MEDIA PREPARATORS

SH 105 / 110

USER'S MANUAL

25529080-b

Jouan

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CAREFULLY READ THIS MANUAL BEFORE OPERATING YOUR INSTRUMENT.

THE VALIDITY OF THE GUARANTEE IS SUBJECT TO THE OBSERVATION OF THE INSTRUCTIONS AND PRECAUTIONS DESCRIBED IN THIS DOCUMENT

REVISION STATUS

INDEX	DATE	AMENDED PAGES	NOTES
-	11/89		Initial release
-	01/90	5, 9, 12, 19, Fig. 3	Handle and F5
a	06/93	6.3, Figs. 4 & 5	Safety valve
b	08/02		Revised edition

GUARANTEE TERMS

JOUAN guarantees that this unit is free from defects in materials and workmanship when it leaves the factory, and undertakes to replace or repair the unit if it proves defective in normal use or during servicing for a period of ONE YEAR from the delivery.

Our liability under this guarantee is limited to repairing the defective unit or any part of the unit providing it is sent, carriage paid, to an authorized service centre or the SAINT-HERBLAIN office.

This guarantee is invalidated if the unit is incorrectly used, poorly serviced or neglected, mis-used or accidentally damaged.

There is no explicit guarantee other than as stated above.

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CONTENTS

1 USE AND FUNCTION

1.1. OVERVIEW

The SH105 and SH110 media preparators are automatic units for the preparation of culture media. They mix the constituents (water - dehydrated ingredients - additives . . .) and also sterilise and cool the medium according to data supplied by the operator.

Many types of agar can be prepared including delicate ones such as heated blood-agar and fresh blood-agar.

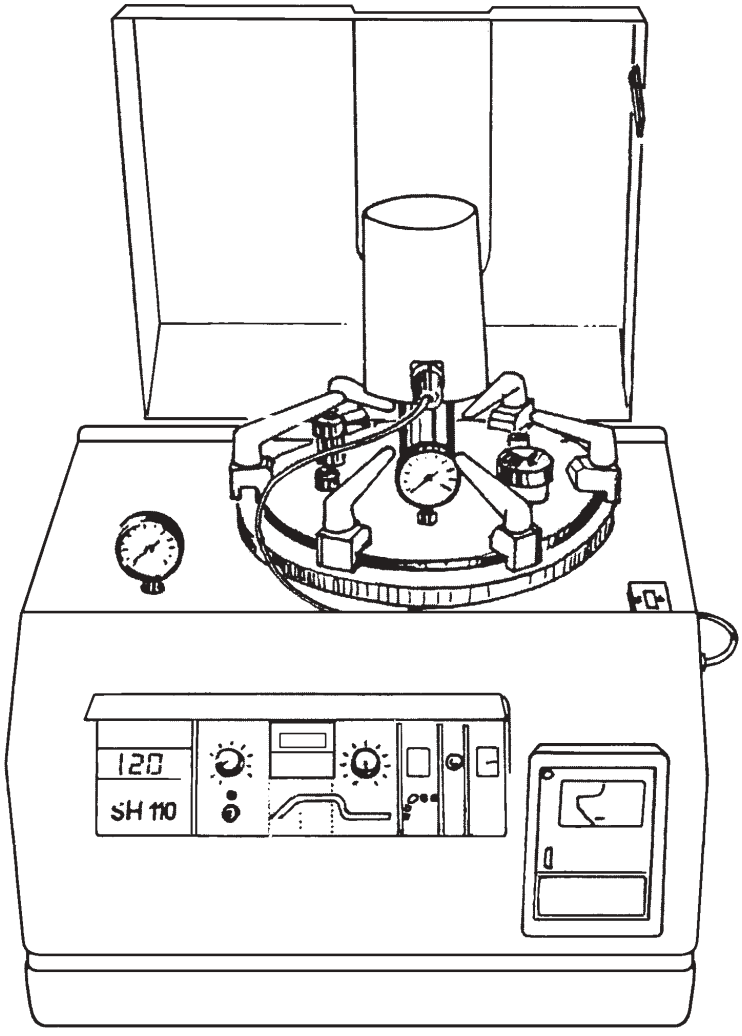

FIG. 1.1 - VIEW OF THE SH 110

1.2. FLUIDS

The fluids contained in the bowl must not be:

- explosive,
- comburants,
- inflamable,
- toxic.

All the fluids used must belong to the group 2 of the European Pressure Directive 97/23 CE.

Fluid used in the heating chamber (external circuit) = water (see Chapter 2.5).

1.3. ACCESSORIES

The SH105 - SH110 are supplied complete with the following accessories :

- 1 set spare fuses,
- 2 sets water connecting pipes,
- 2 sets Serflex hose couplings,
- 1 set seals for chamber and lid,
- 2 dispensing port nipples with silicon tubing,
- 2 dispensing port locking cap,
- 1 unlocking tool for safety cover,
- 1 chamber cover stand,
- 1 paper roll for units fitted with recorder.

