

**SAS SUPER 100™ – SAS SUPER 180™  
DUO SAS SUPER 360™**

***MICROBIOLOGICAL MONITORING OF THE ENVIRONMENT***

## **Instruction Manual**

*Carefully read this Manual before operating your instrument.  
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*Patent Pending  
Manufactured by International pbi Spa Milan, Italy*

### **REFERENCES**

*FDA – 1987 Guideline on Sterile Drug Products produced by Aseptic Process  
ACGIH – Guideline for the Assessment of Bioaerosol in the Indoor Environment  
ASTM – Draft Protocol – Committee D22.05.06  
USP 23-NF 18 8<sup>th</sup> Supplement 1116 (May 1998) – Microbiological Evaluation of Clean Rooms and  
other Controlled Environments  
EU Guide for GMP – Manufacture of Sterile Medicinal Products Control of Medicines and  
Inspection  
CEN/TC 243 Norms for Clean Room Technology*



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## SECTION ONE

### ▪ BRIEF OPERATING INSTRUCTIONS FOR SAS SUPER 100 & SAS SUPER 180

The air flow is visualized on digital display at the fourth automatic succession presentation each time the instrument is switched on.

Press ON/OFF switch.

Press START button to sample the same air volume as the last sampling cycle.

To change the volume of air, use arrows to select “Standard Mode” from menu.

Refer to instruction manual to change settings.

Press ENTER to confirm selection.

Press arrows for menu selection to modify other pre-set parameters:

STANDARD MODE  
USER MODE  
PROGRAM MODE  
DELAY MODE  
MULTI MODE  
UTILITY MODE

Press ENTER to reach the sub-menu of the chosen parameter.

Refer to instruction manual to change settings.

Press ON/OFF switch at the end of sampling operations.

Press “CLEAR” each time you need to end an action. Then unit will come back to the initial configuration.

### ▪ BRIEF OPERATING INSTRUCTIONS FOR DUO SAS SUPER 360

Press the ON/OFF switch (black button).

When the visual display will show the message SELECT HEAD, press ENTER.

Press “UP” or “Down” arrows to select the “LEFT HEAD” or the “RIGHT HEAD” or “LEFT+RIGHT HEAD”.

Press ENTER to confirm selection.

Press START button to sample the same air volume as the last sampling time.



To change the volume of air or other parameters, follow the given instructions for SAS Super 100 and SAS Super 180.

## ▪ VISUAL DISPLAY PRESENTATION

(Press ON/OFF black button switch).

Each time the ON/OFF switch is pressed, a ten seconds visual display presentation will appear displaying the following information:

### SAS SUPER 100/180

- (1) INTERNATIONAL PBI
- (2) S/N XXXX
- (3) PRESS ARROWS  
FOR NEW MENU SELECTION
- (4) S.SAS 100 L or S.SAS 180 L
- (5) ID XXXX  
SITE XXXX
- (6) START FOR XX  
DD/MM/YY - HH/MM

### DUO SAS SUPER 360

- (1) INTERNATIONAL PBI
- (2) S/N XXXX
- (3) PRESS ARROWS FOR NEW MENU SELECTION
- (4) DUO SAS Super 360
- (5) I.D. XXXX SITE XXXX
- (6) SELECT HEAD

Press ENTER and select RIGHT HEAD or LEFT HEAD or HEAD LEFT+RIGHT

- (7) START FOR XX  
MM/DD/YY – HH/MM



This information appears in **automatic succession**. Avoid pushing any button before the end of the few seconds presentation; during this presentation all functions are disconnected.

## SECTION TWO

### ▪ OPERATING INSTRUCTIONS

#### 1. PRINCIPLE OF SURFACE AIR SYSTEM

The Surface Air System (SAS) encompasses several models which use the same principle.

Air is aspirated at a fixed speed for variable time through a cover which has been machined with a series of small holes of a special design. The resulting laminar air flow is directed onto the agar surface of a "Contact Plate" containing medium consistent with the microbiological examination to be made. When the preset sampling cycle is completed, the plate is removed and incubated. The organisms are then visible to the naked eye and can be counted for an assessment of the level of contamination.

#### 2. THE BASIC IDEA

The major points of the Surface Air System (SAS) are:

- A. To use a simple and inexpensive "Contact Plate" ("SURFAIR PLATE", "RODAC") for surface, hands or air control. These plates are very well known and easily available. They can be purchased ready poured with different media.
- B. To sample a known volume of air for a variable time to provide a range of sampling volumes.
- C. To aspirate air in a laminar flow pattern with sufficient velocity to impact organisms onto an agar surface.
- D. To accumulate data on the level of hygiene in each environment so that fluctuation can be monitored.
- E. To take advantage of advanced electronics for more reliable results in different operating conditions.
- F. To have the flexibility to choose between 55 mm Contact Plates, 84 mm Maxi Contact Plates or 90 mm Standard Petri Dishes.
- G. To apply cGLP and cGMP to air sampling operations.
- H. To organize sequential sampling to obtain a more representative sample under actual operating conditions.

**SAS SUPER 100 and SAS SUPER 180:  
Two instruments for two different applications.**

The two air samplers have the same performances with the only difference being in the rate of air aspirated:

SAS SUPER 100 = 100 litres of air per minute  
SAS SUPER 180 = 180 litres of air per minute.

The SAS SUPER 180 is appropriate in Clean Rooms and other applications demanding fast sampling times. In Clean Rooms, for example, it is important to test a larger volumes of air, because the microbial air contamination is very low.

The SAS SUPER 180 reduces the required time to obtain a sample with an important saving of time.

Both SAS SUPER 100 and SAS SUPER 180 are identified by the “SAS SUPER 100” logo on the right side of the instrument.

The SAS SUPER 180 air sampler is recognisable by the SAS SUPER 180 logo that appears on the display when the operator turns on the unit.



**DUO SAS SUPER 360:**  
The instrument includes two heads that can work independently or together.





### 3. INSTALLATION

#### 3.1 The practical use of contact plates

## THE PRACTICAL USE OF “CONTACT PLATES” FOR AIR CONTROL

### SAS SUPER 100™ SAS SUPER 180™ & DUO SAS SUPER 360

#### SAS SUPER 100 SAS SUPER 180 & DUO SAS SUPER 360 FLOW SCHEME

1. Remove the aspirating head.
2. Insert an identified, closed and prepared Contact Plate and remove plate lid.





3. Replace the aspirating head.
4. Select required air flow and start the unit.  
The air flow is directed onto the agar surface of the Contact Plate.
5. At the end of the cycle, remove the aspirating head.
6. Close and remove the Contact Plate.
7. Incubate.
8. Count the colonies, record the results on the microbiological air sampling report and interpret results.

### 3.2. List of menus and utility sub-menus

MENU	DESCRIPTION
START FOR XXX	This message indicates the air sampler is ready to repeat the same volume of prior sampling
STANDARD MODE	This message indicates the air sampler can be set to select one of 8 fixed standard sampling volumes
USER MODE	This message indicates the air sampler can be set to select one of 8 programmable sampling volumes
PROGRAM MODE	This message indicates the air sampler can be set to modify the 8 programmable sampling volumes
DELAY MODE	This message indicates the air sampler can be programmed to start sampling after a set period
MULTI MODE	This message indicates the air sampler can be programmed to extend the total sampling time using “sequential interval time” sampling
UTILITY MODE	This message indicates the air sampler is programmed to enter the following Sub-Menu:
	<i>SET TIME</i> To program date and time
	<i>SAMPLING SITE</i> To identify the sampling point
	<i>IDENTIFY</i> To identify the operator’s name
	<i>LANGUAGE</i> To display text in different languages
	<i>CLEAR RECORD</i> To clear the recorded sampling data
	<i>DISPLAY RECORD</i> To show the recorded sampling data
	<i>PRINT</i>



	To export the recorded sampling data
	<i>AUTO SWITCH OFF</i> To disconnect the automatic switch off when the “Infrared Remote Switch” is used

### 3.3 Preliminary Inspection

The apparatus is subject to specific working tests before shipping and it is carefully packed to avoid possible damage during transit. However, a visible check should be carried out as soon as possible to determine any transit damage. This must be reported immediately. The following procedures should be followed to check that the unit is functioning correctly.

The battery pack of the instrument must be charged for at least 14 hours before the test (2,5 hours if fast battery charger is used).

#### SAS SUPER 100 & SAS SUPER 180

After the ON/OFF button is pressed an automatic visual presentation appears.

In the following displays, the entry of “XX” indicates numerical figures.

#### **ACTION**

#### **DISPLAY**

Switch on the ON/OFF switch (black button)	I	N	T	E	R	N	A	T	I	O	N	A	L		
						P	B	I							

						S.	N.	X	X	X	X				

	P	R	E	S	S	A	R	R	O	W	S	F	O	R		
	N	E	W	M	E	N	U	S	E	L	E	C	T	I	O	N

				S	.	S	A	S			1	0	0		

					I	D				X	X	X	X		
				S	I	T	E			X	X	X	X		

			S	T	A	R	T		F	O	R		X	X	
			D	/	M	/	Y		-		H	/	M		

Push START button to start air sampling with last cycle	(	X	X	)		X	X								
---	---	---	---	---	--	---	---	--	--	--	--	--	--	--	--



			D	/	M	/	Y		-		H	/	M				
--	--	--	---	---	---	---	---	--	---	--	---	---	---	--	--	--	--

The motor will run until the figures in brackets reach the same figure as displayed to the right and then it will stop. During the sampling the two red leds are flashing (see position 16 and 28 in the figures at page 30).

**DUO SAS Super 360**

After the ON/OFF button is pressed, an automatic visual presentation appears. In the following display, the entry of "XX" indicates numerical figures.

