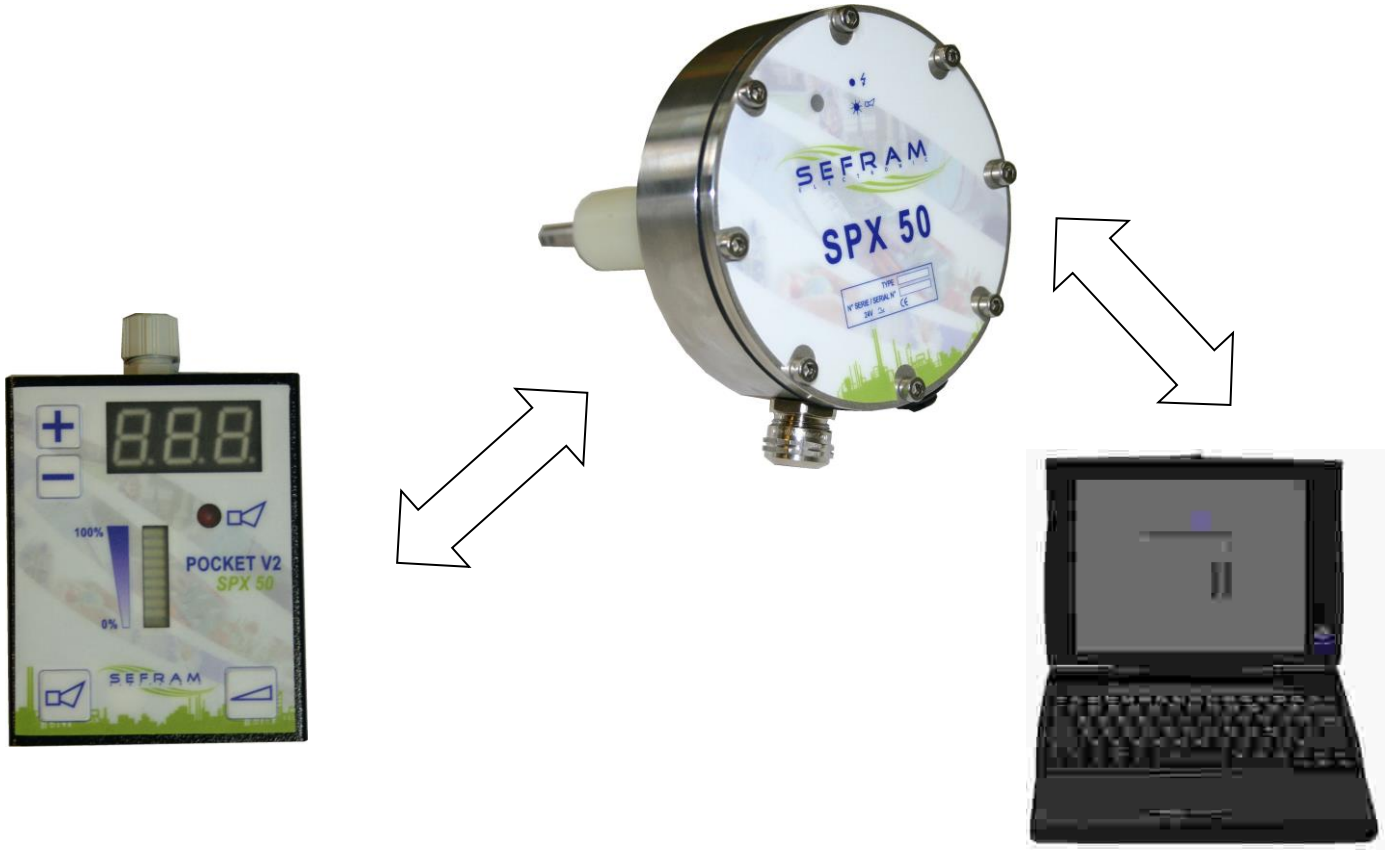
SEFRAM ELECTRONIC
NOTRE ÉLECTRONIQUE INDUSTRIELLE À VOTRE MESURE

DUST EMISSIONS CONTROLLER

SPX50



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GENERAL DETAILS

The SPX 50 is a dust emissions controller which uses the principle of triboelectricity. It is fitted directly into the duct or pipe to be monitored with the SPX 50 sensor being inserted into the particle-filled air flow.

The SPX 50 is available in three versions:
- alarm version with transfer to relay inverter contact,
- 4-20 mA transmitter version,
- network version connected to a central PC.

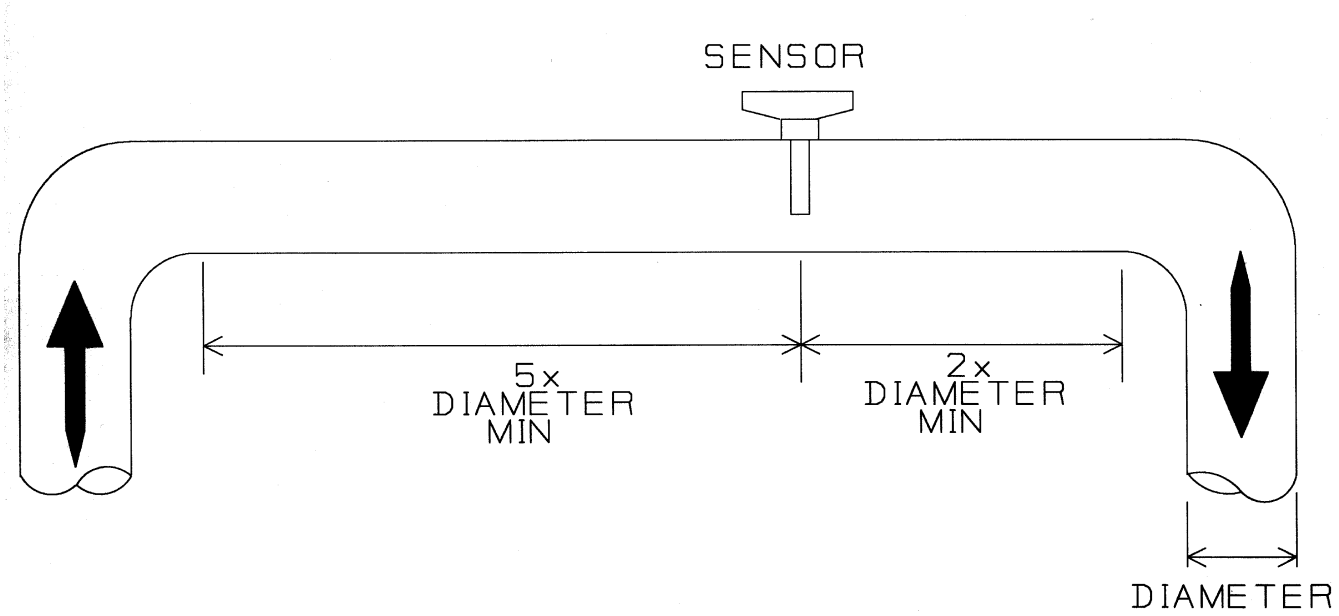
The SPX 50 is adjusted with the SPX 50 pocket unit or a PC with dedicated software.

