



Environmental Equipment, Inc.

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# IMR 2800-IR

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IMR® reserves the right to adopt technical modifications without prior notice.

## **INTRODUCTION**

Thank you for purchasing the **IMR® 2800-IR emission gas analyzer**.  
Please read the following instructions before operating the unit for the first time.

Proper handling is necessary to make full use of the outstanding performance and features of this emission gas analyzer.

### **IMPORTANT INFORMATION:**

- Use the instrument just within the recommended temperature range.
- Never measure without the dust filter and condensation trap.
- The dust filter must be cleaned/replaced when dirty.
- The condensation trap must be checked and the condensed water removed if necessary.
- **IMR® or an authorized service facility must re-calibrate the IMR® 2800-IR once a year to ensure accuracy and performance.**

## **SAFETY INSTRUCTIONS**

Please make sure that you read this section carefully for use of your new emission gas analyzer.

- Follow all warnings and instructions marked on the product or displayed on the screen.
- The AC inlet should only be connected to a socket with a protective earth contact.
- Any adjustment or maintenance of the analyzer under voltage should be avoided.
- The maintenance of the analyzer should be done by qualified personal and the instrument must be turned off and unplugged.
- Do not take the analyzer out of the box during the warranty period. If you do so, then the warranty is null and void.
- Do not use this analyzer in water.
- Never spill water or any liquid on the analyzer.

# 1 DESCRIPTION

The **IMR® 2800-IR** is a state of the art emission gas analyzer. This table shows the sensors and built-in features.

Table 1: IMR® 2800-IR

	O2	CO2	CO	NO	NO2	SO2	HC	Printer	Memory	RS232 Interface	Gas & Ambient Temp	Draft
<b>IMR® 2800-IR</b>	X	X	X	X	O	O	X	X	X	X	X	X

X - standard O - optional  
 Max. 1 sensors

## 1.1 FUNDAMENTALS

### *Gas flow*

A built-in sampling pump is drawing the flue gas through the gas-sampling probe into the analyzer.

1. The gas flows through the gas-sampling probe to the condensation trap.
2. Then the gas passes through a particle filter where dust particles are removed.
3. Then the gas enters the sensor chamber.

### *Gas temperature*

The gas temperature is measured by a thermocouple located at the tip of the gas-sampling probe.

### *Sensors*

Each sensor (O<sub>2</sub>, NO, NO<sub>2</sub>, SO<sub>2</sub> electrochemical sensors / CO<sub>2</sub>, CO, HC infrared sensors) measures the concentration of a specific gas.

The sensors can be damaged

- if exposed to small particles - **never measure without a dust filter**
- if water / condensation comes in contact with the sensors - **empty condensation trap**

### *Service / Calibration*

A “Service” message will be displayed after 1000 hours or after one year of operating time. IMR® Environmental Equipment, Inc. recommends checking the calibration once a year.

### *Operating Temperature*

50°F..104°F / 10°C..40°C

If the unit is brought in from the cold, then it should be allowed to warm up for a few minutes.

## **Storage Procedures: IMPORTANT!**

### *Storage Temperature*

-4°F..122°F / -2°C..50°C

When not in use or in storage, please make sure to keep the analyzer plugged into a wall outlet (AC).

This ensures that the analyzer maintains a constant battery charge and function properly if needed.

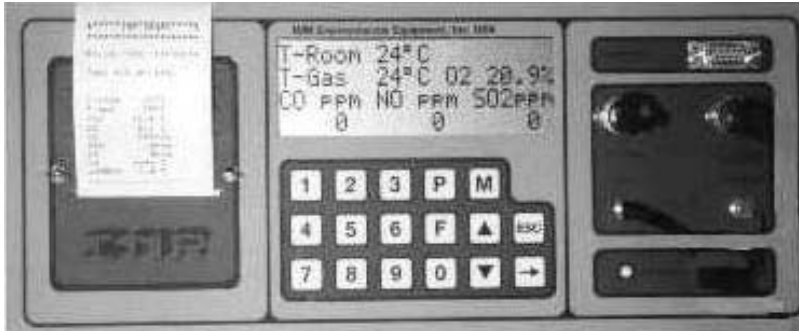
Prolonged periods of disuse without charging the battery may result in a weak battery and the battery can lose its ability to hold the charge.

## 2 SYSTEM DESCRIPTION

### 2.1 OVERVIEW

Please check now if the unit is equipped with all the ordered features and accessories.

