

IRNET-P / IRNEX-P

DEMO BOARD USER MANUAL

- MT3072 -

Rev. 7



CONTENTS

1.	GENERAL DESCRIPTION.....	3
1.1	FEATURES.....	3
1.2	DESCRIPTION	4
2.	SOFTWARE INSTALLATION.....	5
2.1	IRNET PARAMETERS INSTALLATION	5
2.2	DRIVER CONFIGURATION.....	6
3.	PASSWORD TO START.....	8
4.	COMMUNICATIONS PORT SELECTION	9
5.	COMMUNICATION.....	11
5.1	DESCRIPTION OF THE ‘SENSOR’ WINDOW	12
5.2	DESCRIPTION OF THE ERROR	13
5.3	DESCRIPTION OF THE “WARNING” WINDOW	14
5.4	DEVICE REGISTER WINDOW	15
6.	DATA LOGGING	18
6.1	AUTOMATIC MODE.....	18
6.2	ON DEMAND MODE.....	19
7.	CALIBRATION	20
7.1	CALIBRATION WINDOW	20
7.2	ZERO PROCEDURE.....	20
7.3	SPAN PROCEDURE FOR INRET/IREF/IREF LITE SENSORS	20
7.4	SPAN PROCEDURE FOR DYNAMIC RANGE SENSORS.....	21
8.	IREF-LITE THRESHOLD SETTINGS	22

1. GENERAL DESCRIPTION

1.1 FEATURES

IR DEMO BOARD KIT is composed by IR Demo board and IRNET Parameter software.

IR demo board can be used to verify the functionality of the IRNET NDIR sensor. Used in conjunction with the appropriate IRNET Parameter software, it is possible to communicate with all the IR-Sensors produced by N.E.T. srl.

The demo board is powered by USB connection and provides the analogic output voltage of the sensor through the dedicated connector.

There are two versions of the IRNET DEMO BOARD:

Only for POSITIVE IR-sensors
Only for NEGATIVE IR-sensors

In both cases the demo board must be used only with the appropriate polarity of the sensor.

Demo board is suitable to be used with 3 pin and 5 pin IR SENSOR version, but it is important to note that is possible to fit only one sensor at the same time.

The supplied software is designed to be used under Microsoft Windows XP operating system or later versions, operating at 32 or 64 bits.

1.2 DESCRIPTION

In the below pictures are shown typical connections for IRNET DEMO BOARD



NOTE: THE POWER SUPPLY IS PROVIDED ONLY BY USB CONNECTION.

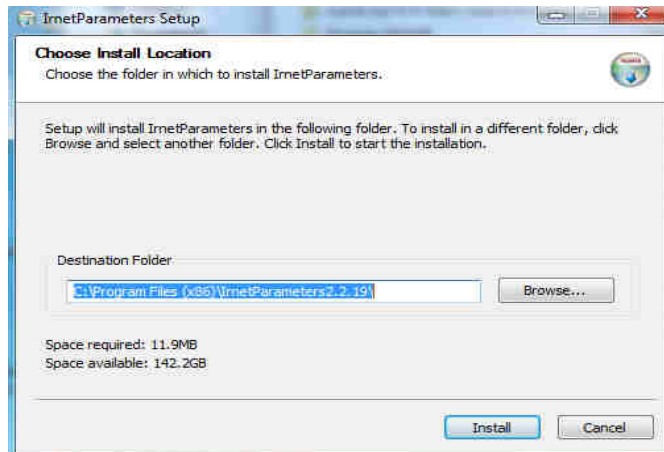
2. SOFTWARE INSTALLATION

2.1 IRNET PARAMETERS INSTALLATION

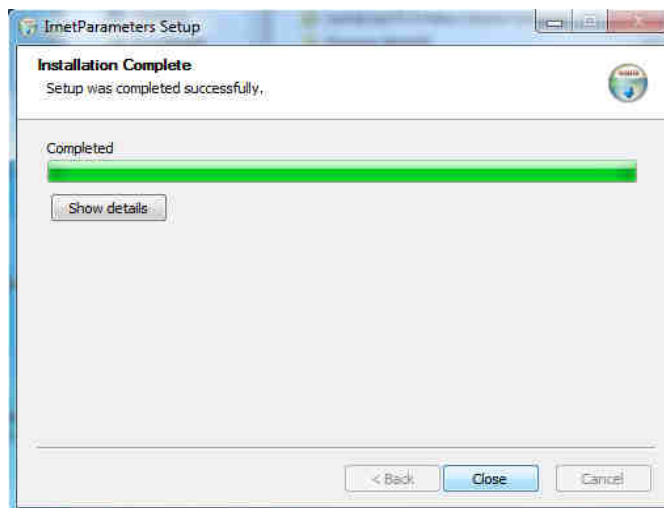
To communicate with the IR-Sensor is necessary to install the “*IRNET Parameters software*” supplied with the IR DEMO BOARD KIT.

To install the software insert the CD/USB Key or download by google drive link

Then double click to the file named “**Irnet parameters x.x.xx**”, (where x.x.xx indicates the software version) and follow the instruction as indicated below:



Check the destination folder and click **install**. The following window is shown:



Wait until the installation is completed and then click Close.

