

assemblad®

**GAS ANALYZER**  
**INFRAGAS-109 • INFRAGAS-205 • INFRAGAS-209**  
**INFRAGAS-305 • INFRAGAS-309**



**OPERATION AND  
MAINTENANCE MANUAL**

Mod. MAU\_GAS\_EN rev. 1.72 dated 20/07/2022  
ASSEMBLAD – Automotive Division - Technical dept.



*Note:*

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# 1 GENERAL INFORMATION

Please read carefully this manual before use and strictly attain to the following instructions to carry out measures and maintenance operations.

INFRAGAS-109 / 209 / 309 / 205 / 305 are infrared gas analyzers to measure car and motorcycle exhaust gas.

Some operation, measure, device or function have an asterisk between brackets (\*); this means that such operation, measure, device or function is available only on certain models while on others can be an optional.

The technical characteristics and homologations may be referred only on certain models.

Open the equipment only during operation for which it is clearly indicated and after having switched off the power supply; close the equipment and put it in the original configuration before switching on again, in particular close and lock the cover.

Take care of the correct tubing and pipe connection, avoid to breath fumes and make sure they can be dispersed in an open ambient.

The manufacturer decline every responsibility in case of an incorrect use or an use not expressly specified in this manual; the responsibility is anyhow limited to the equipment's repair operation with the exclusion of any other direct or indirect damage.

For more information please read the chapter "Warranty condition".

For technical support or spare parts requests please read the chapter "Technical Support"

Due to the continuous technical development of Assemblad equipment, the gas analyzer could have new functions, or modified functions, than that specified on this manual.

The gas analyzers performs measures in compliance with Italian "D. M. n. 628 of 23/10/1996", and subsequent modifications as for "Circ. n. 88/95 of 6/09/1999".

The gas analyzer performs measures in compliance with Italian "D. M. of 16/01/2000", and subsequent modifications as per "C. d. of M.d.T. of 4/01/2002" and "Circ. 64/404 of 19/01/2005"

The control software can implemented other measurement procedures besides those reported.

The gas analyzer is approved for the communication protocol defined by the technical specifications MCTCNET version 2.10 dated 24/09/2015 and subsequent integrations.

The gas analysers are homologated for OIML R99, edition 2008, class 00 and for MID (MI-010) n. SK 14 – 002.

## 2 TECHNICAL DATA

### RANGE AND RESOLUTION

			RANGE	RESOLUTION
CO	0	÷	9.999 vol. %	0.001 %
CO <sub>2</sub>	0	÷	19.99 vol. %	0.01 %
HC	0	÷	15000 ppm	1 ppm
O <sub>2</sub>	0	÷	25,00 vol. %	0,01%
RPM	0	÷	9999 rpm/1'	1 rpm/1'
Oil Temp.	0	÷	130 °C	0.1 °C
Int. Temp.	0	÷	50°C	0.1 °C
Amb. Press.	800	÷	1060 mbar	1 mbar
NO <sub>x</sub> (*)	0	÷	5000 ppm	1 ppm
CO corr.	0	÷	9.9 vol. %	0.1 %
Lambda	0.500	÷	2.000	0.001

### OPERATIONAL CHARACTERISTIC

Response Time	- 20 sec. max
Warming Time	- 2 min. typical
Temperature range	- 0 °C ÷ + 40 °C
Supply	- 9 ÷ 16 Vdc
Power	- 30 W max
Barometric pressure	- 850 ÷ 1060 mbar
Gas flow	- 3 l/min
Compressed air (*)	- from 2 to 4 bar
Periodic calibration	- 12 months max.
Dimensions	- 263x155x84 mm (Infragas-109) - 290x198x168 mm (Infragas-209/309) - 344x160x270 mm (infragas-205/305)
Weight without pipe	- 3,0 Kg about (Infragas-109) - 6,8 Kg about (Infragas-209/309) - 4,2 Kg about (Infragas-205/305)

## DISPLAY – KEYBOARD

N. 1 Display LCD with backlight 240\*128 pixel.

N. 16 alphanumerical keys.

## PRINTER

Thermal printer 32 column customizable with workshop data.

## SERIAL INTERFACE

1 or 5 (\*) serial interface RS-232 9 pin, 9600 baud, 8 bit, no parity, 1 stop bit.

## OTHER FUNCTIONS

Compatible with communication protocol MCTCNET

Low flow warning

Automatic and continuous condense drainage

Automatic calibration

Error indication

Clock – calendar (\*)

### 3 DESCRIPTION

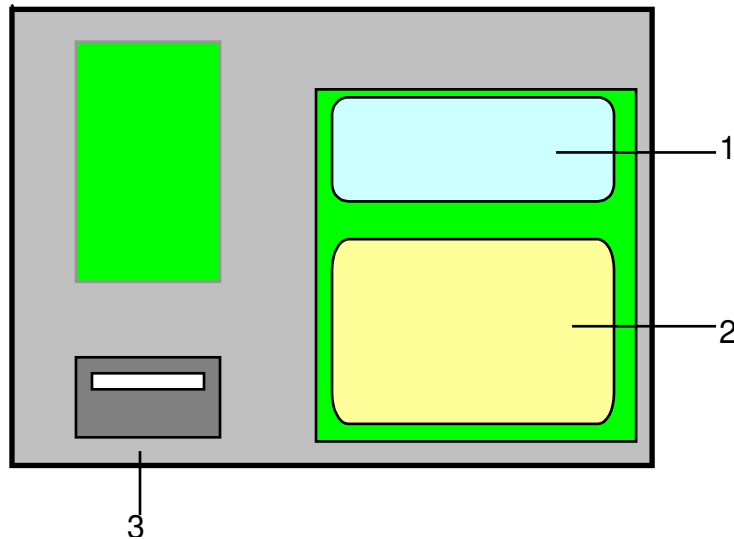
INFRAGAS-205 PONY is an multifunctional exhaust gas analyzer for vehicles based on microprocessor electronic.

#### 3.1 GENERAL SPECIFICATIONS

- CO, CO<sub>2</sub> and HC measure with not dispersive infrared absorption method.
- O<sub>2</sub> (oxygen) measure with electrochemical transducer contained into the equipment.
- RPM measure using an external universal RPM counter.
- Oil temperature measure with a dedicated probe.
- Lambda and CO correction calculation in accordance with the international norms.
- Ambient pressure measure with barometric pressure transducer.
- Internal temperature measure for measures compensation.
- Clock/Calendar with a dedicated battery in order to maintain data also with power off. Date and time can be easily set with the keyboard (see specific chapter) or using a PC connection.
- Automatic drainage of condense. In case a fault occurs an indication will appear on the display and the gas suction will stop.
- Motorcycle version performs an automatic cleaning of the probe during every calibration.
- Visualization of each value on the hi-intensity backlight LCD for the best visibility in every working area.
- Thermal printer, customizable with workshop data. Each measured value, also the ones not displayed, will be printed.
- Membrane protected keyboard to avoid moisture and liquid ingress.
- Gas filter device (condense separator and corpuscular filter) fitted on rear panel for a quick and easy maintenance.
- Display indication of faults as: missing flow, pneumatic line fault , condense drainage fault, etc.
- Measure with automatic calibration, test procedures indication and vehicle gas suction indication.
- Standard serial interface RS-232 for connections with personal computer and other equipment.
- Bluetooth interface for connections with personal computer and other equipment (\*).



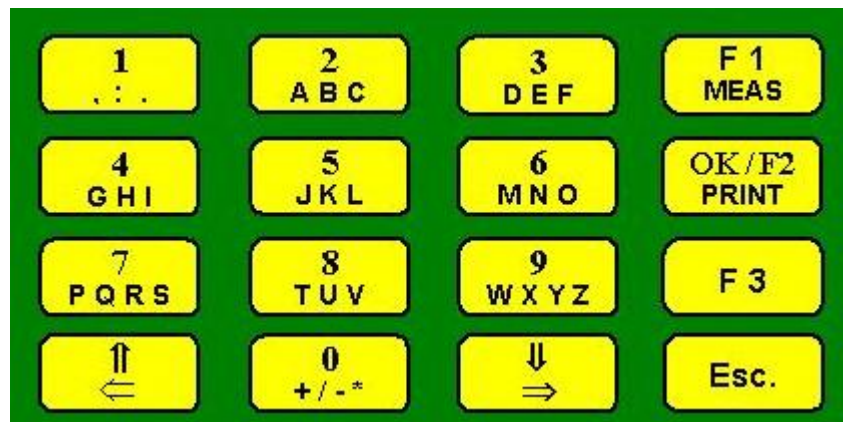
### 3.2 FRONT PANEL INFRAGAS-205/305



Main items on the front panel of Infragas-205/305:

- 1) Display LCD
- 2) Keyboard
- 3) Thermal printer, it is used roll of paper for thermal printer L=57mm D=30mm, 10 m

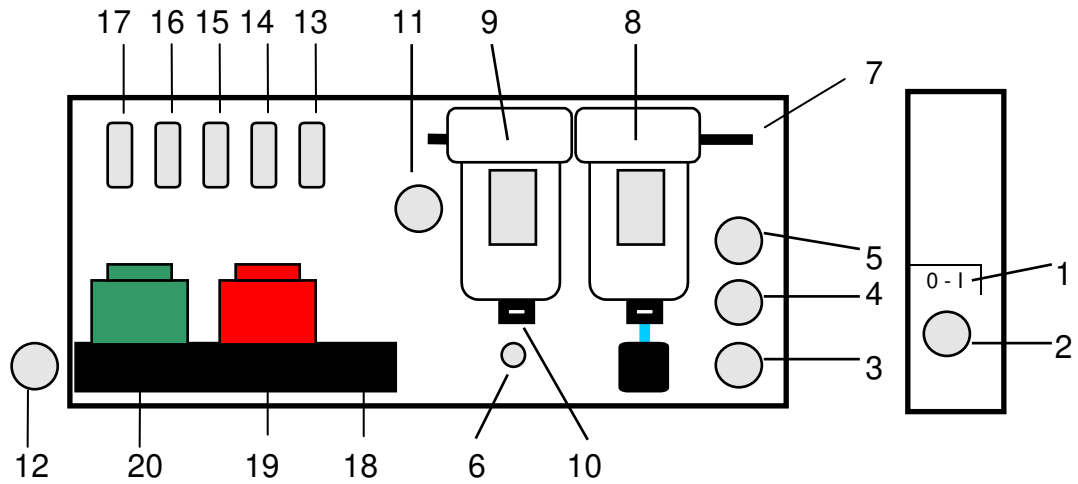
### 3.3 KEYBOARD



#### Keyboard Infragas 205/305

Key MEAS:	Start measure.
Key OK/PRINT:	Confirm entered data. Print results when test is finished.
Key F3:	Force test to continue or end also in case of not positive data.
Key ESC.	Stop test execution and go back to main menu. Go back of one level when into a menu.
Key 0 ÷ 9	Alphanumerical data input (mobile phone style).
Key Arrows	Choice of set-up data. Alphanumerical data cancellation. LCD contrast setting. Choice of data to be displayed.

