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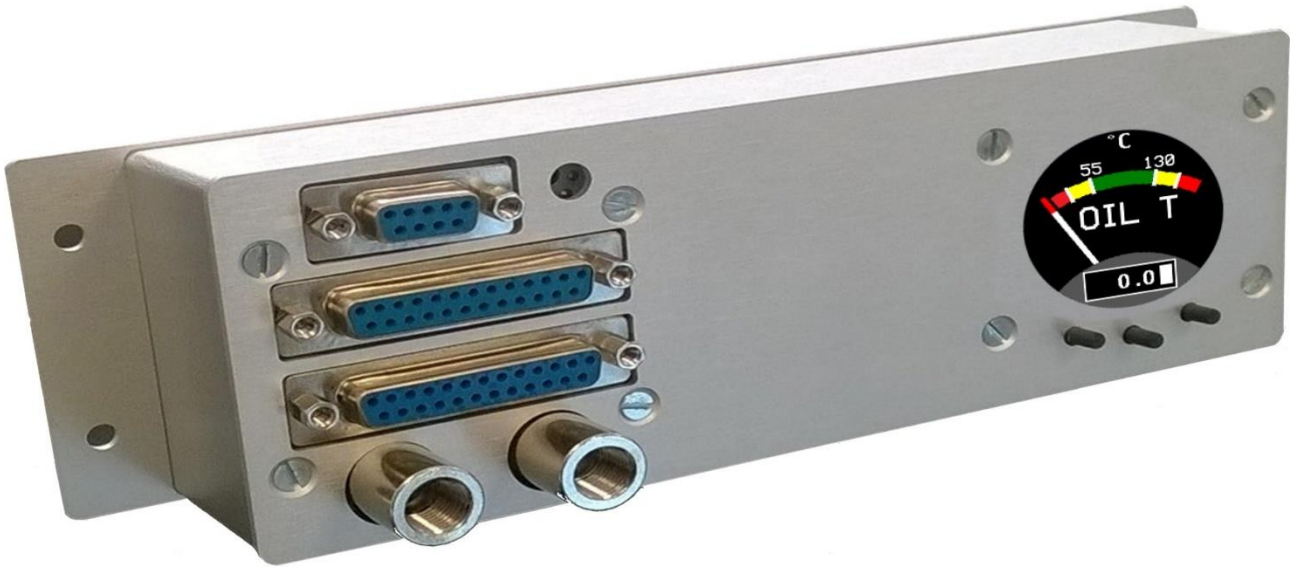
IFD-EMS SYSTEM MASTER-SLAVE



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THE NEXT GENERATION AVIONICS

INSTALLATION AND USER MANUAL

DISCLAIMER & WARNINGS

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The IFD-NET/IFDmicroNET is meant as an aid to VFR navigation and is not a substitute for certified EFIS.
All critical flight information is presented for reference only and must be verified by the commander/pilot in command.
The IFD-NET/IFDmicroNET is not a substitute for on-board instruments.
The commander/pilot in command assumes total responsibility and risk associated with the use of this device and remains solely responsible for flying in safe conditions.
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Summary

1 GENERALITY

1.1 Units Description

IFD-EMS product family includes three types of instruments:

- IFD-micronet : standard 57mm multifunctional gauge
- IFD-NET : standard 80mm multifunctional gauge
- IFD-MODULE : fastened comfortably to the rear panel, in order to realize an ergonomic cabling.

In order to realize a network, this units can be classified as:

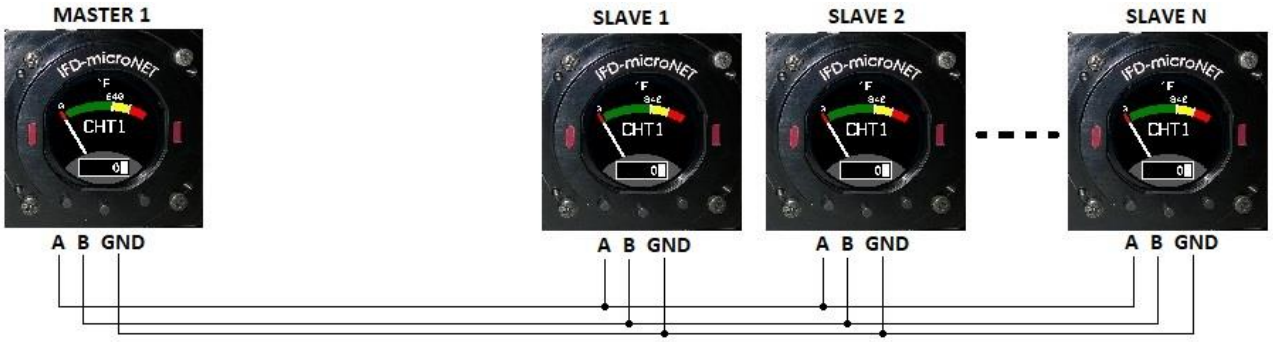
- StandAlone : Only IFD-micronet; it consists in one single unit witch capture and visualize various engine data
- Master: IFD-micronet or IFD-module;it reads data engine and generate RS485 pack data that will be used from other connected units
- Slave: All unit type;it can read data only from RS485 BUS

The IFD-EMS Master-Slave system consists of
-1 o 2 MASTER units
-1 or more SLAVE units.

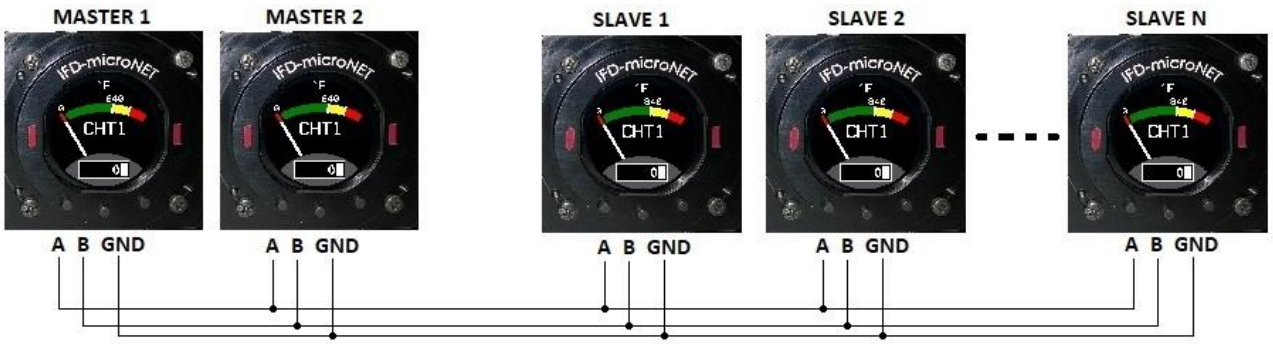
Each MASTER can read until 6 thermocouples and 6 generic sensors (type R,V or I) and builds an RS485 pack data.
SLAVE units it is not provided with the data acquisition circuitry but it reads data from RS485BUS.

1.2 RS485BUS description

-N°1 Master n Slaves



-N°2 Master n Slaves



In this configuration, readable sensors doubles (12 Thermocouples, 12 generic sensors) .
For each unit connected to the bus, thermocouples 1-6 and sensors 1-6 will be those connected to MASTER1 unit, thermocouples 7-12 and sensors 7-12 will be those connected to MASTER2 unit.