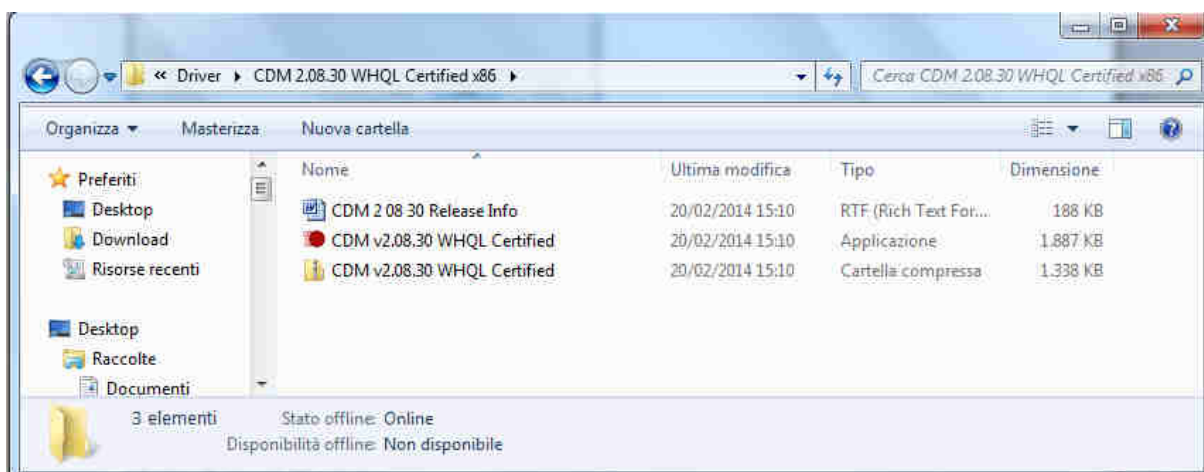
At this point the IRNET Parameters software is installed and ready to be used.

The software is typically installed as follows:

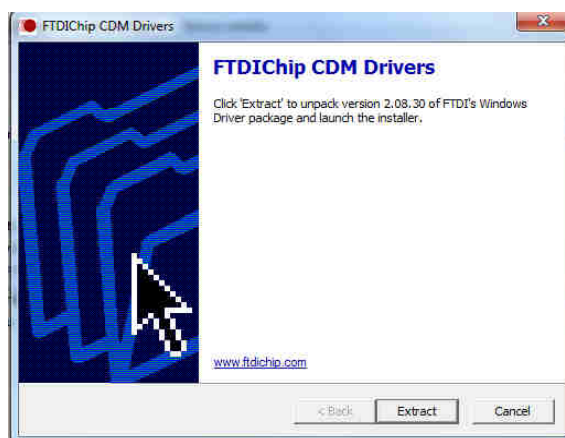
<C:\prog\IrnetParametersx.x.xx\irnetparameter.exe>

2.2 DRIVER CONFIGURATION

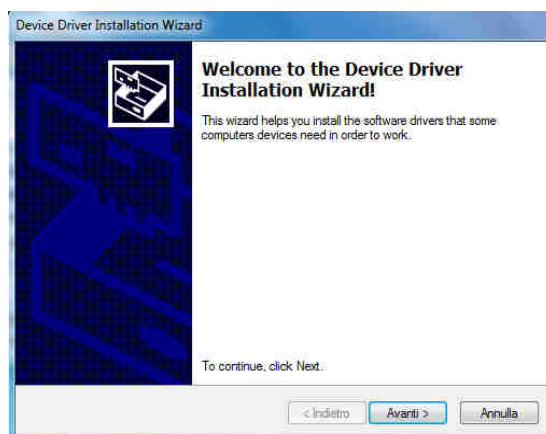
At the first connection of the IRNET DEMO BOARD to the PC it is likely to be required to install the driver. In this case is necessary to install the driver included in the CD/USB Key in the Driver folder, as follows:



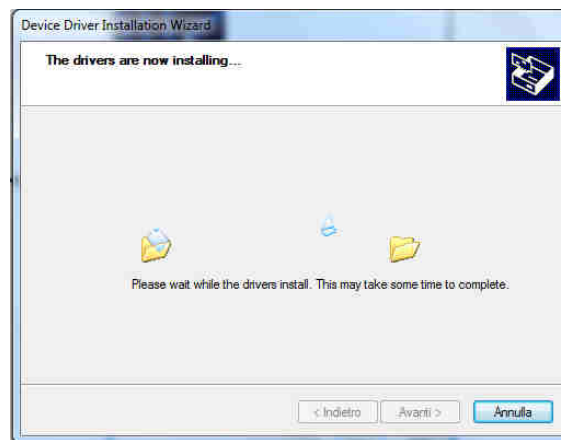
Click on “**CDM v2.08.30 WHQL Certified**” FILE APPLICATION, then following the instruction on the window, as indicated below:



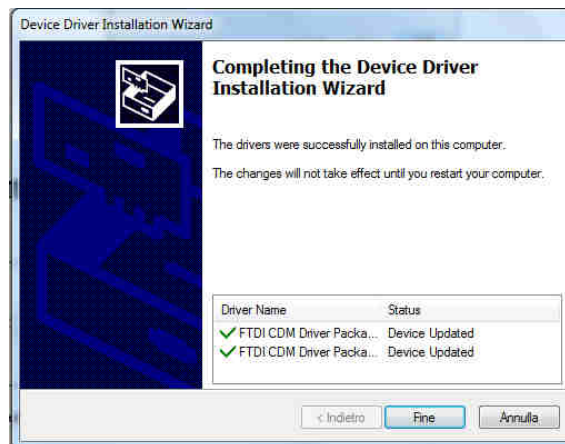
Click “**Extract**”, then the following window is shown:



Then click **"Forward"** and the following window is shown:



Wait until the installation is completed and verify that the following window is shown:



At this point click **"End"** (Showed **"Fine"**) and the driver installation is completed.