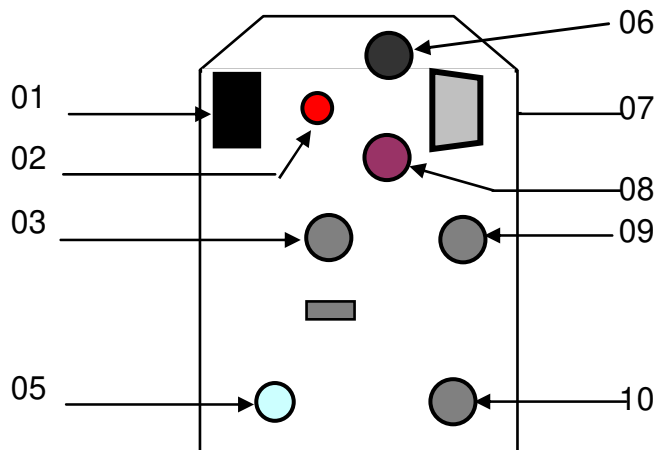
### 3.4 REAR PANEL INFRAGAS 205/305



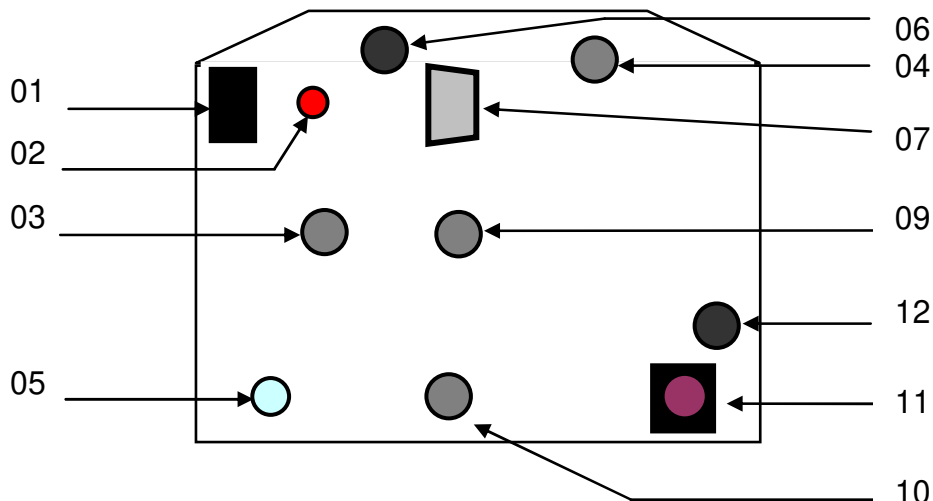
Main items on the rear panel of Infragas-205/305:

- 1) Power on switch.
- 2) Fuse.
- 3) Power supply plug.
- 4) External RPM Counter connection.
- 5) Oil temperature probe connection.
- 6) Drainage.
- 7) Exhaust Gas input.
- 8) Condense separator and filter cartridge (5 micron).
- 9) Condense separator and filter cartridge coalescence (motorcycle\*).
- 10) Condense sensor.
- 11) Compressed air input (motorcycle\*).
- 12) Exhaust Gas output.
- 13) PC Serial connection.
- 14) Smokemeter Serial connection.
- 15) Speedometer Serial connection.
- 16) Universal RPM counter Serial connection.
- 17) EOBD Serial connection (\*).
- 18) Active carbon filter.
- 19) Oxygen Sensor
- 20) NOx Sensor (\*)

### 3.5 CONNECTOR PANEL INFRAGAS 109



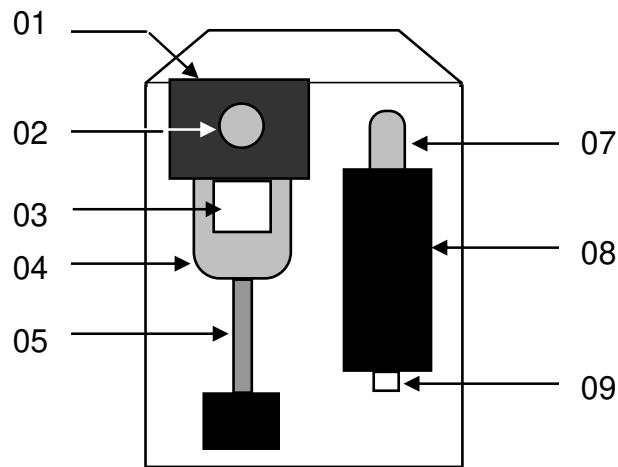
### 3.6 CONNECTOR PANEL INFRAGAS 209/309



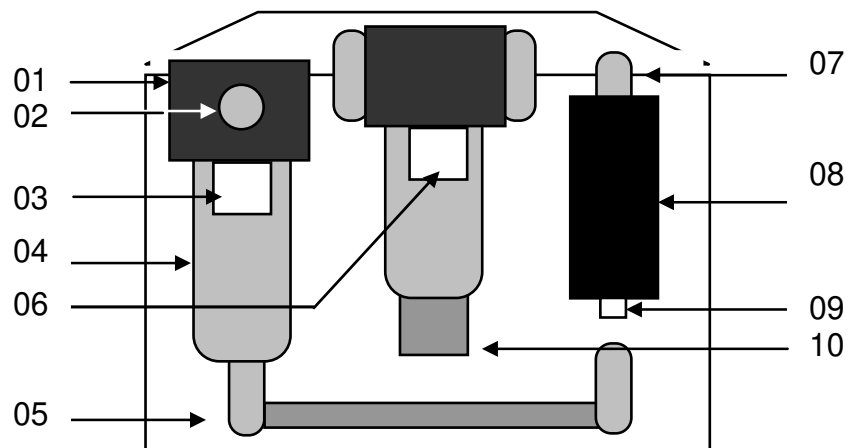
Main items on the connector panel of Infragas-109/209/309:

- 01 – Power on switch.
- 02 – Led
- 03 – External RPM Counter connection.
- 04 – Compressed air input
- 05 – Drainage.
- 06 – Fuse gas analyser
- 07 – RS-232 connector
- 08 – Power supply plug.
- 09 – Oil temperature probe connection.
- 10 – Exhaust Gas output.
- 11 – Connector battery charger.
- 12 – Fuse battery charger

### 3.7 GAS PANEL INFRAGAS 109



### 3.8 GAS PANEL INFRAGAS 209/309



Main items on the gas panel of Infragas-109/209/309:

- 01 – Condense separator
- 02 – Exhaust Gas input.
- 03 – Filter cartridge (5 um)
- 04 – Cup of condense separator
- 05 – Condense pipe
- 06 – Filter cartridge 25 um (Coalescent 0,01 um for Infragas-309)
- 07 – Input condense sensor case
- 08 – Condense sensor case
- 09 – Condense discharge
- 10 – Valve for manual discharge

### 3.9 DISPLAY AND MENU

The gas analyser INFRAGAS-205 has a display to show the menu and the measurement. Some part may be not enabled, some other reserved for technical service.

#### MAIN MENU

26/06/06	INFRAGAS-205
1 -	VEHICLE DATA
2 -	AMBIENT DATA
3 -	LIMITS SETTING
4 -	INSTRUMENTS
-----	
5 -	MAINTENANCE
6 -	LANGUAGE

This menu is displayed when we turn on the instrument and when we come-back from other menu.

In the high-left corner is showed the data, in the upper centre is reported the selected instrument, to operate the choice push the key-number.

After a short time the backlight is switched-off, push the ESC key to restore.

Use the arrow keys to set the contrast of the LCD, this function work only in this menu.

#### AMBIENT DATA

AMBIENT DATA	
1 -	Temperature : 20°C
2 -	Amb. pressure : 1000hP
3 -	Rel. humidity : 35%
4 -	Wind speed : 0m/s

Use this menu to enter ambient data.

These data must be read from a dedicated instrument and they will be printed onto the test result report.

Press ESC to go back to the main menu.

VEHICLE DATA

VEHICLE DATA	
1 - Plate	:
2 - Reg. date	: dd/mm/yyyy
3 - Fuel type	: Gas. CAT
4 - N. cylinder	: 4
5 - Engine	:
6 - Chassis	:
7 - oth choices	:

VEHICLE DATA	
1 - Vehicle type:	Car
2 - Displacement:	
3 - n. exhaust	: 1
4 - Transmission:	Gear
5 - conf. 97/24	: No
6 - Trade name	:
7 - oth choices	:

VEHICLE DATA	
1 - type	:
2 - Company	:
3 - Mileage	:
4 - Km of condit:	
5 - V.max Km/h	:

Press the corresponding key number to select the value you want to set, use the alphanumerical keys to enter a value, then press OK to confirm.

The ← key delete previous character, the ⇒ key insert a space.

Before entering the registration date delete "dd/mm/yyyy", then enter the correct date. The slash symbol will be automatically entered.

The following selections must be choice using the arrow keys:

Fuel type, N. cylinder, Vehicle type, Transmission, conf.97/24.

This selections, with Reg.date, will have an impact on the acceptable limits of the test.

Press ESC to go back to the main menu.

## LIMITS SETTING

LIMITS SETTING	
1 - Max RPM at minimum rate:	1000 rpm
2 - Min RPM at accel. rate:	2000 rpm
3 - Max RPM at accel. rate:	3000 rpm
4 - Max COcorr at min. rate:	0.50 %vol
5 - Max COcorr at acc. rate:	0.30 %vol
6 - Max Lambda	: 0.97
7 - Min Lambda	: 1.03

Acceptable limits of the test are set in accordance with the vehicle data entered.

It is possible, however, to edit such limits pressing the corresponding key, delete the present limit, enter a new value and press OK to confirm.

In case of no catalytic vehicle some limits will not be present because they are not requested for the test execution.

Press ESC to go back to the main menu.

## INSTRUMENTS

INSTRUMENTS	
1 - ANALYSER	
2 - SMOKEMETER	
3 - RPM	
4 - SPEED TESTER	
5 - REMOTE	

Press the numeric key to select the instrument you want to use then press OK to confirm. If you need to connect and/or control the equipment with a PC you must select 'REMOTE'. With this selection the PC will be able to communicate with the internal gas analyser and with the connected smoke meter and RPM.