NOTE: Sensors and thermocouples numbered 1-6 on MASTER2 Unit aren't those connected to this unit, but those connected to MASTER 1 unit ,to ensure setup uniformity for each unit connected to RS485BUS

MASTER unit can be replaced with IFD-ENGINE-MODULE unit , which can be fastened comfortably to the rear panel, in order to realize an ergonomic cabling. IFD-ENGINE-MODULE has all the features of MASTER unit.

SLAVE unit can be replaced with IFD-NET-EMS unit (80mm diameter)

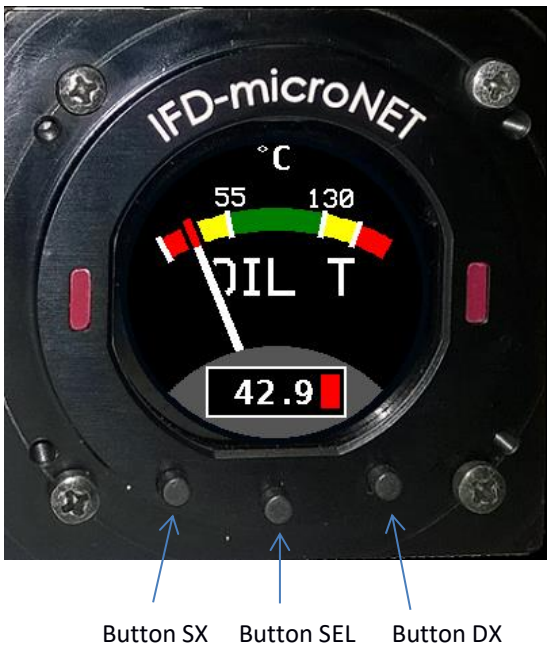
1.3 BOX CONTENTS

- N°1 IFD-NET unit (IFD-micronet or IFD-NET or IFD-Module)
- N°1 9 pin socket (male)
- N°1 9 pin socket cover
- N°2 25 pin socket (male) (Only if not SLAVE type)
- N°2 25 pin socket cover (Only if not SLAVE type)
- N°4 1KΩ 1% metal resistor (Only if not SLAVE type)
- N°4 1.5KΩ 1% metal resistor (Only if not SLAVE type)
- N°2 3KΩ 1% metal resistor (Only if not SLAVE type)
- N°1 instruction booklet

1.4 USER INTERFACE

IFD-microNET-EMS and IFD-module-EMS interface consists of three buttons

- DX Menu cursor move down or decrease values
- SX Menu cursor move upu or increase values
- SEL Confirm data



IFD-NET (80mm) interfce consists of one rotary knob with button;
clockwise rotation corresponds to DX press
counterclockwise rotation corresponds to SX press
Push button corresponds to SEL press

1.1 CHARACTERISTICS

- Installation Diameter Standard 57mm (IFD-microNET) or 80mm(IFD-NET)
- Very bright screen, sunlight visible, up to 1000 cd/m².
- Low power consumption down to 2.3W (200mA @ 12Vdc).
- Ergonomic interface with three buttons (or rotary knob)
- Multi-environment software with simple switch menu
- Several functions in color/ graphic display:
  - Until 12 THERMOCOUPLES (type j,k,n,e,r,s,t)
  - Until 12 SENSORS (type ,R, I, V)
  - Until 6 Pulse Revolution Counter (RPM, RotorRPM,Fuel Flow..)
  - Until 2 Manifold pressure system measure

1.2 ELECTRICAL AND MECHANICAL SPECIFICATION

- Power Supply 10 - 30Vdc 200mA with internal filter and automatic peak protection .
- Operating temperature -20°C to 80°C 90% Rh.
- 64mm x 64mm x 75mm (width, height, depth).
- 1 x 1/8 NPT Static pression connector (MAP sensor).
- Standard 9 SUB-D Power Supply and RS485BUS.
- 2 x Standard 25 SUB-D for sensors, thermocouples, Can Bus and other services .

1.3 AVAILABLE MODELS

In order to available sensors readable, five types IFD-NET_EMS models exists :

- TEMPERATURE
  - EGT (Exhaust Gas Temperature)
  - CHT (Cylinder Head Temperature)
  - CT (Coolant Temperature)
- ENGINE
  - RPM (Round Per Minute)
  - MAP (Manifold Pressure)
  - OIL T (Oil Temperature)
  - OIL P (Oil pressure)
- FUEL
  - FLEV (Fuel Level)
  - FUEL P (Fuel Pressure)
  - F FLOW (Fuel Flow)
- AUX
  - Voltmeter (Battery Voltage)
  - Amperometer (Battery Current)
  - CAT (Coolant temperature)
  - ABT (Interior Temperature)
  - OAT (Out temperature)
  - LAMBDA (Lambda sensor)

- FULL

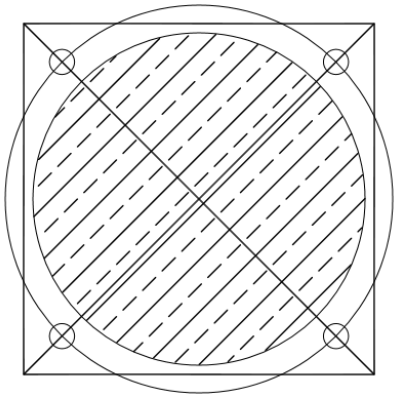
  In this case all sensor types are available

2 INSTALLATION AND DIMENSIONS

2.1 IFD-microNET (57mm)

2.1.1 Installation

IFD-microNET EMS has a 57mm standart aeronautical diameter; this means that the installer must follow the aeronautical standards for a correct installation of the unit. Refer to the hole models below if the aircraft does not have 57mm holes already prepared.

