BASIC

Service manual

Ref. 0NVBAT

Manual version: 1.18

CE

SECOMAM, a NOVA ANANLYTICS Company,
91, Avenue des Pins d'Alep
30319 ALES FRANCE
Tel: +33 4 66 54 35 60
Fax: +33 4 66 54 35 69
E-mail: info@secomam.fr
URL: www.secomam.fr

SYSTEME QUALITE CERTIFIE

NF EN ISO 9001 : 2000
A S C I I
CERTIFICAT 2003 - CLXV.
QUALITATEM
ACCREDITATION N° 4-016/98
cofrac
CERTIFICATION D'ENTREPRISES & DE PERSONNELS

SUMMARY

1 REMARKS

The Automatic aspiration system kit is manufactured by SECOMAM.

The information contained in this document may be the object of patents or patent applications by SECOMAM. The possession of this document does not confer any license to such patents.

The following names are SECOMAM's registered trademarks throughout the world.

SECOMAM
BASIC

This manual is updated periodically. The updates are included in the new editions.

All information supplied in this edition of the manual may be amended before the products described herein are available.

Reference	Date of last modification	Version	Date of document.	Writer	Controller	Approving
0NVBAT	07/12/05	**1.18**	01/10/00	WJ		

2 WARRANTY

The new equipment and material sold by SECOMAM is guaranteed against any manufacturing defects for one year (unless otherwise stated by SECOMAM) with effect:

- From the technical acceptance of the equipment in the factory by the buyer or his designee,
- or failing this :
    * For Metropolitan France: from the date on the delivery note.
    * For other destinations: from the date of factory shipment certified by air waybill, consignment note or bill of lading.

The SECOMAM company guarantee applies exclusively to defectiveness arising from a design fault or from a concealed defect. It is strictly limited to the free dispatching of replacement parts (except for consumable items) or to the repairing of the equipment in our workshops within a deadline of 10 working days (shipping delay not included).

By express agreement, the following are strictly excluded from our guarantee:

- All damages, notably for staff costs, loss of earnings, business trouble, etc
- Any breakdown due to an incorrect use of the equipment (non adapted mains, fall, attempt at transformation, etc) or to a lack of maintenance by the user or to poor storage conditions.
- Any breakdown due to the use of parts not supplied by SECOMAM, on SECOMAM equipment
- Any breakdown due to the transporting of the equipment in packaging which is not its original packaging
- The lamps, the cells and generally any item which appears in the "accessories" section on the price list.

Our customers are kindly asked to apply for our consent before returning any instrument for repair. No return of materials may be accepted without the prior written consent of our Sales Management which will precise the terms of such return.
If the above consent is given, articles shall be returned in their original packaging on a prepaid basis to the following address:

SECOMAM - 91 avenue des Pins d'Alep – 30100 ALES FRANCE

We reserve the right to reship all instruments received collect failing such consent.

Whatever method and conditions of transport are chosen for the shipment of the equipment to be repaired under guarantee, in the original packaging, the corresponding costs and the insurance costs will be payable by the customer.

Any damage connected to the return transport of the equipment falls within the framework of the guarantee on the express condition that the customer has sent his complaint within forty-eight hours by registered letter with acknowledgement of receipt to the carrier. A copy of the letter should be sent to SECOMAM.

For equipment with a guaranty card, this is only applicable if the card delivered with the equipment is returned to SECOMAM duly completed.

SOFTWARE GUARANTEE

The software is guaranteed by the designer or the distributor of the software under the conditions specified in the literature accompanying the aforementioned software packages.
Under no circumstances whatsoever will SECOMAM supply any type of guarantee for software packages.
By express agreement, all damages, notably for staff costs, lost of earnings; business trouble, etc are strictly excluded from our guarantee.
The customer is informed that the software cannot be guaranteed exempt from defects or bugs.

TRADE SECRET AND PROPERTY RIGHTS

3 INFORMATION

The SECOMAM equipment has been designed, manufactured, tested and inspected according to the ISO 9001 standards.

If the unit is not immediately installed, it should be stored in a dry and clean area. The storage temperature should be between 10 and 35°C.

SECOMAM equipment is carefully inspected before it is packed. As soon as you receive your equipment, check the condition of the packaging and if you notice any problems, notify your carrier within 48 hours. Then consult the packing list and check that everything is in order. Finally, if you discover that something is missing, or if the goods are damaged immediately notify SECOMAM.

IMPORTANT:
In order to benefit from SECOMAM's service (application notes, SECOMAM information, technical assistance, etc.) immediately complete the attached guarantee card and return it to the following address:

SECOMAM
Service PRODUIT
91 Avenue des Pins d'Alep
30319 ALES Cedex
FRANCE

Tel: +33 4 66 54 35 60
Fax: +33 4 66 54 35 69
E-mail: info@secomam.com
Service Department: +33 4 66 54 35 63
Technical support: +33 1 39 35 42 12

4 PRECAUTIONS OF USE

- **Always make sure that the instrument is connected on the good voltage. (Between 100 – 240V 50-60Hz)**
- **Always disconnect the mains plug before starting any work inside the instrument.**
- **When dangerous substances for health and environment are used, the laboratory or site rules, where the instrument is installed must be followed.**
- **Take all the necessary precautions, during the use the instrument, to protect the operator from eventual liquids leaks or spills or possible radiations (protective gloves, anti radiation glasses , protected clothes, etc)**
- **All operations made inside the instrument, must be done by SECOMAM or by SECOMAM's authorized technicians.**

5 HOW TO USE THIS GUIDE

REMARK :

The object of this servicing manual is to repair and recalibrate SECOMAM's BASIC spectrophotometers.
It has been made to help servicing persons to detect the deficient subset order their replacement, to do the calibration and the test of spectrophotometer.
This servicing manual doesn't contain any information to repair the mechanical subset and electronics on their own; it being done exclusively by SECOMAM.

You will find in this servicing manual the following chapter :

- Troubleshooting (See chapter 6 page 15).

- Instrument description (See chapter 7 page 25).

- Spare parts and EPROM**{**XE "EPROM"**}** evolution (See chapter 8 page 31).

- Spare parts change and adjustment (See chapter 9 "REPAIRING" page 33).

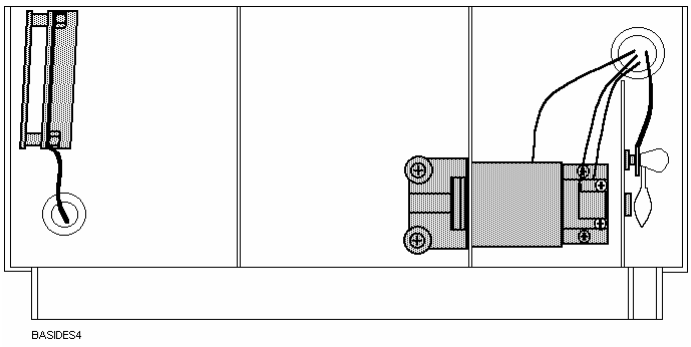
- Instrument general adjustment and control (See chapter 10 page 59).

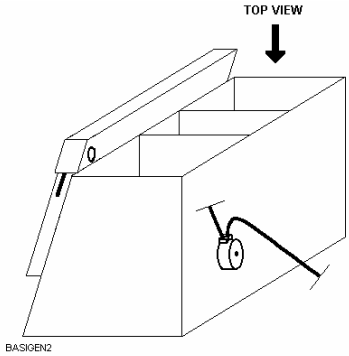
- Boards electronical drawings (See chapter 11 page 75)

- Outputs specifications (See chapter **Erreur ! Source du renvoi introuvable.** page **Erreur ! Signet non défini.**).

6 TROUBLESHOOTING

6.1 PRECAUTIONS BEFORE INVESTIGATIONS





.Fig. 1 Optical components view

IMPORTANT
80 % of instruments failures are not due to the optical components (grey parts of the above drawing). So intervene on these parts only if needed.

Before any investigations verify:

Room temperature{XE "Temperature"}	15 – 28°C
Room condition	Dry and clean area Protected from direct light (sun, lamp,…).
Table	Able to support a 12 kg minimum weight.
Voltage	115/230 VAC ± 10 %
Frequency	50-60 Hz
Power	50 W
Electrical plug	Must be fitted with an earth connection in conformity with the standards in force
Mains	Protected against short cuts and abnormal voltage variation (through regulator or inverter).
Transformer{XE "Transformer"} connection	Verify the connection between the transformer**{**XE "Transformer"**}** and the main plug
BASIC connection	Verify the connection between the BASIC and the transformer.**{**XE "Transformer"**}**
Fluidic circuit	- Tubes assembly - Flow-through cuvette**{**XE "Flow-through cuvette"**}** setting. - Pump peristaltic head setting. - Dead volume**{**XE "Dead volume"**}** adjustment. - Suction volume adjustment. - Possibility of bubble or piece of material in flow-through cuvette**{**XE "Flow-through cuvette"**}** window**{**XE "Window"**}**
Screen	Back-lit adjustment.
Vial detection	Vial detection adjustment.
Printer{XE "Printer"}	Conformity between the printer**{**XE "Printer"**}** chosen with: - printer**{**XE "Printer"**}** selected, - output port used (serial or parallel**{**XE "Parallel"**}**), - connection cable used
Methodology	Conformity between analysis runned and methodology technical notice

6.2 TROUBLES, EXPLANATIONS AND SOLUTIONS

TROUBLES
During zero measurement, the unit displays " Measurement problem. Repeat?"
EXPLANATION
The optical detector{XE "Optical detector"} (diode array) does not receive enough energy{XE "Energy"}
SOLUTION
Verify if - the halogen lamp{XE "Halogen lamp"} switches on correctly, - optical sides of flow-through cuvette{XE "Flow-through cuvette"} are clean, - there is distilled water inside flow-through cell, - aspiration{XE "Aspiration"} and dead volume{XE "Dead volume"}s are correctly programmed, - there are no bubbles{XE "Bubbles"} or impurities{XE "Impurities"} inside flow-through cuvette{XE "Flow-through cuvette"} in the measure chamber, - the distance between the bottom and the center of the measure window{XE "Window"} of flow-through cuvette{XE "Flow-through cuvette"} is 8,5 mm, - the flow-through cuvette{XE "Flow-through cuvette"} is correctly setting inside the cuvette compartment, - inlet filter{XE "Filter"} is becoming oxydized (due to extreme weather conditions), Remove flow through cuvette and try again.
§ and Chapter
See paragraph 10.10 FLOW-THROUGH CUVETTE HEIGHT ADJUSTMENT **page 73**

TROUBLES
Printing problem *- Beeping noise{XE "Beeping noise"} when the BASIC, connected with printer,{XE "Printer"} is switching on.*
EXPLANATION
There is no communication between the BASIC and the printer{XE "Printer"}
SOLUTION
Verify if - the chosen printer{XE "Printer"} (serial or parallel{XE "Parallel"}) is connected to the right output port (serial or parallel), - the printed is correctly programmed, - the printer{XE "Printer"} is correctly connected to the mains, - the printer{XE "Printer"} is connected to the BASIC - the selected printer{XE "Printer"}, in the software BASIC, is the one used, - the selected baud{XE "Baud"} rate, in the software BASIC, is the one programmed on the printer{XE "Printer"}, - the used cable between BASIC and printer{XE "Printer"} is the right one (cable is different if it is a serial or parallel{XE "Parallel"} printer), Change the power supply board{XE "Power supply board"} (ref: 416662A).
§ and Chapter
See chapter 12 RS 232C OUTPUT page 89

TROUBLES
Cuvette holder{XE "Cuvette holder"} is too hot or to cold
EXPLANATION
Temperature{XE "Temperature"} regulation{XE "Temperature regulation"} of cuvette holder{XE "Cuvette holder"} is not working correctly. It is due to the temperature sensor{XE "Temperature sensor"} or to the temperature command.{XE "Temperature command"}
SOLUTION
Verify if - the temperature{XE "Temperature"} sensor{XE "Temperature sensor"} is at its right place. Change the temperature{XE "Temperature"} sensor{XE "Temperature sensor"} (ref: 416680). Change the power supply board{XE "Power supply board"} (ref: 416662A).
§ and Chapter
See § 9.10.1 "TEMPERATURE SENSOR REPLACING" page 51

TROUBLES
Working temperature{XE "Temperature"} is never reached.
EXPLANATION
The Peltier effect{XE "Peltier effect"} component is out of order. The Peltier effect{XE "Peltier effect"} command is out.
SOLUTION
Change Peltier effect{XE "Peltier effect"} component (Ref: 410357P). Change the power supply board{XE "Power supply board"} (ref: 416662A).
§ and Chapter
See **§** 9.10.2 “PELTIER EFFECT REPLACING” page 52

TROUBLES
No automatic sample aspiration.{XE "Aspiration"}
EXPLANATION
Vial/cuvette position detector is blinded by external light. Quality of the vial is not good (plastic quality, vial roundness quality) Vial/cuvette position detector is out. Potentiometer{XE "Potentiometer"} which adjust the sensibility of vial/cuvette detector position is not well adjust. Command of vial/cuvette position detector is out.
SOLUTION
Verify if the user did not program the BASIC functioning “cuvette after cuvette” Verify with white sheet of paper if you realize the aspiration{XE "Aspiration"}. Verify the potentiometer{XE "Potentiometer"} which adjust the sensibility of vial/cuvette detector position (Out or bad position). Try to realize aspiration{XE "Aspiration"} by moving vial/cuvette position. Verify vial/cuvette plastic quality. Verify connection between the detector and interface board{XE "Interface board"}. Verify connection between interface board{XE "Interface board"} and micro-processor board. Change the microprocessor board{XE "Microprocessor board"} (ref 416662B).
§ and Chapter
See paragraph 9.11.1 VIAL POSITION OPTICAL DETECTOR REPLACING **page 57**

TROUBLES
Untimely realize aspiration.{XE "Aspiration"}
EXPLANATION
There is a too great light source (sun, spot, white surface…) near the vial/cuvette position detector.
SOLUTION
Protect the vial/cuvette position detector from external light
§ and Chapter

TROUBLES
The peristaltic doesn't work.
EXPLANATION
Peristaltic pump**{**XE "Peristaltic pump"**}** head is not correctly set up. Peristaltic pump**{**XE "Peristaltic pump"**}** tubes are not correctly set up. Peristaltic pump**{**XE "Peristaltic pump"**}** motor**{**XE "Motor"**}** is not fed.
SOLUTION
Verify: - the assembly of the peristaltic pump**{**XE "Peristaltic pump"**}** head - the assembly of the peristaltic pump**{**XE "Peristaltic pump"**}** tubes. - connection between pump peristaltic motor**{**XE "Motor"**}** and power supply board**{**XE "Power supply board"**}**. Change the power supply board**{**XE "Power supply board"**}** (ref: 416662A).
§ and Chapter
See chapter 9.9 "PERISTALTIC PUMP MOTOR REPLACING" page 48

TROUBLES
*Nothing on the display and**{**XE "Display"**}** the fan**{**XE "Fan"**}** does not work.*
EXPLANATION
BASIC is not correctly fed. Power supply board**{**XE "Power supply board"**}** is out.
SOLUTION
Verify: - connection between the mains and the transformer**{**XE "Transformer"**}**. - connection between the transformer**{**XE "Transformer"**}** and the BASIC. - internal connections. Change the transformer**{**XE "Transformer"**}**. Change the power supply board**{**XE "Power supply board"**}** (ref: 416662A).
§ and Chapter
See paragraph 9.6 MICROPROCESSOR BOARD AND POWER SUPPLY BOARD REPLACING **page 41**

TROUBLES
*Nothing on the display,**{**XE "Display"**}** but the fan**{**XE "Fan"**}** is working correctly.*
EXPLANATION
Back lit**{**XE "Back lit"**}** is not correctly adjusted. Connection problem between display**{**XE "Display"**}** and boards The display**{**XE "Display"**}** is out.
SOLUTION
Verify: - the potentiometer**{**XE "Potentiometer"**}** which adjust the back lit**{**XE "Back lit"**}** (Out or bad position). - connection between display**{**XE "Display"**}** and interface board**{**XE "Interface board"**}**. - connection between display**{**XE "Display"**}** and power supply board**{**XE "Power supply board"**}**. - connection between interface board**{**XE "Interface board"**}** and microprocessor board**{**XE "Microprocessor board"**}**. Change the microprocessor board**{**XE "Microprocessor board"**}** (ref 416662B). Change the interface board**{**XE "Interface board"**}** (ref: 0X6676).
§ and Chapter
See paragraph 9.11.2 DISPLAY REPLACING **page 58**

TROUBLES
Absorbance{XE "Absorbance"} values are too high.
EXPLANATION
Something blocks the beam{XE "beam"}{XE "Beam"} or there is no beam.
SOLUTION
Verify: - flow-through cuvette{XE "Flow-through cuvette"} position - if there any bubbles{XE "Bubbles"} or impurities{XE "Impurities"} inside the flow-through cuvette{XE "Flow-through cuvette"}. - if the aspiration{XE "Aspiration"} volume is correctly adjusted (presence of bubbles{XE "Bubbles"}). Change the halogen lamp{XE "Halogen lamp"}
§ and Chapter
See chapter 9.5 “LAMP REPLACING” page 39

TROUBLES
BASIC can not zeroing.
EXPLANATION
Something blocks the beam{XE "beam"}{XE "Beam"} or there is no beam.
SOLUTION
Verify: - flow-through cuvette{XE "Flow-through cuvette"} position - if there any bubbles{XE "Bubbles"} or impurities{XE "Impurities"} inside the flow-through cuvette{XE "Flow-through cuvette"}. - if the aspiration{XE "Aspiration"} volume is correctly adjusted (presence of bubbles{XE "Bubbles"}). Change the halogen lamp.{XE "Halogen lamp"}
§ and Chapter
See chapter 7.1 “FLUID CIRCUIT DESCRIPTION” page 25

TROUBLES
Absorbance{XE "Absorbance"} values are negative
EXPLANATION
Solution used to do the zero has an absorbance{XE "Absorbance"} higher than the sample absorbance.
SOLUTION
Verify: - absorbance{XE "Absorbance"} of the solution used to do the zero. - if there any bubbles{XE "Bubbles"} or impurities{XE "Impurities"} inside the flow-through cuvette{XE "Flow-through cuvette"} during the zero. - if the aspiration{XE "Aspiration"} volume is correctly adjusted (presence of bubbles){XE "Bubbles"}.
§ and Chapter **See user’s manual**

TROUBLES
Instability on the results.
EXPLANATION
Halogen lamp{XE "Halogen lamp"} is ready to dead. Sample is not stable or very concentrated.
SOLUTION
Change halogen lamp{XE "Halogen lamp"}. Verify: - sample quality. - sample concentration. - presence of bubbles{XE "Bubbles"} or impurities{XE "Impurities"} inside the sample.
§ and Chapter
See chapter 9.5 “LAMP REPLACING” page 39

TROUBLES
Display{XE "Display"} inscriptions are not legible.
Explanation
The BASIC is in stand-by mode. The basic is fed of by the battery.{XE "Battery"}
SOLUTION
Press a key to go out of stand-by mode. Verify external BASIC power connections (transformer,{XE "Transformer"} mains).
§ and Chapter

TROUBLES
During mains cut off, BASIC switch off.
Explanation
The battery{XE "Battery"} does not take over from the mains
SOLUTION
Recharge the battery{XE "Battery"}. Change the battery{XE "Battery"}. Verify connections between battery{XE "Battery"} and power supply board{XE "Power supply board"} Change Verify external BASIC power connections (transformer,{XE "Transformer"} mains).
§ and Chapter
See chapter 9.4 “BATTERY{XE "Battery"} REPLACING” page 38

TROUBLES
Date are not keep in memory.
Explanation
Microprocessor battery{XE "Battery"} is out
SOLUTION
Change the microprocessor battery.{XE "Battery"}
§ and Chapter
See chapter 9.7 “EPROM{XE "EPROM"} AND MICROPROCESSOR BOARD BATTERY REPLACING” page 45

TROUBLES
No repeatability between two measurements using decreasing kinetic
Explanation
Samples are not prepared in same conditions Problem on BASIC temperature{XE "Temperature"}
SOLUTION
Verify: - analysis programming (check the reagent technical notice). - reagent volume. - sample volume. - reagent quality (validity date). - reagent temperature{XE "Temperature"} (room or measure temperature) - waiting time. - measuring time. - BASIC temperature.{XE "Temperature"}
§ and Chapter
See user’s manual.

TROUBLES

Contamination{XE "Contamination"} between samples

Explanation

Sample volume is to low.

Aspiration{XE "Aspiration"} or dead volumes{XE "Dead volume"} are not correctly adjusted.

SOLUTION

Verify:

- dead volume{XE "Dead volume"} (about 200 µl).
- aspiration{XE "Aspiration"} volume (minimum 800 µl).

Verify, in the reagent technical notice, if the reagent manufacturer does not advocate a cuvette by cuvette measurement.

§ and Chapter

See **§** 10.9 “CONTAMINATION CONTROL” page 72 and **§** 10.8 “ASPIRATION ADJUSTMENT” page 69

TROUBLES

Relay{XE "Relay"} K3 (on power supply board){XE "Power supply board"} is chattering and the lamp goes off during measurement

Explanation

There is a short cut between the radiator{XE "Radiator"} (RA3) of regulator LM323K (U7) and the track under the radiator

The short cut is located close capacitor C25 & C26.

SOLUTION

Isolate the radiator{XE "Radiator"} from the track under.

§ and Chapter

See drawing page 75

TROUBLES

Bridge{XE "Bridge"} rectifier{XE "Rectifier"} CR1 of power supply board{XE "Power supply board"} become very hot and burns

Explanation

When the Peltier effect{XE "Peltier effect"} heats, the current in the transistorQ2 becomes important because it is not limited enough by the resistor{XE "Resistor"} R29, so the bridge{XE "Bridge"} rectifier{XE "Rectifier"} becomes hot and burns.

SOLUTION

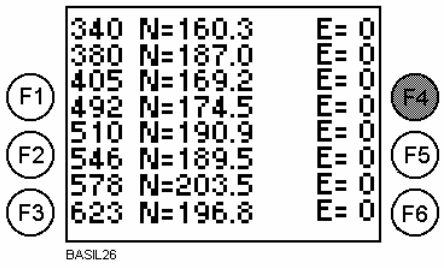
- Add a heat spreader on the bridge{XE "Bridge"} rectifier{XE "Rectifier"} CR1 if there is no.
- Replace the resistor{XE "Resistor"} R29 (0.1 Ohm) by a 0.2 Ohm

§ and Chapter

See drawing page 75

TROUBLES

During the zero, it displays



{XE "Bridge"}{XE "Rectifier"}{XE "Power supply board"}

Explanation

The cell amplifier does not receive energy from halogen lamp during the zero measurement.

SOLUTION

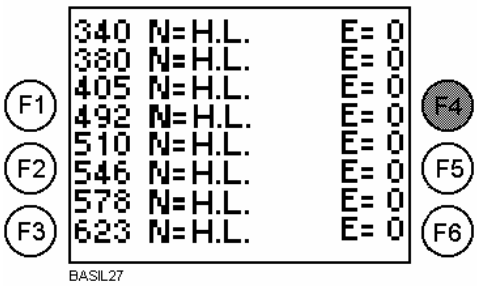
- Change halogen lamp.

§ and Chapter

See chapter 9.5 “LAMP REPLACING” page 39

TROUBLES

During the zero, it displays



{**XE "Bridge"**}{**XE "Rectifier"**}{**XE "Power supply board"**}

Explanation

The cell amplifier does not send information to the microprocessor board.

SOLUTION

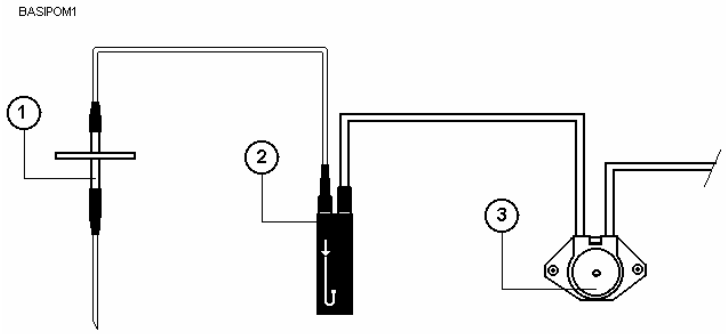
- Verify connection between cell amplifier board and microprocessor board.