2 INSTALLATION PROCEDURE

2.1. UNPACKING

Check that the parts on the packing list are included in the package. If any parts are missing, contact your JOUAN agent.

Remove all accessories and paperwork.

2.2. LIFTING AND TRANSPORT

Due to the weight of the machine, all lifting and transporting must be carried out using proper handling equipment (eg : fork lift trolley) that complies with current regulations, and by people having undergone the necessary training.

The machine must be supported from underneath. If it has to be transported without its pallet, for example on a staircase, professional handling assistance is required.

Carefully lift the unit by holding it at the sides.

Never attempt to lift the unit by the front, the cover or the pipes coming out of the back.

2.3. WORK SURFACE

Place the media preparator on a work surface that does not produce vibrations.

This surface must be at a height of about 0.850 m to facilitate working conditions, and close to a water and electricity supply. It must be able to support the weight of the unit under working conditions (+8 kg for the SH105 ; +14 kg for the SH110).

2.4. ENVIRONMENTAL CONDITIONS

This instrument is designed to operate safely under the following conditions:

- Indoor use.
- Temperature : 5° to 40°C.
- Maximum relative humidity of 80% for temperatures up to 22°C.
- Maximum altitude : 2000 m.

Maximum performance is assured across the following temperature range : 15°C to 25°C.

This instrument is not designed to resist an earthquake.

2.5. ELECTRICAL CONNECTION

Connect the supply cable to the mains.

The electricity supply must be single-phase, 1 live, 1 neutral and 1 earth.

The SH105 requires 10 A at 220 - 240 V A.C. (50 or 60 Hz depending on type).

The SH110 requires more power : 13 A at 220 - 240 V.

The unit must be earthed for personal safety.

The SH105/SH110 media preparators have a built-in mains cable.

Remember that in order to respect the electrical safety standards related to protection against indirect contact, the supply of power to the instrument must be via a power socket fitted with a protection device ensuring automatic cut-off in the case of an insulation fault.

A supply fitted with a circuit breaker of the correct rating complies with this requirement.

2.6. WATER CONNECTION

The unit is supplied complete with connecting tubes and couplings. Connections are made at the rear of the unit.

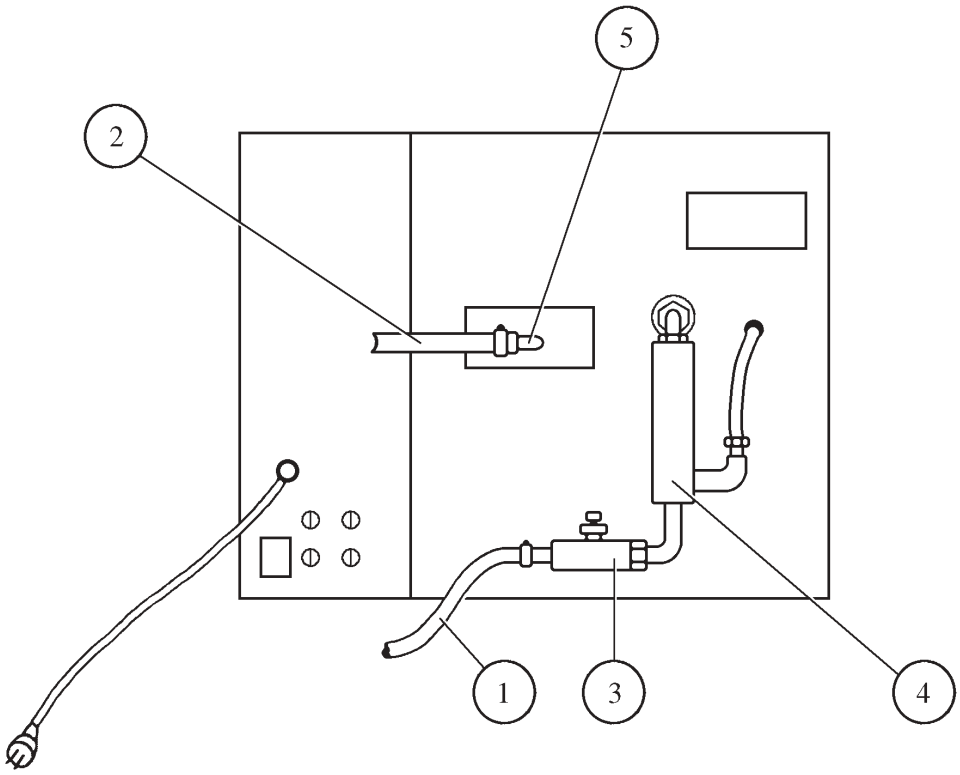

FIG. 2.1 - WATER CONNECTION

1. Water inlet tubing
2. Water outlet tubing
3. Pressure regulator
4. Water level detector
5. Steam condensor

2.6.1 WATER INLET

The water supply pressure must be at least 2 bars. The water supply temperature must be between 10°C and 30°C if the unit is to work properly.