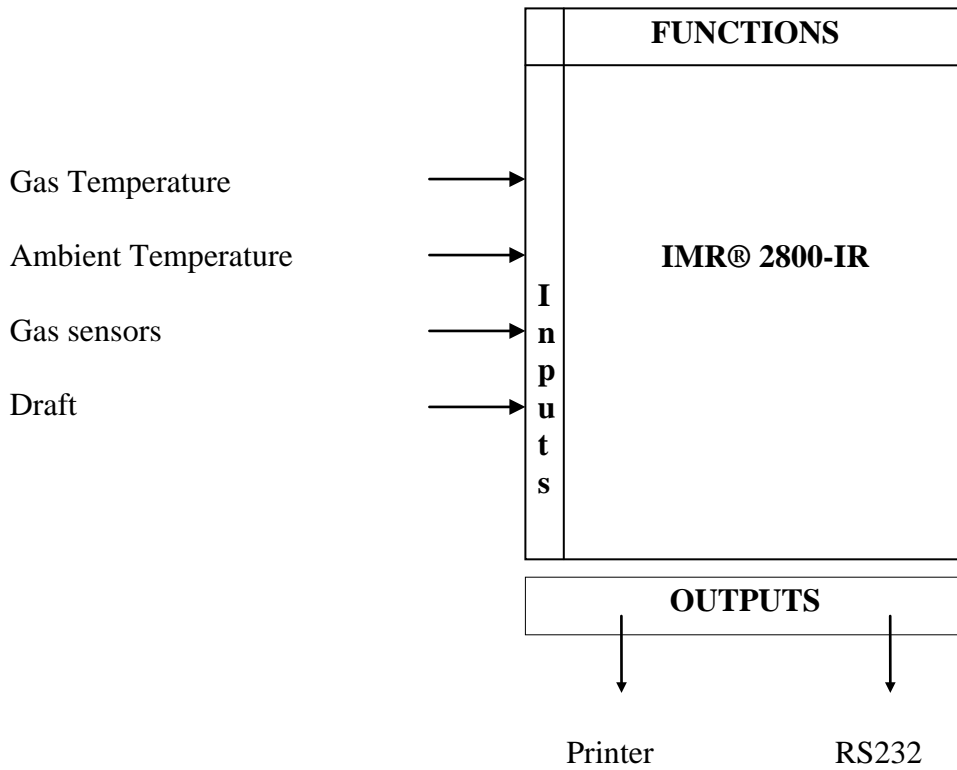
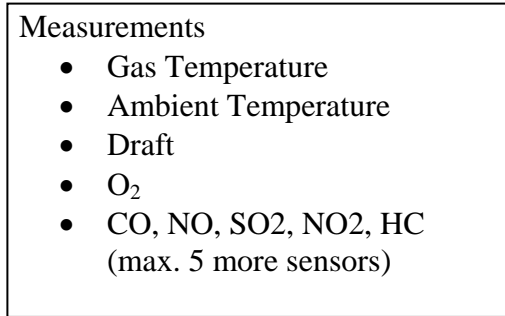
IMR® 2800



Features and Accessories (if equipped):

- Backlit LCD
- Keypad
- Gas sampling probe
- Ambient temperature probe
- Thermal printer
- RS232 interface
- Rechargeable battery
- Draft measurement
- Memory
- O2 sensor
- CO sensor
- NO sensor
- NO2 sensor
- SO2 sensor
- HC sensor
- Aluminum case
- Manual
- Power Cord
- Calibration certificate

## 2.2 FUNCTION OVERVIEW



## 2.3 TECHNICAL DATA - STANDARD RANGES

Other measurement ranges and probe lengths are optional available.

Table 2: Technical Data

<b>PARAMETER</b>	<b>PRINCIPLE</b>	<b>RESOLUTION</b>	<b>ACCURACY</b>	<b>RANGE</b>
<b>O<sub>2</sub> Oxygen</b>	Electro-chemical cell	0.1 Vol. %	± 0.2 %	0-25 Vol. %
<b>CO<sub>2</sub> Carbon dioxide</b>	IR-sensor	0.01 %	± 4% rel.	0-10 %
<b>CO Carbon monoxide</b>	IR-sensor	0.01 %	± 4% rel.	0-10 %
<b>NO Nitric oxide</b>	Electro-chemical cell	1 ppm	± 4% rel.	0-5000 ppm
<b>NO<sub>2</sub> Nitric dioxide</b>	Electro-chemical cell	1 ppm	Z	0-100 ppm
<b>SO<sub>2</sub> Sulfur dioxide</b>	Electro-chemical cell	1 ppm	Z	0-4000 ppm
<b>HC Hydrocarbons</b>	IR-Sensor	1 ppm	± 2% of range	0-30000 ppm
<b>TG Flue gas temperature</b>	NiCr-Ni Thermocouple	1K	± 2 %	-4°F / 2192°F -20°C / 1200°C
<b>TA Air temperature</b>	Semiconductor	1K	± 0.5 K	-4°F / 248°F -20°C / 120°C
<b>P Draft</b>	Solid state	0.004" H <sub>2</sub> O 0.01 hPa	± 2 %	± 8" H <sub>2</sub> O ± 20hPa

Other measurement ranges are available upon request

Max. 6 gas sensors

Z: 0 - 20% of full scale: 1% of full scale

20 - 100% of full scale: 5% of reading

<i>Power Inlet</i>	110VAC/60Hz or 230VAC/50Hz
<i>Display</i>	4-line, 20-character illuminated LCD
<i>Printer</i>	Thermal printer - paper width 58mm - built-in
<i>Gas sampling probe</i>	Type E, probe length 9.8" / 250mm, hose 8.2' / 2.5m
<i>Ambient air probe</i>	Ambient air temperature plug
<i>Condensation Trap</i>	Inline with integrated filter
<i>Filter</i>	In-line - four micron - washable
<i>Case</i>	Rugged wood/aluminum case
<i>Operating temperature</i>	50°F..104°F / 10°C..40°C
<i>Storing temperature</i>	-4°F..122°F / -2°C..50°C
<i>Calibration</i>	Automatic 5-minute zero calibration

## 2.4 SYSTEM CONNECTIONS

### 2.4.1 Probe

The gas-sampling probe plug and hose has to be connected to the analyzer before it can be turned on and must stay connected during the whole measurement.