§ and Chapter

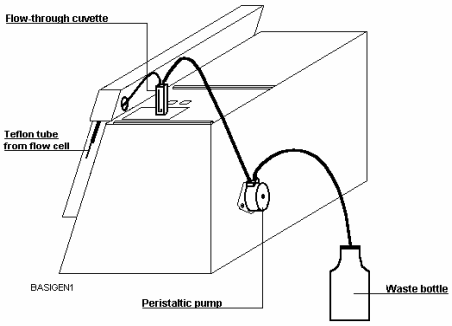
See paragraph 7.3 ELECTRIC INTERNAL CONNECTIONS page 27.

7 BASIC DESCRIPTION

7.1 FLUID CIRCUIT DESCRIPTION

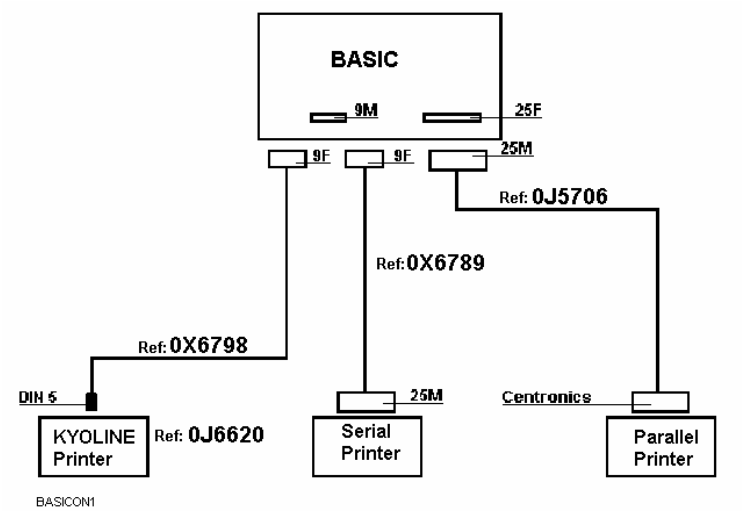


.Fig. 2 BASIC fluid circuit

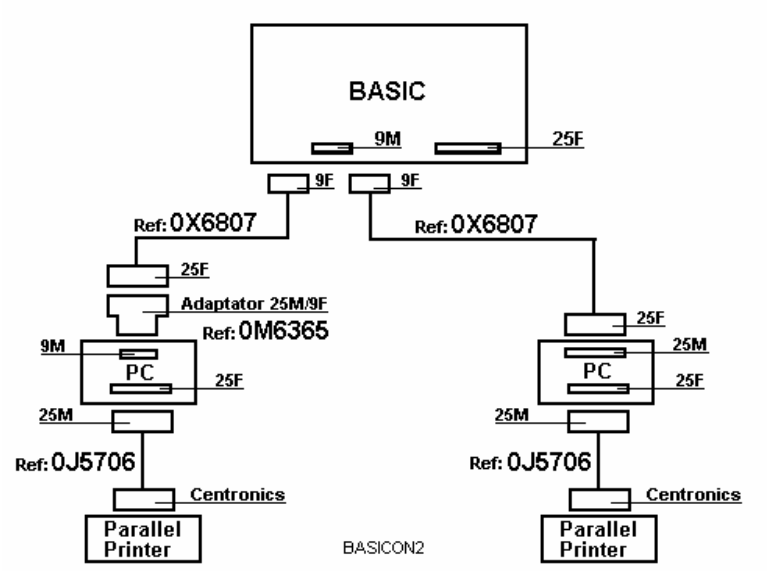


1 – GUIDE FOR SUCTION TUBE.
2 – FLOWTHROUGH CUVETTE REF: 0G6716
3 - PERISTALTIC PUMP. REF: 0M6679

7.2 EXTERNAL CONNECTIONS

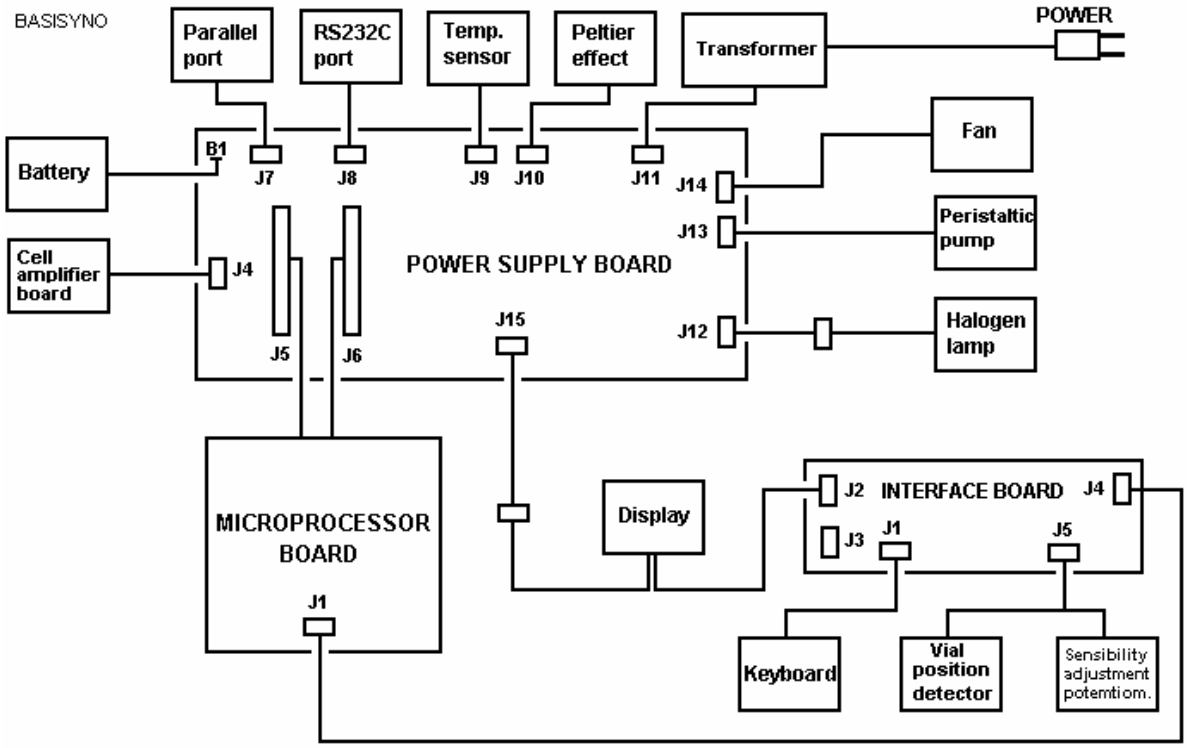


.Fig. 3 Connections with printers



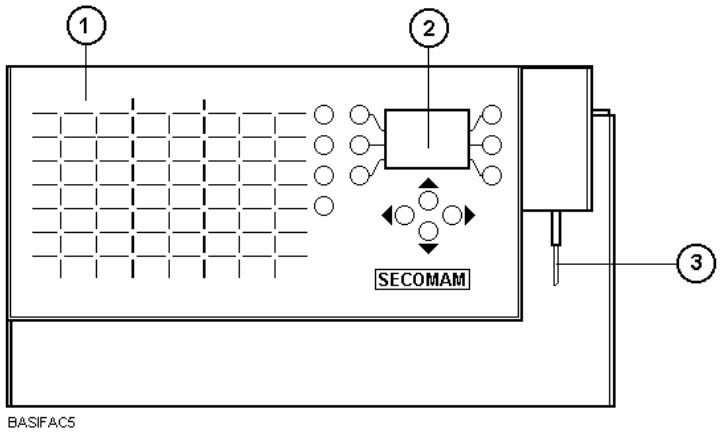
.Fig. 4 Connections with PC{XE "PC"} computer{XE "Computer"}

7.3 ELECTRIC INTERNAL CONNECTIONS



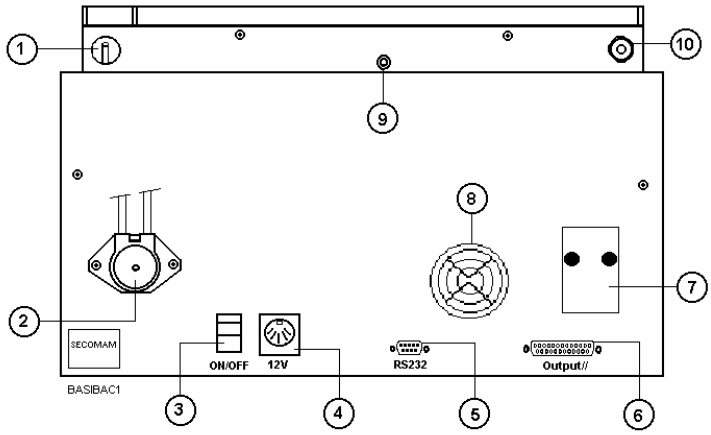
.Fig. 5 Synoptic

7.4 SPARE PARTS DESCRIPTION



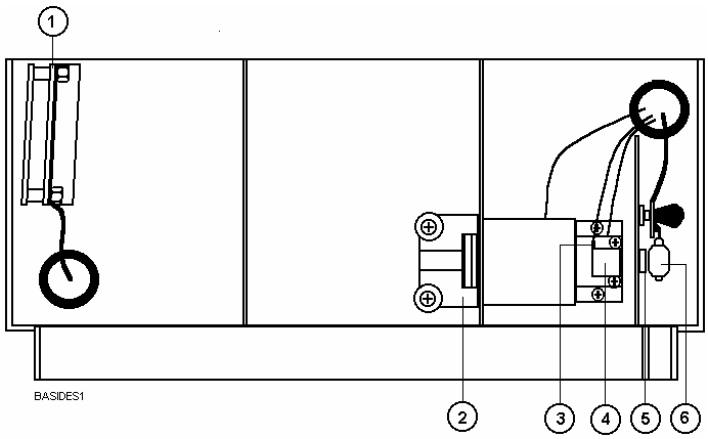
.Fig. 6 BASIC front view

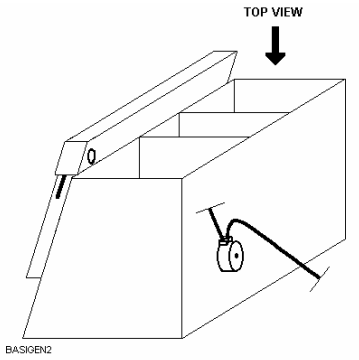
1 – KEYBOARD REF: 0W6791
2 – DISPLAY
3 – SUCTION TUBE



.Fig. 7 BASIC rear view

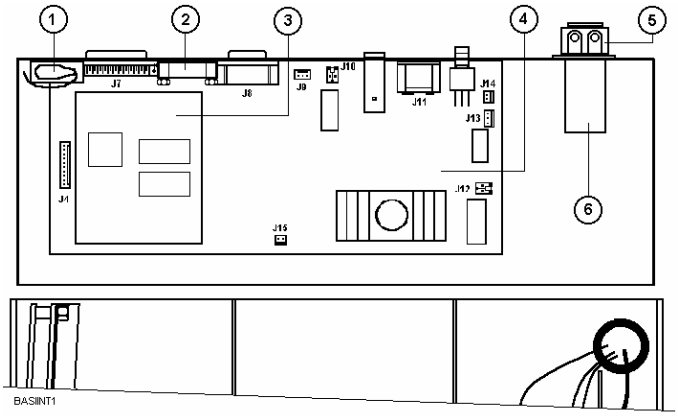
1 – SUCTION TUBE GUIDE.
2 – PERISTALTIC PUMP. REF: 0M6679
3 – ON/OFF SWITCH.
4 – 12V POWER SUPPLY CONNECTOR
5 – RS 232C**{** XE "RS 232C" **}** PORT (serial).
6 – PARALLEL PORT (centronics**{** XE "Centronics" **}**).
7 – BATTERY COMPARTMENT.
8 – FAN.
9 – BACK LIT ADJUSTMENT.
10 - SENSIBILITY ADJUSTMENT OF VIAL POSITION DETECTOR.

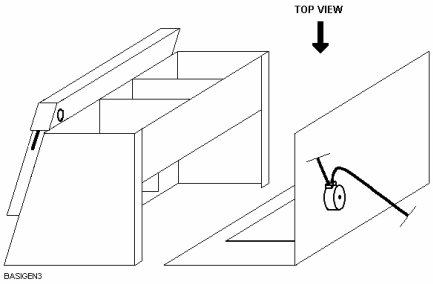




.Fig. 8 Monochromator{XE "Monochromator"} view

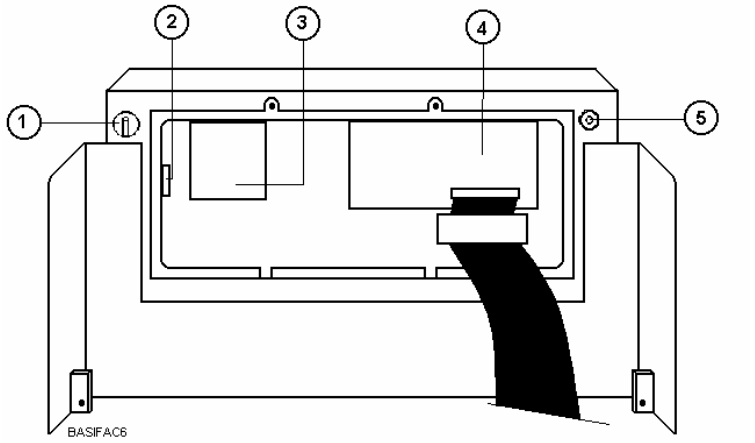
1 – CELL AMPLIFIER BOARD REF: 0X6689.
2 – GRATING SUBSET (grating & lens{ XE "Lens" })
3 – TEMPERATURE SENSOR REF: 416680
4 – CELL HOLDER
5 – FILTER HOLDER REF: 406670
6 – HALOGENE LAMP REF: 80ST0200





.Fig. 9 Main boards view

1 – BATTERY.
2 – FAN. REF: 410357V.
3 – MICROPROCESSOR BOARD REF: 416662B.
4 – POWER SUPPLY BOARD REF: 416662A.
5 – PUMP PERISTALTIC HEAD REF: 0M6679.
6 – PUMP PERISTALTIC MOTOR REF: 410357M.



.Fig. 10 Front panel rear view

1 – SUCTION TUBE GUIDE.
2 – VIAL POSITION OPTICAL DETECTOR REF: 0X6708.
3 – DISPLAY BOARD REF: 416391VB.
4 – INTERFACE BOARD REF: 0X6676.
5 – SENSIBILITY ADJUSTMENT OF VIAL POSITION DETECTOR REF: 0M6679.

8 SPARE PARTS AND EPROM{XE "EPROM"}

8.1 SPARE PARTS

REFERENCE		DESIGNATION
0EBAC		Packing box
0M6679		Peristaltic pump**{**XE "Peristaltic pump"**}** tube
0M6905		Transformer**{**XE "Transformer"**}** with European plug
0NVBAT		English technical manual
0NVBAU		English user's manual
0NVBFU		French user's manual
0W6791		Keyboard**{**XE "Keyboard"**}**
0X0357C		Armed flat cable
0X6676		Interface board**{**XE "Interface board"**}**
0X6689		Cell amplifier board**{**XE "Cell amplifier board"**}**
0X6708		Vial/cuvette position detector
0X6798		Cable for KYOLINE printer**{**XE "Printer"**}**
404611BA		Set of programmed EPROM**{**XE "EPROM"**}**
406670		Filters holder
406670		BG38 filter**{**XE "Filter"**}** subset
406671		BG39 filter**{**XE "Filter"**}** subset
410357M		Motor**{**XE "Motor"**}** of peristaltic pump**{**XE "Peristaltic pump"**}**
410357P		Peltier effect**{**XE "Peltier effect"**}**
410357V		Fan**{**XE "Fan"**}**
416391VB		Display**{**XE "Display"**}** subset (phase3)
416659		Display**{**XE "Display"**}** subset (phase2)
416662A		Power supply board**{**XE "Power supply board"**}**
416662B		Microprocessor board**{**XE "Microprocessor board"**}**
416680		Temperature**{**XE "Temperature"**}** sensor**{**XE "Temperature sensor"**}**
80ST0200		Halogen lamp**{**XE "Halogen lamp"**}**
80VB0363		Tubes kit
80VB0380		Tubes kit & peristaltic pump**{**XE "Peristaltic pump"**}** head

8.2 EPROM{ XE "EPROM" } EVOLUTION

EPROM{ XE "EPROM" } VERSION	DATE
V1.8d	20/06/97
V1.11	05/09/97
V1.12	29/09/97
V1.13a & V1.13b	05/01/98
V1.14a & V1.14b	19/01/98
V1.15a	12/05/98
V1.17	29/09/98
V1.17a	29/01/99
V1.17b	15/02/99
V1.17c	17/03/99
V1.17d	19/03/99
V1.17 e	25/6/99
V1.18	03/11/99

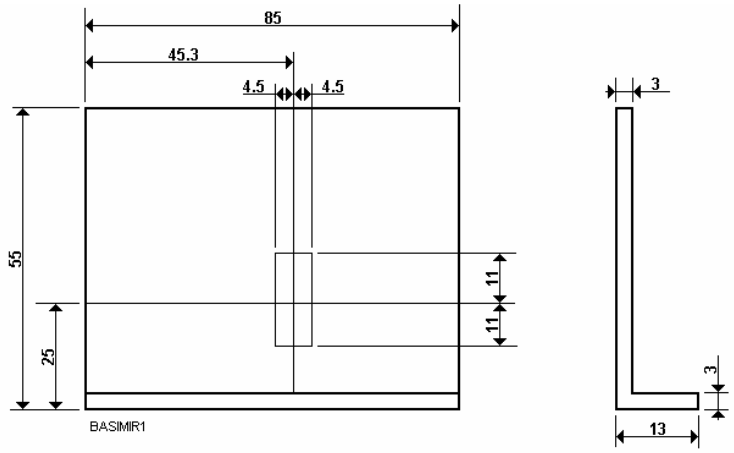
9 REPAIRING

9.1 LIST OF TOOLS AND CONTROL STANDARDS

- Tool case.

- Multimeter.

- Optical target{XE "Optical target"} (0M6734).



- Straylight{XE "Straylight"} filter{XE "Filter"} at 340 nm (ref: 404686).

- GG 420 Filter{XE "Filter"} (ref: 406717).

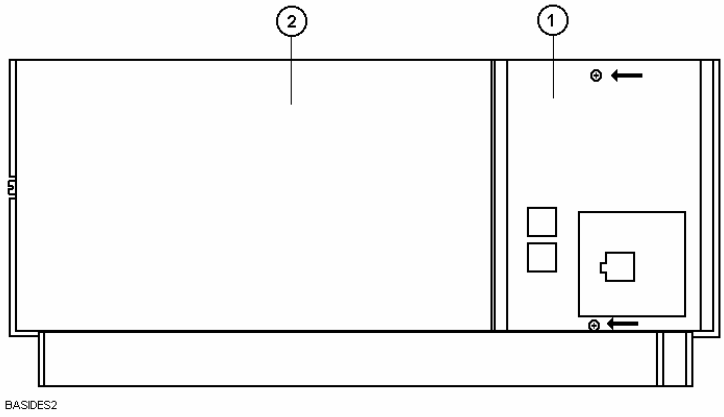
- Neutral filters (ref:404513).

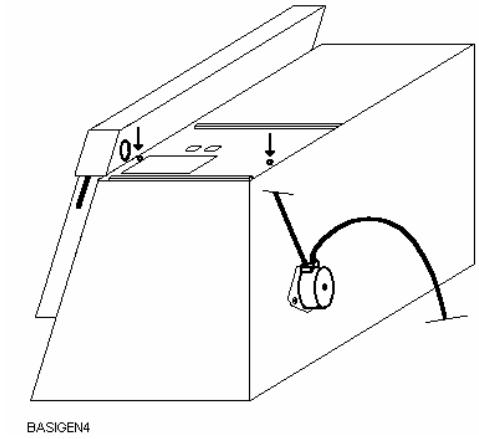
- Halogen lamp{XE "Halogen lamp"} (Ref: 80ST0200).

- English technical manual for BASIC (Ref: 0NVBAT).

9.2 BASIC OPENING

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.
- Remove flow-through cuvette{XE "Flow-through cuvette"} and tubes.

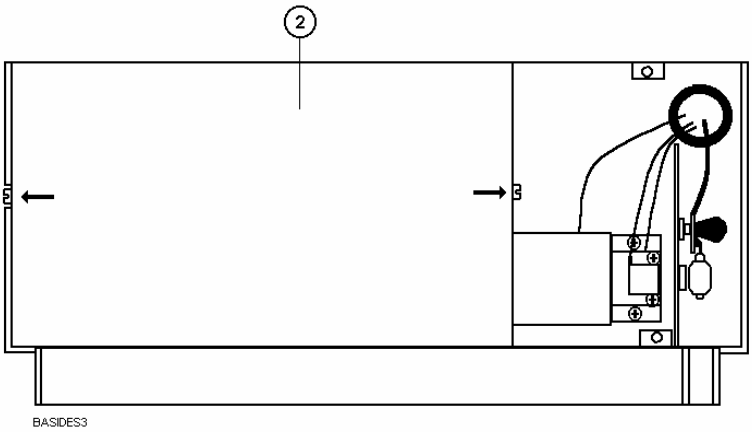


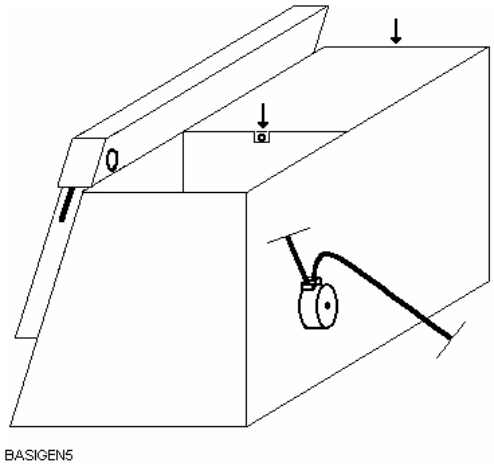


.Fig. 11 Cuvette well cover removing

1 – Cuvette well cover.
2 – Monochromator{XE "Monochromator"} cover.

- Unscrew the two screws shown by arrows.
- Remove cuvette well cover.