The SPX 50 is itself of "blind" type and only an alarm status is displayed on the front panel. Using the pocket unit or the PC, it gives a dust emissions trend as a % or as a quantity (mg/m^3 or other). In this case, the device must be calibrated in relation to a reference measurement.

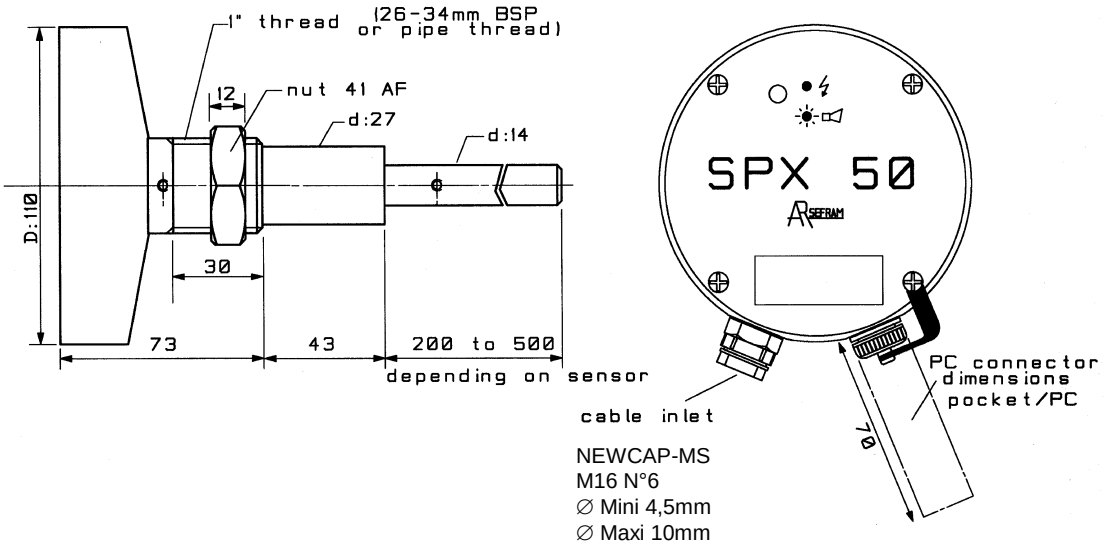
Connected to a PC, the software is used to:
- continuously record instantaneous or average values,
- create graphs, reports, etc,
- store data in a computer file,
- interact with the SPX 50.

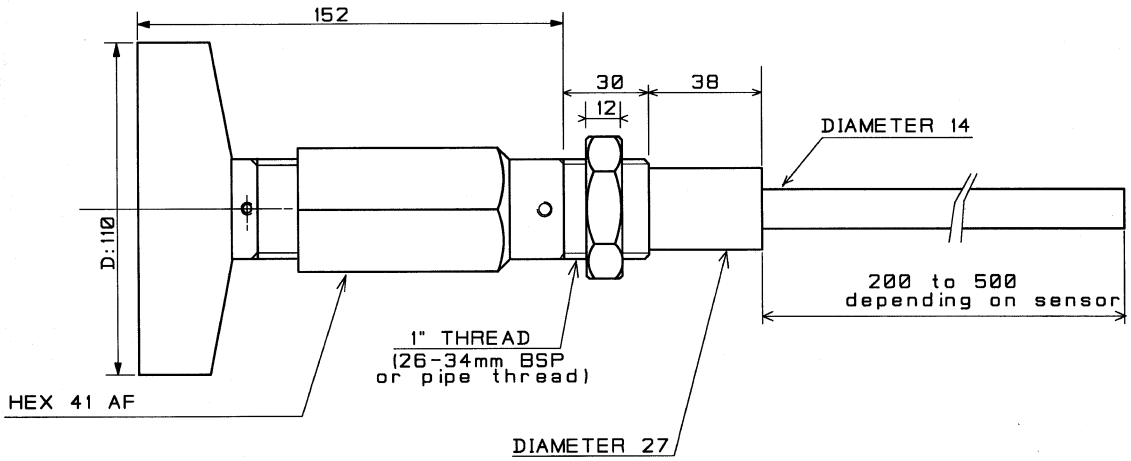
MECHANICAL ASSEMBLY

The sensor is fitted directly to the duct to be monitored under the following conditions:
- 1" / 26-34 mm thread (BSP or pipe thread),
- positioned in a straight portion in line with the following diagram,
- on a metal duct connected to earth, the continuity of the earth between the sensor and the duct section must be ensured,
- sensor length (100 - 500 mm) to be suited to the duct (e.g. length of 200 mm for a Ø 250 - 450 duct).



