700 GAS DIVIDER

OPERATORS' MANUAL

OPERATING MANUAL

SONIMIX 2106 GAS DIVIDER

Main menu
Mixture Generation
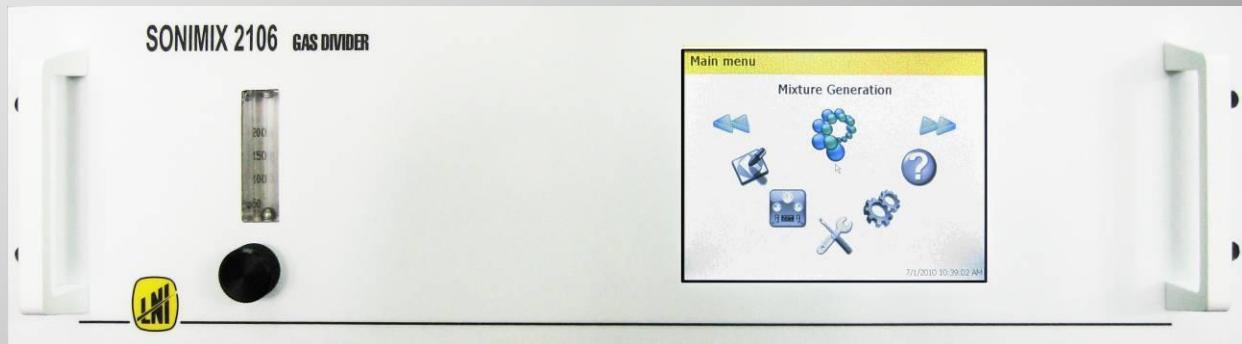
SONIMIX 2106-x-LCD

This Operating Manual is applicable for the following models :

- **SONIMIX 2106-16-LCD**
- **SONIMIX 2106-32-LCD**
- **SONIMIX 2106-64-LCD**
- **SONIMIX 2106-128-LCD**
- **SONIMIX 2106-256-LCD**
- **SONIMIX 2106-512-LCD**
- **SONIMIX 2106-1024-LCD**
- **SONIMIX 2106-10-LCD**
- **SONIMIX 2106-2x10-LCD**
- **SONIMIX 2106-3x10-LCD**

With or without the NOX Converter Tester Option

- **SONIMIX 2106-predivider-LCD**

Table of Contents

FORWORD

The SONIMX 2106-x-LCD represent a family of different models of Gas Dividers. The difference between the models are the numbers of dilution steps (from 16 to 1024 for the binary one and from 10 to 3x10 for the lin/log one) and the eventual built in Nox converter Tester option. This operating manual is valid for all models and will take care of all the options as compatibility with corrosive gases, additional inlets,… (even they are note installed in you specific device).

INTRODUCTION

The Gas Divider SONIMIX 2106-LCD is an easy to use programmable high precision mechanical binary reference gas mixer able to generate the " zero " and up to 1024 fixed steps of concentration with a **precision of the mixture better than 0.6% relative.**

Built in accordance with the ISO 6145/6 normalization, this instrument is equipped of pressure regulators and sonic nozzles. These components are essential and allow precision, stability, repeatability and homogeneity of the generated gas mixtures.

Due to its unique design, the Gas Divider generates a constant flow of mixture with following dilution points :

SONIMIX 2106-16-LCD	from 6% to 100% in 16 steps
SONIMIX 2106-32-LCD	from 3% to 100% in 32 steps
SONIMIX 2106-64-LCD	from 1.5% to 100% in 64 steps
SONIMIX 2106-128-LCD	from 1% to 100% in 128 steps
SONIMIX 2106-256-LCD	from 0.5% to 100% in 256 steps
SONIMIX 2106-512-LCD	from 0.2% to 100% in 512 steps
SONIMIX 2106-1024-LCD	from 0.1% to 100% in 1024 steps
SONIMIX 2106-10-LCD	from 10% to 100% in 10 steps
SONIMIX 2106-2x10-LCD	from 1% to 10% in 10 steps + from 10% to 100% in 10 steps
SONIMIX 2106-3x10-LCD	from 0.1% to 1% in 10 steps + from 1% to 10% in 10 steps + from 10% to 100% in 10 steps

The control of all command functions of the gas divider can be done trough an touch screen LCD interface or through the RS 232 remote command. On remote mode, the standard communication protocol is in accordance with the "Arbeitskreis der Deutschen Automobil-Industrie" recommendations.   In addition, the SONIMIX 2106 is equipped with an ETHERNET interface and with an USB capabilities.

A flow-meter on the front face allows a constant visualization of the flow generated and can be selected manually by the end-user.

The major applications of the Gas Divider are:

    * calibration of analysers
    * verification of the analyser's linearity
     * simulation of special atmospheres
    * mixture generation for chemical pilot installations
     * …

Gas Alimentation

  Diluted line
                                    Pure or premixed dry gases such as CO, CO2, NO, SO2
Or low concentrated < 500 ppm corrosive gases :
HCl, NH3, H2S, NO2,…in AIR or N2
If the compatibility of corrosive gases is installed, the
concentration of the corrosive gas cylinders concentration can
go up to 10%.
In this case corrosive gases should be dry and purges should be
done correctly.

  Carrier Line   Dry AIR and N2 from a cylinder or a LNS Zero Air Generator

Dilution Range

  Mono Range :
                                      10 steps (SONIMIX 2106-10) (1 step every 10%)
16 steps (SONIMIX 2106-16) (1 step every 6.6%)
 64 steps (SONIMIX 2106-64) (1 step every 0.5%)
128 steps (SONIMIX 2106-128) (1 step every 1%)
1024 steps (SONIMIX 2106-1024) (1 step every 0.1%)

  Multi Range :   **2 ranges of 10 points** (0, 1%,2%,…10% + 10%, 20%,…100%)
SONIMIX 2106-2x10
3 ranges of 10 points (0, 0.1%, 0.2%,…1% + 1%,2%,…10% +
10%, 20%,…100%) SONIMIX 2106-3x10

Total flow   2500 Nml/min of mixture as standard (N2 equivalent)
5000 NmL/min as option, other flow upon request
adjustable by the by-pass valve and visualised by the flow-
meter

Accuracy of the concentration   **Better than +/-0.5% relative**
Repeatability   **Better than +/-0.2% relative**
Influence of external parameters effects of temperature changes from –5 to 35°C, and
atmospheric pressure variations from 800 to 1200 mbar
included in the repeatability.

Stabilisation time   **< 20 seconds**
Calibration   by volumetric means, traceable to most National Standards
Possibility to have an ISO 17025 Calibration certificate
Inlet pressure   from 2.7 to 3.3 bar relative
Pressure of the mixture   vacuum to 1 bar rel

Alarms   Monitoring of the alimenting and mixture pressures
Setting and communication Modes local or remote
* **local** with LCD display   LCD display with touch screen
* **remote** by standard interface **RS-232**,
1200 to 9600 bauds, other parameters 100% adjustable
standard
communication protocol : AK
ETHERNET
USB

Voltage and Power consumption 50W 230VAC/50Hz or 60Hz ; 50W 117VAC/60Hz
Fittings   Swagelok 1/4" or 6mm, 316L < 10-7 mbar l/s,
Tightness   < 10-7, verified by He detection

Casing and Net weight	19" 3HE/84 TE , 500mm deep / 10 to 20 Kg depending on model
Nox Converter Tester Option :	
Diluted Line	NO cylinder of 1000, 100 or 50 ppm (depending of the model) mixed with N2
Carrier Line	Air or Oxygen
Range	5 to 50 ppm NO2 **or**
	25 to 100 ppm NO2 **or**
	300 to 1000 ppm NO2
Total flow	2200 Nml/min
Dilution of the NO cylinder	90%
Communication Mode	RS 232 /Ethernet / LCD display (all common with the gas divider)
Inlet pressure	from 2.7 to 3.3 bar relative
Pressure of the mixture	vacuum to 1 bar rel
Additional weight	5 Kg
Casing	Integrated in the gas divider casing

THE MOST COMMON OPTIONS

The most common options are :

Compatibility with corrosive gases
4 additional inlets (maximum 3 set per devices)
RS 232 remote command
NOx converter tester
GasCal Software
ISO 17025 Calibration certificate

(note the every device is delivered at least with a standard volumetric calibration)

PRESENTATION OF THE DEVICE

FRONT VIEW

The Front Panel consist of a touch screen LCD display and a flow meter.

The LCD display is used to enter all the requested parameter (type of gas, concentration of cylinder, …) and to generate gases.

The flow meter is used to select flow rate at the outlet of the SONIMIX. The rest of the flow rate will go to the by-pass.

Gas Divider only

Flow meter

LCD touch screen display
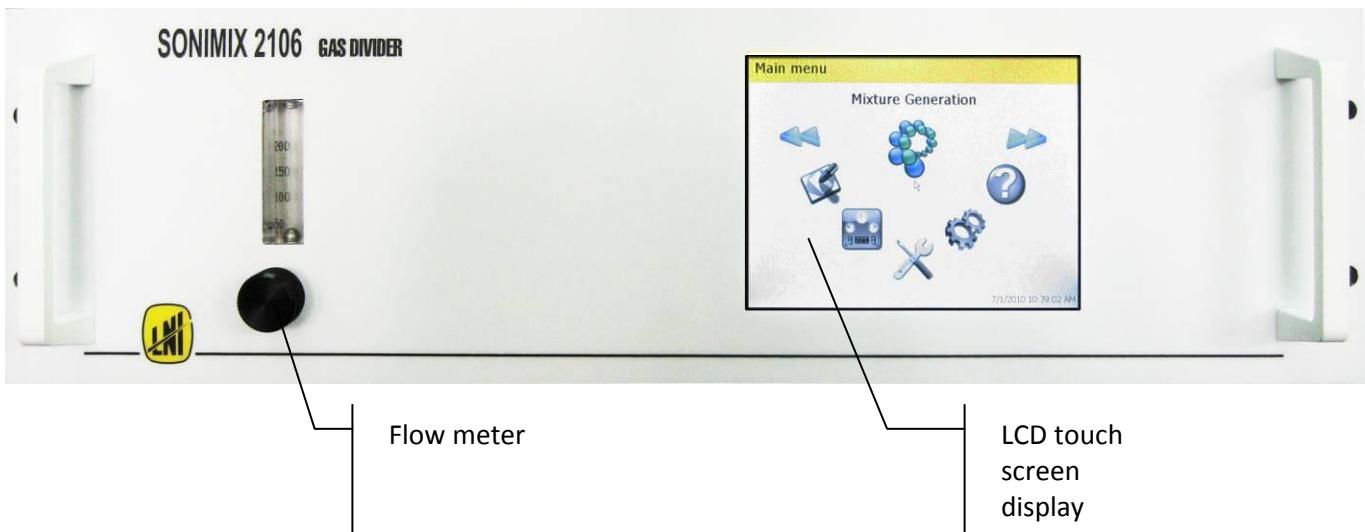
Gas Divider with Nox converter Tester option

Nox excess flow metre
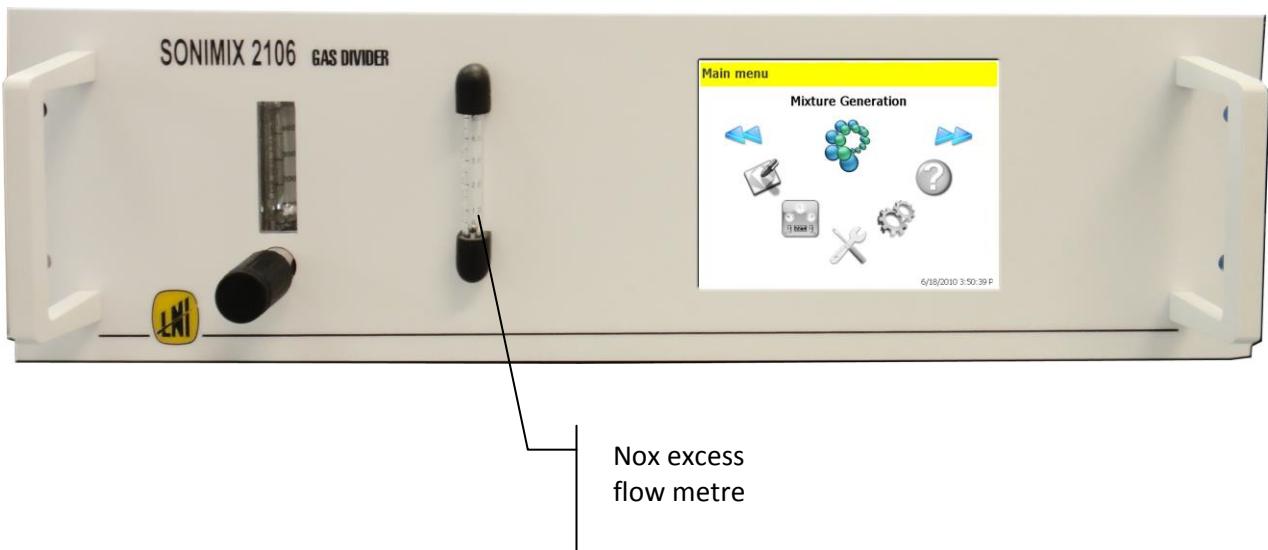
The back panel consist of the fluidics inlets and outlets, the communications connectors (Ethernet, USB and RS 232) and the power line. The first picture show the most simple device (no options)
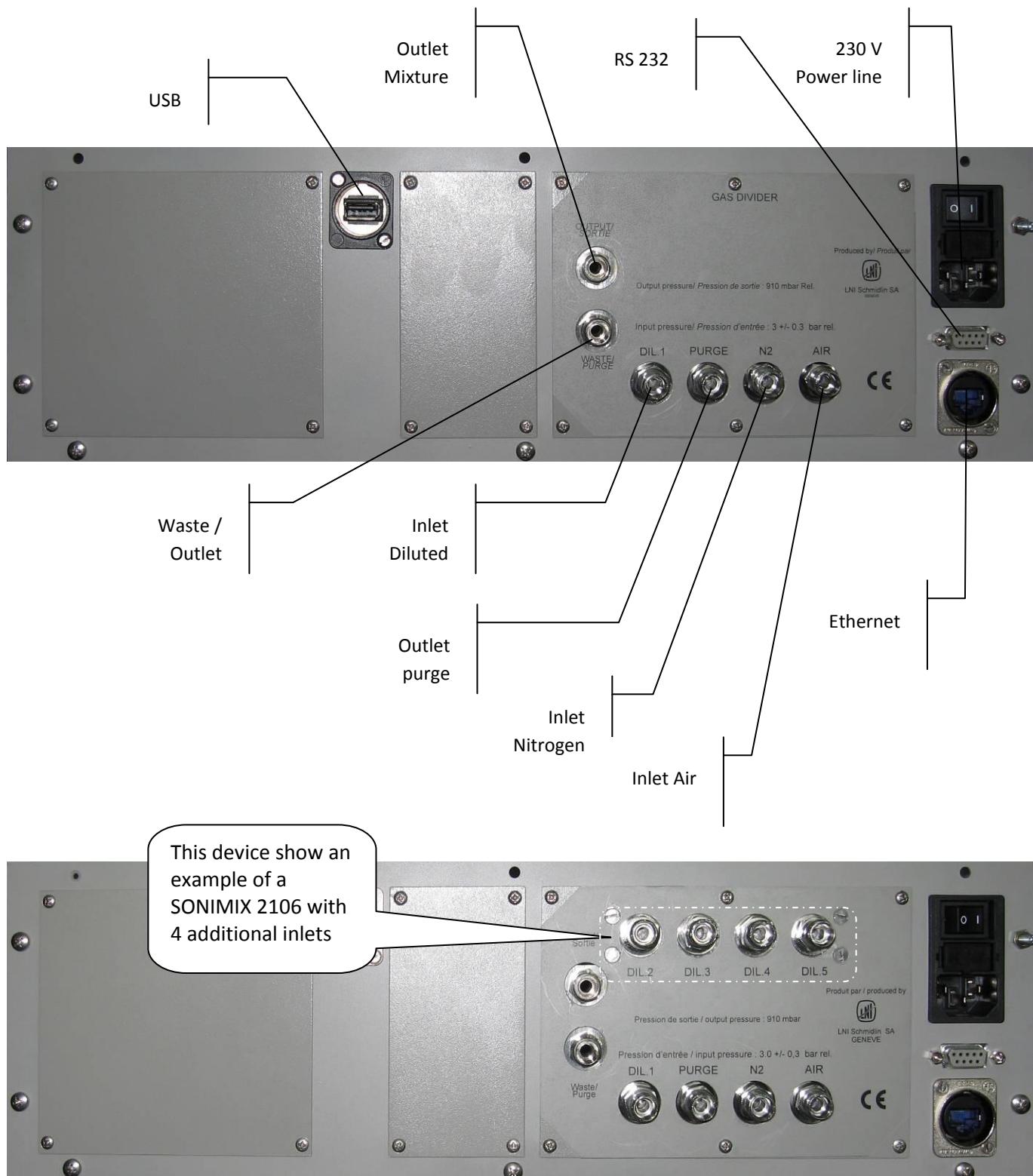
Back view with a model with NOX converter tester :

Nox converter tester Inlets and outlets

Output pressure / Pression de sortie : 910 mbar rel.