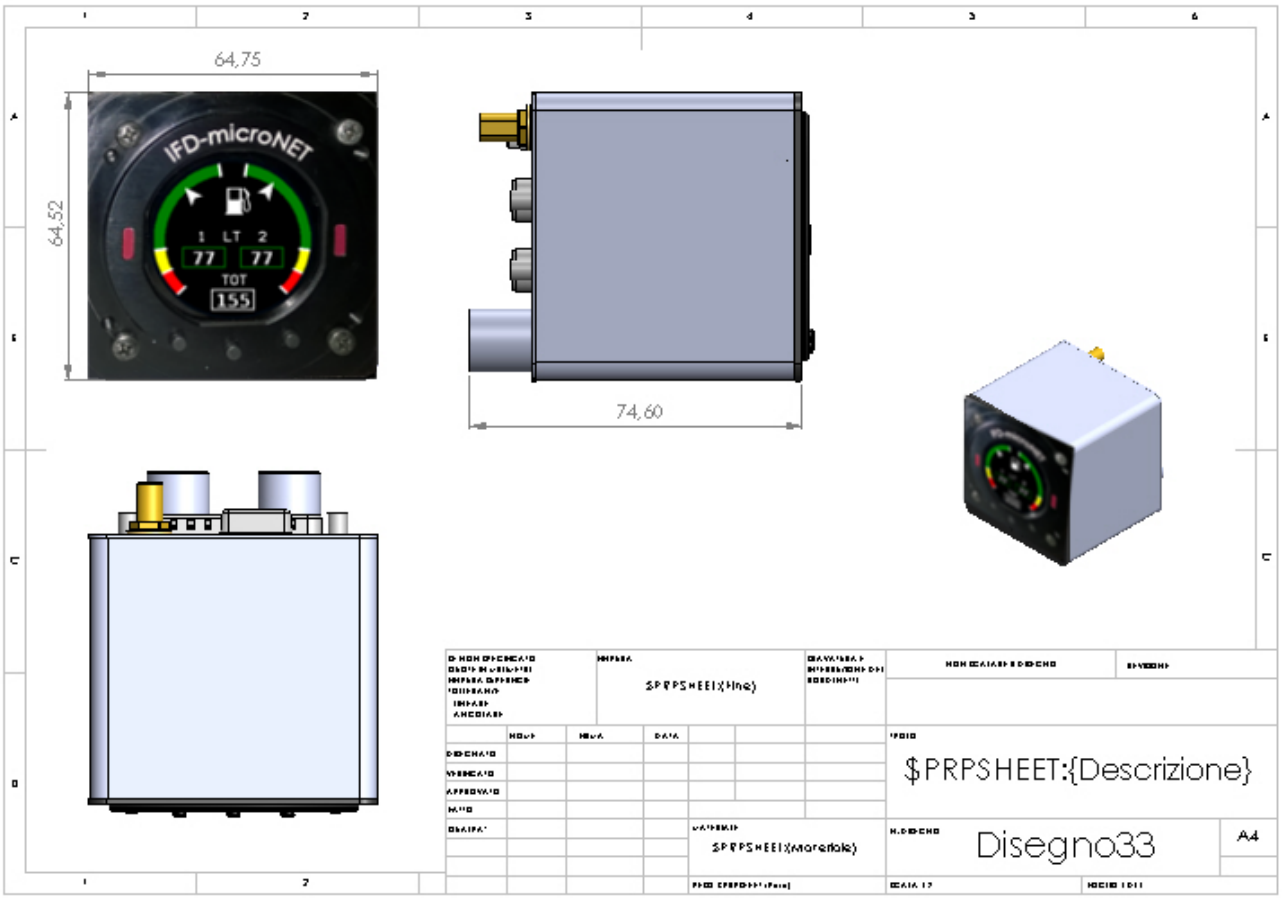


2 1/4 (57mm) Instrument Hole

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 fix IFD-microNET (57mm) to the cockpit use the four black screws supplied with the instrument, or use different screws but with the same dimensions 3MA x 10mm MAX.
No modification to the standard 2 ¼ inch (57mm) holes is required to achieve perfect device installation.
The screws in the remaining three holes must be pulled with sufficient force to correctly fix the instrument.
Use the supplied black screws (4mm MA length 10mm) to fix the instrument to the panel. Do not pull the screws too hard to avoid damage to the IFD-MicroNET chassis.

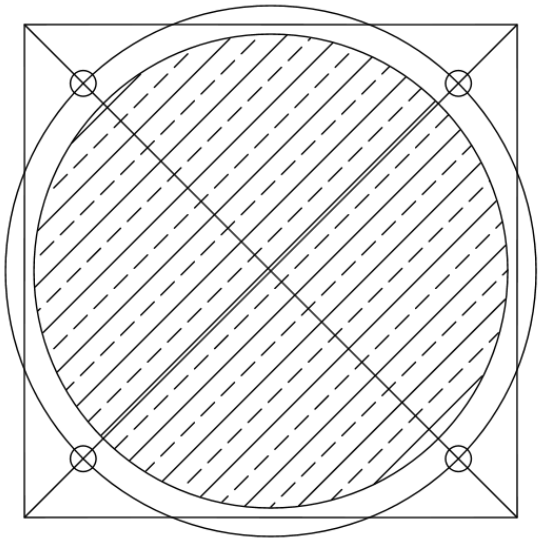
2.1.2 DIMENSIONS



2.2 IFD-NET (80mm)

2.2.1 IInstallation

The IFD-NET EFIS/MAP has a standard 80mm aeronautical shape.
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.

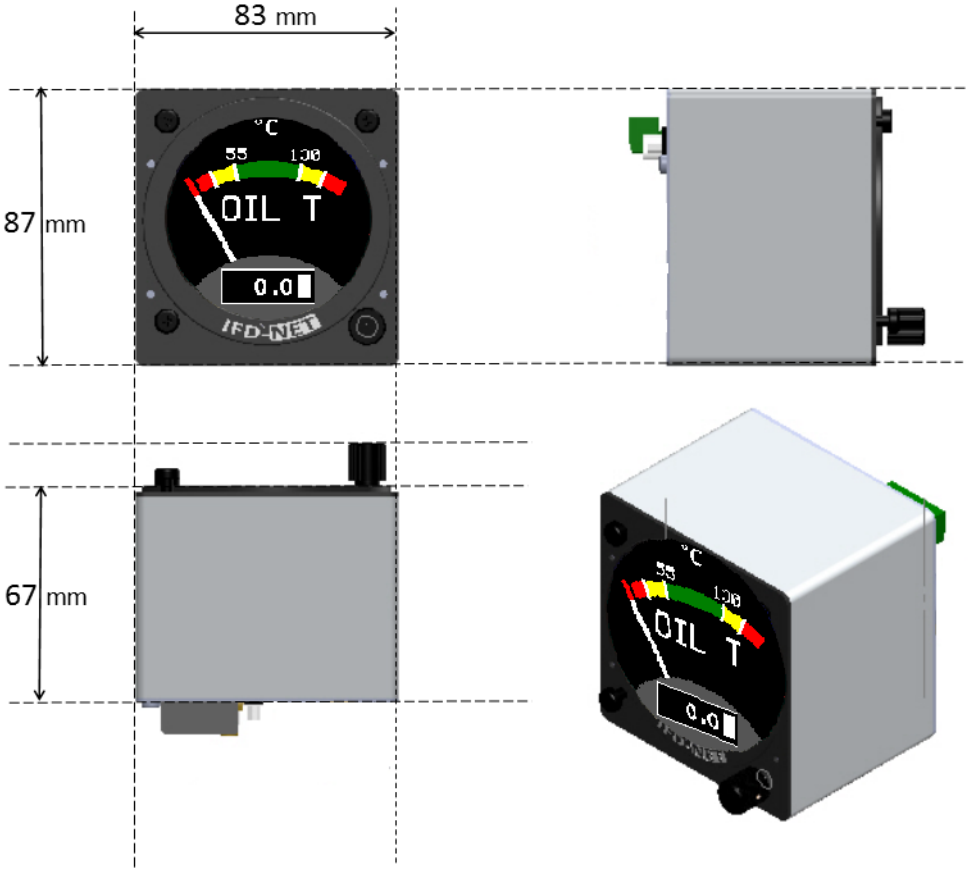


3 1/8 (80mm) Instrument Hole

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.