**ACTION**

**DISPLAY**

Switch on the ON/OFF switch																	
		I	N	T	E	R	N	A	T	I	O	N	A	L			
								P	B	I							

								S.	N.	X	X	X	X				





Press ENTER																	
		R	I	G	H	T	O	R	L	E	F	T	H	E	A	D	
		R	I	G	H	T	+	L	E	F	T		H	E	A	D	

Select the choosen head by "UP" or "DOWN" arrows and confirm pressing ENTER																	
			S	T	A	R	T		F	O	R		X	X			
		D	D	/	M	M	/	Y	Y	-	H	H	/	M	M		

Press START button to start air sampling with last cycle																	
			(		X	X	)		X	X							



		D	D	/	M	M	/	Y	Y	-	H	H	/	M	M	
--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--

The motor will run until the figures in brackets reach the same figure as displayed to the right and then it will stop.

During the sampling the two red LEDs are flashing.

### 3.4 “55 mm Contact Plates” Holder Adjustment

The Contact Plate holders can be adjusted (using a screw driver) in case the available plates slightly different in diameter from the standard 55 mm Contact Plate (see Figure 1 page 30 and Chapter 4.10 page 24).

### 3.5 “84 mm Maxi-Contact Plates”

If high fungal contamination is expected in the sampled air, Maxi-Contact Plates are suggested. This is because moulds tend to spread and consequently make counting difficult after incubation.

The “84 mm Maxi-Contact Plates” are inserted into the SAS SUPER 100 or SAS SUPER 180 using a special adaptor (Cat.n. 19123). For more details see Application Note N. 89.

### 3.6. Tripod Installation (Optional)

The SAS SUPER 100 & SAS SUPER 180 can be fixed to a table tripod or a floor tripod. The screw thread connection is located under the unit, between the two front feet. When not in use, the screw is protected by a plastic cap.



#### 4. OPERATIONS

Push the Main switch (black button) once to switch on the unit.

The Main switch (black button) must be pushed twice to switch on the unit if the automatic switch off timer operated when last used.

Press “CLEAR” at any time to return to the initial “START FOR” configuration.

The air sampler is provided with eight fixed air volumes (“Standard Mode”) stored in the memory and eight programmable air volumes (“User Mode”) selected by the operator. The selection of the volume is made by pressing the “UP” or “DOWN” arrows when the program is in the relevant sub-menu.

The following volumes of air are suggested:

- Contaminated areas (communities, processing rooms, etc.) 10-200 litres of air
- Normal areas (laboratory benches, houses, etc.) 200-500 litres of air
- Sterile or high risk areas (clean rooms, operating theatres, etc.) 500-1000 litres of air.

#### SAS SUPER 100 & SAS SUPER 180

##### 4.1. To start with the same air volume as the previous sample

ACTION	DISPLAY													
Switch on the ON/OFF switch (black button)- wait 6 seconds (Last aspirated volume of air)														
			S	T	A	R	T		F	O	R		X	X
		D	/	M	/	Y		-		H	/	M		

Push “START” (after the visual display presentation)														
			(		X	X	)		X	X				
		D	/	M	/	Y		-		H	/	M		

##### 4.2. To start with one of the eight memorized “STANDARD MODE” programs

ACTION	DISPLAY													
Switch on the ON/OFF switch (black button)- wait 6 seconds														
			S	T	A	R	T		F	O	R		X	X
		D	/	M	/	Y		-		H	/	M		

Press “▲” to reach														
			S	T	A	N	D	A	R	D		M	O	D
		D	/	M	/	Y		-		H	/	M		



Press ENTER and then “▲” to select one of the eight volumes (10, 20, 30, 50, 100, 200, 500, 1000)			S	.	P	R	O	G	R	A	M		X	X	?		
			D	/	M	/	Y		-		H	/	M				

**ACTION** **DISPLAY**

Press ENTER to confirm the chosen figure			S	T	A	R	T		F	O	R		X	X			
			D	/	M	/	Y		-		H	/	M				

Push “START”				(		X	X	)			X	X					
			D	/	M	/	Y		-		H	/	M				

DUO SAS SUPER 360

**4.1. A - To start with the same air volume as the previous sample**

Switch on the ON/OFF switch			S	E	L	E	C	T		H	E	A	D				
			D	/	M	/	Y		-		H	/	M				

Press ENTER: select one of the 3 options by “UP” and “DOWN” arrows. Confirm by pressing ENTER	R	I	G	H	T	O	R	L	E	F	T	H	E	A	D		
	R	I	G	H	T	+	L	E	F	T		H	E	A	D		

			P	R	E	S	S		S	T	A	R	T				
			D	/	M	/	Y		-		H	/	M				

Press START to sample the last used volume			(	X	X	)		X	X								
			D	/	M	/	Y		-		H	/	M				



**4.2. B - To start with one of the eight memorized “STANDARD MODE” programs**

Switch on the ON/OFF switch			S	E	L	E	C	T		H	E	A	D		
			D	/	M	/	Y		-		H	/	M		

Press ENTER: select one of the 3 options by “UP” and “DOWN” arrows. Confirm by pressing ENTER	R	I	G	H	T	O	R	L	E	F	T	H	E	A	D
	R	I	G	H	T	+	L	E	F	T	H	E	A	D	

”			P	R	E	S	S		S	T	A	R	T		
			D	/	M	/	Y		-		H	/	M		

Press “UP” or “DOWN” arrows to reach “STANDARD MODE		S	T	A	N	D	A	R	D		M	O	D	E	
			D	/	M	/	Y		-		H	/	M		

Press ENTER and then an arrows to select one of the eight volumes (10?, 20?, 30?, 50?, 100?, 200?, 500?, 1000?)			S	.	P	R	O	G	X	X	?				
			D	/	M	/	Y		-		H	/	M		

Press ENTER to confirm the choosen figure			S	T	A	R	T		F	O	R		X	X	
			D	/	M	/	Y		-		H	/	M		

Push START			(	X	X	)		X	X						
			D	/	M	/	Y		-		H	/	M		

Press CLEAR button to know which head is active (left, right or both) or to change it. The message “SELECT HEAD” will appear on the visual display.  
Follow the previous instruction.



### 4.3 “UTILITY MODE” PROGRAM

In this program the following SUB-MENUS are listed:

Set time,	Clear Record,
Sampling site,	Display record,
Identify,	Print,
Language,	Autoswitch OFF.

Always start from UTILITY MODE to reach one of these SUB-MENUS.

ACTION	DISPLAY
Switch on the Main ON/OFF switch (black button) and press “▲” to reach UTILITY MODE.	U T I L I T Y M O D E
	D / M / Y - H / M

#### 4.3.1. “SET TIME”

This option is used to program day, month, year and time of the day

ACTION	DISPLAY
Press ENTER to select the “SET TIME” Sub-Menu	S E T T I M E
	D / M / Y - H / M

Press ENTER and “▲” to change	day
Press ENTER and “▲” to change	month
Press ENTER and “▲” to change	year
Press ENTER and “▲” to change	hours
Press ENTER and “▲” to change	minutes

ACTION	DISPLAY
Press ENTER to confirm	U T I L I T Y M O D E
	D / M / Y - H / M





### 4.3.2. "SAMPLING SITE"

This data is memorized in the file "DISPLAY RECORD" (see paragraph 4.3.6). The site identification should be changed for samples taken at different sites especially if the results are to be printed.

Select UTILITY MODE Program.

#### ACTION

#### DISPLAY

Press ENTER and then "▲" to select "SAMPLING SITE" Sub-Menu	S	A	M	P	L	I	N	G	S	I	T	E		
		D	/	M	/	Y		-	H	/	M			

Press ENTER to indicate sampling location	S	A	M	P	L	I	N	G	S	I	T	E		
					X	X	X	X						

Press "▲" to select the first letter or number (1 → 9 A → Z)	S	A	M	P	L	I	N	G	S	I	T	E		
					X	X	X	X						

Press ENTER and repeat selection for 2 <sup>nd</sup> , 3 <sup>rd</sup> and 4 <sup>th</sup> letter or number	S	A	M	P	L	I	N	G	S	I	T	E		
					X	X	X	X						

	S	A	M	P	L	I	N	G	S	I	T	E		
					X	X	X	X						

	S	A	M	P	L	I	N	G	S	I	T	E		
					X	X	X	X						

Press ENTER to confirm.



**4.3.3. "IDENTIFY"**

This option is used to identify the operator. This should be changed if different operators use the sampler and especially if the date is to be printed. The data is recorded in the file "DISPLAY RECORD" (see paragraph 4.3.6).

Select UTILITY MODE Program.

**ACTION**

**DISPLAY**

Press ENTER and then "▲" to select the IDENTIFY Sub-Menu				"	I	D	E	N	T	I	F	Y	"			
			D	/	M	/	Y		-		H	/	M			

Press ENTER to select operator identification				"	I	D	E	N	T	I	F	Y	"			
							X	X	X	X						

Press "▲" to select the first letter or number (1 → 9 A → Z)				"	I	D	E	N	T	I	F	Y	"			
							X	X	X	X						

Press ENTER and repeat selection for 2 <sup>nd</sup> , 3 <sup>rd</sup> and 4 <sup>th</sup> letter or number				"	I	D	E	N	T	I	F	Y	"			
						X	X	X	X							

				"	I	D	E	N	T	I	F	Y	"			
						X	X	X	X							

				"	I	D	E	N	T	I	F	Y	"			
						X	X	X	X							

Press ENTER to confirm.

**4.3.4. "LANGUAGE"**

The text of the Menus may be selected choosing from different languages.

Select UTILITY MODE Program.