BYPASS   OUTPUT

Input pressure / pression d'entrée : 3.0 +/- 0.3 bar rel.

NO   Air

Output/Sortie

DIL.2   DIL.3   DIL.4   DIL.5

Pression de sortie / output pressure : 910 mbar

Waste/Purge

Pression d'entrée / input pressure : 3.0 +/- 0,3 bar rel.

DIL.1   PURGE   N2   AIR

Produit par / produced by

LNI Schmidlin SA
GENEVE

CE

Inlet NO

Inlet Air

Outlet purge

Outlet NO/Air or NO2Nitrogen
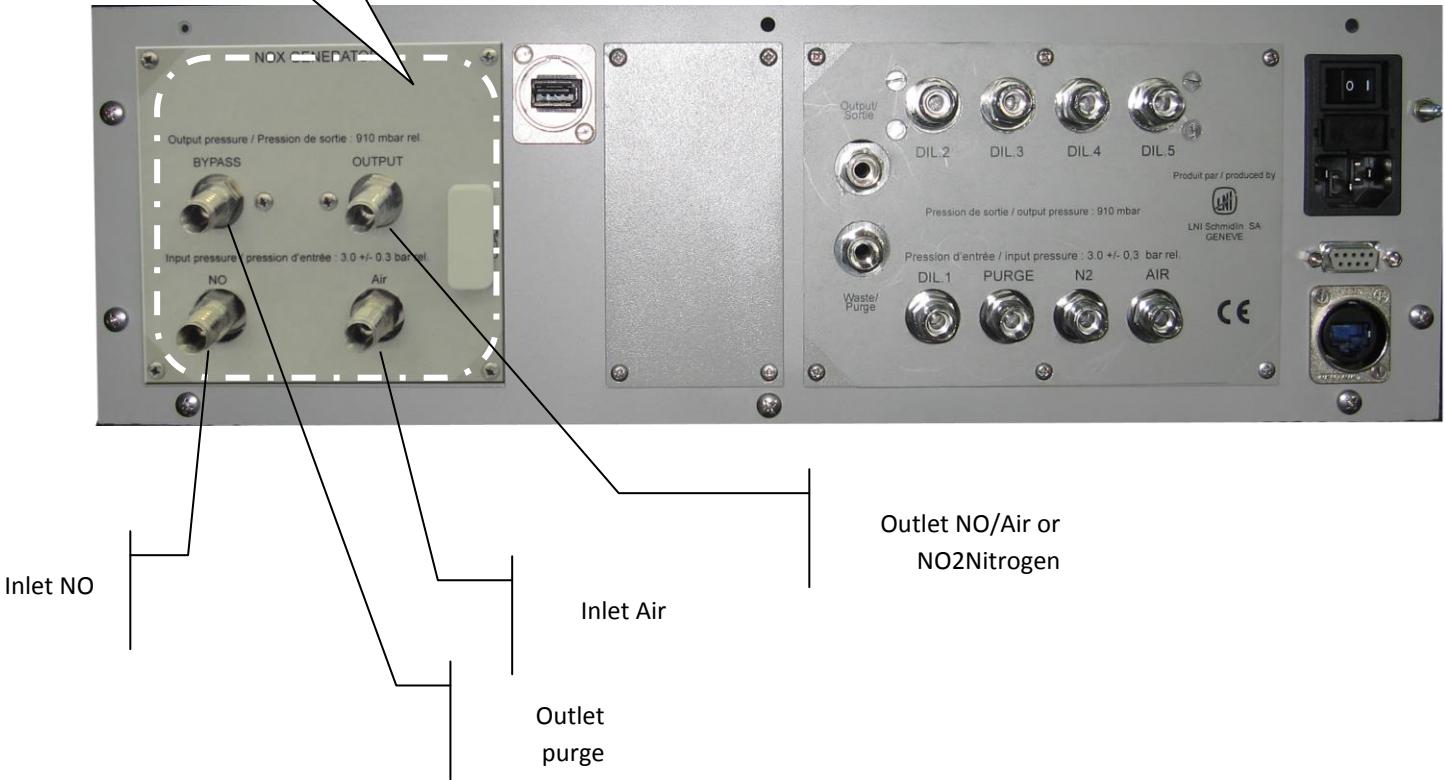
Top View of a SONIMIX 2106-32-LCD with 5 Sonic Nozzles
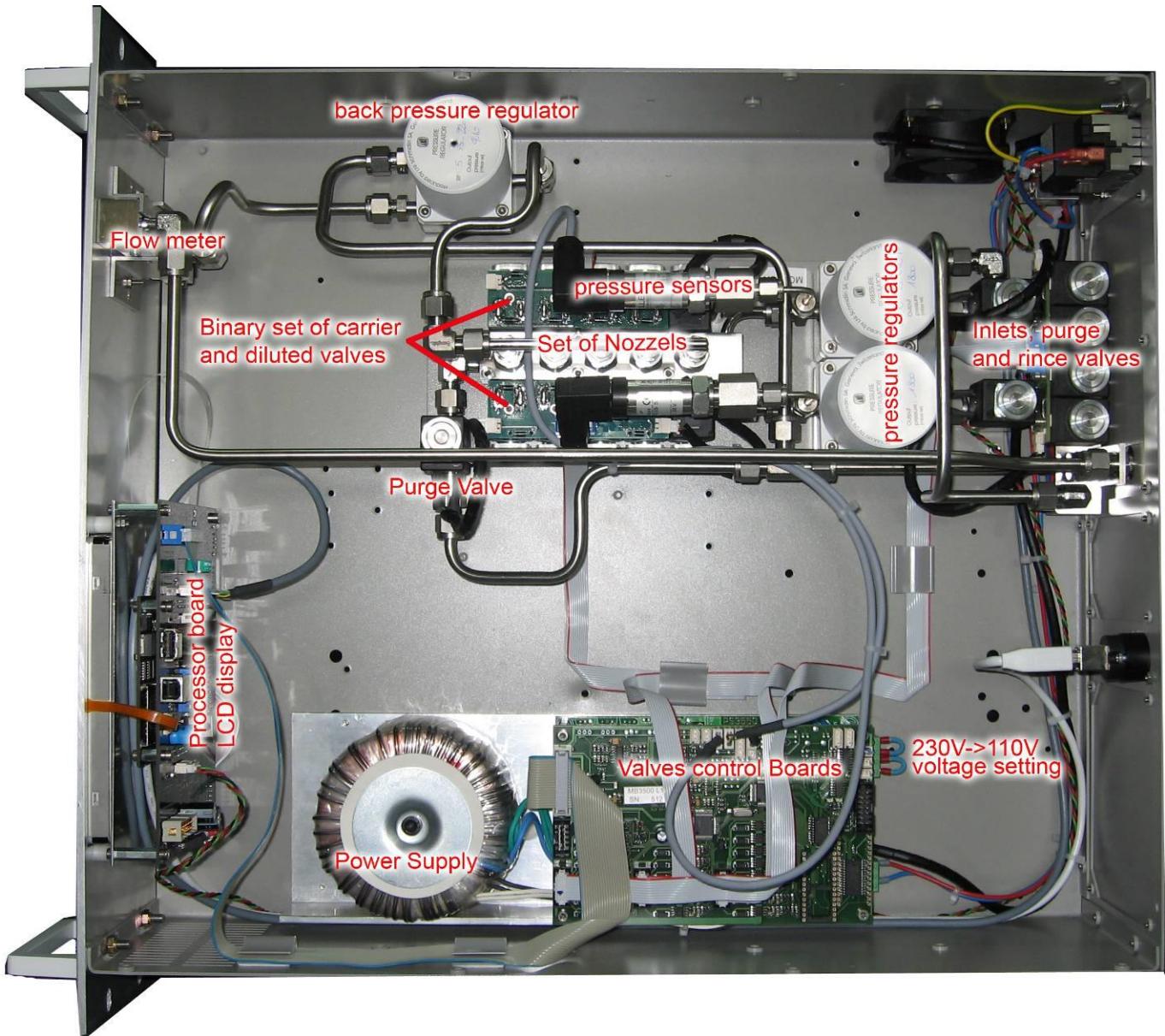
In this case, the model is the SONIMIX 2106-1024 (with 10 sonic Nozzles) and 4 additional inlets. The differences with the previous model are the number of nozzles, number of control board valves and the 4 additional inlets.
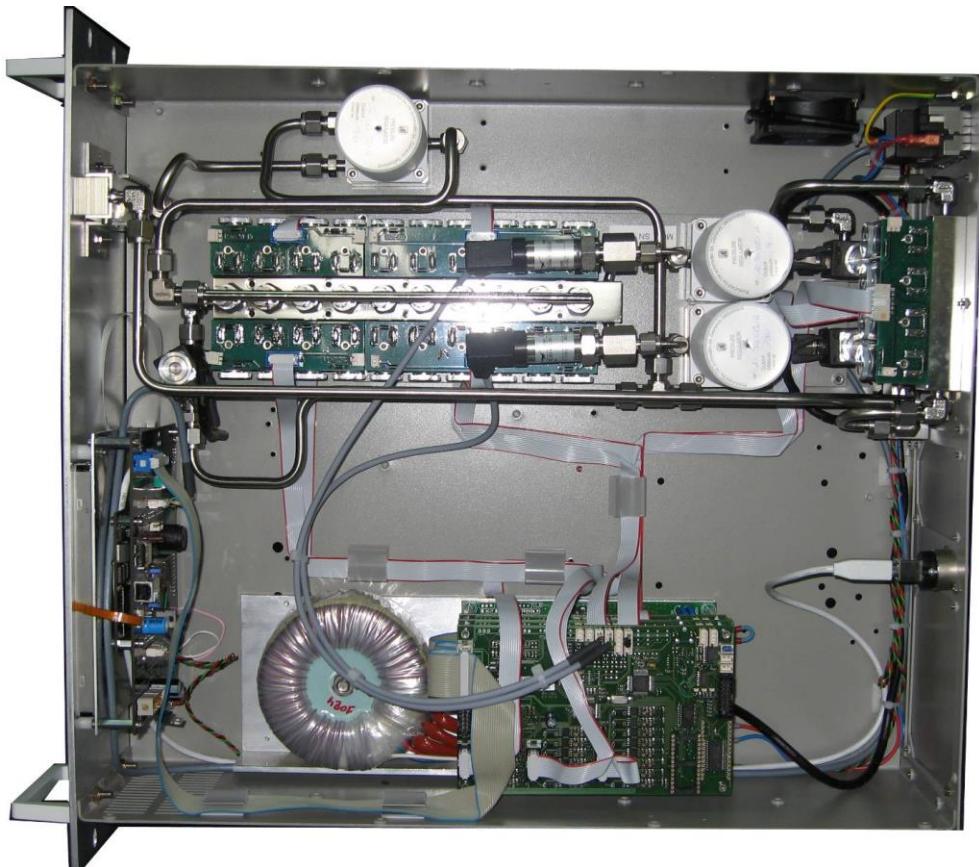

Top view including a NOx converter tester :
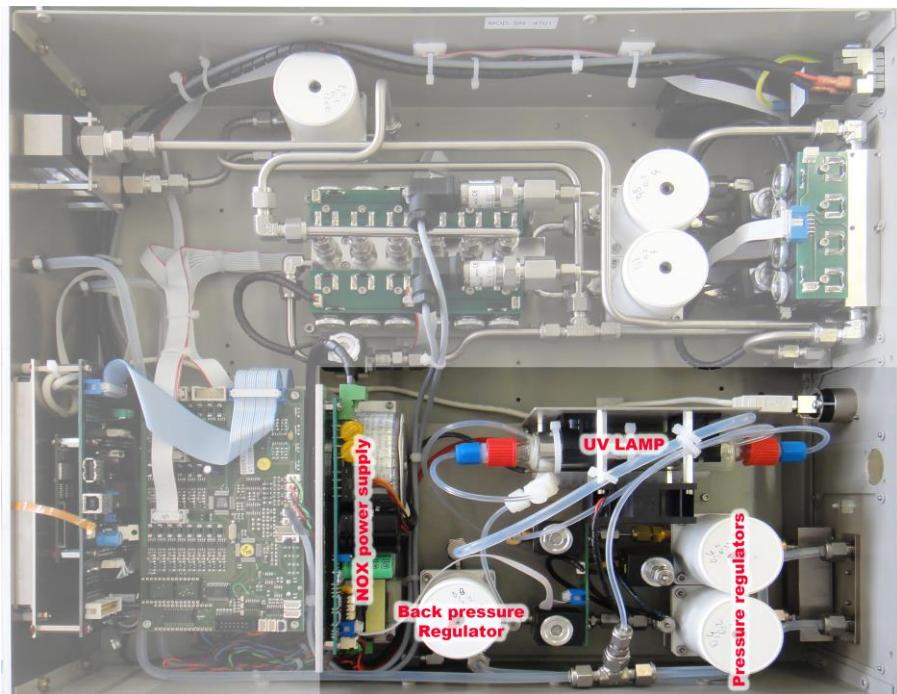
DIMENTIONS :
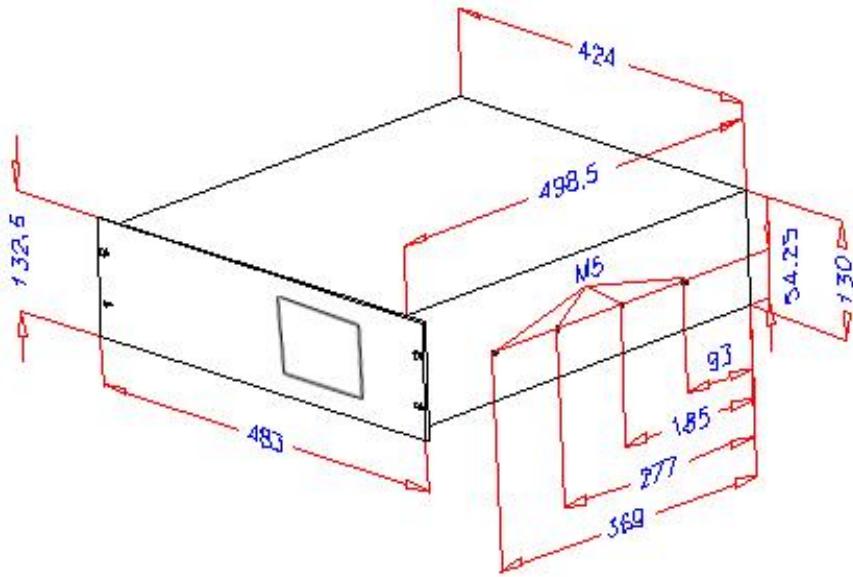
TRANSPORT AND STORAGE CONDITIONS

Temperature	Minimum –10°C, maximum +45°C
Humidity	Inferior to 90%Rh, non condensing
Chocks and vibrations during transport	Chocks < 1g; vibrations < 0.2g / 5Hz
Instrument's position	Horizontal

The above mentioned values are considered for an instrument transported in its original new packing.

Recommendations for the transport

When the instrument is shipped back to the factory for recalibration or repair, the gas divider + Nox should be packed in its original packing with the inlets and outlets protected against any accidental penetration of dust or particles of the package.