If the gas-sampling probe is not connected, then the analyzer cannot perform an accurate calibration and an error message will be displayed.

#### *Type E*

The probe E has one hose for the flue gas measurement and the draft measurement.

It also has a connection line to connect the thermocouple with the analyzer.

- a) Thermocouple                   - Connect the thermocouple plug (5-pos) with the 'flue gas temp' socket of the analyzer
  
- b) Flue gas                         - Connect the hose to the barbed fitting 'gas input'

The hose must be connected to the 'gas input' fitting for the flue gas measurement.

The hose must be connected to the 'draft' fitting only for the draft measurement and it must be connected back to the 'gas input' fitting after the draft measurement is completed.

### 2.4.2 Ambient air temperature plug

The ambient air temperature plug must be connected to the instrument at all time.

If the ambient air temperature plug is not connected, then the unit shows an error message.

The ambient air temperature plug measures the temperature of the air that is used for the combustion process.

The measured temperature is needed for various calculations.

Connect the plug (4-pos) with the 'air temp' socket of the analyzer.

### 2.4.3 Gas fitting

The gas hose of the gas-sampling probe must be connected to the gas fitting. Make sure that the tubing for the sensors is connected to the gas outlet fitting.

### 2.4.4 Draft fitting

The draft hose of the gas-sampling probe must be connected to the draft fitting.

### 2.4.5 LED

The LED shows the power status of the unit.

GREEN: AC connected and turned off (charging the battery)

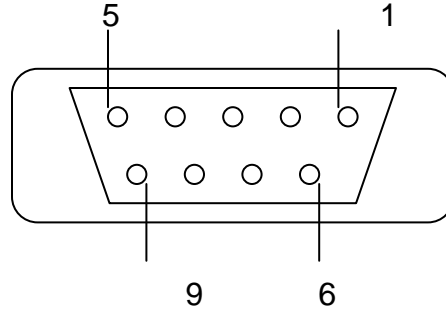
YELLOW: AC connected and turned on

### 2.4.7 RS232 interface

The RS232 serial interface can be used to transfer data from the analyzer to a PC. Real time data or stored data can be transferred (ASCII signs are getting transferred). The serial connection to a PC must be a 'Null-modem connection'. The **IMR® 2800-IR** has a 9-pos. female D-Sub connector on the front panel.

RS232 female connector 9-pos.

- 1-
- 2-
- 3- TXD transmit data
- 4-
- 5- GND ground
- 6-
- 7-
- 8- CTS clear to send
- 9-



Connection to a PC (null-modem connection):

IMR® 2800	PC 9-pos	PC 25-pos
3 TXD	2 RXD	3 RXD
5 GND	5 GND	7 GND
8 CTS	7 RTS	4 RTS

#### Serial data format

A character has 8 data bits; no parity and 2 stop bits.

ASCII "Computer" format:

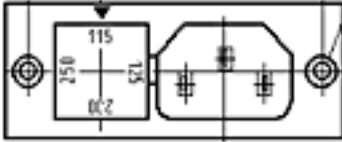
```

Start (→)
Station
Units (ppm, etc.)
Date
Time
No. of samples
Time of samples
Room Temperature
O2
HC
CO
CO2
NO2
NO
Draft
Gas Temperature
Stop (←)
    
```

## 2.5 POWER

The **IMR® 2800-IR** works either on 230VAC/50Hz or 110VAC/60Hz.

A fuse selector next to the AC inlet sets the voltage.