The IFD-NET is installable in a standard hole, keeping in account that the lower-right screw hole shall be enlarged to a diameter of 7.41mm to accommodate the rotary knob.
The screws on the remaining three holes shall be tightened with appropriate torque, in a way to keep the instrument fixed and not introduce any vibration which would decrease the accuracy of the gyro sensors.
Remove the aluminum knob by turning on the little screw. This is because the encoder shaft need to pass throw the 7.5mm diameter hole in the bottom right corner of the 80mm hole.
After putting the instruments in the reworked slot, install the aluminum knob and turn its screw to lock it; use the plastic profile template to obtain a thickness of about 1.5mm between the cockpit surface and the bottom part of the aluminum knob.

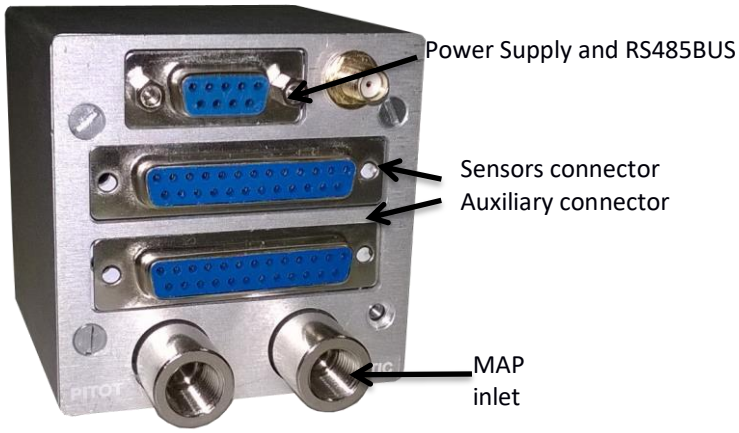
2.2.2 DIMENSIONS



3 CONNECTIONS

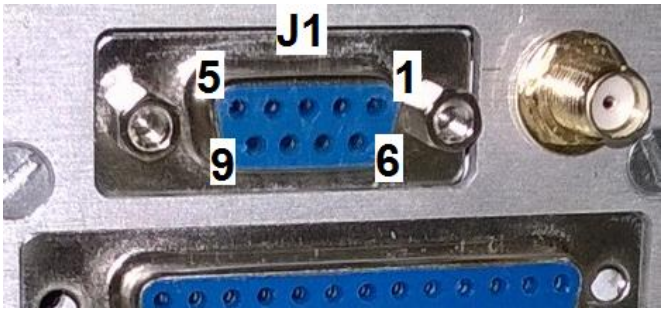
3.1 IFD-microNET (57mm) and IFD-MODULE

3.1.1 REAR CONNECTIONS



3.1.2 Power Supply and Bus Connector J1

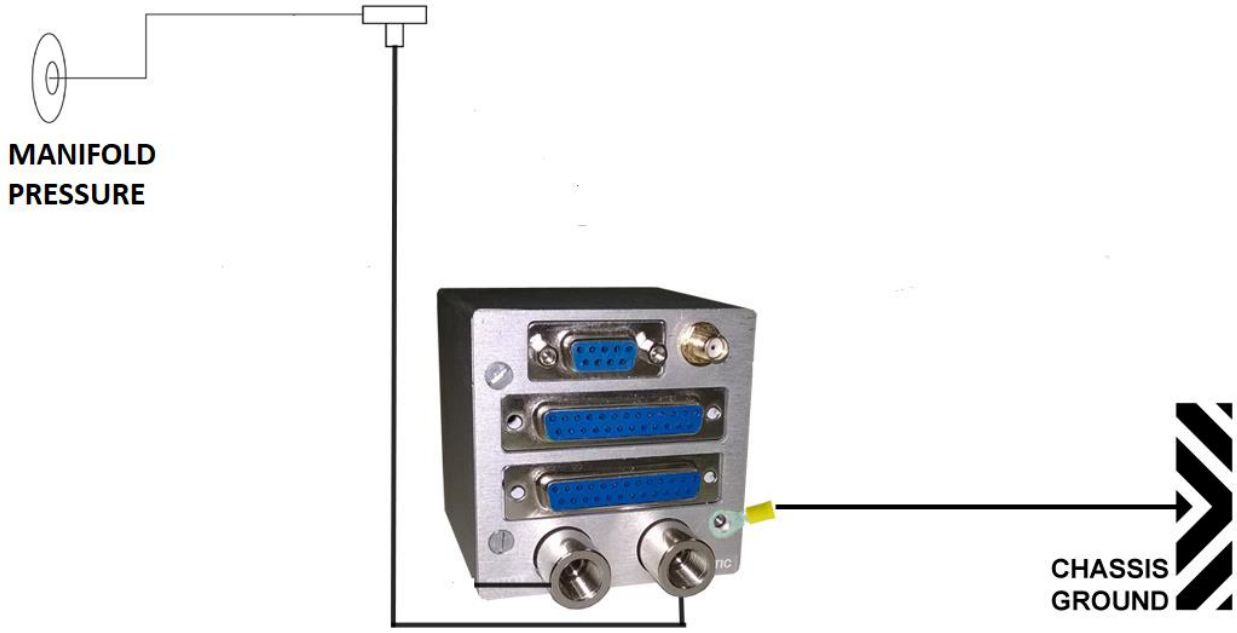
1. Power Supply (10 - 28Vdc).
2. Not connected
3. Not connected
4. BUS 485 PinA
5. Ground. Connected to plane chassis or negative battery pole.
6. Power Supply (10 - 28Vdc).
7. Not connected
8. BUS 485 PinGND.
9. Bus 485 PinB



Pins 1 and Pin 6 must be connected to positive battery pole . It is better connect one of the screws to the plane chassis by a faston connector and a 2.5 mm^2 cable. This trick can reduce the radiofrequency noise of the unit.

3.1.3 Pressure Connector MAP

Please observe the safety regulations for connecting pipes in. Contact the manufacturer for any questions regarding the correct installation of the pneumatic system. See a diagram of the pneumatic connections below.



The MAP pneumatic input is supplied with a 1/8 NPT nickel-plated brass female connector. Use appropriate adapters with rubber o-rings and do not tighten the pipes too hard to prevent damage to the internal parts of the unit.

3.1.4 Sensors Connector

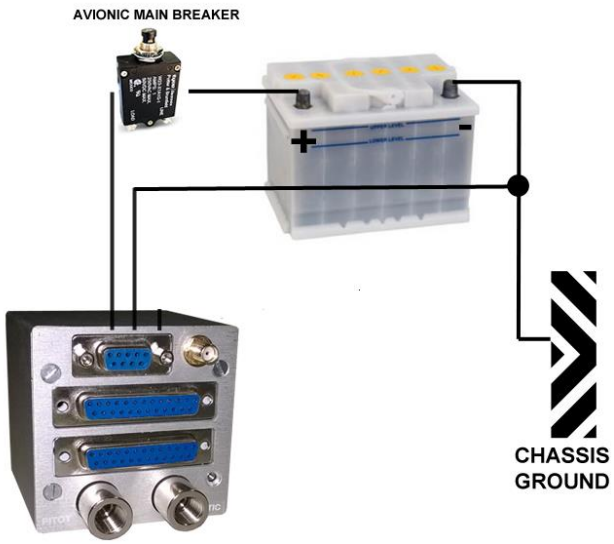
1. 5VOut
2. GND
3. GND
4. GND
5. GND
6. GND
7. GND
8. GND
9. GND
10. GND
11. GND
12. GND
13. GND
14. IN Sensor 6
15. IN Sensor 5
16. IN Sensor 4
17. IN Sensor 3
18. IN Sensor 2
19. IN Sensor 1
20. IN Thermocouple 6
21. IN Thermocouple 5
22. IN Thermocouple 4
23. IN Thermocouple 3
24. IN Thermocouple 2
25. IN Thermocouple 1