FUNCTIONING CONDITIONS

Operating temperature	Minimum +15°C, maximum +40°C
Humidity	Inferior to 80%Rh, non condensing
Atmospheric pressure	From 850 to 1150 hP
External vibrations	Inferior to 0.05g / 25Hz
Instrument's position	Horizontal

SCHEMES
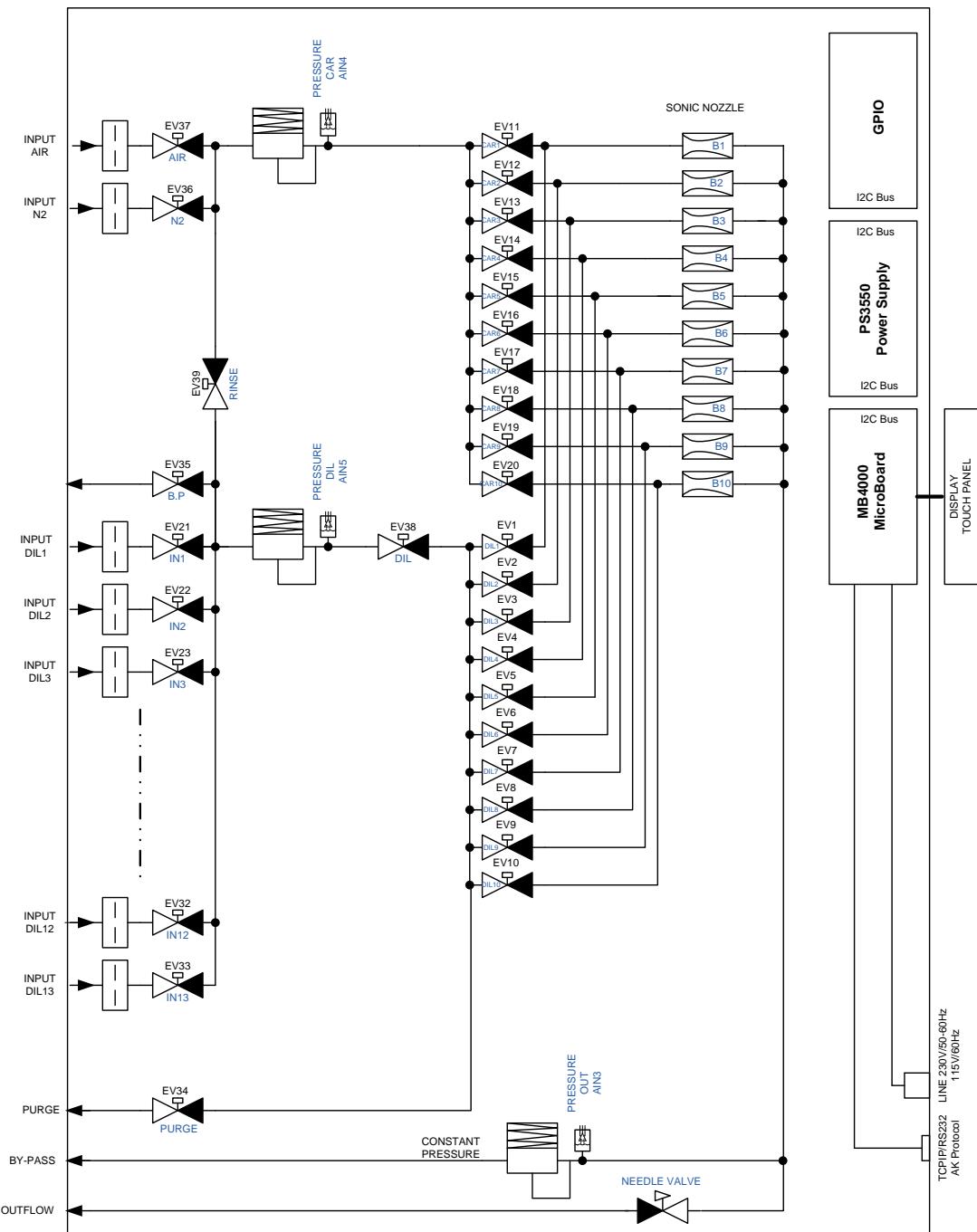
FLUIDICS (ONLY NOX CONVERTER TESTER)
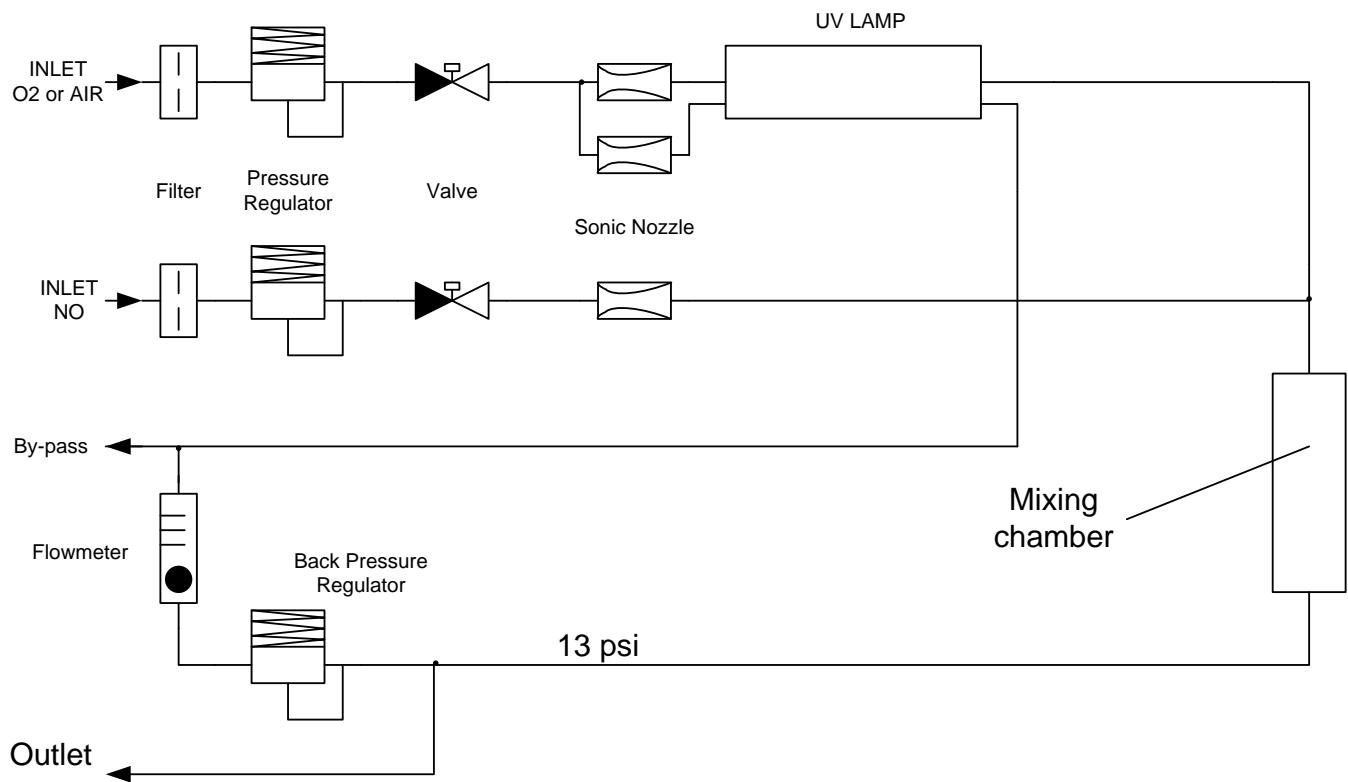
SONIMIX 2106-32 (gas divider only)

Bouton noir interrupteur
3770 60 100

Ventilateur 60x60 12VDC, Cablé
3766 20 010

Ventilateur 60x60 12VDC
3766 20 000

Prise Secteur
3770 04 005

Toron Interrupteur
4770 01 010

Cable Terre
4770 10 016

Capteur température cablé
3771 36 020

Câble Purge EV
4770 10 006

PURGE
EV34

Dil   Car   Out

Capteur pression cablé

PS3500A
4771 14 010

MB3500L1
4771 15 005

Cable plat module dilution
4770 13 020

M1   M2
DIL1 CAR1
DIL2 CAR2
DIL3 CAR3
CAR4 DIL4
M2   M1

M1   M2
DIL5 CAR5
DIL6 CAR6
DIL7 CAR7
CAR8 DIL8
CAR9 DIL9
CAR10 DIL10
M2   M1

Cable plat 7
4770 03 300

MB4000
4771 40 040

TCP/IP

USB

MB3500L1
4771 15 005

ECRAN LCD
Touch Panel

Câble Purge EV
4770 10 900

DIL
EV38

BAS
IN1   B.P   N2   AIR
EV1   EV36 EV37

4EV23G-A
4771 50 060

M2   M1

EV26 EV27 EV28 EV29
IN6   IN7   IN8   IN9

4EV23G-A
4771 50 060

Câble Purge EV
4770 10 006

RINCAGE
EV39

MB3500L1
4771 15 005

4EV23G-B
4771 50 060
EV30 EV31 EV32 EV33
IN10 IN11 IN12 IN13

4EV23G-B
4771 50 060
EV2   EV3   EV4   EV5
IN2   IN3   IN4   IN5

FACE ARRIERE

Nox converter Tester

Prise Secteur KNF
3770 04 008
+
Tiroir Fusible
3770 04 300

O I
Fuse

Cable Terre
4770 10 016

Ventilateur 60x60 12VDC, Cablé
3766 20 010

Ventilateur 60x60 12VDC
3766 20 000

Toron Interrupteur
4770 01 010

ALUV2-05C

ALUV2-05C
4771 00 016

AIR
NO
Q3

RINSE

AIR 2EV60 NO
4771 50 050

Lampe nox 1000PPM
4730 01 020

PS3500A
4771 14 010

MB3500L5
4771 15 009

Cable plat 7cm
4770 03 300

230V/ 110V VOLTAGE SETTING WITH PS 3550

To use the SONIMIX device at another voltage setting than the one set at the factory, the following jumper should be set.

110 V setting   230V setting
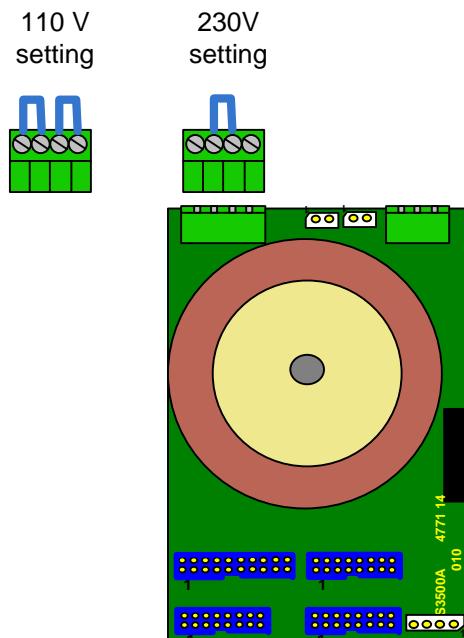
230V/ 110V VOLTAGE SETTING WITH PS 4000

To use the SONIMIX device at another voltage setting than the one set at the factory, the following jumper should be set.

Large voltage setting

Fine voltage setting
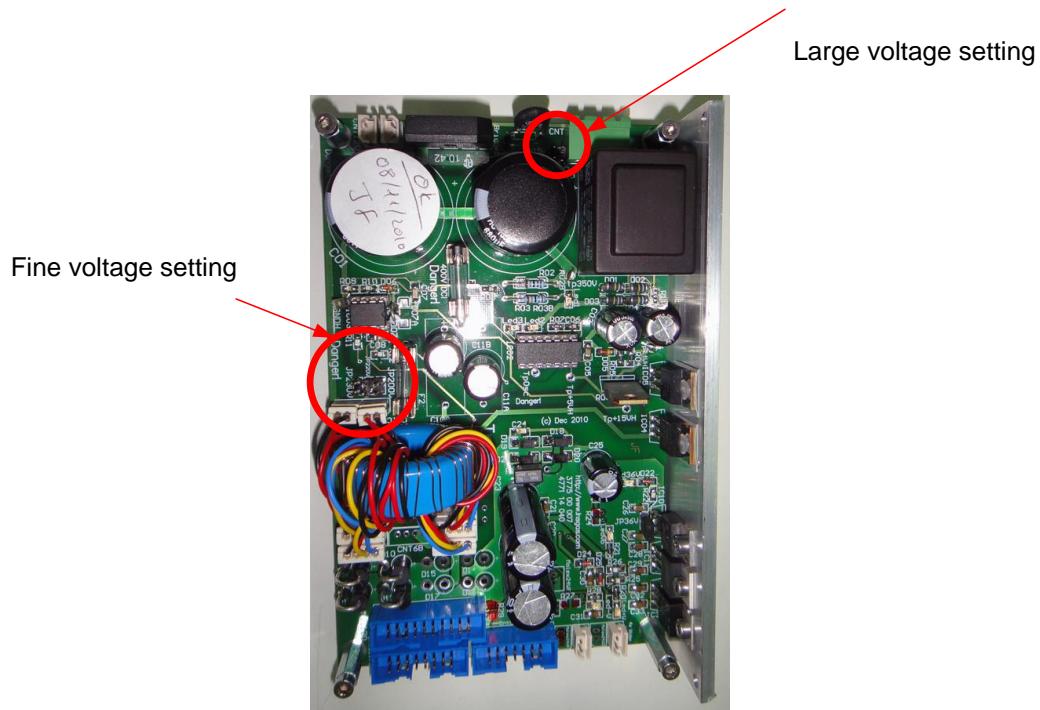
voltage	Fine voltage setting	Large voltage setting
100V		
110V		
220V		
230V-240V		

Read carefully the Operating Manual
Connect the SONIMIX to the power line

⚠️Check if the setting voltage is correct (100V/110V or 230V)
Connect the SONIMIX to the gas Cylinders

⚠️**ONLY USE ELECTROPOLISHED STAINLESS STEAL TUBES**
Set the pressure regulator of the cylinders to 3 bar rel
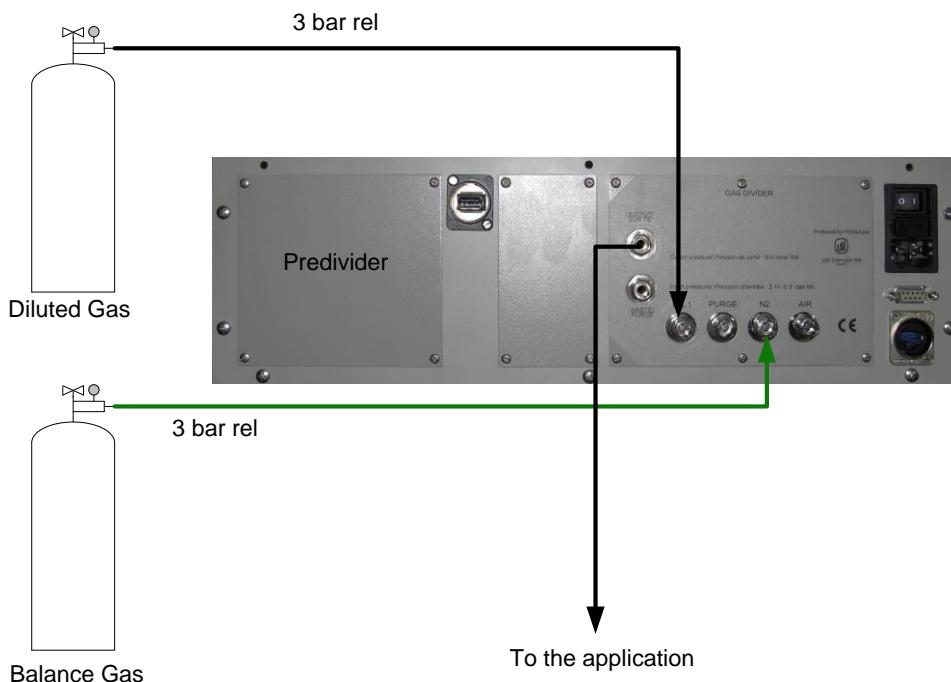
Set the operation parameter
Set the purge and rinse time (configuration\general)
Connect the outlet of the SONIMIX to your application
Connect the bypass of the SONIMIX to an exhaust
Generate dilution points

SPECIAL CASE OF A PREDIVIDER

5 bar rel

Predivider

Diluted Gas

5 bar rel

Balance Gas

Pressure regulator
3 bar

Gas Divider

To the application
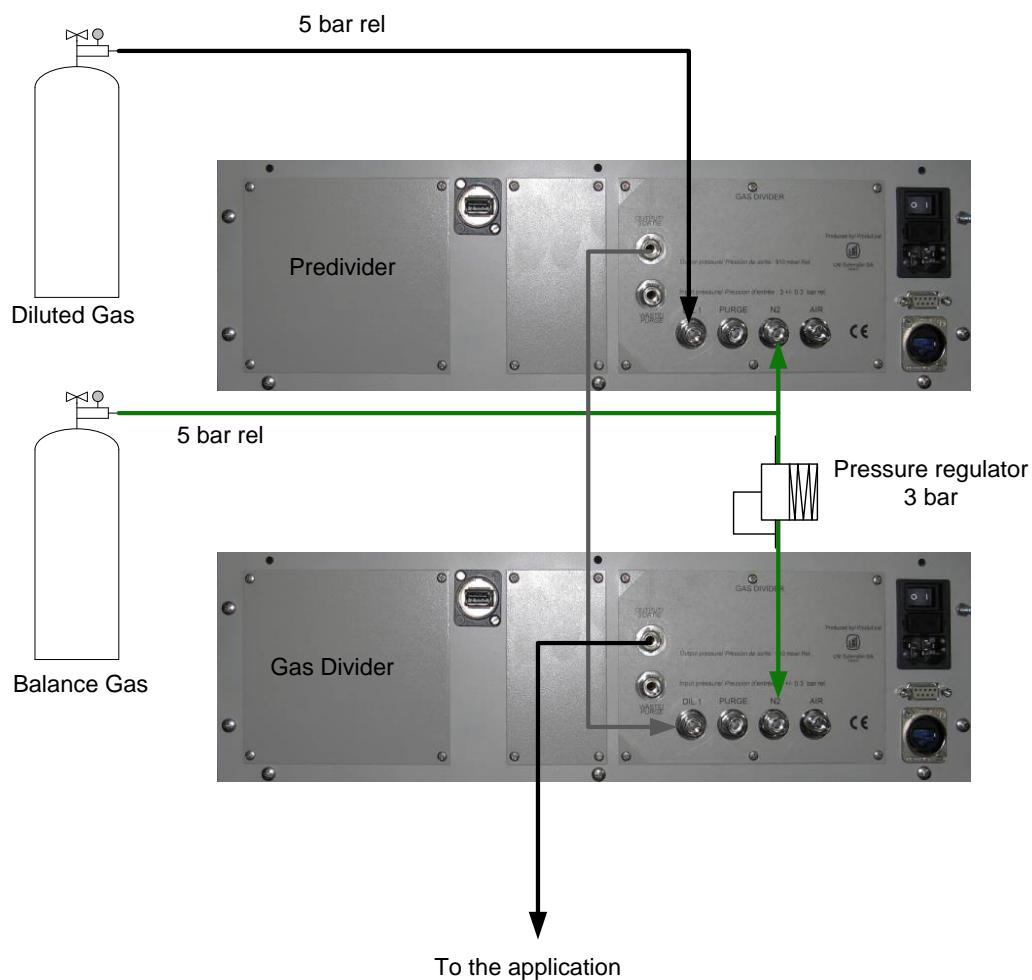
LCD INTERFACE / SOFTWARE

The SONIMIX has an user friendly LCD interface. The software consist in Menus and sub menus.

