EP1000A

Stack dust monitoring

OPERATION AND MAINTENANCE

AFAQ ISO 9001

CE

Fabrication française

OLDHAM

DETECTION GAZ / MESURE A L'EMISSION
GAS DETECTION / STACK GAS MONITORING

L I M I T S O F R E S P O N S I B I L I T Y

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CONTENTS

FOREWORD

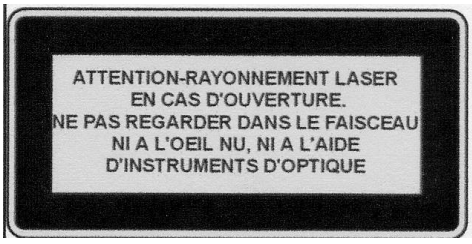
WARNING

- The EP1000A appliance uses a laser diode which emits a laser beam modulated at 2 kHz, with a wavelength of 660 nm and a maximum power of 2mW (mean power = 1 mW).

- This laser beam thus belongs to class 3A.

- The following markings are therefore clearly indicated on the labels as follows:

INSIDE AND OUTSIDE LABELS



I. COMMISSIONING OF THE INSTALLATION

Warning: The operations and adjustments described in this paragraph are reserved to AUTHORISED personnel only.

? This section describes the commissioning procedure
? It is assumed that at least:
- all parts of the installation are connected
- the electric mains supply is not yet connected: the various parts (EP1000A, and accessories...) are therefore voltage-free (shut down).

IMPORTANT: Nevertheless, in order to protect the EP1000A (gases, vapours, dust, damp, etc.) while waiting for commissioning, it is preferable to start up the turbine only, once wiring work has been completed.

1. CHECKING THE INSTALLATION

? **Note:**

It is assumed that the installation is in conformity with the currently-applicable standards and that the "process" is working.

Before beginning **the commissioning into service**, it is necessary to check the trajectory of the laser beam.

PROCEDURE:

✍ Open the EP1000A unit after first unlocking the lateral roses.

✍ After first removing the 2 screws (**fig. 1 ref. A**): extract the photoreceptor module (**fig. 1 ref. B**) and disconnect it.

✍ If required, attach the makeshift aiming tube[1] to the support of the photoreceptor module (**fig. 1 ref. B**).

✍ Check by eye, looking into the tube, if the trajectory of the laser beam is correct, i.e. if the laser beam is exiting correctly via the hole in the smokestack diametrically opposite the EP1000A, or if it is stopped in the light trap.

There should be dispersion of the beam (smearing) on the edges of the hole.

If a trajectory correction is required, it will be necessary to use the alignment system (**fig. 2 ref. C**) by adjusting the tightness of the fixings (**fig. 2 ref. D**) using a flat 24[2] spanner.

✍ When the check is completed, do not forget to remove the aiming tube and to re-position the photoreceptor module.

1 This makeshift aiming tube facilitates checking of the trajectory of the beam (it can be made of card, paper or anything else)

2 Make sure that the springs are fairly well compressed, so as to provide maximum protection from vibration .

2. SWITCHING-ON THE INSTALLATION

The various parts of the installation (EP1000A, turbine, recorder, etc.) can be switched on using the circuit-breakers[3] which protect each mains feed.

However, the EP1000A is itself fitted with an on/off switch (fig 1 – Ref. C) which must be switched to the "On" position

3. COMMISSIONING THE EP1000A INTO SERVICE

Open the EP1000A unit after first unlocking the lateral roses.

? Operate the on/off switch located on the main board: **fig. 1 ref. C**

***Note*:** the procedure described in this paragraph is valid for all the EP1000A versions available (with built-in or remote display).

? With the EP1000A now powered up:
The yellow "Fault" lamp comes on (steady) for 20 seconds at the start of the stabilisation cycle.
The green lamp blinks.

The display indicates the following, for example:

LASER DIODE DUST COUNTER **Version FR1.0.**

Checking the **data in memory**

Stabilisation in progress **Please wait: 20 s**

Then the appliance counts the seconds down to 5 where it holds for a few seconds, for the time it takes to set its ELECTRICAL ZERO.
(The green and yellow lamps are on "steady").

Then, the "Fault" lamp goes out, the green lamp blinks, and the display shows the following for the first commissioning into service:

Please perform [4] **the commissioning procedure**

alternating with:

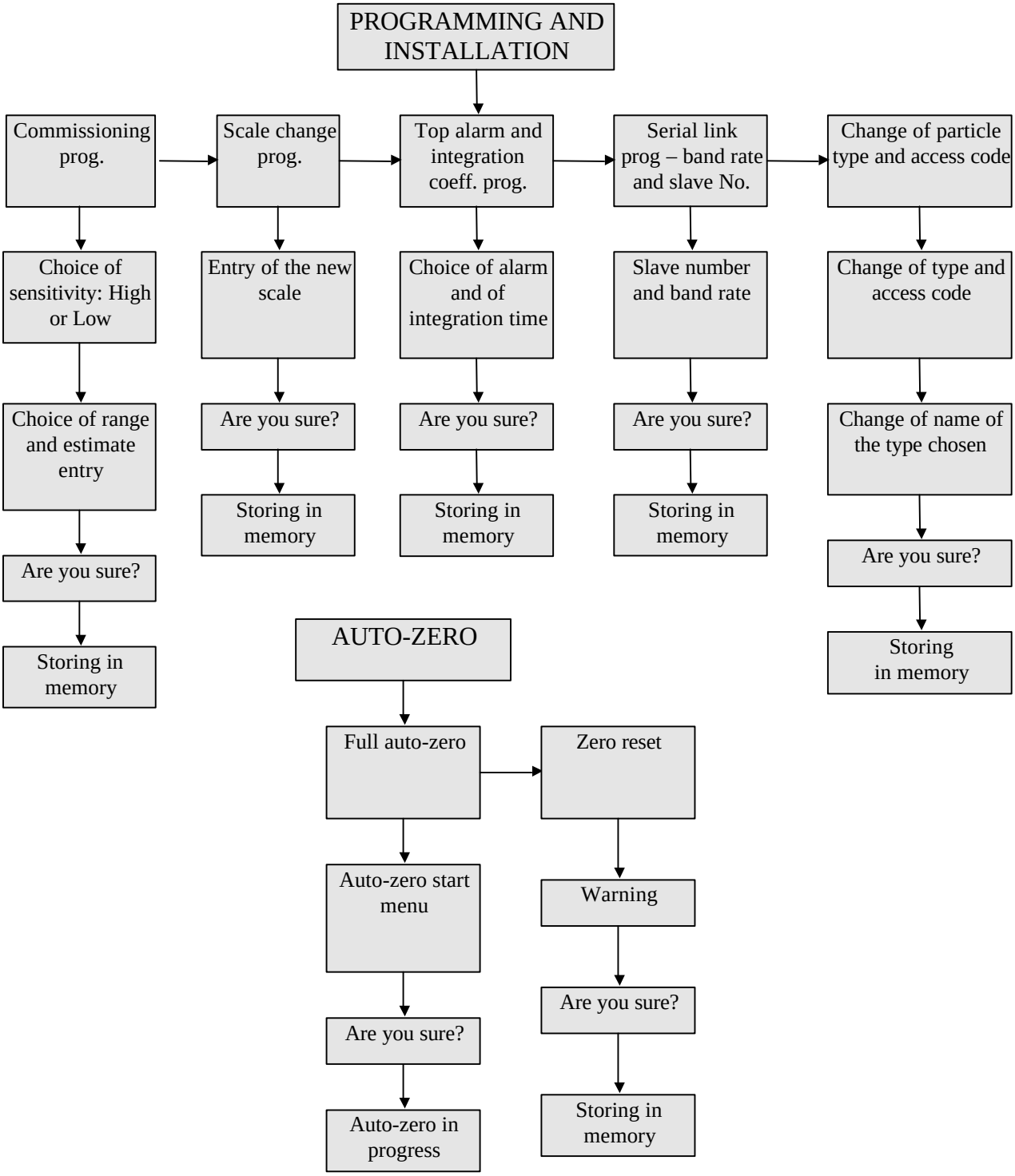
Dust : TYPE 1 **Measurement : 0 . 00 mg / Nm3**

3 The circuit-breakers should be chosen in accordance with the length of the installed electric cables

4 The "dust" measurements are displayed directly if commissioning has already been done.

4. PROGRAMMING AND INSTALLATION OF THE EP1000A:

- Done with the **PROGRAMMING and INSTALLATION** menu, which allows the use of other "sub-menus", as shown in the following chart:
- Use the "local" or " remote" keyboard to gain access to these menus (see fig. 3 at the beginning of the manual)

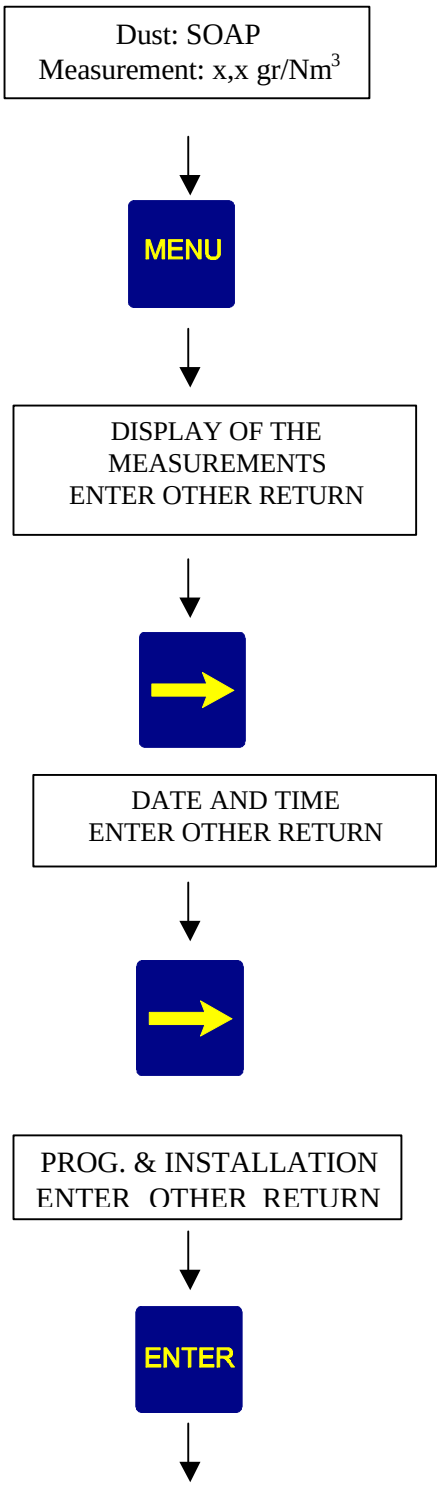


4.1. PROGRAMMING AND COMMISSIONING

✍ As shown in the diagram on page 29, in the main "Programming and installation" menu.

✍ To gain access to this menu now, do the following:

NB: The industrial process is in operation.



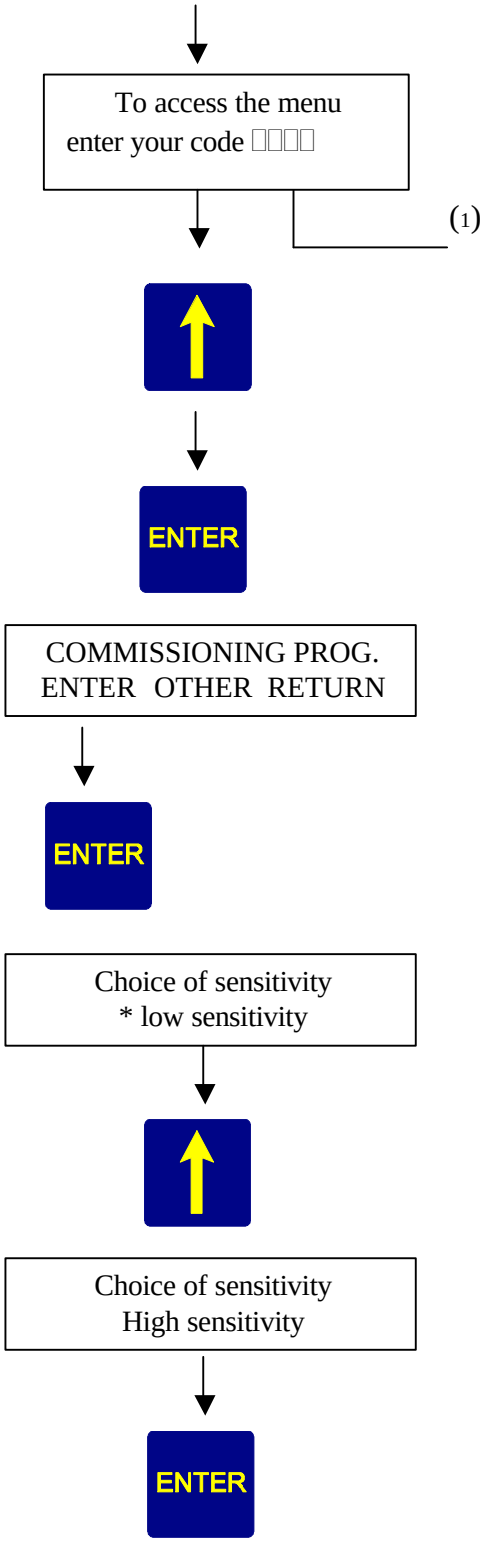
? In normal operation: Display of the current measurement

Display of first menu

Display of second menu

Display of third menu "Programming and installation" which will be used

Validate this menu



Request for access code
(1) Standard factory code: 1000 or code modified by the user

The index below the figure indicates the figure to be changed .

Using these 2 keys:
Display your code

Display of first menu

Validate the code

Display of "sub-menu":
"programming and commissioning"

Validate

Display of sensitivity choice -
"low" or "other"

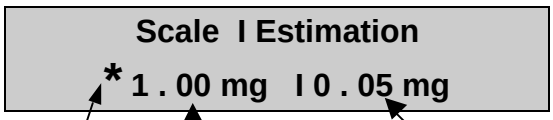
Validate your choice to suit the conditions of the site to be monitored (2)

(2) **Note**: the sensitivity is chosen as a function of two parameters: the level of sunshine and the level of alternating signal.

In fact, it is necessary to have the maximum of usable signal while avoiding any saturation. It is possible to do a first installation, and then to check the percentages of direct and alternating signal in the maintenance menu.

For example:

- An installation in winter with 20% of direct component is very likely to be saturated in the summer. It is necessary to go to low sensitivity.
- It is preferable to go to high sensitivity when there is a very high gain (64 x 128 x 256)
- If the EP1000A indicates “operation to exceed scale impossible”, it may be necessary to go to low sensitivity.