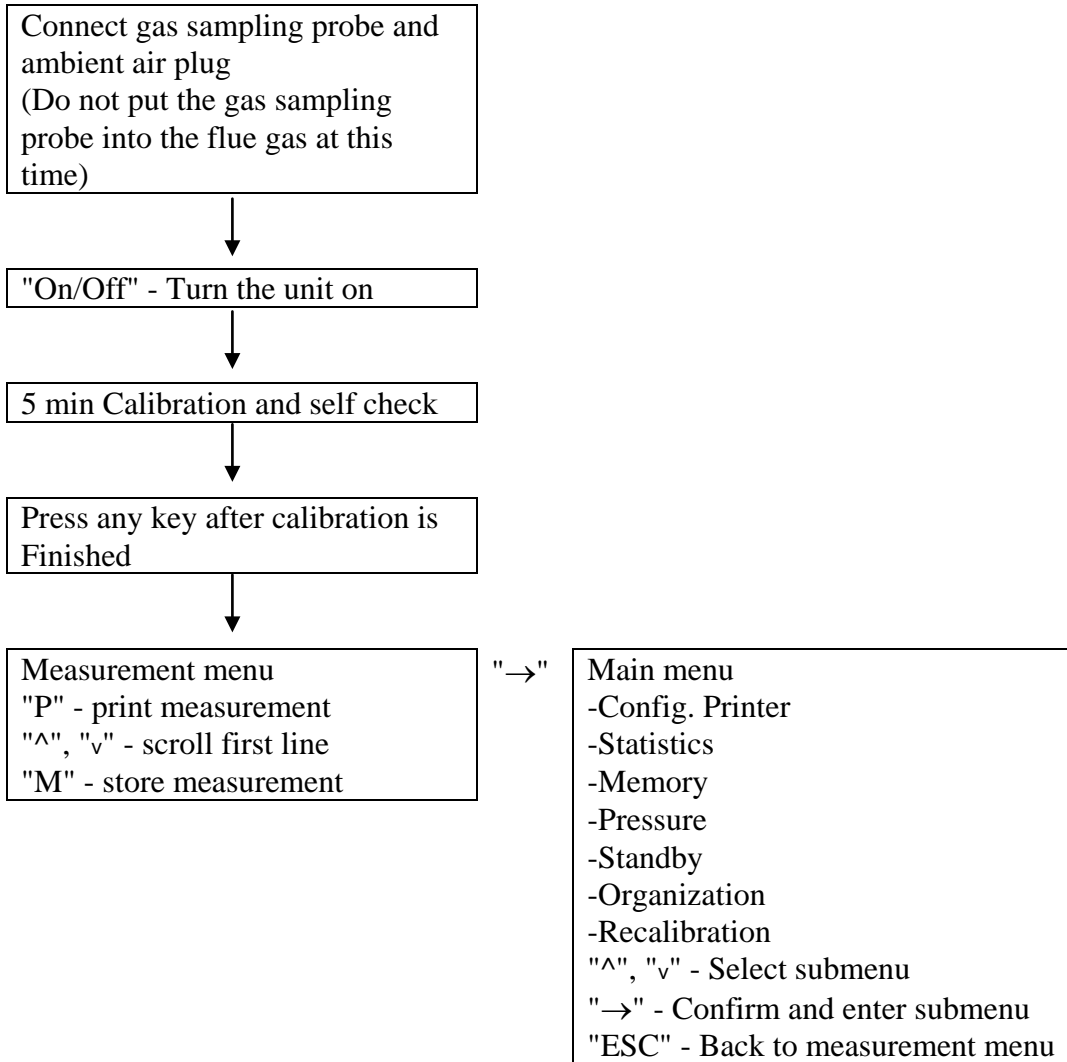


## 2.6 BUTTON FUNCTIONS

- "0" - "9" - Numeric buttons for numbers
- "P" - Prints a measurement  
"measurement menu" - complete measurement  
submenu "pressure" - draft measurement
- "M" - Stores a measurement
- "F" - Feed
- "^" - Scroll up
- "v" - Scroll down
- "ESC" - Back to the measurement menu
- "→" - Enter / confirm

### 3 OPERATION

#### 3.1 OVERVIEW



### 3.2 TURNING ON

Make sure to connect the gas sampling probe and the ambient air temperature plug to the analyzer and do not insert the gas-sampling probe into the flue gas.

IMR 2800P  
FLUE GAS  
ANALYZING COMPUTER

Turn the "On/Off" - button to "On" and the unit starts with the zero calibration.

IMR 2800P  
Calibration 2:00 PM

294 seconds

The zero calibration takes 300 seconds and the unit is checking all sensors and sets all the values to its zero point.

IMR 2800P  
Calibration done.

Press any key

Press any key after the calibration is finished.

### 3.3 MEASUREMENT MENU

#### *Measurement*

- Put the gas sampling probe into the flue gas.
- The sensors need approximately 2 minutes for an accurate and stable reading.

The measurement menu shows all measured and calculated parameters as well as the fuel type.

O2 0.0%	TG 27 C
CO 0.0%	TA 27 C
NO 0 ppm	NO2 0ppm
CO2 0.0%	HC 0ppm

The first line shows these different values:  
CO<sub>2</sub>, T-room, losses, excess air, fuel type

#### Active buttons

Store measurement	M	Print measurement	P
Enter main menu	→	Line feed	F

### 3.3.1 Main menu

Press the "→" button in the measurement menu to enter the main menu.

The main menu sets date, time and much more.

→ Config. Printer
Statistics
Memory 45

The arrow selector has to be in front of the submenu by using the "^" and "v" button.

Enter the submenu by pressing the "→" button.

4 submenus are shown on the LCD. To see other submenus scroll with the "^" and "v" button.

#### Active buttons

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	v	Line feed	F
Enter submenu	→		

#### Main Menu

<b>Config. Printer</b>	Set printout intervals
<b>Statistics</b>	Start statistics for calculation of mean value and standard deviation
<b>Memory</b>	Print memory
<b>Pressure</b>	Start draft measurement
<b>Standby</b>	Standby mode
<b>Organization</b>	Date/time, configuration of the analyzer, interface
<b>New calibration</b>	Start new calibration

### 3.3.2 Store a measurement

Press the "M" button to store the current measurement.

Each stored measurement consists of date, time and all measured and calculated parameters.

The **IMR® 2800-IR** can store up to 50 measurements.

#### *Memory status*

The memory status is located in the main menu behind the submenu "memory".

→ Config. Printer
Statistics
Memory 44

Memory status = 44

The analyzer can store 44 more measurements.

⇒ 1 measurement is already stored

See the description of the submenu "memory" on how to select and print the stored data.

### 3.3.3 Printout

The **IMR® 2800-IR** is equipped with a built-in thermal printer. The paper width is 58mm.