## MAINTENANCE

MAINTENANCE	
1 - Date/time setup	
2 - Garage data	
3 - RPM-meter data	
4 - Services	
5 - Set-Up	
6 - Instrument data	
7 - Leak test	

From this menu it is possible to enter on assistance and service functions.

Assistance and Set-Up are restricted only to authorized technician and the access requires a password.



**SET DATE/TIME**

DATE-TIME SETUP		
1 - Year	:	18
2 - Month	:	6
3 - Day	:	26
4 - Hour	:	15
5 - Minutes	:	56

Press the corresponding numeric key to modify a value, delete present value using ← key, enter a new value and press OK to confirm.  
 Press ESC to go back to the previous menu.

**WORKSHOP DATA**

GARAGE DATA - OPERATOR		
1 - row1	:	.....
2 - row2	:	.....
3 - row3	:	.....
4 - row4	:	.....
5 - row5	:	.....
6 - Surname	:	.....
7 - Name	:	.....

Press the corresponding numeric key to modify a value, delete present value using ← key, enter a new value and press OK to confirm, max 24 characters per line.  
 Press ESC to go back to the previous menu.

**RPM DATA**

RPM METER DATA		
1 - Manuf.	:	ASSEMBLAD
2 - Model	:	RPM-111
3 - Approv.	:	OM00664F/NET2
4 - S.N.	:	BR141001
5 - Exp. data	:	03/06/2019
6 - RPM Enab.	:	Yes
7 - RPM Ext.	:	Yes

In this menu the external RPM counter data will be entered.  
 Press the corresponding numeric key to modify a value, delete present value using ← key, enter a new value and press OK to confirm.  
 Attention: if it is enabled the external RPM counter but not connected or activated, the instrument report "COM: ERROR"  
 Press ESC to go back to the previous menu.

## INSTRUMENT DATA

INSTRUMENT DATA		
1 - Manuf.	:	ASSEMBLAD
2 - Model	:	INFRAGAS 205
3 - Approv.	:	OM00620EST003C/NET2
4 - S.N.	:	BC181001
5 - Exp data	:	03/06/2019
6 - SW.Ver.	:	1.511
7 - PEF	:	0.500

In this menu it is possible to read the information of the instrument connected. Data cannot be modified (read only), they are acquired from the instrument. Press ESC to go back to the previous menu.

## LEAK TEST

This function is able to perform the leak test on the pneumatic circuit of the gas analyzer. Refer to the specific paragraph for detailed instructions.

## MEASUREMENT SCREEN

With the key F1 MEAS a measure is activated, the instrument perform an autozeroing, in this phase is possible to select the type DIAGNOSIS or CERTIFICATION with the key F3.

INFRAGAS-205					
Measurement					02
1-CO 0.000	2-CO2 00.00	3-HC 00000			
4-Lmd OR	5-COc 0.0	6-RPM 0000			

INFRAGAS-205					
Measurement					23
1-CO 0.011	2-CO2 15.21	3-HC 00027			
4-Lmd 1.004	5-COc 0.0	6-RPM 0914			

During the test phase the following data will be displayed:

- Test type, certification or diagnosis.
- Test duration in seconds.
- 6 windows with measured value displayed. To select different parameters press the corresponding numeric key, use arrows keys to select the required parameters, press OK to confirm.

Some help or error messages could be displayed depending on specific events that can occur during the test phase.

At the end of the test is possible to print the result.

## 3.10 ACCESSORIES

### STANDARD ACCESSORIES

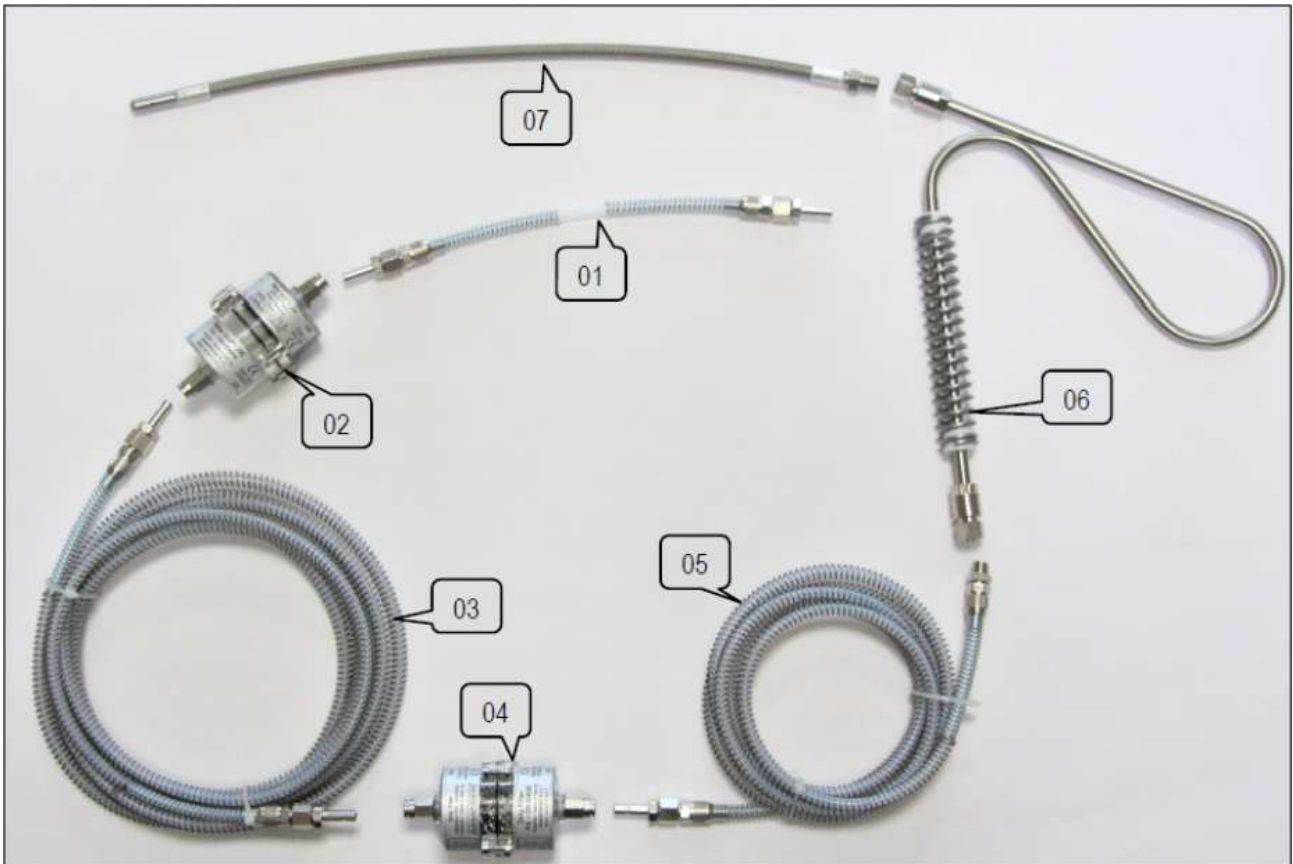
- 1) Operation and maintenance manual
- 2) PC serial connection cable.
- 3) Waterstop-206
- 4) Power supply 220Vac→12 Vdc, the model with battery inside have instead a battery charger
- 5) Power supply cable for external battery, only for instruments without battery
- 6) Gas probe

The gas probe supplied for the instrument for motorcycle may be different to the one supplied for car, see specific paragraphs.

### OPTIONAL ACCESSORIES

- 1) Trolley
- 2) Bluetooth interface.
- 3) Oil temperature probe
- 4) NOx sensor
- 5) Battery pack for instruments without battery
- 6) Cigarette lighter battery cable, for instruments without batteries

### 3.11 CAR GAS PROBE



The gas probe for car is composed with following components:

- 1 – Initial teflon pipe protected by an external spring
- 2 - Waterstop-206. Device
- 3 - Teflon pipe protected by an external spring length about 4 m.
- 4 – Filter with steel wool, the filter is openable for washing and reuse
- 5 - Teflon pipe protected by an external spring length about 2 m.
- 6 – S terminal made with stainless steel pipe and spring for thermal insulation.
- 7 – Flexible stainless steel terminal

### 3.12 MOTORCYCLE GAS PROBE

The gas probe supplied for motorcycle equipment is different to the one for car analyzer. The motorcycle probe is made by a teflon pipe with a condense separator, manually drained, with a 25 um filter.

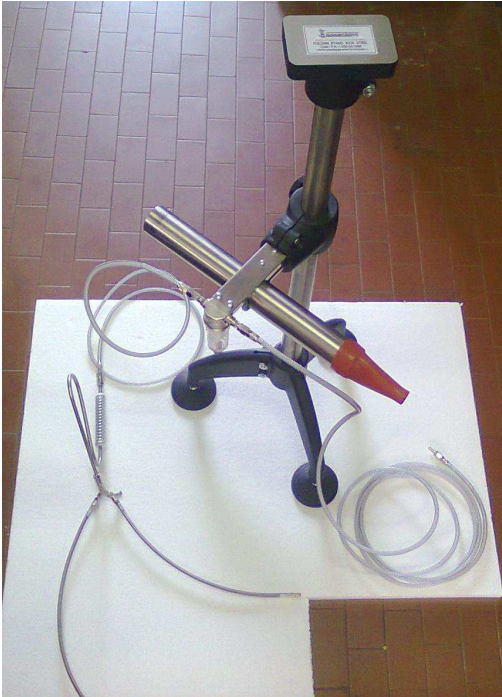
The pipe is protected by a spring, it is connected to the gas analyzer and to the condense separator through quick fittings.

The condense separator is mounted on a metal support, be sure that the drain valve positioned on the lower side is closed, verify that the flow direction goes from the terminal to the analyzer.



The terminal side is made with a flexible brass pipe on which the terminal must be connected.

For motorbike use the rigid terminal with input from the bottom, pay attention to avoid solid parts ingress from the exhaust pipe and from the ground.



Otherwise, flexible terminals can be used; these are more protected against detritus because the suction holes are lateral.

To perform a measure with multiple exhaust pipes, connect to the brass pipe 3 “Y” fittings, with the needed flexible terminals, close the holes not used with the dedicated caps.

Use washers and torque as necessary, verify that there is not air leakage with a leak test.



It is supplied an expansion brass tube with silicon adaptors.

This tube is positioned on the condense separator support and it is used as an extension for short exhaust pipe, when using this expansion tube, insert the rigid terminal into the tube itself.

### 3.13 WATERSTOP-206

The Waterstop-206 is an automatic anti-flooding device. It is used to protect the gas analyzer in case of abnormal quantity of condensate accumulated in the exhausts of vehicles.