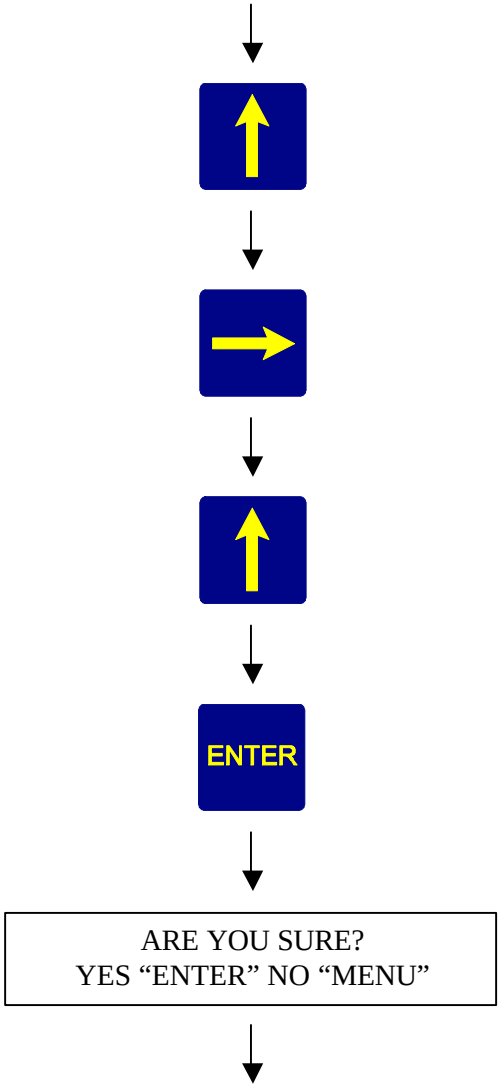
? The star indicates the value currently in memory
N.B.: If the scale changes, then the EP1000A calculates X0, XF, initial gains and puts them in memory.
? The star blinks alternately with the appearance of a black square (1)

You have the choice of several scales between 1 mg and 10 g

Estimate of current discharge in smokestack

(1) this blinking black square shows the window which is currently modifiable

For example



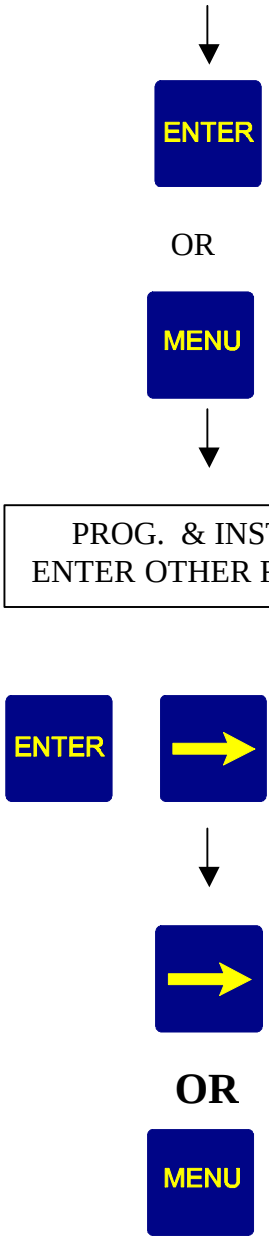
Using this key:
Display the wanted scale.

By pressing once on this key to bring the blinking black square into the "ESTIMATION" window

Using this key:
Display estimate of current stack discharge

Validation of the new scale and estimate parameters

Request for confirmation of the new programming



To validate “YES”

To validate “NO” and re-start, or to keep the existing parameters

Return to beginning of “Programming and installation” menu

To use another menu

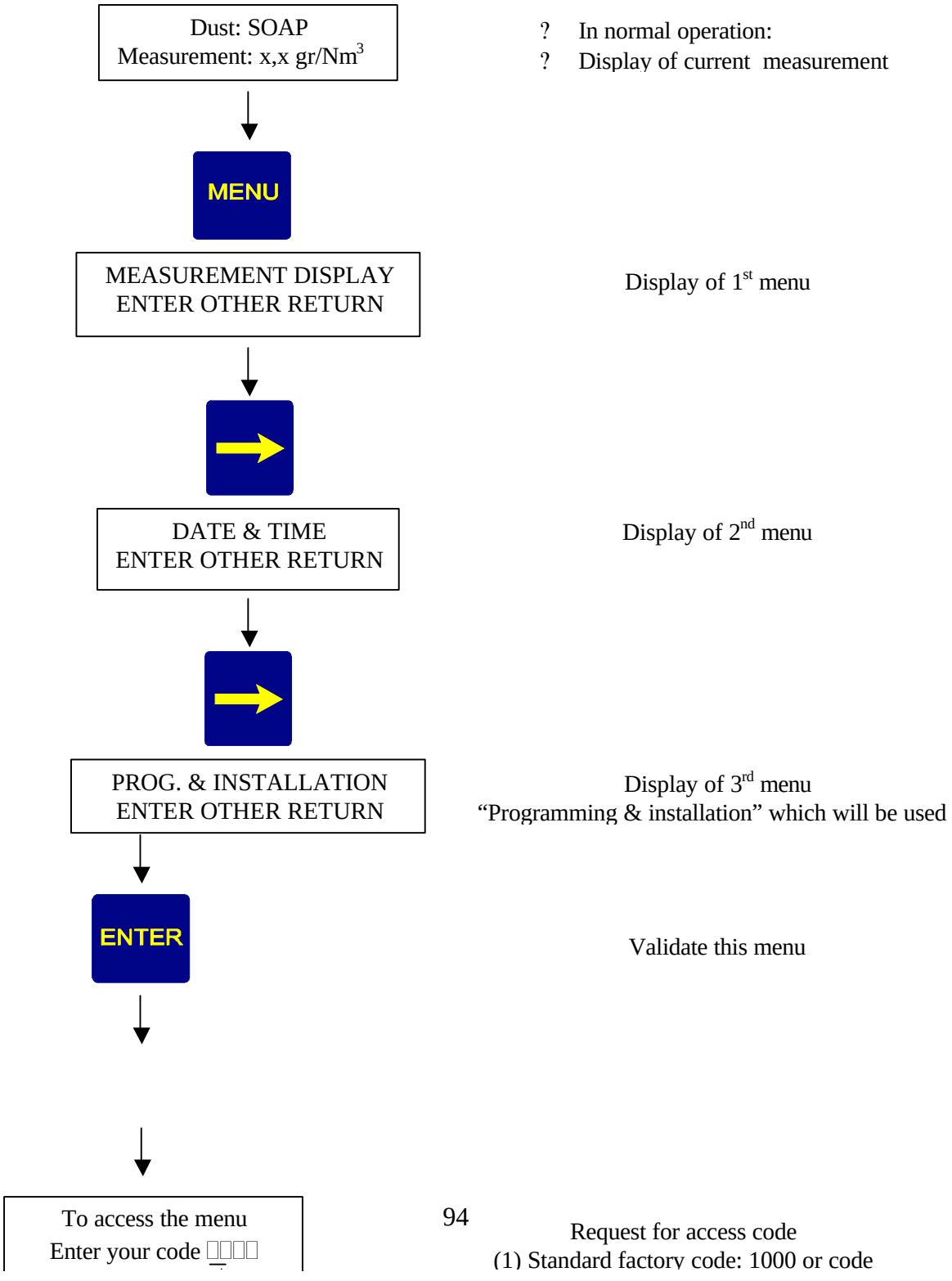
To return to normal operation and display the current measurement.

4.2 CHANGE OF SCALE

This sub-menu is used to go from one scale to another while keeping the measurement parameters (xO and xF). It is therefore no longer necessary to repeat the calibration after this change of scale.

Warning: this type of change can only be done between adjacent scales (commissioning) and with the same unit of measurement.

? *To gain access to this menu:*



To validate “YES”

To validate “NO” and re-start, or to keep the existing parameters

Return to the start of the “Programming and installation” menu

To use another menu

To return to normal operation and display of the current measurement.

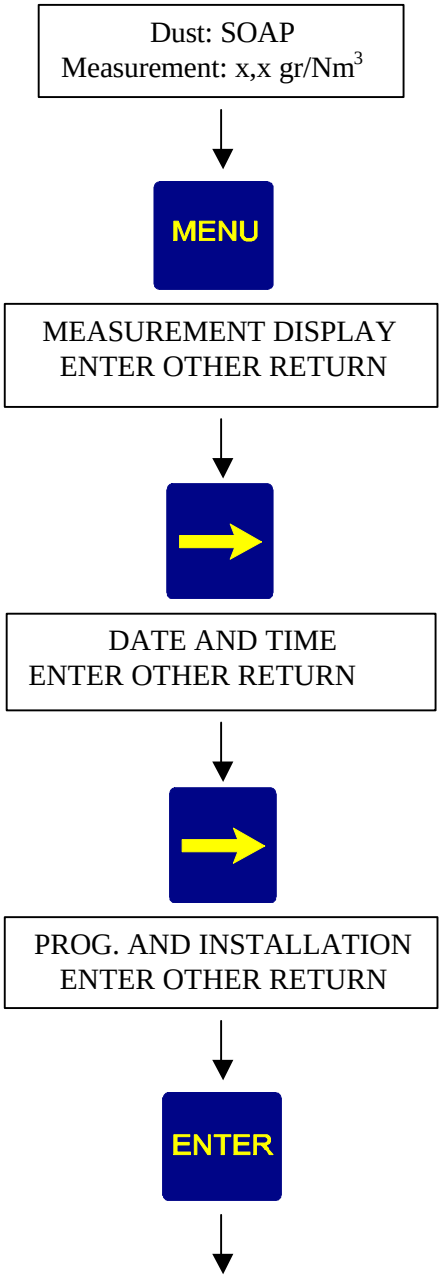
4.3 PROGRAMMING THE ALARM AND INTEGRATION TIME

Used to set the alarm threshold, as well as the integration[5] time of the measurement (none, 5 sec, 30 sec, 1mn, 2 mn, 5 mn, 10 mn, 15 mn).

Example of display:

Alarm: I Integration *** X . X mg I * X sec**

? *To gain access to this menu:*



? In normal operation:
? Display of current measurement

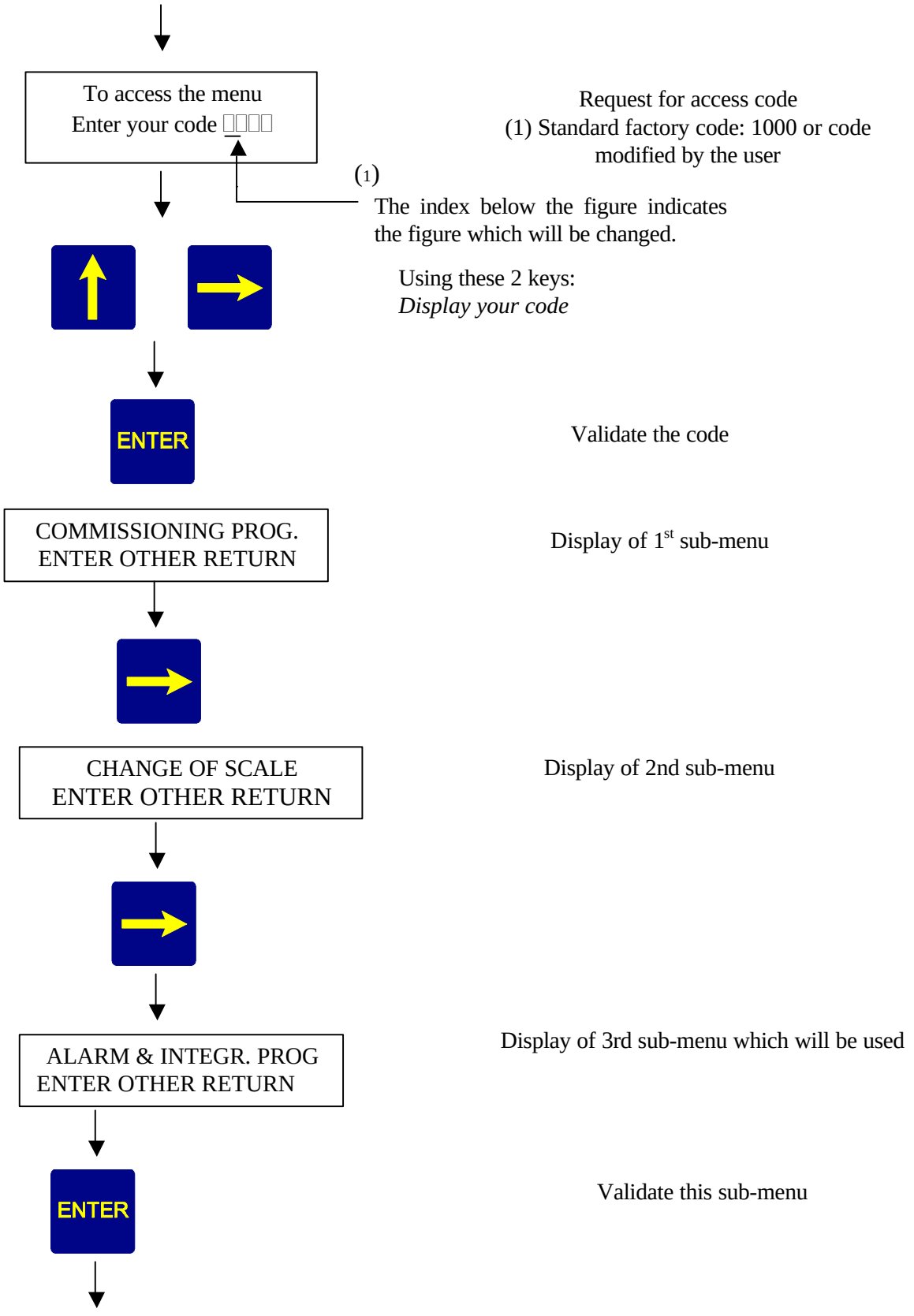
Display of 1st menu

Display of 2nd menu

Display of 3rd menu
"Programming and installation" which will be used

Validate this menu

[5] an integrated measurement is one which is smoothed out. This smoothing will be calculated over an interval which will match times chosen beforehand. This prevents the appearance of "peaks" of varying size, due to sharp and sudden variations in signal amplitude.



Request for access code
(1) Standard factory code: 1000 or code modified by the user

The index below the figure indicates the figure which will be changed.