**Important:**

- Use only original **IMR®** thermal paper.
- Make sure that the thermal side of the paper is on the correct side.  
The printer prints only on the thermal side.

Press the "P" button to print the current measurement.

```

*****
*      IMR 2800P      *
*****
09/16/1999  01:31PM

T-Room      75°F
T-Gas       75°F
CO2         0.00%
O2          20.9%
HC          0p
CO          0.00%
NO          0p
NO2         0p

```

#### *Change paper*

Unscrew the two thumbscrews and remove the printer cover from the front panel. Take the old paper roll out and put the new roll in. Make sure the thermal side is on the correct side. Close the cover and fasten the two thumbscrews.

### 3.3.4 Feed

Press "F" to do a line feed.

### 3.4 SUBMENUS OF THE MAIN MENU

<b>Config. Printer</b>	Set printout intervals
<b>Statistics</b>	Start statistics for calculation of mean value and standard deviation
<b>Memory</b>	Print memory
<b>Pressure</b>	Start draft measurement
<b>Standby</b>	Standby mode
<b>Organization</b>	Date/time, configuration of the analyzer, interface
<b>New calibration</b>	Start new calibration

**Active buttons**

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	∨	Line feed	F
Enter submenu	→		

→ Config. Printer	
Statistics	←
Memory 50	

"←" - indicator :  
Indicates an active submenu (e.g. statistics is running)

A submenu can only be entered from the main menu.  
Select the submenu and then press "→" button to enter the submenu.

### 3.4.1 Config. printer

This menu sets print intervals and prints the memory.

```

== Config. Printer ==
->Printer off
  Print protocol
  Print memory
    
```

Move the arrow selector up or down ("^","v") to select a submenu.

Confirm the submenu by pressing the "→" button.

**Active buttons**

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	v	Confirm selection	→

**Printer off:**

Stops the interval printouts.

**Print protocol:**

Sets print intervals: one printout every x minutes

The print intervals can be set for a measurement printout or a statistics printout.

```

===Config. printer===
--- print protocol ---
Minutes/Output
15
    
```

The time between the printouts can be selected from 10 to 99 minutes by using the numeric keys.

Confirm the setting by pressing the "→" button

The first printout is after one minute and the following printouts are every x minutes.

```

Continuous output

Press any key
    
```

If statistics and RS 232 transfer are activated, then the print intervals cannot be started.

**Print memory:**

This submenu prints the last stored measurement.

```

Memory empty

Press any key
    
```

If there are no measurements stored, the display shows.

### 3.4.2 Statistics

The statistics menu starts, stops and prints the statistical measurement.

```

====Statistics====
→ Stop stat.
  Start stat.
  Print stat.
  
```

Move the arrow selector up or down ("^","v") to select a submenu.

Confirm the submenu by pressing the "→" button.

#### Active buttons

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	v	Confirm selection	→

Statistics calculates mean values and standard deviations of the measured and calculated parameters.

#### Calculation:

Mean value  $m = (\sum x) / n$

Standard deviation  $s = \sqrt{(1/(n-1) * \sum(x-m))}$

x = measured value

n = number of samples

#### Stop statistics:

Stops the statistics calculation.

#### Start statistics:

Starts calculation of mean value and standard deviation. A calculation is made every second.

If the statistics is running, then these submenus cannot be entered:

- Choice ppm/mg
- Select fuel
- Organization / Change fuel parameters
- Organization / Set date/time

**Print statistics:**  
Prints the statistics.

```
*****  
*       IMR 2000P       *  
*****  
09/16/1999  02:32pm  
  
# of samples    60  
  
Mean value Std. dev  
  
T-room    75°F    0  
T-gas     75°F    0  
CO2       0.00%  0.00  
O2        20.9%  0.0  
HC        0ppm    0  
CO2       0.00%  0.00  
NO        0p     0  
NO2       0p     0
```

Start stat.  
  
Press any key

If the statistic calculation is not running, then this message is displayed.

### 3.4.3 Memory

This menu deletes and prints the stored measurements.

If the analyzer is turned off, then all the stored values are deleted. Keep the unit in standby mode if the stored measurements are important and need to be printed later on.

```

====Memory====
->Clear memory
   Print memory
    
```

Move the arrow selector up or down ("^","v") to select a submenu.  
 Confirm the submenu by pressing the "→" button.

**Active buttons**

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	v	Confirm selection	→

**Clear memory:**

Deletes all the stored measurements.

**Print memory:**

Prints one stored measurement or all stored measurements.

```

====Memory====
---Print memory---
->sample all
    
```

Select all measurements or only one measurement by using the "^" and /or "v" button to select the measurement.  
 To print the selected number press the "→" button.

```

==== Memory ====
---Print memory ---
   Station    0
-> sample    1
    
```

Example: First stored measurement (from station 0) is selected.

```

Memory empty

Press any key
    
```

If the memory is empty, then this message appears.

### 3.4.4 Pressure

Starts the draft measurement.

The pump is turned off.

*Important (gas-sampling probe E)*

The draft hose of the gas-sampling probe has to be connected to the draft fitting.

```

====Pressure====
exchange pipe
Pressure  0.00 hPa
    
```

The draft measurement starts as soon as the hose is connected to the draft fitting.