3.1.5 3.1.5 Auxiliary Connector

1. 5VOut
2. GND
3. REV2
4. REV1
5. REV0
6. RX1 RS232
7. GND
8. TX2 RS232
9. CANBus L
10. GND
11. CANBus1 H
12. Out Rele 2.1
13. Out Rele 1.1
14. 5VOut
15. GND
16. GND
17. GND
18. GND
19. TX1 RS232
20. RX2 RS232
21. GND
22. CANBus0 H
23. CANBus1 L
24. Out Rele 2.2
25 Out Rele 1.2

3.1.6 Power Supply Connection

The electrical connection of the EMS models is very simple.
On the right a simple connection diagram for IFD-microNET-EMS.
Use cables with a cross-section of no less than 1.5 mm2.
Make connections as short as possible.



3.1.7 Sensor Wiring

Refer to the datasheets of the sensors that you intend to use.

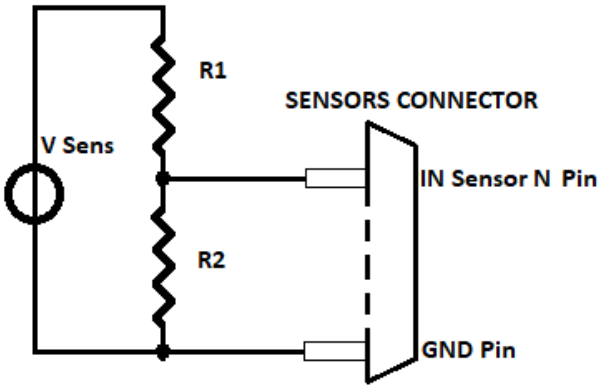
3.1.8 Current Sensors Notes

In case of current sensors, connect an electrical resistance in parallel to the sensor, the value of which must be set in the setting table of the corresponding sensor.
Typical values :

Sensor Output	Resistor Value
4..20 mA	150Ω
0..10 mA	300Ω

3.1.9 Voltage Sensors Notes

In case of voltage sensors, the maximum sensor output must be 3V.
if the maximum sensor output exceeds three volts, a divider must be connected to the input pins, as shown below

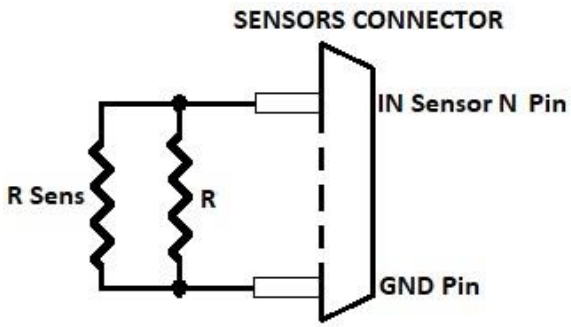


Typical values :

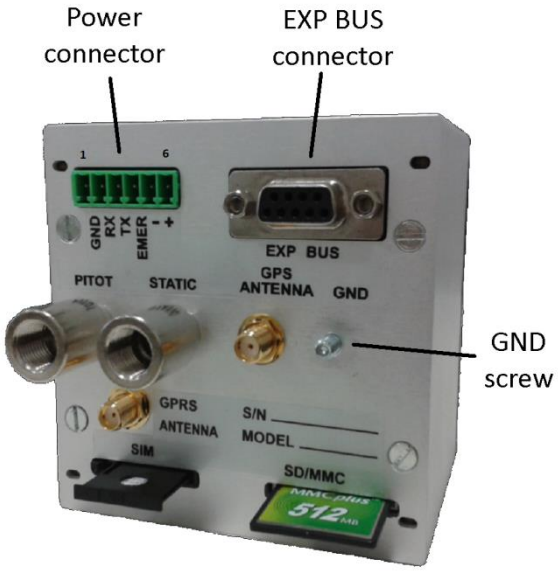
Sensor Max Value	R1 Value	R2 Value
5V	1.0K Ω 1%	1.5K Ω 1%
10V	1.0K Ω 1%	3.0K Ω 1%

3.1.10 Resistive Sensors Notes

In case of resistive sensors, the maximum sensor value must be 1500 Ω.
if the maximum sensor value exceeds this limit, a resistor must be connected parallel to sensor;
Typical value for resistor R is 1.5K Ω 1%



3.2 IFD-NET (80mm)



POWER CONNECTOR:

- Pin 1 – 0V -> connect to GND
- Pin 2 Not Used
- Pin 3 Not Used
- Pin 4 Not Used
- Pin 5 GND -> GND for internal GPS
- Pin6 +12V (10 to 30Vdc) 250mA: use 5A Fuse

EXP BUS CONNECTOR:

- Pin 1 Not Used
- Pin 2 Not Used
- Pin 3 Not Used
- Pin 4 BUS485 A
- Pin 5 GND
- Pin6 Not Used
- Pin7 Not Used
- Pin8 Not Used
- Pin 9 BUS485 B

4 INTERFACE

4.1 MAIN MENU

IFD-microNET EMS main menu consists in several color graphic screens diplaying the values of installed and configurated sensors.
Graphic Screens depends on unit model (TEMP,ENGINE,FUEL,AUX, FULL) and the number of connected and configurated sensors.
Press quickly SEL to navigate between available screens.
Press quickly SX or DX to displaying actual type sensor

EXAMPLE :

Unit model : TEMPERATURE
Connected sensors : 3EGT,3CHT

4.1.1 -TEMPERATURE- TYPE

<TEMPERATURE> type allows reading of

- Max 6 EGT Exhaust Gas Temperature
- Max 6 CHT Cylinder Head Temperature
- N°1 CT Carbouretor Temperature

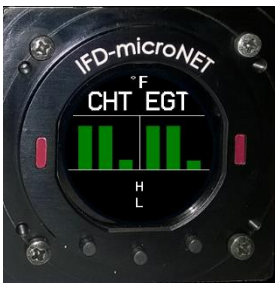
Available screens are :

EGT, CHT ,CT : Single sensor reading

Possible options :

- EGT1,EGT2,EGT3,EGT4,EGT5,EGT6
- CHT1,CHT2,CHT3,CHT4,CHT5,CHT6
- CT

Selectable unit of measure: °C-°F



4.1.1.1.1

EGT+CHT

It shows simultaneously the progress of all the CHT and EGT,
With recording of the maximum and minimum peaks for each typology.