The supply tube is connected to the lower port (point 1 and 3) with a hose coupling to ensure a water-tight connection.

2.6.2 WATER OUTLET

Despite the inclusion of a steam condenser in the hydraulic circuit outlet, a water discharge connection capable of withstanding boiling water under pressure is required. The discharge pipe is connected to the upper port (point 5) at the rear of the unit with a clamp.

Care must be taken to ensure that the other end of the discharge pipe is located so as to prevent steam under pressure being released into the room.

3 SPECIFICATIONS

3.1. WEIGHT AND DIMENSIONS

	SH105	SH110
Net weight (kg)	38	46
Gross weight (kg)	42	50
Width (mm)	520	520
Depth (mm)	530	530
Height : lid closed (mm)	650	650
Height : lid open (mm)	800	800

3.2. MAINS ELECTRICITY

220-240 V / 50 Hz single-phase + earth
230 V / 60 Hz single-phase + earth

3.2.1 CONSUMPTION

	SH105	SH110
Min.	0.4 A	0.4 A
Max.	9 A *	10.5 A *

* Values at 240 V / 50 Hz

3.2.2 HEATING POWER

	SH105	SH110
Standard	1500 W	2000 W
Max.	1800 W	2380 W

3.2.3 ELECTRICAL INSULATION CLASS

Class I as per European and American standards.

3.3. WATER SUPPLY

Minimum mains water pressure > or = 2 bars.
Temperature of mains water $10° \leq T°C < 30°$

3.4. CAPACITY BY VOLUME OF MEDIA

SH105 0.5 to 5 L.
SH110 1.3 to 10 L.

3.5. MIXING SPEED

45 rpm

3.6. CHAMBER SPECIFICATION

Stainless steel
Chambers tested to 9 bars

3.7. TIMING OF STANDARD PROCESSING CYCLE

	SH105	SH110
Heating 20° to 121°C	45 min	60 min
Sterilising	20 min	20 min
Cooling 121°C to 40°C	15 min	25 min
TOTAL	1 h 20 min	1 h 45 min

3.8. TEMPERATURE CONTROL

3.8.1 STERILISATION RANGE

80 to 130 °C ±1°C

3.8.2 DISPENSING RANGE

30 to 80°C ±0.5°C

3.9. CYCLE TIMING CONTROL

By programmable timer adjustable by means of four buttons located under the display:

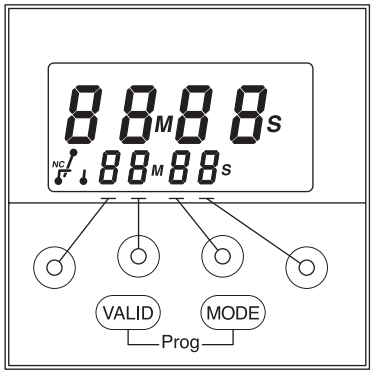

FIG. 3.1 - TIMER

The lower number indicates the setpoint time for sterilisation.

The upper number indicates the time left for sterilisation.

Do not use the “Valid” and “MODE” button.

3.10. OVERPRESSURE VALVE SETTINGS

Heating chamber : 32 psi (2.2 bars)
Inner chamber : 32 psi (2.2 bars)

Heating chamber security : 41 psi (2.8 bars)- CE model only.

4 INSTRUCTIONS FOR USE

4.1 DESCRIPTION

4.1.1 GENERAL VIEW

The unit is mounted on a rigid chassis with painted sheet metal closed-in sides.