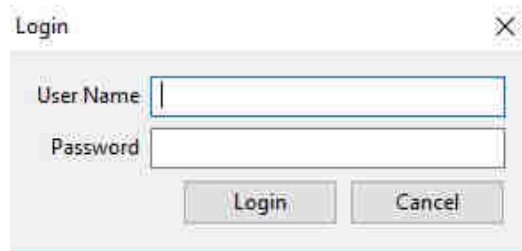
Note: Is possible that will be necessary to restart the PC after the driver installation.

3. PASSWORD TO START

IRNET Parameters software allow the user to manage sensor's functionality using two different versions:

- **Read only mode (BASE Version):** *in this mode it is possible to check functionality without any possibility to change internal parameters of the sensor.*
- **Write and calibration mode (MEDIUM Version):** *it is possible to change internal parameters and to perform calibration of the sensor.*

Once IRNET Parameter software has been launched it will appear the following pop-up window:

A login dialog box titled "Login" with a close button (X) in the top right corner. It contains two text input fields: "User Name" and "Password". Below the fields are two buttons: "Login" and "Cancel".

If user press **Login** button, without any data inside User Name and Password field, then software starts in *"read only mode"*.

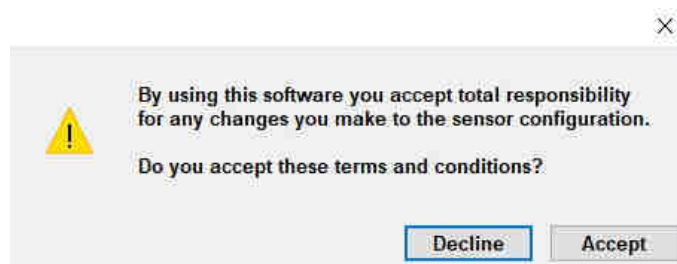
If user enter **User Name** and **Password** then it will be activated *"write and calibration mode"*.

To obtain User Name and Password it's necessary to contact NET sales department and to sign **"M.8.2-03 Calibration releasing"** document.

If user activate *"write and calibration mode"*, IRNET Parameters software gives the possibility to recalibrate the sensor through Auto Zero and Auto Span buttons and to change some internal parameters as baud rate and Modbus address. Launching the application in *"write and calibration mode"*, a pop-up window appears and user is advised that has the full responsibility for any changes to the sensor calibration and functionality. **Accepting this condition, the user accepts full responsibility for any changes he/she makes to the sensor calibration.**

This is a condition of sale imposed by NET srl.

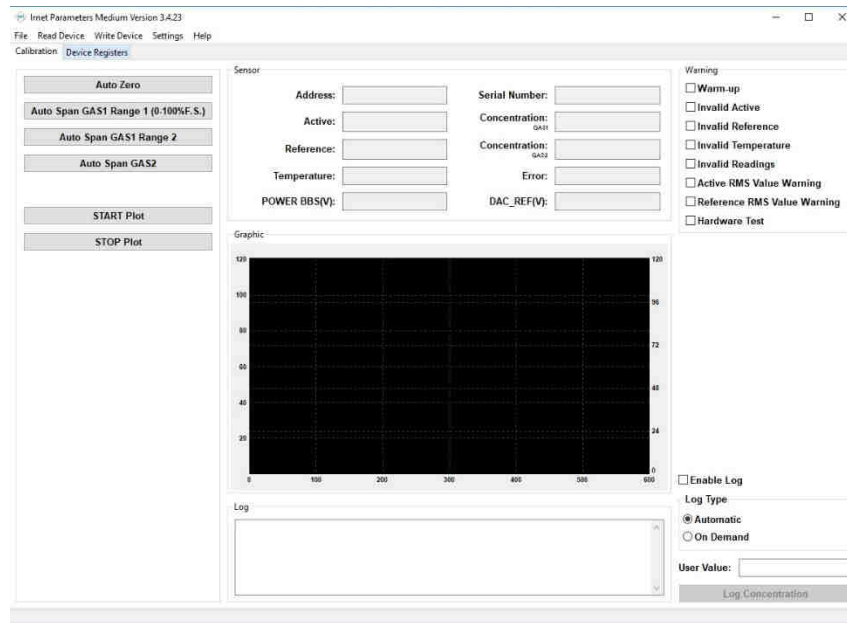
This decision does not affect the warranty against defects in materials or workmanship.

A dialog box with a yellow warning triangle icon on the left. The text inside reads: "By using this software you accept total responsibility for any changes you make to the sensor configuration. Do you accept these terms and conditions?". At the bottom right, there are two buttons: "Decline" and "Accept".

4. COMMUNICATIONS PORT SELECTION

Before starting the IRNET Parameters Software the user must connect IRNET DEMO BOARD to the PC using the USB cable. (If the set-up is correct the green led is on).