MECHANICAL DIMENSIONS



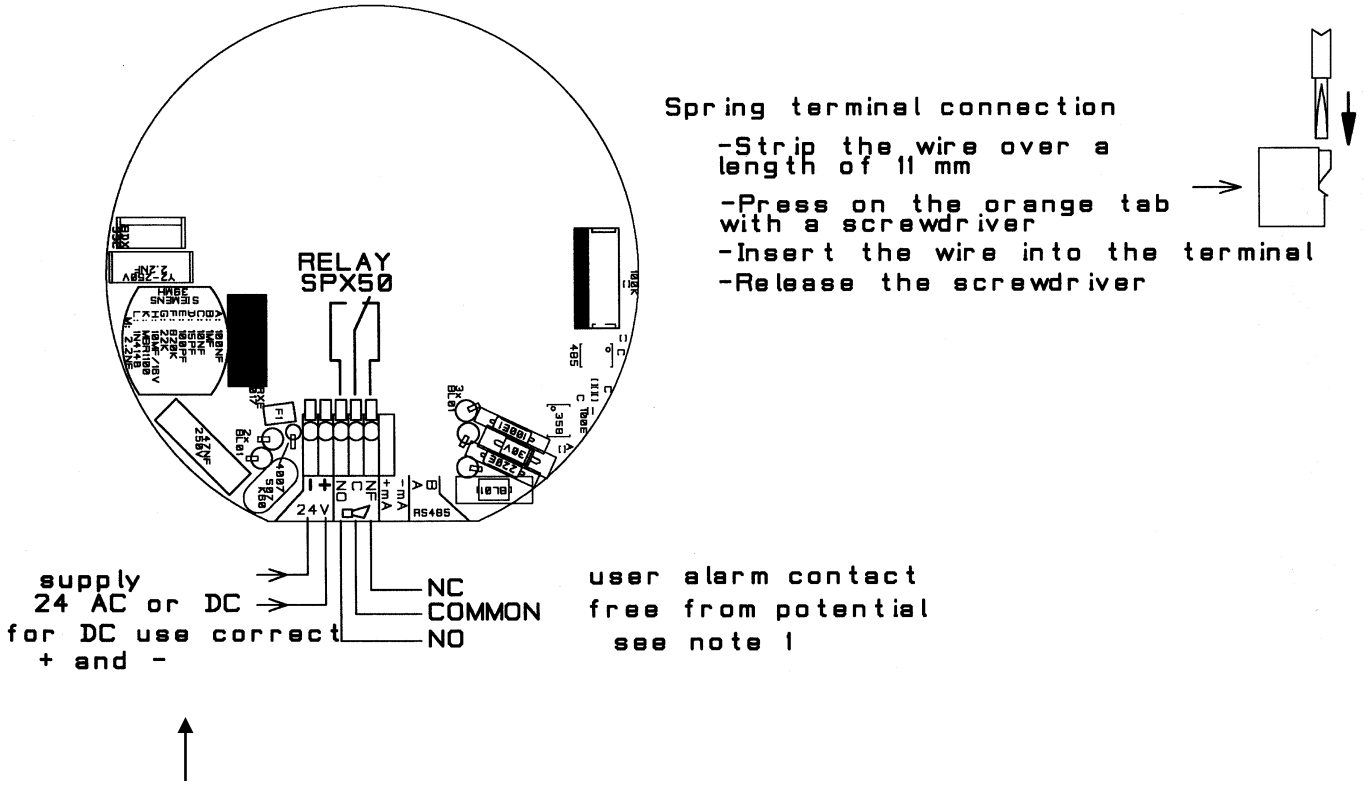


ELECTRICAL CONNECTIONS

The connection terminals can be accessed after removing the cover. The connections are made using a cable with at least 4 conductors. Maximum conductor cross section: 0.5 mm². Recommended cable: HI FLEX-CY 4x0.5².

It is recommended that a voltage □ 24 V AC is used for the alarm contacts. For higher voltages, it is recommended that an interface is used. The current is limited by the cross section of the conductors used.

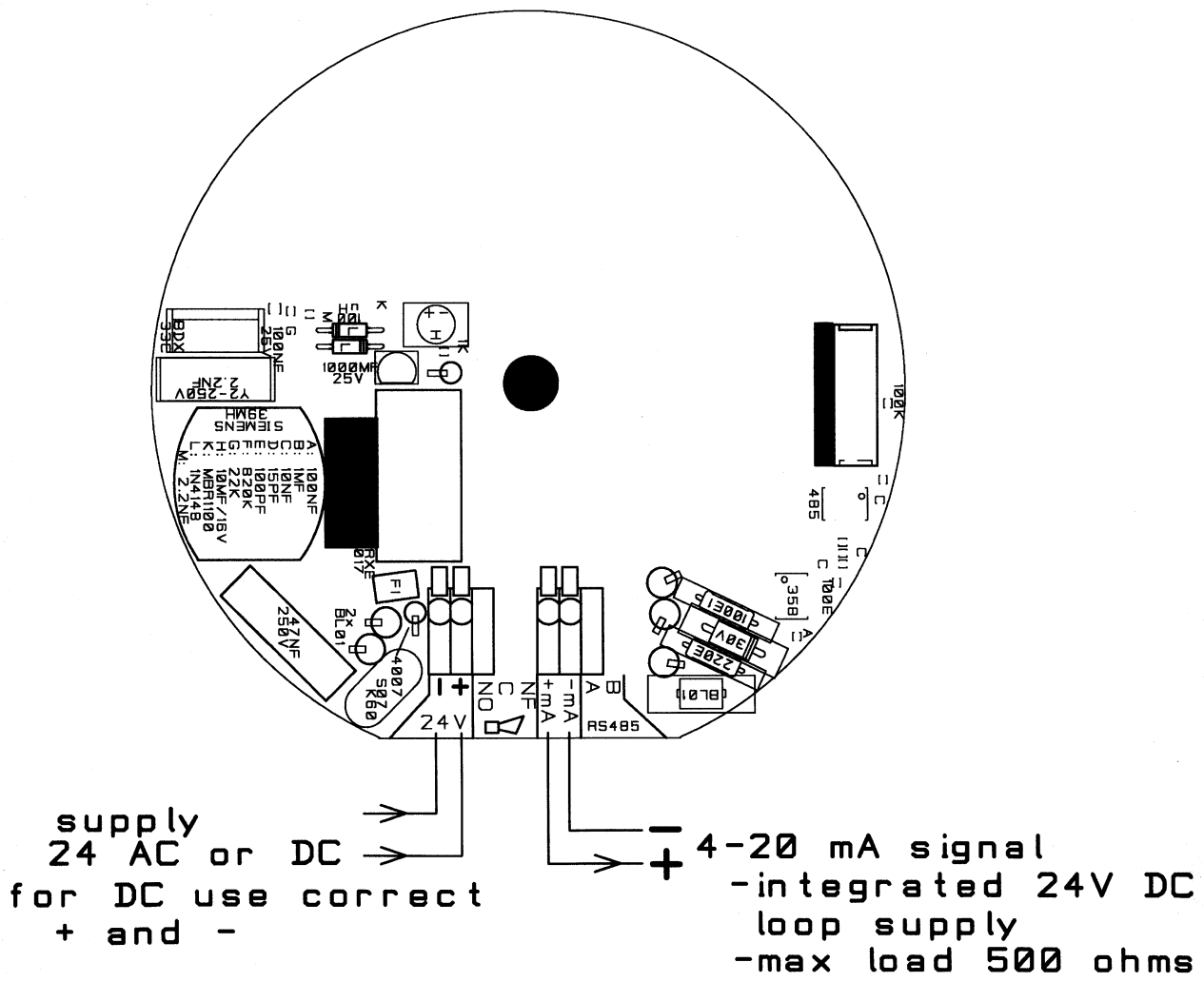
Relay alarm version:



When supplying several SPX 50 units with a common 24 V AC power supply, it is essential to connect all of the + together and all of the - together.

The contacts of the alarm relay are shown with the SPX 50 not switched on; when the power is switched on, the relay rises if there is no alarm.

4-20 mA transmitter version:



The 4-20 mA is of active integrated 24 V DC voltage type.

Network version:

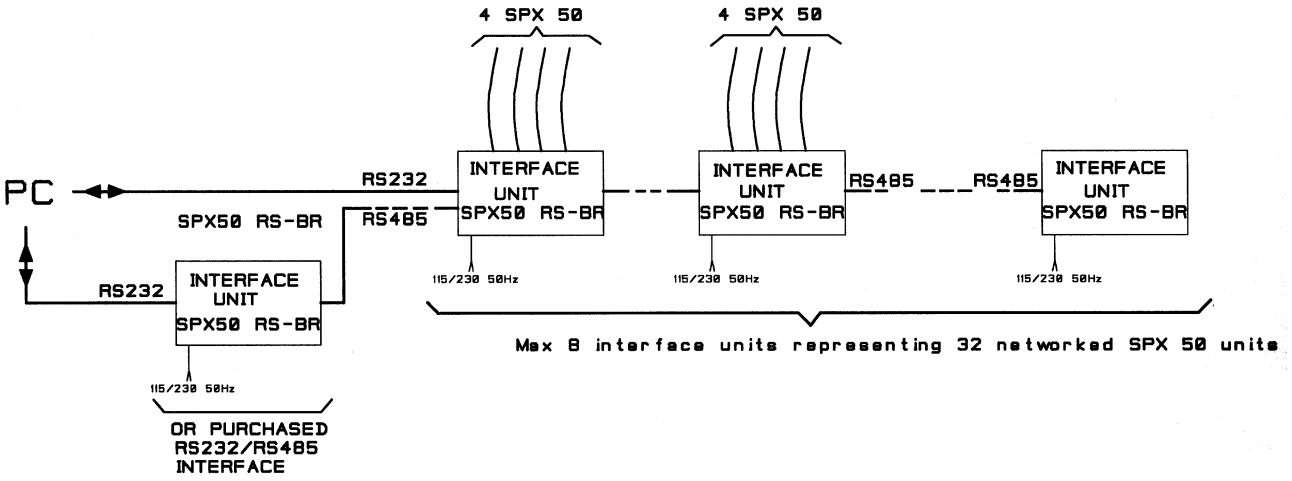
- 32 SPX 50 sensors can be networked.

- Connections are made using the SPX 50 RS-BR interface unit.

- In the network version, the "alarm" output to relay function is maintained. The interface unit incorporates the interface relays for using contacts up to 2.5 A 250V AC1.

- Dialogue connections are of RS485 type using the secure SEFRAM protocol.

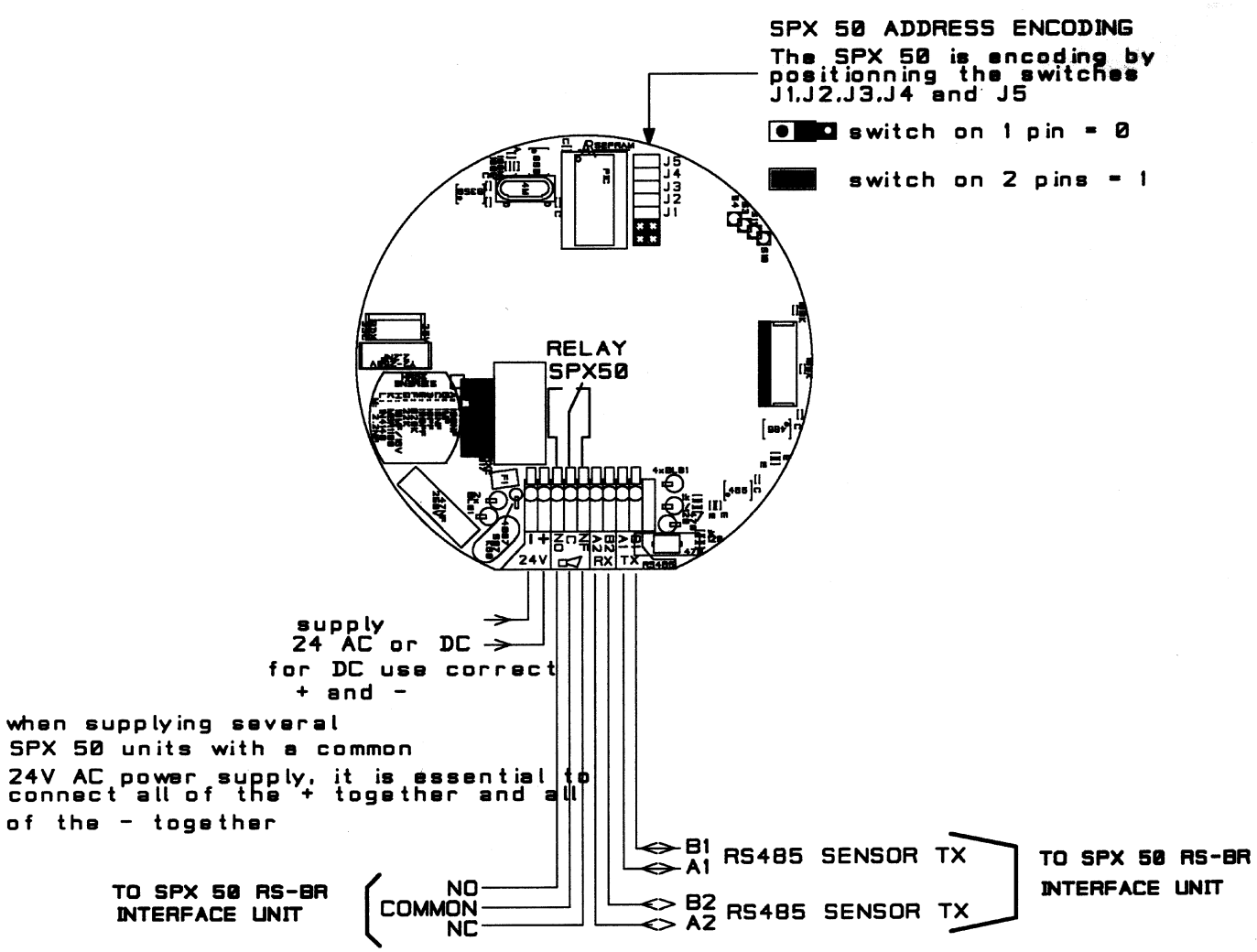
The network:



The SPX 50-NET VXX software supplied with the assembly includes all functions:

- for configuring and adjusting the sensors
- for displaying graphs
- for continuous recording
- for printing graphs and reports

Sensor connection:

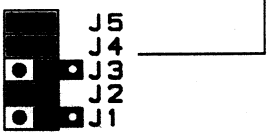


Sensor encoding:

J5	J4	J3	J2	J1	Adr
0	0	0	0	0	1
0	0	0	0	1	2
0	0	0	1	0	3
0	0	0	1	1	4
0	0	1	0	0	5
0	0	1	0	1	6
0	0	1	1	0	7
0	0	1	1	1	8
0	1	0	0	0	9
0	1	0	0	1	10
0	1	0	1	0	11
0	1	0	1	1	12
0	1	1	0	0	13
0	1	1	0	1	14
0	1	1	1	0	15
0	1	1	1	1	16

J5	J4	J3	J2	J1	Adr
1	0	0	0	0	17
1	0	0	0	1	18
1	0	0	1	0	19
1	0	0	1	1	20
1	0	1	0	0	21
1	0	1	0	1	22
1	0	1	1	0	23
1	0	1	1	1	24
1	1	0	0	0	25
1	1	0	0	1	26
1	1	0	1	0	27
1	1	0	1	1	28
1	1	1	0	0	29
1	1	1	0	1	30
1	1	1	1	0	31
1	1	1	1	1	32

Eg:set the SPX 50 to address 27



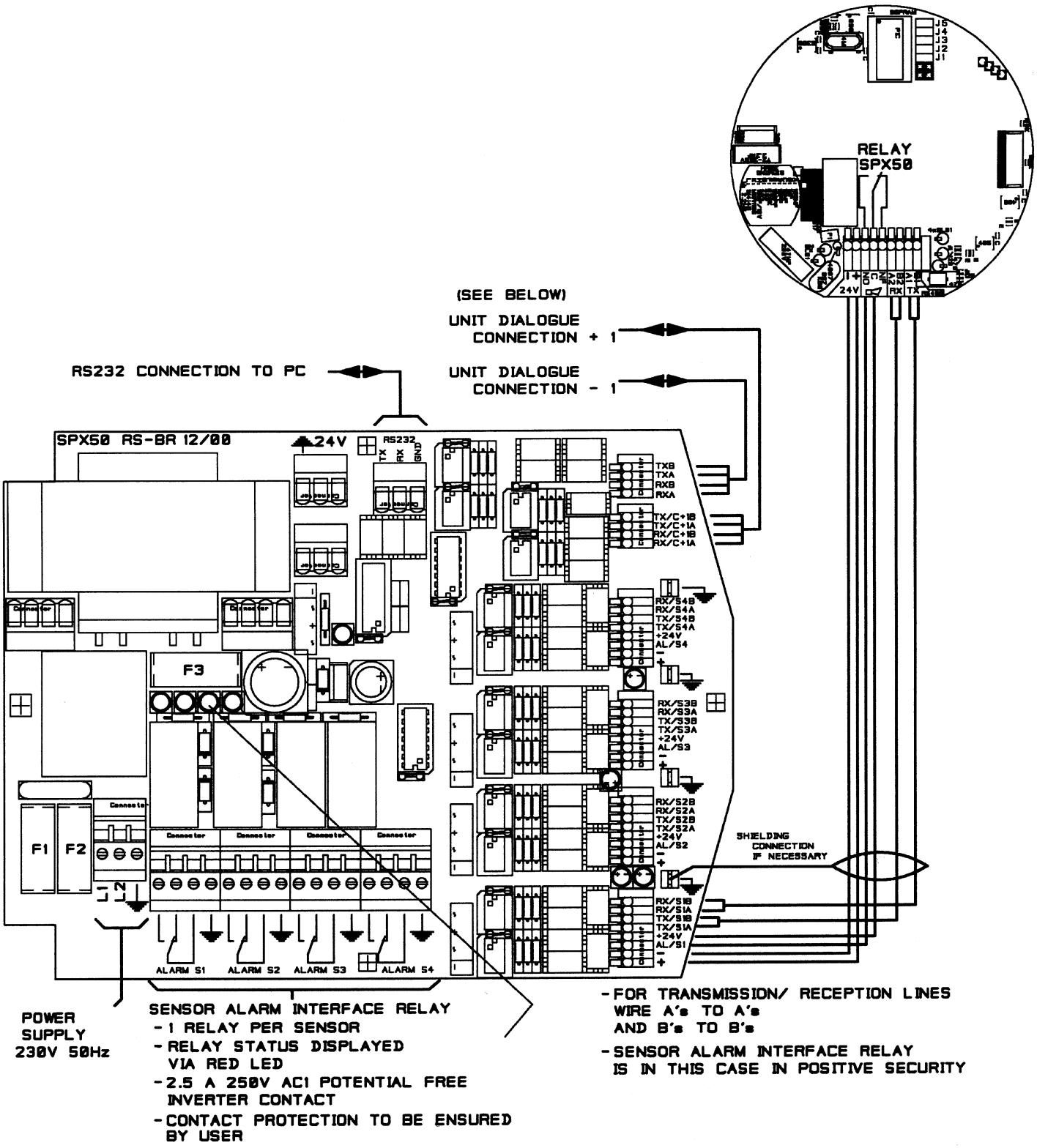
The SPX 50 RS-BR interface unit:

The SPX 50 RS-BR interface unit is used to connect the sensors of the
network to the PC. It includes the SPX 50 alarm relay interfaces.

Main specifications:

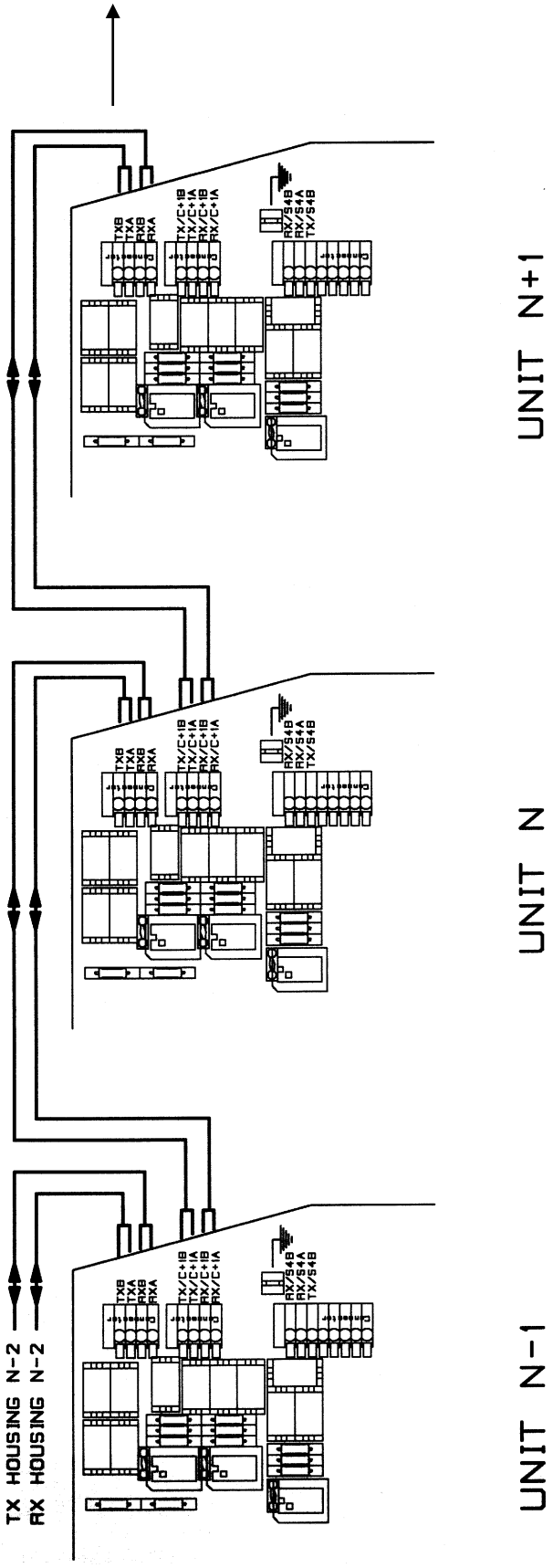
- Main supply: 230V 50 Hz
- Power consumption: 40 VA
- Fuse protection
  F1 F2 general 500 mA protection (250V)
  F3 1A sensor supply protection (24V)

N.B.: the sensor connections are the same for each sensor.