Using these 2 keys:
Display your code

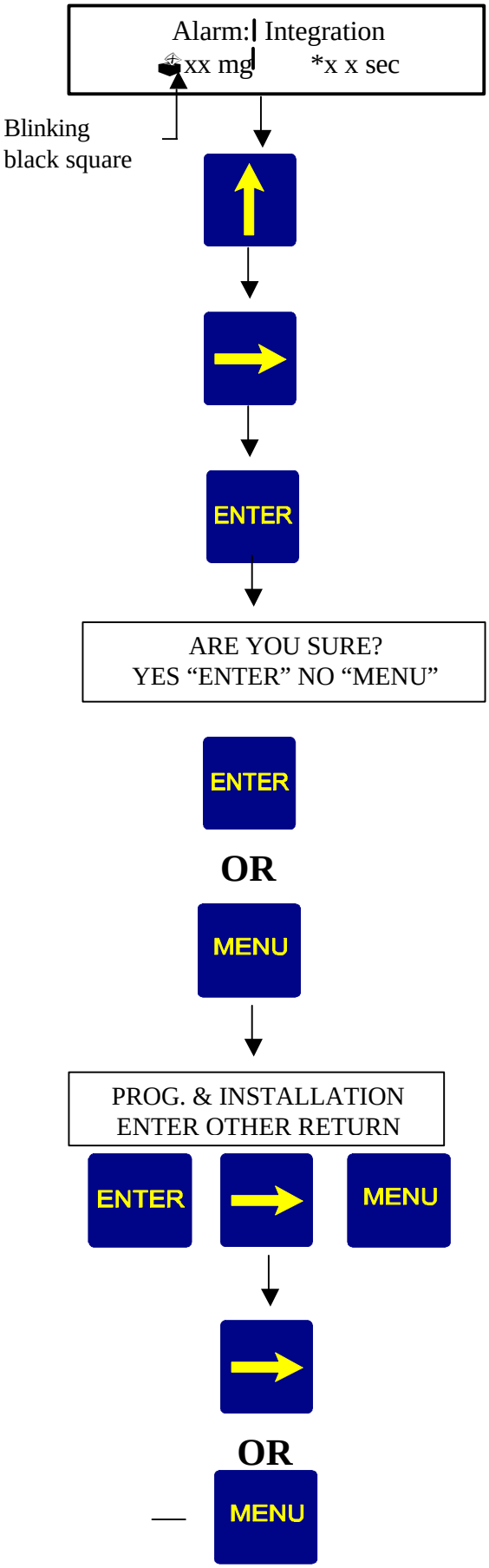
Validate the code

Display of 1st sub-menu

Display of 2nd sub-menu

Display of 3rd sub-menu which will be used

Validate this sub-menu



With this key:
Display the wanted alarm

With this key:
Display the wanted integration time

Validate this new programming

Request for confirmation of the new programming

To validate “YES”

To validate “NO” and re-start or to keep the existing parameters

Return to start of
“Programming and installation” menu

To use another menu

To return to normal operation and display of the current measurement.

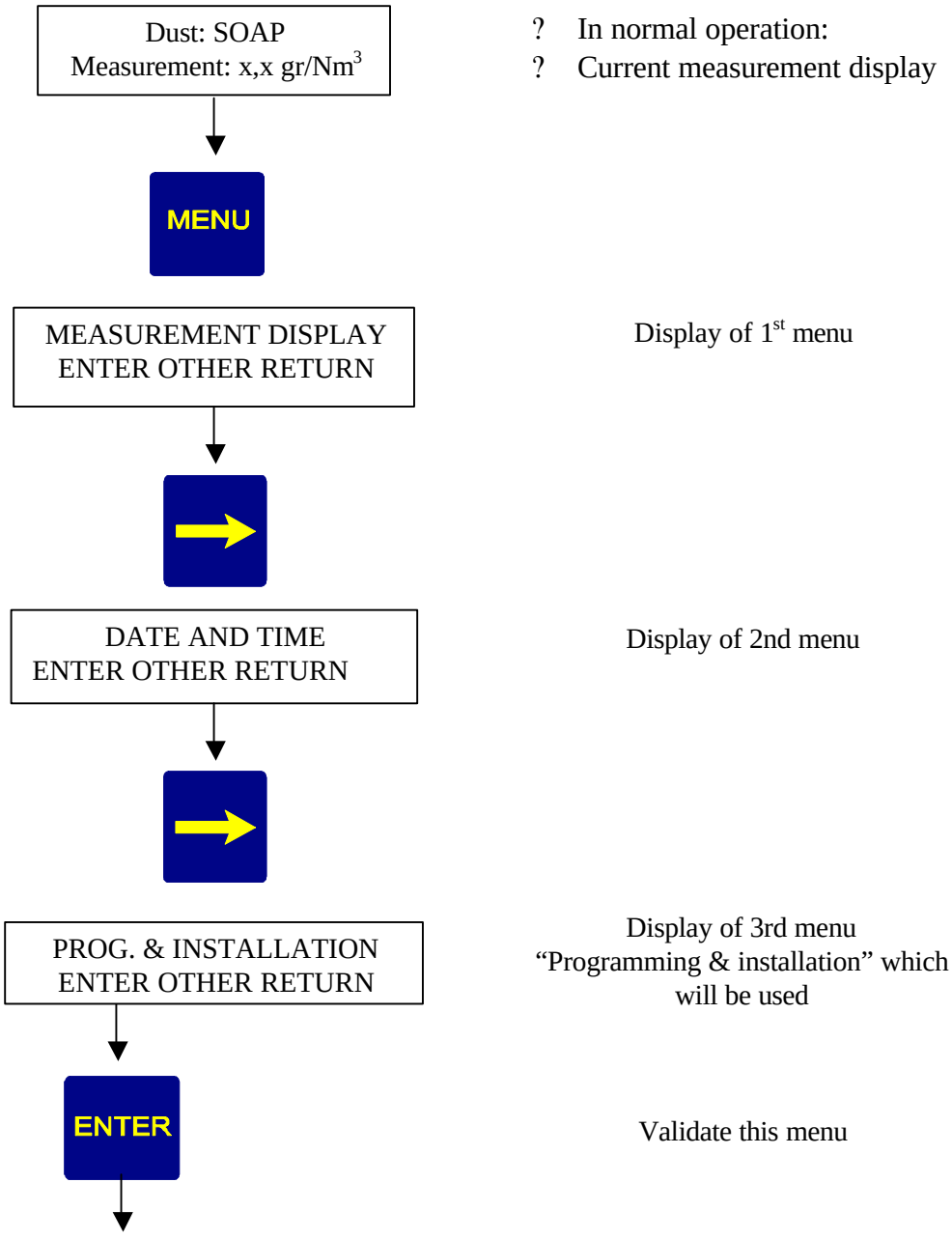
4.4. SERIAL LINK PROGRAMMING

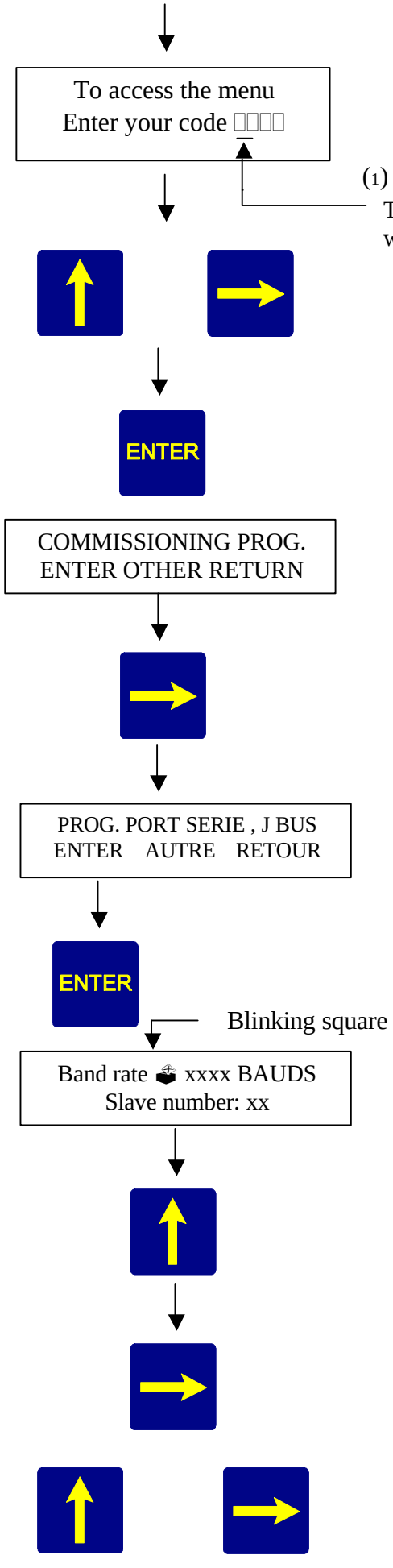
This is used to select the band rate of the serial link (1200, 2400, 4800, 9600 or 19200 bauds) and the slave number for the J-Bus protocol, and to assign the slave number.

Example of display:

Band rate 9600 BAUDS **Slave number: 01**

? *To gain access to this menu*





Request for access code
(1) Standard factory code: 1000 or code modified by user

The index below the number indicates the figure which will be changed

Using these 2 keys:
Display your code

Validate the code

Display of 1st sub-menu

Press this key 3 times until the “Serial port programming” menu appears

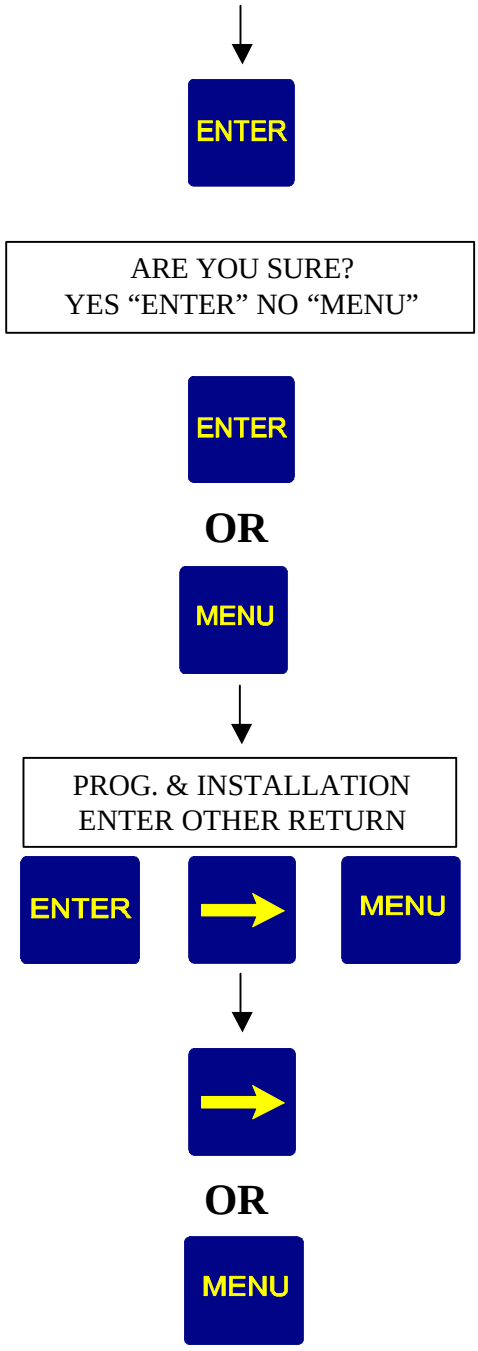
Display of the “Serial port” menu which will be used

Validate

Using this key, change your band rate if necessary (x Bauds)

The black square blinks in front of the slave number

Now enter the slave number of your operation, if necessary



Validate this programming

Request for confirmation of the new programming

To validate “YES”