OVERVIEW OF THE MENUS
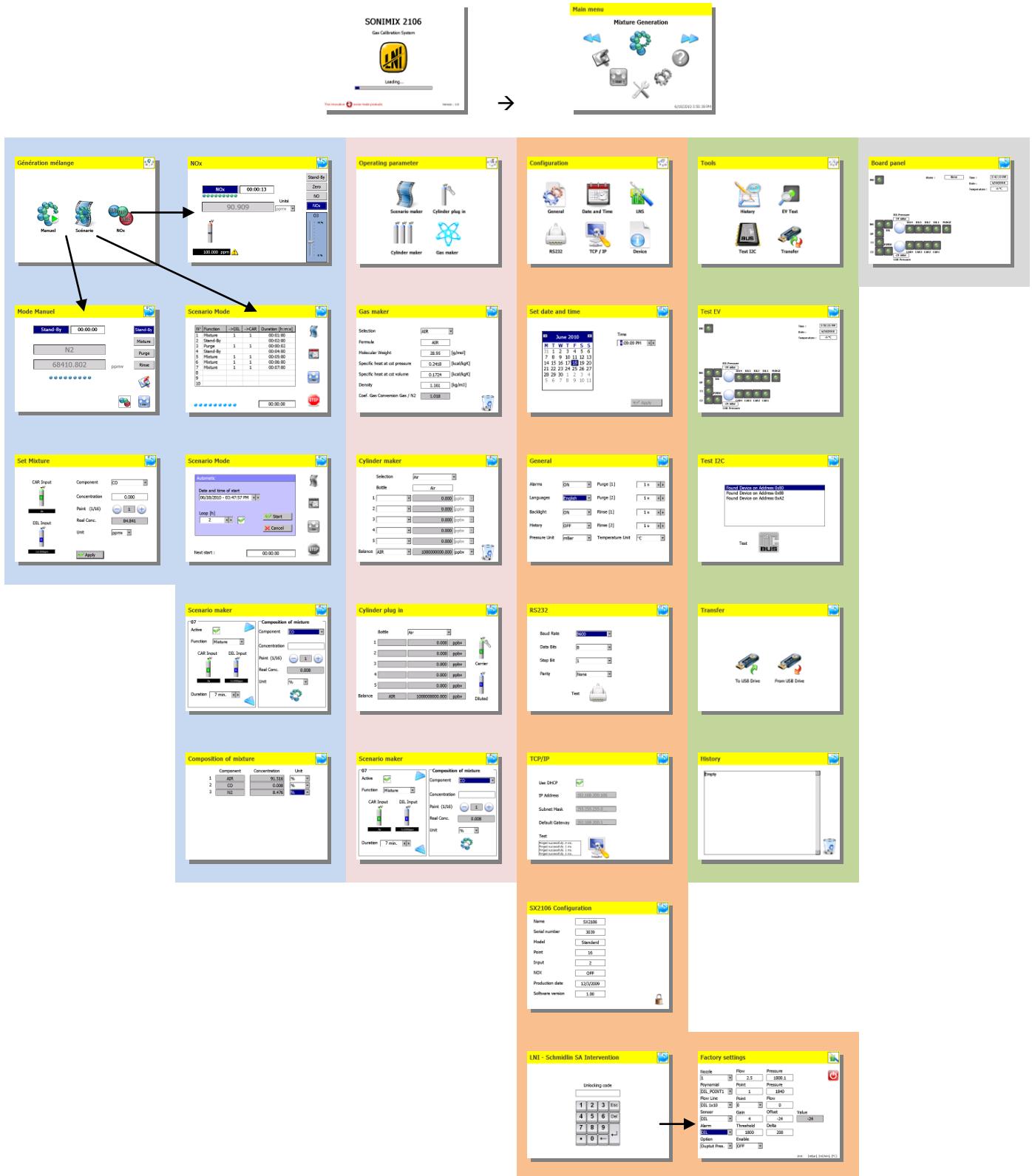
Once you turn ON the SONIMIX, 3 beeps will be emitted by the device.
Just after, following screen will appear :

SONIMIX 2106

Gas Calibration System

Loading...

The innovative ✚ swiss made products   Version : 1.20

The program is charging the different windows. Once finished the main menu will appear.

MAIN MENU

Main menu

Mixture Generation

6/18/2010 3:50:39 PM

1. Touch to **select** the desired submenu

2. Touch to **enter** the desired submenu
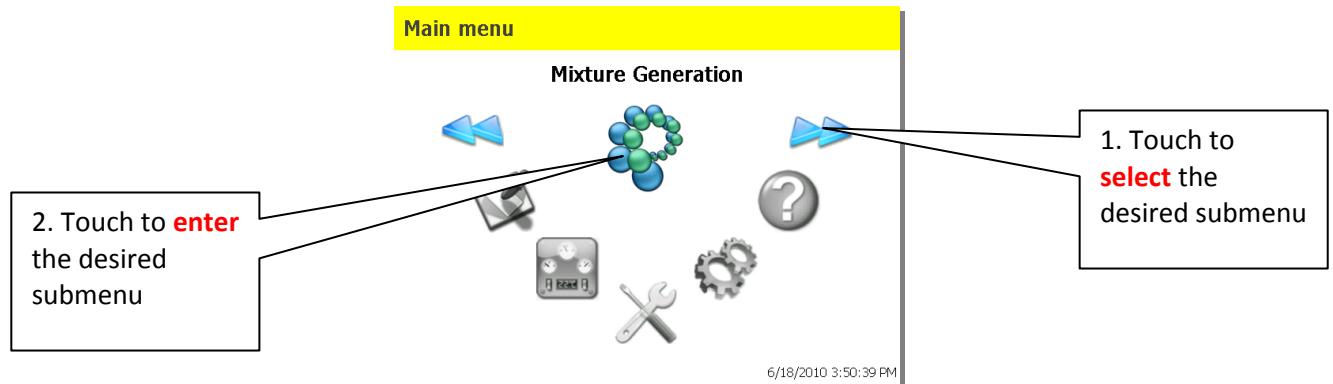
The main menu gives access to the following sub menus :
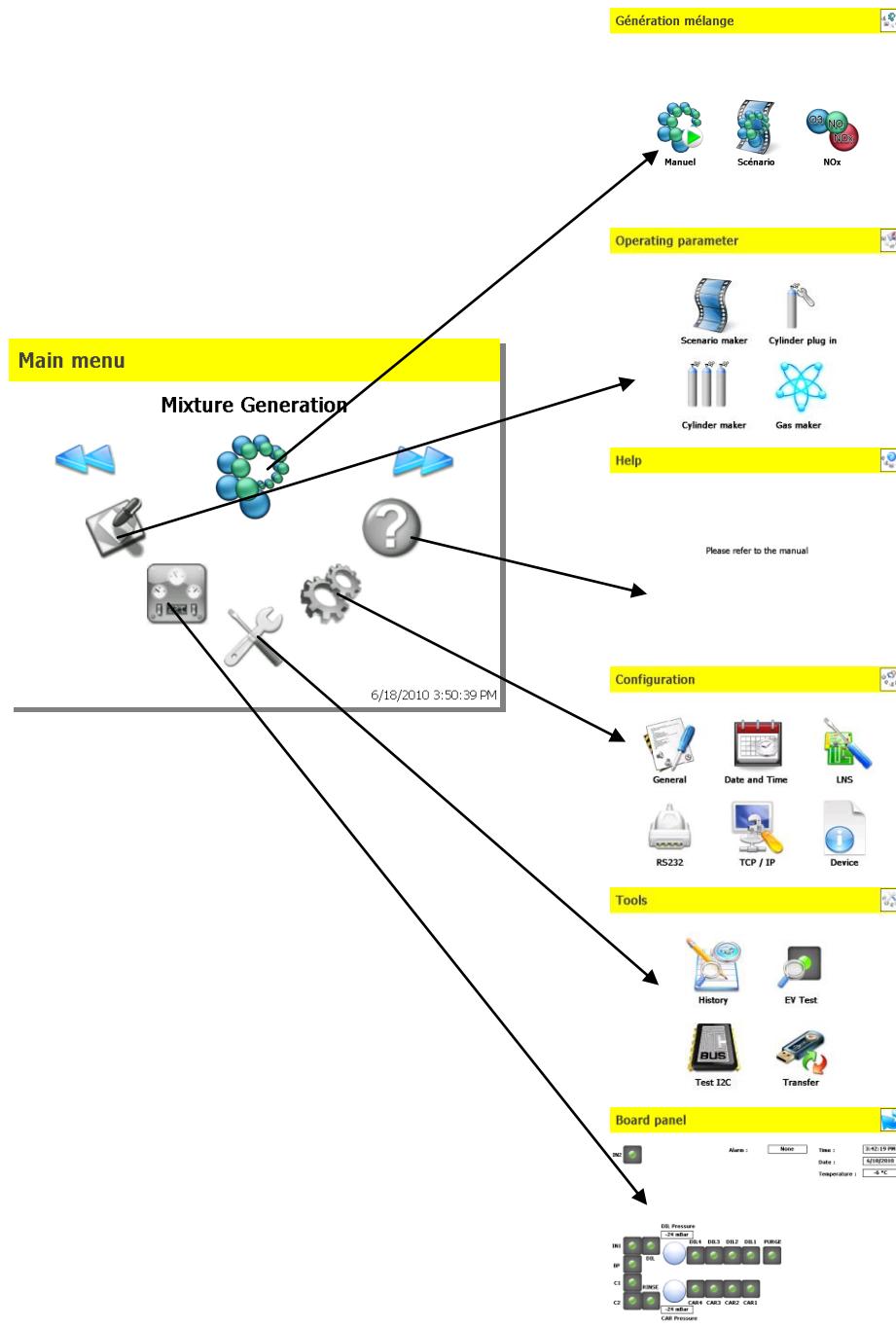
To generate concentration manually or using the Scenario

To set the cylinders values, gases and program a scenario

help

To configures the parameters linked to the device (remote command) or general parameters like date, time,…

Some tools to open valves, read and transfer the history to USB or test the remote command.

To see which valve is open or closed. This menu is also accessible from other menus.

OPERATING PARAMETERS MENU

Touch to **enter** the desired submenu

Press this icon to get back to the previous menu

To create new gases (if they are not in the predefined list)

To create a gas cylinder

To "connect" a cylinder to the SONIMIX

To program a scenario (for automatic linearity or repeatability)

Gas Maker sub-Menu :

If the gas you intend to mix is not in the list, you can add it to the list. To do so, you have to find out following parameters : Molecular weight, specific heat at constant pressure and volume (at the same temperature) and the density. The software will then calculate the coefficient factor that will be used in the dilution ration calculations.
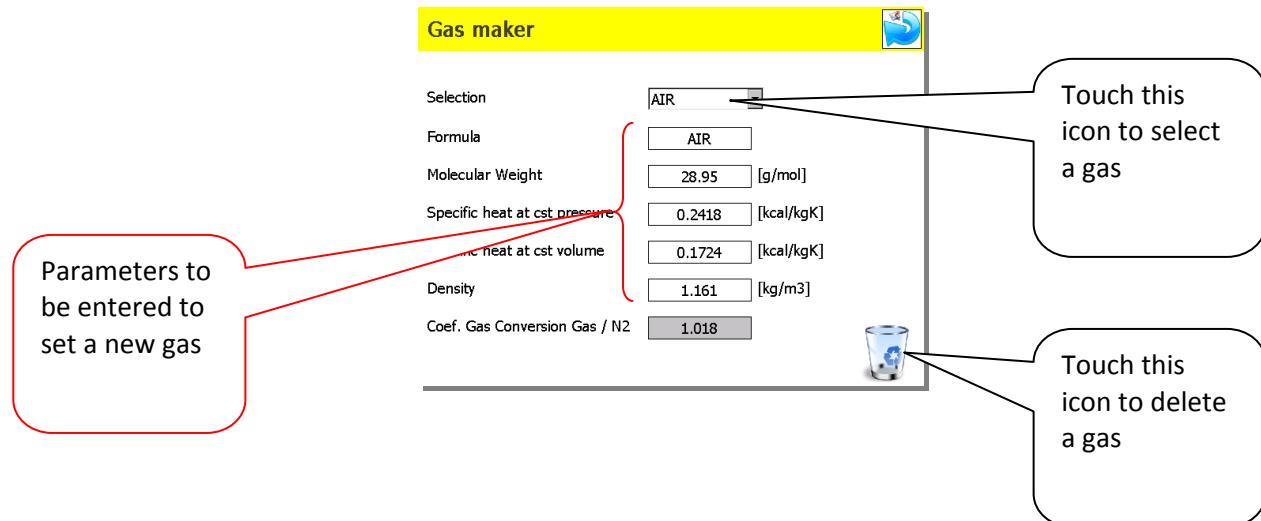
⚠️ **_If you modify the parameter of an existing gas, this will change the coefficient gas converter factor. As consequence, the dilution ratio of the modified gas will not be right anymore._**

Cylinder Maker sub-Menu :

With this menu, you can create different type of cylinder (representing the one you have in your lab and that you will attach to the SONIMIX). You can have in your cylinder up to 5 different components plus 1 balance gas.
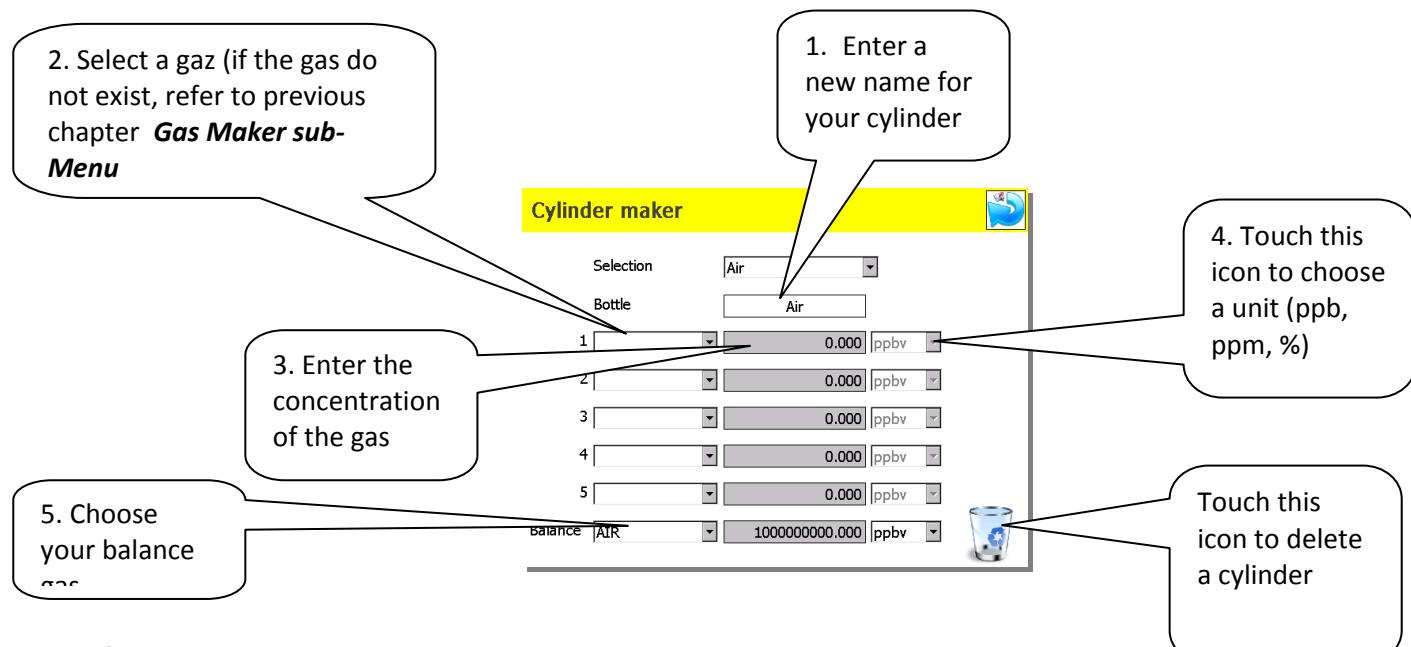
If you cylinder has 100% concentration, enter it as Balance gas only.