**ACTION**

**DISPLAY**

Press ENTER and then “▲” to select the LANGUAGE Sub-Menu					L	A	N	G	U	A	G	E				
				D	/	M	/	Y		-		H	/	M		

Press ENTER and then “▲” to select the chosen Language (English, etc.)					E	N	G	L	I	S	H					
				D	/	M	/	Y		-		H	/	M		

Press ENTER to confirm.

**4.3.5. “CLEAR RECORD”**

This option is used to delete all the data memorized in the “DISPLAY RECORD”. Before starting this procedure, please be certain that existing data is not required or that it has been downloaded.

Select UTILITY MODE Program.

**ACTION**

**DISPLAY**

Press ENTER and then “▲” to select the CLEAR RECORD Sub-Menu				C	L	E	A	R		R	E	C	O	R	D	
				D	/	M	/	Y		-		H	/	M		

Press ENTER to delete all the memorised data on the DISPLAY RECORD. After about five seconds the display will show UTILITY MODE and all memorised data is deleted.

**4.3.6. “DISPLAY RECORD”**

The last 32 samples are memorized in the file “DISPLAY RECORD”. Each sample is identified in chronological date order and shows the date, time, operator, site and volume of air sampled.

Select UTILITY MODE Program.

**ACTION**

**DISPLAY**

Press ENTER and then “▲” to select the DISPLAY RECORD Sub-Menu				D	I	S	P	L	A	Y		R	E	C	O	R	D
				D	/	M	/	Y		-		H	/	M			

Press ENTER and then “▲” to select the number on the left side that refers to the chronological sample runs			X	X	-	D	/	M	/	Y	-	H	/	M		
			I	D	/	S	I	T	E	-	V	O	L	U	M	E

If data has not been inserted,			?	?	-	?	?	/	?	?	-	?	?	?	?		
--------------------------------	--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--



the display will show

	X	X	X	X	/	X	X	X	X		X	X	X	X	
--	---	---	---	---	---	---	---	---	---	--	---	---	---	---	--

Thirty-two cycles can be memorised. After 32 aspirating cycles, data storage automatically starts at Sample n.1.

**4.3.7. "PRINT"**

The sampler should be connected to the printer by connecting cable (a specific cable and diskette must be ordered: cat. n. 22536-SAS-PC).

Select UTILITY MODE Program.

Switch the printer on.

**ACTION**

**DISPLAY**

Press ENTER and then "▲" to select "PRINT". Press again ENTER.						P	R	I	N	T					
				D	/	M	/	Y		-		H	/	M	

The following data will be printed in chronological order: progressive sample number, day, month, year, hour, operator's name, site, litres of aspirated air.

Remove the results by tearing the paper off.

Switch the printer off.

**4.3.8. "AUTO SWITCH OFF"**

This option is used to disable the automatic switch off option when the Infra Red Remote switch is being used.

Select UTILITY MODE Program.

**ACTION**

**DISPLAY**

Press ENTER and then "▲" to select the "AUTO SWITCH OFF" Sub-Menu.		A	U	T	O	S	W	I	T	C	H		O	F	F
				D	/	M	/	Y		-		H	/	M	

Press ENTER

		B	A	T		S	A	V	E			O	N		
			D	/	M	/	Y		-		H	/	M		

Press "▲" to choose

		B	A	T		S	A	V	E			O	N		
			D	/	M	/	Y		-		H	/	M		

Press ENTER to confirm.



When the air sampler is switched off at the end of cycle, the BAT SAVE ON is automatically reset. (For more details see Chapter 4.9.)

#### 4.4. To start with one of the eight operator programmable sampling volumes memorised in the “USER MODE” program

If the operator require to use volumes other than the standards volumes, up to 8 additional volumes, can be program into the unit.

ACTION	DISPLAY														
Switch on the ON/OFF switch (black button)															
			S	T	A	R	T		F	O	R		X	X	
		D	/	M	/	Y		-		H	/	M			
Press “▲” to select the USER MODE															
			U	S	E	R					M	O	D	E	
		D	/	M	/	Y		-		H	/	M			
Press “ENTER” to select the pre-memorized volumes															
			P	R	O	G	R	A	M		?				
		D	/	M	/	Y		-		H	/	M			
Press “▲” to select the chosen pre-memorized volumes															
			P	R	O	G	R	A	M		X	X	X	X	?
		D	/	M	/	Y		-		H	/	M			
Press ENTER to confirm															
			S	T	A	R	T		F	O	R		X	X	X
		D	/	M	/	Y		-		H	/	M			

Press START to run the sampling cycle.

The total number of available “USER MODE” programs is eight.  
The maximum volume of air for each sampling cycle is 1800 litres.

#### 4.5. “PROGRAM MODE”: modification of an existing “USER MODE” program

Using this procedure, it is possible to memorise up to eight different volumes (from 1 to 1800 litres of air). (See chapter 4.4.)

##### ACTION

##### DISPLAY

Switch on the ON/OFF switch (black button)			S	T	A	R	T		F	O	R		X	X		
			D	/	M	/	Y		-			H	/	M		

Press “▲” to select PROGRAM MODE			P	R	O	G	R	A	M		M	O	D	E		
			D	/	M	/	Y		-			H	/	M		

Press ENTER and then “▲” to select the volume of air to be modified			P	R	O	G	R	A	M		X	X	X	X	X	?
			D	/	M	/	Y		-			H	/	M		

Press ENTER					X	X	X	X	-	0	0	0	0			
					D	/	M	/	Y		-		H	/	M	

Press “▲” to select the thousands of litres					X	X	X	X	-	X	0	0	0			
					D	/	M	/	Y		-		H	/	M	

Press ENTER and then “▲” to select the hundreds of litres					X	X	X	X	-	X	X	0	0			
					D	/	M	/	Y		-		H	/	M	

Press ENTER and then “▲” to select the tens of litres					X	X	X	X	-	X	X	X	0			
					D	/	M	/	Y		-		H	/	M	

Press ENTER and then “▲” to select the units of litres					X	X	X	X	-	X	X	X	X			
					D	/	M	/	Y		-		H	/	M	



Press ENTER. Note the display will still show the old volume before modification.

To verify the selected volume, look at the USER MODE Program	S	T	A	R	T	F	O	R	X	X	X	X
			D	/	M	/	Y	-	H	/	M	

#### 4.6. Using a “DELAY MODE” program to delay instrument start

##### ACTION

##### DISPLAY

Switch on the ON/OFF switch (black button)	S	T	A	R	T	F	O	R	X	X
			D	/	M	/	Y	-	H	/

Press “▲” to select delay mode	D	E	L	A	Y	M	O	D	E	
			D	/	M	/	Y	-	H	/

Press ENTER to reach the delay Sub-Menu (01, 02, 03, 05, 10, 20 minutes)	D	E	L	A	Y	X	X	M	I	N
			D	/	M	/	Y	-	H	/

Press “▲” to select the chosen Delay Time.

Press ENTER to confirm and then press START.

The message “DELAY” will flash until the selected time is reached: the display flashes to confirm delayed start has been selectes.

##### ACTION

##### DISPLAY

	S	T	A	R	T	F	O	R	X	X

	!	!	D	E	L	A	Y	!	!

	(	X	X	)	X	X			
		!	!	D	E	L	A	Y	!



#### 4.7. Using the “MULTI MODE” program.

This program is very useful for extending the time of sampling with the purpose of obtaining a more representative environmental sample “in actual operating conditions”. The total air volume to be sampled is aspirated with two or more sub-volume aspirations (E.g.:1000 litres in ten runs of 100 litres at five minute intervals).

Before entering the MULTI MODE Program you should therefore decide (a) total volume of air to be sampled onto the Contact Plate; (b) number of runs; (c) interval time. See Application Note N.95 for more details.

#### ACTION

#### DISPLAY

Switch on the ON/OFF switch (black button)			S	T	A	R	T	F	O	R	X	X		
			D	/	M	/	Y	-	H	/	M			

Press “▲” to select MULTI MODE			M	U	L	T	I	M	O	D	E			
			D	/	M	/	Y	-	H	/	M			

Press ENTER and then “▲” to select interval time (05, 10, 15, 20, 25, 30 MIN)		I	N	T	E	R	V	A	L	T	I	M	E	
				X	X		M	I	N					

Press ENTER and then “▲” to select number of runs (2, 3, 4, 5, 6, 7, 8, 9, 10) <i>NC=number of cycles</i>		N	U	M	B	E	R	S	O	F	R	U	N	S
					X	X		N	C					

Press ENTER to select the volume of each single air sample	S	I	N	G	L	E	R	U	N	V	O	L	U	M	E
					X	X	X	X							

Press “▲” to select the first figure (thousands of litres)		S	I	N	G	L	E	V	O	L	U	M	E	
					X	X	X	X						





Press ENTER and “▲” to select the second figure (hundreds of litres)	S	I	N	G	L	E		V	O	L	U	M	E
					X	X	X	X					

Press ENTER and “▲” to select the third figure (tens of litres)	S	I	N	G	L	E		V	O	L	U	M	E
					X	X	X	X					

ACTION	DISPLAY												
Press ENTER and “▲” to select the fourth figure (units of litres)	S	I	N	G	L	E		V	O	L	U	M	E
						X	X	X	X				

Press ENTER to confirm.

The visual display will show the TOTAL volume of air to be aspirated at the end of the cycles. Check if it is the correct volume. If not, push “clear” and start again from the beginning.