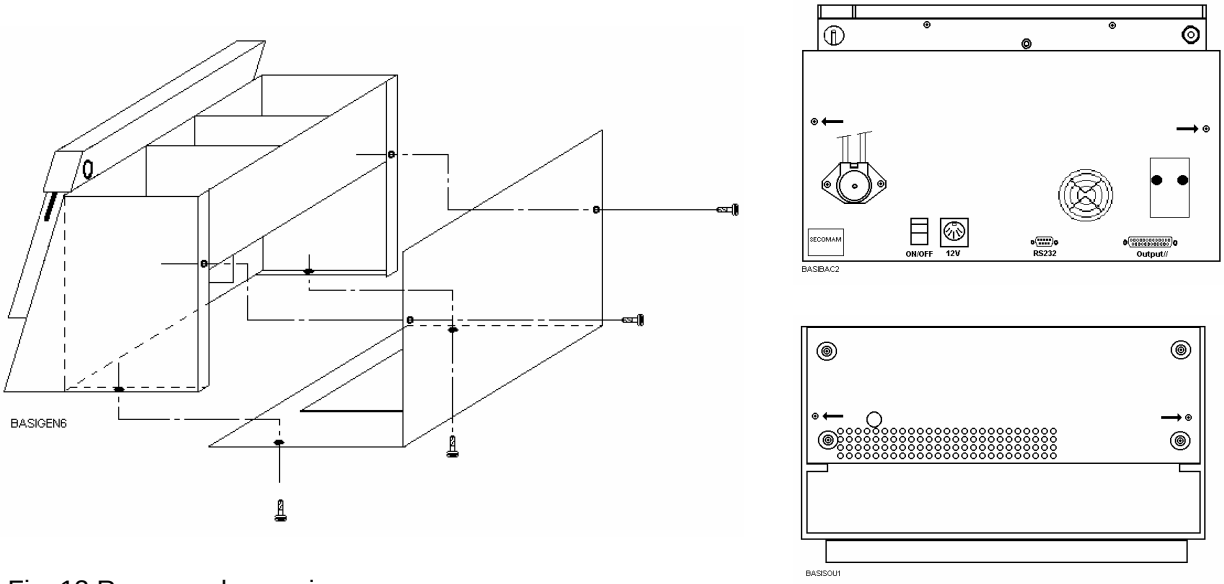




.Fig. 12 Monochromator{XE "Monochromator"} cover removing

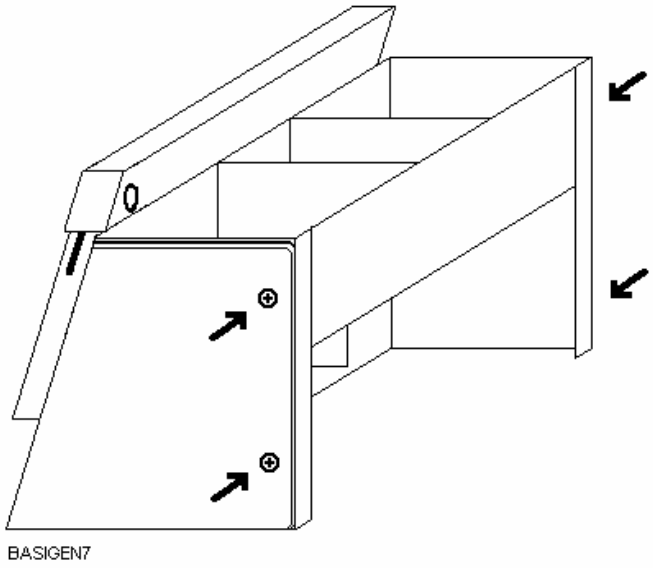
2 – Monochromator{XE "Monochromator"} cover

- Unscrew the two screws shown by arrows.
- Remove monochromator{XE "Monochromator"} cover.



.Fig. 13 Rear panel removing

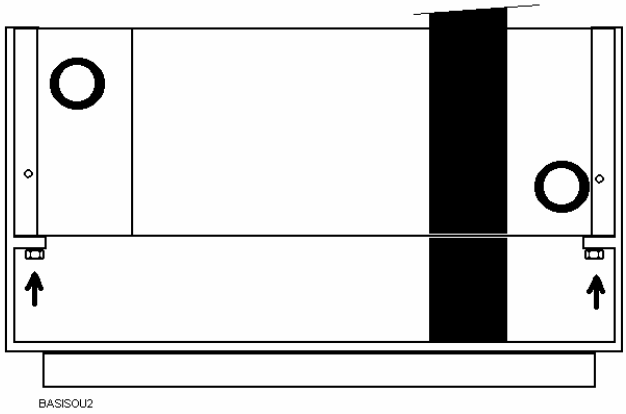
- Remove four screws (2 at the back, 2 below).
- Slide backward rear panel.
- Disconnect the different subsets connectors.

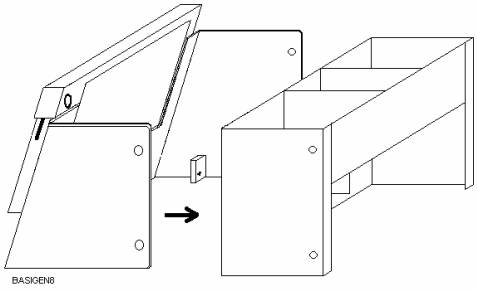


.Fig. 14 Front panel removing

- Remove 4 screws shown by arrows.
- Turn the BASIC over.

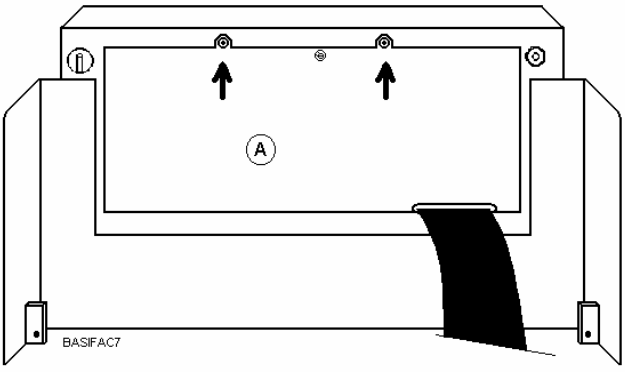
abys





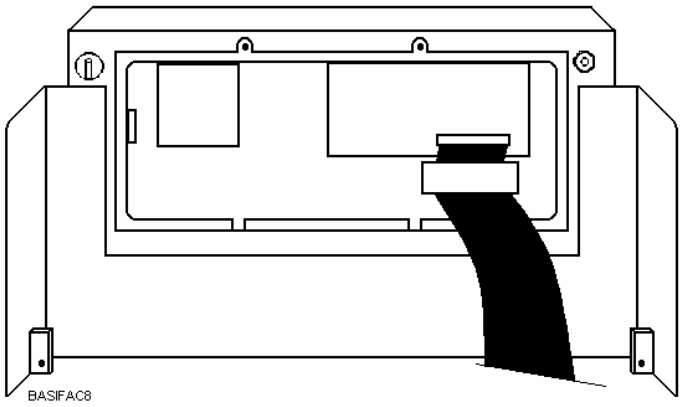
.Fig. 15 Front panel removing

- Remove 2 screws shown by arrows.
- Slide backwards the internal part of the BASIC.



.Fig. 16 Access to the front panel.

- Remove 2 screws shown by arrows
- Remove the cover labeled A.



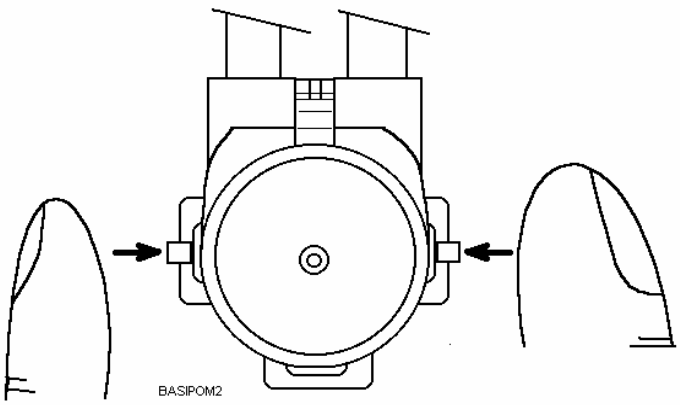
.Fig. 17 Back of the front panel

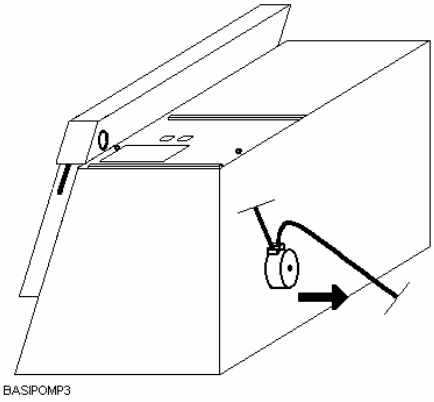
Now the user have access to all BASIC parts.

9.3 PUMP PERISTALTIC HEAD REPLACING

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.

- Remove the peristaltic pump{XE "Peristaltic pump"} tube out from the flow-through cuvette{XE "Flow-through cuvette"}.





.Fig. 18 How to remove the peristaltic pump{XE "Peristaltic pump"}
head

- Press, with your fingers on two clips located on each side of the peristaltic pump{XE "Peristaltic pump"} head (see drawing above).
- Slide backwards the peristaltic pump{XE "Peristaltic pump"} head.
- Insert a new peristaltic pump{XE "Peristaltic pump"} head on the motor{XE "Motor"} axis.
- Slide it forwards until you heard a “click”.
- Install the tube on flow-through cuvette{XE "Flow-through cuvette"}.
- Try to aspirate distilled water.
- Verify the aspiration{XE "Aspiration"} volumes.

PROBLEM

The peristaltic pump{XE "Peristaltic pump"} does not aspirate the sample.

FIRST INTERVENTION

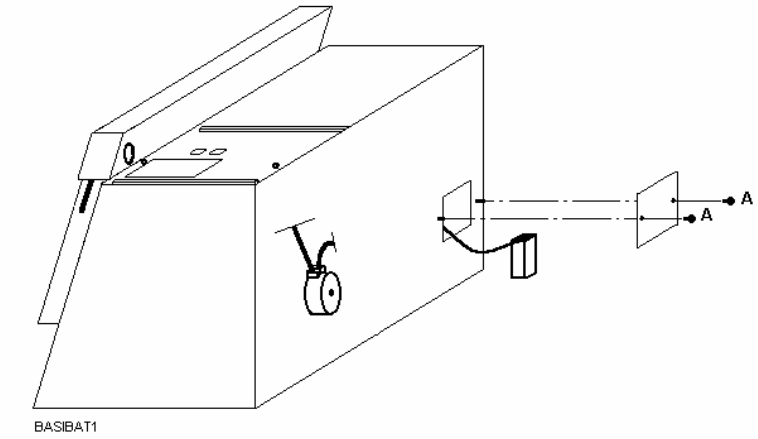
- Verify if the peristaltic pump{XE "Peristaltic pump"} head is correctly “clipped”.
- Verify the tubes setting.
- Verify aspiration{XE "Aspiration"} volume.

9.4 BATTERY{XE "BATTERY"} REPLACING

The battery{XE "Battery"} which is used is a **rechargeable** battery. It is used when the mains is off, to maintain data{XE "Data"} on BASIC screen and to finish kinetical reaction.

WARNING : This battery{XE "Battery"} is automatically recharged by the BASIC, so do not replace it by a disposable battery.

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.



.Fig. 19 How to replace the battery{XE "Battery"}

- Unscrew the two screws labeled A
- Remove the battery{XE "Battery"} compartment cover.
- Extract the battery{XE "Battery"} out of the compartment.
- Disconnect it.
- Replace the battery{XE "Battery"} by a new one if needed.
- Insert the battery{XE "Battery"} in its compartment.
- Replace the battery{XE "Battery"} compartment cover.
- Connect the transformer{XE "Transformer"}.
- Switch on the instrument.
- Wait 30 minutes
- Disconnect the transformer{XE "Transformer"} without switch the instrument off.

There is no back lit{XE "Back lit"} on the screen but it is possible to see data{XE "Data"}.

PROBLEM

It is not possible to read data{XE "Data"} on the screen.

FIRST INTERVENTION

- Verify the connection way of the battery{XE "Battery"}.

9.5 LAMP REPLACING

9.5.1 WARNING

It is user's responsibility to change the lamp periodically.

The halogen lamp**{**XE "Halogen lamp"**}** is not covered by the warranty.
Never touch the quartz lamp envelope with your fingers; otherwise clean it with alcohol.
Since the lamp has been pre-aligned in our factory, only use parts supplied by SECOMAM.
Any use of a lamp from another source would bear prejudice to the performances of the spectrophotometer and void the warranty

The lamp lights up in the wavelength**{**XE "Wavelength"**}** range 340 - 623 nm. It is pre-aligned in our factory and does not require any adjustment when it is changed. It is power-supplied directly by its fastening pins.

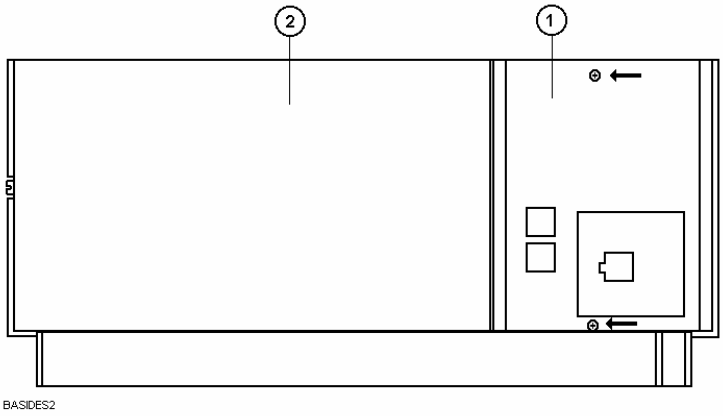
9.5.2 CHECKING THE LAMP

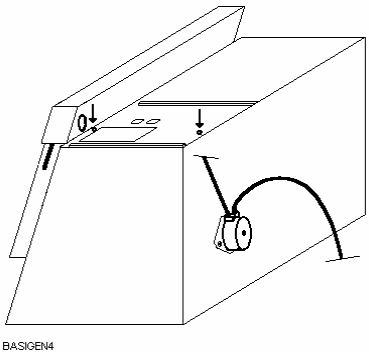
Service life: About 1000 hours.

If, during a reading, the unit cannot reset or systematically gives the message «*Measurement problem. Repeat?* », it will be necessary to check the lamp or to change it.

9.5.3 REPLACING THE HALOGEN LAMP

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.
- Remove flow-through cuvette**{**XE "Flow-through cuvette"**}** and tubes.

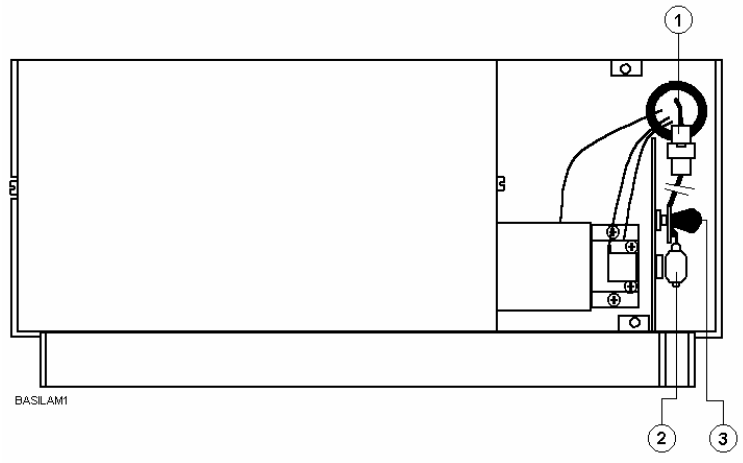




.Fig. 20 Cuvette well cover removing

1 – Cuvette well cover.

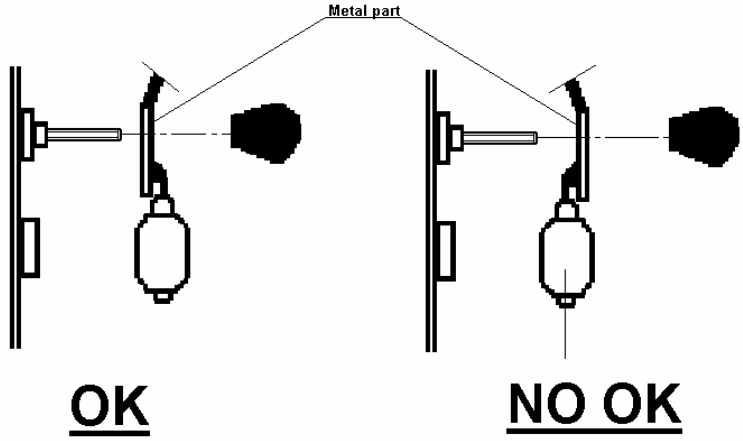
- Unscrew the two screws shown by arrows.
- Remove cuvette well cover.



.Fig. 21 Compartment lamp top view

1 – Halogen lamp**{**XE "Halogen lamp"**}** connector.
2 – Halogen lamp**{**XE "Halogen lamp"**}** REF: 80ST0200.
3 – Nuts which hold the halogen lamp**{**XE "Halogen lamp"**}**

- Disconnect the halogen lamp**{**XE "Halogen lamp"**}** connector (1).
- Remove both black nuts (3) which maintain it.
- Remove the faulty lamp (2) after letting it cool down.



.Fig. 22 Halogen lamp**{**XE "Halogen lamp"**}** assembly

- Set the new lamp and **tighten up** the fastening nuts (Be careful to the assembly way).

PROBLEM

The halogen lamp**{**XE "Halogen lamp"**}** does not light up.

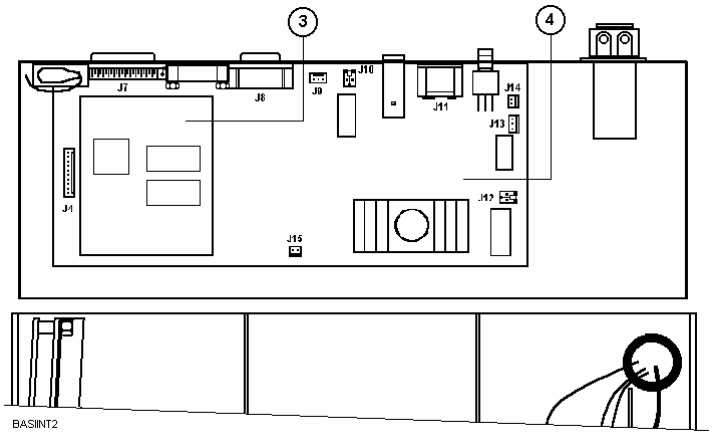
FIRST INTERVENTION

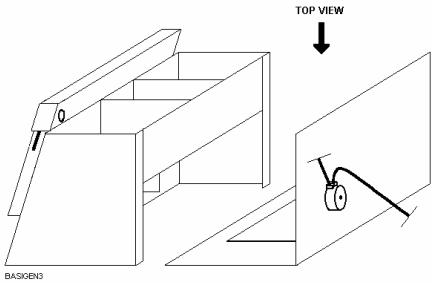
- Verify if the fastening nuts of halogen lamp**{**XE "Halogen lamp"**}** are sufficiently tightened.
- Verify the lamp halogen connection.

9.6 MICROPROCESSOR BOARD AND POWER SUPPLY BOARD REPLACING

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.

- Remove four screws (2 at the back, 2 below).
- Slide backward rear panel.

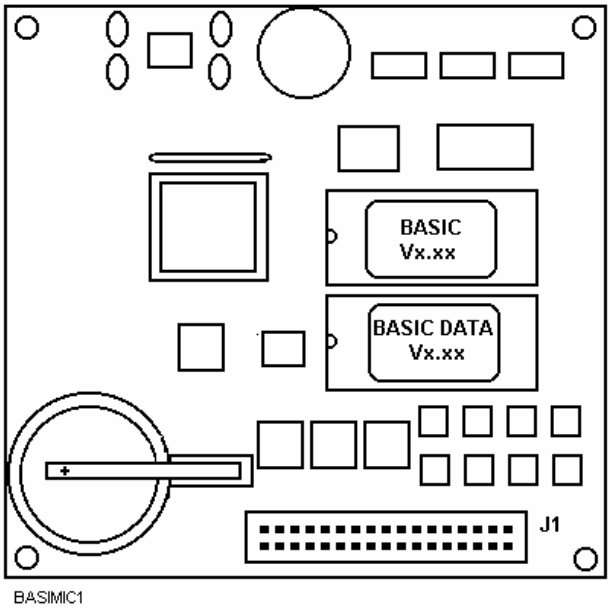




.Fig. 23 Main boards view

3 – MICROPROCESSOR BOARD REF: 416662B.
4 – POWER SUPPLY BOARD REF: 416662A.

9.6.1 MICROPROCESSOR BOARD REPLACING



.Fig. 24 Microprocessor board{XE "Microprocessor board"}

- **J1** (J4 interface board{XE "Interface board"}).

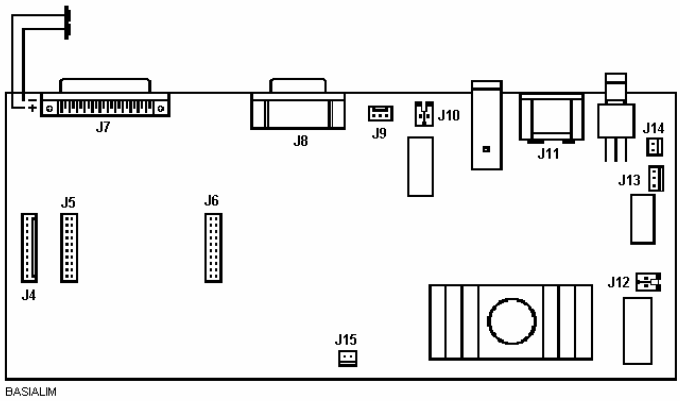
- Disconnect flat connector (J1).
- Remove the four nuts.
- Unplug the microprocessor board{XE "Microprocessor board"}
- Recover the EPROM{XE "EPROM"} if there are none on new microprocessor board{XE "Microprocessor board"}.
- Plug the new microprocessor board{XE "Microprocessor board"}.
- Connect flat connector (J1)..
- Switch on the spectrophotometer.
- Verify aspiration{XE "Aspiration"} volume adjustment.

PROBLEM
Nothing happens when BASIC is switched on..

FIRST INTERVENTION
- Check the EPROMs fitting direction.
- Verify microprocessor fitting.
- Verify flat connector assembly

9.6.2 POWER SUPPLY REPLACING

- Unplug the microprocessor board{XE "Microprocessor board"}
- Disconnect the different subsets connector.
- Remove the power supply board{XE "Power supply board"}.
- Install new power supply board{XE "Power supply board"}.



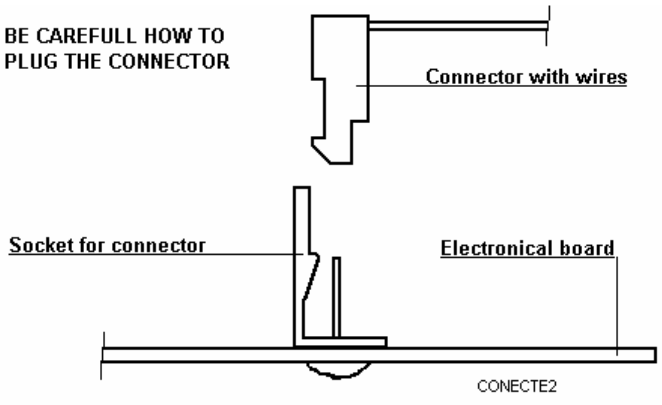
.Fig. 25 Power supply board{XE "Power supply board"}

- Connect the different subsets connector.

TAKE CARE TO THE CONNECTORS SENS (see on following page how to plug the connector).

- **J4** (cell amplifier board{XE "Cell amplifier board"}).
- **J5** (microprocessor board{XE "Microprocessor board"}).
- **J6** (microprocessor board{XE "Microprocessor board"}).
- **J7** (parallel{XE "Parallel"} port).
- **J8** (RS232C port).
- **J9** (temperature{XE "Temperature"} sensor{XE "Temperature sensor"}).
- **J10** (Peltier effect{XE "Peltier effect"}).
- **J11** (transformer{XE "Transformer"}).
- **J12** (halogen lamp{XE "Halogen lamp"}).
- **J13** (peristaltic pump{XE "Peristaltic pump"}).
- **J14** (fan{XE "Fan"}).
- **J15** (display{XE "Display"} back lit{XE "Back lit"}).

- **B1** (battery{XE "Battery"}).



.Fig. 26 How to plug the connectors

- Plug the new microprocessor board{XE "Microprocessor board"}.
- Connect flat connector (J1)..
- Switch on the spectrophotometer.
- Verify aspiration{XE "Aspiration"} volume adjustment.

PROBLEM
Nothing happens when BASIC is switched on..

One of the subsets does not work correctly.