Cylinder Plug-in sub-Menu :

This menu is used to teach the software, which gas cylinder is physically attached to the SONIMIX. The software automatically recognize the number of inlet (the minimal configuration is 2 inlet for the carrier (normally Air or N2) and 1 for diluted. Then for each option of additional inlets there will be 4 diluted more.

1. Press the cylinder to change the physical channel of the carrier gas. By default Nitrogen is N° 1 and Air is N°2

2. Select your cylinder. If the cylinder do not exist, refer to previous chapter *Cylinder Maker sub-Menu*

Do the same with the Diluted cylinder
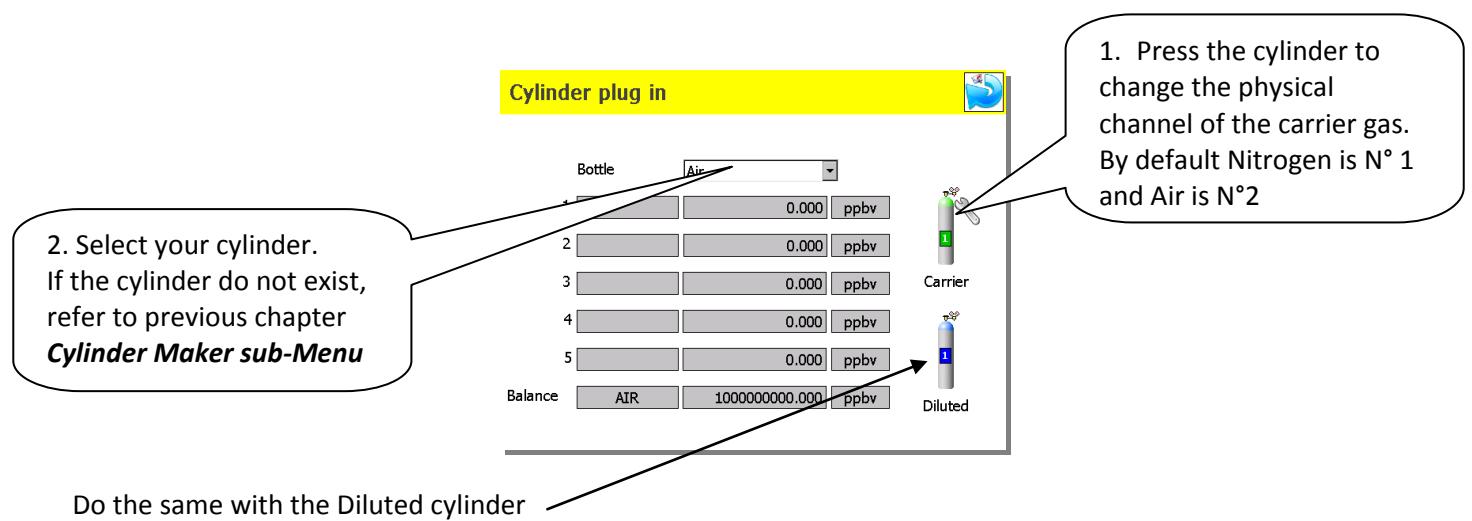
Scenario maker sub-Menu

The scenario maker able to perform automatically 10 different dilutions steps. This is ideal to perform linearity tests or repeatability tests. The parameter to set are the cylinders that will be used, the time duration of the point, the trace gas (this is necessary for multiple component cylinder), the requested concentration of the traced component and the unit.

8. Press this icône to go to the **next** point

1. Use this icon to activate the point (a non activated point will not be generated

2. Select what the point should do : « stand-by, mixture or purge »

Press this icône to go to the **previous** point

3. Select the carrier and diluted gas. If you do not find the right cylinder, refer to previous chapter *Cylinder Plug-in sub-Menu*

4. Set the time during which the point should be generated

6. Select the gas you want to trace. In a multiple component gas cylinder all the component will be diluted with the same dilution ratio. This mean that only 1 component need to be set.

7. Set the concentration you would like to get. The software will automatically choose the closed corresponding dilution point

Or you can directly choose the dilution point.

5. To set the unit of the different concentrations.

Display of the effective concentration of the trace gas

Press this icon to view all the concentration of all your gases (if you have multiple component cylinders

Composition of mixture

	Component	Concentration	Unit	
1	AIR	91.516	%	
2	CO	0.008	%	
3	N2	8.476	%	

Once all parameters have been filled in, the gas divider SONIMIX 2106 can start to generate different gas mixtures.

MIXTURE GENERATION MENU

The menu makes possible the generation of dilution points. Two different way are possible :
1. Generation fully manual
2. Automatic generation through the scenario.

Génération mélange

Touch this icon to select the Manual sub-menu

Manuel **Scénario** **NOx**

Manual sub-Menu

Mode Manuel

Button to select the different actions : purge, rinse, stand-by and mixture

Information about what the SONIMIX is doing

| Stand-By | 00:00:00 |

N2

68410.802 ppmv

Stand-By
Mixture
Purge
Rinse

Press this icon to set or change the concentration.

Set Mixture

2. Select the gas you want to trace. In a multiple component gas cylinder all the component will be diluted with the same dilution ratio. This mean that only 1 component need to be set.

1. Select the carrier and diluted gas. If you do not find the right cylinder, refer to chapter *Cylinder Plug-in sub-Menu*

CAR Input

1
Air

DIL Input

1
Co1000ppm

Component   CO
Concentration   0.000
Point (1/16)   ⊖ 1 ⊕
Real Conc.   84.841
Unit   ppmv

✔ Apply

3. To set the unit of the different concentrations.

4. Set the concentration you would like to get. The software will automatically choose the closed corresponding dilution point

Set Mixture

CAR Input

Component CO

Concentration 0.000

Point (1/16) ⊖ 1 ⊕

DIL Input

Real Conc. 84.841

Unit ppmv

✓ Apply
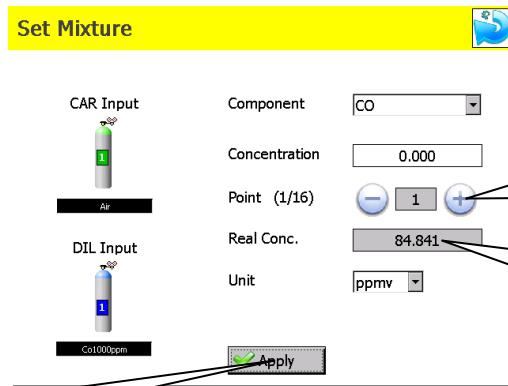
Or you can directly choose the dilution point.

Display of the effective concentration of the trace gas

5. Validate once finished

Mode Manuel

Stand-By 00:00:00

N2

CO...02 ppmv

Stand-By

Mixture

Purge

Rinse

Press this icon to view all the concentration of all your gases (if you have multiple component cylinders

In this menu you will find which valve is open or closed, the pressure values, if there are alarms,...

Composition of mixture

	Component	Concentration	Unit
1	AIR	91.516	%
2	CO	0.008	%
3	N2	8.476	%

Board panel

IN2

Alarm : None

Time : 3:42:19 PM

Date : 6/18/2010

Temperature : -6 °C

DIL Pressure
-24 mBar

IN1 DIL4 DIL3 DIL2 DIL1 PURGE

BP DIL

C1 RINSE CAR4 CAR3 CAR2 CAR1

-24 mBar
CAR Pressure
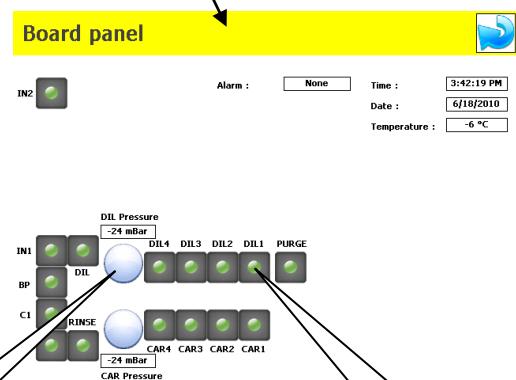
Pressure regulator and it's pressure value.

Valve (green light if the valve is open)

Scenario sub-Menu

Génération mélange

Touch this icon to select the Scenario sub-menu

Manuel   Scénario   NOx

This table show the 10 different dilution points, diluted and carrier cylinder Nr as well as the time duration of each point.

Press this icon to have more details about the set dilution points or modify them.

Scenario Mode

N°	Function	->DIL	->CAR	Duration [h:m:s]
1	Mixture	1	1	00:01:00
2	Stand-By			00:02:00
3	Purge	1	1	00:00:02
4	Stand-By			00:04:00
5	Mixture	1	1	00:05:00
6	Mixture	1	1	00:06:00
7	Mixture	1	1	00:07:00
8				
9				
10				

00:00:00

Press this icon to open the « start » scenario

In this menu you will find which valve is open or closed, the pressure values, if there are alarms,…

To stop the Scenario process.

Set the start date and time

Scenario Mode

Automatic

Date and time of start
06/18/2010 - 03:47:57 PM

Loop [h]
2

Next start :   00:00:00

Start
Cancel

Start the scenario or cancel button

Set how many time do you want to wait until the scenario will repeat

Select this item if you want to repeat the scenario (until manual stop)

NOX converter tester sub-Menu

This menu is available only if the NOX converter tester option is installed.

Génération mélange

Manuel   Scénario   NOx

Touch this icon to select the Nox converter tester sub-menu

NOx

Select the NO gas cylinder attached to the NOX converter tester.

NOx   00:00:13

90.909   Unité
ppmv

NO

100.000 ppm ⚠️

Stand-By
Zero
NO
NOx

Button to select the different actions :
Zero (Air)
NO
NO+O3->NO2

O3
41%

0 %

Button to select the quantity of Ozone (ie the quantity of NO2
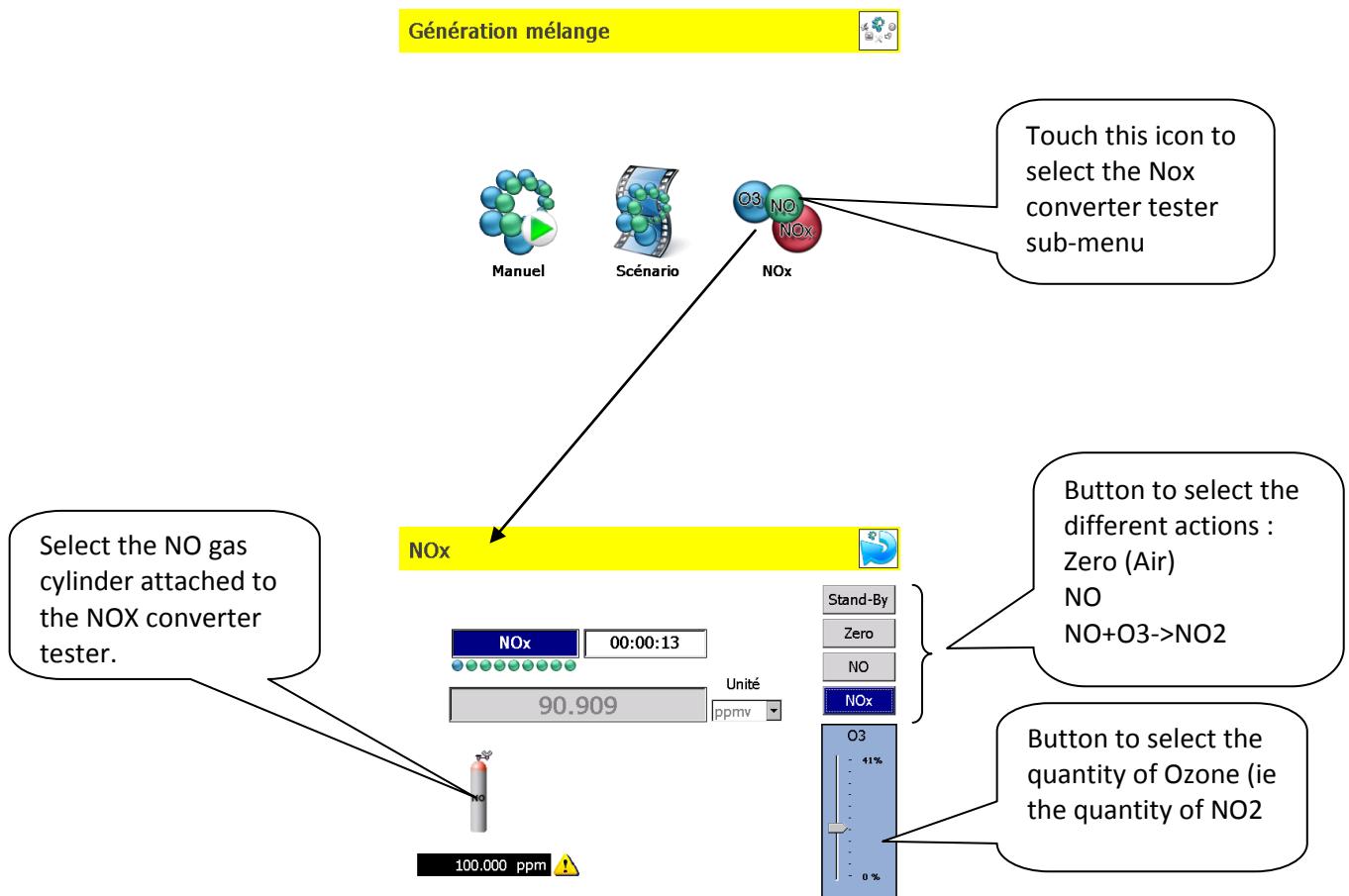
The Nox converter tester menu is also available from the Gas Divider Generation Menu :

Mode Manuel

Stand-By   00:00:00

N2

68410.802   ppmv

Stand-By
Mixture
Purge
Rinse

NOx

NOx   00:00:13

90.909   Unité
ppmv

NO

100.000 ppm ⚠️

Stand-By
Zero
NO
NOx

O3
41%

0 %

Touch this icon to select the Nox converter tester sub-menu
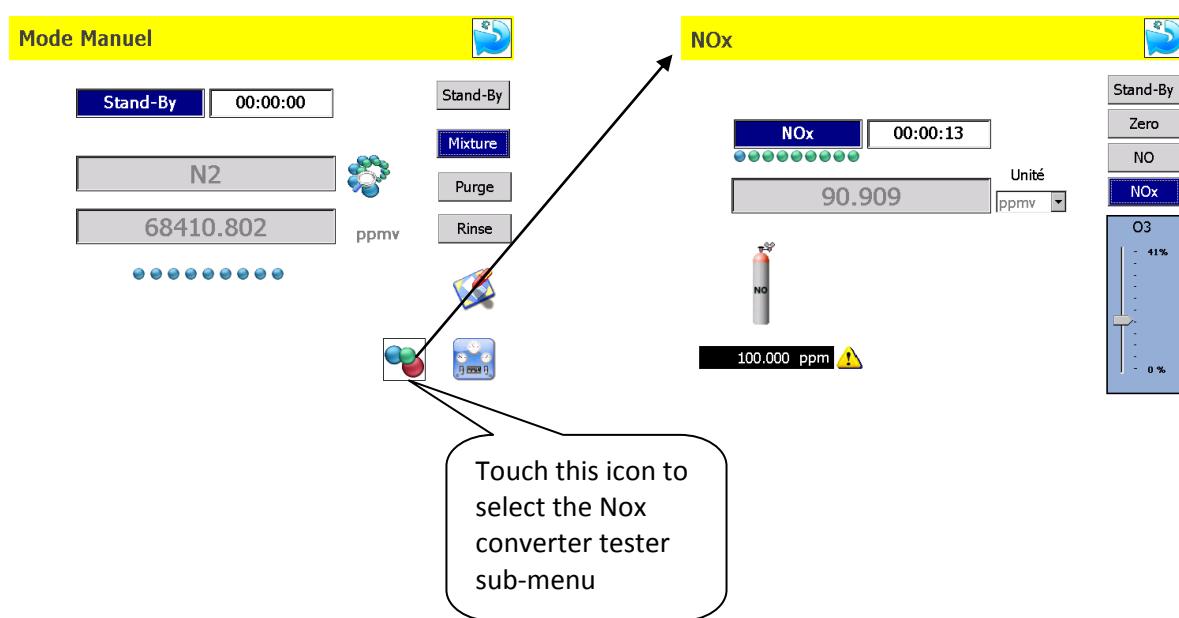
Zero Setting of the UV lamp

