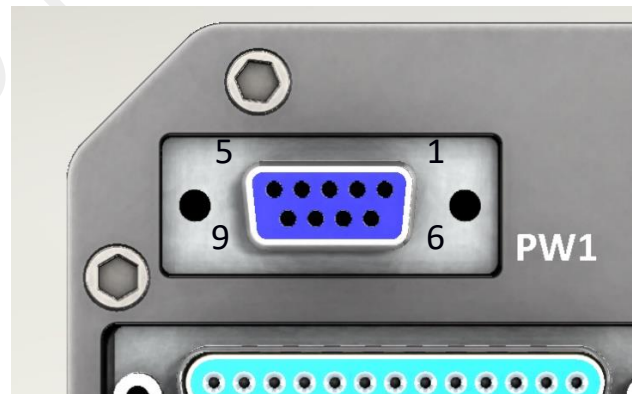
Pins 1 and 6 must be connected both to the positive pole of aircraft electric circuit. Pins 5 and 8 must be connected both to negative pole of aircraft electric circuit.

Is strictly recommended to connect the dedicated GROUND shaft on the rear of the instrument directly to the metal ground chassis of the aircraft by an adapt "ring 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).

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8. CALIBRATIONS

8.1. 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 and move it according to the correct angle of the levelled flight at normal cruise speed.

- 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

Mount 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**, previously described) 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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8.2.   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 track when available (see paragraph **SETUP** above, **PFD CONFIG --> HDG TYPE**)

8.2.1.   COMPASS CALIBRATION

The IFD-NET EFIS EVO 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 "**CALIBRATE**" and press the knob to start the calibration. This menu item usually reads "OFF". The "**OFF**" will change to "**ON**" (green color) to indicate that the calibration process has been started.

Setup compass

- 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 "**CALIBRATE**" and press the knob again.

  You will notice that the "ON" near "**CALIBRATE**" changes back to "OFF". Also, the top-right item on the screen should read "**C1**" instead of "**C0**".

Compass page calibration

  ➢ In case the "**C0**" never turns to "**C1**", it could mean that the magnetometer is not working properly. It may be saturated by a very strong magnetic field.

  ➢ 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.

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- 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.

- 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.

8.2.2.   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.

8.2.3.   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, "**T027**" as in the picture on the right).

That number (027 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, 026 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.

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8.3.   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. 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.

Compass not calibrated

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 asterisks ("***********")

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

Compass calibrated

8.3.1.   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 EVO EFIS 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 but, in case of the magnetic field would be too strong, shell be considered the de-Gaussian procedure to remove the magnetic residual field from the aircraft iron parts. Refer to your technician to learn more on this procedure.

8.3.2.   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 will always show "---" unless in the SETUP menu you set "HDG TYPE" to either "AUTO" or "GPS".

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9. MECHANICAL DIMENSIONS DIAGRAM