To validate “NO” and re-start, or to keep the existing parameters

Return to the start of the “Programming and installation” menu

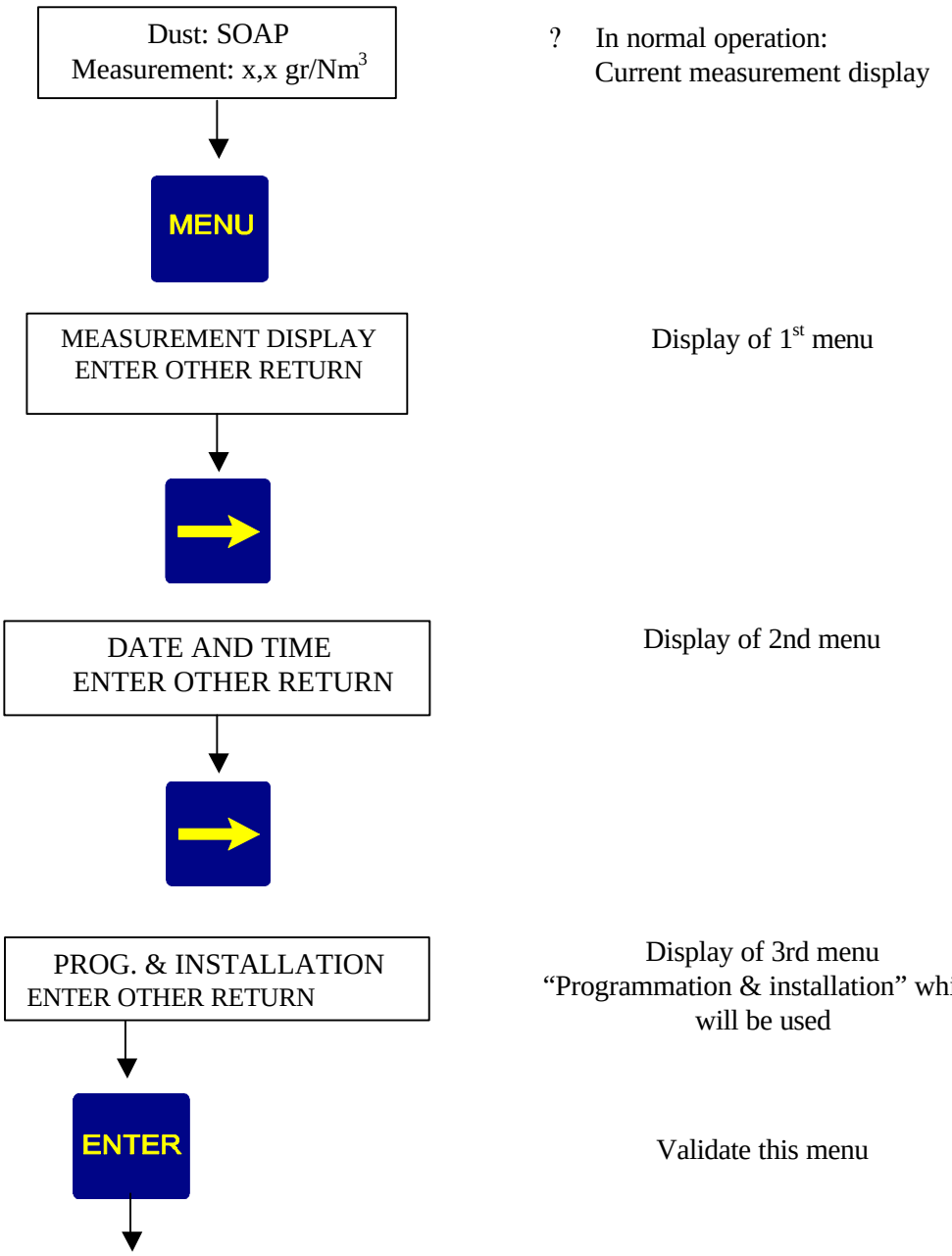
To use the other menu

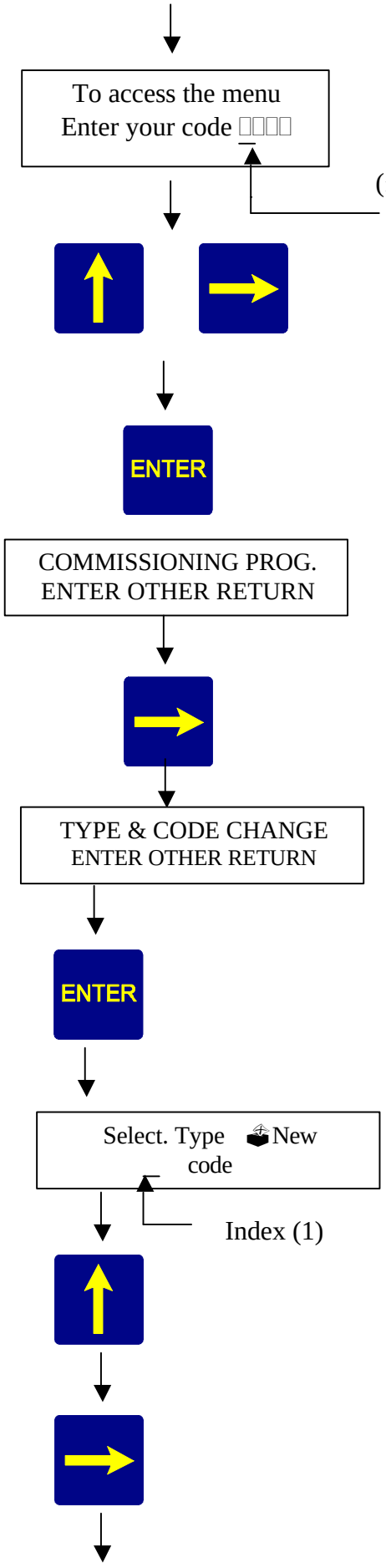
To return to normal operation and to display the current measurement

4.5. CHANGE OF PARTICLE TYPE AND OF THE ACCESS CODE

Note: This menu is used to go from one type of production or dust to another (10 types), and to change the name of the process concerned.

? *To gain access to this menu:*





Request for access code
(1) Standard factory code: 1000 or code changed by the user

(1)

The index below the number indicates the figure to be changed

Using these 2 keys:
Display your code

Validate the code

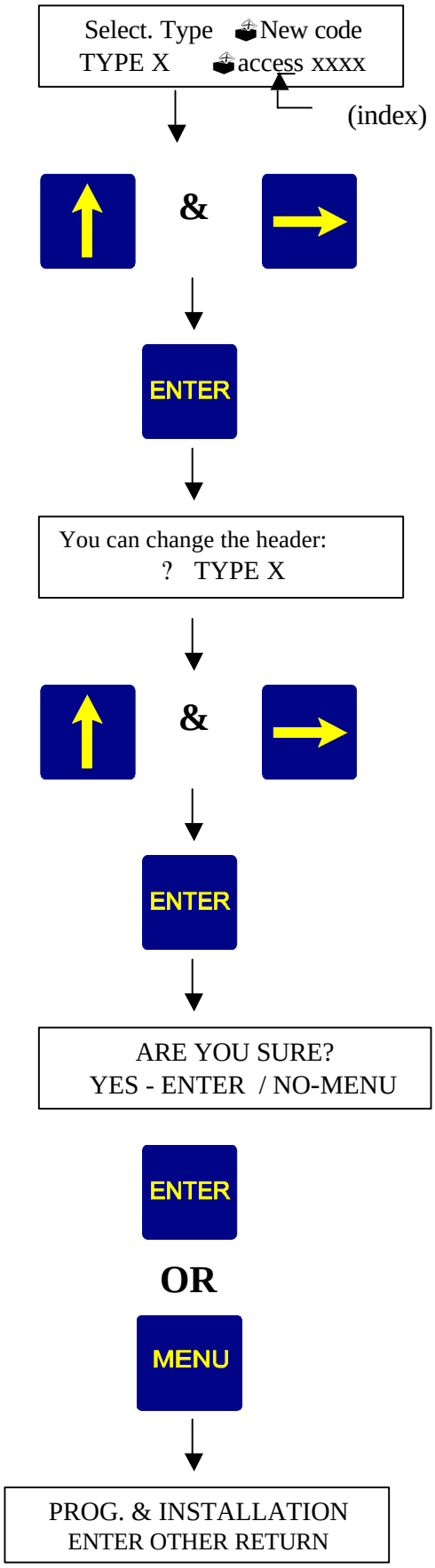
Display of 1st sub-menu

Press this key 4 times until the “Change particle and code type” menu appears

Display of “Change particle and code type” menu which will be used

(1) Standard factory code: 1000 or code modified by the user

With this key: display the type number



With these 2 keys: display your new access code

Validate this new code

Option to assign a name to this "new" particle type (8 figures and letters max)

Programming, if necessary, of this new particle name

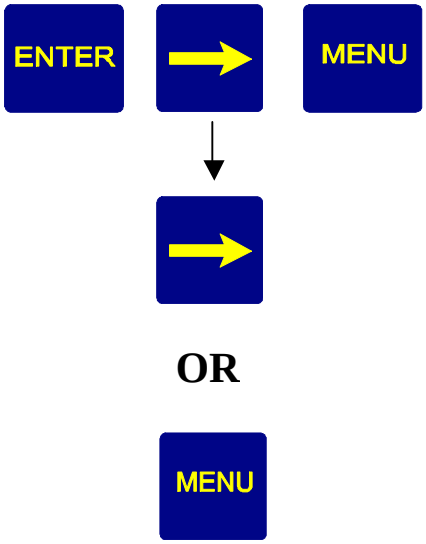
Validate this new programming

Request for confirmation of the new programming

To validate “YES”

To validate “NO” and re-start or to keep the existing parmeters

Return to the start of the “Programming & installation” menu



To use another menu

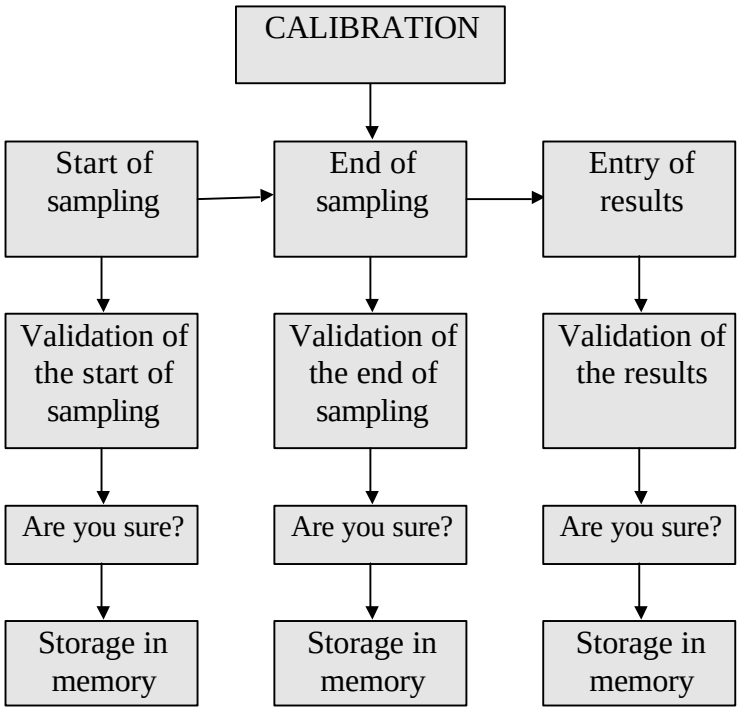
To "return" to normal operation and display the current measurement

4.6. CALIBRATION

When the above programming has been completed (1.4.1 to 1.4.5), the display now shows the following alternatively with the current measurement.

Please perform the calibration

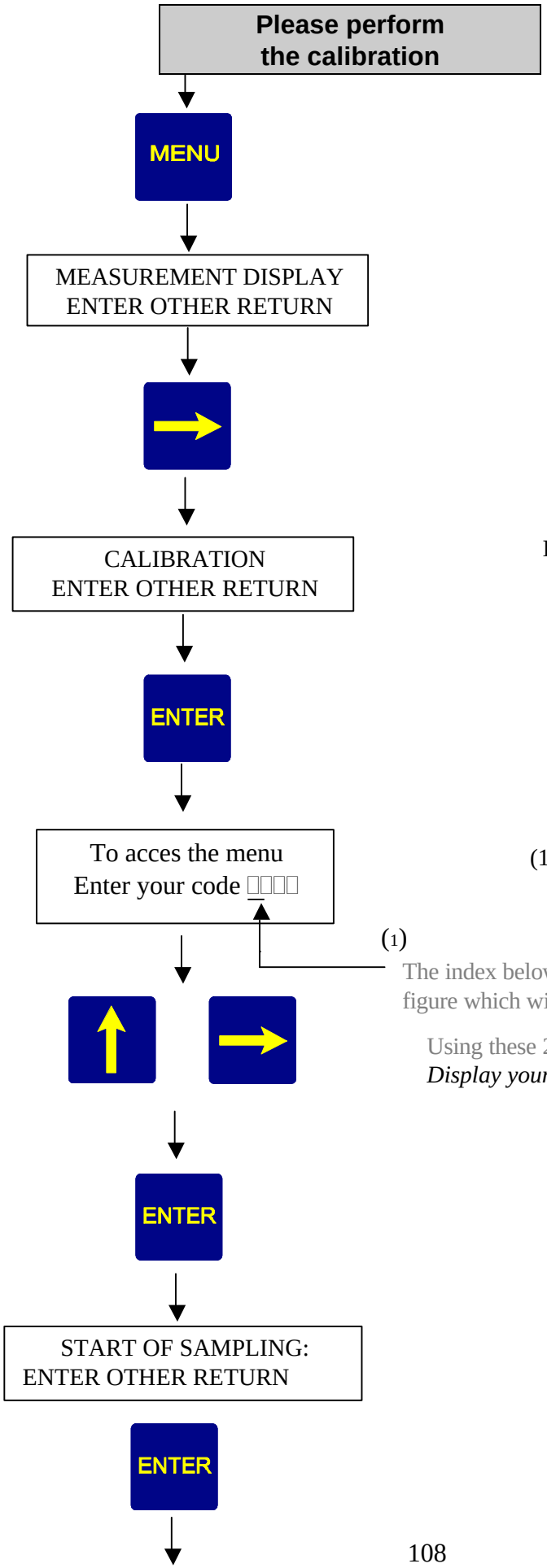
For this, it is therefore necessary to use the **calibration** menu, the block diagram of which is shown below:



These various menus are used as follows:

Start of sampling	- To begin the storage of measurements for a given time, in accordance with the characteristics of the site.
End of sampling	- To halt the storage of measurements
Entry of results	- To validate the actual result of the sampling using the keyboard, performed by an official body – a comparison will be made between the measurements taken by the EP1000A and the organisation concerned, and then the appliance will effect an automatic correction if necessary.

? *To gain access to this main menu:*



The index below the number indicates the number which will be changed.

Using these 2 keys:
Display your access code

Appearance of the "Measurement display" menu "

Press this key 4 times, until the "Calibration" menu appears

Display of the "Calibration" menu which will be used

Validate this menu

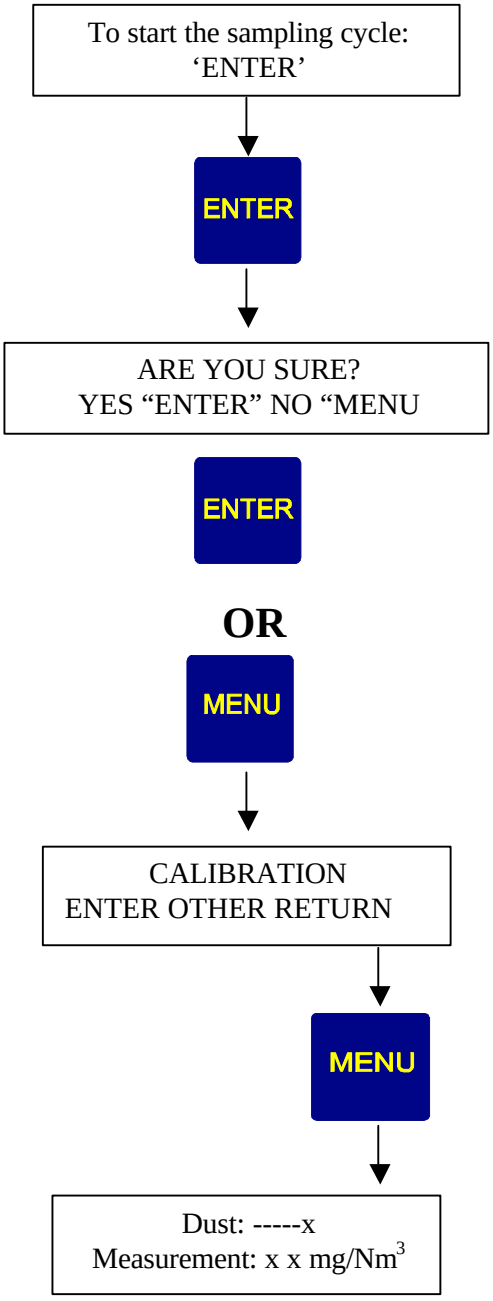
Request for the access code
(1) Standard factory code: 1000 or code modified by the user

The index below the number indicates the figure which will be changed

Using these 2 keys:
Display your code

Validate the code

Validate the start of sampling



To confirm the start of sampling (1)

To validate "YES"

To validate "NO" and to keep the existing parameters

Return to the start of the "Programming and installation" menu "

To return to normal operation and display of the current measurement

(1) When the "start of sampling" is confirmed, the EP1000A stores the measurements (storage in memory) until the moment when "end of sampling" is validated.