If the UV lamp do not start at a few %, it is necessary to re-set the Zero value of the UV Lamp.
To do that, go to the "CONFIG SX 2106 Menu"

Press the « lock » icon and enter the « 1219 » as password.
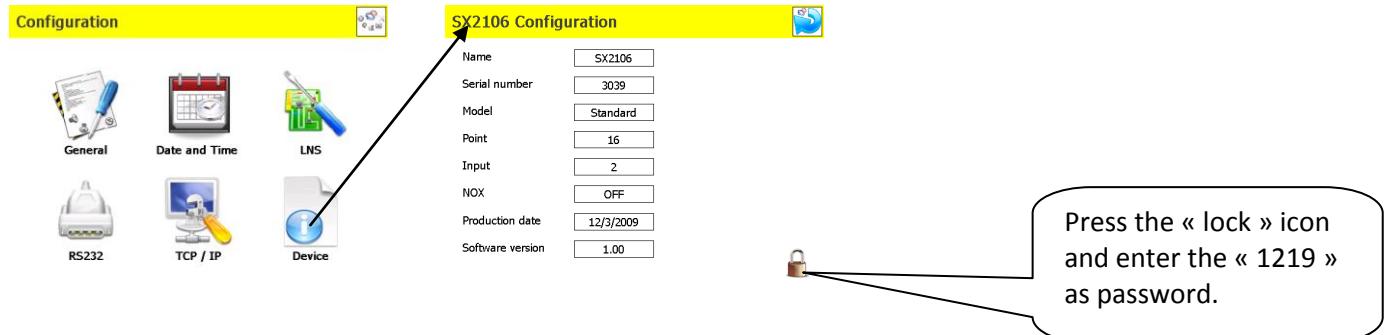
Then the Nox converter tester window will look as follow :

2. Increase the O3 value until the UV lamp starts

1. Press the button to re-set the Zero of the UV lamp
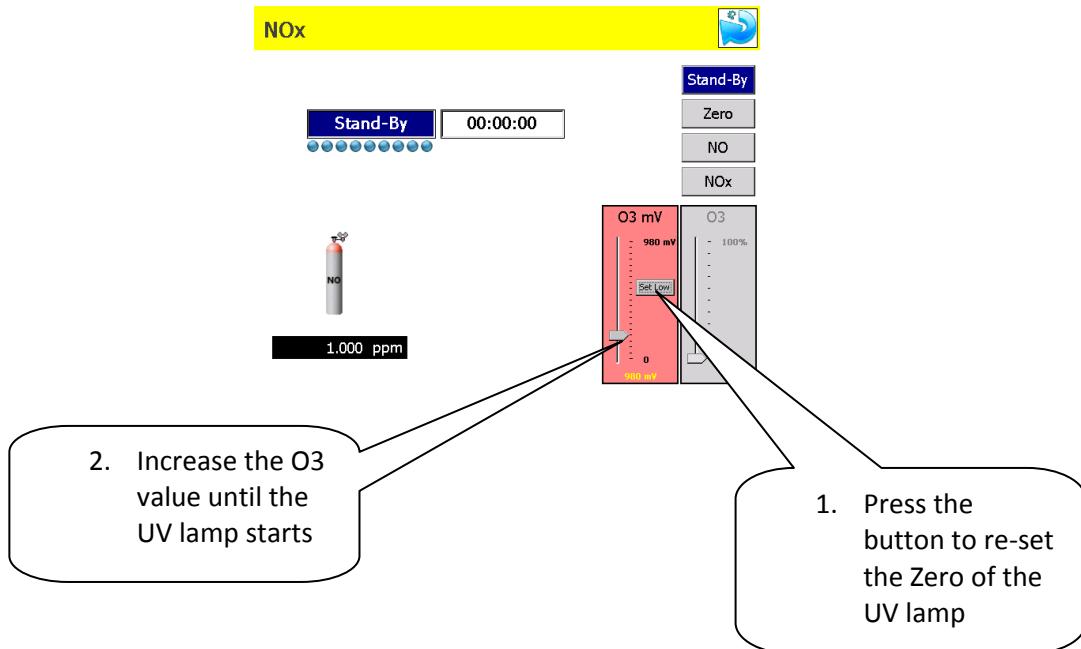
CONFIGURATION MENU

This menu is used to set some general parameter and access (reading only) some feature of the SONIMIX gas divider.

Used to choose different General setting

Use to set the day and time

Use to access the different internal values of the SONIMIX

Use to set the RS 232 parameters and test them

Use to set the TCP/IP parameters and test them

Access to the configuration of the SONIMIX
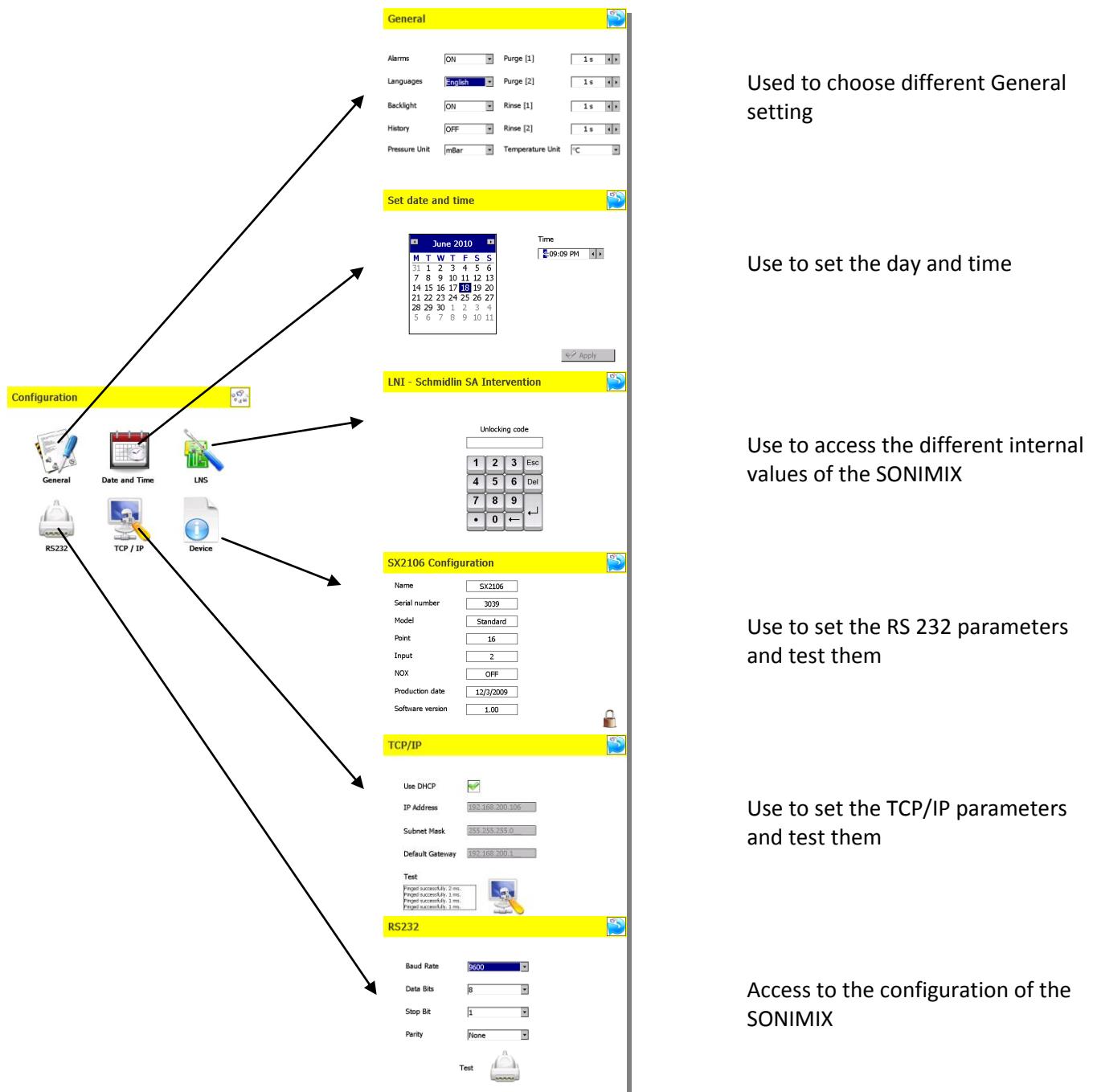
General Sub-menu

The first topic of this sub menu is to set the general parameters as Alarms (ON/OFF), language (French, German or English), the back light (ON/OFF), the pressure units (bar/PSI) and the temperature units (°C/°F).

The history memorize the different status of the gas divider. We recommend to set it ON, as it can be an important tool for our service department

Channel Number used for the RS 232 AK protocol

The purge and rinse values are very important parameter. Read carefully the following explanation about them
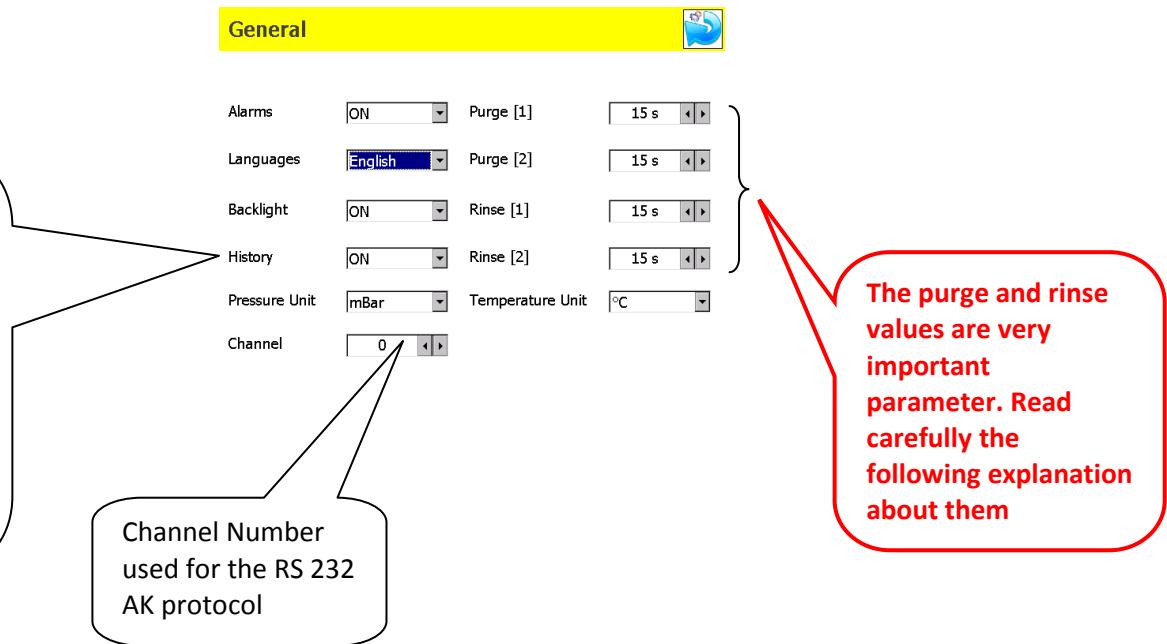
The purge 1 is used to clean the line between the Gas Cylinder and the inlets of the SONIMIX. This purge will remove all the air and humidity being in the line and replace it with the pure gas of the cylinder. This purge one should be done each time you replace the cylinder by another one or open the line for any reason. The purge will protect your gas divider if you use corrosive gases (do not use corrosive gases if the option : compatibility with corrosive gases has not been purchases).
In addition, the purge will speed up the stabilization time of the mixture, as the line will be ready with the right gas.
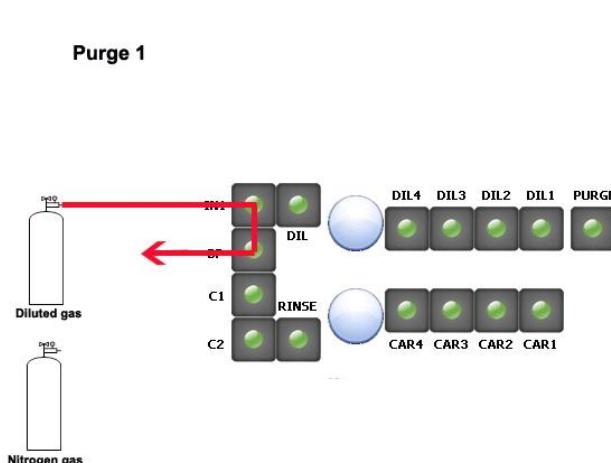
The purge 2 : Once the purge 1 is performed, the purge 2 will bring the new gas in the heart of the Mixing module of the SONIMIX. The purge 2 should be performed each time you change of inlet (with the basic model,

you only have 1 inlet. This mean each time you change the cylinder purge 1 and 2 should be performed). If you have purchased the option "additional diluted inlets", you have the possibility to switch form one cylinder to another.

In this case, perform the purge 1 once you connect the cylinder and then only perform the purge 2 each time you switch form one cylinder to the other. (note that a Zero Nitrogen is performed during the purge process)
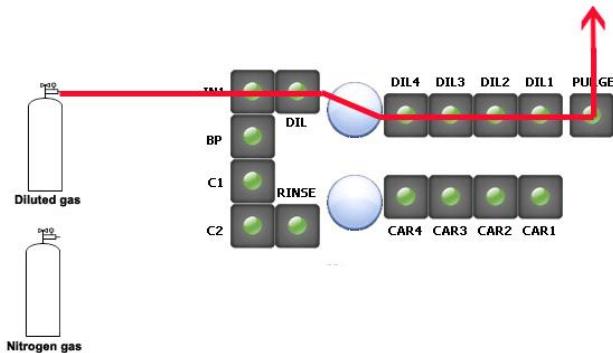
The rinse functions are used to clean with Nitrogen your instrument, once you have used corrosive gases or once you have finished to work with the SONIMIX dilution system. The same process apply for the rinse function as for the purge function.

The rinse 1 will clean with nitrogen the inlets of the SONIMIX
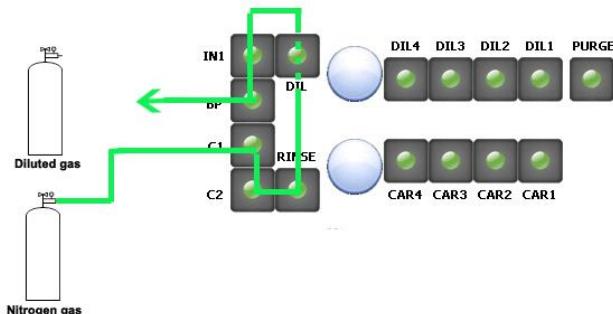
the rinse 2 : will clean with Nitrogen the heart of the dilution system, including the outlet.
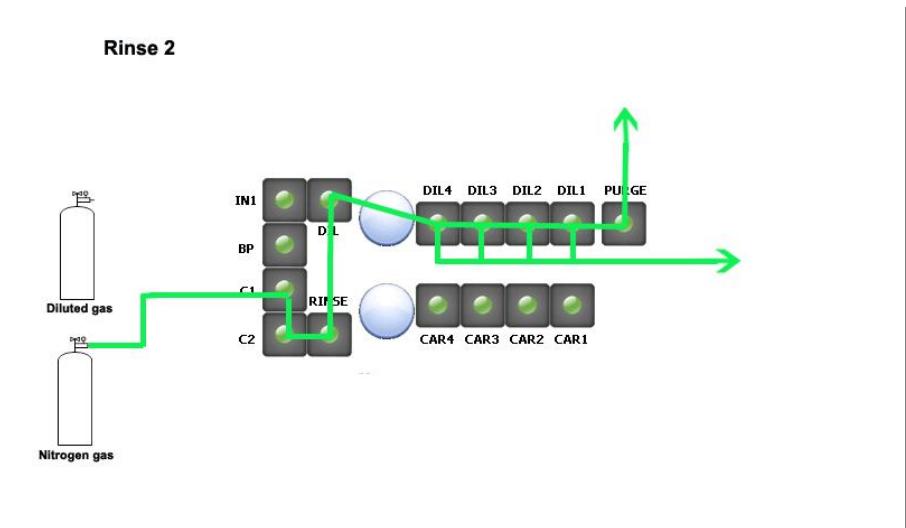
Set date and time sub menu
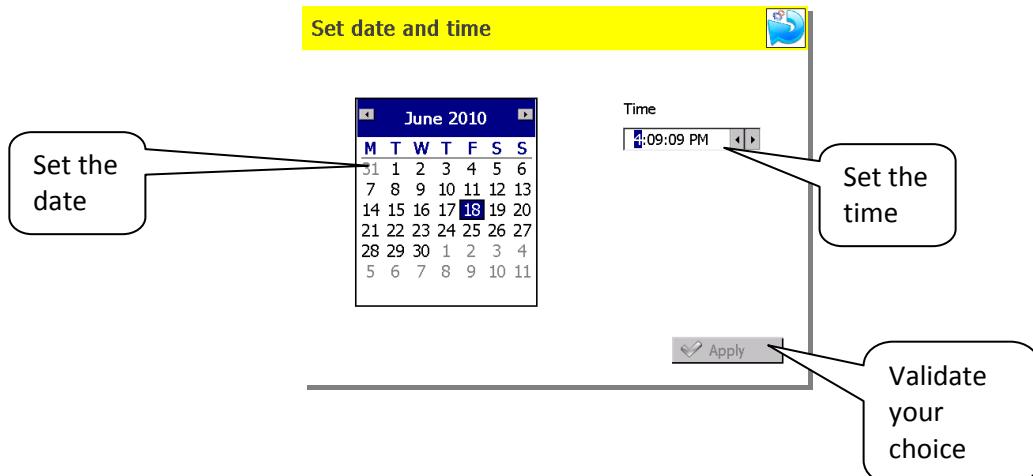
LNS intervention sub menu

This sub menu contains all information about the critical parameters of the SONIMIX : Flow values of the Nozzles, pressure values, polynomial corrections, alarm tolerances. With the code "1219" you can consult the values but not modify them. ONLY LNI Schmidlin SA person can modify the parameters.