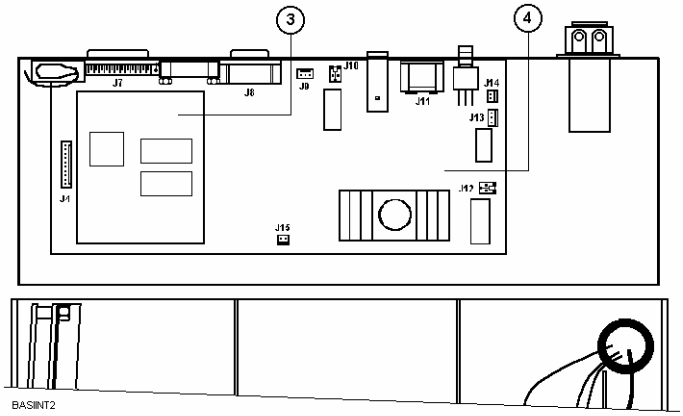
FIRST INTERVENTION
- Check the EPROMs fitting direction.
- Verify microprocessor board{XE "Microprocessor board"} fitting.
- Verify flat connector assembly

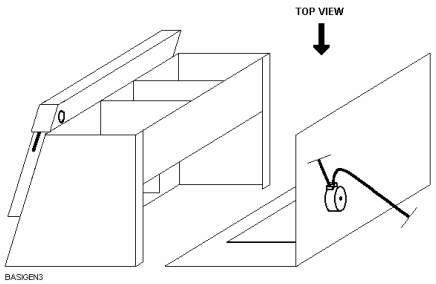
- Verify the subset connection.

9.7 EPROM{XE "EPROM"} AND MICROPROCESSOR BOARD BATTERY REPLACING

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.

- Remove four screws (2 at the back, 2 below).
- Slide backward rear panel.

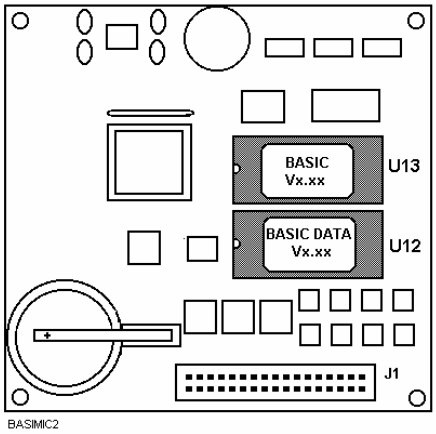




.Fig. 27 Main boards view

3 – MICROPROCESSOR BOARD REF: 416662B.
4 – POWER SUPPLY BOARD REF: 416662A.

9.7.1 REPLACING THE EPROM{XE "EPROM"}



.Fig. 28 EPROMs POSITION

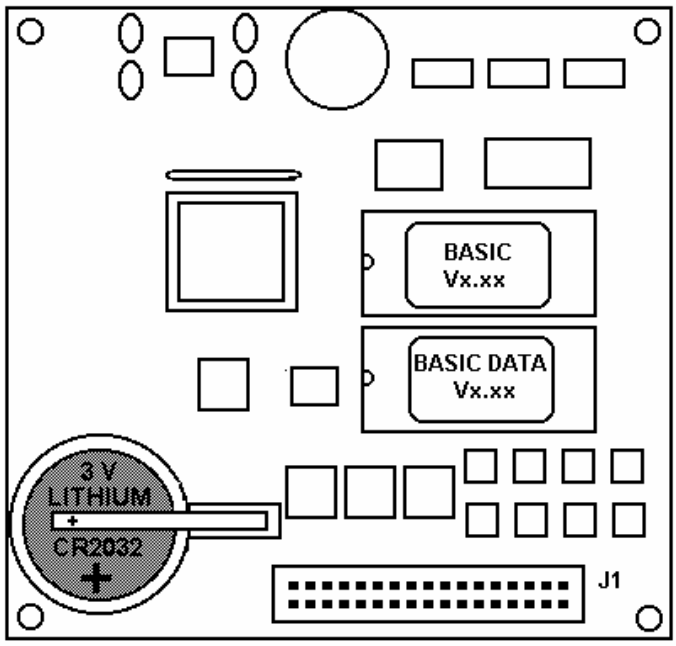
- Remove the two EPROM**{**XE "EPROM"**}** U12 and U13.
- Install the new EPROM**{**XE "EPROM"**}** (take care to the sense) as follow:

U13 ⇒ EPROM**{**XE "EPROM"**}** labeled **BASIC Vx.xx**

U12 ⇒ EPROM**{**XE "EPROM"**}** labeled **BASIC DATA Vx.xx**

- Switch on the instrument and verify if it runs correctly.

9.7.2 BATTERY OF MICROPROCESSOR BOARD REPLACING



.Fig. 29 Battery{XE "Battery"} position

- Remove the battery{XE "Battery"}.
- Install the new battery{XE "Battery"} (take care to the side, + on the top).

Battery{XE "Battery"} characteristics :

Voltage : 3 volts.
Type : Lithium.
Ref : CR 2032

- Switch on the instrument and verify if it correctly.
- Verify date and time.

PROBLEM
Nothing happens when BASIC is switched on..

Time and date are not kept in memory.

FIRST INTERVENTION
- Check the EPROMs fitting direction.

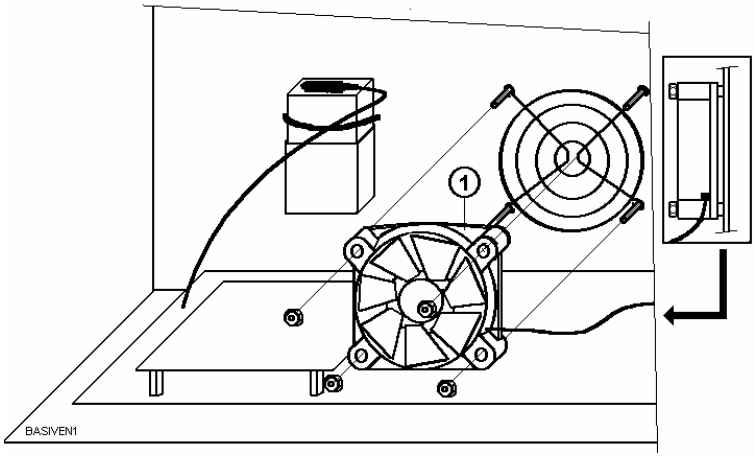
- Verify the subset connection.

- Check the battery{XE "Battery"} voltage.
- Check the battery{XE "Battery"} fitting.

9.8 FAN REPLACING

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.

- Remove BASIC rear part
- Disconnect the fan{XE "Fan"} from the microprocessor board{XE "Microprocessor board"}.
- Remove the four nuts.
- Remove the faulty fan{XE "Fan"}.



.Fig. 30 How to change the fan{XE "Fan"}

1 FAN (Ref: 410357V).

- Install a new fan{XE "Fan"}.

TAKE CARE TO THE FAN SENS
Wires must be at the right bottom part of the fan{XE "Fan"}, against the side.

- Fix the fan{XE "Fan"}.
- Connect it on the microprocessor board{XE "Microprocessor board"} (J14).
- Switch on the instrument.
- Verify if the fan{XE "Fan"} works correctly.

PROBLEM
Fan{XE "Fan"} does not work when BASIC is switching on

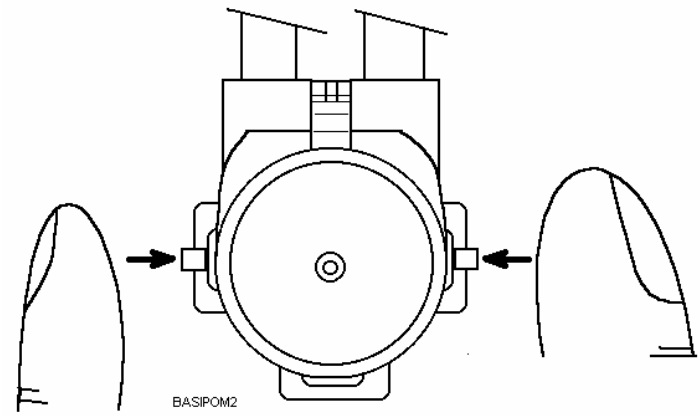
FIRST INTERVENTION

- Verify fan{XE "Fan"} connection.
-Check the fan{XE "Fan"} voltage command.

9.9 PERISTALTIC PUMP MOTOR REPLACING

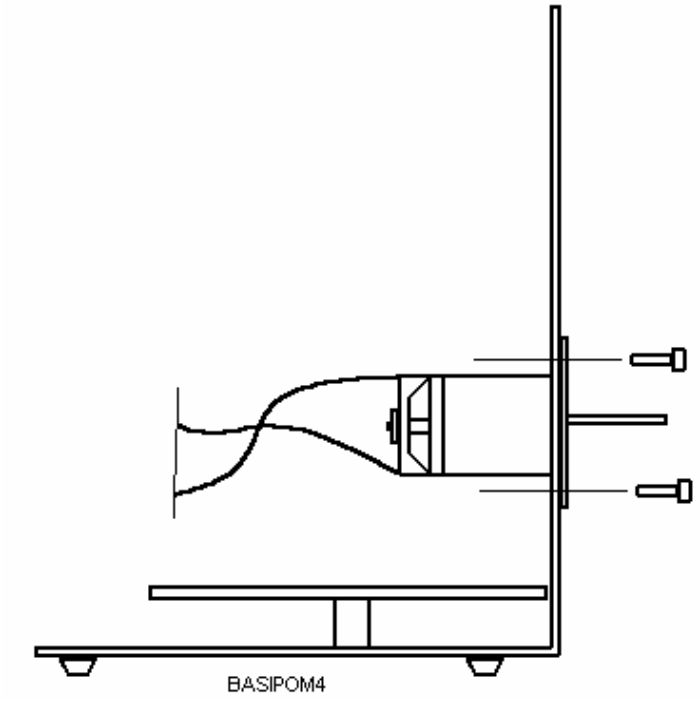
FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.

- Remove head of peristaltic pump{XE "Peristaltic pump"}.



.Fig. 31 How to remove peristaltic pump{XE "Peristaltic pump"} head

- Remove BASIC rear part
- Disconnect the peristaltic pump{XE "Peristaltic pump"} motor{XE "Motor"} from the microprocessor board{XE "Microprocessor board"}.
- Remove the two screws.
- Remove the faulty motor{XE "Motor"}.



.Fig. 32 How to change the peristaltic pump{XE "Peristaltic pump"} motor{XE "Motor"}

.**1** PERISTALTIC PUMP MOTOR (Ref: 410357M).

- Install a new motor{XE "Motor"}.
- Fix the motor{XE "Motor"}
- Install the head of peristaltic pump{XE "Peristaltic pump"}.
- Connect it on the microprocessor board{XE "Microprocessor board"} (J13).
- Switch on the instrument.
- Verify if the motor{XE "Motor"} works correctly.
- Verify if the aspiration{XE "Aspiration"} is correct.

PROBLEM

Motor{XE "Motor"} does not work when aspiration{XE "Aspiration"} is requested

Liquid is not aspirated.

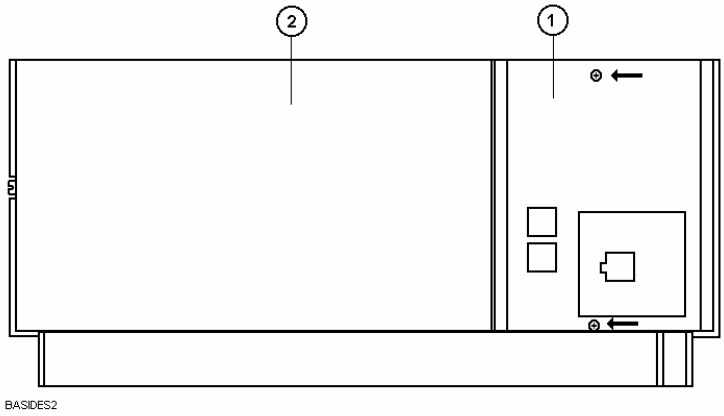
FIRST INTERVENTION

- Verify motor{XE "Motor"} connection.
-Check the motor{XE "Motor"} voltage command.

- Verify the pump head setting
- Verify fluid circuit.

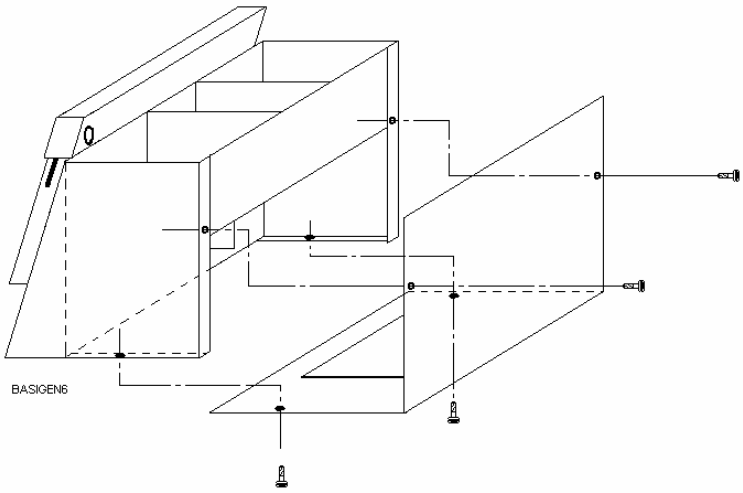
9.10 TEMPERATURE SENSOR AND PELTIER EFFECT REPLACING

FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.



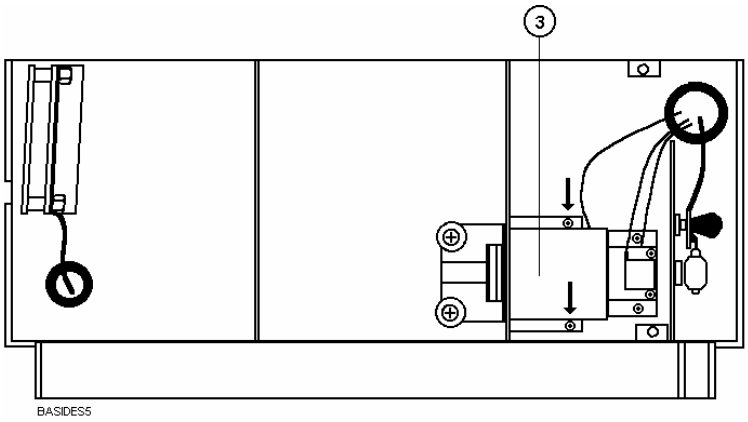
.Fig. 33 Monochromator{XE "Monochromator"} opening.

- Remove part 1 and part 2



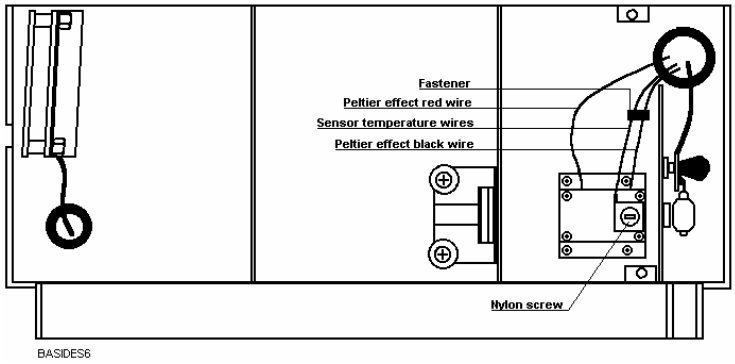
.Fig. 34 Rear part removing

- Remove BASIC rear part



.Fig. 35 Cover 3 removing

- Remove screws shown by arrows.
- Remove the cover marked 3.

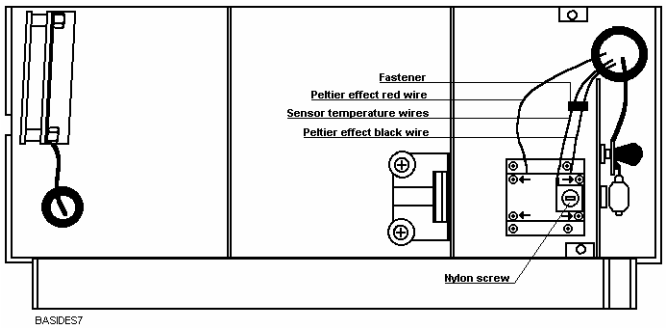


.Fig. 36 Top view

9.10.1 TEMPERATURE SENSOR REPLACING

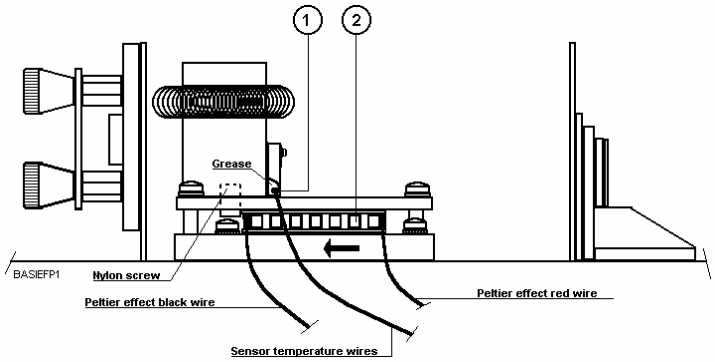
- Disconnect temperature{XE "Temperature"} sensor{XE "Temperature sensor"} (J10) from the power supply board{XE "Power supply board"}.
- Cut the fastener.
- Remove the temperature{XE "Temperature"} sensor{XE "Temperature sensor"}.
- Clean carefully the temperature{XE "Temperature"} sensor{XE "Temperature sensor"} compartment.
- Coat the new temperature{XE "Temperature"} sensor{XE "Temperature sensor"} with a film of thermic silicone grease{XE "Silicone grease"}.
- Insert temperature{XE "Temperature"} sensor{XE "Temperature sensor"} deep inside its compartment.
- Fix temperature{XE "Temperature"} sensor{XE "Temperature sensor"} wires together with Peltier effect{XE "Peltier effect"} black wire using a fastener.
- Connect temperature{XE "Temperature"} sensor{XE "Temperature sensor"} on power supply board{XE "Power supply board"} (J9).
- Install the cover.
- Install the fastener (when the fastener is installed, it avoid to the sensor temperature{XE "Temperature"} to go away out of its place).

9.10.2 PELTIER EFFECT REPLACING



.Fig. 37 Peltier effect{XE "Peltier effect"} removing

- Disconnect Peltier effect{XE "Peltier effect"} (J9) from the power supply board{XE "Power supply board"}.
- Remove 4 screws shown by arrows.
- Remove the cuvette holder{XE "Cuvette holder"}.
- Remove Peltier effect{XE "Peltier effect"}.



.Fig. 38 Temperature{XE "Temperature"} sensor{XE "Temperature sensor"} & Peltier effect{XE "Peltier effect"} view

1 TEMPERATURE SENSOR (Ref: 416680).
2 PELTIER EFFECT (Ref: 410357P).

- Spread a film of thermic silicone grease{XE "Silicone grease"} on both sides of new Peltier effect{XE "Peltier effect"}.
- Replace the Peltier effect{XE "Peltier effect"}.

IMPORTANT: Push it against the nylon screw{XE "Nylon screw"} (See drawing above).

- Replace the cuvette holder{XE "Cuvette holder"}.
- Do not tighten firmly the 4 screws.
- Connect Peltier effect{XE "Peltier effect"} on power supply board{XE "Power supply board"} (J9).
- Verify optical alignment{XE "Optical alignment"}.
  See paragraph 10.2 **"OPTICAL ALIGNMENT"** page 61
- Verify the temperature{XE "Temperature"}.
  See paragraph 10.7 "**TEMPERATURE CHECKING"** page 68

PROBLEM

Peltier effect{XE "Peltier effect"} does not working properly

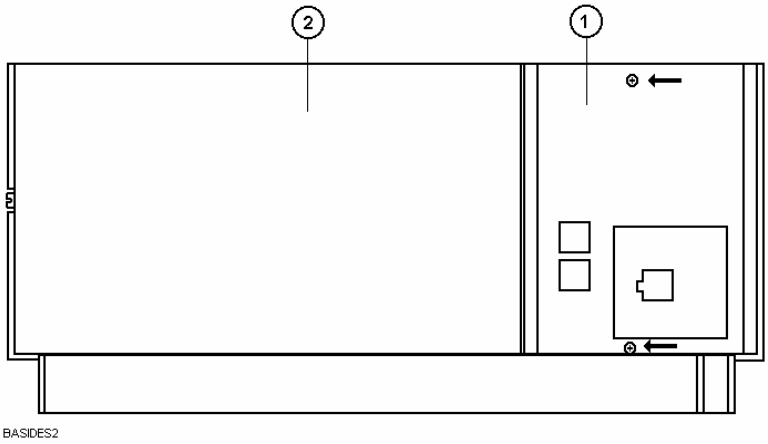
FIRST INTERVENTION

- Verify the item connection.
- Verify Peltier effect{XE "Peltier effect"} setting.

9.10.3 FILTERS REPLACING

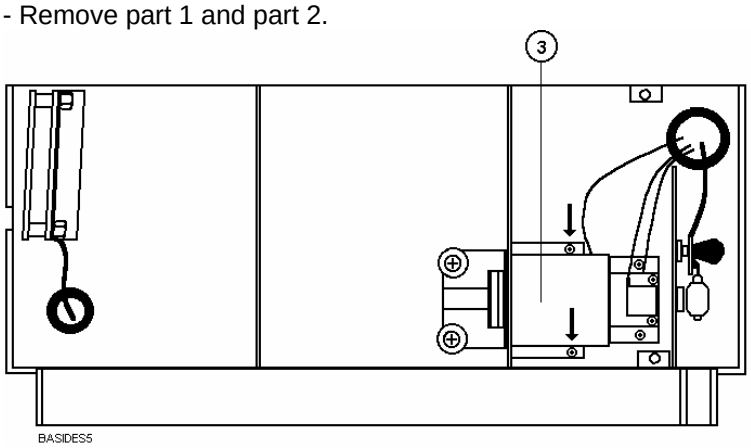
FIRST OF ALL, DISCONNECT THE BASIC TRANSFORMER FROM THE MAINS.

VERY IMPORTANT:
BASIC analyzer which serial number inferior to 258, the filter holder contains a BG39 filter (SECOMAM REF: 0O9031) in place of BG38 filter.
BASIC analyzer which serial number superior to 565 (except serial number 569, 570, 574) are the filters (BG24 and BG38) located closed to the input slit, on the opposite side of cuvette holder (see drawing and explanation at the end of this paragraph).



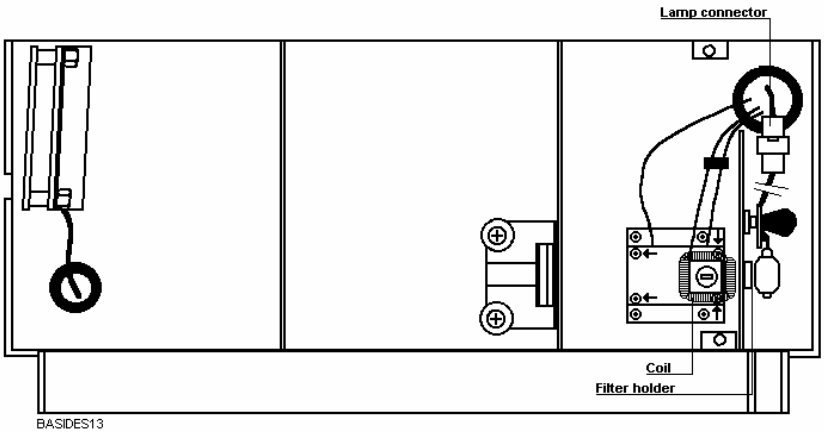
.Fig. 39Monochromator{XE "Monochromator"} opening.

- Remove part 1 and part 2.



.Fig. 40 Cover 3 removing

- Remove screws shown by arrows.
- Remove the cover marked 3.



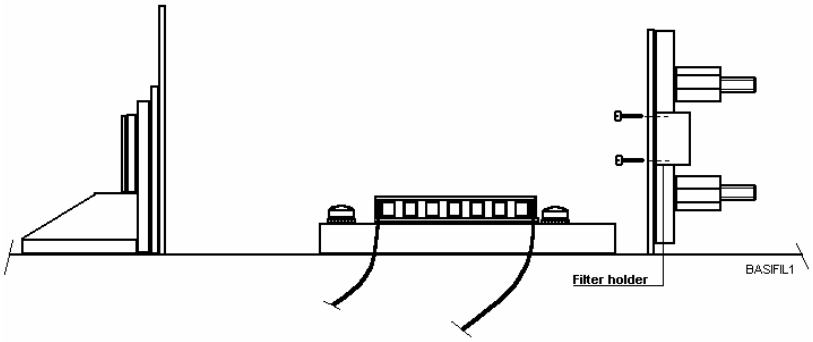
.Fig. 41 How to remove cell holder

- Remove 4 screws shown by arrows.
- Remove the cuvette holder{XE "Cuvette holder"}.