#### CONNECTION TO THE GAS ANALYZER.



Put vertically the Water stoP-206, as indicated in Figure, near the input connection gas of the gas analyzer that we want to protect.

Connect with adequate pipe the gas analyzer to the Water stoP-206 upper connection (Output to ANALYZER)

Connect the gas probe to the lower part of the Water stoP-206 (Input from EXHAUST)

#### FUNCTIONALITY

The Water stoP-206 must be placed in a vertical position, as indicated in Fig. 1, we strongly suggest to fix it to the analyzer or to the support trolley, using i:e a biadhesive tape or coupling, etc.

When the analyzer through the probe gas aspirates only gas from the exhaust the Water stoP-206 remains practically inactive and it does not interfere with the flow of gases. If, together with the gas, also any liquids arrive, or even only condensed water, the floater of the Water stoP-206 goes up till contacting with the gasket and closing every flux of gas and water to the analyzer.

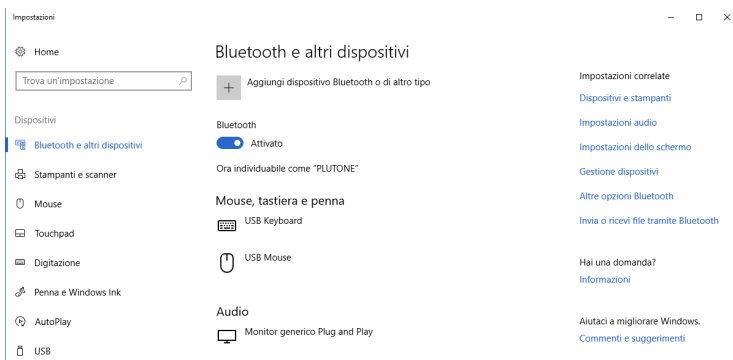
When the Water stoP-206 stops the flux, the analyzer goes in condition of “Low flow” or “No flow” or “Error....” and the anomaly will alarm the operator and stopping the aspiration pump.

Then to operator must stop the analyzer pump, remove the Water stoP-206 from the analyzer and expel all the water that has been stopped inside. Normally it is necessary to remove the Water stoP-206 from the analyzer because the depression created inside maintains closed the system of the Water stoP-206.

Every time after the Water stoP-206 is activated it is suggested to remove also the probe gas and to the eliminate the water eventually still inside

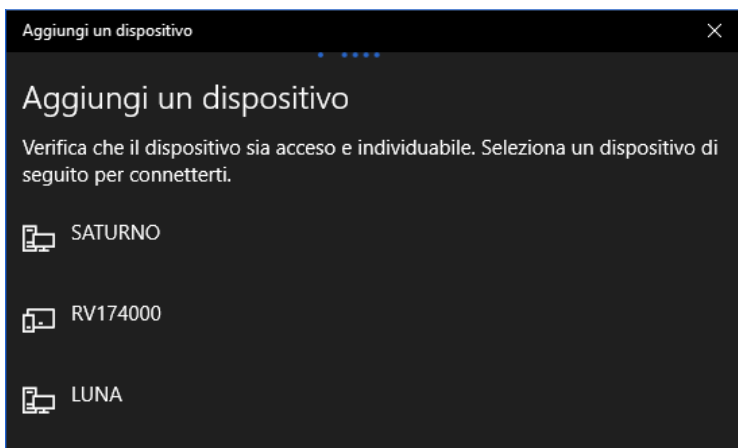


### 3.14 BLUETOOTH USB ADAPTER CONFIGURATION

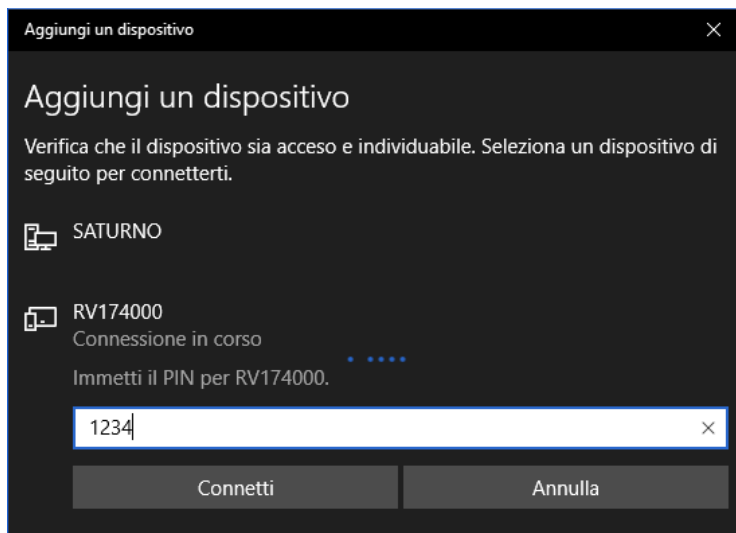


It is recommended to use the standard windows bluetooth configuration.

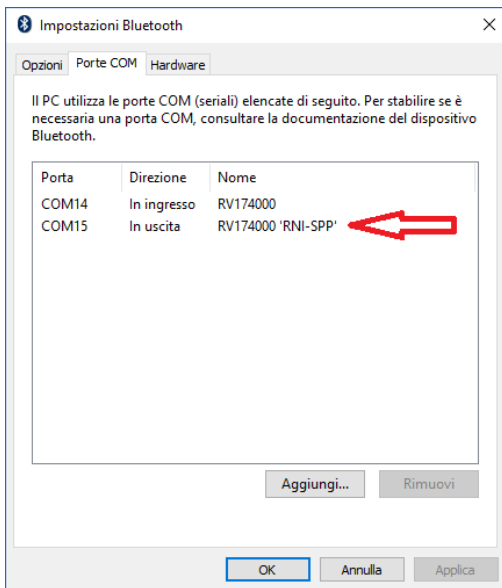
Open the BlueTooth devices panel and select 'Add wireless device'.



Select the Blu.Radio-217 Interface, typically named like RV174000. Then press the next key



Insert the passkey '1234' then press the 'CONNECT' key. Wait for some seconds to finish the configuration procedure.



In the property of the device you can find the serial port number to use in your software.

## BluRadio-217 specification

Power supply : 5÷12 Vdc on pin 9 or external power supply by plug connector, 5 Vdc by micro-USB-B connector.

Communication: 9600 baud, 8 bits data, 1 bit stop, no parity

### Note

If the Blu.radio-217 interface is placed in a close cabinet or other location with radio problem, use a wire extension for RS232 communication to place the interface in a better expose location.

## 4 INSTALLATION

Installation is easy and can be performed by the user or, if required, by Assemblad authorized personnel.

### 4.1 TRANSPORT AND INSTALLATION

Due to small dimensions of the equipment, transportation can be done by hand, take care to particularly avoid crashes or falls, damages caused for these reasons are not covered by warranty.

It is suggested to keep the original package in case of future shipment for periodic calibration, technical assistance, etc.

If a trolley has been supplied together with the equipment, it must be put over with care in order to guarantee stability during movements, on the trolley shelf and supports it is possible to place all the accessories needed for its use.

Connect the optional Universal RPM Counter to the external RPM plug or to the dedicated RPM serial port on the rear panel, connect the Oil temperature probe to the Oil Temp plug, connect the Gas probe to the condense separator input.

For motorcycle equipment connect compressed air line (maximum pressure setting is 4 bar) to the dedicated connector-plug.

Metrological logbook must be kept in a secure place and showed to the technical personnel for periodic control or to National Inspectors for verification. The buyer is legally responsible for the correct preservation from loss and/or damage. ASSEMBLAD decline every responsibility in case of what said above is not observed.

### 4.2 CONNECTION TO POWER SUPPLY

#### Infragas 109 – Infragas 205 – Infragas 305

Connect the equipment to a power supply plug, at 220 Vca. 50 Hz., using the 12V power adaptor supplied and verify that such values correspond to the ones indicated on the rear label. Put the power button in the ON position to switch on the equipment.

#### Infragas 209 – Infragas 309

Press the switch in position [-] (upwards) for at least one second to switch it on or in position [=] (downwards) to switch it off. The instrument will automatically shut off when the battery falls below the guard level. Approaching this level will be signalled by an acoustic alarm.

## 5 OPERATION

### 5.1 OPERATIONS TO BE AVOID

Do not use gas analyzer with diesel vehicles; do not use car version of gas analyzer with 2 stroke vehicles, improper use may cause damages to the equipments.

Avoid operation in proximity of the output pipe when it is connected to an engine running vehicle if a dedicated exhaust has not been put in place.

Do not obstruct air inlet on the rear panel.

Do not leave the instrument at direct sun ray (whether it is switched on or not), do not wet the instrument.

### 5.2 NOTES AND CAUTIONS

Clean frequently the gas probe, check corpuscular filter and replace it when needed.

Before each test execution, verify that water is not present in the condense separator. In case of excessive condense check that the drainage and the pump are working properly.

Clean periodically the cartridge filters contained into the condense separator to avoid pneumatic flow leakages into the equipment and error messages. To do that, switch off the instrument, remove the pipe connected to the condense separator bottom side, unscrew plastic caps, remove filters, check and replace if necessary.

The Condense separator connected to the drainage pump contain a 5 um filter.

Equipments for motorcycle have an additional condense separator positioned along the probe with a 25 um filter and another filter into the second condense separator.

The oil temperature probe must not be used to measure temperature of liquids different from oil (for example water or cooling liquid) or warmed on air. An improper use will damage the probe permanently.

During measurement be sure that the oil temperature probe cable and others equipment connecting cables (i.e. RPM counter, Smoke meter, etc.) are not close to the sparking plug cables, to the coil, etc. in order to avoid electromagnetic interference to the instrument circuits.

In case of obstruction of the gas output, after having removed the cause, wait 5 minutes with the equipment switched on to restore the oxygen sensor stability.

In case of pneumatic circuit low flow warning, check that:

- gas probe is not obstructed or full of condense.
- condense separator filter is free from water.
- corpuscular filters and cartridge filter are not obstructed or damaged.
- gas output on the rear panel is not obstructed.

The message "or" or similar indicates a reading that exceed the measure range. For other warning messages please refer to chapter DIAGNOSTICS.

### 5.3 INSTRUMENT POWER ON

Connect the power cable to the instrument and switch it on, the instrument will go in warm-up for a period of about 2 minutes.