				T	O	T	A	L		L		X	X
				S	T	A	R	T		F	O	R	

Press START to start the first RUN					X	X	X	X		X	X		
				X	X		C	Y	C	L	E	S	

At the end of the first RUN, during the interval, the number of “residual cycles” (runs) that are remaining are shown on the display:

				-	X	X		C	Y	C	L	E	
				*	*	D	E	L	A	Y	*	*	

After DELAY TIME					X	X	X	X		X	X		
					X	X		C	Y	C	L	E	

At the end of the cycles	S	T	A	R	T		F	O	R		X	X	X	X
			D	/	M	/	Y	-	H	/	M			

#### 4.8. Low Battery Message



When the LOW BATTERY message is flashing, the air sampler must be connected to the battery charger. The residual charge may be enough to complete the last sample, but this will vary according to the condition of the battery (age, use, temperature, etc.).

**ACTION**

**DISPLAY**

Switch on the ON/OFF															
	!	!	L	O	W		B	A	T	T	E	R	Y	!	!
switch (black button)															

**4.9. “Remote switch” use**

The SAS SUPER 100 and SAS SUPER 180 microbiological air samplers can be fitted with an Infrared Remote Control (optional).

The instrument, in normal operating conditions, automatically switches off after 4/5 minutes, to save the battery, if the unit is not being used. It is therefore necessary to disable the “autoswitch off” in case the Infrared Remote Switch is used after 4 minutes.

The following protocol shows how to disable the auto-switch off option.

**ACTION**

**DISPLAY**

Switch on the ON/OFF														
	S	T	A	R	T		F	O	R		X	X		
switch (black button)			D	/	M	/	Y	-	H	/	M			

Press “▲” to select														
	U	T	I	L	I	T	Y		M	O	D	E		
UTILITY MODE			D	/	M	/	Y	-	H	/	M			

Press “ENTER”														
	S	E	T		T	I	M	E						
			D	/	M	/	Y	-	H	/	M			

Press “▲” to select														
	A	U	T	O	S	W	I	T	C	H				
“AUTOSWITCH OFF” Sub-menu			D	/	M	/	Y	-	H	/	M			

Press “ENTER”														
	B	A	T		S	A	V	E			O	N		
			D	/	M	/	Y	-	H	/	M			

Press “▲” to choose														
	B	A	T		S	A	V	E		O	F	F		
“BAT SAVE OFF”			D	/	M	/	Y	-	H	/	M			

Press “ENTER” to confirm														
	A	U	T	O	S	W	I	T	C	H				



			D	/	M	/	Y	-	H	/	M						
--	--	--	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--

(The instrument will now not switch off after 4/5 minutes and the Infrared Remote Switch will work regularly).

**ACTION**

**DISPLAY**

Press "clear" to go			S	T	A	R	T		F	O	R		X	X		
back to the start			D	/	M	/	Y	-	H	/	M					

**NOTE.**

At the end of this protocol, the automatic switch off option is disabled and the Infrared Remote Switch may be used at any time.

The automatic switch off option is reactivated by switching off the air sampler with the Main Switch (black button).

**CAUTION!**

When the auto switch off option is disabled, remember to switch off the instrument after use to save the battery charge.

**4.10. Adjustable "Contact Plate" holders**

The SAS SUPER 100 and SAS SUPER 180 air samplers are designed for use with standard "Contact Plates". The plate holders are adjustable to allow different brands of Contact Plate to be fitted.



*Adjustable plate holders in the sampler head allow the operator to use contact plates from many sources without concern for slight differences in plate size.*

#### **4.11 “Contact Plate” handling**

- (a) Disinfect the cover of the air sampler at the beginning of each sampling program treating the inside and the outside part with a disinfecting alcohol wipe or swab.
- (b) The cover with its protective plastic lid can be autoclaved at 121°C for 15 minutes. If this procedure is to be repeated regularly, a s/s head is recommended. It is therefore useful to have available several heads ready to use. Alternatively, the unit can be sanitised using a disinfecting aerosol at about 30 cm from the head when the fan is running. Thirty seconds are sufficient to disinfect the air path.
- (c) Remove the cover of the air sampler by unscrewing it, holding the edge of the cover. Avoid touching the inside and outside of the drilled area.
- (d) Insert a closed filled “Contact Plate” into the retaining slots and then remove its lid. Avoid contamination from droplets and aerosol infection.
- (e) Replace the sampling head and start the air aspiration cycle. At the end of the cycle, unscrew the sampling head, replace the “Contact Plate” lid and remove the “Contact Plate”.
- (f) Be sure each “Contact Plate” is identified with the appropriate sample data.
- (g) Incubate the “Contact Plate” for the specified time at the appropriate temperature.
- (h) At the end of incubation count the number of visible organisms (C.F.U.) and relate this number to the volume of air sampled.

#### **4.12. Sanitation of the air sampler**

##### **A. COVER OF THE HEAD**

The sampling head with its protective plastic lid can be autoclaved at 121°C for 15 min. Alternatively, the sampling head can be sanitised by treating the inside and outside surfaces with a disinfecting alcohol wipe or swab.



## **B. CONTACT PLATE HOUSING HEAD**

The unit complete with the sampling head can be sanitised using a disinfecting aerosol (e.g.: Isopropyl alcohol sterile spray cod. 18223) held at about 30 cm from the head when the fan is running. 30 seconds are sufficient to disinfect the air path.

## **C. BODY OF THE UNIT**

The plastic body of the unit can be wiped with a mild chemical agent.

### **4.13. Use of the air sampler in Clean Areas**

The sampling head should be autoclaved and the body of the unit wiped with a mild chemical agent.

#### Note.

The air sampler is a scientific instrument and its surface should be disinfected using an aerosol and not a liquid!

The unit should be protected with a sterile bag and then transferred into the Clean Area.

It is important to wear sterile gloves when handling the “Contact Plates” and the head of the air sampler to prevent bacteriological contamination.

Use double packed, gamma irradiated “Contact Plates” to avoid possible clean environment contamination.

For more details see Application Notes N.15, 31, 55, 63, 68, 83, 95, 99.

#### 4.14. “Contact Plates” preparation

It is important that the volume of media dispensed into a “Contact Plate” is constant for the type of plate used. An excess volume can create a convex surface that is too high and which may touch the inside of the sampler head. An insufficient volume will create a concave surface, unsuitable for representative colony growth using SAS System.

The volume of agar in a “55 mm Contact Plate” should be 16-18 ml and in a “84 mm Maxi-Contact Plate” 24-26 ml.

For more details see Application Note N.78.

#### 4.15 Total Bacterial Count and/or micro-organisms identification by dilution

In normal conditions, if sampling is correctly performed, the colonies are easily counted and collected for identification on the agar surface of the Contact Plate. If very high colony count is expected, if inhibitors are expected in the air being sampled or if the micro-organisms are to be incubated at different temperatures, the dilution method should be applied.

The total amount of agar of the Contact Plate is aseptically transferred to a Stomacher bag, sterile diluent is added and the Somacher treatment is applied for one minute. The usual plating technique and/or identification procedures are applied to the processed diluent.

#### 4.16 Multi Point Sampling with several independent air samplers

A progressive simultaneous operation monitoring in a closed environment can be organised using several SAS Super 100 air samplers programmed with different starting delay times and sequential interval steps.

The air samplers can be positioned on a different walls using a support arm (cat. n. 19834) to allow 45°C inclination. At the end of operation, the air samplers are collected for Contact Plate transfer and / data export to paper by printer or PC.

This type of organisation allows:

- (a) to reduce staff labor involved in sampling;
- (b) to reduce microbial contamination risk because the enclosed environment is monitored “in operation” ;
- (c) to obtain complete written report on air sampling.

AREA	Position	SAS s/n	Single Air Volume	Total Air Volume	Sub Sample number	Sampling interval	Start delay
A	A1	1.210	-	1.000	-	-	5
	A2	1.211	200	1.000	5	30	-
	A3	1.213	250	1.000	4	30	-
B	B1	1.214	250	1.000	4	30	-
	B2	1.215	200	1.000	5	30	-
C	C1	1.216	-	1.000	-	-	20

- (a) Air sampler SAS SUPER 100 Serial Number 1210 was positioned in AREA A on site A1 and programmed for a total air volume of 1000 litres in one run, starting after 5 minutes from the switching on of the instrument.
- (b) Air sampler SAS SUPER 100 Serial Number 1211 was positioned in AREA A on site A2 and programmed for a total air volume of 1000 litres in five times (200 litres during each run) with interval times of 30 minutes.



- (c) Air sampler SAS SUPER 100 Serial Number 1213 was positioned in AREA A on site A3 and programmed for a total air volume of 1000 litres in four times (250 litres during each run) with interval times of 30 minutes.
- (d) Air sampler SAS SUPER 100 Serial Number 1214 was positioned in AREA B on site B1 and programmed for a total air volume of 1000 litres in four times (250 litres during each run) with interval times of 30 minutes.
- (e) Air sampler SAS SUPER 100 Serial Number 1215 was positioned in AREA B on site B2 and programmed for a total air volume of 1000 litres in five times (200 litres during each run) with interval times of 30 minutes.
- (f) Air sampler SAS SUPER 100 Serial Number 1216 was positioned in AREA C on site C1 and programmed for a total air volume of 1000 litres in one run, starting after 20 minutes from the switching on of the instrument.

#### **4.17 Multi Pont Sampling with several connected air samplers**

Several SAS Super 100 air samplers can be connected and controlled by PC.

### **5. FINAL OPERATIONS**

Switch off the ON/OFF Main switch (black button).

The unit will switch off automatically after 4/5 minutes, if the “switchg off option” has not been disabled for Infrared Remote Control use.



## 6. CALCULATION OF RESULTS

### 6.1. Colony Forming Units per 1000 litres of air

The number of organisms counted on the surface of the “Contact Plate” must first be corrected for the statistical possibility of multiples particles passing through the same hole. The statistical formula is taken from work by J. Maker. Correction Tables are given below for both the 55 mm standard Contact head, the 84 mm Maxi-Contact head and the Petri head. The probable count (Pr) is then used to calculate the Colony Forming Unit (CFU) per cubic metre of air sampled.