NOTE Long press on the DX button resets the peaks.
If there are not CHT or EGT sensors connected, the screen shows only the type available

4.1.2 -ENGINE- TYPE

<ENGINE> type allows reading of

- Max 2 RPM (Motor + rotor)
- N°1 MAP Manifold Pressure
- N°1 OIL T Oil Temperature
- N°1 OIL P Oil Pressure

Available screens are :

RPM,MAP ,OIL T,OIL P : Single sensor reading

Selectable unit of measure :

- Oil T : °C - °F
- Oil P : Bar – Psi
- MAP : Psi

RPM+MAP (available only if both sensors are connected)

OIL T + OIL P (available only if both sensors are connected)

ENGINE ALL

Show all connected sensors simultaneously.
In case one or two sensors are not connected, the Graphics automatically adapts.

4.1.3 -FUEL- TYPE

<FUEL> type allows reading of

- N°1 Fuel P Fuel Pressure
- N°1 Fuel F Fuel Flow
- Max 4 Fuel Lev Fuel Level
- N°1 OIL P Oil Pressure

Available screens are :

FUEL PRESSURE ,FUEL FLOW : Single sensor reading
Selectable unit of measure :

- Fuel F : Lt/min,Gal/min
- Fuel P : Bar, Psi

Fuel Lev : Single sensor reading

Fuel Lev 2

Shows two fuel level (Lev1+LEV2 oppure LEV3+LEV4) and
The sum.

Selectable unit of measure : Lt, Gal

FUEL ALL

Shows simultaneously all installed sensors.
n case one or two sensors are not connected, the
Graphics automatically adapts.

4.1.4 -AUX- TYPE

<AUX> type allows reading of

- N°1 Voltmeter -Battery Voltage
- N°1 Amperometro -Battery Current
- N°1 Cat -Cooling Temperature
- N°1 ABT - Interior Temperature
- N°1 OAT - Outside Temperature
- N°1 LAMBDA - Lambda Sensor

Available screens are :

VOLTMETER , AMPEROMETER: Single sensor reading
unit of measure :

- Voltmetro : V
- Amperometro : A

OAT,ABT,CAT : Single sensor reading
unit of measure : °C,°F

VOLTMETER + AMPEROMETER

OAT+ABT+CAT.

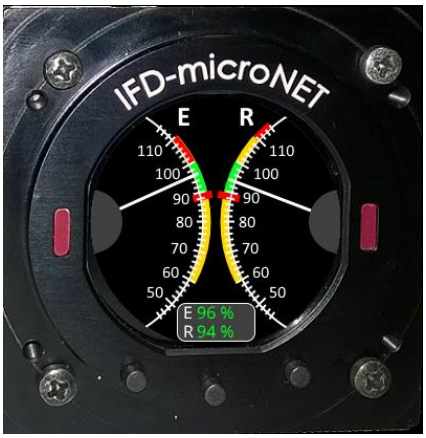
4.1.5 -FULL- TYPE

<FULL> type allows the reading of ALL the sensors previously exposed.
In this case, using the PAGES MENU, you can determine which screens to enable in view.
The FULL version therefore allows maximum versatility in the configuration of the acquisition system.

In FULL type is possible to view the DUAL RPM HELICOPTER page also;

To view DUAL RPM meter for HELICOPTER page, do :

- Set PICKUP1->Parameter and PICKUP2->Parameter to RRPM (PICKUP1 is ENGINE sensor, PICKUP2 is ROTOR sensor)
- Set PICKUP1->WORK RPM to typical engine RPM value (e.g. 2400)
- Set PICKUP2->WORK RPM to typical rotor RPM value (e.g. 600)
- Set arcs as you wish



4.2 SETUP MENU

It is possible to access the SETUP by pressing the central button for about 1 second, until the screen shown on the right appears (LOGIN).

By entering the MID key you enter in SETUP page.

Settings of Setup Menu:

- **EXIT**: Come back to main menu.
- **LIGHT:** Screen brightness regulation
- **PAG INI**: Screen shown when the instrument is started.
- **INDEX**: Number of the instrument to be displayed at startup.
- **ENGINE**: Self configuration in order to selected engine.
- **TERMOCOUPLE**: Setup termocouples (See
- **MENU** TERMOCOUPLE)
- **SENSORES** : Set Sensors (See **MENU SENSORES**)
- **RPM/FLOW**: Set pulse input (See **RPM/FLOW MENU**)
- **MAP**: Set pneumatic input MAP
- **SET UOM**: Set unit of measure for physical quantities
- **V BAT** : Set battery voltage
- **SW**: Firmware version
- **SET PAGES** Setup pages (See **MENU PAGES**) **(**Only -FULL- type**):**
- **DATA LOGGER :** Max temperature and RPM log

4.3 MENU TERMOCOUPLE

IFD-microNET_EMS is able to read up to 6 thermocouples configurable according to the model.
Each thermocouple you want to manage can be connected to each input -Thermomocouple- (See **Sensors Connector**).
Through the TERMOCOUPLE menu it is possible to link the physical input of the thermocouple to its logical function.

Press for about 1 second DX to access the setup of the next TC;
Press for about 1 second SX to access the setup of the previous TC.

Settings of termocouple menu:

- **EXIT:** Come back to menu SETUP
- **PARAMETER:** Type of measurement required. The available values vary depending on the model
- **TC TYPE:** Construction type of the thermocouple. Available values j, k, n, e, r, s, t (See thermocouple data sheet under examination):
- **ARCS:** Set coloured arcs **(**See **ARCS** MENU)

4.4 MENU SENSORS

IFD-microNET_EMS is able to read up to 6 sensors configurable according to the model.
Each sensor that you want to manage can be connected to each input -sensor- (See **Sensors Connector**). Through the SENSORES menu it is possible to link the physical input of the sensor to its logical function.

Press for about 1 second DX to access the next sensor setup;
Press for about 1 second SX to access the previous sensor setup.
The characterization of the sensor can be done in two ways:

1. Selecting a specific sensor model from the internal database (parameter SENS)
2. By inserting customized characteristic (parameter TYPE) and curve (parameter CURVE)

Settings of sensors menu:

- **EXIT:** Come back to menu SETUP
- **PARAMETER:** Type of measurement required. The available values vary depending on the model
- **TYPE:** sensor construction technology. Valid only if the SENS parameter is not active. Possible values:
  1. **V (Voltage Sensor)**
  2. **I (Current Sensor)**
  3. **R (Resistive Sensor)**
- **SENS:** Sensor model See paragraph - DEFAULT SENSORS-.
- **CURVE :** Manual setting of the sensor characteristic curve See **MENU CURVE.** If sensor PARAMETER is F LEV (fuel level) this voice became to **CALIB**
- **ARCS :** Set coloured arcs **(**See **ARCS MENU)**

4.5 RPM/FLOW MENU

IFD-microNET_EMS can read up to 3 impulsive inputs configurable according to the model.
Each sensor can be connected to each input -REVn- (See EXPANSION CONNECTOR). Through the RPM / FLOW menu it is possible to link the physical input of the sensor to its logical function.

Press for about 1 second DX to access the next sensor setup;
Press for about 1 second SX to access the previous sensor setup.
Logical features availables are :

1. RPM (rpm motor or rotor)
2. F FLOW (Fuel Flow)

Settings of RPM/FLOW menu:

- **EXIT:** Come back to menu SETUP
- **PARAMETER:** Type of measurement required. The available values vary depending on the model
- **ARCS :** Set coloured arcs **(**See **ARCS** MENU**)**
- **PULSE REV/FLOW:** Indicate pulse revolutions respectively or the impulse liters

4.6 MENU MAP / MENU VBAT

These menu allow the settings of coloured arcs for MAP and Power Supply instruments.
See **ARCS** MENU

4.7 MENU PAGES

This menu (active only on FULL type unit) allows to make the list of visible screen.
Available screens are all those seen in the previous sections.
Selected screens will appear only if the related sensors are configured.