### 5.4 STANDARD MEASURE FOR CAR

- Before start measuring: clean the gas probe and the condense separator, check the filters, switch on the instrument, wait for the warm-up to be finished.
- Enter vehicle data, check and eventually modify test measurement limits.
- Insert the oil probe into the car oil filler pipe, run the engine, the measure must be carried out with an oil temperature not less than 80 °C
- Perform two quick engine idle accelerations and then leave engine to the minimum speed, check for excessive water presence into the exhaust pipe.
- Press MEAS to start the gas analysis procedure.
- Perform the leak test at least once per day as indicated in the dedicated paragraph.
- Perform the HC residual test as indicated in the dedicated paragraph.
- Prepare the external RPM counter (if present) to the test, refer to the specific RPM Manual.
- Insert the gas probe for at least 30 cm. into the vehicle exhaust pipe.
- Wait at least 30 seconds in order to stabilize the reading, press F3 key to stop the test or go to the minimum acceleration.
- In case of catalytic vehicle put the engine to the minimum acceleration, maintain it for at least 30 seconds, press F3 key to stop the test.
- Press OK/PRINT key to print the test report.
- Press ESC key to terminate the test.
- The gas analyzer runs automatically periodic calibrations until the gas is present and it switches off the pump when the gas is not detected.

### 5.5 STANDARD MEASURE FOR MOTORCYCLE

- Do not use car analyzer for 2 stroke engine vehicle or diesel engine.
- Set up the analyzer as described in the previous chapter.
- Move the motorcycle on the speedometer, insert the gas probe with the specific connection and, eventually, the external RPM counter.
- Enter vehicle data.
- Start the measure, follow the instructions that appear on the display, it is important to maintain the speed constant (typically 40 Km/h  $\pm$ 3 Km/h).
- In case the motorcycle has more than one exhaust pipe, stop the vehicle, move the gas probe and repeat the test.
- If some parameters are not automatically detected, insert them manually.

## 5.6 SMOKE METER

The gas analyzer INFRAGAS-205/305 is able to manage smoke measurement for diesel engine connecting a Smoke Meter OPA-105 'Puma' to the dedicated serial port. From Instrument Menu select 'OPA-105'.

## 5.7 RPM COUNTER

The gas analyzer INFRAGAS-205 PONY is able to read vehicle RPM using an external universal RPM counter. This can be connected to the dedicated RPM digital input. It is also possible connect the RPM counter to the serial port (RPM-111).

## 5.8 SPEEDOMETER

The gas analyzer INFRAGAS-205/305 is able to read the tested motorcycle speed value using a speedometer connected to the dedicated serial port.

## 5.9 PRINTER

The gas analyzer printout is made by: test values measured, calculated values, date and time of the test and (eventually) the workshop name.

## 5.10 MCTC-NET

The gas analyzer is approved for the technical specifications of MCTCNet. The communication can be done in DIR mode with software GASANALYZER or in "RS SENZA ESITO" (RSSE) mode connecting the serial port with a Pc station. In the "RS SENZA ESITO" mode the default address is "1", the communication parameters are the following:  
9600 baud, 8 bit, no parity, 1 stop bit.  
To enable communication with a PC select 'REMOTE' from the Instrument Menu.

In case of measure error or anomaly, the analyzer send a COD type response with an error code that has the following meaning:

- 1 – gas analyzer in WARMING status
- 2 – gas analyzer LOW FLOW status
- 3 – gas analyzer out of order for CONDENSE ERROR
- 4 – FUEL definition error received
- 5 – OUTPUT definition error received
- 6 – OPERATION NOT ALLOWED in the present status received
- 7 – gas analyzer in LEAK TEST status
- 8 – gas analyzer in HC RESIDUAL TEST status
- 9 – internal temperature or input pressure or output pressure out of limit
- A – power supply voltage out of limit

## 5.11 LAW AND DEFINITION REFERENCES

Refer to the applicable laws and to the manufacturer specification when performing test procedure or vehicle setup. The principal definitions are as follow:

1) *Minimum engine speed* is the engine speed lower than 1000 rpm, if not specified by the vehicle manufacturer, with the fuel feeding system controls (accelerator and enhancement) in idle position, electrical devices not working, gear in idle position and clutch inserted on manual or semiautomatic gear vehicle, selector in "zero" or "parking" position on automatic gear vehicle.

2) *Accelerated minimum engine speed* is the engine speed between 2000 and 3000 rpm, if not specified by the vehicle manufacturer.

3) *Normal temperature condition* is when the engine oil temperature is equal or greater than 80 °C, if not specified by the vehicle manufacturer.

4) *Percentage volume of Carbon Oxide* is the volume of Carbon Oxide expressed in percentage after steam water condensation and corrected as follow:

$$[\text{CO}]_{\text{corr}} = 15 (\$) \frac{[\text{CO}]}{[\text{CO}] + [\text{CO}_2]}$$

[ ] = % vol  
 (\$) = 12 for fuel CH<sub>4</sub>  
 (\$) = 14 for fuel GPL  
 (\$) = 10 for fuel GASOLINE + OIL

when the sum of [CO] and [CO<sub>2</sub>] is less than 15 for gasoline fuel, 14 for GPL fuel, 12 for Methane fuel, 10 for GASOLINE + OIL fuel; in the other cases the test result is the one showed by the instrument.

5) *Lambda* is the ratio between the real and theoretical value of air quantity versus the fuel quantity, this is measured indirectly through CO, CO<sub>2</sub>, HC and O<sub>2</sub> concentration. The Lambda value is calculated with the following formula:

$$\lambda = \frac{\{[\text{CO}_2] + \frac{[\text{CO}]}{2} + [\text{O}_2] + \left(\frac{H_{cv}}{4} \cdot \frac{3.5}{3.5 + [\text{CO}]/[\text{CO}_2]} - \frac{O_{cv}}{2}\right) \cdot ([\text{CO}_2] + [\text{CO}])\}}{[1 + (H_{cv}/4) - O_{cv}/2] \cdot \{[\text{CO}_2] + [\text{CO}] + [\text{HC}] \cdot 6 \cdot 10^{-4}\}}$$

H<sub>CV</sub> = 1.73 GASOLINE fuel  
 2.525 GPL fuel  
 4 METHANE fuel

O<sub>cv</sub> = 0,02

[CO], [CO<sub>2</sub>] e [O<sub>2</sub>] = % in vol.

[HC] = ppm in vol.

6) *Test Speed* is the speed of 40 km/h (± 3 km/h) on the speedometer. For vehicles that cannot reach 45 km/h, the test speed is the maximum speed that can be reached on the speedometer less 5 km/h (± 3 km/h). For vehicles with mechanic gear, motorbike excluded, the test speed is 40 km/h (± 3 km/h) with engine RPM greater than 3500. For vehicles with 3 wheels or 4 wheels with only one drive wheel on the speedometer the test speed is 40 km/h (± 3 km/h) with engine RPM greater than 3500. For motorbike with 3 wheels the test speed is 35 km/h (± 3 km/h) with engine RPM greater than 3500.

### 5.12 HC RESIDUAL TEST

The equipment automatically performs HC residual test and inhibits the operations in case values detected are higher than normal in accordance with the regulations.

### 5.13 LEAK TEST

This test is automatically performed daily or manually through the Maintenance menu.

To perform the test follow the instructions on the equipment display: cap the probe end and press 'OK', wait until the test is finished, wait the end of the leakage phase with the pump off, uncap the probe when the test result is showed.

If the analyzer fail the leak test, the air leakage need to be identified; usually it's caused by cracks on the probe or on the rubber pipe, or by the condense separator not correctly fitted. Repeat the leak test, if the fault still exists contact the Technical Service.

The request of the test may be disabled in the set-up menu.



## 6 MANAGEMENT SOFTWARE

### 6.1 INFPLUSWIN SOFTWARE

InfplusWin is a software developed to run on a PC with Windows operative system, this software controls the Assemblad instruments, manage the test and create the reports, it has a specific section for the gas analyzer.

It can be downloaded from Assemblad web site with its operative manual.

### 6.2 GASANALYZER SOFTWARE

GasAnalyzer is a control software for Assemblad instruments, it run under Windows operative system.

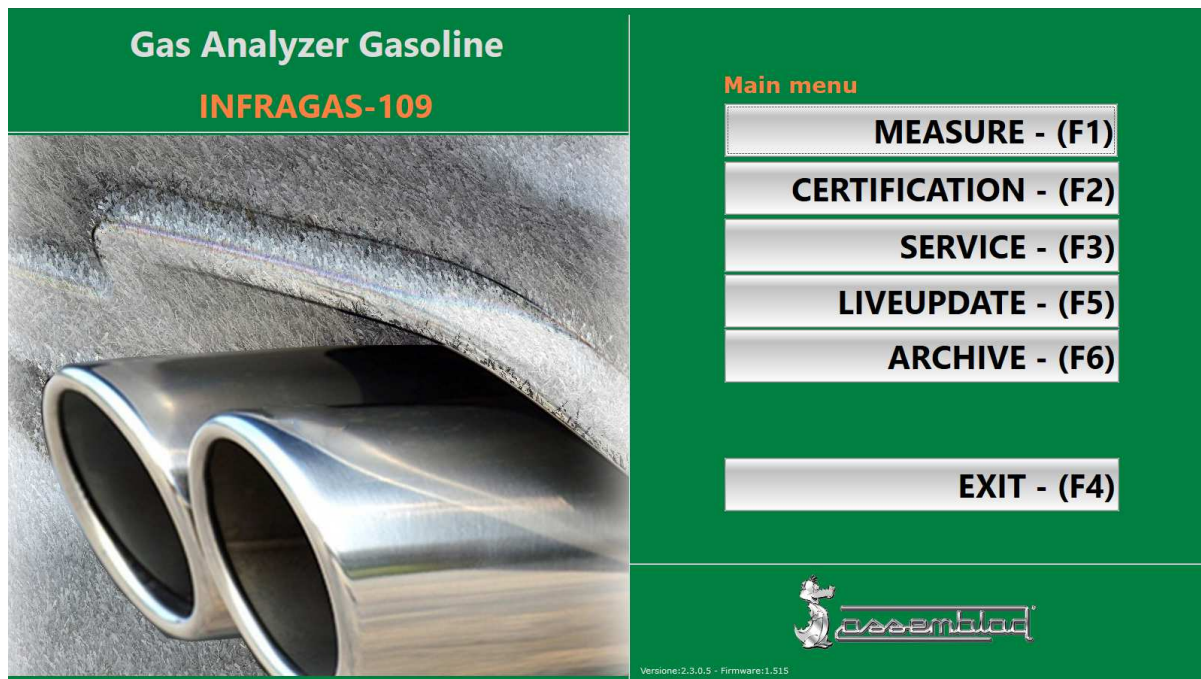
It can be downloaded from Assemblad web site, [www.assemblad.com](http://www.assemblad.com).