#### CORRECTION TABLE TO ADJUST COLONY COUNTS FROM A 219-HOLE IMPACTOR USING STANDARD 55 mm CONTACT PLATES AND 90mm PETRI PLATES

Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr
1	1	41	45	81	101	121	175	161	289	201	542
2	2	42	46	82	102	122	178	162	293	202	554
3	3	43	48	83	104	123	180	163	297	203	567
4	4	44	49	84	106	124	182	164	301	204	580
5	5	45	50	85	107	125	185	165	305	205	595
6	6	46	51	86	109	126	187	166	309	206	611
7	7	47	53	87	110	127	189	167	313	207	627
8	8	48	54	88	112	128	192	168	317	208	646
9	9	49	55	89	114	129	194	169	322	209	666
10	10	50	57	90	116	130	196	170	326	210	687
11	11	51	58	91	117	131	199	171	331	211	712
12	12	52	59	92	119	132	201	172	335	212	739
13	13	53	60	93	121	133	204	173	340	213	770
14	14	54	62	94	122	134	206	174	344	214	807
15	15	55	63	95	124	135	209	175	349	215	851
16	17	56	64	96	126	136	212	176	354	216	905
17	18	57	66	97	128	137	214	177	359	217	978
18	19	58	67	98	130	138	217	178	365	218	1088
19	20	59	69	99	131	139	220	179	370	219	1307
20	21	60	70	100	133	140	222	180	375		
21	22	61	71	101	135	141	225	181	381		
22	23	62	73	102	137	142	228	182	387		
23	24	63	74	103	139	143	231	183	393		
24	25	64	76	104	141	144	234	184	399		
25	26	65	77	105	142	145	237	185	405		
26	28	66	78	106	144	146	240	186	412		
27	29	67	80	107	146	147	243	187	418		
28	30	68	81	108	148	148	246	188	425		
29	31	69	83	109	150	149	249	189	432		
30	32	70	84	110	152	150	252	190	439		
31	33	71	86	111	154	151	255	191	447		
32	34	72	87	112	156	152	258	192	455		
33	36	73	88	113	158	153	261	193	463		
34	37	74	90	114	160	154	265	194	471		
35	38	75	92	115	162	155	268	195	480		
36	39	76	93	116	165	156	271	196	489		
37	40	77	95	117	167	157	275	197	499		
38	42	78	96	118	169	158	278	198	508		
39	43	79	98	119	171	159	282	199	519		
40	44	80	99	120	173	160	286	200	530		





*r = colony forming units counted*  
*Pr = probable count*

**CORRECTION TABLE TO ADJUST COLONY COUNTS FROM A 487-HOLE IMPACTOR USING 84 mm MAXI-CONTACT PLATES**

Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr	Colonies r	MPN Pr
1	1	41	43	81	88	121	139	161	195	201	259
2	2	42	44	82	90	122	140	162	197	202	261
3	3	43	45	83	91	123	142	163	198	203	262
4	4	44	46	84	92	124	143	164	200	204	264
5	5	45	47	85	93	125	144	165	201	205	266
6	6	46	48	86	95	126	146	166	203	206	267
7	7	47	49	87	96	127	147	167	204	207	269
8	8	48	50	88	97	128	148	168	206	208	271
9	9	49	52	89	98	129	150	169	207	209	273
10	10	50	53	90	99	130	151	170	209	210	274
11	11	51	54	91	101	131	152	171	210	211	276
12	12	52	55	92	102	132	154	172	212	212	278
13	13	53	56	93	103	133	155	173	213	213	280
14	14	54	57	94	104	134	157	174	215	214	281
15	15	55	58	95	106	135	158	175	217	215	283
16	16	56	59	96	107	136	159	176	218	216	285
17	17	57	61	97	108	137	161	177	220	217	287
18	18	58	62	98	109	138	162	178	221	218	289
19	19	59	63	99	111	139	163	179	223	219	290
20	20	60	64	100	112	140	165	180	224	220	292
21	21	61	65	101	113	141	166	181	226	221	294
22	22	62	66	102	114	142	168	182	228	222	296
23	24	63	67	103	116	143	169	183	229	223	298
24	25	64	69	104	117	144	171	184	231	224	300
25	26	65	70	105	118	145	172	185	232	225	301
26	27	66	71	106	119	146	173	186	234	226	303
27	28	67	72	107	121	147	175	187	236	227	305
28	29	68	73	108	122	148	176	188	237	228	307
29	30	69	74	109	123	149	178	189	239	229	309
30	31	70	75	110	125	150	179	190	241	230	311
31	32	71	77	111	126	151	181	191	242	231	313
32	33	72	78	112	127	152	182	192	244	232	315
33	34	73	79	113	128	153	183	193	245	233	317
34	35	74	80	114	130	154	185	194	247	234	318
35	36	75	81	115	131	155	186	195	249	235	318
36	37	76	83	116	132	156	188	196	250	236	320
37	38	77	84	117	134	157	189	197	252	237	322
38	40	78	85	118	135	158	191	198	254	238	324
39	41	79	86	119	136	159	192	199	255	239	326
40	42	80	87	120	138	160	194	200	257	240	330

**Example of calculation of results**

$$X = \frac{\text{Pr} \times 1000}{V}$$

Where:

- V = Volume of sampled air = 200 litres of air
- r = Colony Forming Units counted on “ 55 mm Contact Plates” = 67
- Pr = Probable count obtained by positive hole correction = 80
- x = Colony Forming Units per 1000 litres (= 1 cubic metre) of air



$$x = \frac{80 \times 1000}{200} = 400 \text{ CFU per 1000 litres of air (1000 litres=1m}^3\text{)}$$

To express the final result in CFU/ft<sup>3</sup> multiply the CFU/m<sup>3</sup> value by 0,02832

## 6.2. Data recording

All data related to instrument identification, operator's name, sampling site, date and hour of sampling, type of media, CFU may be reported on the specific software "SAS software" (Cat.n.15578).

# SECTION THREE

## 7. SPECIFICATIONS

### Principle

Air-borne micro-organisms are collected on microbiological agar by impaction produced by aspiration.

### Nominal Air Flow Rate

SAS SUPER 100 = 100 litres of air per minute

SAS SUPER 180 = 180 litres of air per minute

### Range of Air Sample Volume

10, 20, 30, 50, 100, 200, 500, 1000 litres are permanently memorised (Standard Mode); up to eight other volumes can be selected and memorised by the operator (User Mode). Maximum volume of air per cycle is 1800 litres.

### Voltage

8,4 Volts – 2,4 amp/h

### Battery Pack

Rechargeable Nickel Metal Hydride (without memory effect).

### Battery Autonomy

Aspiration of approx. 40.000 litres of air

### Motor

6 Volts, 2,8 Watts

### Size

105x110x290 mm

### Weight

1750 g

### Construction

Aspirating Head: aluminium or stainless steel

Turbine: antistatic plastic resin

Housing: polyurethane resin

### Sampling Efficiency

The effective sampling efficiency of the SAS SUPER 100, in a controlled environment, with aerosol of known particle size is 100% over 4 microns in size.

Considering the normal range of environmental micro-organisms is between 4 and 20 microns, the SAS SUPER 100 is suitable for all normal air monitoring testing (V.LACH – Journal of Hospital Infection, 1985, 6, 102-107). This condition is obtained using the standard 219 holes aspirating head.

If, for special applications or research, it is necessary to collect micro-organisms to a size of 1 micron, the 401 holes special aspirating head should be used.

This head has smaller holes to increase the velocity of particles and achieve a 100% capture efficiency on particles down to 1 micron in size.

### Acoustic signal

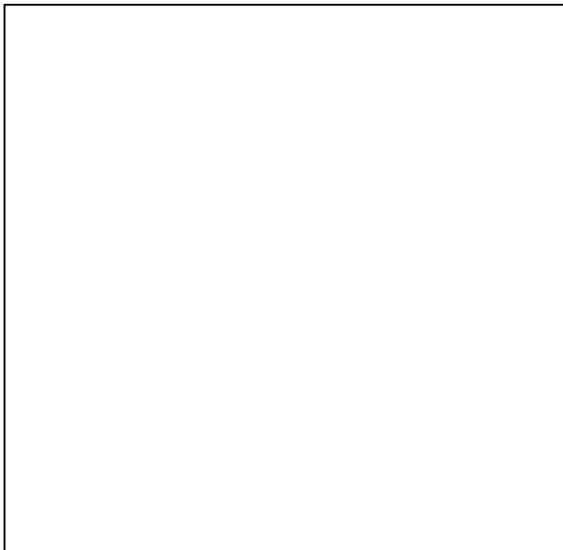
An acoustic signal alerts the operator when air sampling is completed.

### 3,0 Volts Flat Battery

Date and hours are activated, even when air sampler is switched off, by a 3,0 V flat battery.

The instrument should be switched on during the 3,0 V flat battery replacement, to avoid losing date and hours.