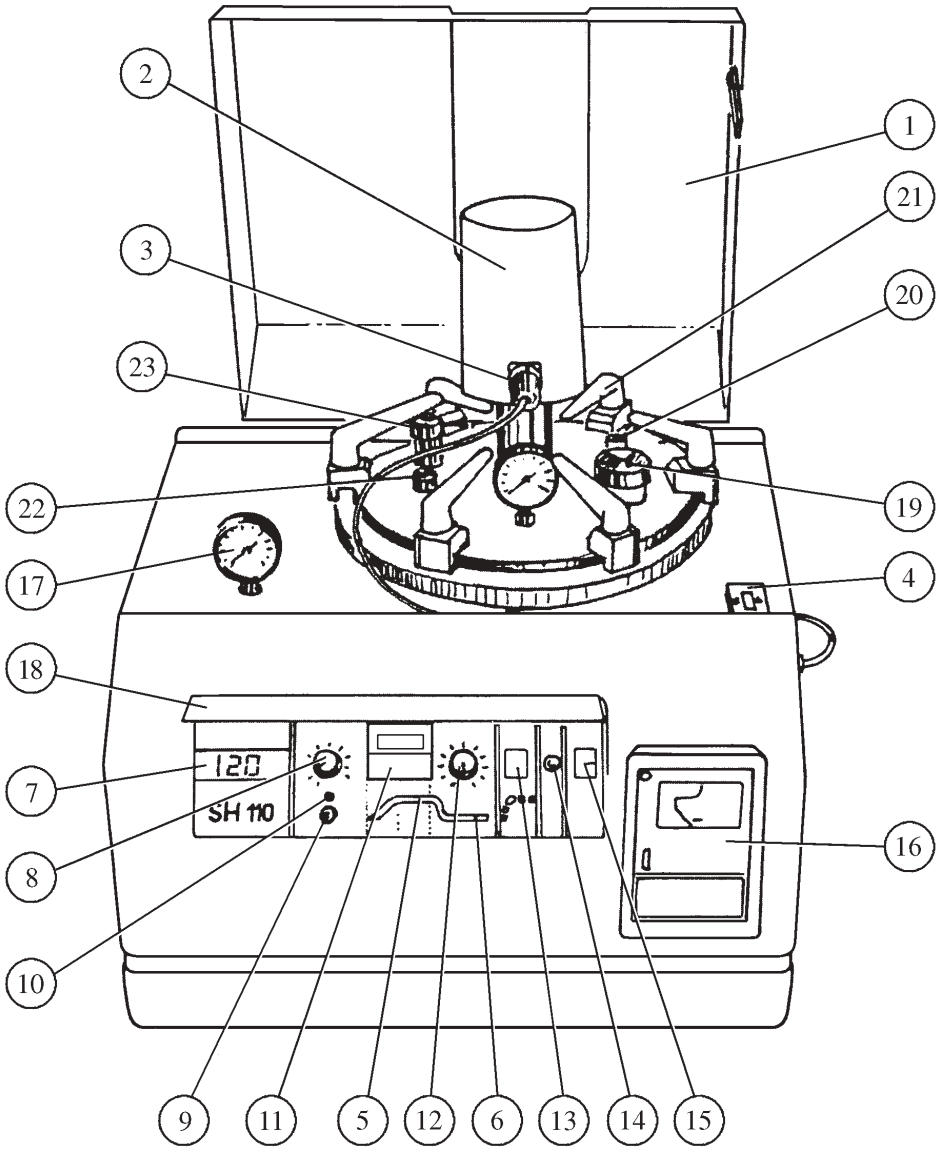

FIG. 4.1 - GENERAL VIEW

1. Acrylic cover
2. Motor
3. Motor and probe plug
4. Locking system
5. Sterilization indicator light
6. Dispensing indicator light
7. Temperature display
8. Sterilization temp-adjust
9. Start pushbutton
10. Heating indicator
11. Timer
12. Dispensing temp-adjust
13. Blood agar pushbutton
14. Fast cooling pushbutton
15. On/off mains switch
16. Temperature recorder
17. Heating jacket pressure gauge
18. Control panel protective lid
19. Additions port
20. Safety valve
21. Locking handle
22. Dispensing port
23. Decompression valve

4.1.2 FRONT PANEL, CONTROL PANEL

Control panel and, depending on model, medium temperature recorder.

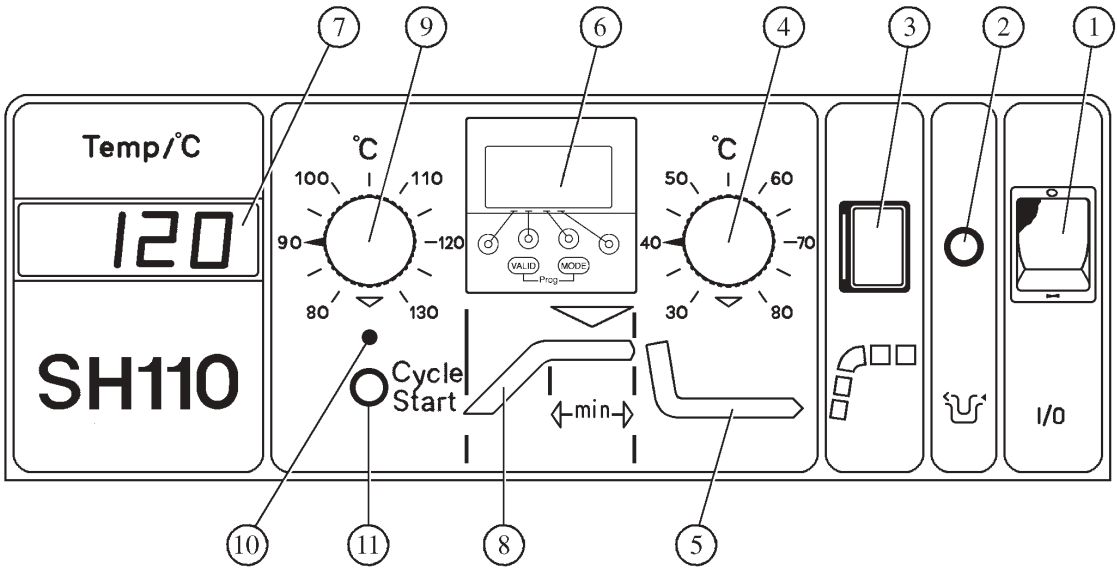

FIG. 4.2 - CONTROL PANEL

1. On/off mains switch
2. Fast cooling pushbutton
3. Blood-agar pushbutton
4. Dispensing temp-adjust
5. Dispensing indicator light
6. Timer
7. Temp-display
8. Sterilisation indicator light
9. Sterilisation temp-adjust
10. Heating indicator
11. Start pushbutton

The control panel is protected from splashing by a sliding transparent screen.