It allow to perform exhaust gas measurement under several rules or free test, the list of the official rules implemented is continuously updated.



The installation does not require special knowledge, just run the setup.exe file and confirm with 'NEXT' the screens suggested.

To uninstall the software, open the Windows control panel, add/remove programs window, select the GasAnalyzer item and then select uninstall.



In the main screen is reported the model of the connected instrument, the firmware version and the version of the software.

In the main menu there are the following selections.

**MEASURE** – start up a free measure

**CERTIFICATION** – start up a measure performed under specific rules. The operator must choice the specific rule requested in its country, fill in the requested data about vehicle under test and other information. For some application or in some country, some rules may be disabled.

**SERVICE** - to make the setting of the software

**LIVEUPDATE** - the system verifies if a new version of the software is available, then is possible to perform the upgrade. It is required an internet connection.

**ARCHIVE** – to reprint the saved referts

The screen SERVICE allows the configuration of the COM ports used to connect the gas analyzer and rpm counter.

Set the Serial Port connected to the instrument in the Analyzer sector, select “Try setting” and verify the reception of instrument data. If the serial port used for the connection is not in the list, verify that the software has the Administrator privileges.

Use the same procedure for the rpm counter. If it is not used, in the RPM selection, chose “NOTHING”.

In the standard configuration, the reports are printed in a selectable windows printer.

To use a portable bluetooth printer for the report, acquire the printer as it is described in the chapter “Bluetooth usb adapter configuration”, enable the selection “Set external print” and fixed the Serial Port linked to the printer.

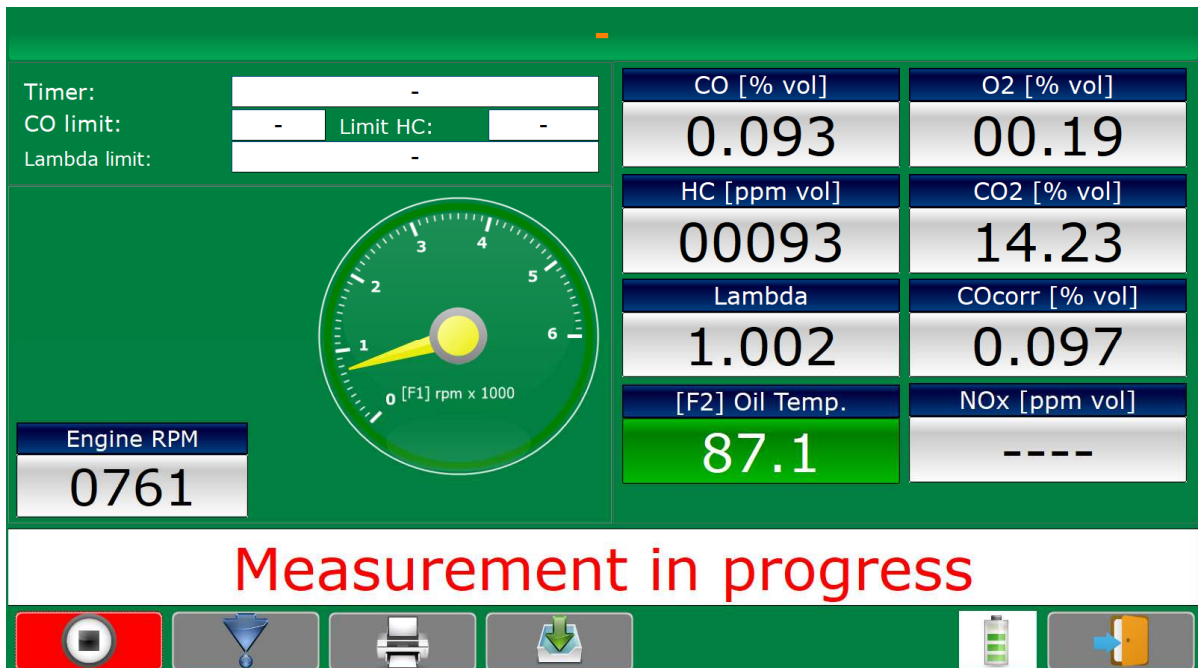
In this screen there is the language selection.

With key “Heading” is possible to record the revision centre data.

With selection of MEASURE is activated the free test screen.

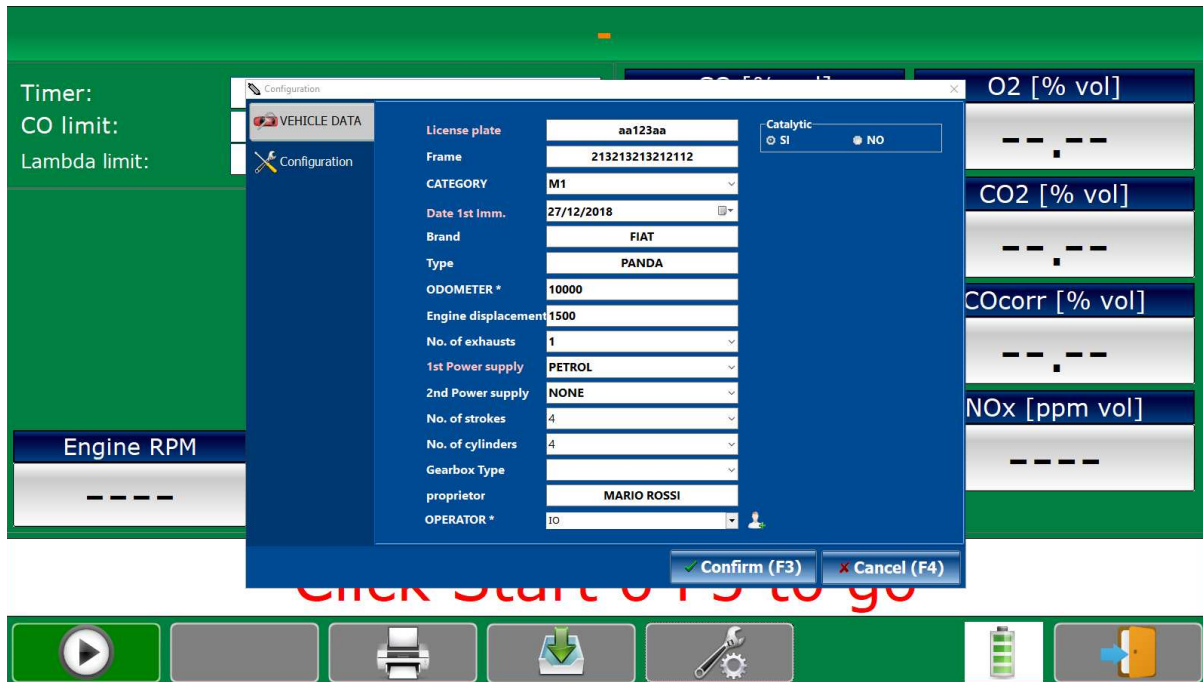


Select the left key to begin the measure.



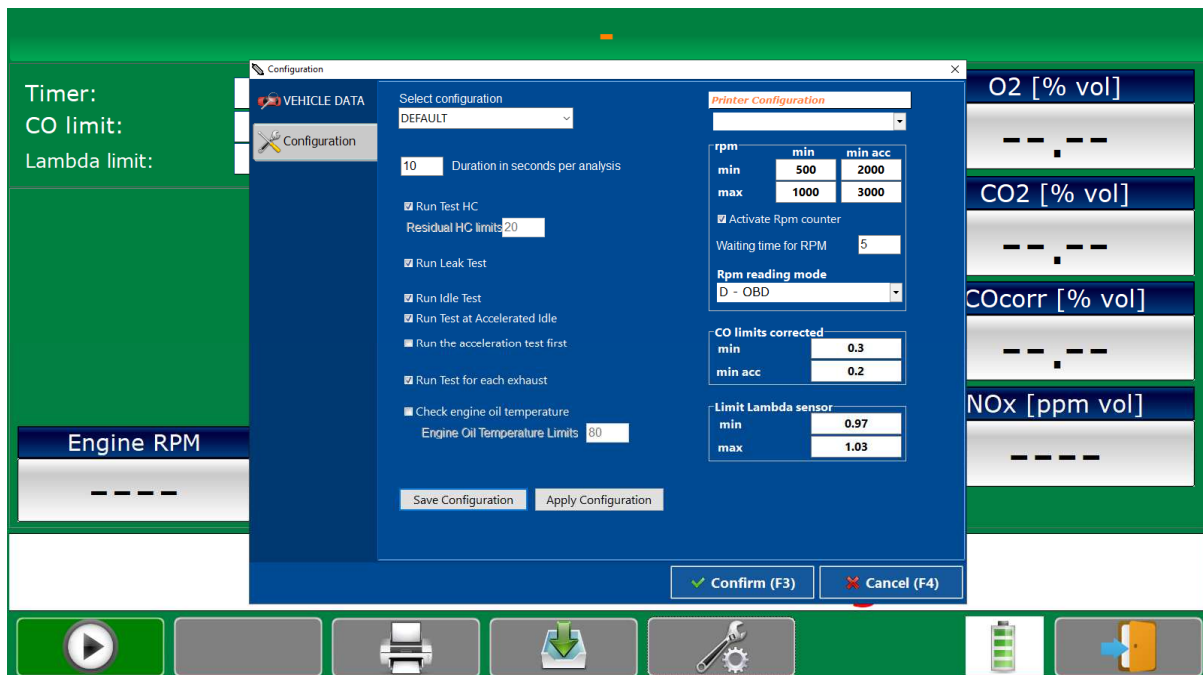
The system perform an autozero and after go in measure status. The measured values are showed in the screen. If the rpm counter is enabled in the setup and in certification setting, there are also these values.

With selection of CERTIFICATION is activated the screen to perform the test under specific rules, with the key SETTING it is opened the window to insert data.



With selection of VEHICLE DATA is activated the screen to insert the information about the vehicle under test, the first line is the plate, this is the first identifier, it is reported in the test screen.

The requested data for test are highlighted, the others are optional.



With selection of configuration there are the pre-configured rules or the choice default to set a specific one.