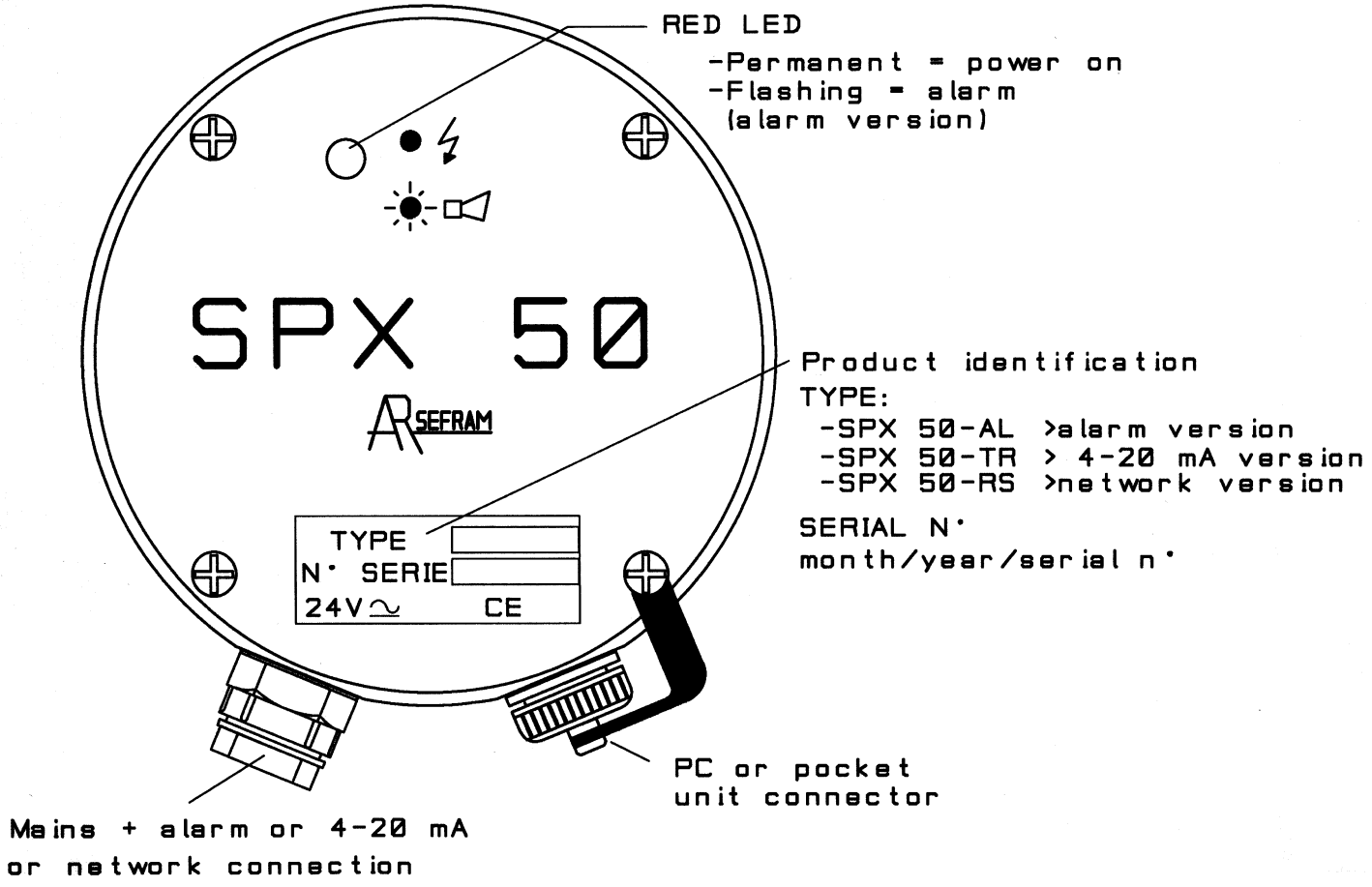

RELAY
SPX50
(SEE BELOW)
UNIT DIALOGUE
CONNECTION + 1
RS232 CONNECTION TO PC
UNIT DIALOGUE
CONNECTION - 1
SPX50 RS-BR 12/00
24V
RS232
TX
RX
GND
TXB
TXA
RXB
RXA
TX/C+1B
TX/C+1A
RX/C+1B
RX/C+1A
RX/S4B
RX/S4A
TX/S4B
TX/S4A
+24V
AL/S4
RX/S3B
RX/S3A
TX/S3B
TX/S3A
+24V
AL/S3
RX/S2B
RX/S2A
TX/S2B
TX/S2A
+24V
AL/S2
RX/S1B
RX/S1A
TX/S1B
TX/S1A
+24V
AL/S1
F1
F2
F3
ALARM S1
ALARM S2
ALARM S3
ALARM S4
SHIELDING
CONNECTION
IF NECESSARY
POWER
SUPPLY
230V 50Hz
SENSOR ALARM INTERFACE RELAY
- 1 RELAY PER SENSOR
- RELAY STATUS DISPLAYED
VIA RED LED
- 2.5 A 250V AC1 POTENTIAL FREE
INVERTER CONTACT
- CONTACT PROTECTION TO BE ENSURED
BY USER
- FOR TRANSMISSION/ RECEPTION LINES
WIRE A's TO A's
AND B's TO B's
- SENSOR ALARM INTERFACE RELAY
IS IN THIS CASE IN POSITIVE SECURITY

Dialogue connection with the interface unit:

- Connect all terminals "A" together and all terminals "B" together.



THE UNIT


RED LED
-Permanent = power on
-Flashing = alarm
(alarm version)
SPX 50
SEFRAM
TYPE
N° SERIE
24V~
CE
Product identification
TYPE:
-SPX 50-AL >alarm version
-SPX 50-TR > 4-20 mA version
-SPX 50-RS >network version
SERIAL N°
month/year/serial n°
PC or pocket
unit connector
Mains + alarm or 4-20 mA
or network connection

SPECIFICATIONS

Power supply	24V AC or DC
Power consumption	< 100 mA
Alarm relay	1A 24V AC/DC inverter contact
4-20 mA	active, max load 500 Ω
Network	RS 485 type. Max length < 1.2 km (depending on cable)
Parameter settings	using pocket unit or PC
Display	1 LED on front panel → power on and alarm status for the alarm version
Unit protection	with self-resetting fuse
Operating temperature	
- Part outside the duct SPX 50 body	0° - 65°
- In the air flow at the sensor	< 85° - standard SPX 50 ≤ 250° with SPX 50 fitted with thermal separator > 250° - please contact us
Storage temperature	-20° - +80°
Alarm version	
- Alarm adjustment setting	0 - 100 % with pocket unit or PC 0 - scale max (µg/m^3, mg/m^3, g/m^3) with PC
- measurement average	adjustable from 1 - 60 min in steps of 1, 2, 5, 10, etc.
Repeatability / stability	< 5 % (on test loop)
Materials	Stainless steel 316L or 304 (316 TI for the sensor on request) PTFE for the insulator
Specifications of gaseous flow	please contact us

ADJUSTMENTS

Regardless of the version, the SPX 50 is adjusted in the same way using the pocket unit or a PC.

3 automatic functions are available to the operator:

1) Auto sensitivity:

During installation, the unit must be calibrated in relation to the environment into which it is installed (installation type, dust, concentration, etc.).

To do this:

- Place the SPX 50 in the normal operating conditions of the installation (emissions with no problems),
- Set an average value encompassing all of the various representative operations of the installation (clogging, arrival of material, etc),
- Start the auto-sensitivity test on the pocket unit or the PC.

The unit adjusts its sensitivity automatically and considers that the emissions caused during this adjustment phase represent 10% on a scale of 0-100 %.

2) Auto-zero:

This function is used to re-calibrate the zero point of the SPX 50 with time (deviation essentially caused by the temperature operating conditions and "ageing" of the electronics).

To perform an auto-zero, start the auto-zero test.

At the end of the test, the SPX 50 automatically returns to normal operation. The test lasts for approx. 75 seconds.

This operation should be performed on a regular basis once a year.

3) Calibration:

Function accessible through the PC only.

This function is used to associate an emissions trend in µg/m^3 or mg/m^3 or g/m^3 to a 0 - 100% scale or to recalibrate the unit with time.