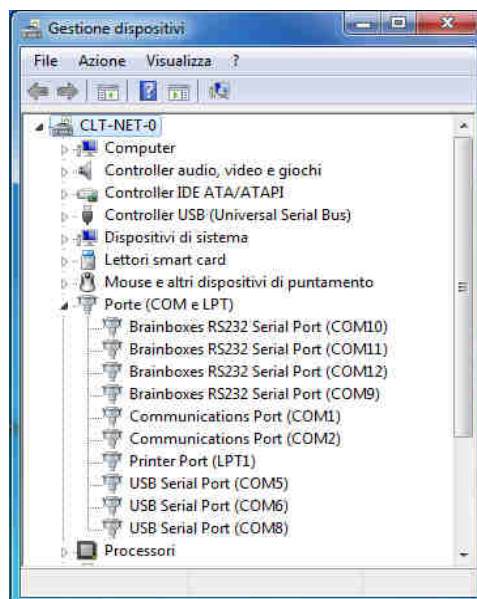
Once the user has launched the IRNET Parameters Software, appear the following window:



Before to start any communications, the user must select the serial port associated to the IRNET DEMO BOARD.

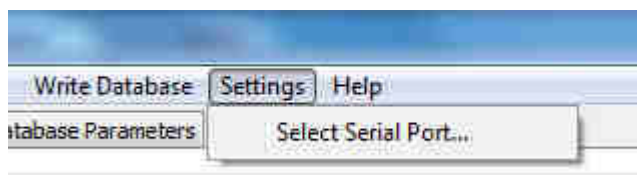
It is possible to find serial port on “**Device manager/COM&LPT**”. Exact device manager address depends on Windows version.

The following window is shown:

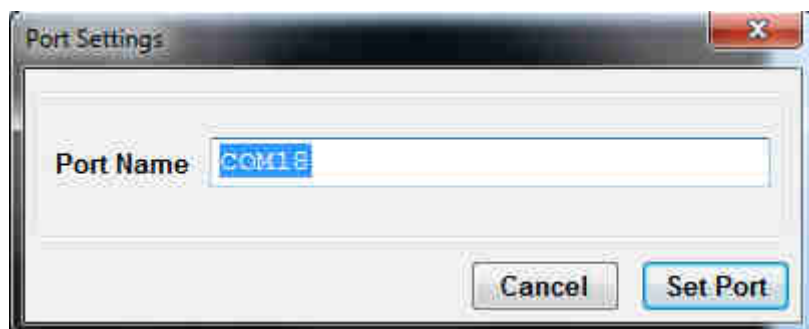


Connecting and disconnecting the USB cable the appropriate port will appear and disappear. Once the serial port number has been identified the user must select in the IRNET Parameter Software.

Select **Settings/Select Serial Port...** as below:



The following window is shown:



Click within the space **Port Name**, write the COM number and then click Set port.
Now the IRNET PRO DEMO BOARD is ready for communication.

To turn on the IR-Sensor is necessary to insert the IR sensor in the correct FIT position (depending by the number of pins).

The left position is for the 3 pins version and the right one is for the 5 pins version.



REMEMBER: DO NOT FIT MORE THEN ONE SENSOR AT THE SAME TIME!!

5. COMMUNICATION

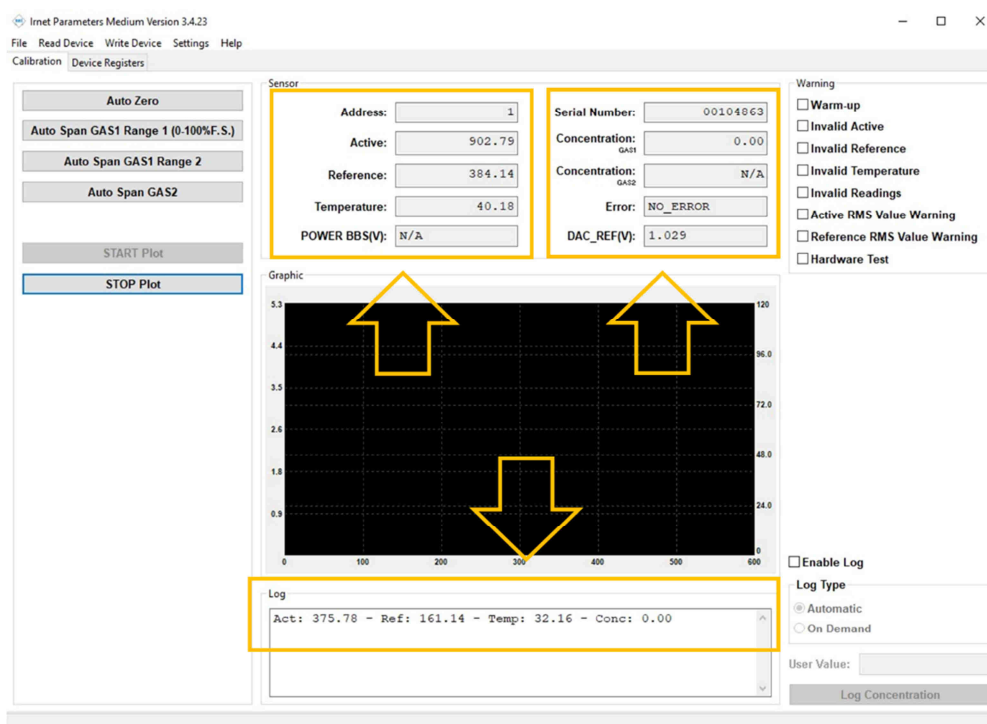
To communicate with the IR-Sensor enter in the **“Calibration Folder”** then click **START Plot** as shown in the next image and wait two seconds.