### SAS Super 100 / SAS Super 180 Contact Plate Chamber



1. 2. 3. Adjustable holders to accommodate "Contact Plates" of different diametres
4. 5. 6. Screws not to be touched by the operator
7. Air turbine
8. Contact Plate fixing spring

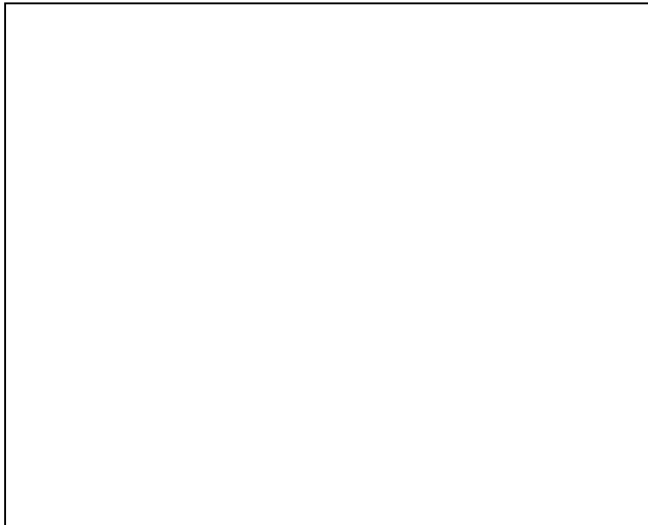


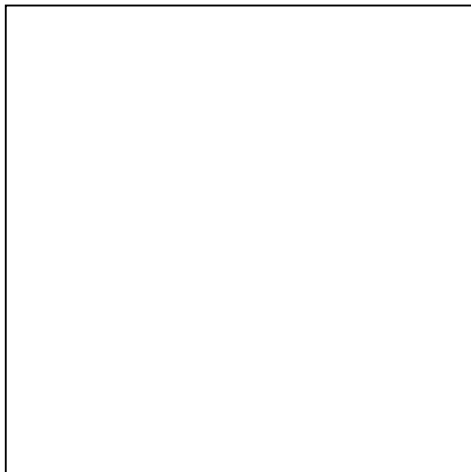
FIG. 1

**SAS Super 100 / SAS Super 180 Upper Panel**

- 9. 10. 11. 12. Feet for sampling in upright position
- 13. ON/OFF switch (black button)
- 14. Printer connection
- 15. Battery charger connection
- 16. Flashing LED during air sampling
- 17. Instrument Serial Number
- 18. CE mark

FIG. 2

**SAS Super 100 / SAS Super 180 Front Control Panel**



- 19. Infrared sensor for remote control
- 20. Screw for battery pack and access to PC board
- 21. Back lit alpha numeric visual display
- 22. UP arrow to select MENU and SUB-MENU
- 23. DOWN arrow to select MENU and SUB-MENU
- 24. **START** command to initiate the air sampling cycle
- 25. **CLEAR** command to exit program and to go to the starting conditions
- 26. **ENTER** command to confirm selected MENU and SUB-MENU
- 27. Rubber gasket
- 28. Flashing LED during air sampling (visible when instrument is in upright position)

FIG. 3

**SAS Super 100 / SAS Super180 Bottom Panel**

- 29. Protecting screw cap for tripod connection
- 30. Instrument Brief Instructions
- 31. Battery pack and PC Board
- 32. 33. 34. 35 Instrument feet





FIG. 4

### 7.1 Messages shown on display

The following messages can be displayed:

<b>INTERNATIONAL PBI</b>	Name of producer
<b>S.N. XXXX</b>	Instrument Serial Number
<b>PRESS ARROWS FOR NEW MENU SELECTION</b>	Operator's options
<b>S. SAS 100</b>	Name of instrument
<b>ID XXXX</b>	Operator's identification
<b>SITE XXXX</b>	Sampling location identification

<b>START FOR XX</b>	The instrument is ready to collect the same volume of air as the last sample
<b>STANDARD MODE</b>	8 Standard volumes option
<b>USER MODE</b>	8 User volumes option
<b>PROGRAM MODE</b>	Program to modify user program
<b>DELAY MODE</b>	Program to delay sampling start: 1, 2, 3, 5, 10, 20 minutes
<b>MULTI MODE</b>	Program for sequential interval sampling: interval time, numbers of runs, single run volume, total volume of aspirated air,
<b>** DELAY **</b>	The sampler is in "stand-by", waiting to start
<b>UTILITY MODE</b>	Program to set time, sampling site, operator's identification, language, clear record, display record, print, auto switching off
<b>**LOW BATTERY**</b>	The battery of the instrument must be recharged

### 7.2 Sampling time required for different air volumes

#### **SAS SUPER 100**

#### **SAS SUPER 180**

LITRES OF AIR	TIME REQUIRED	LITRES OF AIR	TIME REQUIRED
50	30 seconds	90	30 seconds



100	1 minutes	180	1 minute
200	2 minutes	360	2 minutes
300	3 minutes	540	3 minutes
400	4 minutes	720	4 minutes
500	5 minutes	900	5 minutes
600	6 minutes	1000	5 minutes 30 seconds
700	7 minutes		
800	8 minutes		
900	9 minutes		
1000	10 minutes		

### 7.3 Battery charger operations

When the message LOW BATTERY is flashing, the air sampler must be recharged.

1. Switch off the unit.
2. Connect the smaller plug of the battery charger to the battery socket on the SAS SUPER 100 or SAS SUPER 180.
3. Connect the battery charger to the main supply (220-240 or 110 Volts): verify that the LEDs on the charger are lit correctly (see label on charger).
4. The air sampler is recharged after 14 hours using the normal battery charger “Revit” (Cat.n.18201 or 19248) or after 3.5 hours using the fast battery charger “Swift” (Cat.n.17275 or 19143).
5. Disconnect the battery charger from the mains supply.
6. At the end of operation, disconnect the battery charger plug from the socket of the air sampler.

#### **NOTES**

- (a) The correct metal hydrate battery charger must be used to charge the SAS SUPER 100 or SAS SUPER 180!
  - (b) If the air sampler has not been used for several weeks, check the battery status!
  - (c) The efficiency of the battery is reduced when operating at temperatures below 0°C.
  - (d) This battery pack, using the SAS SUPER 100 sampler, should provide approximately 5-7 hours of sampling time. (50% less in SAS SUPER 180).
- Before using for the first time, or after a storage time of one month or more, charge battery for 14 hours. If you do not reach the rated battery capacity during initial use, repeat the 14 hours charge process.
  - Do not charge the battery for more than 24 hours.
  - Battery performance will degrade at extreme temperatures like +60° or – 20°C.
  - The Metal Hydrate battery has a self-discharge rate and, without use, will lose about 2% of its charge per day.
  - To prevent injury or burns, do not allow metal objects to contact or short circuit the battery terminals.



- The Metal Hydrate battery may explode if disposed in fire.

#### 7.4 Automatic switch off

The instrument will automatically switch off after 4/5 minutes to save the battery.

The ON/OFF switch (black button) must be pushed twice to switch on the unit to start a cycle if the automatic switch off has operated.

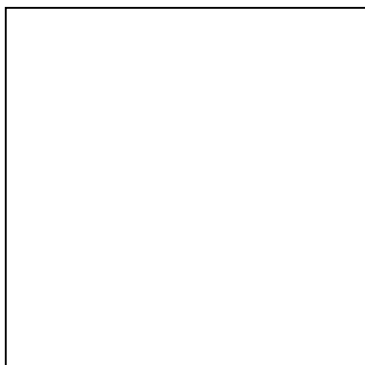
#### 7.5 Sampling at high altitude over the sea level

The aspirated volume of air at high altitude could be different from the the declared instrument figures due to the different barometric pressure and temperature. It is therefore necessary to re-validate the instrument at this specific altitude to know the true value of aspirated air.

The re-validation is performed using the “Pitot Kit” or the “Propeller” Unit. (See *chapter 8.2*)

## SECTION FOUR

### 8. MAINTENANCE



#### 8.1 Cleaning

The SAS SUPER 100 and SAS SUPER 180 do not require special care and maintenance procedures. Clean the outside surface with a normal mild NON CORROSIVE detergent.

- Do not subject the air sampler to sudden shock.
- Clean the air sampler with a soft damp cloth and a mild detergent. Do not use harsh abrasives.
- Do not submerge in water; do not pour or spray water directly on the air sampler.
- Do not use acetone or other volatile solvents for cleaning.

#### 8.2 Validation and Calibration

The motor speed and consequently the air flow are related to the electrical power supply, motor bearing conditions, etc. It is therefore suggested that the unit should be validated at least every six/twelve months.

The validation of the air flow rate should be done by a certified anemometer in a wind tunnel.

This type of certification may be performed by pbi international or an official pbi distributor.



**NOTE:** Both the “Pitot kit” and the “Propeller validation kit” are to be used for internal validation only (i.e. to verify the correct working conditions of the air sampler). When an Official Calibration is requested, a certified anemometer must be used to meet the required traceability characteristics (i.e. FDA inspections require a Calibration Certificate that is traceable to know standard such as the NIST).

### 8.3 Performance routine monitoring

The SAS SUPER 100, SAS SUPER 180 or DUO SAS SUPER 360 should be checked monthly / bimonthly (depending how often they are used) using the “Pitot Kit” or “Propeller” units to monitor that they are working correctly and their performances has not been affected by bad handling or damage. (See *chapter 8.2*)

### 8.4 Trouble shooting – problems and actions

PROBLEM	SUGGESTED ACTION
Unit does not start	<ul style="list-style-type: none"> <li>- Push ON/OFF switch (black button)</li> <li>The ON/OFF main switch must be pushed twice to switch on the unit if the automatic switch off operated at the end of the last cycle</li> <li>- Recharge battery</li> <li>- Check the battery charger</li> <li>- Replace battery.</li> </ul>
Battery discharges after few minutes working	<ul style="list-style-type: none"> <li>-Recharge battery</li> <li>-Check the battery charger</li> <li>-Replace the charger</li> </ul>
“LOW BATTERY” message	-Recharge battery
Infrared remote switch doesn't switch on the unit	-Replace infrared remote battery





Microbiological media is dehydrated after sampling	-Control expiration date of media and that the agar is not dehydrated before sampling
--	---

## 8.5 Battery replacement

1. Take out the two caps (Position 1) from the lower part of the control panel.
2. Unscrew the three fixing screws (Position 2) that fix the control block.
3. Slide the control block (Position 5) from the instrument body (Position 6).