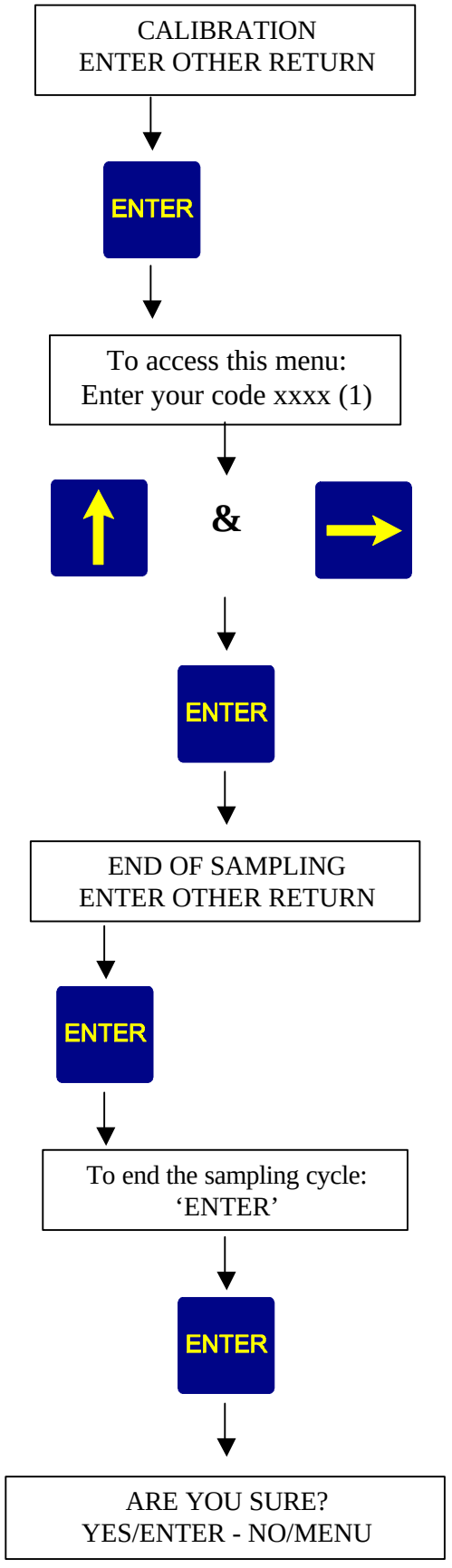
(2) This time between "start and end of sampling" will be chosen according to the characteristics of the site and the time necessary for the organisation to effect all of these various samples.

? <u>During this time</u>: - THE EP1000 continues, in parallel, to "work" normally.

- A sample, which will be sent to us later, is taken from the smokestack by an approved organisation which will check exactly the weight of the particles emitted (using a balance), in addition to various parameters such as the flow, the temperature, the humidity, the dust, etc.

When the planned time between the "start and the end of sampling" has ended:

? Resume the procedure as before until the appearance of:



Validate this menu again

(1) Standard factory code: 1000 or the code modified by the user

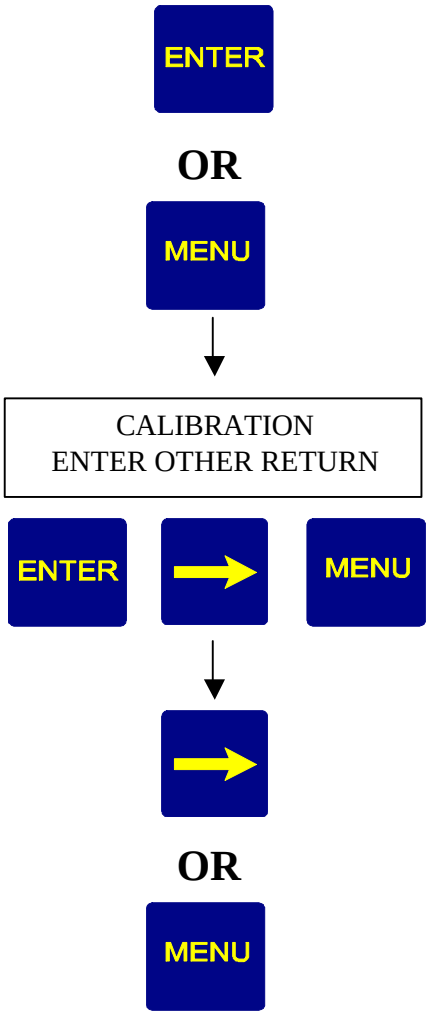
With these keys: display your access code

Validate the code

Validate the end of sampling

To confirm the end of sampling (2)

Request for confirmation of the new programme



To validate YES

To validate “NO” and re-start, or to keep the existing parameters

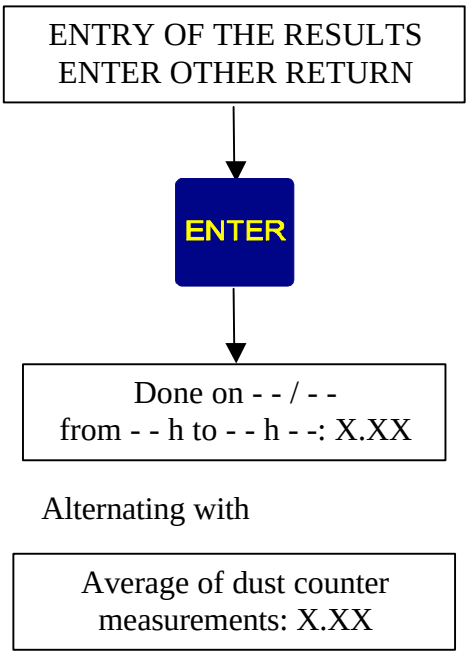
Return to the start of the "Programming and installation" menu

To use another menu

To return to normal operation and to display the current measurement

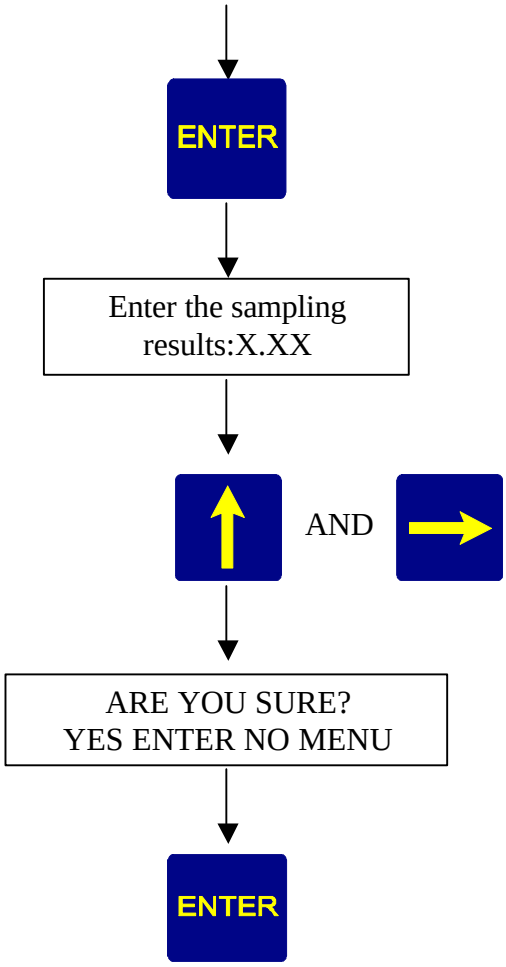
ENTRY OF THE SAMPLING RESULTS

Resume the calibration procedure as before until the appearance of:



Validation of the sampling results entry menu

The dust counter alternately displays the measurements taken during the times and on the dates shown



Enter the measurement given by the approved body

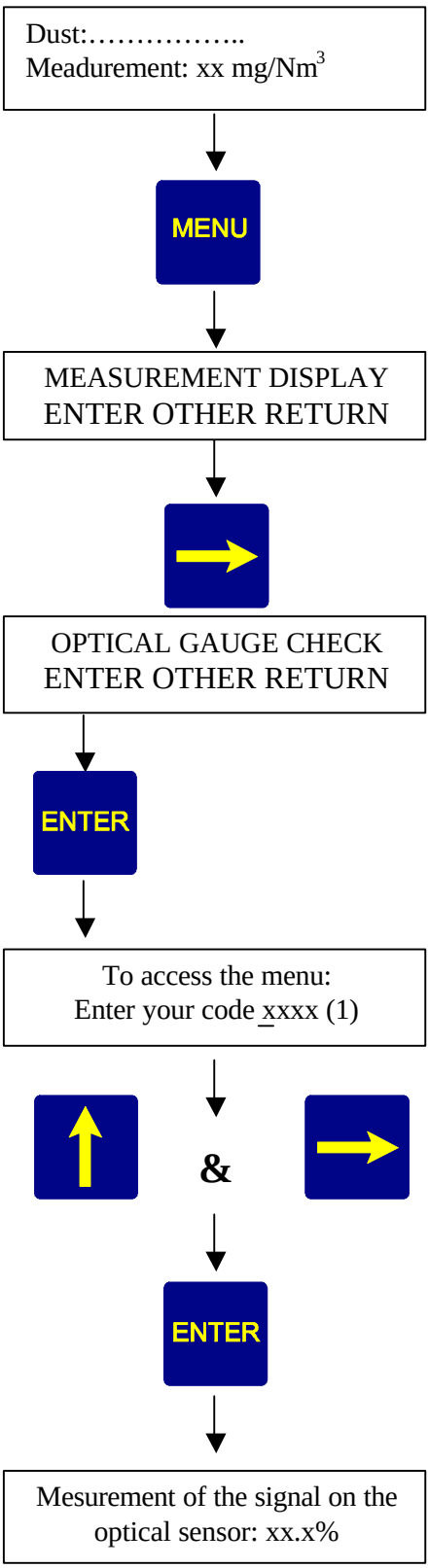
- Validate this cal. measurement

4.7. READING THE VALUE SPECIFIED BY THE OPTICAL GAUGE

During the initial introduction to service, the **optical gauge** can be inserted and the value indicated by the display noted. This operation repeated over time can be used to check that the measurement does not drift.

Procedure

- Undo the locking system of the appliance on its flange
- Then pull the appliance open by rotating it
- Insert the optical gauge as shown in figure 4 at the start of the instructions
- Use the “optical gauge check” menu as follows:



Display of the current measurement, in normal operation

Display of the 1st menu

Press this key 7 times until the appearance of:

Validate this menu

(1) Standard factory code: 1000 or code modified by user

With these keys:
Display your access code

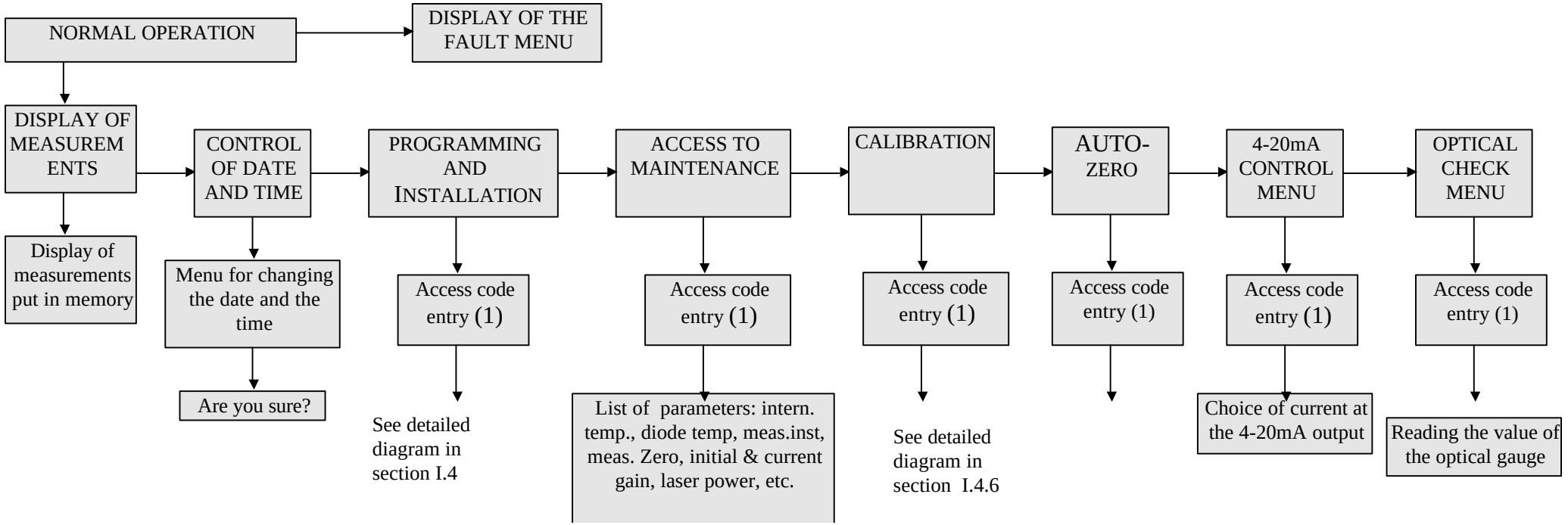
Validate this menu

Display of the signal read after inserting the optical gauge

- Allow the measurement to stabilise
- Read and note the value read on the display of the appliance
- Press twice on the MENU key to return
- Remove the optical gauge and replace it carefully in its case
- Close the appliance and do up the locking system