Please note that for first 60 sec. the sensor is in warm up and it doesn't display any value.

If sensor is in warm up following flag is checked:



After warm-up time, the following window is shown:



If the IR-Sensor communicates correctly the user will see the information within the spaces highlighted in yellow in the previous picture.

5.1 DESCRIPTION OF THE 'SENSOR' WINDOW

In the top side of the screen are present the two boxes showed in the picture below:

Sensor	
Address:	1
Active:	902.79
Reference:	386.14
Temperature:	40.18
POWER BBS(V):	N/A
Serial Number:	001048E3
Concentration: GAS1	0.00
Concentration: GAS2	N/A
Error:	NO_ERROR
DAC_REF(V):	1.029

The information contained in the respective fields are the following:

- **Address:** Indicates the sensor MODBUS address
- **Active:** Indicates the active signal level
- **Reference:** Indicates the reference signal level
- **Temperature:** Indicates the temperature value expressed in Celsius degree
- **POWER BBS(V):** Indicates power of BBS source (only for IREF sensors)
- **Serial number:** Indicates the sensor serial number
- **Concentration GAS1:** Indicates the concentration expressed as percentage of volume or ppm depending on sensor measuring scale
- **Concentration GAS2:** Indicates the concentration expressed as percentage of volume or ppm depending on sensor measuring scale (only for Dynamic sensors)
- **Error:** Indicates the errors occurred during the sensor operation
- **DAC_REF(V):** Indicates value of Reference voltage

In the screen bottom side is present this box:

Log
Act: 375.78 - Ref: 161.14 - Temp: 32.14 - Conc: 0.00

- **Log window:** Indicates the Active, Reference, Temperature and Concentration values recorded at communication start-on or during the **On Demand** log.

5.2 DESCRIPTION OF THE ERROR

Sensor

Address:	1	Serial Number:	00104863
Active:	902.79	Concentration: GAS1	0.00
Reference:	384.14	Concentration: GAS2	N/A
Temperature:	40.18	Error:	NO_ERROR
POWER BBS(V):	N/A	DAC_REF(V):	1.029



As previously shown, IRNET sensor, during the communication, indicates its functional status, if everything works correctly in the Error box is shown the **“NO_ERROR”** notice; otherwise the specific indication will appear.

The possible errors list is shown below:

Error message	Description
NO_ERROR	This message indicates that the IR-Sensor works properly.
I2C_ERROR	Internal I2C communication failure.
SPI_ERROR	Internal SPI communication failure.
VREF_ERROR	Incorrect Voltage Reference value.
VIN_ERROR	Incorrect power supply.
ADC_ERROR	Analogue to Digital Converter failure.
DAC_ERROR	Digital to Analogue Converter failure.
FLASH_WRITE_ERROR*	This message indicates an error occurred during the flash memory writing.
FLASH_CKSM_ERROR*	This message indicates an error occurred during the flash memory checksum control.
FLASH_READ_ERROR*	This message indicates an error occurred during the flash memory reading.
RAM_ERROR*	Internal RAM memory failure.
E2PROM_WRITE_ERROR**	This message indicates an error occurred during the E2PROM MEMORY writing.
E2PROM_CKSM_ERROR**	This message indicates an error occurred during the E2PROM MEMORY checksum control.
VDD_ERROR	This message indicates that internal power supply is abnormal.
ANALOG_420MA_ERROR	Analogue output failure.
RFI_ERROR	
SW_ERROR	Internal MCU algorithm calculation error.
VBG_ERROR	Internal MCU voltage failure.
LAMP_ERROR	This message indicates a Failure of the internal Lamp
AMP_ERROR	This message indicates a Failure of the internal Amplifier Stage.

* FLASH and RAM error can be shown only during the hardware test.

** E2PROM error can be shown during the hardware test execution and a writing action on the device registers.

5.3 DESCRIPTION OF THE “WARNING” WINDOW

In the Calibration panel right side, the user can find the **Warning** information reported by the sensor.

It is possible to have one or more active warning checked.

Here below is shown the list of the possible warnings.

Warning

- ☐ Warm-up
- ☐ Invalid Active
- ☐ Invalid Reference
- ☐ Invalid Temperature
- ☐ Invalid Readings
- ☐ Active RMS Value Warning
- ☐ Reference RMS Value Warning
- ☐ Hardware Test

The meaning of the warning is explained below:

Warning	Description
Warm-up	This flag indicates the warm-up status. It is checked during warm-up time, its duration depends on the value expressed in seconds contained in the Warm-up Time Register.
Invalid Active	This flag is checked in case of instantaneous Active signal is out of range.
Invalid Reference	This flag is checked in case of instantaneous Reference signal is out of range
Invalid Temperature	This flag is checked in case of temperature value is out of range ($-40^{\circ}\text{C} > \text{Temp} > 90^{\circ}\text{C}$).
Invalid Readings	This flag is checked if there is an excessive change of the ambient temperature, gas sample temperature or flow rate, in this case the output signal is momentarily frozen. Correct operation is restored when the effects of the transient have settled.
Active RMS Value Warning	This flag is checked in case of Active RMS value is out of range.
Reference RMS Value Warning	This flag is checked in case of Reference RMS value is out of range.
Hardware Test	This flag is checked during the hardware test execution. Hardware test is performed once a day.