9.10.3.1 Previous BASIC analyzer version

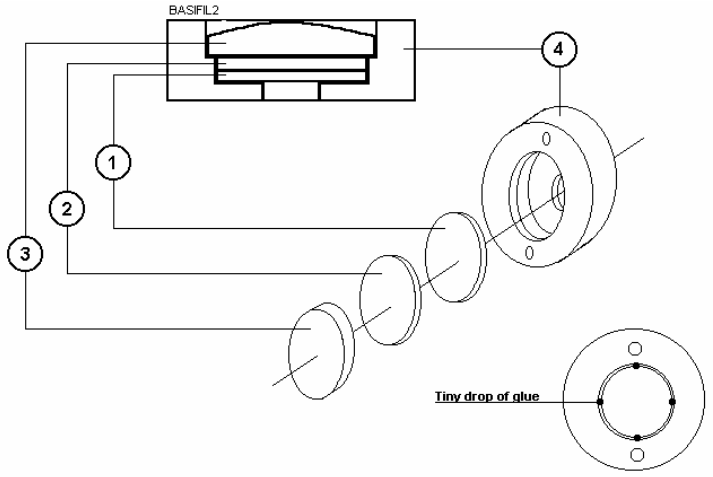
BASIC analyzer which serial number inferior to 566 (and serial number 569, 570, 574)

- Disconnect and remove halogen lamp.



.Fig. 42 How to remove filter holder.

- Remove two screws as shown on drawing above.
- Pick the filter holder up.
- Soak in acetone to remove the Araldite glue.
- Knock the filters and lens out of its holder, two minutes later by giving a slight blow from the smaller aperture.
- Protect the lens because it must not be damaged.
- Clean thoroughly the holder from any trace of glue.

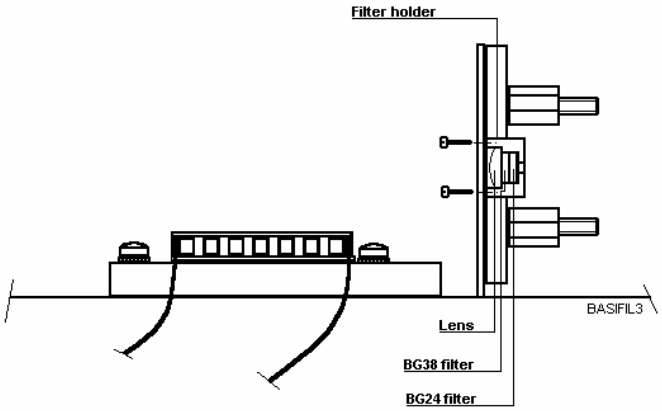


.Fig. 43 Drawing of filter holder

1 BG24 filter (Ref: 0O9032).
2 BG38 filter (Ref: 0O9046).
3 Lens (Ref: 0O6702).
4 Holder (Ref: 0M6670).

- Remove any finger trace from the filters and lens.
- Put in order BG24 filter, BG 38 filter and lens with the flat side next to the filter, as shown on drawing above.
- Put, with a needle, just a tiny drop of glue on 4 locations at the peripheral of the lens to hold the set in the holder.
Be very careful not to put any glue on the lens surface itself.
- Live to dry 24 hours.

- Screw the filter holder, one screw at a time taking care to place the lens on the opposite side of the lamp (see drawing above).

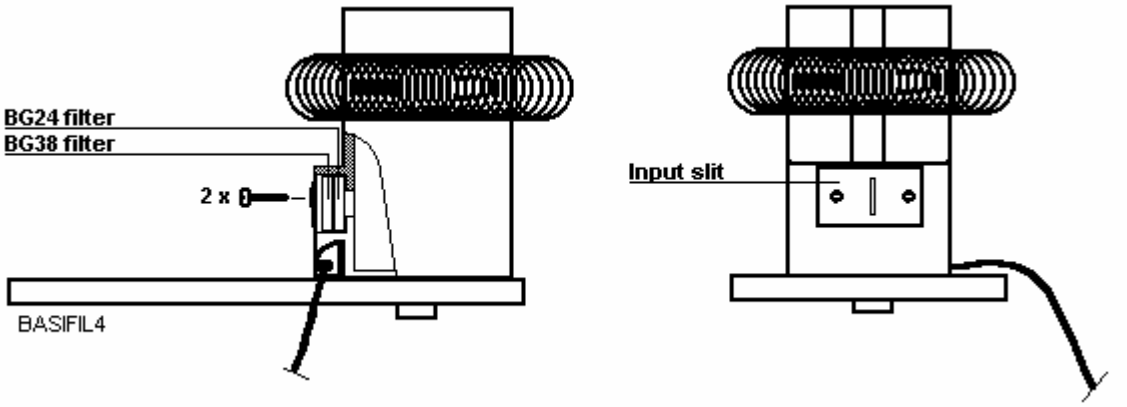


.Fig. 44 How to set the filter holder

- Replace the lamp by following the drawing at the bottom of the lamp compartment.
- Replace the cuvette holder**{**XE "Cuvette holder"**}**.
- Do not tighten firmly the 4 screws.
- Verify optical alignment**{**XE "Optical alignment"**}**.
See paragraph 10.2 **"OPTICAL ALIGNMENT"** page 61

9.10.3.2 New BASIC analyzer version

BASIC analyzer which serial number superior to 565 (except serial number 569, 570, 574).



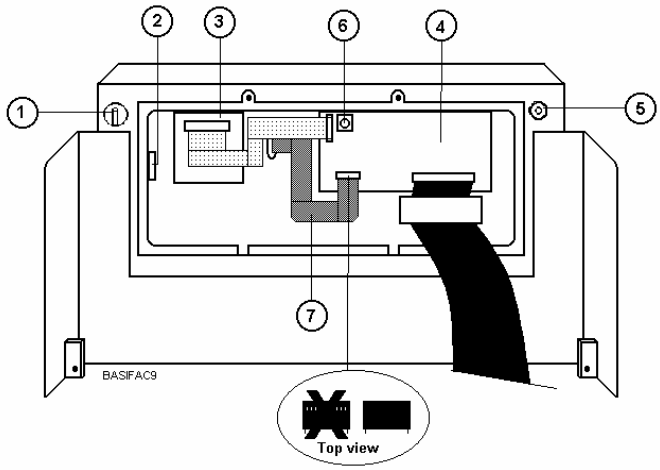
.Fig. 45 How to change filters on new BASIC version.

1 BG24 filter (Ref: 0O9032).
2 BG38 filter (Ref: 0O9046).

- Remove two screws which hold the input slit
- Remove the filters.
- Clean thoroughly the holder.
- Remove any finger trace from the filters.
- Put in order BG24 filter, BG 38 filter as shown on drawing above.
- Replace input slit.
- Replace the cuvette holder**{**XE "Cuvette holder"**}**.
- Do not tighten firmly the 4 screws.
- Verify optical alignment**{**XE "Optical alignment"**}**.

See paragraph 10.2 **"OPTICAL ALIGNMENT"** page 61

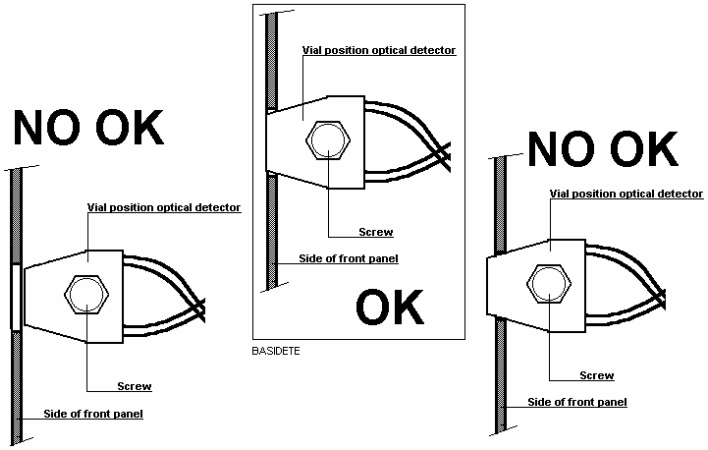
9.11 FRONT PANEL SPARE PARTS REPLACING



.Fig. 46 Front panel items

1 – SUCTION TUBE GUIDE.
2 – VIAL POSITION OPTICAL DETECTOR REF: 0X6708.
3 – DISPLAY DOARD REF: 416391VB.
4 – INTERFACE BOARD REF: 0X6676.
5 – SENSIBILITY ADJUSTMENT OF VIAL POSITION DETECTOR REF: 0M6679.
6 – BACK LIT ADJUSTMENT
7 – KEYBOARD CABLE

9.11.1 VIAL POSITION OPTICAL DETECTOR REPLACING



.Fig. 47 How to set the vial position optical detector**{**XE "Optical detector"**}**

VIAL POSITION OPTICAL DETECTOR → REF: 0X6708.

This reference includes the potentiometer**{**XE "Potentiometer"**}** which adjust the sensibility of this detector
- Install the vial position optical detector**{**XE "Optical detector"**}** as describe on the drawing above; The extremity of this item must be level with the front panel side.
- Connect it on interface board**{**XE "Interface board"**}** (J5).

PROBLEM
No measurement is triggered off by the vial presence.

FIRST INTERVENTION
- Verify the item connection.
- Verify the setting of detector
- Turn the potentiometer{XE "Potentiometer"} which control the detector sensibility (5).

9.11.2 DISPLAY REPLACING

DISPLAY BOARD → REF: 416391VB.

- Center correctly the display{XE "Display"} board{XE "Display board"}.
- Connect it to the interface board{XE "Interface board"} (J2) and power supply board{XE "Power supply board"} (J15).

PROBLEM
Nothing on the display{XE "Display"}.

FIRST INTERVENTION
- Verify the item connection.
- Turn the potentiometer{XE "Potentiometer"} which control the back lit{XE "Back lit"} adjustment (6).

9.11.3 KEYBOARD REPLACING

KEYBOARD → REF: 0W6791.

- Switch on the BASIC
- Remove wrong keyboard{XE "Keyboard"}.
- Clean carefully the surface.
- Center correctly window{XE "Window"} keyboard{XE "Keyboard"} around switch on display{XE "Display"}.
- Stick the keyboard{XE "Keyboard"}.
- Connect it to the interface board{XE "Interface board"} (J1). Be careful to the setting way (see drawing above).

PROBLEM
No answer from the keyboard{XE "Keyboard"}

FIRST INTERVENTION
- Verify the item connection.

9.11.4 INTERFACE BOARD REPLACING

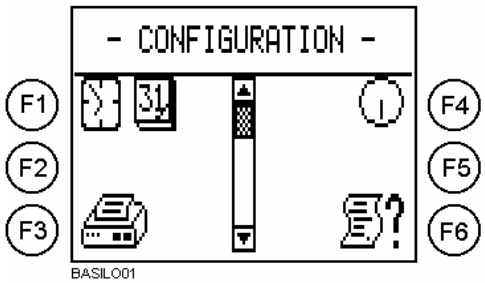
INTERFACE BOARD → REF: 0X6676.
Be careful when setting the board. Adjust its position in order that the potentiometer{XE "Potentiometer"} axis pass through the corresponding hole in front panel rear cover
- Connect the different items
J1 Keyboard{XE "Keyboard"}.
J2 Display{XE "Display"} board{XE "Display board"}.
J3 Nothing.
J4 Microprocessor board{XE "Microprocessor board"}.
J5 Vial position optical detector{XE "Optical detector"}.

PROBLEM
Problem when switch on
FIRST INTERVENTION
- Verify the items connections.

10 ADJUSTMENTS AND CONTROLS

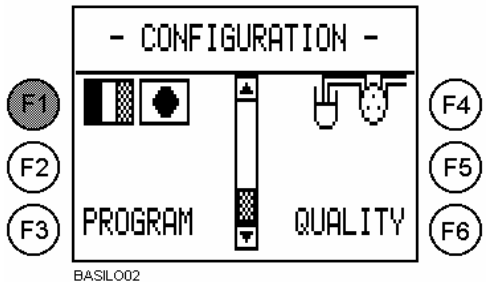
10.1 HOW TO ENTER IN TEST PROGRAM

- Press “Conf” key. It displays:



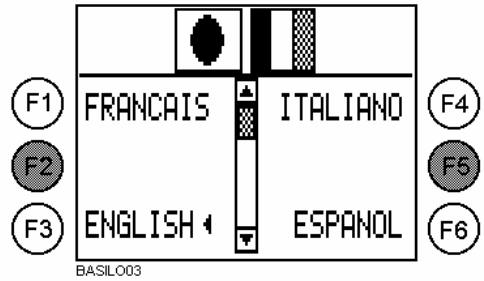
BASILO01

- Press the down arrow key from the navigator.



BASILO02

- Press “F1” key.

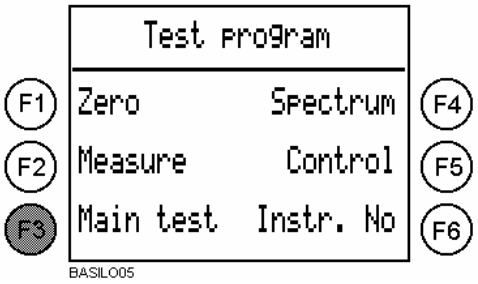


BASILO03

- Press “F5” key, then “F2” key

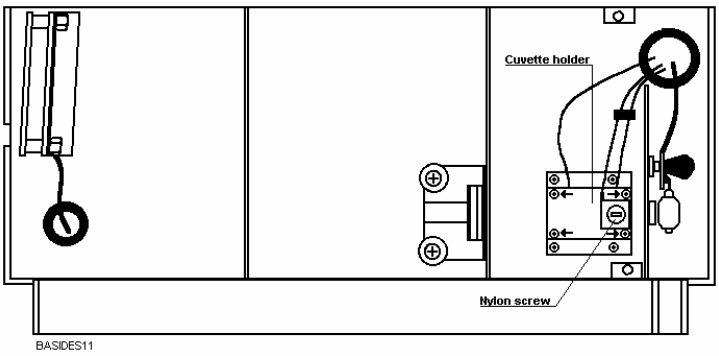
BASILO04

- Press “F3” key



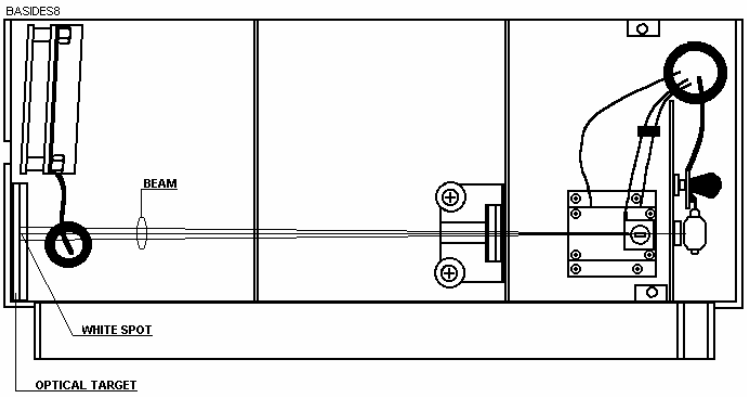
BASILO05

10.2 OPTICAL ALIGNMENT



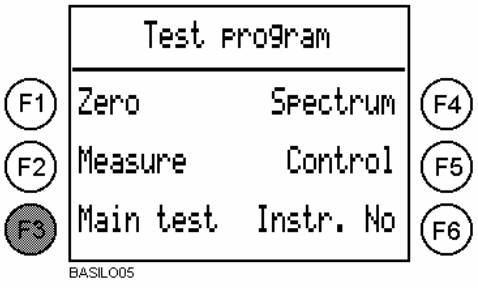
.Fig. 48 How to move the Peltier effect{XE "Peltier effect"}

- Unscrew four screws shown by arrows
IMPORTANT: When you move cuvette holder{XE "Cuvette holder"}, push it against the nylon screw{XE "Nylon screw"}.

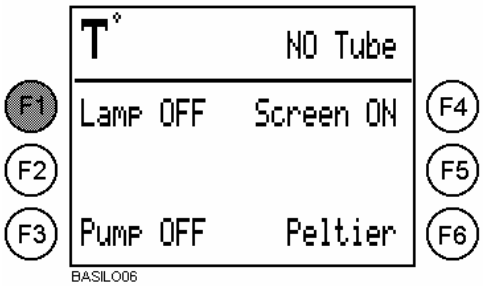


.Fig. 49 Optical target{XE "Optical target"} setting.

- Insert the optical target{XE "Optical target"} as shown above.
From the main menu
- From the following screen::

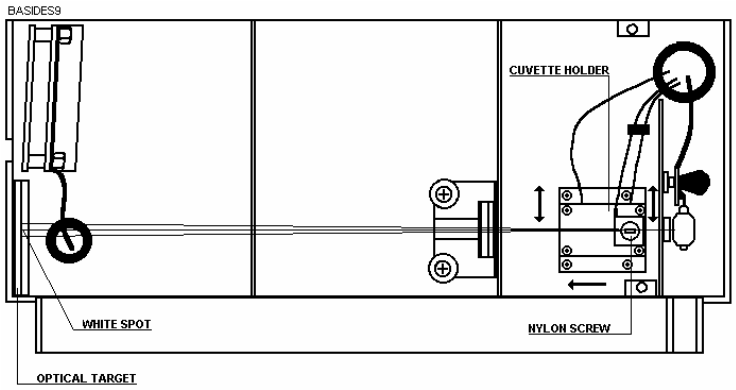


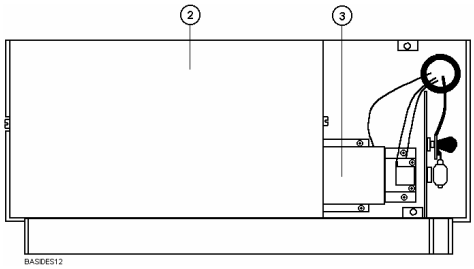
- Press “F3”.



- Press “F1” to switch on the halogen lamp{XE "Halogen lamp"}.

WARNING: THE HALOGEN LAMP CAN NOT BE SWITCH ON MORE THAN 15 SECONDES CONSECUTIVELY. OVER THAT TIME THE POWER SUPPLY WILL BE DAMAGED.





.Fig. 50 Cuvette holder{XE "Cuvette holder"} adjustement

- Align the white spot (zero order of the beam{XE "beam"}{XE "Beam"}) straight in the center of optical target{XE "Optical target"} by moving the cuvette holder{XE "Cuvette holder"}.
- Place the cuvette holder{XE "Cuvette holder"} thoroughly on the left (against nylon screw{XE "Nylon screw"}).
- Move up and down with both hands slowly.

Warning: the cuvette holder{XE "Cuvette holder"} doesn’t rotate.

- Observe that the white spot goes through the center of optical target{XE "Optical target"}.
- Tighten (not strongly because Peltier effect{XE "Peltier effect"} could be destroy) cuvette holder{XE "Cuvette holder"} four screws.
- Remove the optical target{XE "Optical target"}.
- Fix the cover marked 3.
- Put the cover marked 2 without fix it.
- Verify wavelengths adjustment

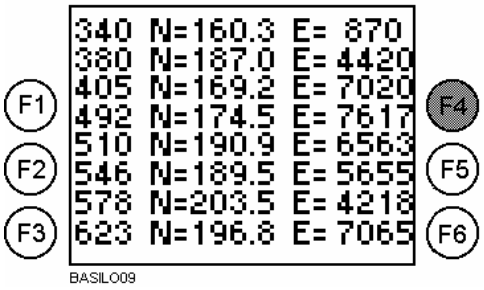
See paragraph 10.3 **“WAVELENGTH CONTROL AND ADJUSTMENT”** page 63.

10.3 WAVELENGTH CONTROL AND ADJUSTMENT

From this screen:

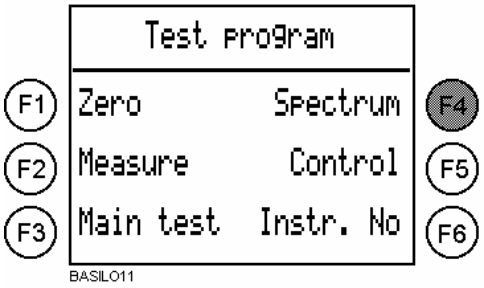
- Press “F3” key

- Press “F1” to perform the zero on the air.

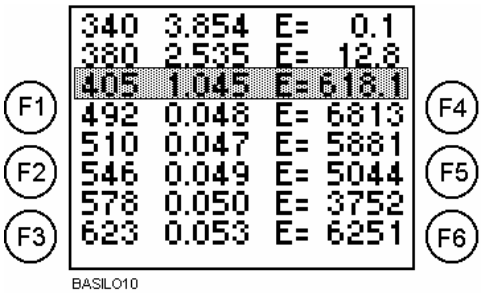


The machine reads the energy**{**XE "Energy"**}** at the 8 wavelengths. The screen displays for each wavelength**{**XE "Wavelength"**}** the dark energy**{**XE "Dark energy"**} N** (with the lamp off) and the delta of energy **E** between the dark energy and the energy measured with the lamp ON.

- Press”F4”.



- Insert, in cuvette holder**{**XE "Cuvette holder"**}**, standard GG420 filter**{**XE "Filter"**}** (ref: 406717).
- Press “F4”.

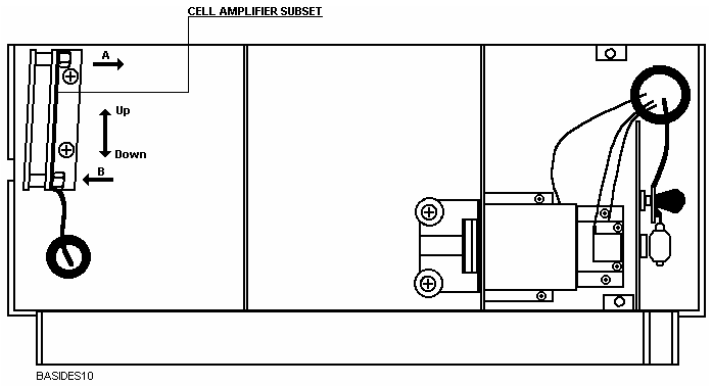


The machine reads the absorbance**{**XE "Absorbance"**}** at the 8 wavelengths and displays for each wavelength**{**XE "Wavelength"**}** the absorbance and the energy**{**XE "Energy"**}** E.

Variation range

Minimum value permitted	Value from the test	Maximum value permitted
0.950	Absorbance**{**XE "Absorbance"**}**	1.050

If the absorbance**{**XE "Absorbance"**}** value is out of range, move up and down the cell amplifier subset.
WARNING: When cell amplifier subset is moved, it is important that it keeps the special gradient shown by arrows A and B



.Fig. 51 How to adjust cell amplifier subset position

- Unscrew the two screws which hold cell amplifier subset

Absorbance{XE "Absorbance"} value > 1.050

- Move cell amplifier subset up.
- Tighten the two screws.
- Restart the control sequence.

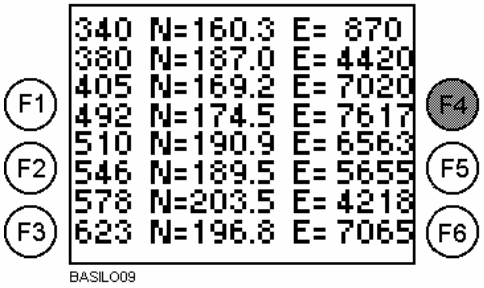
Absorbance{XE "Absorbance"} value < 0.950

- Move cell amplifier subset down.
- Tighten the two screws.
- Restart the control sequence.

10.4 ABSORBANCE CHECKING

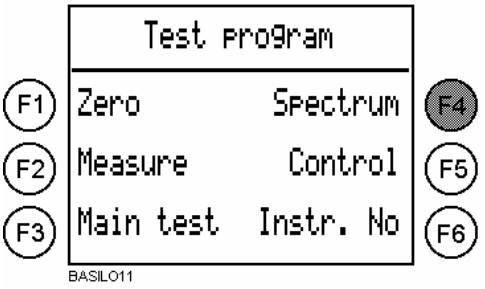
BASILO08

- Press “F1” to perform the zero on the air.