### **Caution: disconnect battery pack immediately**

4. Disconnect the two pin connectors (Position 3) from the battery.
5. Take out the old battery, replace it with a new one, and connect the new battery.
6. Reassemble the control block to the instrument body in the reverse order. Be sure the rubber sealing ring (Position 4) is correctly positioned.

## 8.6 Accessory and spare part list

### **Accessories**

Cat.n. 15931	55 mm aluminium certified drilled head
Cat.n. 15503	55 mm stainless steel certified drilled head
Cat.n. 19123	84 mm aluminium certified drilled head – complete with adaptor for Maxi Contact Plate
Cat.n. 18148	84 mm stainless steel certified drilled head – complete with adapter for Maxi Contact Plate
Cat.n.19117	90 mm aluminium standard Petri dish head + adaptor
Cat.n.19119	90 mm stainless steel standard Petri dish head + adaptor
Cat.n.19115	Atrium chamber for Clean Room application
Cat.n. 6064	Autoclavable plastic cover for sampling head
Cat.n.19239	Compressed air head
Cat.n. 5214	Table tripod
Cat.n. 5215	Floor tripod
Cat.n.18201	Normal battery charger (220 Volt)
Cat.n.19248	Normal battery charger (110 Volt)
Cat.n.17275	Fast battery charger (220 Volt)
Cat.n.19143	Fast battery charger (110 Volt)
Cat.n.20153	Aluminium carrying case
Cat.n.18143	Soft carrying case
Cat.n.18950	Infrared remote control
Cat.n.18200	“IN OUT MH” Battery pack
Cat. n.20915	“SAS Printer” Printer to be connected to SAS Super 100
Cat.n.19836	“Paperol” paper for SAS printer



Cat.n.19834 "ARM" System to fix SAS Super 100 to wall  
 Cat.n.20093 Installation Qualification manual  
 Cat.n.20094 Operator Qualification manual

### **Spare Part List**

Cat.n. 18200 8,4-2,4 MH Battery pack for SAS SUPER 100  
 Cat.n. 77414 Printed circuit board for SAS SUPER 100  
 Cat.n. 77140 Motor complete with turbine  
 Cat.n. 77119 ON/OFF main switch  
 Cat.n. 77117 Battery charger socket  
 Cat.n. 50607 Metal clip for holding Contact Plate  
 Cat.n. 77415 Visual display for SAS SUPER 100  
 Cat.n. 77279 Infrared sensor  
 Cat.n. 77417 P.C. connection socket  
 Cat.n. 22536 Sas-pc diskette and connecting cable for printer

### **Control and Validation Systems**

Cat.n.17873 Propeller  
 Cat.n.17872 Pitot Kit  
 Cat.n.16222 Wind tunnel with certified NIST anemometer

### **Consumables**

#### **"AGAR CONTACT" READY TO USE MEDIA FILLED STERILE CONTACT PLATES**

CAT N°	TYPE	DESCRIPTION	PACK
5210	PCA 60	With "Plate Count Agar" for total viable count	80
7426	PCA TW 60	With "Plate Count Agar" and neutralizing agent for total viable count	80
17354	TSA TW 60	With "Tryptone Soy Agar" and neutralizing agent for total viable count	80
17573	SDA TW 60	With "Sabouraud Dextrose Agar" for fungi (yeasts and moulds) count and neutralizing agent for total viable count	80
7427	Gram 60	With "Violet Red Bile Agar" for gram negative count	80

Cat.n. 19810 Surfair Plate - Empty Contact Plates



**SECTION FIVE**

**9. BRIEF INSTRUCTIONS FOR SAS SUPER 100 & SAS SUPER 180**

**TO START WITH THE SAME AIR VOLUME AS THE PREVIOUS SAMPLE**

**ACTION**

**DISPLAY**

Switch on the ON/OFF switch (black button) (Last aspirated volume of air)			S	T	A	R	T		F	O	R		X	X		
			D	/	M	/	Y		-		H	/	M			

Push "START"  (after the visual display presentation)			(		X	X	)		X	X						
			D	/	M	/	Y		-		H	/	M			

**TO START WITH ONE OF THE EIGHT MEMORISED "STANDARD MODE" PROGRAMS**



**ACTION**

**DISPLAY**

Switch on the ON/OFF switch (black button)			S	T	A	R	T		F	O	R		X	X		
			D	/	M	/	Y		-		H	/	M			

Press “▲” to select			S	T	A	N	D	A	R	D		M	O	D	E	
			D	/	M	/	Y		-		H	/	M			

Press ENTER and then “▲” for the volumes of air to be sampled (10, 20, 30, 50, 100, 200, 500, 1000)			S	.	P	R	O	G	R	A	M		X	X	?	
			D	/	M	/	Y		-		H	/	M			

Press ENTER to confirm the chosen figure			S	T	A	R	T		T	O		G	O			
			D	/	M	/	Y		-		H	/	M			

Push “START”			(		X	X	)		X	X						
			D	/	M	/	Y		-		H	/	M			

**TO START WITH ONE OF THE EIGHT FREE SAMPLING VOLUMES PRE-MEMORISED  
IN THE “USER MODE” PROGRAM**

**ACTION**

**DISPLAY**

Switch on the ON/OFF switch (black button)			S	T	A	R	T		F	O	R		X	X		
			D	/	M	/	Y		-		H	/	M			

Press “▲” to select the USER MODE			U	S	E	R		M	O	D	E					
			D	/	M	/	Y		-		H	/	M			

Press “ENTER” to select the program			P	R	O	G	R	A	M		?					
			D	/	M	/	Y		-		H	/	M			

Press “▲” to select the chosen			P	R	O	G	R	A	M		X	X	X	X	?	
			D	/	M	/	Y		-		H	/	M			



pre-memorised program			D	/	M	/	Y		-		H	/	M			
-----------------------	--	--	---	---	---	---	---	--	---	--	---	---	---	--	--	--

Press ENTER			S	T	A	R	T		F	O	R		X	X	X	X
to confirm			D	/	M	/	Y		-		H	/	M			

Press START to initiate the sampling cycle.

The total number of available “USER MODE” programs is eight.  
The maximum volume of air for each sampling cycle is 1800 litres.

**“AGAR CONTACT” READY TO USE MEDIA FILLED STERILE CONTACT PLATES**

CAT N°	TYPE	DESCRIPTION	PACK
5210	PCA 60	With “Plate Count Agar” for total viable count	80
7426	PCA TW 60	With “Plate Count Agar” and neutralizing agent for total viable count	80
17354	TSA TW 60	With “Tryptone Soy Agar” and neutralizing agent for total viable count	80
17573	SDA TW 60	With “Sabouraud Dextrose Agar” for fungi (yeasts and moulds) count and neutralizing agent for total viable count	80
7427	Gram 60	With “Violet Red Bile Agar” for gram negative count	80
7066	Empty “Contact Plates” Ø 55 mm		400
4474	Empty Maxi Contact Plates Ø 84 mm		100

**9.1 BRIEF INSTRUCTIONS FOR DUO SAS SUPER 360**

To start with the same air volume as the previous sample

Switch ON the ON/OFF switch			S	E	L	E	C	T		H	E	A	D			
			D	D	/	M	M	/	Y	Y	-	H	H	/	M	M

Press ENTER: select one of the 3 options by “UP” and “DOWN” R arrows.	R	I	G	H	T	O	R	L	E	F	T	H	E	A	D	
Confirm by pressing ENTE	R	I	G	H	T	+	L	E	F	T	H	E	A	D		

			P	R	E	S	S		S	T	A	R	T			
			D	D	/	M	M	/	Y	Y	-	H	H	/	M	M

Press START to sample the last used volume			(		X	X	)		X	X						
--	--	--	---	--	---	---	---	--	---	---	--	--	--	--	--	--



		D	D	/	M	M	/	Y	Y	-	H	H	/	M	M		
--	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--

To start with one of the eight memorized “STANDARD MODE” programs

Switch on the ON/OFF switch			S	E	L	E	C	T		H	E	A	D				
			D	/	M	/	Y		-		H	/	M				

Press ENTER: select one of the 3 options by “UP” and “DOWN” arrows. Confirm by pressing ENTER	R	I	G	H	T	O	R	L	E	F	T	H	E	A	D		
	R	I	G	H	T	+	L	E	F	T	H	E	A	D			

			P	R	E	S	S		S	T	A	R	T				
			D	/	M	/	Y		-		H	/	M				

Press START to sample the last used volume			(	X	X	)		X	X								
			D	/	M	/	Y		-		H	/	M				

Press “UP” or “DOWN” arrows to reach “STANDARD MODE”		S	T	A	N	D	A	R	D		M	O	D	E			
			D	/	M	/	Y		-		H	/	M				

Press ENTER and then an arrows to select one of the eight volumes (10?, 20?, 30?, 50?, 100?, 200?, 500?, 1000?)			S	.	P	R	O	G	R	A	M		X	X	?		
			D	/	M	/	Y		-		H	/	M				

Press ENTER to confirm the chosen figure			S	T	A	R	T		F	O	R		X	X			
			D	/	M	/	Y		-		H	/	M				

Push START			(	X	X	)		X	X								
			D	/	M	/	Y		-		H	/	M				

Press CLEAR button to know which head is active (left, right or both) or to change it. The message “SELECT HEAD” will appear on the visual display.  
Follow the previous instruction.