There are 3 calibration options:

- Associate a reference or estimated value to an average value given by the SPX 50.
- Associate a reference or estimated value to a known average value.
- Associate a reference or estimated value to an average value given by a saved file.

The optimum solution is to:

- Have a weighted measurement taken by an approved organisation.
- In parallel, during the weighted measurement, create a computer file of the values given by the SPX 50.
- Enter the reference value to the test results, using the calibration function and a computer file.

An instruction manual for the pocket unit and an instruction manual for the PC software giving the procedures to follow are attached to these instructions.

OPERATION

Alarm version:

The SPX 50 calculates an average value as a function of the duration set by the user.

If the average value exceeds the alarm reference limit, the alarm relay "falls" and the LED on the front of the unit flashes.

When the average value falls back below the alarm reference value, the relay "rises" and the LED on the front of the unit remains permanently illuminated.

The alarm can be acknowledged using the pocket unit or the PC and in this case, the average value is "loaded" with the current value.

4-20 mA transmitter version:

The SPX 50 leaves our factory set to 4 mA for 0% and 20 mA for 100%. This represents the average value.

If a value in µg/m^3, mg/m^3 or g/m^3 is associated to the 4-20 mA scale, the scale maximum is given by the PC software in the main parameter menu.

Network version:

In the network version, the central PC with the dedicated software interrogates each SPX 50 in turn. Each SPX 50 has a unique address defined by positioning jumpers.

The software is used to:

- adjust the various settings sensor by sensor,

- view all of the networked SPX 50 units at the same time,

- continuously record computer files for each sensor,

- create graphs, reports, etc.

General instructions for safety, assembly, commissioning, usage and maintenance
to be read before working on the device

GENERAL

These instructions must be read jointly with:
+the standard NFC15-100
+the technical data sheet specific to the device
The Sefram devices are designed to be assembled, commissioned and used in compliance with the characteristics/data given in the technical data sheet. Always adhere to all of directives, legislation, orders and most recent standards in force for the stated field of application.
The assembly, commissioning, usage and maintenance operations must always be carried out by qualified and authorised personnel.
Personnel working on the devices must be familiar with the safety rules and requirements in force regarding the components, devices, machines and electrical installations.

RECEPTION - STORAGE

After unpacking the device, check that this latter has not been damaged during transport; for certain devices, remove the protective film from the cover. The material must be stored inside in a dry place.
In the event of a problem, please contact Sefram.

ASSEMBLY

The assembly operations must be carried out by qualified, skilled and authorised personnel. Personnel working on these devices must be familiar with the safety rules and requirements in force.
The box must be mounted vertically.
For material connected permanently to the network, a quickly accessible cut-off device must be incorporated into the cabling installation of the building.
The device supply must be equipped with a device for protection against risks of over-current and fault isolation. The number of poles protected must be appropriate to the neutral regime of the building and to the regulations in force.
The equipment must be connected to the PE protection mass by green/yellow wires (NFC15-100).
The device is compatible with the neutral regimes TT, TN or IT;
Nevertheless, we recommend that the device is supplied through the intermediary of an insulation transformer for which the primary is supplied between phases and not between phase and neutral, so as to avoid any accidental over-voltage caused when the neutral is cut before the phases.

In the event of a problem, please contact Sefram.

COMMISSIONING AND USAGE

Commissioning is authorised only after duly establishing that the device, the machine or the installation in which the device has been integrated in a compliant manner, satisfies all of the directives, legislation, orders and most recent standards in force.
Commissioning operations must be carried out by qualified, skilled and authorised personnel. Personnel working on these devices must be familiar with the safety rules and requirements in force.
Note: correct operational functioning does not in itself constitute an indication of conformity to the recommendations for the use of the material in complete safety.
Also read the maintenance recommendations which equally apply during commissioning and use.
In the event of a problem, please contact Sefram.

MAINTENANCE

The device does not require any special maintenance.
The following operations are recommended; they constitute a minimum:

- Before any work intervention, we recommend that the dust is removed **before** opening the cover,
- The device must not be opened in an excessively dusty environment
- If the unit is calibrated in µg/m^3, mg/m^3 or g/m^3, an annual re-calibration using a reference mass measurement should be carried out to ensure the emissions trend is correct.
- The integrity of the joints must be checked: remove any trace of dust or other deposit,
- Remove any trace of dust which could have penetrated during the setting operation,
- **Always** ensure that the cover is correctly closed.
- For high concentrations of "sticky / caking" products, periodically clean the sensor which is immersed in the flow.
- In general, perform an auto-zero operation once a year
- The replacement of the batteries must be made out voltage. The monthly history is lost upon removal batteries. Before replacement, please record the memory if needed.

Maintenance operations must be carried out by qualified, skilled and authorised personnel. Personnel working on these devices must be familiar with the safety rules and requirements in force.
In the event of a problem or any questions during these operations please contact SEFRAM.

ATEX version : See FI 72.0242 instruction

MAINTENANCE

The SPX 50 does not require any specific maintenance.

For high concentrations of "sticky / caking" products, periodically clean the sensor which is immersed in the flow.

If the unit is calibrated in µg/m^3 or mg/m^3 or g/m^3, an annual re-calibration using a reference weighted measurement should be carried out to ensure the emissions trend is correct.

In general, perform an auto-zero operation once a year.

WARRANTY

The warranty does not apply in the following cases:

- Breakage through dropping or knocks to non-packaged products
- Damage caused by abnormal use of the device, connecting error, surges/overvoltages, etc.
- Any intervention on the device apart from the connections

For ATEX devices : no intervention

Any action on the devices is forbidden. You must send us back the device in our workshops, otherwise the certification and the guarantee are lost.

In case of failure, no action is permitted and the unit must be returned to the following address:

SEFRAM
PLACE GUTENBERG
59175 TEMPLEMARS
FRANCE

CERTIFICATE

The SPX50 respects the European directives (CEM and ATEX), which concerns it.

However, it must be used correctly in applications for which it is intended, and should be linked or near CE approved products.

Certificate available on request.

WE RESERVE THE RIGHT TO CARRY OUT ANY MODIFICATIONS TO OUR UNITS WHICH WE DEEM NECESSARY.