5.4 DEVICE REGISTER WINDOW

To read the data contained in the device registers it is necessary to enter in the **Device Register folder**. The following window is shown:

Calibration	Device Registers
	Sensor Value
SensorType	
DeviceAddress	
LotDD	
LotMM	
LotYYYY	
WarmupTime	
UartSpeed	
OutputMode	
DACZeroVoltage	
DACSpanVoltage	
DACSpanPellistor	
FwVersionMajor	
FwVersionMinor	
FwVersionRevision	
UoM	
DisplayMode	
Threshold1	
Hyst 1 LOW cost	
Threshold2	
Hyst 2 LOW cost	
Analog Threshold1	
Analog Threshold2	
ActiveZeroRMS	
ReferenceZeroRMS	
TempZeroCalibration	
FullScale GAS1 Range 1	
CalibrationGasLevel GAS1 Range 1	
RoundingValue GAS1 Range 1	
SpanValue1 GAS1	
TempSpan1Calibration GAS1	
FullScale GAS1 Range 2	
Calibration GasLevel GAS1 Range 2	
Span Value2 GAS1	
TempSpan2Calibration GAS1	
TempSpan2Calibration GAS1 NET	
Full Scale GAS2 Value	
Calibration GasLevel GAS2	
Span Value GAS2	

This window presents the information contained in the device register.

Description of the Device Registers

- **Sensor type:** indicates the sensor type.
- **Device address:** indicates the Modbus device address
- **LotDD/MM/YYYY:** indicates the day, month and year in which the sensor has been calibrated.
- **Warm up time:** indicates the warm-up time, expressed in seconds.
- **UART Speed:** indicate sensor BAUD rate
- **Output mode:** indicates type of the output mode selected inside the sensor.
- **DAC zero voltage:** indicates the analogic output value corresponding to zero level (expressed in Volt)
- **DAC span voltage:** indicates the analogic voltage difference between full scale level and zero level (expressed in Volt)
- **DAC span pellistor:** If the output mode is set to *“bridge”* or *“pellistor”* mode, it indicates the analogic voltage difference between full scale level and zero level (expressed in mV). It is not active in *“voltage mode”*.
- **Fw version major,minor & revision:** indicates the installed Firmware version.
- **UOM:** indicates unit of measure (%Vol, ppm or %LEL)
- **Display Mode:** indicates quantity of decimal numbers
- **Threshold1/Threshold2:** indicates values of threshold level (**USED only inside IREF-LITE sensors**)
- **Hyst 1/2 LOW cost:** indicates values of hysteresis associated to the threshold levels (**USED only inside IREF-LITE sensors**)
- **Analog Threshold 1/2:** indicates analogue output values associated to threshold 1 and threshold 2 (**USED only inside IREF-LITE sensors**)
- **Active zero RMS:** indicates the Active signal level recorded during the Zero calibration.
- **Reference zero RMS:** indicates the Reference signal level recorded during the Zero calibration.
- **Temp zero calibration:** indicates the temperature value recorded during the Zero calibration. It is expressed in Kelvin degrees.
- **Full scale GAS1 Range 1/2:** these registers indicate full scale range of the sensor. In case of standard sensor, only Range 1 is used. Only for Dynamic sensors are used 2 ranges.
- **Calibration gas level GAS1 Range 1/2:** these registers indicate calibration gas level of the sensor. In case of standard sensor, only Range 1 is used. Only for Dynamic sensors are used 2 ranges.

- **SpanValue1/2 GAS1:** these registers indicate the parameters of SPAN recorded during calibration of the sensor. Only for Dynamic sensors are used 2 ranges.
- **Temp Span1/2 calibration GAS1:** indicates temperature value recorded during SPAN calibration. It is expressed in Kelvin degrees. In case of standard sensor, only Range 1 is used. Only for Dynamic sensors are used 2 ranges.
- **Full scale GAS2 Value:** this register indicates full scale range of the GAS 2 . (USED only for Dynamic range sensors and multiple gases)
- **Calibration gas level GAS2:** this register indicates Calibration Gas level of the GAS 2 . (USED only for Dynamic range sensors and multiple gases)
- **SpanValue GAS2:** this register indicates the parameter of SPAN recorded during calibration of GAS 2 range of the sensor. Only for Dynamic sensors are used 2 ranges.

All the registers are accessible in read only mode; there are only few registers that can be modified by the user.

DAC Zero Voltage min value is 0.2 otherwise is not possible to detect fault conditions.

DAC Span Voltage value must be set considering that max output voltage @ 100% F.S is 2.3V.

Example:

If DAC Zero Voltage is 0.4 then max value of DAC Span Voltage is 1.9

IREF-Lite threshold settings are explained inside Chapter. 8

6. DATA LOGGING

The user has the possibility to start the data logging functionality creating a .txt file. The data logging facility allows the user to monitor the IR-Sensors response over a period time. It is possible to start the data logging in two different modes: **Automatic** and **On Demand**.

6.1 AUTOMATIC MODE

To start data logging in "**Automatic**" mode the user must enter in the Calibration folder, select **Automatic** and check **Enable Log** then click on **START Plot**. The following screen is shown:

Warning

- ☐ Warm-up
- ☐ Invalid Active
- ☐ Invalid Reference
- ☐ Invalid Temperature
- ☐ Invalid Readings
- ☐ Active RMS Value Warning
- ☐ Reference RMS Value Warning
- ☐ Hardware Test

☒ Enable Log

Log Type

☒ Automatic

☐ On Demand

User Value:

Log Concentration

In this mode the program runs a log every two seconds. When the user needs to stop the log he/she has to click **STOP Plot** and wait some seconds. The program will automatically open a window in which the user can select the suitable path, folder and file name for the txt file.