**Active buttons**

Back to measurement menu	ESC
Back to measurement menu	→
Prints draft measurement	P

```

====Pressure====
Pressure -0.37 hPa
→Confirm
    
```

The draft measurement is on the LCD.  
 Press the "P" button to print the draft measurement.  
 Press the "→" button to return to the measurement menu.

```

16.09.1999  03:41:12pm
          Pressure  -0.042 hPa
-----
-
    
```

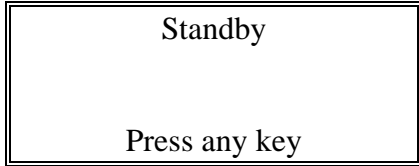
Draft printout

*Important (gas-sampling probe E):*

Remove the hose after the measurement from the draft fitting and put it back on the gas inlet fitting.

### 3.4.5 Standby

Standby mode conserves power by switching off the pump and the LCD. All activated modes will be stopped. The standby mode is used to save the stored measurements.



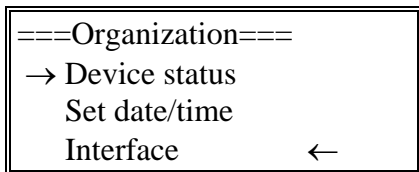
The LCD shows at the beginning of the mode this message. Later on it will turn off the LCD. Press any key to start the unit and stop the standby mode.

### 3.4.6 Organization

The submenu organization has different menus to set date, time, interface RS232 and check device status and much more.

#### Submenus

<b>Device status</b>	Checks operating hours and overflows
<b>Set date/time</b>	Sets date and time
<b>Interface</b>	Sets Baud Rate, continuous output, format
<b>Configuration</b>	Program version, sensor ranges
<b>Station</b>	Edit station numbers
<b>Select language</b>	English - German - French



Move the arrow selector up or down ("^","v") to select a submenu. Enter the submenu by pressing the "→" button. 3 submenus are shown on the LCD. To see the other submenus scroll with the "^" and "v" button.

#### Active buttons

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	v	Confirm selection	→

#### 3.4.6.1 Device status

The device status menu shows information about the operating hours of the unit as well as the overflows of the sensors.

*Overflow:* A measurement above the measuring range of a sensor is called 'overflow'. An overflow damages the sensor and it can decrease the lifetime of the sensor.

```

====Organization====
---Device status---
Lifetime (hours)
30.61
    
```

The operating hours are displayed in hours and hundredths of an hour.

Scroll to the overflow display of the various sensors by using the "^" and / or "v" button.

Press "ESC" to return to the measurement menu

```

====Organization====
---Device status---
Overflows
CO      2
    
```

Example: CO sensor was twice above its measuring range  
Scroll to the other sensors by using the "^" and / or "v" button.

### 3.4.6.2 Set date / time

This mode enables the user to set a new date and time.

USA:            12.00am - 12.00pm  
                  Month - Day - Year

European:      00.00 - 24.00  
                  Day - Month - Year

```

====Organization====
---Set date/time---
New date
08-16-99
    
```

Enter the new date by using the numeric buttons and confirm it by pressing the ""→" button.

```

==== Organization ====
---Set date/time---
New time:
05:32 PM
    
```

Enter the new time by using the numeric buttons and confirm it by pressing the ""→" button.

**Active buttons**

Numeric buttons	0-9	Back to measurement menu	ESC
Confirm	→		

```

Stop stat.

Press any key
    
```

The date and time cannot be changed if the statistics is active.

### 3.4.6.3 Interface

This mode sets all the parameters for the RS232 interface.

An **IMR®** Null-modem cable is needed for the data transfer to a PC.

*Important:*

All needed parameters must be set before a data transfer can be started.

Data can be transferred in only one format: decimal or formatted

<b>Continuous output</b>	Continuous serial data transfer
<b>Output once</b>	One measurement will be transferred
<b>Memory</b>	Memory will be transferred
<b>Decimal output</b>	Only ASCII signs will be transferred
<b>Formatted output</b>	Printout format will be transferred
<b>Set parameters</b>	Set Baud Rate
<b>Stop output</b>	Stops data transfer

```
==== Organization ====
---- Interface ----
-> Continuous output
    Output once
```

Move the arrow selector up or down ("^","v") to select a menu point.  
 Enter the menu point by pressing the "→" button.  
 To see the other menu points scroll with the "^" and "v" button.

**Active buttons**

Move arrow selector up	^	Back to measurement menu	ESC
Move arrow selector down	v	Confirm selection	→

**Continuous output:**

This mode starts a continuous serial data transfer from the **IMR® 2800-IR** to a PC.

```
====Organization====
---Interface---
Seconds/Output
    10
```

A measurement is transmitted every ten seconds.  
 Using the numeric buttons changes the interval setting.  
 Valid intervals: 1-255 seconds  
 Pressing the "→" button confirms the selection

```
==== Organization ====
----Interface----
Minutes/Output
    5
```

If the statistic is active, then a statistic measurement is transferred every five minutes.  
 Using the numeric buttons changes the interval settings.  
 Valid intervals: 1-255 minutes  
 Pressing the "→" button confirms the selection

Continuous output

Press any key

If the statistics and print intervals are active, then a continuous data transfer cannot be started.

**Output once:**

This mode transfers one measurement from the **IMR® 2800-IR** to a PC.