**SECTION SIX*****AIR SAMPLER IDENTIFICATION SHEET ACCORDING TO EN 45001***

According to the Document EN45001, to apply the current Good Laboratory Practice, it is necessary to identify each instrument with a specific sheet. An example is here reported.

**EN45001 Instrument Identification Sheet**

Form n.	XXXX
Date	XXXX
Company / Institute	XXXX
Laboratory	XXXX



Name of Instrument	Microbiological Air Sampler
Model	SAS SUPER 100
Serial Number	XXXX
Name of Producer	International pbi
Name of Distributor	XXXX
Condition at the moment of arrival	(X) new; (x) used; (x) reconditioned
Date of Arrival	/ /
Date of initial use	/ /
Usual collocation	Room XXXX
Servicing details	See servicing POS
Instrument to be calibrated	(X) Yes; (X) No
Periodic Calibration	(X) monthly; (X) quarterly; (X) Yearly
Instrument to be validated	(X) Yes; (X) No
Periodic Validation	(X) half year; (X) yearly

## SAS SUPER 100 KURZANLEITUNG

### ARBEITEN MIT DEM GLEICHEN VOLUMEN DER LETZTEN PROBENNAHME:

Bedienung des SAS100:	Anzeigen:
Einschalten am schwarzen Ein-/Ausschalter (letztes Ansaugvolumen)	Starten mit xx T/M/J – Std / Min
„START“ drücken (nach der Bildschirmanzeige)	( xx) xx T/M/J – Std / Min

### STARTEN EINES VON ACHT ABGESPEICHERTEN STANDARD-PROGRAMMEN:



<b>Bedienung des SAS100:</b>	<b>Anzeigen:</b>
Einschalten am schwarzen Ein-/Ausschalter (letztes Ansaugvolumen)	Starten mit xx T/M/J – Std / Min
Zur Auswahl „A“ drücken	Standardmodus T/M/J – Std / Min
Die ENTER-Taste drücken und das gewünschte Volumen eingeben (10?, 20?, 30?, 50?, 100?, 200?, 500?, 1000?)	S. Programm T/M/J – Std / Min
Zur Bestätigung der Auswahl die ENTER-Taste betätigen	SAS100 starten T/M/J – Std / Min
„START,“ drücken (das Programm startet)	( XX) xx T/M/J – Std / Min

#### STARTEN EINES VON ACHT FREI DEFINIERBAREN ANWENDER-PROGRAMMEN:

<b>Bedienung des SAS 100</b>	<b>Anzeigen</b>
Einschalten am schwarzen Ein-/Ausschalter (letztes Ansaugvolumen)	Starten für xx T/M/J – Std / Min
Zur Auswahl der Anwender-Programme „A“ drücken	Anwendermodus T/M/J – Std / Min
Die Programmauswahl erfolgt mit der ENTER-Taste	Programm ? T/M/J – Std / Min
Mit „A“ die Programmwahl bestätigen	Programm xxxx ?



	T/M/J – Std / Min
Zur Bestätigung der Auswahl die ENTER-Taste betätigen	Starten für XXXX T/M/J – Std / Min

Durch Drücken der START-Taste wird das Programm gestartet.

Es können bis zu acht frei definierbare Programme im Anwendermodus abgespeichert werden. Maximal 1800 Liter Luft können je Zyklus angesaugt werden.

**INSTRUCCIONES RESUMIDAS**

**SAS SUPER 100 DIAGRAMA DE TRABAJO**

1. Desenroscar el cabezal del equipo.
2. Insertar la placa de contacto cerrada y quitar la tapa de la placa.
3. Enroscar el cabezal al equipo.
4. Seleccionar el flujo de aire necesario. El flujo de aire va dirigido sobre la superficie de agar de la placa de contacto.
5. Al cumplirse el tiempo del ciclo, sacar el cabezal.
6. Poner la tapa a la placa y sacar la cerrada.
7. Incubar.

**FUNCIONAMIENTO CON EL MISMO VOLUMEN DE AIRE  
DEL MUESTREO ANTERIOR**

**ACCIÓN**

**DISPLAY**

Conectar el interruptor ON/OFF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------



(Botón negro) (Último volumen de aire aspirado)			S	T	A	R	T		F	O	R		X	X		
			D	/	M	/	A			H	/	M				

Pulsar "START"  (Después de la presentación en el display)			(		X	X	)		X	X						
			D	/	M	/	A			H	/	M				

**FUNCIONAMIENTO CON UNO DE LOS OCHO PROGRAMAS MEMORIZADOS "STANDARD MODE"**

**ACCIÓN**

**DISPLAY**

Conectar el interruptor ON/OFF  (Botón negro)			S	T	A	R	T		F	O	R		X	X		
			D	/	M	/	A		-		H	/	M			

Pulsar "▲"  Para seleccionar STANDARD MODE			S	T	A	N	D	A	R	D		M	O	D	E	
			D	/	M	/	A		-		H	/	M			

Pulsar ENTER y aparecerán los volúmenes que pueden muestrearse (10?, 20?, 30?, 50?, 100?, 200?, 500?, 1000?)			S	.		P	R	O	G	R	A	M				
			D	/	M	/	A		-		H	/	M			

Pulsar ENTER para confirmar el valor elegido			S	T	A	R	T		T	O		G	O			
			D	/	M	/	A		-		H	/	M			

Pulsar "START"			(		X	X	)		X	X						
			D	/	M	/	A		-		H	/	M			

**FUNCIONAMIENTO CON UNO DE LOS OCHO VOLÚMENES DE MUESTREO PREFIJADOS LIBREMENTE EN EL PROGRAMA "USER MODE"**

**ACCIÓN**

**DISPLAY**

Conectar el interruptor ON/OFF			S	T	A	R	T		F	O	R		X	X		
--------------------------------	--	--	---	---	---	---	---	--	---	---	---	--	---	---	--	--



(Botón negro)			D	/	M	/	A	-	H	/	M			
---------------	--	--	---	---	---	---	---	---	---	---	---	--	--	--

Pulsar "▲"			U	S	E	R			M	O	D	E		
Para seleccionar USER MODE			D	/	M	/	A	-	H	/	M			

Pulsar ENTER para seleccionar el programa			P	R	O	G	R	A	M	?				
			D	/	M	/	A	-	H	/	M			

Pulsar "▲" para seleccionar el pro- grama prefijado que hemos elegido			P	R	O	G	R	A	M	X	X	X	X	?
			D	/	M	/	A	-	H	/	M			

Pulsar ENTER para confirmar			S	T	A	R	T	F	O	R	X	X	X	X
			D	/	M	/	A	-	H	/	M			

Presionar START para empezar el ciclo de muestreo  
 El numero total de programas disponibles en "USER MODE" es de ocho.  
 El volumen máximo de aire por cada ciclo de muestreo es de 1800 litros.

## INSTRUCTIONS RESUMEES

### POUR PRELEVER LE MÊME VOLUME D'AIR QUE LORS DE L'ECHANTILLONAGE PRECEDENT

ACTION	ECRAN
Allumer l'interrupteur ON/OFF (bouton noir) (dernier volume d'air aspiré)	C O M M E N C E R P A R X X
	J / M / A - H / M
Appuyer sur la touche «START» (après l'écran visuel de présentation)	( X X ) X X
	J / M / A - H / M

**POUR PRELEVER 1 DES 8 VOLUMES MEMORISES DANS LE «MODE STANDARD»**



**ACTION**

**ECRAN**

Allumer l'interrupteur ON/OFF (bouton noir)			C	O	M	M	E	N	C	E	R		P	A	R		X	X	
			J	/	M	/	A		-		H	/	M						

Presser « ▲ » pour sélectionner le mode d'utilisation			M	O	D	E		S	T	A	N	D	A	R	D				
			J	/	M	/	A		-		H	/	M						

Presser la touche «ENTER» et ensuite le volume d'air à prélever (10 ?, 20 ?, 30 ?, 50 ?, 100 ?, 200 ?, 500 ?, 1000 ?)			P	R	O	G	R	A	M	M	E			I				
			J	/	M	/	A		-		H	/	M					

Presser la touche «ENTER» pour confirmer le volume choisi			P	R	E	T		A		P	A	R	T	I	R				
			J	/	M	/	A		-		H	/	M						

Appuyer sur la touche «START»			(		X	X	)		X	X								
			J	/	M	/	A		-		H	/	M					



**POUR PRELEVER 1 DES 8 VOLUMES AU CHOIX DE L'UTILISATEUR DANS LE  
«MODE UTILISATEUR» (LES VOLUMES DOIVENT ETRE PRE-ENREGISTRES DANS  
LE «MODE UTILISATEUR»**

ACTION

ECRAN

Allumer l'interrupteur ON/OFF (bouton noir)			C	O	M	M	E	N	C	E	R		P	A	R		X	X	
			J	/	M	/	A		-		H	/	M						

Presser « ▲ » pour sélectionner le mode d'utilisation			M	O	D	E		U	T	I	L	I	S	A	T	E	U	R	
			J	/	M	/	A		-		H	/	M						

Presser la touche «ENTER» pour sélectionner le programme			P	R	O	G	R	A	M	M	E		?						
			J	/	M	/	A		-		H	/	M						

Presser « ▲ » pour sélectionner le volume pré-mémorisé			P	R	O	G	R	A	M	M	E		X	X	X	X		?	
			J	/	M	/	A		-		H	/	M						

Presser la touche «ENTER» pour confirmer			C	O	M	M	E	N	C	E	R		P	A	R		X	X	X	X
			J	/	M	/	A		-		H	/	M							

Presser la touche «START» pour commencer le cycle de prélèvement d'échantillon.

Le nombre total de programme disponible dans le «mode utilisateur» est de 8.

Le volume d'air maximum pour chaque cycle de prélèvement d'échantillon est de 1800 litres.