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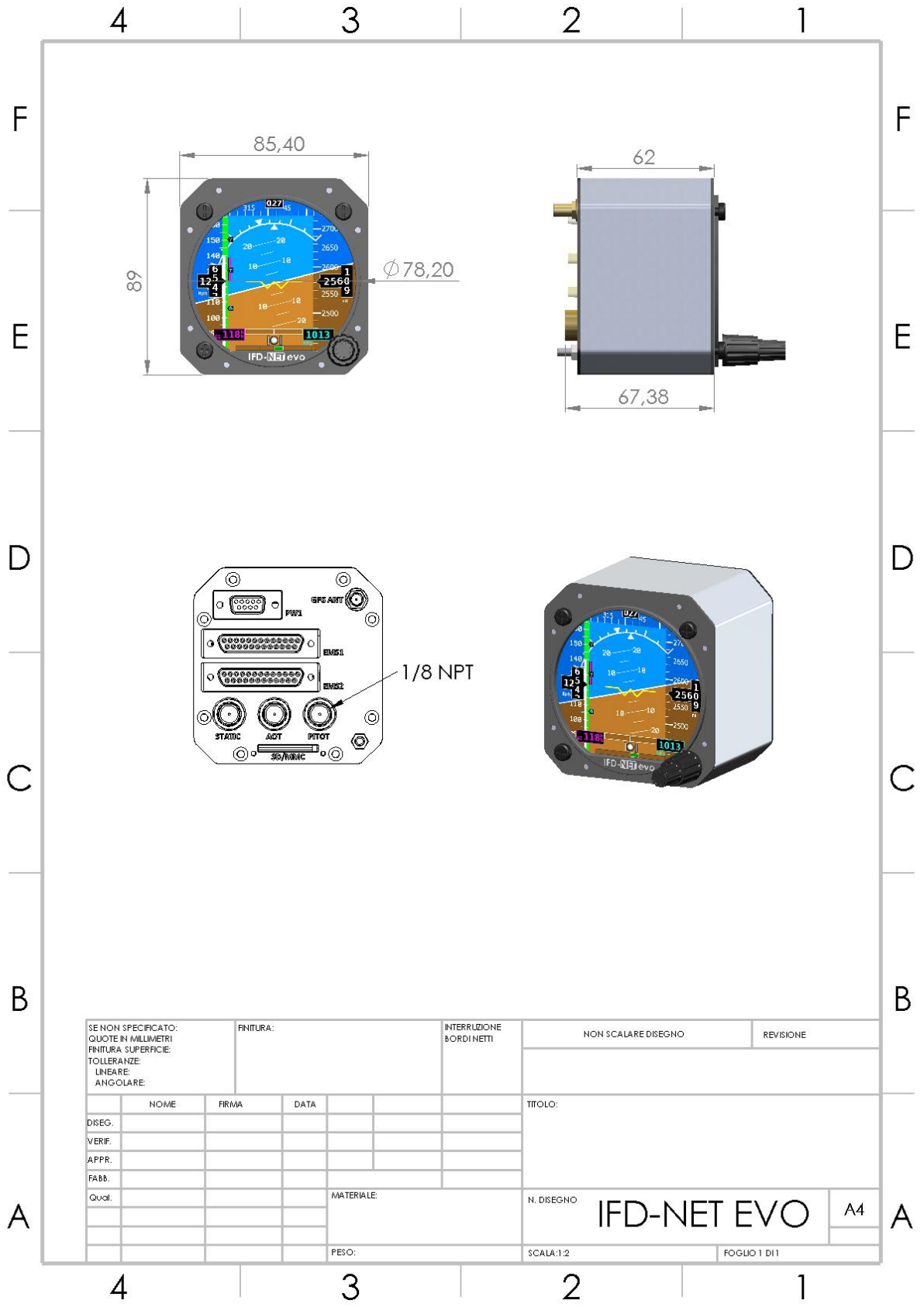
10. ORDERING INFORMATION

IFD-NET EVO EFIS PFD is part of a large range of products. 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-NET EVO EFIS PFD
- IFD-NET EVO BARO
- IFD-NET EVO EFIS NAV
- IFD-NET EVO EFIS MAP
- IFD-NET EVO EFIS PLUS
- IFD-NET EVO EFIS SLAVE
- IFD-NET EVO EMS MASTER
- IFD-NET EVO EMS SLAVE
- IFD-NET SERVO 5Nm
- IFD-NET SERVO 10Nm
- IFD-NET SERVO 12Nm
- GPS ANTENNA
- 1/8 NPT MALE to RUBBER PIPE HOSE ADAPTERS
- (T) RUBBER PIPE HOSE ADAPTER
- SD CARD Extension.

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 be observed VFR policy during your flight.
- The manufacture doesn't respond for any problem or damage generated by a not properly use of the product.
- Images on this manual are just for explication porpoises and may be different in some details to the final product the end user bought. Contact vendor for more information.
- The internal magnetometer works fine only if in case of the unit results correctly installed. Any improper installation detail could generate a malfunction of the magnetometer and the other embedded sensors or receivers. Keep in a great account all the hints reported in the present manual. Consult our representatives to learn more on how to obtain the perfect unimodality of the instruments described in the present manual.