Enter the code " 1219"
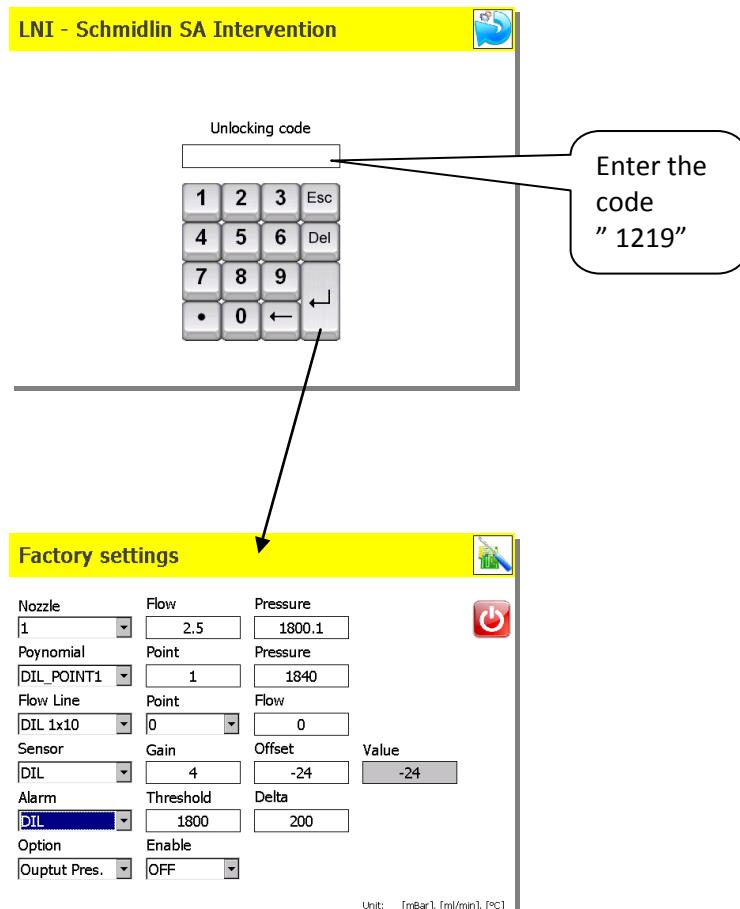
Configuration sub menu

This sub-menu gives information about the configuration of your device (type of device, serial number, Model, # of points, # of diluted inputs, if the Nox converter tester is installed, production date and software version. ONLY LNI Schmidlin SA person can modify the parameters.

ONLY LNI Schmidlin SA person can modify the parameters.
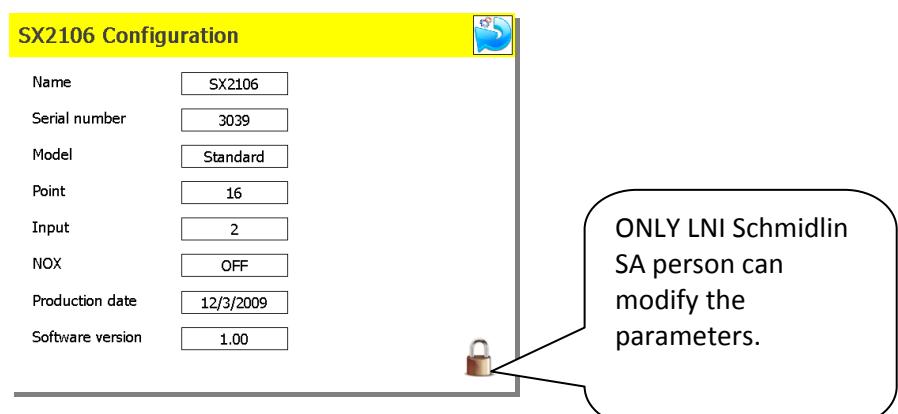
RS 232 sub menu

This menus able to parameter and test the RS 232 setting.
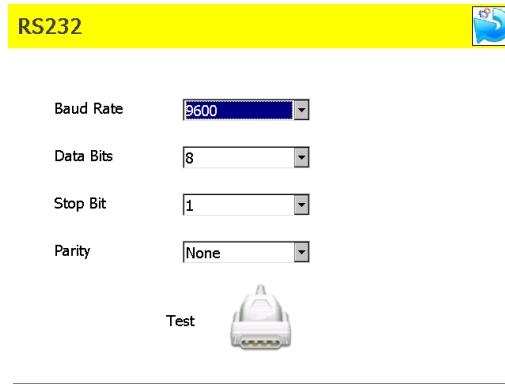
The RS 232 has the "AK protocol"

TCP/IP sub menu

This menus able to parameter and test the TCP/IP setting.
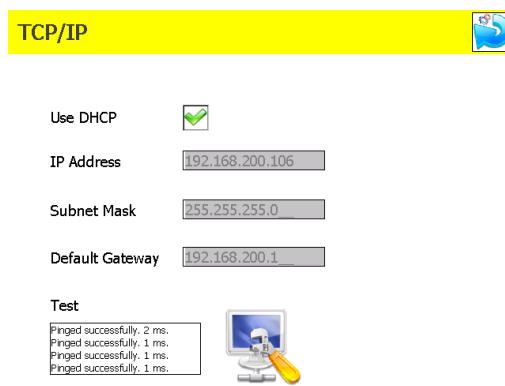
The Ethernet has the "AK protocol"
The UDP port is fixed at "9880"

The tools menu gives the possibility to access to the history of the gas divider, to open and closed valves individually, to test if the boards are well connected and to transfer data from or to the SONIMIX Gas Divider.
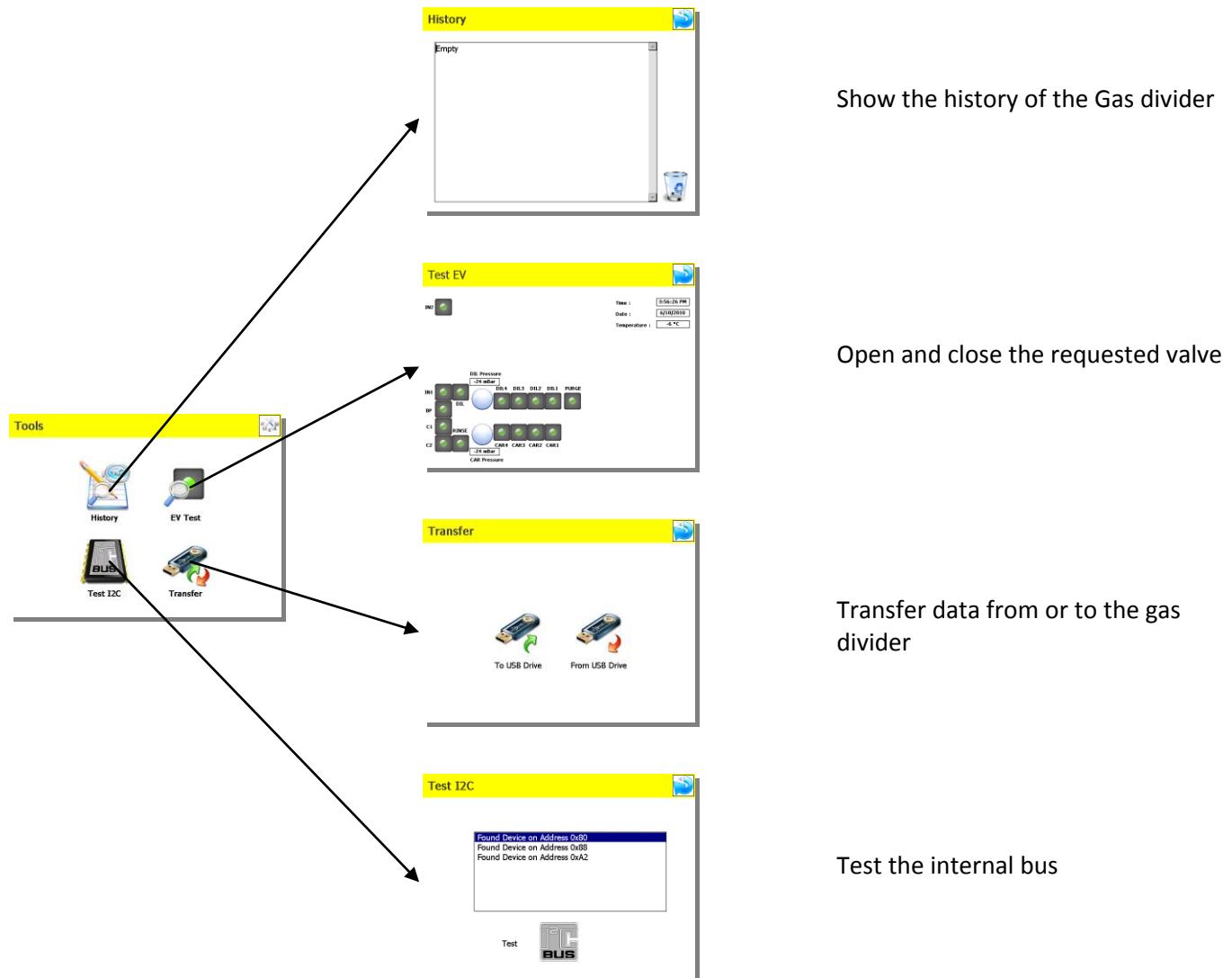
Show the history of the Gas divider

Open and close the requested valve

Transfer data from or to the gas divider

Test the internal bus

The history Sub-Menu

This sub menu gives all the status that have been performed by the SONIMIX. All the alarms are also documented. This sub menu is very important for our service people in order to understand what has happened with the SONIMIX.
We strongly recommend not to delete the history.
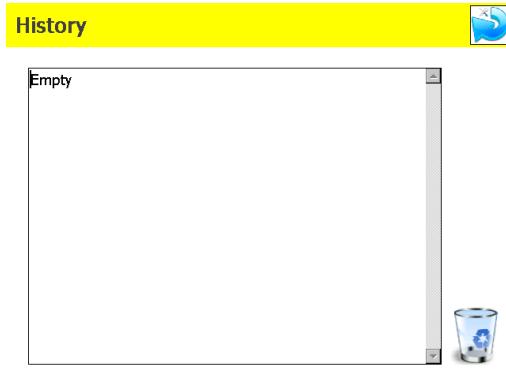
Test EV Sub-Menu

This menu is from interest if you suspect that some electro valve is not opened correctly. You can check the opening or close of each valve individually.

Touch the valve to open it (the green will turn to light green). Touch it again to close it
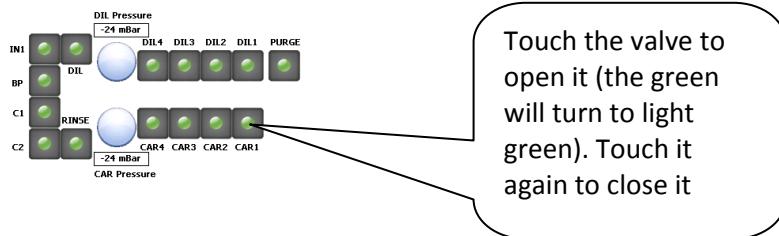
Test I2C Sub-Menu

This sub menu is used to test the I2C bus.

See how many board MB3500 are connected

Test I2C

Found Device on Address 0x80
Found Device on Address 0x88
Found Device on Address 0xA2

Press to start the TEST

Test

I²C
BUS
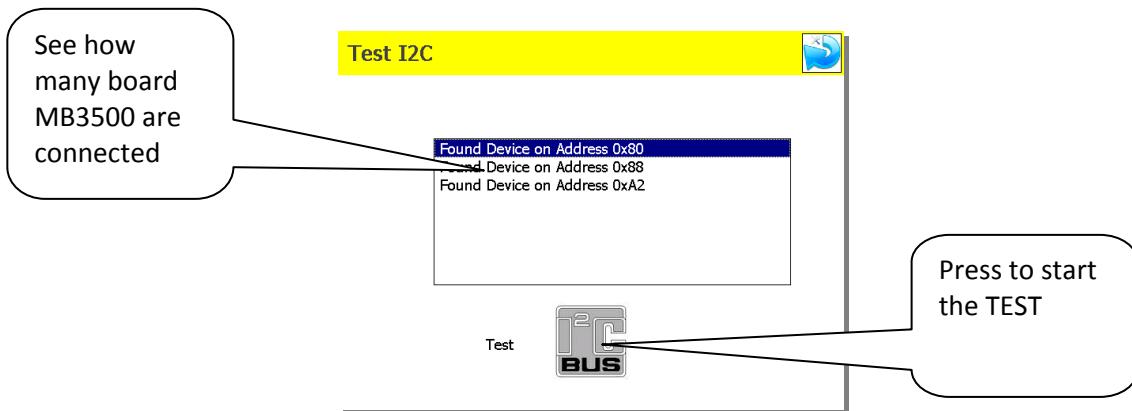
Transfer Sub-Menu

This board can be used in different cases :
        To download the parameters form the SONMIX to the USB
        To download the parameter (software update or parameters) from the USB to the SONIMIX

Transfer

To USB Drive   From USB Drive

In any cases, plug the USB key before you touch the icon
If you download to the USB key, a SONIMIX folder will be crated :
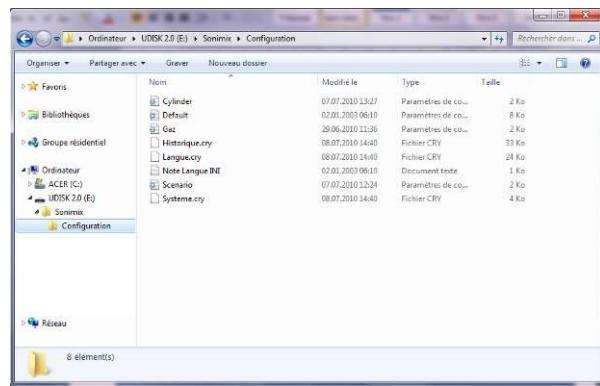
ZIP this folder and send it to our service department.

MAINTENANCE

The SONIMIX 2106-LCD as the other LNI instruments, if they are used in accordance with the manufacturer recommendations, **does not requires regular maintenance**. The major sources of problems being due to the poor quality of the alimenting gases, we recommend to check and to exchange regularly the input filters.

SOFTWARE UPDATE

To upgrade Sonimix software using USB Flash Disk/ Flash Drive - Step by Step Guide

1. Copy folder "SONIMIX" to USB Flash Drive Disk
2. Turn off SONIMIX
3. Insert you Flash Drive to your SONIMIX USB drive port.
4. Then start SONIMX , please wait the end of loading boot screen before disconnecting USB Flash Drive.