===Organization===  
 ---Interface---  
 Continuous output  
 →Output once

The current measurement or the current statistical measurement will be transmitted.

Pressing the "→" button confirms the transfer

**Memory:**

This mode transfers all stored measurements from the **IMR® 2800-IR** to a PC.

===Organization===  
 ---Interface---  
 Output once  
 →Memory 22

All the stored measurements will be transmitted.

Pressing the "→" button confirms the transfer

Memory empty

Press any key

If no measurement is stored, then the analyzer cannot transfer any stored data.

**Decimal output:**

A decimal output is a format where only ASCII signs (numbers) are sent to the PC.  
The sent numbers represent these parameters.

```

Start (→)
Station
Units (ppm, etc.)
Date
Time
No. of samples
Time of samples
Room Temperature
O2
HC
CO
CO2
NO2
NO
Draft
Gas Temperature
Stop (←)

```

If the data is needed for a spreadsheet or similar application (data processing), then this format is useful, because only the measured parameters are transferred and nothing else.

```

===Organization===
---Interface---PC
Memory 30
→Decimal output

```

Pressing the "→" button confirms the selection 'decimal output'.  
If the statistic is active, then only the mean values will be transferred.

**Formatted output:**

The formatted output sends the data as a printout to the PC.

```

===Organization===
---Interface---
Decimal output
→ Formatted output

```

Pressing the "→" button confirms the selection 'formatted output'.

**Set parameters:**

This mode sets the baud rate of the data transfer.

Baud rates: 1200 / 2400 / 4800 / 9600

```

===Organization===
---Set parameters---
9600 Baud
^ next → select

```

Pressing the "^" button changes the baud rate setting  
Pressing the "→" button confirms the setting

**Stop output:**

Stops the continuous output.

```

====Organization====
----Interface----
Set parameters
→ Stop output
    
```

Pressing the "→" button stops the continuous output

**3.4.6.4 Configuration**

The configuration mode informs about program version, calibration date, serial number and much more.

No values can be set in this mode. This mode is only for information.

*Important:*

If any questions regarding this analyzer occur and **IMR®** has to be contacted, then please have this information ready.

```

Program version
Calibration date
Serial number
O2 sensor type / range
CO sensor type / range
NO sensor type / range
NO2 sensor type / range
HC sensor type / range
CO2 sensor type / range
    
```

```

==== Organization ====
--- Configuration ---
2800V4    07/99
    
```

Scroll up or down ("^", "v") to view the different information. Press "ESC" to return to the measurement menu

**3.4.6.5 Station**

A station (measurement, plant, etc.) can be entered.

```

====Organization====
----Station----
Station  0
    
```

Station no.: 0 - 32767  
 The number will be printed on the measurement printout and / or transferred together with all other data via the RS232.  
 If the station is set at 0, then station no. will not appear on the printout or data transfer.

### 3.4.6.6 Select language (if equipped)

The language can be set either in English, German or French.

===Organization=== ----Select language---- → English German
--

Move the arrow selector up or down ("^","v") to select a language.

Confirm the change by pressing the "→" button.

2 languages are shown on the LCD. To see the other language scroll with the "^" and "v" button.

### 3.4.7 Recalibration

The analyzer turns off and starts a new calibration cycle of 3 minutes.

Make sure that the gas-sampling probe is out of the stack and in ambient atmosphere.

## 4 UNIT MAINTENANCE

- Make sure the dust filter is replaced when dirty.
- Empty the condensation trap after each measurement or if necessary during a measurement, and clean it regularly.
- Remove soot residues from the gas sampling probes.
- Store the unit with AC connected to the unit (different sensors need to have power applied to them at all times).

### IMPORTANT

- Connect the unit to the AC to make sure the battery remains charged.
- IMR® or an authorized dealer must check the analyzer once a year.

### SERVICE PRINTOUT

If there is a problem with the analyzer, then it is useful to make a service printout. The service printout contains information about the sensors.

**IMR® recommends printing and then faxing the printout to IMR® if any questions or problems occur with the analyzer.**

Press following combination from the main menu: 8 8 0 → →

The printer starts printing this protocol:

XXXXXXXXX			
2800V4		07/99	
08/16/1999		04:32PM	
T-Ni		-16	
T-Pt		-58	
Vcc		2506	
Tklemm		627	
Tint		590	
T-O2		553	
T-Room		478	
O2	3092	3045	3053
CO	-3	-3	0
CO2	-2	-1	-1
NO	-1	-2	1
Pr.Dr.	-12		
T-Room		75°F	
T-Gas		75°F	
O2		20.9 %	
CO		0ppm	
CO2		0ppm	
NO		0ppm	

## 5 ERROR MESSAGES

The **IMR® 2800-IR** has several functions to identify any problems with the unit. If an error occurs, then a message is displayed and the error should be cleared before the measurement can be continued.

### **xx-overflow**

If a gas concentration exceeds the measuring range or if the temperature is higher than the maximum allowable temperature, then the unit will show an overflow for the specific sensor. The gas-sampling probe must be removed immediately from the flue gas pipe and must remain in ambient air as long as it takes to get the values back to its zero points. The higher the concentration of the harmful substance, the longer it will take the sensor to return to the zero point.