II. LIST AND FUNCTIONS OF THE OTHER MENUS

1. BLOCK DIAGRAM OF THE MAIN EP 1000A MENUS

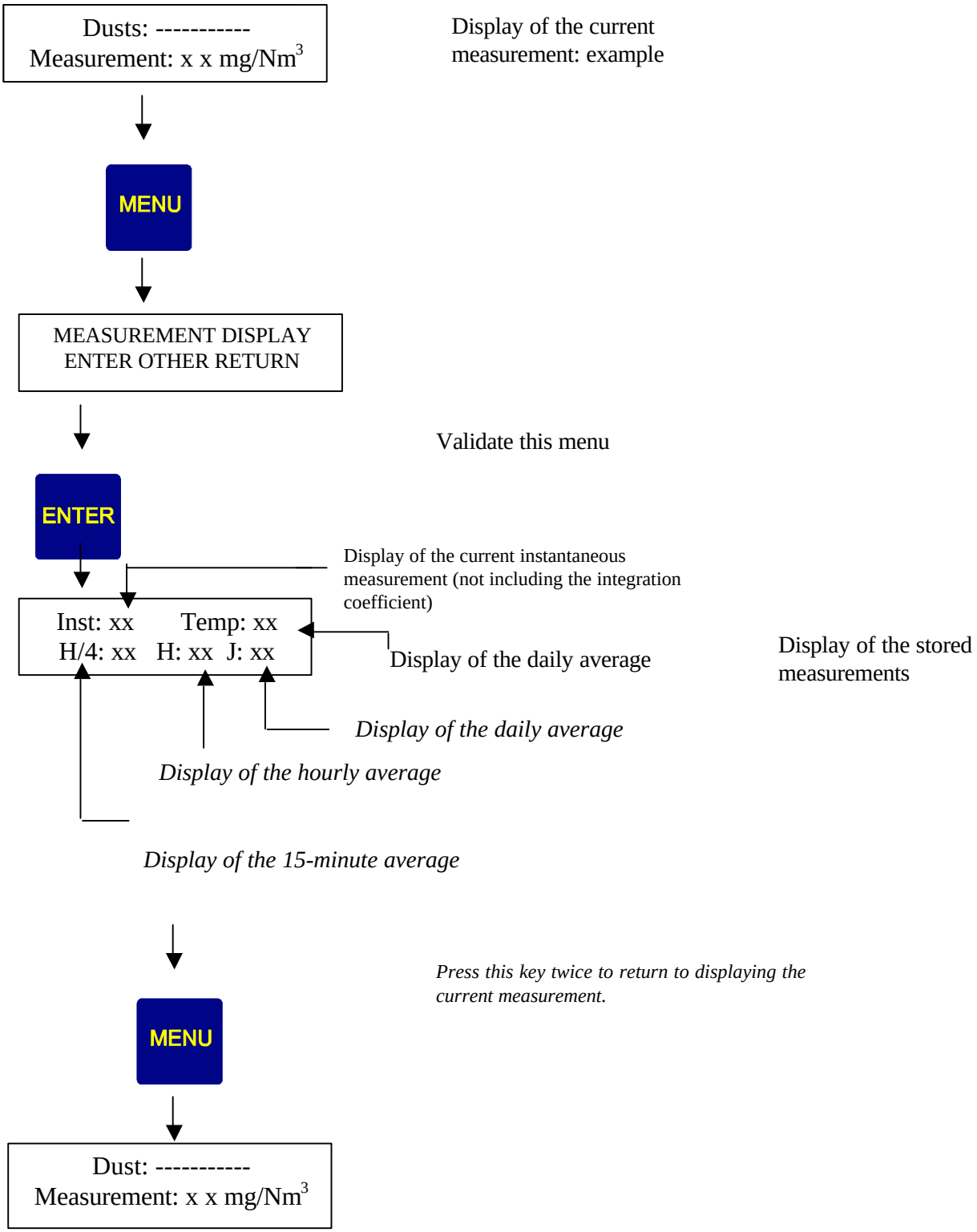


(1) Standard factory access code: 1000 or code modified by the user

2. MEASUREMENT DISPLAY

This menu provides access to the measurements stored in memory.

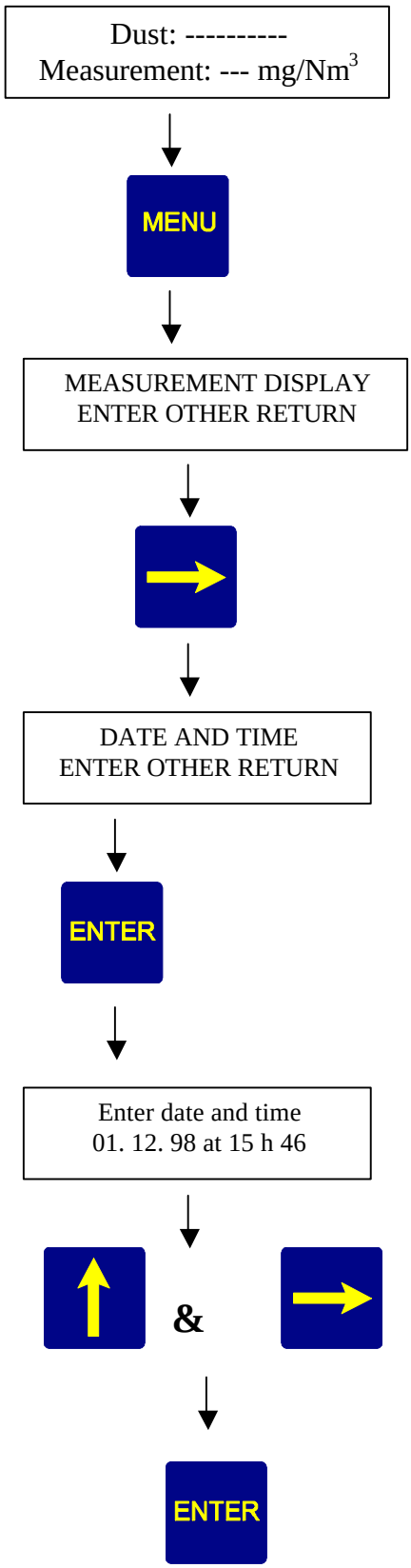
? *To gain access to this menu:*



3. DATE AND TIME MANAGEMENT

This menu is used to display and alter the date and the time of the internal clock of the EP1000A

? *To gain access to this menu*

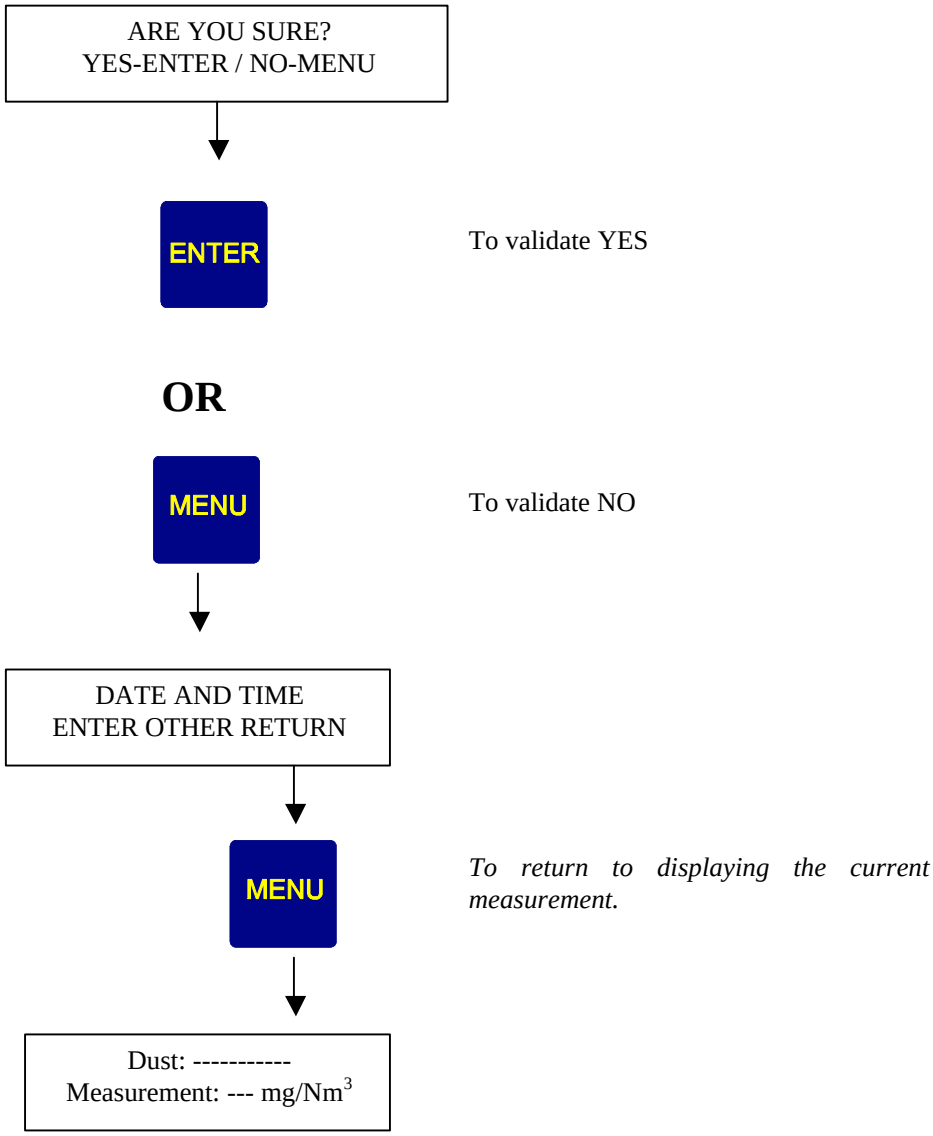


Validate this menu

Display example

Use these keys to display the wanted date and time

Validate


ARE YOU SURE?
YES-ENTER / NO-MENU
ENTER
To validate YES
OR
MENU
To validate NO
DATE AND TIME
ENTER OTHER RETURN
MENU
To return to displaying the current measurement.
Dust: ----------
Measurement: --- mg/Nm3

4. MAINTENANCE

This menu is used to consult the various operating parameters

Example of display (1st window):

```
TI 27.7 TD 2 0.1 pl 1.995
SH x128 - AN 0.59  MI 0.04
```

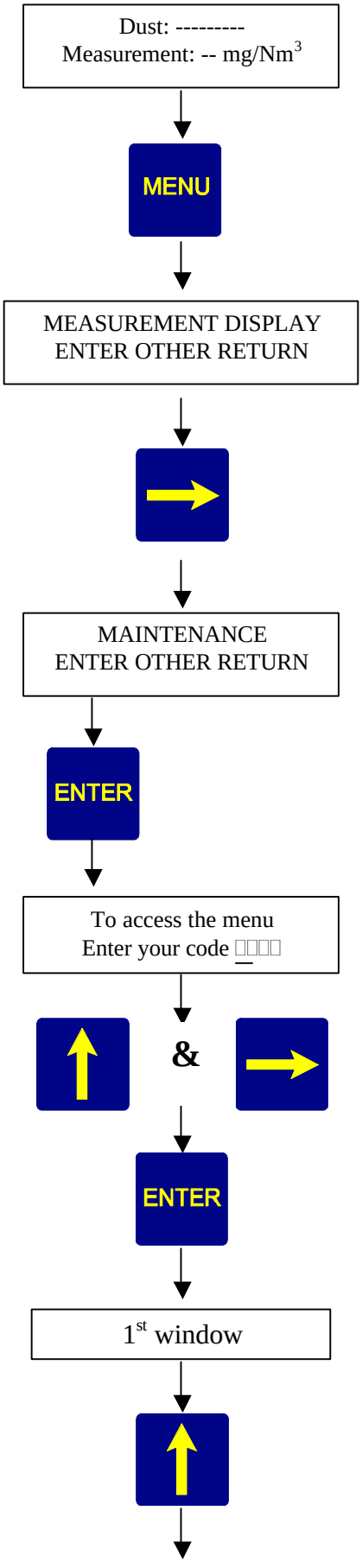
Example of display (2nd window):

```
i 3284 0 3295 x f 15380
c.cont  0% c.alt 11%
```

Meaning of the symbols used:

TI	Internal temperature
TD	Temperature of the laser diode (around 20°C)
pl	Emitted laser power (max: 2 mW and 1 Mw on average)
SH	High sensitivity
SB	Low sensitivity
X_{xxx}	gain (x1 to x 256)
+ or - or 0	State of operation of the Peltier-effect module +: heating -: cooling 0: nothing
ANX.XX	Analogue value of the input signal (between 0.5 and 5 V)
MI X.XX	Instantaneous measurement (according to scale)
i XXXX	"Interval" of the converter (measurement of the electrical zero, around 3273)
? **XXXX**	Full zero (after auto-zero)
X f xxxx	Value in "intervals" of the converter between to and bottom of scale
c.cont	XX% = the value of the direct component expressed as a %
c.alt xx%	The value of the alternating component expressed as a %

? *To gain access to this menu:*

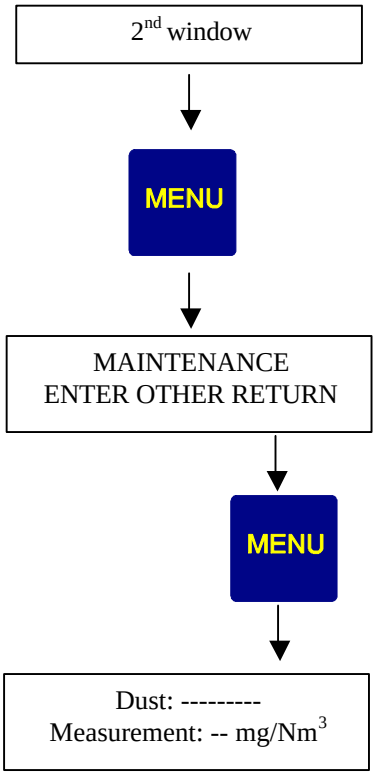


Press this key 3 times until the maintenance menu appears

Display the access code using these 2 keys

Validate your code

To display the 2nd window



To exit from this menu

To return to displaying the current measurement

5. AUTO-ZERO

Warning: this procedure is extremely important, and it is essential that it be performed at the appropriate time, since it will have an impact on later operation.

? **Main menu:** this is used to start an auto-zero procedure (when the process is at a halt)(1). The EP1000A calculates a full zero, and then corrects the XO XF automatically.

(1) Process shut down: This means that the ”industrial process” is halted, and that you have expected and checked (by consulting the recording) during a certain time, that the emission nevertheless delivered by the light now correspond to the correct moment for validation of the auto-zero (cleaning or changing or purging the filters, purging the pipes upstream and downstream of the filters or scrubbers, purging the smokestack, etc.).

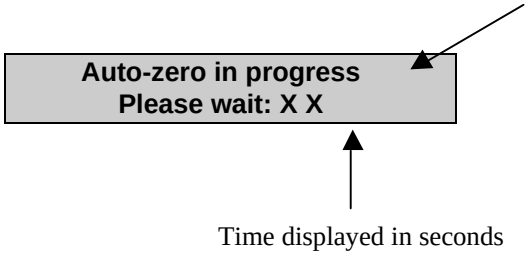
Example: **See figure 10 (at the beginning of the manual)**

? **Sub-menu: zero reset:** this is used to reset the XO (bottom of scale) to the level of the electrical zero.

WARNING: this menu erases previous auto-zero processes.