RECALIBRATION

The SONIMIX 2106-LCD is a reference instrument which was carefully calibrated with high precision flowmeters. An ISO 17025 calibration certificate is also available, as LNI Schmidlin SA is an accreditated company for Flow measurements.
We recommend to recalibrate the instrument it every 18 months. For this process, we recommend to send the instrument back to LNS

All certificate are available on our web site : www.LNSGAS.com

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PROBLEM	MAIN POTENTIAL CAUSE	CORRECTIVE ACTION
Gas Divider		
Input pressure ALARM activated	1. The input pressure of one or both lines is under the minimum value of 2.5 bar	1. Increase the faulty line to a value of minimum 2.5 bar with flow (suggested setting point: dilution step 8)
	2. The internal alarm wiring is interrupted	2. Call your maintenance Dpt.

Insufficient flow at the input of your process (analyzer)	1. An important part of the flow is directed to the by-pass	1. The outlet pressure is more important than the setting value of the back pressure regulator (910 mbar)
		  Modify the alimenting pressure of the process.
		  Verify that there is no additional restriction between the gas divider and the process

	2. There is a leak between the gas divider and the process	2. Verify the tightness of all fittings and organs from the outlet of the gas divider to the process.
Poor quality of mixture's concentration	1. One or all nozzles have been damaged by dust or corrosive gas	1. Call your maintenance Dpt.
	2.On or all electro valve cannot open.	2. Call your maintenance Dpt.
	3. The by-pass outlet is obstructed	3. Verify that this outlet is close to the atmospheric pressure
No power supply, revealed by absence of message on the display	1 The fuse is melted or the line voltage is wrong	1. Verify the line voltage and change the fuse. If the fuse fails repeatedly, the problem is probably more important. Please call your maintenance Dpt.
NOX converter tester :		
No flow at the outlet	The valves do not open	Check the Nox converter power supply
No Ozone (NO2)	1. UV lamp is damaged 2. NOx power supply is damaged	1. Replace the UV lamp 2. Replace the transformer of the power supply.

REMOTE COMMAND

The Hypertext Transfer Protocol (HTTP) is an application protocol for distributed, collaborative, hypermedia information systems. Hypertext is a multi-linear set of objects, building a network by using logical links (the so-called hyperlinks) between the nodes (e.g. text or words). HTTP is the protocol to exchange or transfer hypertext. HTTP functions as a request-response protocol in the client-server computing model. The client submits an HTTP request message to the server. The server performs functions on behalf of the client, returns a response message to the client. The response contains completion status information about the request and may also contain requested content in its message body. It means that **the server will close the TCP connection immediately after the transfer of this response**.

AK PROTOCOL

The remote command protocol is the AK-Protocol, mainly used in the Automotive Industry.
This chapter is not intended to describe all functions and particularities of the protocol, but only to present briefly the instructions installed in the gas divider. For complete information about the AK protocol, the reader has to refer to the "official" documentation.

Syntax

The speed of communication between the Host computer and the SONIMIX 2106-16+NOx is low (frequency < 10Hz).
The principle of communication is based on the Master-Slave relation; the Host Computer (the Master) sends a message to the gas divider (the Slave), the Slave executes the instruction and sends an acknowledgment. The Slaves never requests the communication to the Master.

The instructions are **transmitted to the instrument** with the following syntax :

* 1 byte   : start of the message : STX
* 1 byte   : Don't care word
* 4 bytes   : function code (4 characters)
* 1 byte   : blank
* 2 bytes   : channel number :K0 (see **)
* N bytes   : data if necessary
* 1 byte   : end of message : ETX

The instructions are received from the instrument with the following syntax (answer to the MASTER):

* 1 byte   : start of the message : STX
* 1 byte   : Don't care word
* 4 bytes   : function code (4 characters): ???? if the command is unknown by the Slave
* 1 byte   : blank
* 1 byte   : error status : 0 if no error was detected
* N bytes   : data if necessary
* 1 byte   : end of message : ETX

** to select the channel number :

General

Alarms	ON	Purge [1]	15 s
Languages	English	Purge [2]	15 s
Backlight	ON	Rinse [1]	15 s
History	ON	Rinse [2]	15 s
Pressure Unit	mBar	Temperature Unit	°C
Channel	0		

Channel Number used for the RS 232 AK protocol

Error Handling

It might happen that an unknown instruction is sent, that the device is busy with a function which is not the desired one, or that an error occurred in the command parameters. This Table summarizes all errors that can appear upon any master instruction.

Device Acknowledgment	Explanation
???? ES	Device does not know the instruction sent.
xxxx ES BS	Device or module is busy with another function or not ready .
xxxx ES SE	Syntax error within command parameters or incomplete command.
xxxx ES NA	Requested function or data are not available.
xxxx ES DF	Data error: The kind or number of given parameters are not valid.
xxxx ES OF	Offline: Device is offline, i.e. Device is in local mode. Only inquiry commands and SREM (set analyzer in remote mode) are allowed.

Where

xxxx   = command
ES   = Error status (see ASTF command for error status description)

LIST OF THE AK INSTRUCTIONS

K0 is used as standard channel number. If you need to change is you may replace it by K1, K2,…

SRES

Perform a reset. All the defaults values are restored.

Command   **:** SRES K0
Response   : SRES **ES**

> Where
>
> > **ES**   = Error status (see ASTF command for error status description)

SREM

Activate the Remote command mode

Command   : SREM K0
Response   : SREM **ES**

> Where
>
> > **ES**   = Error status (see ASTF command for error status description)

SMAN

Activate the Manual command mode

Command   **:** SMAN K0
Response   : SMAN **ES**

> Where
>
> > **ES**   = Error status (see ASTF command for error status description)

STBY

Cancels all running functions (close all the electro-valves) ,set the device to Stand-By and waiting a new command

Command   **:** STBY K0
Response   : STBY **ES**

> Where
>
> > **ES**   = Error status (see ASTF command for error status description)

ASTF

Return the current alarms values

Command   **:** ASTF K0
Response   : ASTF **ES X Y … N**

> Where
>
> > **ES**   = Error status
> >
> > *The **error status** byte in the acknowledgment telegram signals if
> > internal errors in the device occurred.
> > It is zero when no error appeared, and it is unequal zero when one or more errors
> > occurred. Every time a change in the errors happened the error status byte is incremented
> > by one, or when several errors disappeared is decremented by one . Error status byte
> > indicate the real number of errors. If the device does not have errors, the error status
> > byte contains the value 0.*
> >
> > **X Y … N** = The alarm code
> >
> > > <u>Alarm code :</u>
> > >
> > > | | |
> > > |---|---|
> > > | 0 | if there are no alarms |
> > > | 1 | if the pressure of the carrier gas is out of range |
> > > | 2 | if the pressure of the diluted gas is out of range |
> > > | 3 | if the outlet pressure is out of range |
> > > | 4 | if the command **SNOX** have been sent before the **SAIR** command |

SLST

Open the electro valves in order to perform the selected dilution point

Command   **:** SLST K0 **Arg**
Response   : SLST **ES**

> Where
>
> > **Arg**   = dilution point
> > **ES**   = Error status (see ASTF command for error status description)

SSPL

Open the electro valves in order to perform a purge

Command   **:** SSPL K0
Response   : SSPL **ES**

> Where
>
> > **ES**   = Error status (see ASTF command for error status description)

SRUC (HCL)

Open the electro valves in order to perform a purge with the carrier gases

Command   **:** SRUC K0
Response   : SRUC **ES**

> Where
>> **ES**   = Error status (see ASTF command for error status description)

SVIO

Select the desired diluted inlet (if the option is installed).

Command   **:** SVIO K0 **Arg**
Response   : SVIO **ES**

> Where
>> **Arg**   = 1   for the selection of dilution port 1
>> **Arg**   = 2   for the selection of the optional dilution port 2
>> …
>> **Arg**   = 26   for the selection of the optional dilution port 26
>> **ES**   = Error status (see ASTF command for error status description)

AVIO

Read the selected inlet port

Command   : AVIO K0
Response   : SVIO **ES Arg**

> Where
>> **Arg**   = 1   for the selection of dilution port 1
>> **Arg**   = 2   for the selection of the optional dilution port 2
>> …
>> **Arg**   = 26   for the selection of the optional dilution port 26
>> **ES**   = Error status (see ASTF command for error status description)

SVOU

Select the desired outlet port (if the option is installed).

Command   **:** SVOU K0 **Arg**
Response   : SVOU **ES**

> Where
>> **Arg**   = 1   for the selection of outlet port 1
>> **Arg**   = 2   for the selection of the optional outlet port 2
>> …
>> **Arg**   = 4   for the selection of the optional outlet port 4
>> **ES**   = Error status (see ASTF command for error status description)

AVOU

Read the selected outlet port

Command   : AVOU K0
Response   : AVOU **ES Arg**

Where

Arg	= 1	for the selection of outlet port 1
Arg	= 2	for the selection of the optional dilution port 2
…		
Arg	= 4	for the selection of the optional dilution port 4
ES		= Error status (see ASTF command for error status description)

EFDA

Set the purge time [s]

Command   : EFDA K0 **Arg1 Arg2 Arg3**
Response   : EFDA **ES**

Where

Arg1   = optional HCL, SSPL or SRUC (by diluted or carrier gas)

Arg2   = time for upstream purge [s] (0 to 240)

Arg3   = time for downstream purge [s] (0 to 240)

ES   = Error status (see ASTF command for error status description)

AFDA

Read the set purge time [s]

Command   : AFDA K0 **Arg1**
Response   : AFDA **ES Arg2 Arg3**

Where :

Arg1   = optional HCL, SSPL or SRUC (by diluted or carrier gas)

Arg2   = time for upstream purge [s] (0 to 240)

Arg3   = time for downstream purge [s] (0 to 240)

ES   = Error status (see ASTF command for error status description)

AGAT

Read the type of gas and the corresponding correction factor of the gases table

Command   : AGAT K0

Response   : AGAK **ES Gas1 Cf1 Gas2 Cf2 … GasN CfN**

Where

      Gas   = the type of gas
      Cf   **=** the corresponding correction factor of the gas

      ES   = Error status (see ASTF command for error status description)

EGAK

Set the values of the inlet gases

Command   **: EGAK K0 Gas1 Gas2 Arg [Inlet]**
Response   : EGAK **ES**

Where

      Gas1   = the carrier gas (only the gases returned by the AGAT command are accepted)
      Gas2   = the diluted gas (only the gases returned by the AGAT command are accepted)
      Arg   = the concentration in ppm of the diluted gas
      Inlet = the physical inlet of the diluted gas (facultative)

      ES   = Error status (see ASTF command for error status description)

AGAK

Return the values of the set inlet gases

Command   **: AGAK K0**
Response   : AGAK **ES Gas1 Gas2 Arg [Inlet]**

Where

      Gas1   = the carrier gas
      Gas2   = the diluted gas
      Arg   = the concentration in ppm of the diluted gas
      Inlet = the physical inlet of the diluted gas
              (this parameter is returned only if it has been used in the EGAK command)

      ES   = Error status (see ASTF command for error status description)

ALST

Reads the dilution ratios in % of the selected dilution gas
(take into account the nature of the inlet gases, EGAK)

Command   : ALST K0 **[Point]**
Response   : ALST **ES Point0 Dil0 Point1 Dil1…PointN DilN**

      Where

            Point = the dilution point (facultative for command)
            Dil   = the dilution ratios in % [the considered dilution point]

            ES   = Error status (see ASTF command for error status description)

AKAK

Return the final concentration in ppm of the selected dilution gas
(take into account the nature and the concentration of the inlet gases, EGAK)

Command   : AKAK K0 **[Point]**
Response   : AKAK **ES Point0 Dil0 Point1 Dil1 … PointN DilN**

      Where

            Point = the dilution point (facultative for command)
            Dil   = the concentration in ppm [the considered dilution point]

            ES   = Error status (see ASTF command for error status description)

ASTZ

Return the status of the instrument

Command   **: ASTZ K0**
Response   : ASTZ **ES Stat1 Stat2**

      Where

          ES = error status (see ASTF command for error status description)
          Stat1 =
              SREM   Remote mode
              SMAN   Manual mode
          Stat2 =
              STBY   if the device is in the stand-by mode
              SLST POINT   if the device is generating a dilution point
                                  Where POINT is the actual dilution point in use
              SSPL PHASE   if the device is generating a purge
                                   Where PHASE is the actual phase in use
              SRUC PHASE   if the device is generating a carrier purge
                                   Where PHASE is the actual phase in use
              SAIR   if the AIR valve is open (NOX option)
              SONO   if the NO valve is open (NOX option)
               SNOX O3_VALUE if the device generate O3 (NOX option)
                                   Where O3_VALUE is the O3 generated

ADRU

Read the raw pressure values (the unit is defined by the software)

Command   : ADRU K0 **[Line]**
Response   : ADRU **ES Value1 Value2 Value3**

      Where

Line	= 1	Read the pressure on the carrier line (facultative)
Line	= 2	Read the pressure on the diluted line (facultative)
Line	= 3	Read the output pressure (option) (facultative)
Value	= The pressure of the corresponding line	
ES	= Error status (see ASTF command for error status description)	

AKEN

Read the string (of max 40 ASCI characters) storred in the EEPROM

Command   : AKEN K0
Response   : AKEN **ES Message**

      Where

ES	= Error status (see ASTF command for error status description)
Message	= Message is the string of max. 40 ASCI characters

EKEN

Store an string of max 40 ASCI characters in the EEPROM

Command   : EKEN K0 **Message**
Response   : EKEN **ES**

      Where

ES	= Error status (see ASTF command for error status description)
Message	= Message is the string of max. 40 ASCI characters

APAR

Read the configuration of the device

Command   : APAR K0
Response   : APAR **ES Arg1 Arg2 … Argn**

Where

ES	= Error status (see ASTF command for error status description)	
Argn	= The system configuration of the device	

ASYZ

Return the date and time of system

Command   **:** ASYZ K0
Response   : ASYZ **ES Arg**

Where

ES	= Error status (see ASTF command for error status description)
Arg	= Date and time in format "yyMMdd HHmmss"

ATEM

Read the raw temperature values (the unit is defined by the software)

Command   **:** ATEM K0 **[Line]**
Response   : ATEM **ES Value**

Where

Line	= 1 Read the internal temperature (facultative)
Value	= The temperature of the corresponding line
ES	= Error status (see ASTF command for error status description)

EGCF

Set diluted conversion factor (blend gas)

Command   **:** EGCF K0 **Arg**
Response   : EGCF **ES**

Where

Arg	= Conversion factor for blend gas
ES	= Error status (see ASTF command for error status description)

⚠️ **a.) To calculate the concentration (ALST or AKAK instruction) values with the blend as conversion factor, the EGCF argument value (CF) must be > 0.**

b.) Set to 0 , if you want that the Sonimix automatically calculates the CF as long as the gas used have been entered into gas list.

AGCF

Read diluted conversion factor set (blend gas)

Command   **:** AGCF K0
Response   : AGCF **ES Arg**

Where

Arg	= Conversion factor for blend gas
ES	= Error status (see ASTF command for error status description)

SKOP (NOX option)

Activte the NOx converter tester

Command   **:** SKOP K0
Response   : SKOP **ES**

Where

ES	= Error status (see ASTF command for error status description)

SVSA (NOX option)

Open functions for the NOx converter tester

Command   **:** SVSA K0 **Arg**
Response   : SVSA **ES**

Where

Arg	= 101	generate the ozone (the last value set by software)
Arg	= 102	switch on the AIR valve (like SAIR)
Arg	= 103	switch on the NO valve (like SONO)
ES	= Error status (see ASTF command for error status description)

SVSZ (NOX option)

Close functions for the NOx converter tester

Command   **:** SVSZ K0 **Arg**
Response   : SVSZ **ES**

Where

Arg	= 101	stop the ozone
Arg	= 102	switch off the AIR valve (like SAIR)
Arg	= 103	switch off the NO valve (like SONO)
ES	= Error status (see ASTF command for error status description)

SONO (NOX option)

Open or close the valves in order the perform the NO phase of the NOx converter tester

Command   **:** SONO K0 **Arg**
Response   : SONO **ES**

Where

Arg	= 1	Open the valves
Arg	= 0	Close the valves
ES	= Error status (see ASTF command for error status description)

SAIR (NOX option)

Open or close the valves in order the perform the Air phase of the NOx converter tester

Command   : SAIR K0 **Arg**
Response   : SAIR **ES**

Where

Arg	= 1	Open the valves
Arg	= 0	Close the valves
ES	= Error status (see ASTF command for error status description)

SNOX (NOX option)

Set the ozone in order to generate NO2 phase of the NOx converter tester
Pay attention : the commands **SONO** and **SAIR** must have been sent previously

Command   : SNOX K0 **Arg**
Response   : SNOX **ES**

Where

      Arg   = desired NO2 value   (0 = minimal value and 100 = maximal value)
      ES   = Error status (see ASTF command for error status description)

ANOX (NOX option)

Read the set ozone value

Command   : ANOX K0
Response   : **SNOX ES Arg**

      Where

      Arg   = desired NO2 value   (0 = minimal value and 100 = maximal value)
      ES   = Error status (see ASTF command for error status description)