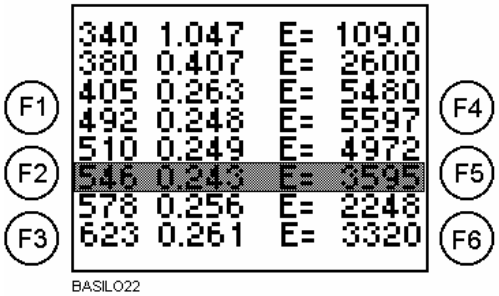
BASILO09

The machine reads the energy**{**XE "Energy"**}** at the 8 wavelengths.
- Press”F4”.



BASILO11

- Insert, in cuvette holder**{**XE "Cuvette holder"**}**, neutral filter**{**XE "Filter"**}** F2 (from neutral filters set ref: 404513).
- Press “F4”.



BASILO22

The machine reads the absorbance**{**XE "Absorbance"**}** at the 8 wavelengths and displays for each wavelength**{**XE "Wavelength"**}** the absorbance and the energy**{**XE "Energy"**}** E.

- Write down the absorbance{XE "Absorbance"} value for 546 nm (ex: 0.243).
- Press “F4”.
- Insert, in cuvette holder{XE "Cuvette holder"}, neutral filter{XE "Filter"} F3 (from neutral filters set ref: 404513).
- Press “F4”.
- Write down the absorbance{XE "Absorbance"} value for 546 nm.
- Press “F4”.
- Insert, in cuvette holder{XE "Cuvette holder"}, neutral filter{XE "Filter"} F4 (from neutral filters set ref: 404513).
- Press “F4”.
- Write down the absorbance{XE "Absorbance"} value for 546 nm.

Variation range

Minimum value permitted	Value from the test	Maximum value permitted
0.227	F2 absorbance{XE	0.249
0.516	F3 absorbance{XE	0.544
0.912	F4 absorbance{XE	0.950

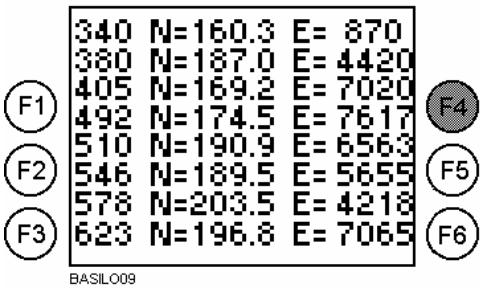
PROBLEM
Absorbance{XE "Absorbance"} values of neutral filters are out of range

FIRST INTERVENTION

- Verify optical alignment{XE "Optical alignment"}.
- Clean optical components (grating, lens{XE "Lens"}).

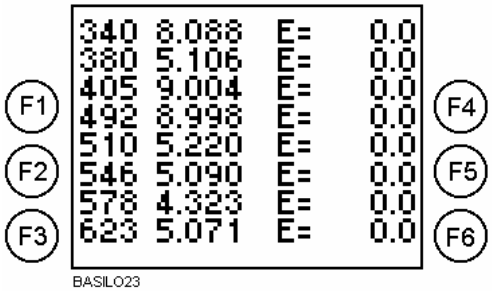
10.5 BACKGROUND NOISE CHECKING

- Press “F1” to perform the zero on the air.



The machine reads the energy{XE "Energy"} at the 8 wavelengths.
- Press”F4”.

- Cut the beam{XE "beam"}{XE "Beam"} in cuvette holder{XE "Cuvette holder"}.
- Press “F4”.



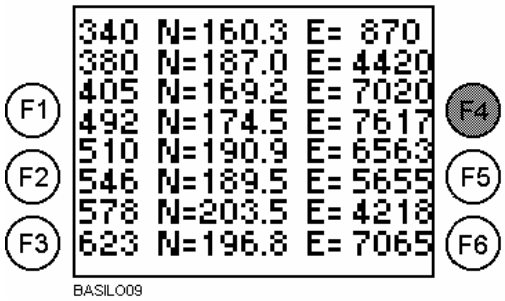
The machine reads the absorbance{XE "Absorbance"} at the 8 wavelengths and displays for each wavelength{XE "Wavelength"} the absorbance and the energy{XE "Energy"} E.

Variation range

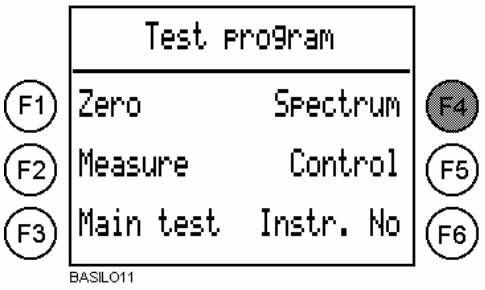
Minimum value permitted	Value from the test	Maximum value permitted
2.300	Absorbance{XE "Absorbance"} for every	-,---

10.6 STRAYLIGHT CHECKING

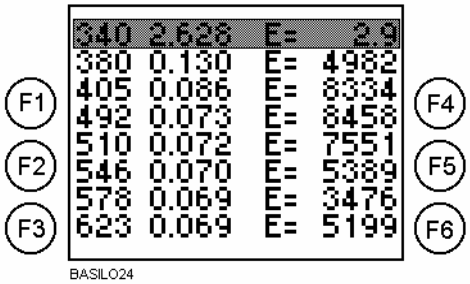
- Press “F1” to perform the zero on the air.



The machine reads the energy{XE "Energy"} at the 8 wavelengths.
- Press”F4”.



- Insert, in cuvette holder{XE "Cuvette holder"}, straylight{XE "Straylight"} filter{XE "Filter"} at 340 nm (ref: 404686).
- Press “F4”.



The machine reads the absorbance{XE "Absorbance"} at the 8 wavelengths and displays for each wavelength{XE "Wavelength"} the absorbance and the energy{XE "Energy"} E.

Variation range

Minimum value permitted	Value from the test	Maximum value permitted
2.300	Absorbance{XE "Absorbance"} at 340 nm	-,---

PROBLEM
Absorbance{XE "Absorbance"} value of straylight{XE "Straylight"} filter{XE "Filter"} is out of range

FIRST INTERVENTION

- Verify optical alignment{XE "Optical alignment"}.
- Clean optical components (grating, lens{XE "Lens"}).

10.7 TEMPERATURE CHECKING

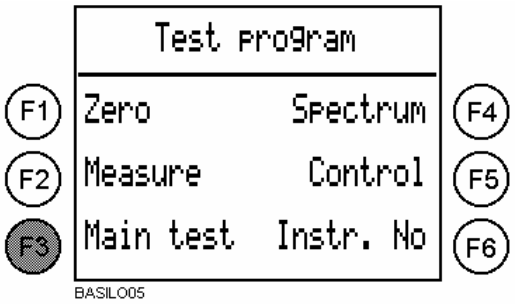
10.7.1 TEMPERATURE CYCLE EXPLANATION

When temperature{XE "Temperature"} is setting (ex: 37°C)
- The Peltier effect{XE "Peltier effect"} begins to heat.
- The inscription 37°C on the BASIC display{XE "Display"} is flashing (one time ON, one time OFF).
- Between 40s and 80s, the temperature{XE "Temperature"} sensor{XE "Temperature sensor"} detects when the Peltier effect{XE "Peltier effect"} has reach its temperature (It depends on room temperature and the previous cuvette holder{XE "Cuvette holder"} temperature).
- The temperature{XE "Temperature"} regulation{XE "Temperature regulation"} around set point starts.

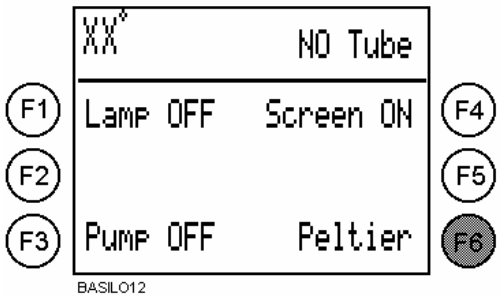
Then BASIC adds an additional time to permit to the cuvette holder{XE "Cuvette holder"} and flow-through cell to reach the correct temperature{XE "Temperature"}.
This additional time will be around 15 mn, it will be add to the Peltier effect{XE "Peltier effect"} initial heating time in order to have a total time of 1000s (up to the EPROM{XE "EPROM"} V1.18 version).

- During this time, the inscription 37°C is flashing in different way (two times ON, one time OFF).
When the inscription stops flashing the cuvette holder{XE "Cuvette holder"} and flow-through cell are at their correct temperature{XE "Temperature"}.
This total time is a safety time, especially in kinetic mode, to be sure that the first sample will be measure in good condition.
- Over this total time every measurement is very fast (approximately 8 seconds).
When you pass from one analysis to another, working at the same temperature{XE "Temperature"}, it will not be necessary to wait 15 minutes because the BASIC stay with the temperature of the previous analysis.

10.7.2 TEMPERATURE CHECKING



- From this screen press “F3”.
- Insert, in cuvette holder{XE "Cuvette holder"}, a plastic cuvette filled with 1250 µl of water. (**The cuvette used should not be a semi-micro cuvette**).



- Change the temperature{XE "Temperature"} by pressing “F6” key
- Set the temperature{XE "Temperature"} at 25°C
- Wait 20 minutes
- Use a digital thermometer with a small probe.
- Measure the temperature{XE "Temperature"} by introducing the probe inside the cuvette.
The probe must be at the bottom of the cuvette and on its left side.
- Wait 10 seconds to stabilize the temperature{XE "Temperature"}.
- Read the temperature{XE "Temperature"}.
- Restart with the other temperatures (30°C and 37°C)

Variation range

Minimum value permitted	Value from the test	Maximum value permitted
Nominal temperature{XE "Temperature"} - 0.8°C	Reading temperature{XE "Temperature"}	Nominal temperature{XE "Temperature"} + 0.8°C

PROBLEM
After checking the temperature{XE "Temperature"} is not correct

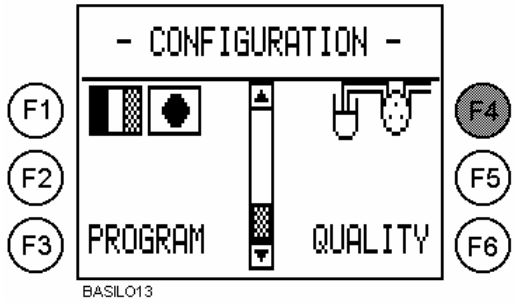
FIRST INTERVENTION

Reading temperature{XE "Temperature"} > set point temperature + 0.8°C
Add thermic silicone grease{XE "Silicone grease"} around temperature{XE "Temperature"} sensor{XE "Temperature sensor"} **without remove it** (bad thermic contact).

Reading temperature{XE "Temperature"} < set point temperature - 0.8°C
Remove a little bit of grease around temperature{XE "Temperature"} sensor{XE "Temperature sensor"} **without remove it.**

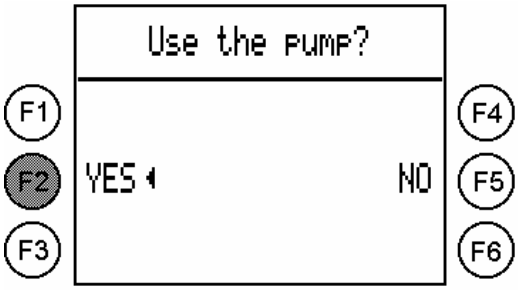
10.8 ASPIRATION ADJUSTMENT

- Verify that the length of suction tube{XE "Suction tube"} is **320 mm**
- Press “Conf” key
- Press down arrow key of the navigator.



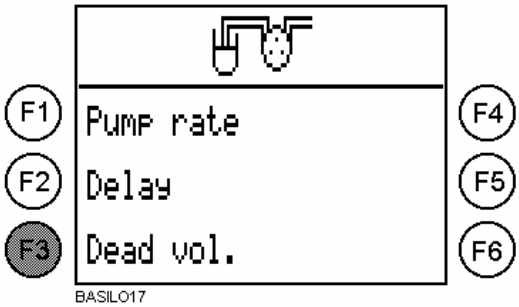
BASILO13

- Press “F4”.



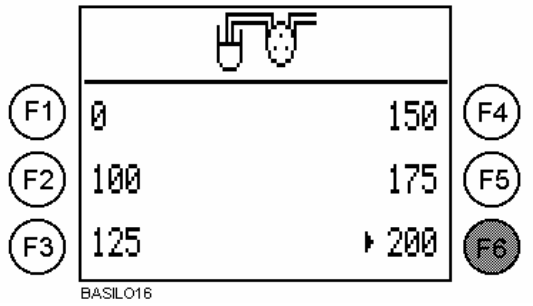
BASILO14

- Press “F2”.



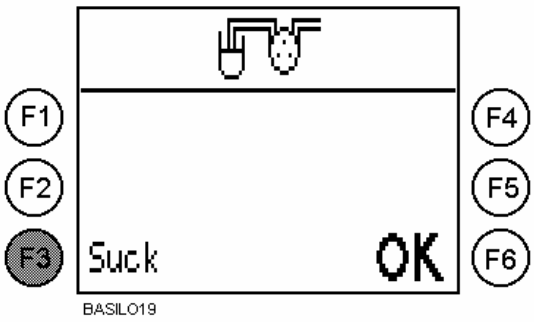
BASILO17

- Press “F3”.



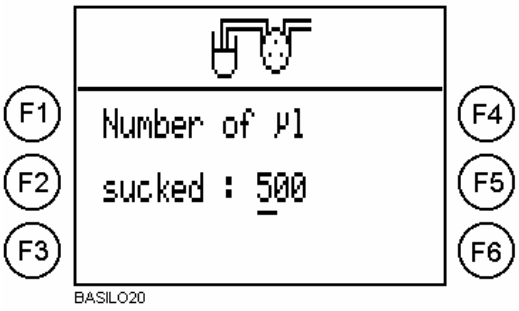
- Select **200µ**l for the dead volume**{**XE "Dead volume"**}**.

- Press “F1”.



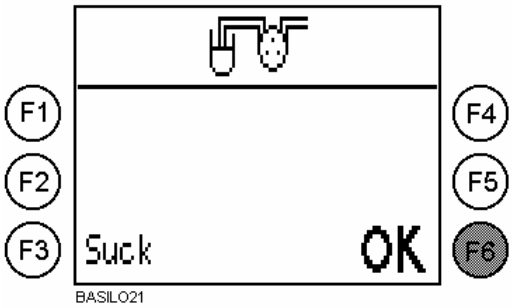
- Prepare a tube with distilled water.
- Aspirate 6 times in a row to empty completely the BASIC liquid circuit
- Press “F3”.

It aspirates 500 µl and then display**{**XE "Display"**}**:



- Press “Val” key.
- Repeat this operation 6 times.

- Prepare several tubes with 500µl of distilled water.
- Press “F3” to aspirate the 500µl.
After aspiration{XE "Aspiration"}, a drop of water (about 20 µl) should remain at the bottom.
- Enter the estimated value of distilled water aspirated.
- Press “Val” key.
- Press “F3” to aspirate the 500µl.
- Continue until it is OK.



- Press “F6” when it is OK.

10.9 CONTAMINATION CONTROL

Program analysis 64: (by ‘Configuration ', ‘Program ', 'Modify ')

Name	Validate
Aspiration{XE "Aspiration"} Volume	500
Temperature{XE "Temperature"}	37
Unit	%
Precision	X.X
Calculation Mode	Linear
Standard 1	100
Wavelength{XE "Wavelength"}	340
Analysis mode	End point (F1)
Limit Blank O.D	Validate
Limit of linearity	Validate
Normal High	Validate
Normal Low	Validate
Control Frequency	Validate

- Quit the configuration program
- Launch distilled water analysis.
- Launch analysis 64.
- Run the blank using distilled water
- Standardize with a potassium-bichromate solution which absorbance{XE "Absorbance"} at 340 nm is about 1 Abs.
- Measure twice in a row the distilled water
- Measure twice also of the standard.
- Note down the 4 values.

Example:	distilled water	A1 = 0.8
		A2 = 0.0
		% = 0.8
	Standard	A3 = 100.1
		A4 = 101.1
		% = 1.0

The contamination{XE "Contamination"} percentage is given by the difference of 2 aspirations of the same type: it must not exceed 2%.

PROBLEM
Contamination{XE "Contamination"} percentage exceed 2%.

FIRST INTERVENTION
Clean the tubings with 10% of hydrochloric acid and rinse thoroughly with distilled water or change tubings.

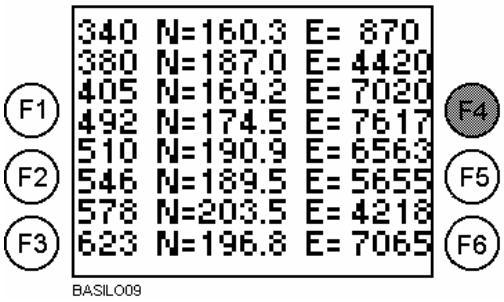
10.10 FLOW-THROUGH CUVETTE HEIGHT ADJUSTMENT

The distance between the window center of flow-through cuvette and its bottom is 8,5 mm. So, it is necessary to verify or to adjust the position of flow-through cuvette in cell holder in order that the beam pass through the center of its measurement windows.

To verify, proceed as follow:

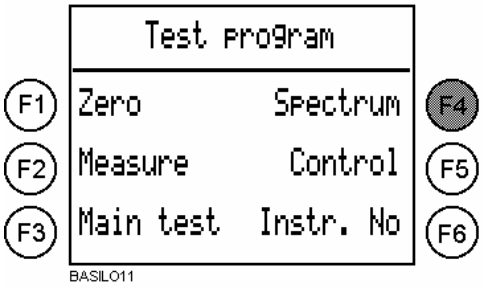
BASILO08

- Press “F1” to perform the zero on the air.



BASILO09

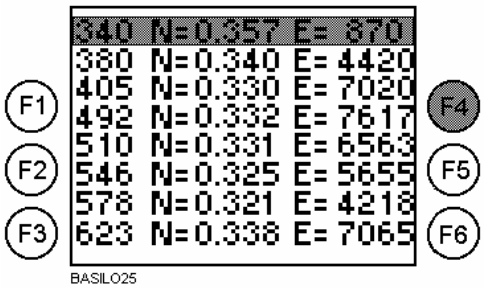
The machine reads the energy{XE "Energy"} at the 8 wavelengths.
- Press”F4”.



BASILO11

- Install the flow-through cuvette inside the cell holder.

- Press “F4”.



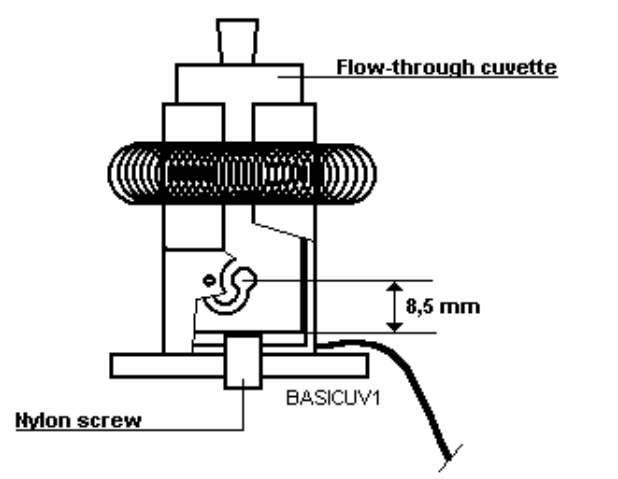
The analyzer read the absorbance value of the flow-through cuvette at every wavelength.

Variation range

Minimum value permitted	Value from the test at 340 nm	Maximum value permitted
	Absorbance{XE "Absorbance"} at	0.300

PROBLEM
Absorbance value of the flow-through cuvette at 340 nm is superior at 0.300 Abs.
The beam is not correctly center straight into the cuvette windows.

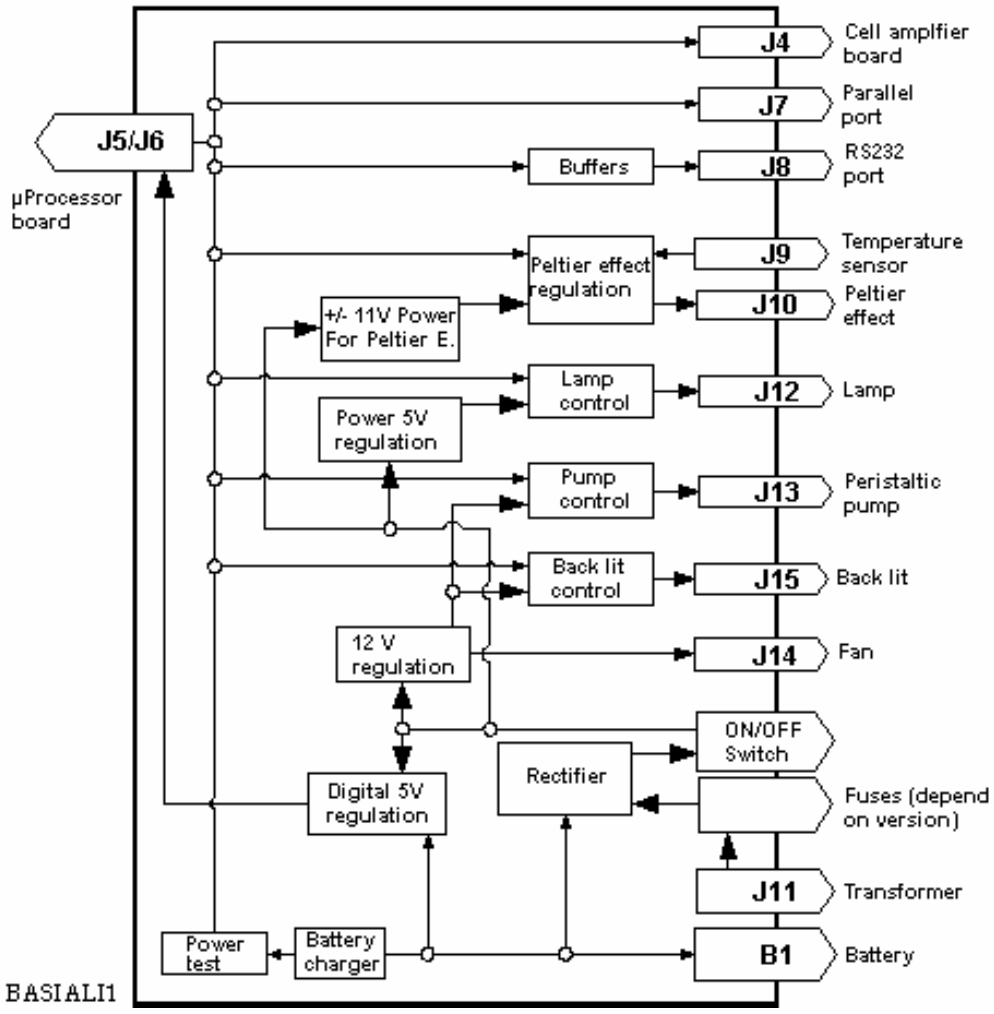
FIRST INTERVENTION



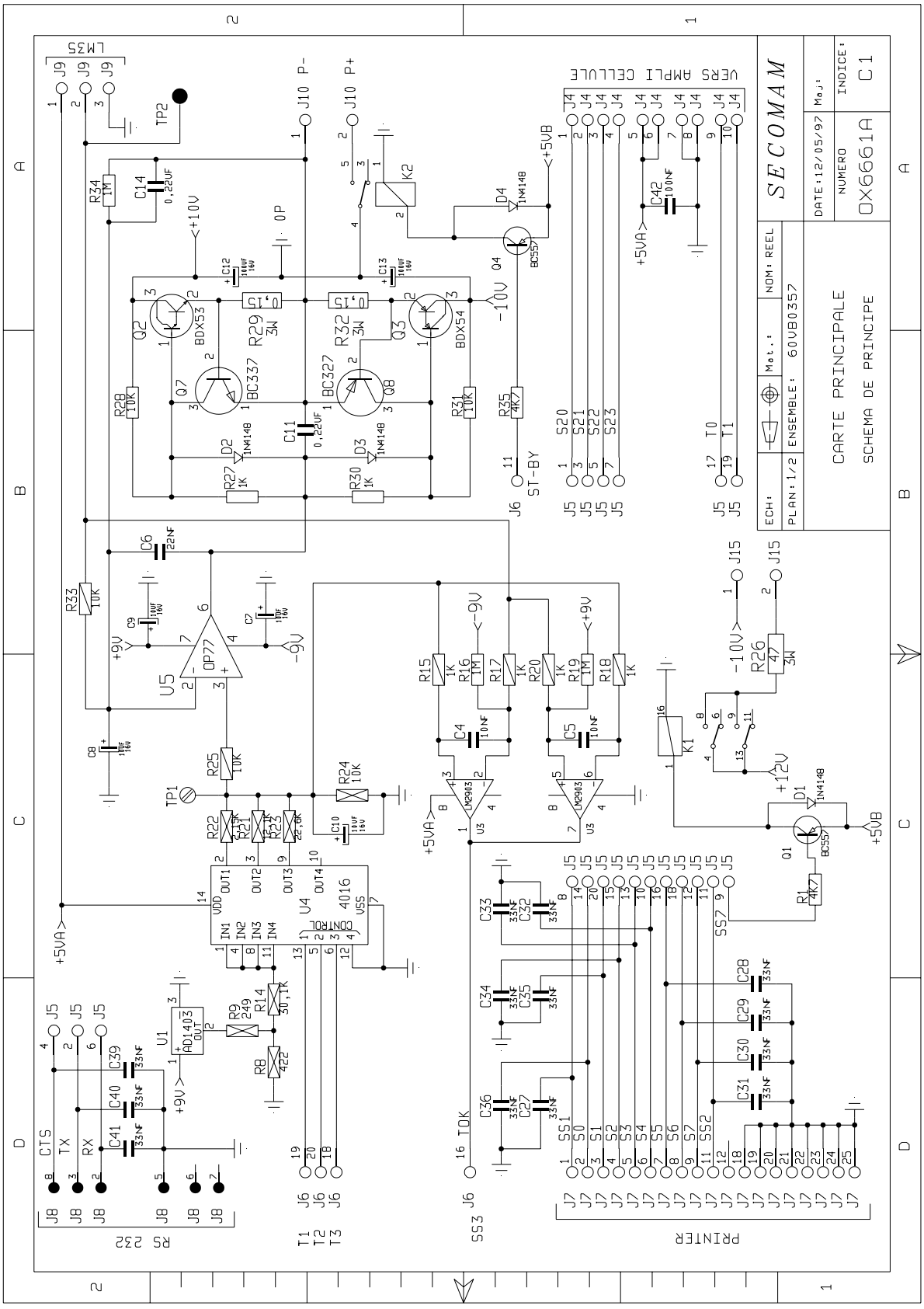
.Fig. 52 Flow-through cuvette height adjustment.