Behind the front panel is the electronic rack protected by a cover and cooled by the fan mounted on the right hand side of the unit..

4.1.3 REAR PANEL

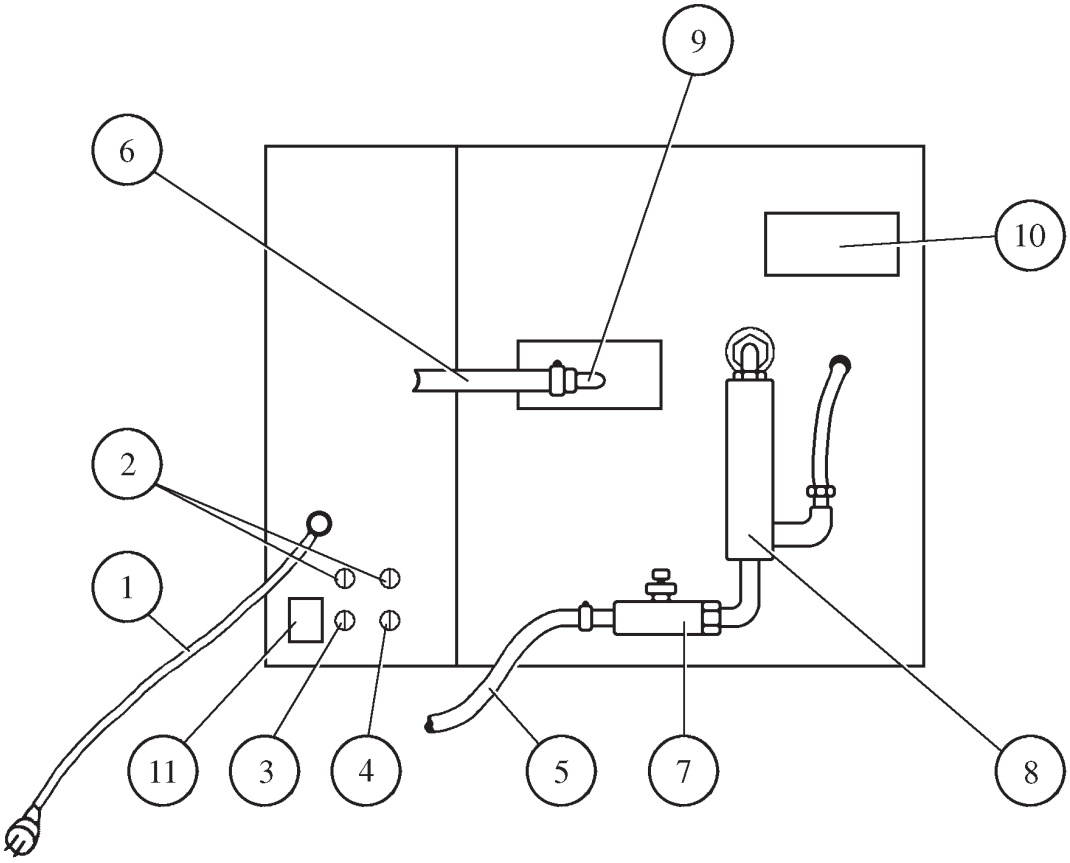

FIG. 4.3 - BACK OF SH 105 / SH 110

1. Mains cord
2. Mains fuse (Q = 1)
3. Electronique fuse
4. Motor fuse
5. Water inlet tubing
6. Water outlet tubing
7. Pressure regulator
8. Water level detector
9. Steam condensor
10. Identification plate
11. On/off mains isolation switch (CE model only)

The rear consists of two painted panels :

- Left : fuses and mains lead and on/off mains isolation switch.

- Right : hydraulic circuit inputs and outputs, pressure regular and water-level indicator.

4.1.4 TOP VIEW

The top is made of stainless steel plate with :

- Pressure gauge connected to the heating jacket to measure the pressure in the hydraulic circuit.
- Acrylic safety cover fitted with a locking latch which, in the closed position, fits into the locking hole.
- Heating jacket which holds the medium sterilisation chamber.
- The chamber is closed by a removable and lockable cover.
- The cover houses the following components :