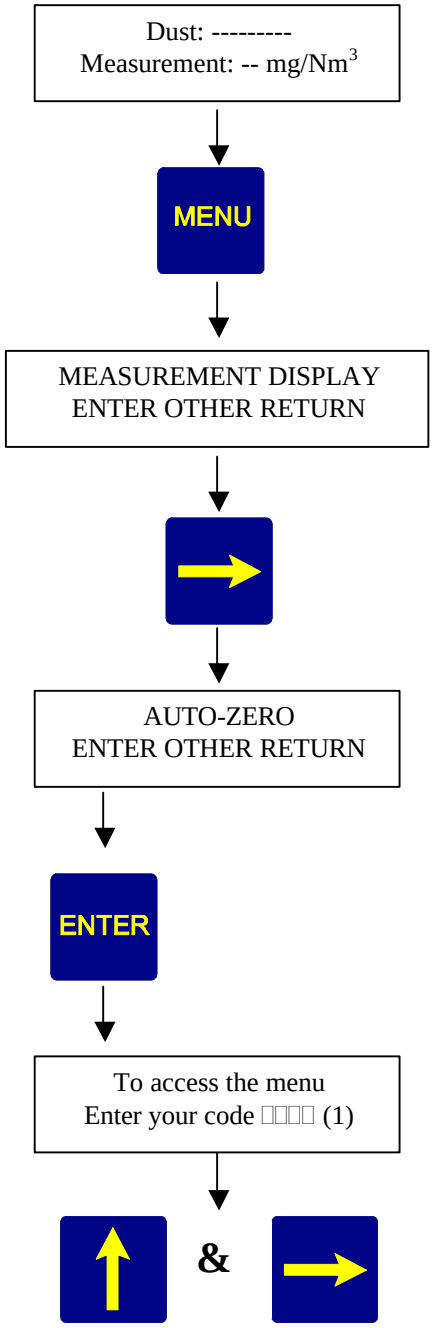
Example of display:

The appliance counts down (the time to do the auto-zero), and this lasts for 1 minute.



Time displayed in seconds

? *To gain access to this menu:*

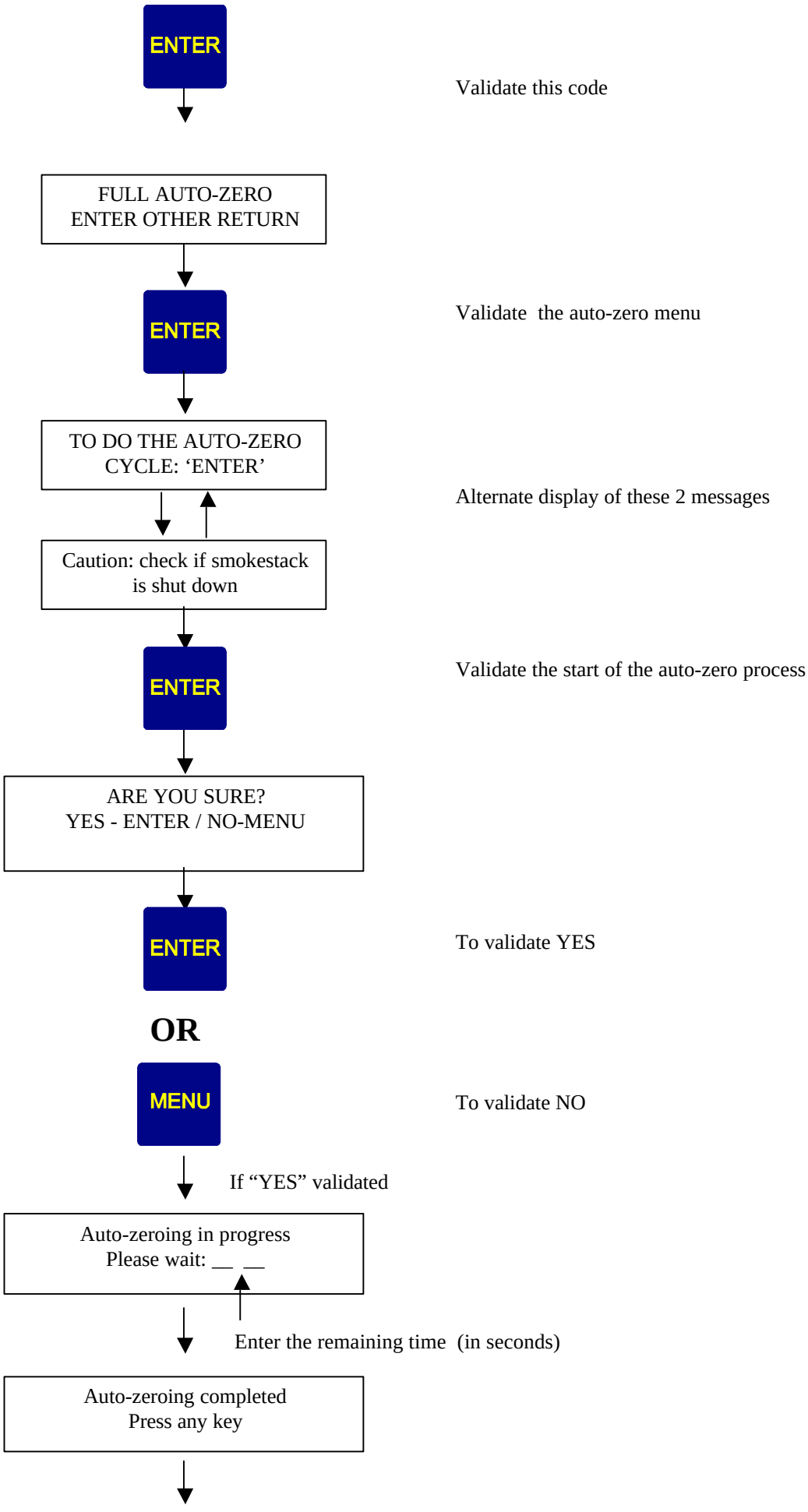


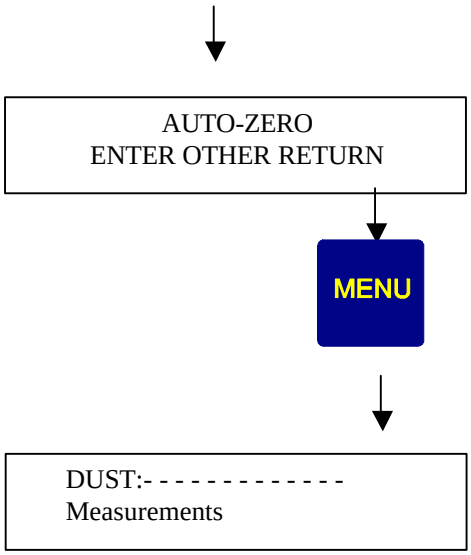
Press this key 5 times until the auto-zero menu appears

Validate this menu

(1) Standard Oldham code: 1000 or code modified by the user

Use these 2 keys to display your access code


ENTER
Validate this code
FULL AUTO-ZERO
ENTER OTHER RETURN
ENTER
Validate the auto-zero menu
TO DO THE AUTO-ZERO
CYCLE: 'ENTER'
Alternate display of these 2 messages
Caution: check if smokestack
is shut down
ENTER
Validate the start of the auto-zero process
ARE YOU SURE?
YES - ENTER / NO-MENU
ENTER
To validate YES
OR
MENU
To validate NO
If "YES" validated
Auto-zeroing in progress
Please wait: __ __
Enter the remaining time (in seconds)
Auto-zeroing completed
Press any key

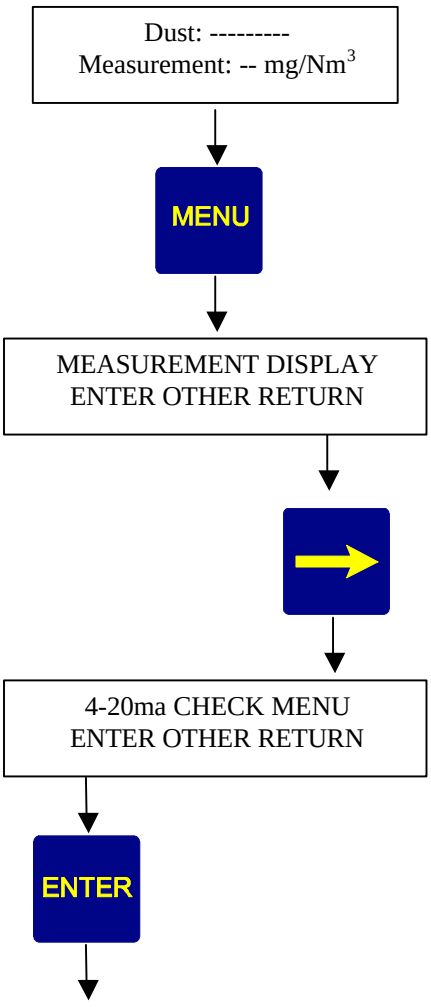


To return to displaying the current measurement

6. CHECKING THE 4-20 mA

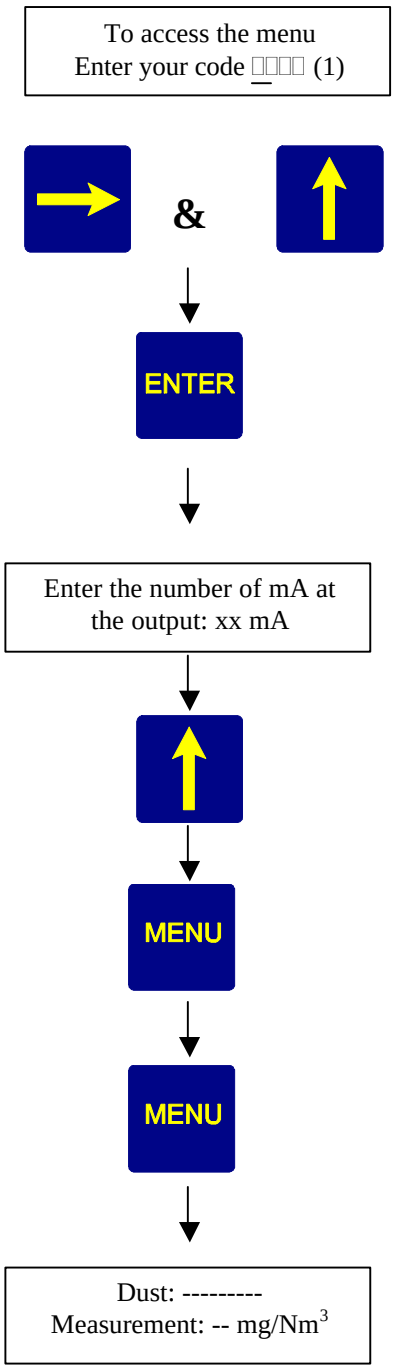
This menu uses the keyboard of the EP1000A to check the 4-20mA output . It is thus able to check for the correct operation of the recorder, for example. Variation is possible from 0 to 24 mA

? *To gain access to this menu:*



Press this key 6 times until the "Checking the 4-20mA" menu appears

Validate this menu



(1) Standard Oldham code: 1000 or code modified by the user

Use these 2 keys to display your access code

Validate your code

To vary the output current at will from 0 to 24 mA

To exit from the menu

To return to displaying the current measurement

7. MISCELLANEOUS INFORMATION

Menu accessible by pressing key

It is then possible to view the following fault reports:

- ✍ laser diode temperature (15°C to 25°C)
- ✍ internal temperature (-30°C to + 70°C)
- ✍ laser diode power (2 mW max ? 0.05 mW)
- ✍ flow problem
- ✍ problem of saturation of the alternating component (> 65%)
- ✍ problem of saturation of the alternating component (> 87%)
- ✍ problem with commissioning into service
- ✍ problem with shift of the electrical zero (3269 to 3277 at gain)

? By pressing 

Note: If there is no fault, the appliance will show the following:

No fault to report **xxxxxxxxxENDxxxxxxxxx**

NB: Exit from the menus is automatic after 15 minutes (if no operation is effected in that time).

III. USING THE SORTIES AVAILABLE ON THE EP1000A

1. FROM THE MAIN ANALOG BOARD

✍ The EP1000A has 2 relays, located on the main board:

- a Fault relay (**fig. 5 ref. B**)
- an Alarm relay (**fig. 5 ref. A**) which operates on failsafe

and their contacts are available on connector J5 (**fig. 5 ref. C**)

✍ The contacts are represented with the appliance switched off.

✍ The remote keypad will be connected to the socket provided for this purpose (**fig. 9 ref. 17**).

Note: The remote unit and the EP1000A will be connected by a 5-wire screened cable fitted at each end with a connector.

✍ The measuring unit will be connected via connector J8 (**fig. 5 ref. E**)
- there are 2 possible versions: RS422 and RS485
- the choice is effected with the switch INV2 on the micro board (fig. 6, ref. A)

✍ The recorder will be connected via connector J6 (**fig. 5 ref. F)**

✍ The "FLOW DATA" signal will be available on connector J5 (**fig. 5 ref. D** (This is controlled by the contact of the pressure switch).

2. THE MICRO BOARD

? The "MICRO" board is connected by a ribbon cable to the display board (output from connector J2: **fig. 6 ref. B**)
? The micro board is connected by a ribbon cable to the main analog board (output from connector J1: **fig. 6 ref. C**)
? The SUB.D "J4" connector (**fig. 6 ref. D**) is used for initialising the EP1000A in the factory (EEPROM programming via RS232). Therefore to program the memory, it is necessary to toggle the switch "INV1" (**fig. 6 ref. E**) to the “Factory” position.

Note: In the "factory" position of the switch "INV1", the RS485/422 outputs are cut off.

? One has the choice of connecting an RS485 or RS422 acquisition unit by setting the switch "INV2" (**fig. 6 ref. A**) to the desired position.

2.1. ABOUT THE RS485/422 SERIAL LINKS
(the data, the operation, the protocol, etc.)

? The RS485 or 422 output can be used to connect 1 to 10 EP1000A appliances in a network.

? You can use the COM1000: D 813 408 software

? Please consult the COM1000: D 813 421 user manual.