The log file created will appear as the example shown in the following picture:

Time	User Value	Address	Serial No	Concentre	Concentre Active	Reference Temperat	Error	Warning	DAC_REF	POWER BBS
1	#####	1	104863	0	N/A	400,93	171,38	35,79 NO_ERRO WARMUP	1,03	N/A
2	#####	1	104863	0	N/A	510,1	218,04	35,98 NO_ERRO WARMUP	1,03	N/A
3	#####	1	104863	0	N/A	580,18	247,94	36,09 NO_ERRO WARMUP	1,03	N/A
4	#####	1	104863	0	N/A	624,44	266,88	36,19 NO_ERRO WARMUP	1,03	N/A
5	#####	1	104863	0	N/A	685,22	292,84	36,31 NO_ERRO WARMUP	1,03	N/A
6	#####	1	104863	0	N/A	724,17	309,47	36,39 NO_ERRO WARMUP	1,029	N/A
7	#####	1	104863	0	N/A	748,81	320	36,47 NO_ERRO WARMUP	1,029	N/A
8	#####	1	104863	0	N/A	782,69	334,44	36,58 NO_ERRO WARMUP	1,029	N/A
9	#####	1	104863	0	N/A	804,41	343,73	36,63 NO_ERRO WARMUP	1,03	N/A
10	#####	1	104863	0	N/A	818,11	349,56	36,71 NO_ERRO WARMUP	1,03	N/A
11	#####	1	104863	0	N/A					

Note: in automatic mode, inside the "user value" field there will be inserted the text written in the "user value" box present in the Calibration folder. (In the above picture the user value box is not filled).

6.2 ON DEMAND MODE

To start data logging in “**On Demand**” mode the user has to enter in the Calibration folder, select **On Demand** and to check **Enable Log** then to click on **START Plot**.

Warning

☐ Warm-up

☐ Invalid Active

☐ Invalid Reference

☐ Invalid Temperature

☐ Invalid Readings

☐ Active RMS Value Warning

☐ Reference RMS Value Warning

☐ Hardware Test

☒ Enable Log

Log Type

☐ Automatic

☒ On Demand

User Value:

Log Concentration

In this case the log file will be filled with information that are present in the user value box each time that user push the Log Concentration button. For example write “*User*” in the User value box and click **Log Concentration**, then repeat the same operation writing “*User1*” and “*User2*” then push **STOP Plot**.

At this point the program will automatically open a window in which the user can select the suitable path, folder and file name for the txt file.

The log file will appear as the example in the below window:

Time	User Value	Address	Serial No	Concentration	Concentration Active	Reference Temperature	Error	Warning	DAC_REF	POWER BBS
1	##### User	1	104863	0	N/A	901,17	379,69	49,43 NO_ERRO NO_WAR!	1,029	N/A
2	##### User	1	104863	0	N/A	901,23	379,65	49,42 NO_ERRO NO_WAR!	1,029	N/A
3	##### User	1	104863	0	N/A	901,17	379,71	49,43 NO_ERRO NO_WAR!	1,029	N/A
4	##### User	1	104863	0	N/A	901,23	379,74	49,42 NO_ERRO NO_WAR!	1,029	N/A
5	##### User	1	104863	0	N/A	901,24	379,69	49,44 NO_ERRO NO_WAR!	1,029	N/A
6	##### User	1	104863	0	N/A	901,24	379,77	49,47 NO_ERRO NO_WAR!	1,029	N/A
7	##### User	1	104863	0	N/A	901,24	379,78	49,43 NO_ERRO NO_WAR!	1,029	N/A
8	##### User	1	104863	0	N/A	901,23	379,8	49,42 NO_ERRO NO_WAR!	1,029	N/A
9	##### User	1	104863	0	N/A	901,27	379,77	49,45 NO_ERRO NO_WAR!	1,029	N/A
10	##### User	1	104863	0	N/A	901,21	379,78	49,44 NO_ERRO NO_WAR!	1,029	N/A
11	##### User	1	104863	0	N/A	901,21	379,78	49,44 NO_ERRO NO_WAR!	1,029	N/A

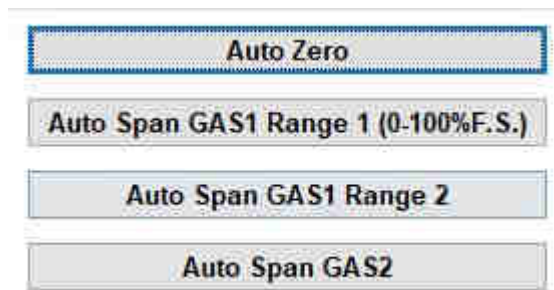
7. CALIBRATION

7.1 CALIBRATION WINDOW

This functionality is enabled only in case of Medium version of the SW (using Password)
Using IRNET Parameters software it is possible to calibrate all the Infrared sensors produced by N.E.T :

- IRNET 20/32mm
- IRNET Dynamic Range
- IREF
- IREF LITE

Inside Medium version of the software are present 4 Buttons to calibrate the sensors:



7.2 ZERO PROCEDURE

To perform **Zero Calibration** the following steps need to be performed:

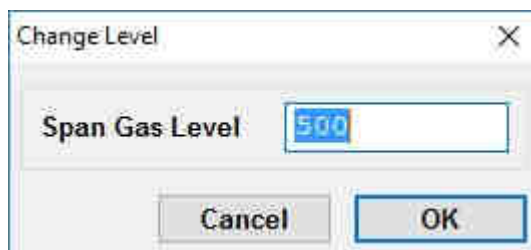
- 1 Apply N2 or Synthetic Air to Irnet-PRO for at least 10 minutes @ 0.5L/min before calibration (gas must be applied until the calibration is done).
- 2 Perform Zero calibration clicking on “**Auto Zero**” button

7.3 SPAN PROCEDURE FOR INRET/IREF/IREF LITE SENSORS

SPAN CALIBRATION MUST BE PERFORMED ONLY AFTER ZERO CALIBRATION AND AT THE SAME TEMPERATURE.

To perform **Span Calibration** the following steps need to be performed:

- 1 Apply target calibration gas to the sensor for at least 10 minutes before calibration (gas must be applied until the calibration is done).
- 2 Perform Span calibration clicking on “**Auto Span GAS1 Range 1 (0-100%F.S.)**” button, a pop-up window appears, then enter the span gas level and click ok button to confirm.



Span Gas Level must be expressed with the same UoM (Unit of measure) of the sensor!

Example:

If the sensor's UoM is "%vol" with a fullscale value "1" and the calibration bottle has a concentration of 5000 ppm, Span Gas Level must be 0.5

7.4 SPAN PROCEDURE FOR DYNAMIC RANGE SENSORS

SPAN CALIBRATION MUST BE PERFORMED ONLY AFTER ZERO CALIBRATION AND AT THE SAME TEMPERATURE.

In case of Dynamic Range sensors, it's possible to calibrate multiple ranges and different gasses.

Procedure to perform Span for **GAS1 Range 1** is the same as 7.3: (NOTE that Range 1 is the biggest of the sensor, in this case, full scale of the sensors correspond to Range 1 full scale.

To perform **Span Calibration** the following steps need to be performed:

- 1 Apply target calibration **GAS1** to the sensor for at least 10 minutes before calibration (gas must be applied until the calibration is done).
- 2 Perform Span calibration clicking on **"Auto Span GAS1 Range 1 (0-100%F.S.)"** button, a pop-up window appears, then enter the span gas level and click ok button to confirm.

To perform Span calibration for **GAS1 Range 2** , these actions should be performed:

- 1 Apply target calibration **GAS1** to the sensor for at least 10 minutes before calibration (gas must be applied until the calibration is done) (This concentration should be lower than concentration used to calibrate **GAS1 Range 1**).
- 2 Perform Span calibration clicking on **"Auto Span GAS1 Range 2"** button, a pop-up window appears, then enter the span gas level and click ok button to confirm.

To perform Span calibration for **GAS2** , these actions should be performed:

- 1 Apply target calibration gas (**GAS2**) to the sensor for at least 10 minutes before calibration (gas must be applied until the calibration is done).
- 2 Perform Span calibration clicking on **"Auto Span GAS2"** button, a pop-up window appears, then enter the span gas level and click ok button to confirm.

In case gas concentration used for Span calibration is outside the permitted limits the calibration will not be performed.

8. IREF-LITE THRESHOLD SETTINGS

IREF-LITE sensors have the possibility to set two thresholds level (for analogic output).
IRNET Parameter software give the possibility to set these thresholds editing the following registers:

Threshold1	
Hyst 1 LOW cost	
Threshold2	
Hyst 2 LOW cost	
Analog Threshold1	
Analog Threshold2	

If user doesn't want to use Threshold2, it's possible to disable threshold level writing value of 0 in the related register.

It is possible to change values considering these limitations:

- **Threshold1/2:** Is the value of threshold level, input value is expressed as % FS
To disable the use of threshold 2, write 0 in the register
It should be a positive value, between 3 and FS value
Threshold 1 and Threshold 2 should be set at different levels
Threshold level should be set to an higher value than hysteresis value
Difference between Threshold 1 and Threshold 2 should be higher than hysteresis value
Threshold 2 should be higher than Threshold 1
- **Hyst 1/2 LOW cost:** it is the value of hysteresis associated to the corresponding threshold level.
This value is expressed as % FS.
In case concentration is higher than threshold 1 then once the concentration will decrease, threshold 1 condition will be maintained until gas concentration will be higher than Threshold 1- Hyst 1, the same is valid also for threshold 2.
Hysteresis value should be lower than threshold 1 and threshold 2
Difference between Threshold 1-Hyst 1 must be lower than Threshold 2-Hyst 2 value
Difference between Threshold 1-Hyst 1 must be higher 3
- **Analog Threshold1/2:** it's the value of analogue output associated to the two threshold levels.
Analogue threshold value should be set between 0,5 and 2,0 V
Analogue threshold 1 should be set to a value lower than Analogue threshold 2
Analogue threshold 1 and Analogue threshold 2 should be set at different levels

After editing the values, to guarantee that values are saved inside the sensor it is necessary to write the sensor configuration.

This action can be performed selecting on the top of the menu the following path: **Write Device/Write Configuration**.

N.E.T. has a policy of continuous development and improvement of its products. As such the specification for the device outlined in this manual may be changed without notice.