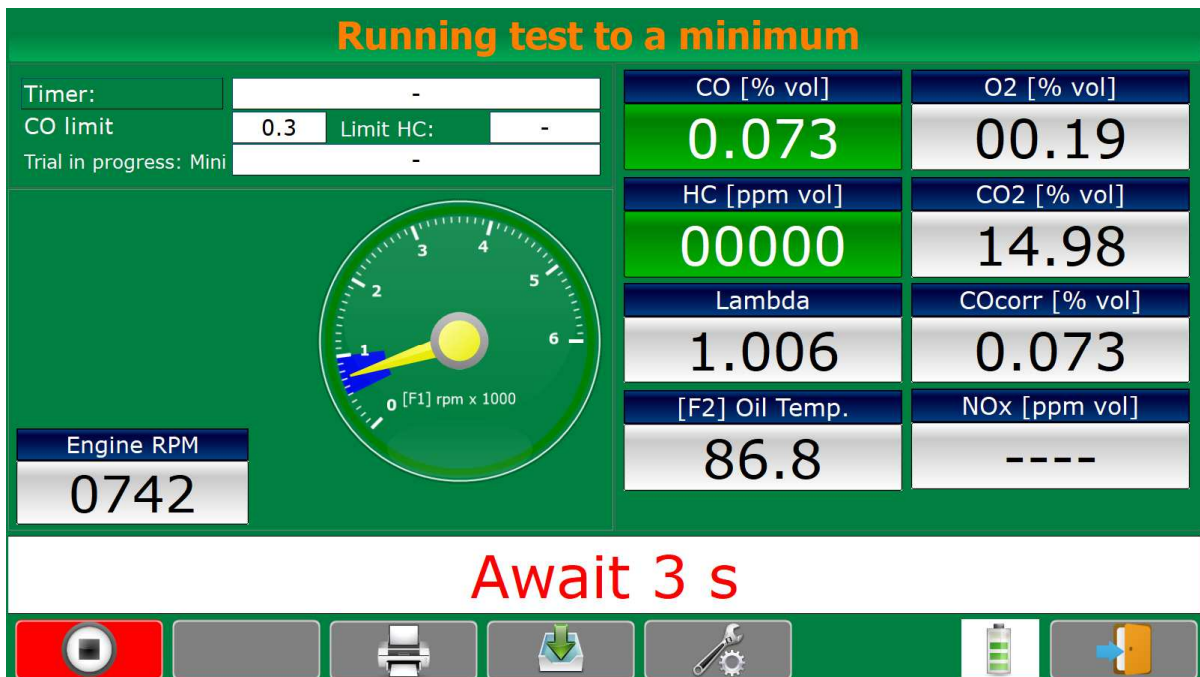
In this window there are the limits which depend on the selected rule and the type of vehicle under test. Some values are editable, others are fixed.

After the confirmation of inserted data, it is possible to begin the test.

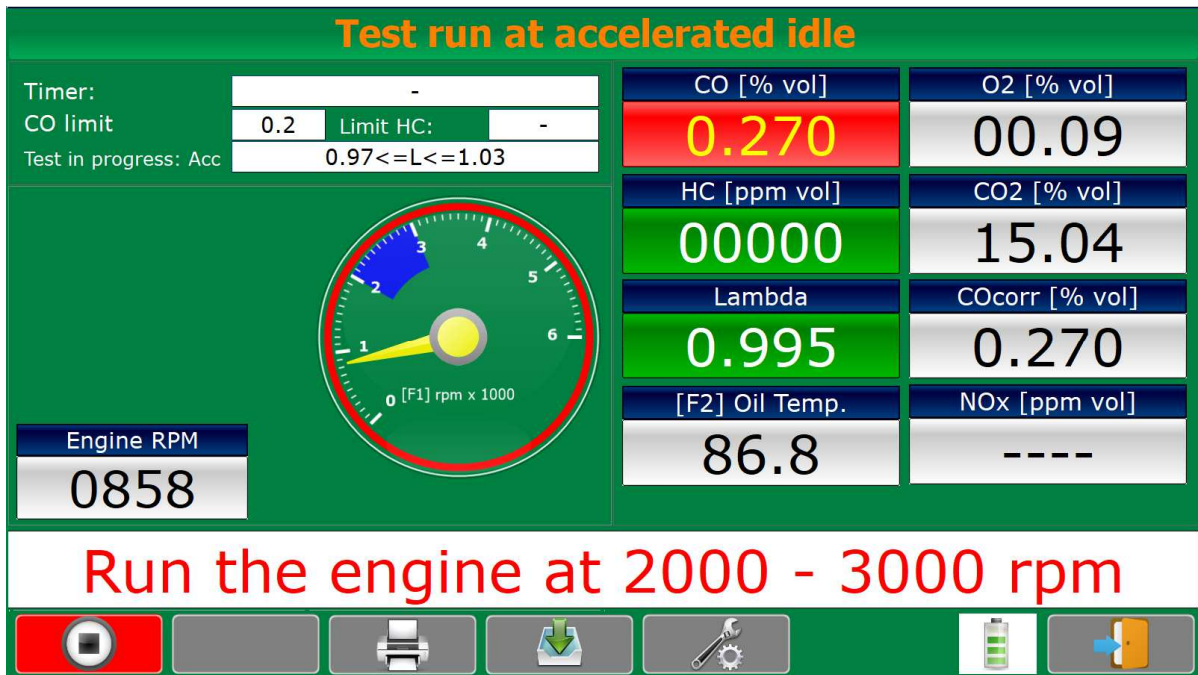


If the control is enabled, the system verifies if a positive leak test is made in the last 24 hours, if the positive test was not made, the system begin the specific procedure, in the screen are reported the operation to make and the result of the test.

The system performs an autozero; at the end the instrument goes in measure status. If the control is enabled, the system performs an HC residual test, in this phase there is a screen that reports the HC value for the set time, generally some seconds, if the reading value goes over the limit the measure is interrupted, the operator must clean the gas probe and the input filters from pollution, after it the measure can be re-started. if the error recurs despite cleaning, contact the technical assistance service.

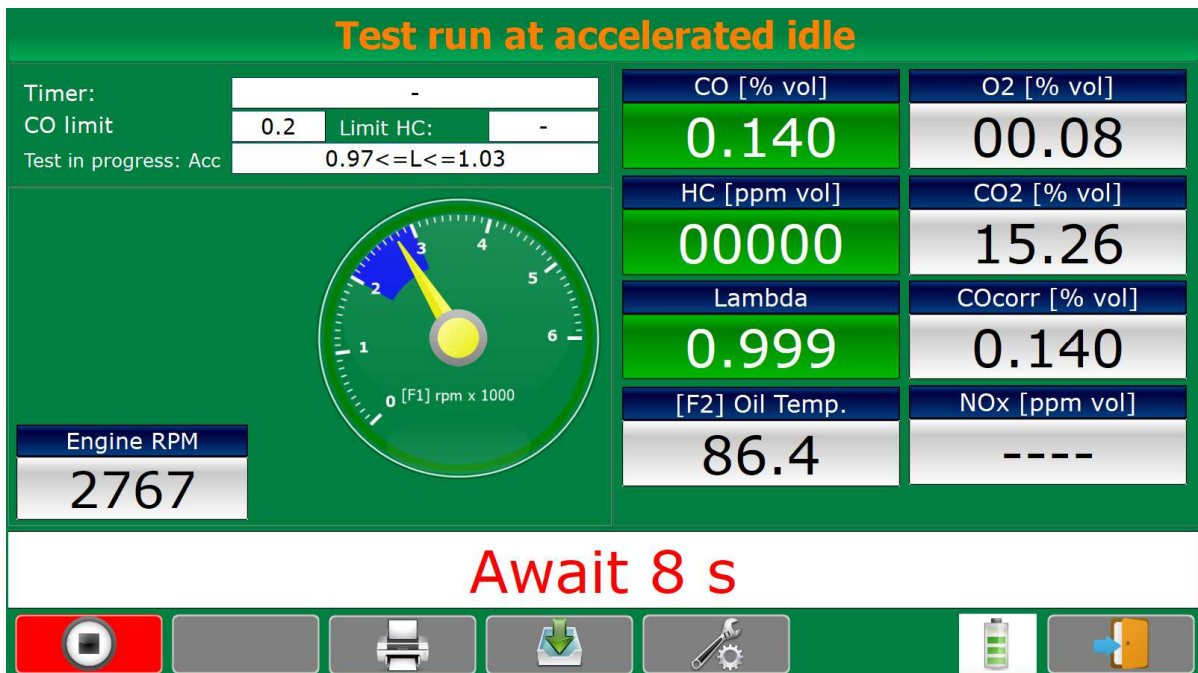


In the measure screen there are reported the measured values, the system wait for the set time for stabilization.









The measure values out of limits are highlighted.

The test may be configured with several parameters, it may be required in one measurement at minimum range or two measurement at minimum and accelerated idle. If the rpm is enabled, the system wait that values go into the requested limits.



The second measure is performed. In the upper left are reported the applied limits.

VEHICLE DATA			
License plate:	aa123aa	Emission Directive:	
Int. Category:	M1	CO Min limit <=	0.3
No. of exhausts:	1	CO limit MinAcc <=	0.2
1st Power supply:	PETROL	Lambda limit	0.97<=L<=1.03
2nd Power supply:	NONE		
1st Power supply			
Minimum		Accelerated Idle	
CO:	0.279	CO:	0.140
Lambda:	0.990	Lambda:	1.000
O2:	0.08	O2:	0.08
COcorr:	0.300	COcorr:	0.100
CO2:	15.35	CO2:	15.26
HC:	0	HC:	0
T. Oil:	87.0	T. Oil:	87.0
Engine RPM:	729	Engine RPM:	2809
REGULAR		REGULAR	

At the end, the detected values are showed in the screen with the main vehicle data, the limits applied and the result.  
 The data may be printed or saved in a file.  
 Here is possible repeat the test directly with the same configuration or perform a new measure.



## 7 STANDARD MAINTENANCE

The following maintenance operations can be performed directly by the end user. In case of calibration or non standard maintenance have to be carried out contact an Authorized Technical Service that will fix problems or will give instructions where to send the equipment for repair.

### 7.1 INSTRUMENT CLEANING

Before proceeding with the instrument cleaning disconnect the power supply. Clean external parts using a wet cloth, use water and not solvents or chemical products.

### 7.2 FUSE REPLACEMENT

The fuse is placed in the rear or connector panel, if it is bowed replace with another with the same value, the use of fuse with wrong values may damage the instrument, replace the fuse as follow:

- Disconnect the power supply.
- Unscrew the fuse cap.
- Remove the fuse, replace it and screw the fuse cap.

### 7.3 CARBON FILTER REPLACEMENT

Usually the carbon filter, that is located on the back side or internally of the instrument, has to be replaced by the service personnel.

In case of need the end user can replace such filter simply removing it from its container and fitting in the new filter.

### 7.4 OXYGEN SENSOR REPLACEMENT

Usually the oxygen sensor, that is located on the back side or internally of the instrument, has to be replaced by the service personnel.