EP1000A

? ***STORAGE OF THE DATA, STARTING OPERATIONS***

? ***THE COMMUNICATION PROTOCOL***

? ***ORGANISATION AND OPERATION OF THE TRANSFER TABLE***

* *STORAGE OF THE DATA*

By means of the RS485/RS422 serial link, in communication with the EP1000A using the JBUS or MODBUS protocol, it is possible to retrieve:

- ✍ the measurements in real time
- ✍ the faults
- ✍ the alarms
- ✍ the states
- ✍ the configuration words
- ✍ the measurement storage tables

STARTING OPERATIONS

- ✍ programming the date and time
- ✍ programming the alarm threshold and the integration coefficient
- ✍ changing the dust type
- ✍ launching an auto-zero
- ✍ changing the data storage interval

* *COMMUNICATION PROTOCOL*

- ✍ is used to read from and write to the authorised zones of **the transfer table**
- ✍ it is possible to identify **3 different zones**
- ✍ the reading zone of the measurement storage areas (tables)
- ✍ the reading zone of the parameters, measurements, words, states, faults, etc.
- ✍ the zone for launching the various programming operations, auto-zero processes, etc.: The write zone.

* *ORGANISATION AND OPERATION OF THE TRANSFER TABLE*

- <u>Measurement storage reading zone (tables)</u>

The transfer table contains 19 tables:

- ✍ The program for the management of measurement storage is used to store *19720 measurements* in memory.
- ✍ The storage interval is variable from *10 seconds to 1 hour.*
- ✍ The measurement stored in the table is the mean of the measurements taken during the storage interval.
- ✍ Because of this, the storage capacity is 19720 intervals.

The memory capacity: EXAMPLES

- For a measurement every 10 seconds: ***<u>38 HOURS</u>***
- For a measurement every hour: ***<u>570 DAYS!</u>***

Regarding the tables:

- ✍ When a table is full, you pass on to the next one.
- ✍ Each table contains 725 words.
- ✍ When the last table is full, you then go back to the first table.
- ✍ The first 720 words are used to store measurements

WARNING: The tables are not placed end to end. It is therefore necessary to know the address of each table in the transfer table.

- Reading zone for the various parameters, measurements, status words, faults, etc.

This reading zone is used to retrieve data for real-time monitoring of the operation of the EP1000A.
In this part of the transfer table, you can find:

- various measurements and averages
- status words, faults, the date and time
- calculation, configuration, and designation parameters, etc.

- Write zone

This write zone is used to change certain parameters and to assign certain operations.

Details of the write zone:

- ? change of dust type,
- ? modification of the name of the dust type,
- ? programming of the date and time,
- ? programming of the alarm,
- ? programming of the integration coefficient,
- ? programming of the storage interval,
- ? starting the auto-zero function,
- ? launching the start of calibration,
- ? launching the end of calibration,
- ? acknowledgement of the faults.

IV. MAINTENANCE

1. PREVENTIVE AND PERIODIC MAINTENANCE

? The EP1000A itself requires very little servicing, because of the following features:

- the use of a laser diode which has a life expectancy of 3 to 5 years (and is easy to control). In addition, an electronic system continuously controls and regulates the power emitted by the laser diode.

- synchronous detection is used to get over the background noise.

- it is fitted with a blowing and ventilation device which prevents the fouling of the optics to a high degree and cools the heat sink of the laser diode.

- it is fitted with an air-flow sensor which sets off an alarm, and optionally has a device for closure of the protective boot (thus preventing fouling of the optics in the event of a blower or mains failure).

Nevertheless, its use on a smokestack and on industrial sites which are very dusty calls for regular servicing.

Warning: the operations and adjustments described in this paragraph are reserved to authorised personnel only.

? In the EP1000A unit:

- a lithium battery (fig. 6 ref. F) backs up the memory of the micro board and has a life expectancy of 5 years maximum. This battery must therefore be changed every 5 years at least.

- check the slaved units controlled by the Alarm and Fault contacts and if necessary change the soldered relays on the main analog board (fig. 5 ref. A and B).

- clean the parts in contact with the blown air and the dust from the smokestack. This cleaning must be performed regularly, and in any event whenever there is a shut-down of the process or the turbine due to a power failure or an air failure - see next paragraph ("the various parts").

✍ THE VARIOUS PARTS:

- ***THE NOSE***:

- ✍ Installation shut down
- ✍ Disconnect the hose coming from the turbine (**fig. 8 ref. C)**
- ✍ Remove the removable lower casing, after first removing the screws, to clean the interior
- ✍ Re-fit the lower casing.
- ✍ Re-connect the air hose

✍ ***OPTICS:***

- ✍ Installation shut down
- ✍ open the EP1000A by rotating it in relation to its fixings, after first operating the lateral roses (**fig. 8 ref. A**)
- ✍ clean the optics using a soft, damp cloth **(fig. 8 ref. B)**
- ✍ clean the tube (**fig. 8 ref. C**) moving toward the smokestack.

✍ ***FIXING SYSTEM AND MATING FLANGE:***

- ✍ Installation shut down
- ✍ before closing the EP1000A (by rotation): take advantage of the opportunity to clean the conduit of the "fixing system/mating flange", going toward the smokestack

✍ ***TURBINE (air generator):***

- ✍ preventive maintenance on the turbine is limited to the cleaning or changing of the air intake filter (**Figure 7 ref. A**), which is protected by a cover.

Note: this filter will become clogged at a rate which depends on the nature of the site.

✍ ***THE RECORDER:***

- ✍ For work by technicians on the types of recorder we use, please consult the manual supplied with each appliance.
- ✍ Periodic maintenance is limited to replacement of the pen head or felt and changing the paper.
- ✍ Nevertheless, you should regularly check for the correct operation of the recorder by simulating a variation in the signal (0 to 24 mA) from the EP1000A unit, using the "control of the 4-20 mA" menu (see section on "Use of the menus").

✍ ***THE ACQUISITION UNIT:***

- ✍ No servicing is necessary on this appliance. However, for all operations on the acquisition unit, please consult the technical manual which comes with it.

✍ ***ASSISTANCE WITH SERVICING BY TECHNICIAN***

- ✍ Any person authorised to work on the EP1000A for the purpose of preventive or remedial maintenance can use the "MAINTENANCE" menu in order to read up on the various parameters in memory (see "use of the menus" and the "meaning of the symbols" list).
- ✍ The auto-zero: it is necessary to take advantage of a shut-down of the process in order to perform an auto-zero on site. In particular, it is necessary to ensure that the smokestack is fully shut down.
  Use the AUTO-ZERO menu: see section on "use of the menus"
- ✍ Calibration: it is necessary to carry out the calibration procedure at least one per year.
- ✍ Use the CALIBRATION menu for this: see section on "use of the menus". Calibration consists of storing in memory the measurements taken by the EP1000A for a time between the "start of sampling" and "end of sampling" times, and then entering the data resulting from a sampling programme carried out by an official and approved organisation. The EP1000A then does its corrections automatically.

Note: if the difference between the measurements of the EP1000A and the results of the entered data is excessive, the EP1000A will display:

Calibration impossible
Values too different

It will then be necessary to check the installation in order to determine the origin of the problem.

✍ ***THE LIGHT TRAP***

Cleaning of the light trap should be carried out regularly, and in any event on the occasion of a shut-down of the process or as a result of a breakdown.

The periodicity will depend on the nature of the site.

✍ ***THE PRESSURE DETECTOR (FIG 8 – REF C)***

Cleaning of the pressure detector should be carried out regularly, and in any event on the occasion of a shut-down of the process or as a result of a breakdown.

The periodicity will depend on the nature of the site.

- ✍ Installation shut down,
- ✍ Disconnect the hose coming from the turbine (fig. 8 ref. C),
- ✍ Clean the interior of the input tube now accessible,
- ✍ Remove the cover of the pressure detector (fig. 9 – ref. 23)
- ✍ Clean, inside, the hoses and filters : replace them if necessary
- ✍ Re-fit every part

2. FAILURES - CAUSES AND REMEDIES

FAILURE	*CAUSES*	*REMEDIES*
- the EP1000A displays the fault: "problem of saturation of the direct component"	- the problem is due to interference coming from the sun's radiation, from a street lamp on the site, etc.	- take steps to eliminate these spurious sources from the area of the laser beam: move the offending light, do not place the EP1000A too close to the exit from the smokestack etc. and choose "low sensitivity" in the programming and installation menu
- the EP1000A displays the fault: "problem of saturation of the alternating component".	- the problem is due to interference coming from neon-type street lamps or from another detection system on the smokestack	- secure the detection appliances (including the EP1000A) on the smokestack in such a way as to avoid interference between them. - Move the neon light position on the site if necessary. - and choose "low sensitivity" in the programming and installation menu.
- the EP1000A displays the fault: "commissioning problem"	- commissioning into service has not been successful	- repeat the commissioning procedure using the "programming/installation" menu, and check that the parameters indicated are correct - choice of sensitivity, scale, band rate etc.
- the EP1000A displays the fault: "problem with shift of the electrical zero "	- on start-up, the EP1000A does an automatic electrical auto-zero during the first 20 seconds, using its internal microprocessor, but there can be interference from neon lights or powerful lamps.	- shut down the EP1000A and start it again so that it repeats the electrical auto-zero process. At the same time, eliminate all other sources of interference. If the problem persists, you will have to call an Oldham technician
- impossible to store measurements with the acquisition unit connected to the EP1000A	- the type of acquisition unit does not match the output of the EP1000A (RS485 or RS422) - the connection between the unit and the EP1000A is faulty. - no message appears at the RS485 or RS422 output of the EP1000A - the band rate is not the same in the two parts. - the slave number is not appropriate	- put the switch"INV2" (located on the micro board) in the position which corresponds to the unit. - check the wiring at both ends of the cable or check that the connector on the EP1000A is inserted correctly. - check that the switch "INV1" located on the micro board is not in the "Factory" position. If it is, switch it to the "Normal" position. If the fault then persists, you will have to get the analog board changed by an Oldham technician - match the band rate of the 2 parts - change the slave number on the acquisition unit

FAILURE	*CAUSES*	*REMEDIES*
- no deviation on the recorder when the EP1000A detects something.	- the "EP1000A/recorder" connection is faulty - the analog board of the EP1000A is faulty (4-20 mA converter, for example)	- check the wiring at both ends or check that the connector on the EP1000A is correctly inserted. Check the 4-20 mA output from the EP1000A analog board and if defective, get the analog board changed by an Oldham technician
- the deviation of the recorder does not match the EP1000A measurement.	- the recorder is incorrectly calibrated	- on the EP1000A, use the "CONTROL OF THE 4-20 mA" menu and vary the current to calibrate the recorder (refer to the user manual of the recorder)
- the remote signalling fails when "Fault" or a “dust” alarm occurs	- the electrical connection between the EP1000A and the controlled items is faulty. - the contacts of the fault and alarm relays are defective.	- check the wiring between the EP1000A and the controlled elements, and also check that the connector on the main EP1000A circuit is correctly inserted - change the soldered relays on the main EP1000A circuit
- the remote unit ceases to work: no display and no remote control	- the cable connection is faulty - the electronics of the unit are faulty	- check the wiring, at both ends of the cable, and also check that the connector on the main circuit is inserted correctly. - change or repair the electronic circuit of the remote unit
- the signal displayed after insertion of the optical gauge is no longer as it was at the beginning	- the optics are dirty - the power laser is faulty	- clean the optics - check the power laser (maintenance menu) and change the laser module if necessary.

3. LIST OF SPARE PARTS AND EXCHANGE PARTS

Optical gauge		**E313039**
Photoreceptor block		**E313002**
Photoreceptor element		**6186724**
Photoreceptor card		**E451006**
Analog board		**E451003**
250 mA fuse (analog board) 220 V version		**6154693**
Laser diode card		**E451002**
Laser module		**E313001**
Peltier module		**E135001**
Laser diode		**6182167**
Collimator		**E133001**
Display card		**E451004**
Micro board		**E451001**
Remote display board		**E451005**
Turbine filter exchange cartridge	**E136008**	**E136009**
	E136010	**E136011**
<u>For recorder types 4101EC and 4101C</u> **- Pre-folded paper (50 div.)** **- Blue felt (path 1)** **- Red felt pen head (path 2 on option)** **- Green felt pen head (path 3 on option)** **- violet felt pen head (path 4 on option)** **- Black annotator felt**		**E113008** **E113009** **E113010** **E113011** **E113012** **E113013**
Turbine filter exchange cartridge: large model		**230 V Turbine E 313 091** **380 V Turbine E 313 092**

THE DEPENDABILITY OF A PROFESSIONAL IN THE SAFETY FIELD

GUARANTY

Please refer to our sales conditions.

RELIABILITY - CONTROLS

Your satisfaction is our primary concern. This means our equipment and our technical departments must be reliable, and the quality of our production is essential to achieve that reliability. Quality is ensured by extremely strict verifications carried out during production, at the end of manufacture and before shipment. (All shipped equipment is configured to meet your requirements). These steps help to save time during equipment start-up and avoid additional costs.

START-UP

Entrusting the start-up of your equipment to our expert technicians gives you the guarantee of additional safety. Please see the list of our branches in FRANCE, or our agents abroad.

FIELD SERVICING

Our AFTER-SALES SERVICE technicians are ready to service your equipment very quickly on your site. This performance is made possible by the efficient network of our branches throughout FRANCE.

If you need field servicing, please call our After-Sales Service at the following special phone number: 825 842 843

FACTORY REPAIRS

For any problem which cannot be solved in the field, a team of SPECIALIZED TECHNICIANS is on hand to ensure the immediate repair of your equipment sent to our plant in ARRAS, France. In this way, **OLDHAM S.A.** undertakes to keep the downtime for your equipment to a minimum.

MAINTENANCE CONTRACT

REGULAR MAINTENANCE IS NEEDED to ensure that your equipment meets the stipulated performance levels, as well as to guarantee the safety of you and your personnel.

OLDHAM S.A. CAN offer you MAINTENANCE CONTRACTS with the following terms:

- One or more visits a year, comprehensive or partial warranty.
- Renewable by tacit agreement.
- Including the adjustment of measuring units, the calibration of equipment and the verification of servo-control systems.

TRAINING

OLDHAM S.A. has a **fully-equipped TRAINING Department**: a number of engineers specialized as instructors, conference rooms, equipment available for practical exercises, computer equipment, display equipment, etc…

You are thus assured that your personnel will receive all the **TRAINING REQUIRED** to use our equipment and perform first-level maintenance. This training can cover our entire product range.

OLDHAM S.A. organizes **SCHEDULED TRAINING SESSIONS** (1 week) at the head office in **ARRAS, France. Special training** programmes can however be set up at the head office or on your site.

QUALITY

With the assurance that we comply with **ISO STANDARDS**, our users can have complete confidence in **OLDHAM QUALITY**.

ADVANTAGES

OLDHAM S.A. is represented all over France by **full-scale branches** with secretarial services, sales personnel and technicians.

Efficient technical teams thanks to our **ON-GOING TRAINING**.

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