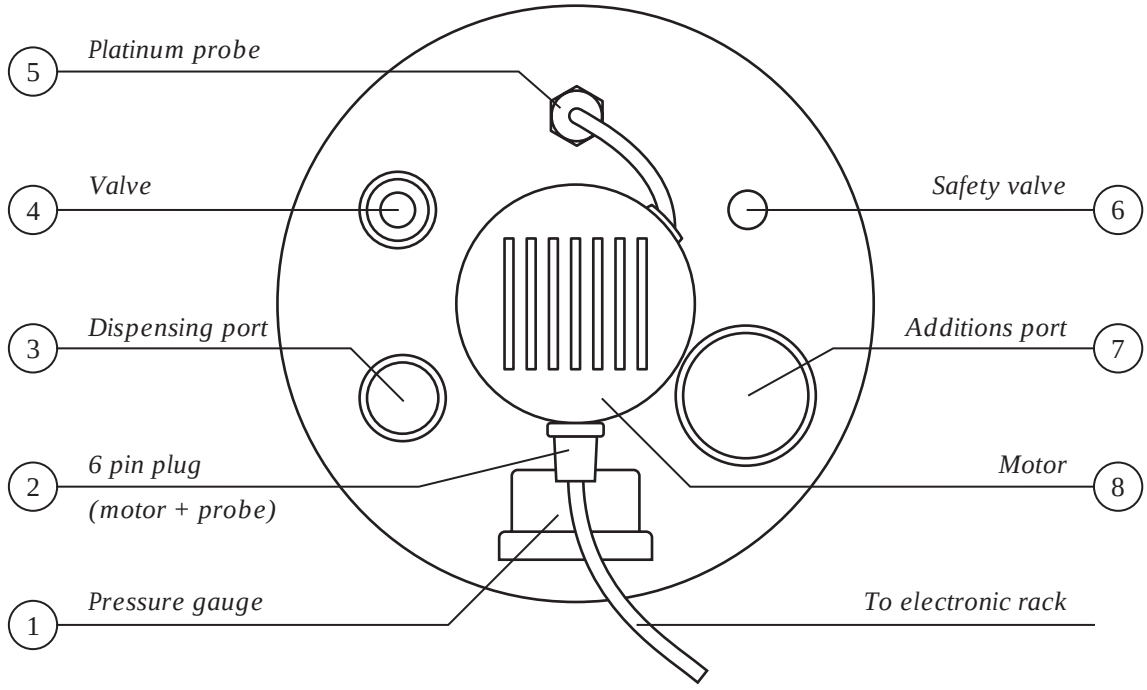

FIG. 4.4 - TOP VIEW OF VESSEL LID

- Motor driving the medium mixing paddle contained in the preparation chamber.
- Medium temperature probe.
- Medium dispensing port.
- Safety valve.
- Manually operated decompression and pressurising valve for the preparation chamber.
- Pressure gauge to measure the pressure in the preparation chamber.
- Quick action 6-pin plug supplying power to the mixing motor and connecting the temperature probe to the electronic rack. The cover is clamped in place (4 clamps on the SH105, 6 on the SH110).