4.8 MENU CURVE

The sensor characterization curves are composed of 24 distinct points.
For each point, the value of the electrical quantity and the corresponding value must be entered value of the physical quantity to be measured.

The long DX pressure allows you to move to the next point.
The long SX pressure allows you to move to the previous point.

Settings of CURVE menu:

- Sensor Name
- Point Index
- EXIT : Come back to SENSORS menu
- ELEC : Value of the electrical quantity at the considered point
- PHIS : Value of the physical quantity of the considered point
- COMPLETE : Complete the curve by copying the current point (POS) until the end
- RESET : Reset all curve points

4.9 MENU CALIB

This page appears only in case of FUEL LEVEL sensor.
The user must empty the tank then fill it in ten steps; in each step the amount to be added is equal to one tenth of the maximum capacity (defined in the ARCS menu)

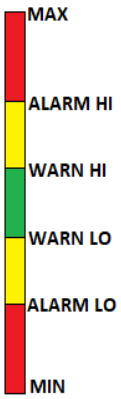
Follow these steps for a correct calibration

1. Enter ARCS menu and compile at least MAX value
2. Enter CALIB menu and follow instruction at screen.
    a. Load one tenth of the maximum capacity tank
    b. Wait to IFD-EMS sample the value
    c. If tank is not full, repeat form a., else finish.

4.10 MENU DATA LOGGER

4.11 ARCS MENU

In the ARCS menu it is possible to configure the operating areas of the sensors.
Up to 5 intervals can be configured:



By adjusting the parameters, it is possible to obtain various combinations useful for the description of various types of measurement.For example, in the case of fuel level sensor with 80Lt tank, setting:

MIN	0
ALARM LO	10 Lt
WARN LO	15 Lt
WARN HI	80 Lt
ALARM HI	80 Lt
MAX	80 Lt

you get the classic Fuel Level indication RED YELLOW GREEN

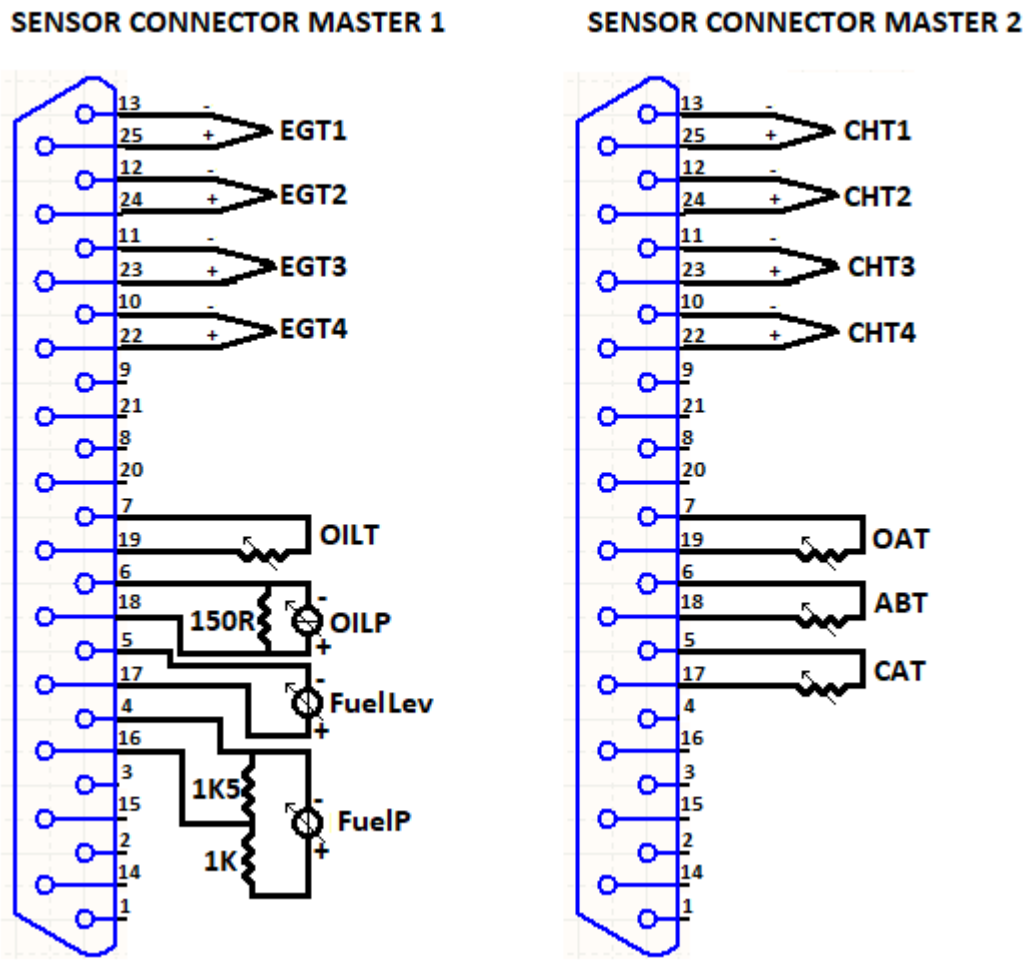
5 CONFIGURATION SYSTEM EXAMPLE

5.1 SENSORS LIST

Sensors to read : 4 EGT (thermocouples)
4 CHT (thermocouples)
1 OilT (R sensor)
1 OilP (I sensor 4 -20 mA)
1 F Lev (V sensor 0-3V)
1 FuelP (V sensor 0-5V)
1 OAT (R sensor)
1 ABT (R sensor)
1 CAT (R sensor)

In this case, there are more than six thermocouples (and more than six sensors), then two master units are needed.
Suppose to want to make this configuration :

5.2 SENSORS CONNECTION



For each unit connected to BUS485, sensor list is :

Thermocouple 1 ->EGT1	Thermocouple 7 ->CHT1	Sensor 1 ->OilT	Sensor 7 ->OAT
Thermocouple 2 ->EGT2	Thermocouple 8 ->CHT2	Sensor 2 ->OilP	Sensor 8 ->ABT
Thermocouple 3 ->EGT3	Thermocouple 9 ->CHT3	Sensor 3 ->FLev	Sensor 9 ->CAT
Thermocouple 4 ->EGT4	Thermocouple 10->CHT4	Sensor 4 ->FuelP	Sensor10->OilT
Thermocouple 5 ->Free	Thermocouple 11->Free	Sensor 5 ->Free	Sensor11->OilT
Thermocouple 6 ->Free	Thermocouple 12->Free	Sensor 6 ->Free	Sensor12->OilT

5.3 Sensors Configuration

Suppose we want to make this configuration :

MASTER 1 MASTER2 SLAVE1 SLAVE 2 SLAVE 3

-Master 1

It is mandatory to set :