To adjust the flow-through cuvette height, proceed as follow:
- Remove the flow-through cuvette.
- Turn round a little bit the nylon screw with a screw driver.
- Re-install the flow-through cuvette.
- Re-measure its absorbance at 340 nm, proceeding as same manner as before.
- Try to find the minimum absorbance value (< 0.300 Abs).

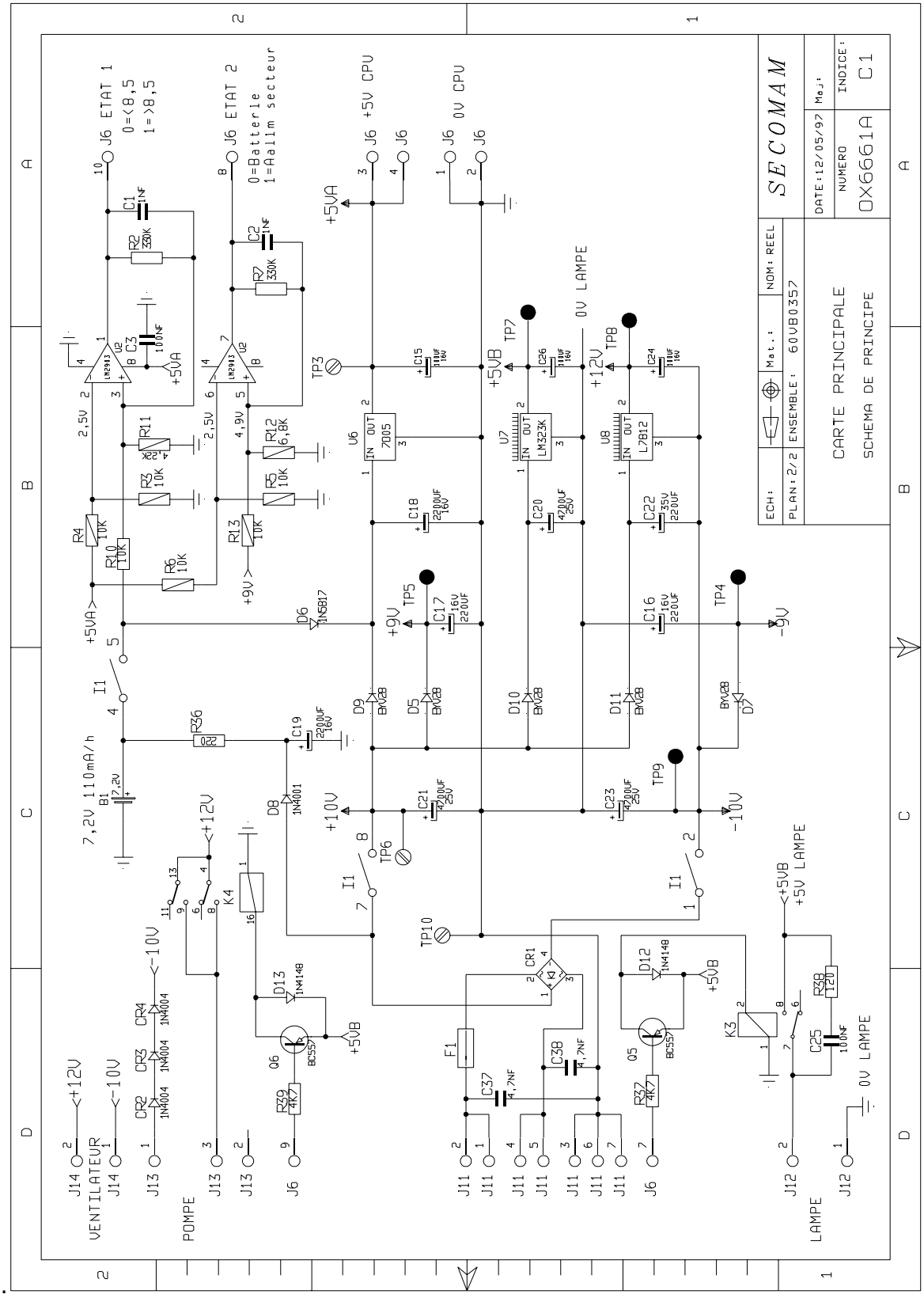
11 DRAWING



.Fig. 53 Schematique diagram of power supply board{XE "Power supply board"} (ref: 416662A).



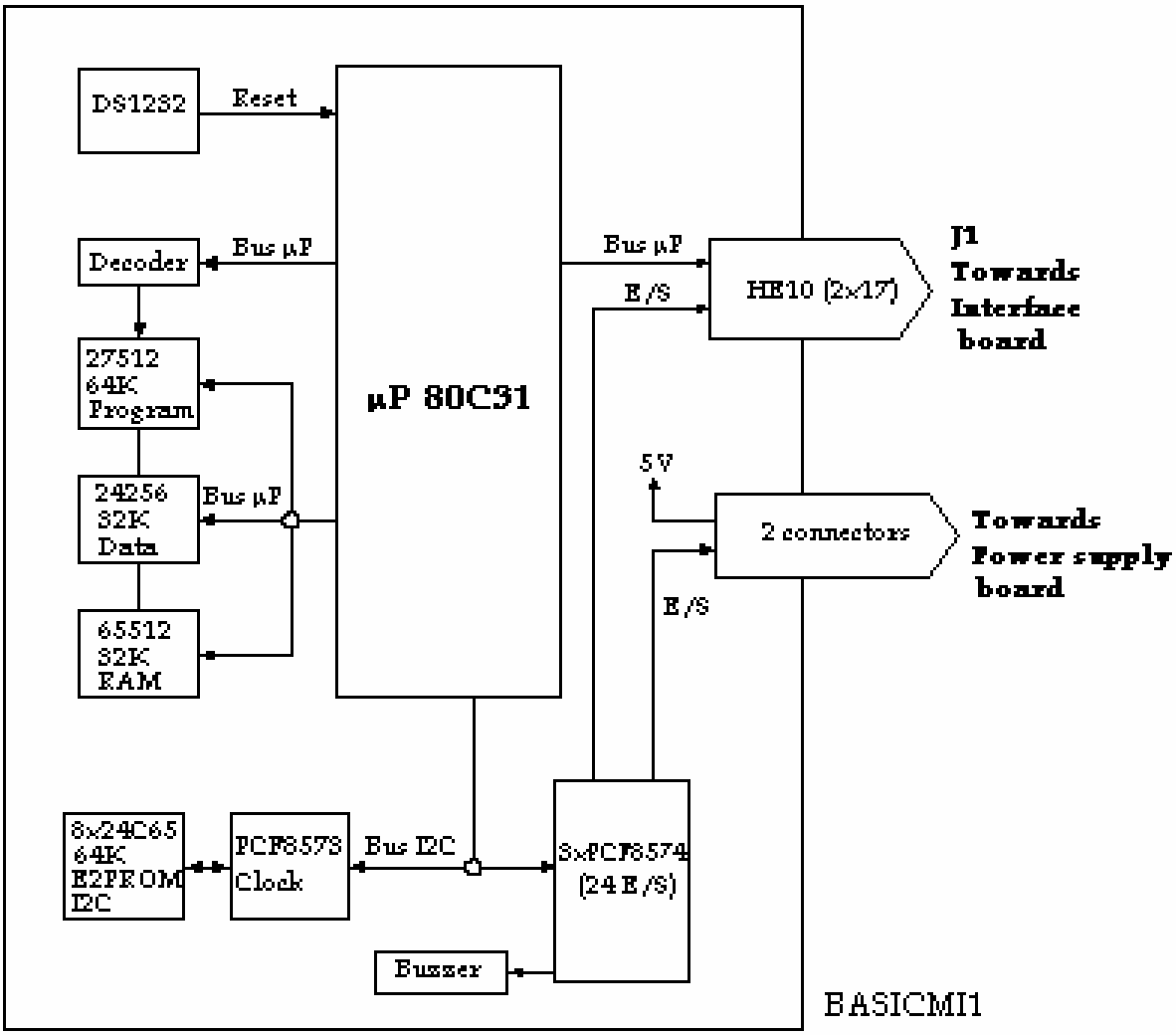
.Fig. 54 Electronic diagram 1/2of power supply board{XE "Power supply board"} (ref: 416662A).



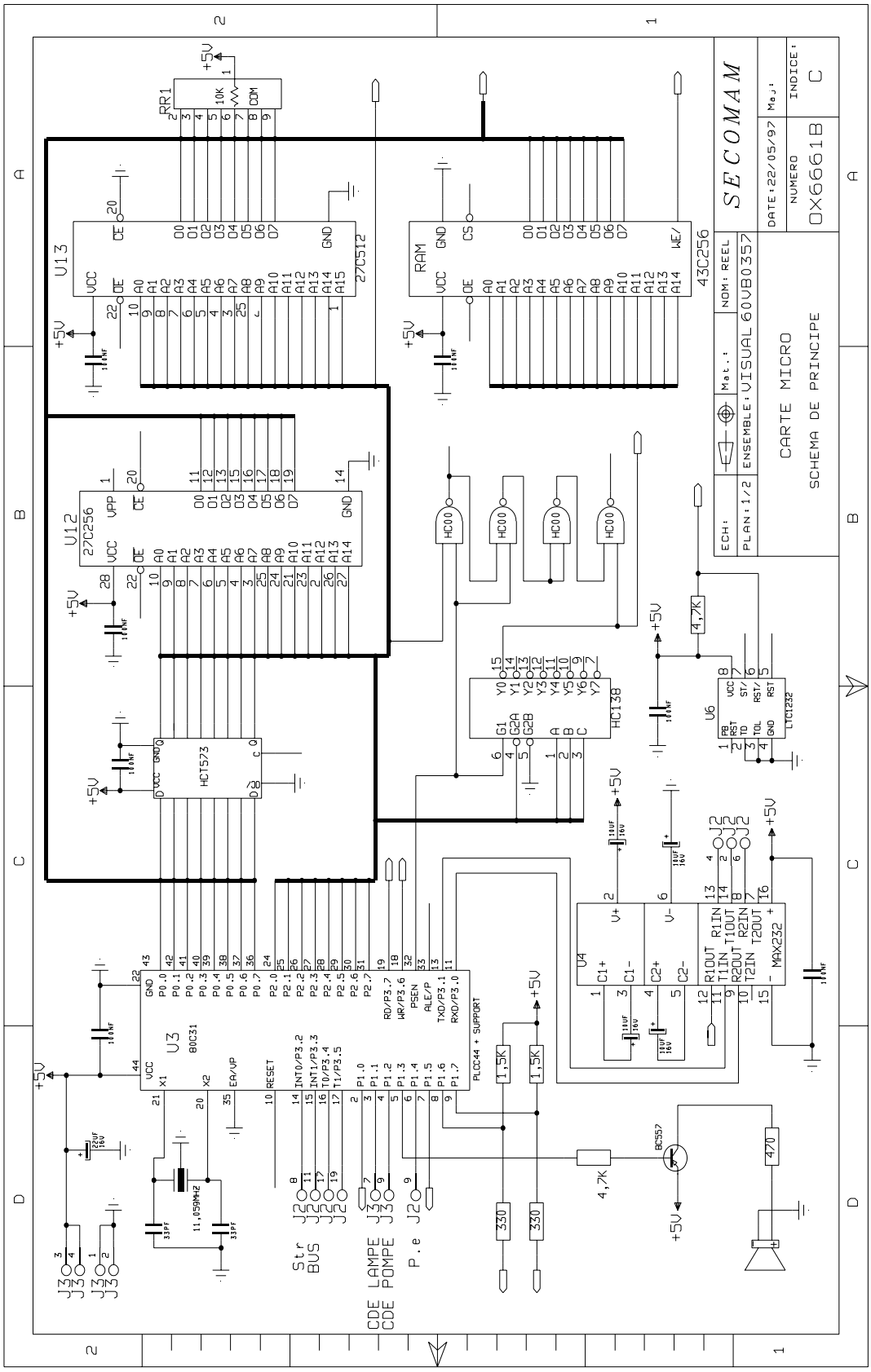
.Fig. 55 Electronic diagram 2/2 of power supply board{XE "Power supply board"} (ref: 416662A).

Name	Voltage	Current	Specif.	Test Point	Functions
+10V	+10 V DC +/- 3V	4A	Not regulated	TP6	Peltier driving
-10V	-10 V DC +/-3V	4 A	Not regulated	TP9	Peltier driving
+5VA	+5 V DC +/-0.2V	150 mA	Regulated	TP3	µP card (80 mA) Logic command
+5VB	+5 V DC +/-0.2V	2.5 A	Regulated	TP7	lamp (2A during 1 sec) relays
+9V	+9V +/-3V	100 mA	Not regulated	TP5	Peltier logical command
-9V	-V +/-3V	100 mA	Not regulated	TP4	Peltier logical command
+12V	+12 V +/-0.2V	450 mA	Regulated (referenced to -10V)	TP8	Fan{XE "Fan"} (100 mA) Display{XE "Display"} back-Lit (2°00 mA) Pump (150 mA)

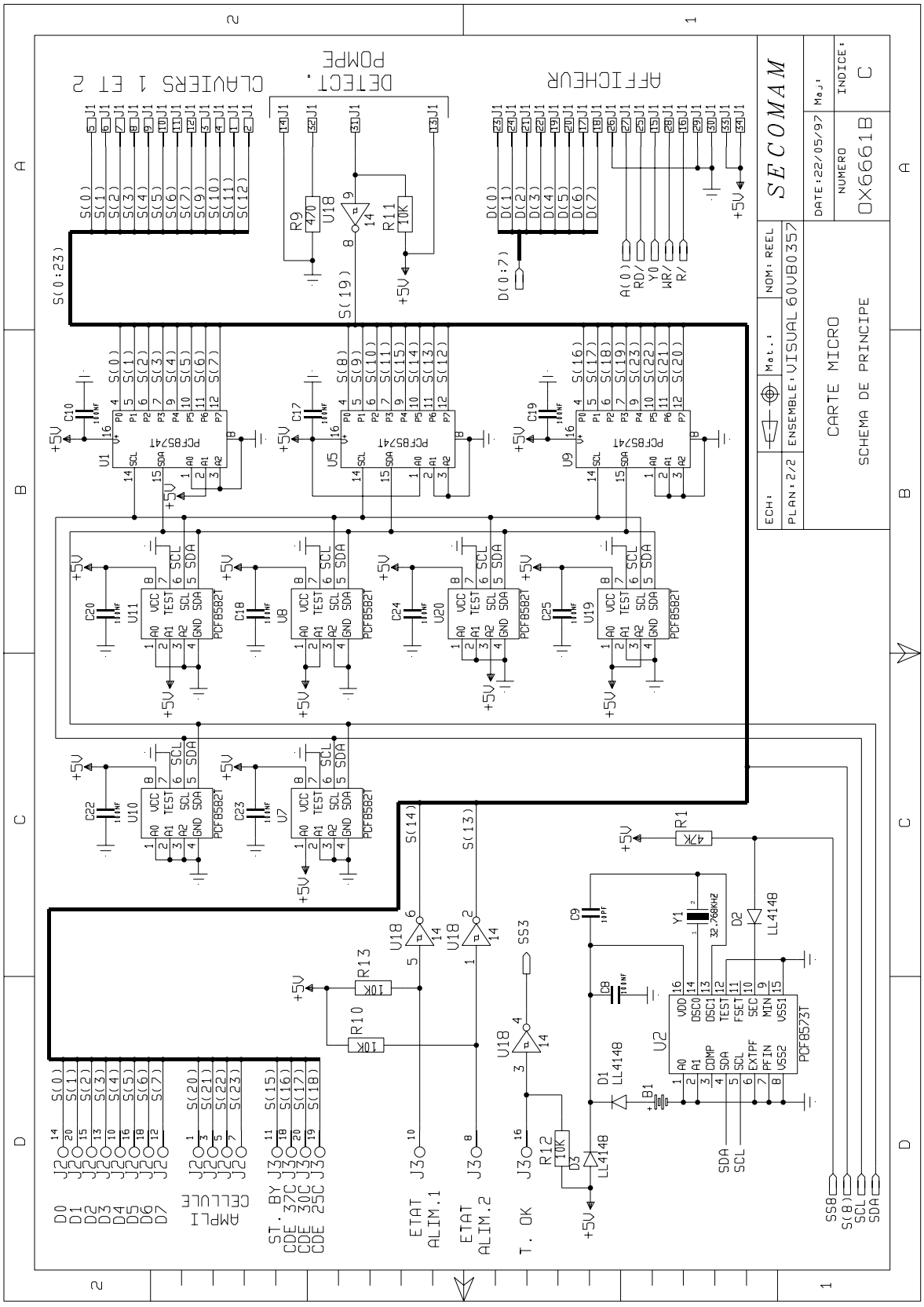
.Fig. 56 Power supply description.



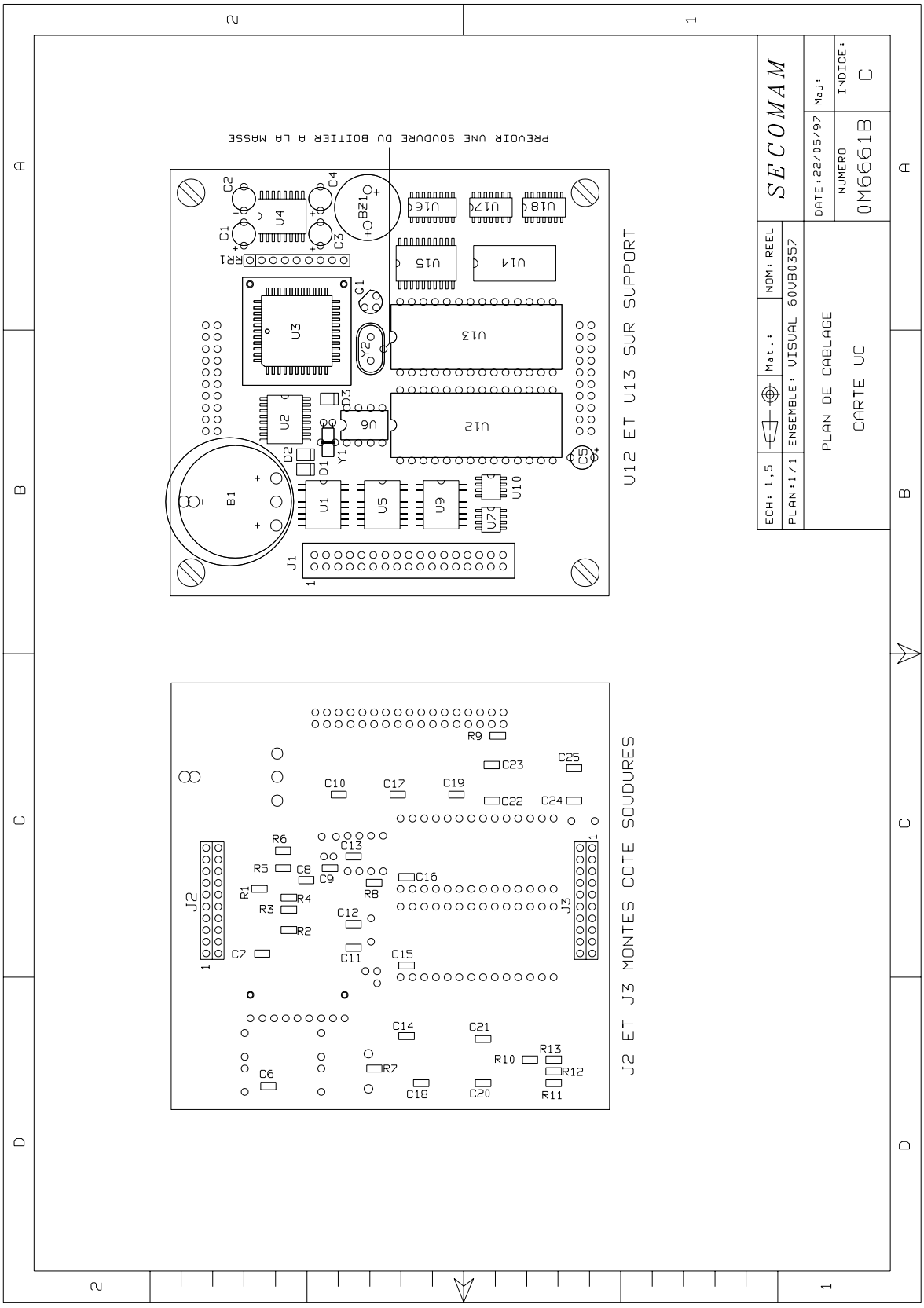
.Fig. 57 Schematic diagram of microprocessor board{XE "Microprocessor board"} (ref: 416662B).