4.1.5 HYDRAULIC SYSTEM

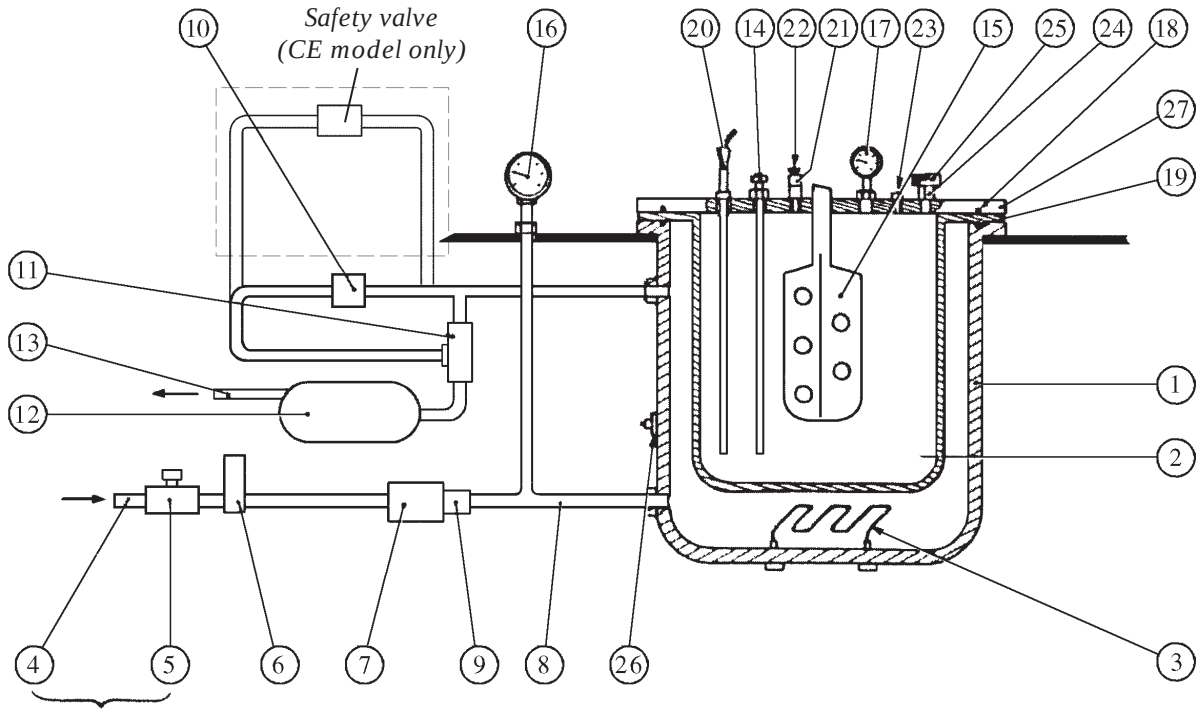

FIG. 4.5 - HYDRAULIC CIRCUIT

1. Heating chamber
2. Preparation chamber
3. Heating element
4. Water inlet tubing
5. Pressure regulator
6. Water level detector
7. Water entry electrovalve
8. Flexible tubing
9. Non-return valve
10. Water discharge electrovalve
11. T connector
12. Steam condensor
13. Water discharge tubing
14. Dispensing port
15. Mixing paddle
16. Heating chamber pressure gauge
17. Preparation chamber pressure gauge
18. Lid seal
19. Chamber seal
20. Temperature probe
21. Decompression valve head
22. Decompression valve
23. Safety valve
24. Additions port
25. Additions port cap
26. Manual reset safety thermostat
27. Chamber lid

4.2. SETTING UP

4.2.1 SAFETY COVER

The unit is fitted with an acrylic safety cover which is locked in the closed position when the unit is not switched on and the temperature of preparation chamber is above 65°C.

Do not attempt to remove the cover when the unit is switched off.

The safety cover unlocks automatically when the unit is switched on with the green switch on the control panel (rep.15 chap. 4.1.2). Lift the safety cover and then switch off.

4.2.2 CLEANING THE PREPARATION CHAMBER

- Undo the locking handle (rep 21 chap. 4.1.1) (the handles are released by an up or down movement according to the model).
- Disconnect the electric plug connecting the motor to the unit (point 3 chap. 4.1.1) by turning the metal ring to the left and pulling.
- Lift the chamber cover clear holding it by the isolating handle (underneath the black cover). Place the chamber cover on the stand supplied. The chamber cover must be handled with care to avoid damage to the temperature probe(cf 20 chap. 4.1.5), dispensing tube (cf. 14 chap. 4.1.5 or cf 3 chap. 4.1.4) and mixing paddle.
- Remove the preparation chamber (cf 2 chap. 4.1.5) and wash in clean water to avoid foreign bodies in the medium.
- Check that there are no foreign bodies in the heating chamber (cf 1 chap. 4.1.5) which might damage the water circulation electrovalves.

4.2.3 PRELIMINARY OPERATIONS

- After cleaning, replace the preparation chamber in the heating chamber. Check the condition of the seal (cf 19 chap. 4.1.5).
- Fill the chamber with water (preferably distilled or demineralised) and dehydrated medium in the required proportions (up to 5 litres of medium in the SH105 and 10 litres in the SH110)

  Warning : Keep within the maximum permitted amounts of water. Exceeding these limits will cause excess pressure and operate the safety cut-out.

  Replace the chamber cover, with the pressure gauge and motor plug to the front to allow all the locking handles to turn freely.
- Replace the cover clamps.
- Gradually tighten the locking handles in a criss-cross fashion (one handle then the one opposite, the next handle and the one opposite etc...) in order to ensure a uniform compression of the seals.
- After tightening the handles, release and turn them inwards to allow the safety cover to close.

Important :

- Remove the decompression valve head (point 21 figure 4.5) and fill with carded (sterile) cotton-wool to ensure filtering of bacteria during dispensing phase (see. Ch. 4.3, phase 6).

The unit is now ready for use.

4.3. USE

4.3.1 STANDARD OPERATING CYCLE

The cycle operating cycle consists of 6 phases.

Phase 1 : Preparation and checking

Before use, the unit must comply with the following conditions :

- Correctly connected to water and electricity.
- Medium (water and ingredients) in the chamber.
- Cover clamped and locked.
- Additive and dispensing ports hermetically sealed.
- Decompression valve : milled knob must be unscrewed (decompression takes place by tightening knob).
- 6-pins plug connected to motor assembly.
- Safety cover on.
- Fresh carded cotton-wool in the decompression unit.

Phase 2 : Starting up

With the unit still switched off :

- Set sterilising T°C as required
- Set dispensing T°C as required
- Set sterilising time as required using the four buttons located under the timer display
- The unit is ready to operate.

Start the unit : Press on/off switches (back panel and front panel).

- The mains switch green light comes on.
- The mixing motor starts up (motor noise audible).
- The digital display shows the temperature of the medium.

Press the START button .

- The sterilising cycle indicator light comes on .
- The input and output electrovalves open allowing water to fill the heating jacket.

NB :

- Water supply pressure must be > or = at 2 bars for the chamber to fill correctly.
- An electronic timing mechanism ensures the water circulates for about 45 seconds.
- A flow monitor engages for a continuous flow in excess of 2 L/min.
- An electronic circuit operates the sterilising cycle if the flow x discharge time conditions are satisfactory.
- The heater comes on (amber light).