In case of need the end user can replace such sensor as follow:

- Disconnect the power supply
- Disconnect the cable
- Unscrew the old sensor
- Screw the new sensor
- Connect the cable

When the oxygen sensor is replaced, it is preferred to perform a gas calibration.

### 7.5 NOX SENSOR REPLACEMENT

Usually the NOx sensor, that is located on the back side of the instrument, has to be replaced by the service personnel.

In case of need the end user can replace such sensor as follow:

- Disconnect the 12 V power supply
- Disconnect the cable
- Unscrew the old sensor
- Screw the new sensor
- Connect the cable

When the NOx sensor is replaced, it is preferred to perform a NOx gas calibration.

## 8 TROUBLESHOOTING

If the gas analyzer shows some defects, verify the following cases to find the cause and perform a repair, otherwise contact the Technical Assistance to communicate defect, model and equipment serial number.

### **Analyzer does not power on**

Verify that the power supply is connected to the analyzer and to the electrical network plug.

Verify that it's set to 12 Vdc.

Disconnect the analyzer from the power supply and verify the fuse.

### **The analyzer turns on, after few seconds return off**

The analyzer's internal battery has dropped below the warning level.

Carry out a battery recharge cycle or use the instrument connected to the battery charger.

### **Condense error displayed.**

Verify the condense drainage circuit, in particular the drain pump.

Switch off the analyzer, clean the condense separator and the gas probe, verify that the draining pump is working.

### **Date/Time not showed in the report**

Verify date and time as described in the specific paragraph.

### **Analyzer perform an excessive number of auto calibration.**

The gas analyzer perform an automatic calibration every 9-10 minutes or when detect unstable internal parameters.

The gas analyzer perform an automatic calibration also in presence of not combusted hydrocarbon in gas input, verify filters cleaning and the correct input of the compressed air (motorcycle version).

### **Low flow error displayed.**

Remove the gas probe from the input connection, if error disappear clean the probe and replace the corpuscular filter, otherwise verify and clean the condense separator filter and the corpuscular filter on the rear panel.

### **Obstruction output displayed.**

Verify the output on the rear panel.

### **Display shows “-or-“ or “----“**

Measure is out of limit

Measure is not available because the probe is missing or because is not possible.

### **Display shows Out.**

The instrument internal temperature is out of limit.

### **Oil temperature display shows “-or-“ or “----“**

Verify oil temperature probe, do not immerse into water, do not put close to hot sources, do not pool the spring, clean carefully.

**Oxygen value is too high**

Oxygen sensor could be faulty, remember that the average life is 1 year also if usually is longer, depending on use and operative temperature. There is a automatic warning if the sensor does not reach the minimum voltage level (5 mV), this check is made during every automatic calibration.

Verify that there are no air leakages performing the leak test.

Contact the Technical Service for the replacement.

**CO/CO<sub>2</sub>/HC values are too low**

Verify the operation of the pumps capping for a short time the outputs on the rear panel and check the presence of pressure.

Another cause could be the gas probe fault or the gas input pipe, perform the leak test as described in the dedicated paragraph.

If no fault is detected contact the Technical Service.

**PRINT doesn't work.**

Verify the correct position of the paper and the right position of the door.

**PEF displayed is not correct or some gas values are 0 or too high**

The analyzer could have suffered an electrical shock. The Technical Service can perform an instrument reset.

**Analyzer cannot connect to the PC via RS-232.**

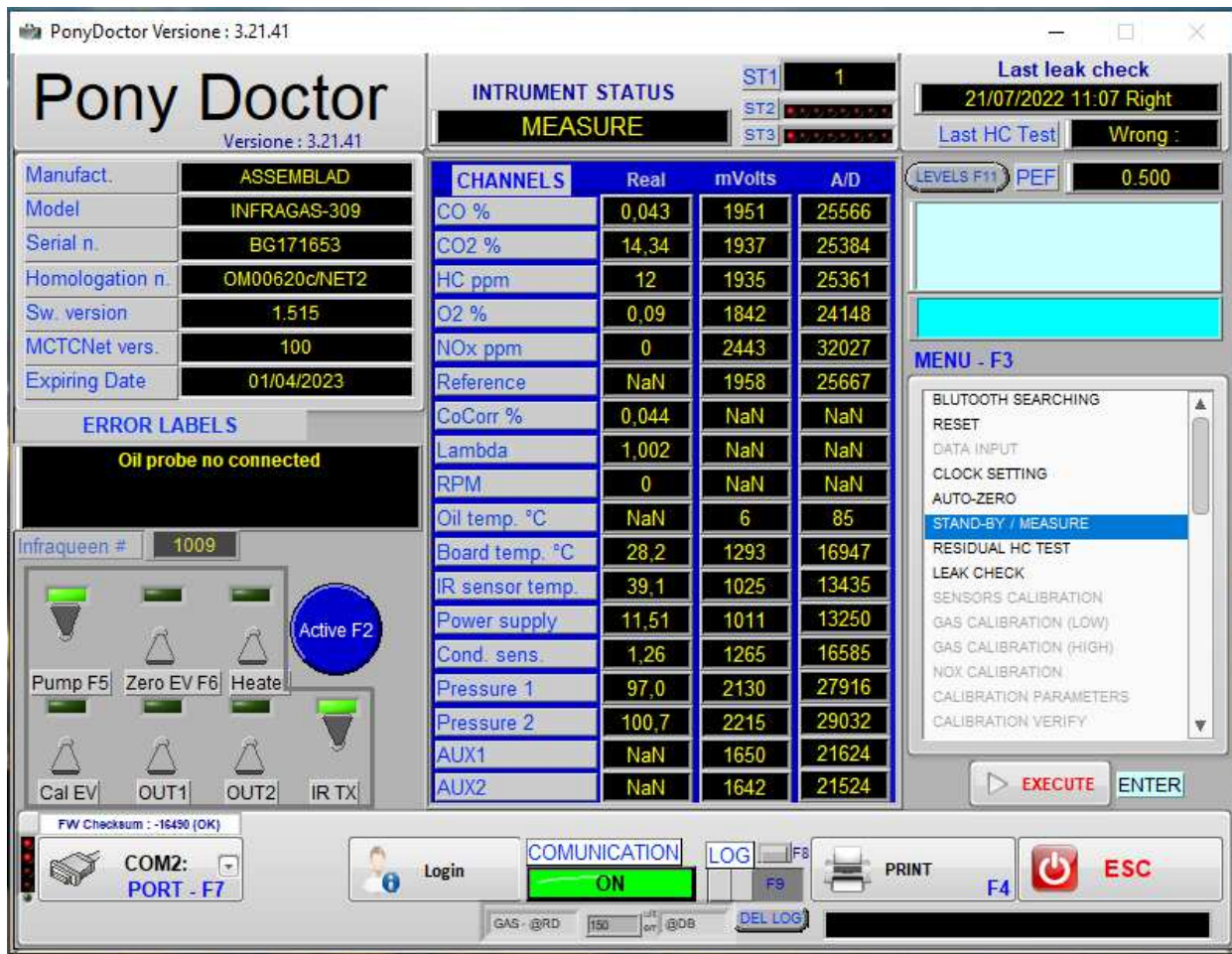
Check serial cable connection between instrument and PC, try to substitute it, the cable is male/female with pin-to-pin connections.

Verify that REMOTE has been selected from the Instrument Menu.

Verify that the communication parameters are correct: 9600 baud, 8 bit data, 1 bit stop, no parity.

## 8.1 PONYDOCTOR

To verify equipment status or to check for fault, start the PONYDOCTOR software.



Check in particular for communication status, error or warning messages and the correct operation of the MEASURE command.

In the menu are allowed several commands, some ones are disabled because reserved for service department.

With clock setting is verified the internal clock of the instrument and synchronized with the PC

With autozero is verified the functionality of the instrument operation.

With standby/measure the pump is turned on/off.

The command leak test perform an accurate test of the input gas line highlighting if there are infiltrations of air.

Before to operate commands about parameters or firmware update, contact the service department.

## 9 METROLOGICAL LOGBOOK


The equipment (if needed) is supplied to the end user with an ***analyzer metrological logbook*** that is a register for verification, control and repairs of the instrument.

In case the equipment is used for legal measurements, the logbook must be always updated, providing to perform the periodic and occasional checks and/or repairs, when needed, by Assemblad or by authorized personnel, C.S.R.P.A.D. of Rome, C.P.A. authorized by “Direzione Generale della Motorizzazione Civile e dei Trasporti in Concessione”, or by Notified Bodies.

In the event that equipment is used for legal measurements, it is necessary to take the logbook with the instrument or, as an alternative, replacing it with a copy on which must be noted the place where the original is located.

## 10 USER INFORMATION - RAEE Directive <sup>(#)</sup>



The symbol  stamped on the equipment means that when the product will be at the end of its operative life it shall be considered as a special refusal and shall be a “special dismantle”. For this reason the user shall take it to a Dismantle Center authorized by Local Authority or to an authorized distributor for purchasing a new equivalent equipment.

<sup>(#)</sup> European Directives 2002/95/CE, 2002/96/CE and 2003/108/CE

## 11 WARRANTY

- ❖ 01 - This device was built with care and carefully inspected before it left the factory.
- ❖ 02 - It is guaranteed for one year from the date of purchase by the final user.
- ❖ 03 - To enjoy full rights under this warranty and avoid the risk of invalidation, you must mail a copy of the Warranty Certificate to the factory within 10 days of the purchase date.
- ❖ 04 - The warranty covers all defects in materials.
- ❖ 05 - The warranty does not cover: external cables, probes, the remote control unit, pumps, motors and the external accessories. These items are subject to wear and their efficiency depends on how they are handled or treated.
- ❖ 06 - The warranty does not cover damage caused by accidents, impact or dropping the instrument, or by negligence, improper use, non-compliance with the instructions and improper storage.
- ❖ 07 - If the device has such defects as to require technical service, you must return it to Assemblad or an authorized service center.
- ❖ 08 - Shipping charges shall be covered by the customer.
- ❖ 09 - ASSEMBLAD, even supplying support on demand for the first installation of the equipment, disclaims any liability for damages and injuries caused, even to third parties, by an improper installation, maintenance, defective or unsafe electrical connections.
- ❖ 10 - Further, ASSEMBLAD disclaims any claim for damages from anyone due to a miss utilization of the equipment for any reason.
- ❖ 11 - The warranty shall immediately become invalid if the device shows any signs of tampering.
- ❖ 12 - The exclusive court of jurisdiction for any disputes arising from the application and/or interpretation of this warranty is the Court of Florence (Italy).

*Note:*

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by

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