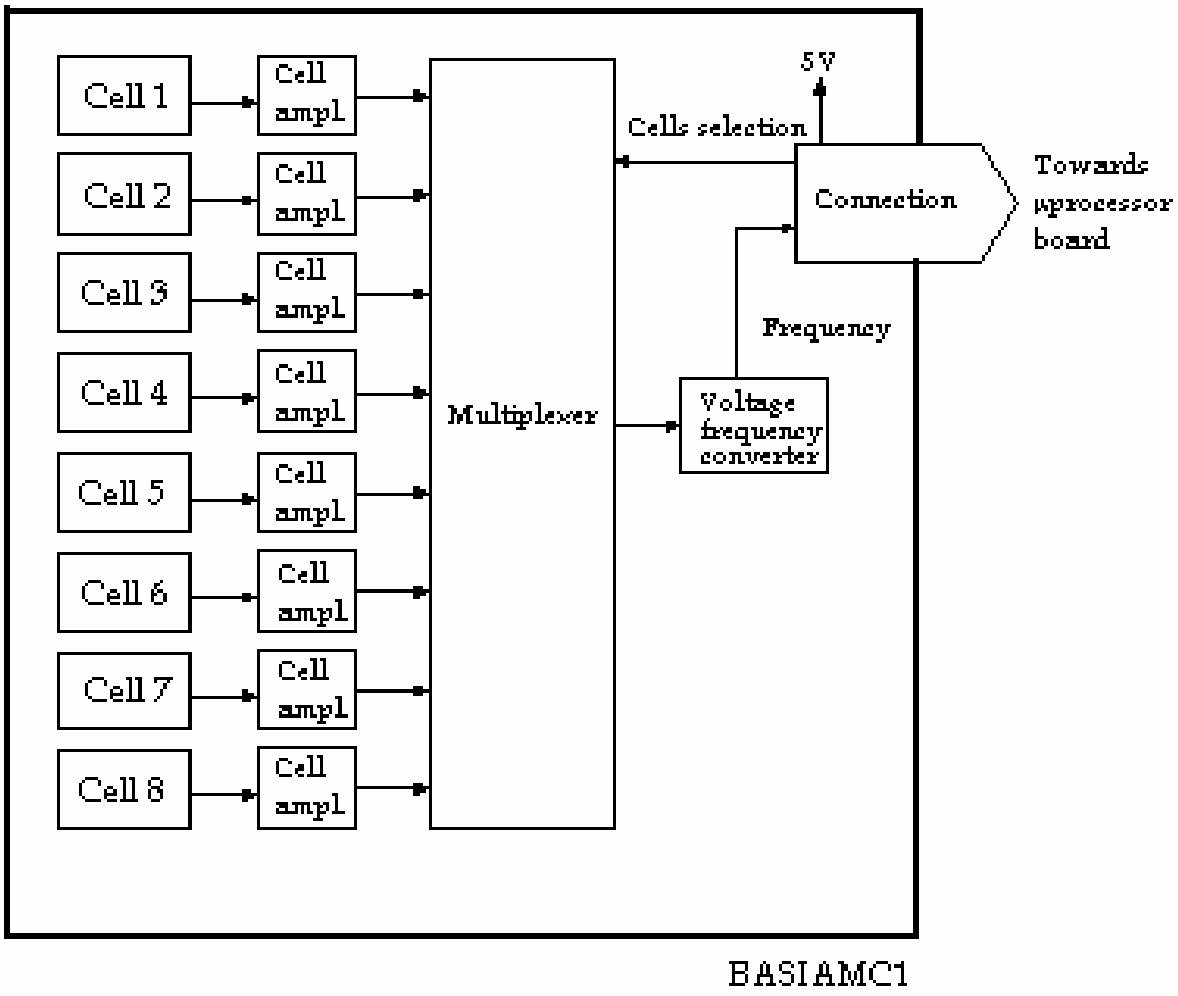
.Fig. 58 Electronic diagram 1/2of microprocessor board{XE "Microprocessor board"} (ref: 416662B).



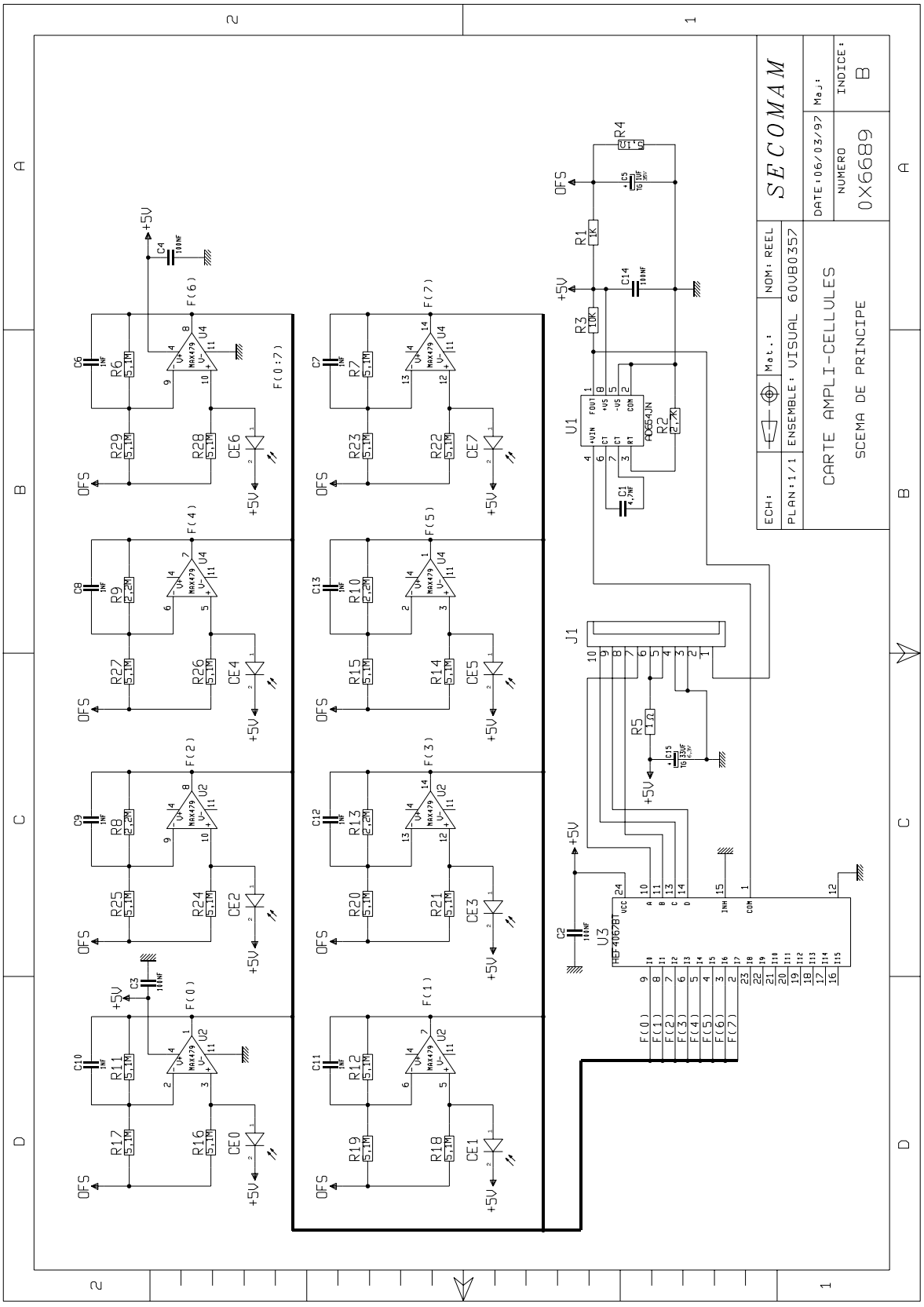
.Fig. 59 Electronic diagram 2/2of microprocessor board{XE "Microprocessor board"} (ref: 416662B).



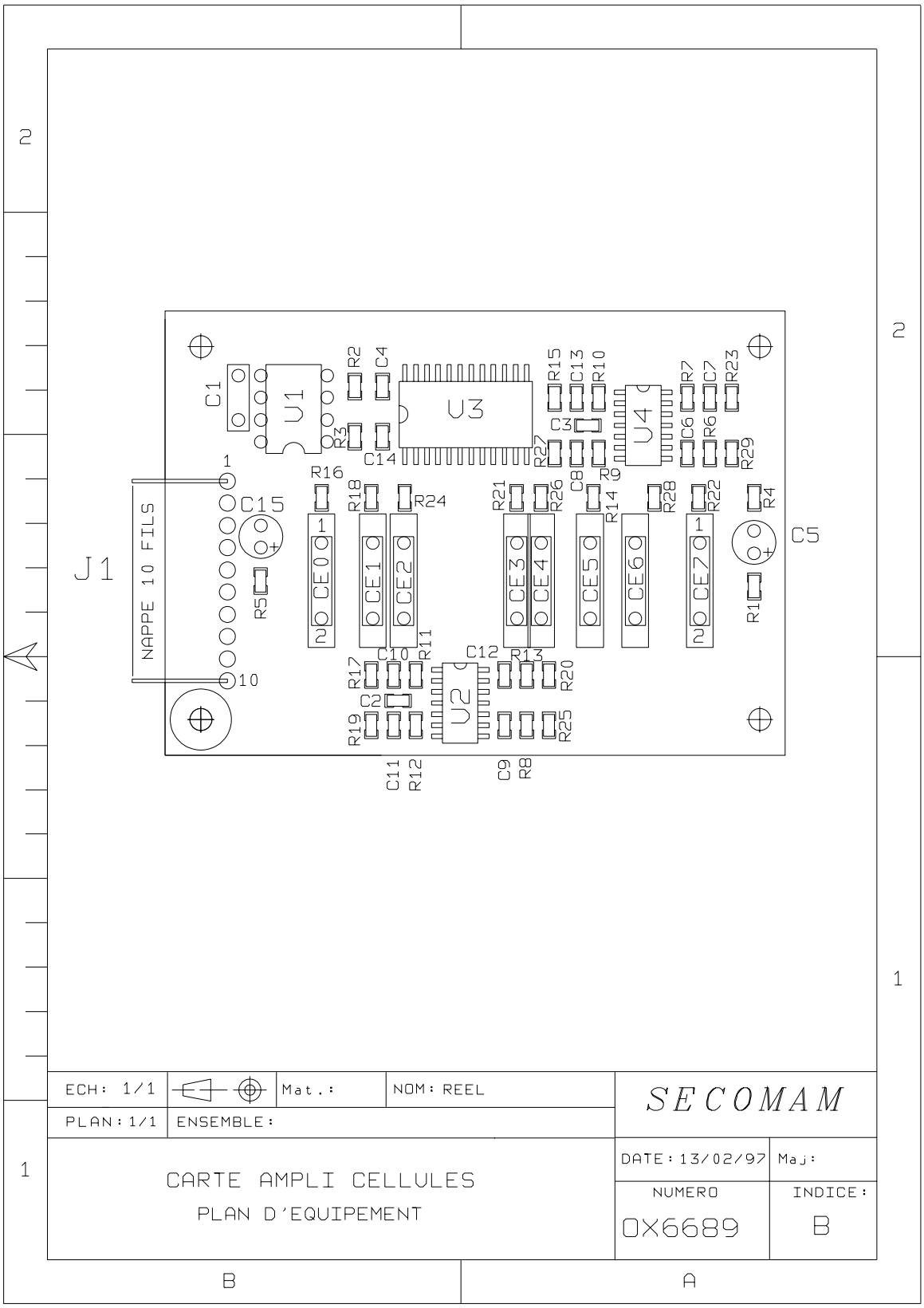
.Fig. 60 Components view of microprocessor board{XE "Microprocessor board"} (ref: 416662B).



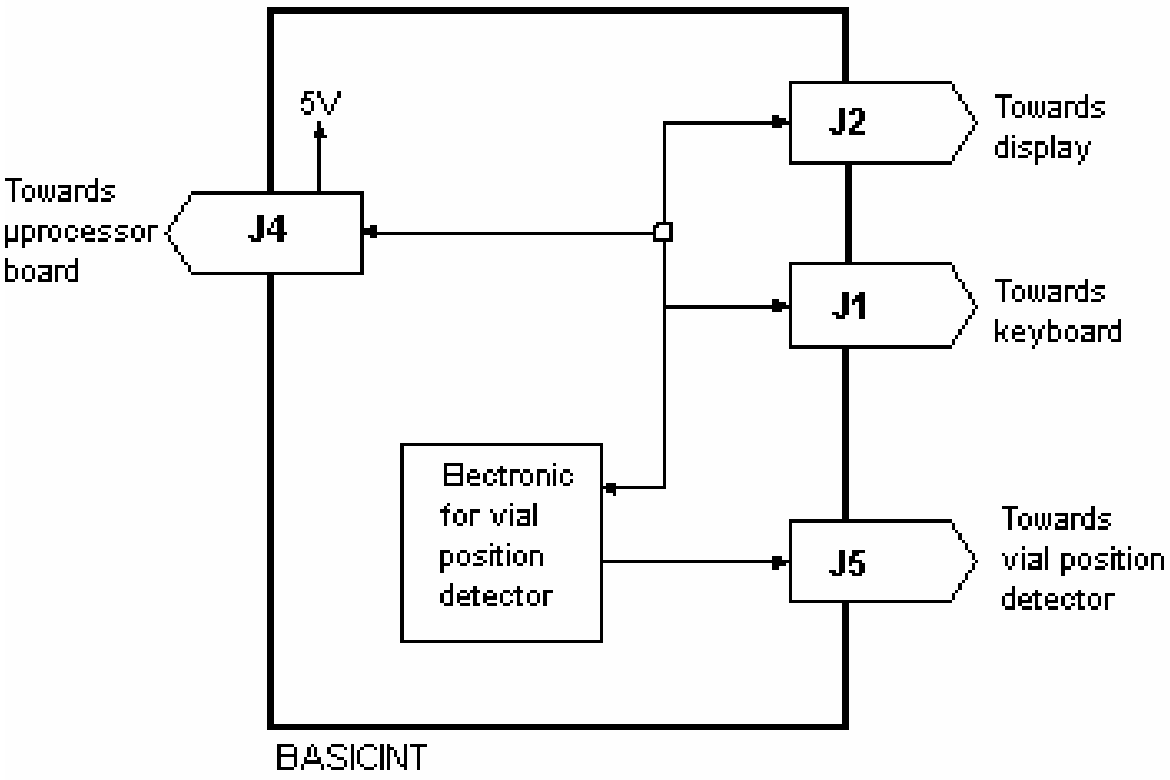
.Fig. 61 Schematic diagram of cells amplifier board (ref: 416689).



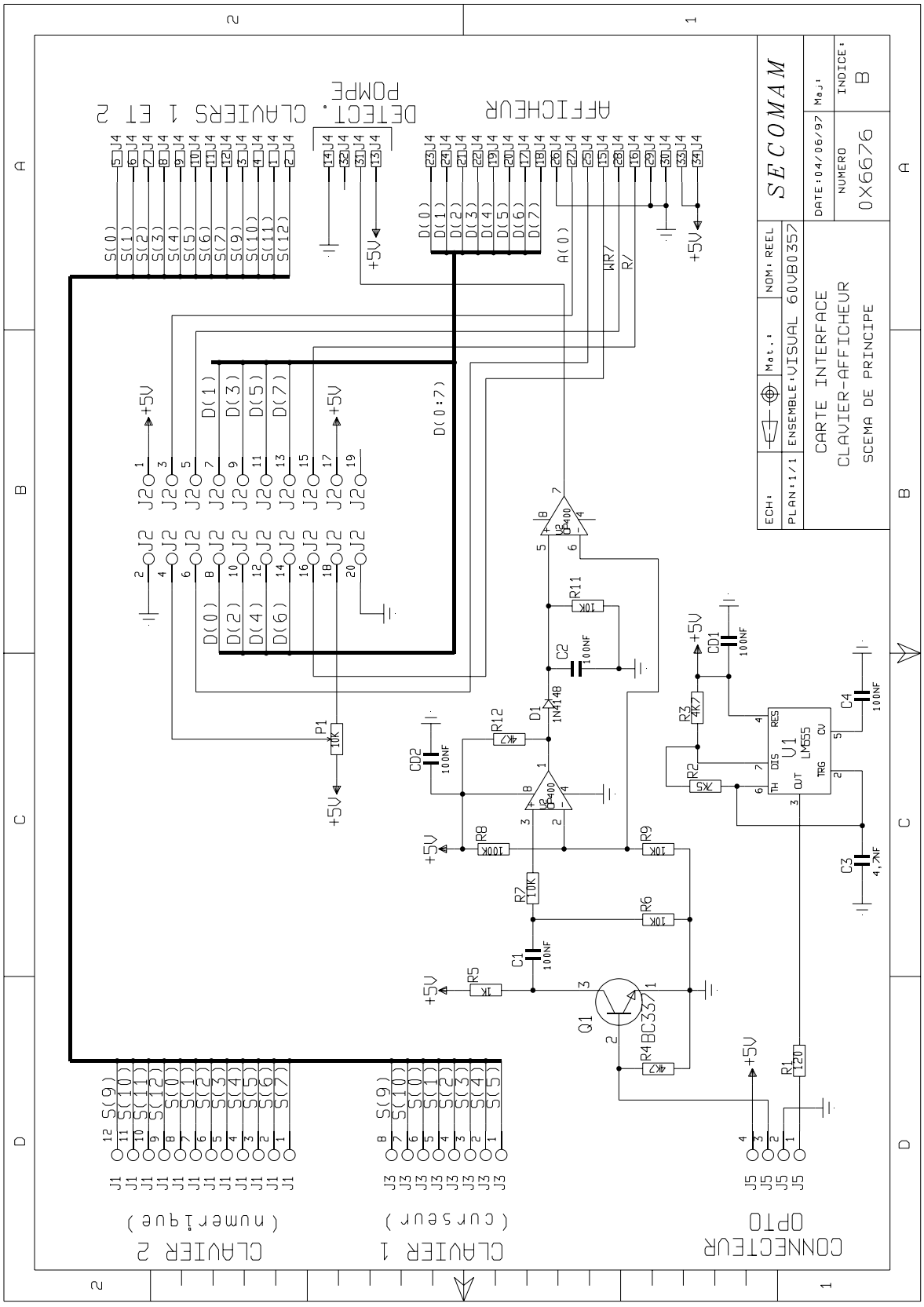
.Fig. 62 Electronic diagram of cells amplifier board (ref: 416689).



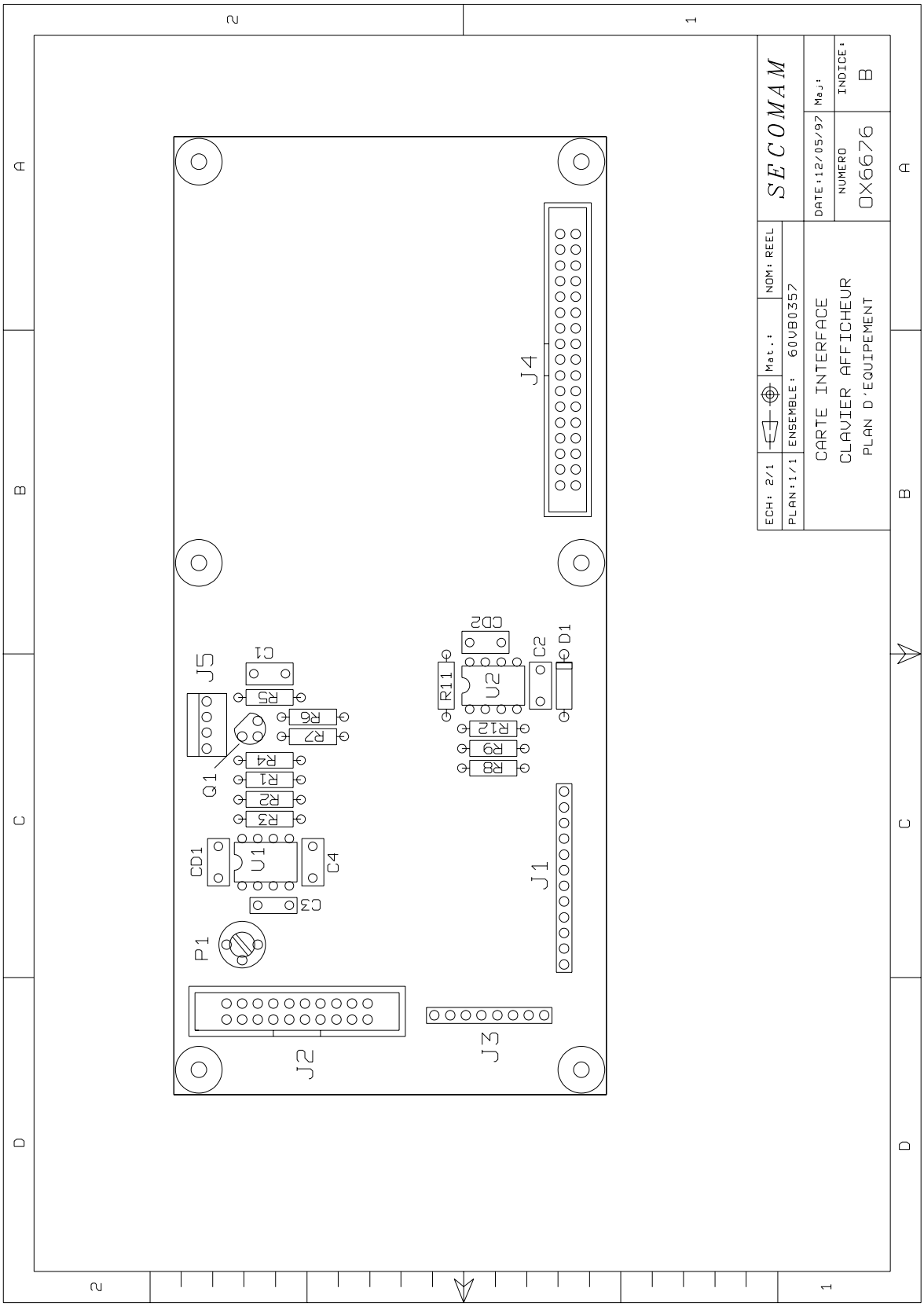
.Fig. 63 Components view of cells amplifier board (ref: 416689).



.Fig. 64 Schematic diagram of interface board{XE "Interface board"} (ref: 0X6676).



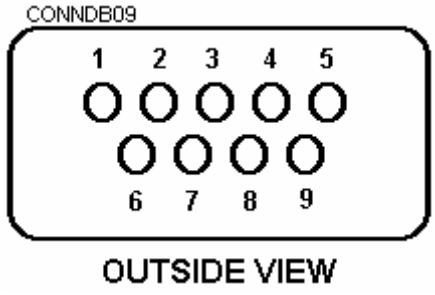
.Fig. 65 Electronic diagram of interface board{XE "Interface board"} (ref: 0X6676).



.Fig. 66 Components view of interface board{XE "Interface board"} (ref: 0X6676).

12 RS 232C OUTPUT

12.1 CONNECTOR



.Fig. 67 9 male pins connector view

5- MASSE
3- TXD BASIC towards printer{XE "Printer"}
2- CTS TERMINAL towards BASIC

12.2 PRINTER

Compatible printers with BASIC are:
- KYOLINE (compatibles KYOLINE),
- EPSON (compatibles EPSON),
- H.P. (compatibles H.P.),
- IBM (compatibles IBM).

12.3 DATA SIZE

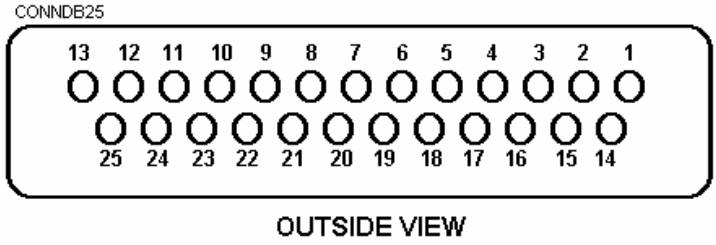
1 START BIT - 8 S BITS - 1 STOP BIT - PAS DE PARITE
CR = CR +LF (Carriage return = Carriage return + Line feed).

12.4 DATA TRANSMISSION RATE

9600 baud{XE "Baud"}.

13 PARALLEL CENTRONICS OUTPUT

13.1 CONNECTOR



.Fig. 68 25 pins female connector view.

1 - STROBE
2 - D0
3 - D1
4 - D2
5 - D3
6 - D4
7 - D5
8 - D6
9 - D7
11 - BUSY
12 - P.END

13.2 PRINTERS

In general, printers in conformity with the EPSON, IBM or HP (printers only under models 700) standards are compatible.

REMINDER: SECOMAM only guarantee the compatibility of printers delivered by SECOMAM.

14 GLOSSARY