### *IMPORTANT:*

**Do not turn the analyzer off, but remove the probe and purge the analyzer with fresh air.**

### **runtime error**

A runtime error is indicated when a calculation result is an indefinite result.

```
Error   a  b  
xxxxxx
```

The unit must be switched off and **IMR®** informed about the problem.

### **xxx-sensor: Service**

xxx is a specific sensor (e.g. O<sub>2</sub>).

The sensor could be damaged or the unit was not calibrated properly. Start a new calibration and let the unit run for some time. This purges the sensor and may dry the sensors, if they were exposed to water. Start a new calibration again.

### **Service 1000 h**

The unit has been operated for more than 1000 hours or longer than one year, without being checked by **IMR®** or an authorized dealer.

### **T-Gas-sensor ???**

The gas-sampling probe is either not connected or has a defective thermocouple. Check the connection.

### **T-Room-sensor ???**

The ambient air temperature plug is either not connected or has a defective component. Check the connection.

**Recharge battery**

The battery voltage is lower than 10.8 V.

The unit can operate on battery for approx. 20 more minutes.

Finish the measurement and charge the battery. If possible continue the measurement with the unit connected to the AC.

**Battery empty**

The battery voltage is below 10 V. This message will be printed and displayed.

The analyzer cannot be used at this point and will turn off automatically.

Connect the unit to the AC and once the battery has a minimal charge it can be operated while connected to the AC.

**T-int < 6 °C / 43°F or T-O2 < 6 °C / 43°F**

The internal temperature is too low for proper use.

Let the unit run until it is warmed up and then start a new calibration.

**T-int > 50°C / 122°F or T-O2 > 50°C / 122°F**

The internal temperature is too high for proper use.

Let the analyzer cool down and then start a new calibration.

**xxx-sensor defect**

xxx is a temperature sensor (T-Ni, T-Pr, T-int, T-O2).

A temperature sensor is defect or it is not connected. Check the connection.

**Interface no CTS**

RS 232 interface is not connected or the data transfer was not done properly.

Check the connection between the **IMR® 2800-IR**, and the PC.

If an interval output has been activated, it will be automatically turned off.

**Memory full**

The memory spaces are full.

Erase some measurements to store additional measurements.

## **6 WARRANTY**

IMR® Environmental Equipment, Inc., 3634 Central Ave., St. Petersburg, FL, 33711, USA states the following:

IMR®, as manufacturer, hereby grants the following worldwide IMR® warranty for an IMR® analyzer purchased from an authorized dealer.

1. The IMR® warranty shall entitle every IMR® customer to demand a free replacement or repair of the defective parts from any IMR® dealer authorized for the respective IMR® unit.
2. The IMR® warranty shall be granted on the factory new unit and shall commence on the date of the delivery of the original IMR® unit to the customer. It shall last for a period of twelve months regardless of the type and the intensity of use and regardless of any change of owner, which may occur during this warranty period.
3. The IMR® warranty shall refer to absence of faults with respect to the state of the art nature of the sold unit in terms of material and finish. The warranty for all parts fitted during the twelve-month warranty period shall end with the unit warranty.
4. After the establishment of a material or production fault by IMR® or the authorized IMR® dealer, the faults will be eliminated by means of free repair or replacement. Replaced parts shall become the property of IMR®.
5. No warranty claims may be made for maintenance and setting work, cleaning or other utility materials required for the function of the unit and other wear parts unless they have a direct bearing on work performed under the warranty.
6. The terms and conditions for the acknowledgement of this warranty shall be the presentation of the fully completed warranty card, which must contain the confirmation from the authorized IMR® dealer on its delivery and, if applicable, the prescribed maintenance work.
7. The IMR® warranty shall only be applicable if
  - a. The analyzer has been maintained in accordance with the instructions issued by the manufacturers and the operating instructions by an authorized IMR® dealer.
  - b. Only original IMR® spare parts have been used for any repairs.
  - c. The unit has been used properly, the operating instructions observed and the unit has not been used for a purpose other than the one for which it has been designed.
  - d. The IMR® unit has been left in its original design and meets the original IMR® specifications.

- e. The fault is not due to external influences or use for a purpose other than the one for which it has been designed.
- f. Exclusively authorized IMR® dealers have made repairs to the IMR® unit.
- g. The IMR® unit has been sent to an authorized IMR® dealer immediately after the fault was discovered.

7. Warranty time for the analyzer, including electrochemical sensors is 12 months.

## 7 SPARE PARTS

Please specify model and serial number when ordering spare parts.

Other ranges are available upon request.

DESCRIPTION	PART-NO
Filter	72200
Pack of 10	72201
Filter for condensation trap	72550
Pack of 10	72551
Thermal paper w=58mm	71200
Soot filter paper	70350
Comparison scale	90300
Condensation trap	91101
O2-Sensor	O2-R1 470003
CO-Sensor	CO-GC-IR
NO-Sensor	NO-R1 480001
NO2-Sensor 0-100ppm	NO2-R1 480009
SO2-Sensor 0-4,000ppm	SO2-R1 480110
HC-Sensor	CH4-GC-IR
CO2-sensor	CO2-GC-IR
Ambient temp. probe, short	92400
Battery 12V, 4Ah	B*200001
Gas probe E, 250mm	94200
Printer, w=58mm	130-20/28-PR
Pump	5002

**8 IMR®**

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