- Thermocouple 1,2,3,4 (because these thermocouples are connected to this unit)
  - PARAMETER EGT
  - TC TYPE [enter type thermocouple, it is possible to read different type on each channel]
  - TC TRIM (if needed)
  - ARC
- Thermocouple 6,7,8,9 (because we want to show this thermocouples in this unit)
  - PARAMETER CH
  - TC TYPE [enter type thermocouple, it is possible to read different type on each channel]
  - TC TRIM (if needed)
  - ARC
- Sensor 1 (because it is connected to this unit)
  - PARAMETER OilT
  - TYPE R
  - SENS or CURVE
  - ARCS
- Sensor 2 (because it is connected to this unit)
  - PARAMETER OilP
  - TYPE I
  - SENS or CURVE
  - ARCS
- Sensor 3 (because it is connected to this unit)
  - PARAMETER FLev
  - TYPE V
  - SENS or CURVE
  - ARCS
- Sensor 4 (because it is connected to this unit)
  - PARAMETER FuelP
  - TYPE V
  - SENS or CURVE
  - ARCS

-Master 2

It is mandatory to set :

- Thermocouple 6,7,8,9 (because these thermocouples are connected to this unit)
  - PARAMETER EGT
  - TC TYPE [enter type thermocouple, it is possible to read different type on each channel]
  - TC TRIM (if needed)
  - ARC
- Sensor 6 (because it is connected to this unit and we want to show this value here)
  - PARAMETER OAT
  - TYPE R
  - SENS or CURVE
  - ARCS
- Sensor 7 (because it is connected to this unit and we want show this value here)
  - PARAMETER ABT
  - TYPE RI
  - SENS or CURVE
  - ARCS

- Sensor 8 (because it is connected to this unit and we want show this value here)
  - PARAMETER CAT
  - TYPE R
  - SENS or CURVE
  - ARCS

-Slave 1

It is mandatory to set :

- Sensor 3 (because we want to show this value here)
  - PARAMETER FLev
  - TYPE V
  - SENS or CURVE
  - ARCS

-Slave 2

It is mandatory to set :

- Sensor 1 (because we want to show this value here)
  - PARAMETER OilT
  - TYPE R
  - SENS or CURVE
  - ARCS
- Sensor 2 (because we want to show this value here)
  - PARAMETER OilP
  - TYPE I
  - SENS or CURVE
  - ARCS

-Slave 3

It is mandatory to set :

- Sensor 3 (because we want to show this value here)
  - PARAMETER FLev
  - TYPE V
  - SENS or CURVE
  - ARCS

6 DEFAULT SENSORS

NAME	IFD-EMS CODE	PARAMETER	TYPE	MAX VAL	OPERATIONAL NOTES
DYNON 100434-000	DY100434-000	MAP	V	5V	Use 1K-1K5 divider resistor
GRT MAP 01/02	GRTMAP 01/02	MAP	V	5V	Use 1K-1K5 divider resistor
ROTAX 912 100411-002	R912100411-002	OIL PRESS	R	240Ω	---
GRT HPS-01	GRT HPS-01	OIL PRESS	R	240Ω	---
JABIRU OIL PRESS INSTALLED	Jabiru OilP	OIL PRESS	R	400Ω	---
Rotax P/N 956413	RtxP/N 956413	OIL PRESS	R	1800 Ω	Use 1K5 parallel resistor
Dynon 100409-001	Dyn100409-001	OIL TEMP	R	2000 Ω	Use 1K5 parallel resistor
Dynon 100409-000	Dyn100409-000	OIL TEMP	R	2000 Ω	Use 1K5 parallel resistor
ROTAX OIL TEMP INSTALLED	Rtx OilT	OIL TEMP	R	2000 Ω	Use 1K5 parallel resistor
JABIRU OIL T INSTALLED	Jab OilT	OIL TEMP	R	2000 Ω	Use 1K5 parallel resistor
Chevrolet LS7 INSTALLED	ChevLS7 OilT	OIL TEMP	R	3000 Ω	Use 1K5 parallel resistor
Dynon 100411-000 (carb)	Dy100411-000	FUEL PRESS	R	3000 Ω	Use 1K5 parallel resistor
Dynon 100411-001 (inj)	Dy100411-001	FUEL PRESS	R	200 Ω	---
GRT LPS-02	GRT LPS-02	FUEL PRESS	R	2000 Ω	Use 1K5 parallel resistor
Dynon P/N 100413-000	Dy100413-000	CARB TEMP	R	100K Ω	Use 1K5 parallel resistor
GRT CARB-01	GRT CARB-01	CARB TEMP	R	30K Ω	Use 1K5 parallel resistor
Dynon P/N 100468-000	Dy100468-000	CARB TEMP	R	500K Ω	Use 1K5 parallel resistor
ROTAX CHT L	ROTAX CHT L	CHT	R	10K Ω	Use 1K5 parallel resistor
ROTAX CHT R	ROTAX CHT R	CHT	R	10K Ω	Use 1K5 parallel resistor
Rotax 801-10-1	Rotax 801-10-1	CHT	R	2000 Ω	Use 1K5 parallel resistor
Dynon P/N 100409-001	Dy100409-001	COOL T	R	80K Ω	Use 1K5 parallel resistor
Chevrolet LS7	Chevrolet LS7	COOL T	R	500K Ω	Use 1K5 parallel resistor
Dynon P/N 100409-000	Dy100409-000	COOL T	R	300K Ω	Use 1K5 parallel resistor
Rotax 801-10-1	Rotax 801-10-1	COOL T	R	150K Ω	Use 1K5 parallel resistor
Dynon P/N 100411-000	Dy100411-000	FUEL PRESS	R	3000 Ω	Use 1K5 parallel resistor
Dynon P/N 100433-000	Dy100433-000	OAT	R	500K Ω	Use 1K5 parallel resistor
Dynon P/N 100433-001	Dy100433-001	OAT	R	500K Ω	Use 1K5 parallel resistor
GRT OAT-01	GRT OAT-01	OAT	R	500K Ω	Use 1K5 parallel resistor
Dynon P/N 100433-000	Dy100433-000	G P TEMP	R	60000 Ω	Use 1K5 parallel resistor
Dynon P/N 100433-000	Dy100433-000	G P TEMP	R	60000 Ω	Use 1K5 parallel resistor
ROTAX 965530	RTX 965530	CHT,Oil T	R	1800 Ω	Use 1K5 parallel resistor
ROTAX 965531	RTX 965531	CHT,Oil T	R	1800 Ω	Use 1K5 parallel resistor
ROTAX 966385	RTX 966385	CHT,Oil T	R	800 Ω	---
KELLER 456180	K456180	OilP, FuelP	I	4-20mA	Use 150 Ω parallel resistor
VDO360003	VDO360003	OilP, FuelP	R	180 Ω	---
VDO360004	VDO360004	OilP, FuelP	R	150 Ω	---
Thermocouple To Voltage Converter	TCANALOGV	Thermocouple	V	3V	---

TCANALOGV is a thermocouple-to-analog transducer with cold junction temperature compensation.
It is useful with hot-junction-grounded thermocouples, who needs full-differential amplification and compensation.
M.A.V. Avionics provides 4 models of transducer:

- J-Type 1 Channel
- J-Type 4 Channels
- K-Type 1 Channel
- K-Type 4 Channels