Phase 3 : Temperature build-up

The temperature rises at 100°C/hour for the SH110, 135°C/hour for the SH105, which gives the following times for sterilising at 120°C with an initial water temperature of 20°C.

- 1 hour for the SH110,
- 45 minutes for the SH105.

NB : The electronic circuitry includes a temperature threshold detector between 65 and 70°C.

If the acrylic safety cover is not in place, heating will stop at this threshold and the sterilising cycle cannot continue. If the cover is in place, the safety cover locking system is automatically tripped, preventing access to the chamber lid for personal safety reasons (dangerously high temperatures and pressures) (see. Ch V).

Phase 4 : Sterilisation

Sterilising temperature can be checked visually from the following displays :

- The heating indicator light begins to flash showing that the required temperature has nearly been reached.
- The digital display shows the required temperature.
- The temperature chamber pressure gauge shows approximately 2 bars (at 121°C).
- The heating jacket pressure gauge shows approximately 2 bars.

An electronic circuit detects when the sterilising temperature is reached and starts the timer.

- The timer starts (the inferior number indicates the setpoint time, the upper number the remaining time).
- The temperature is stabilised at the sterilising temperature.

Phase 5 : Cooling to dispensing temperature

When the timer has finished, the sterilising/dispensing mode selection circuit switches to the dispensing position.

- The electrovalves open. Water circulates in the heating chamber thereby cooling the medium.
- The blue dispensing cycle light (see 8 chap. 4.1.2) comes on.
- Cooling from 121C to 45°C takes approximately 25 minutes for the SH110 and 15 minutes for the SH105 (depending on the water supply temperature).
- When the temperature of the medium falls below 65°C the safety cover unlocks. Access to the chamber lid is allowed and the additions and dispensing ports may be used.

Phase 6 : Dispensing

Dispensing may be carried out as soon as the medium is stabilised at the required temperature. To dispense :

- Raise the safety cover.
- Decompress the preparation chamber by screwing in the milled decompression valve knob.
- Unscrew the dispensing port cap, fit the dispensing nipple with its dispensing port locking cap (under sterile conditions with a Bunsen burner) and dispense using a pump.

4.3.2 HEATING BLOOD-AGAR CYCLE

Carry out phases 1 to 5 of the standard cycle.

Phase 6 a : Adding blood at dispensing temperature.

- Unscrew the additions port cap. Add the blood to the preparation chamber under sterile conditions. Replace the cap.
- Set the sterilising temperature as required typically (80°C).
- Set the timer to 3 minutes
- Unscrew the decompression valve to reseal the medium chamber.
- Lower the safety cover.
- Press the blood-agar push-button until it lights, then the START cycle push-button
- The media preparator automatically carries out the heating and cooling phases to the required dispensing temperature.
- Dispense (see phase 6).

4.3.3 FRESH BLOOD-AGAR CYCLE

Phase 6 b :

Before dispensing, see phase 6, add fresh blood via the additions port (under sterile conditions). Replace the additions port cap. Run the unit for a few minutes at dispensing temperature to allow mixing then proceed with dispensing (phase 6).

4.4 VOLUNTARY OR INVOLUNTARY INTERRUPTION OF THE PROCESS

4.4.1 RAPID COOLING CONTROL

In the event of mis-handling or an operating fault, the operator can initiate the rapid cooling of the unit's chambers manually.

Simply press and hold down the push button located at the right of the control panel. Water flows freely in the hydraulic circuit and quickly reduces the internal temperature in both chambers (approximately 5 minutes to drop from 121° to 30°C in the SH110 instead of 25 minutes on automatic).

4.4.2 COVER UNLOCKING

Unlocking : Normal procedure

The cover is normally unlocked by a solenoid switch.

Unlocking can only be carried out if the unit is switched on and the medium temperature is below 65° C.

Unlocking : Manual procedure

In case of a power cut, the cover will remain locked. It can be unlocked manually by removing the right side panel and using the special unlocking tool : part n° 25535010 (see Chapter 5).

Important : Before carrying out the manual unlocking procedure disconnect the unit to avoid the risk of electric shock.

4.4.3 AUTOMATIC DECOMPRESSION OF THE HEATING CHAMBER

After use, opening the safety cover automatically engages the discharge electrovalve and decompresses the chamber.

Then carefully follow the instructions in the “Maintenance after use” chapter.

4.5. MAINTENANCE AFTER USE

4.5.1 DECOMPRESSING THE MEDIUM CHAMBER

Before removing the chamber lid, always :

- Decompress the preparation chamber by screwing in the milled decompression knob.
- Check that both pressure gauges show zero pressure.
- Check that the medium chamber temperature is below 50°C.
- Switch off the unit with the ON/OFF switch.

4.5.2 REMOVING THE LID

- Unscrew the locking handles and turn the clamps through 90° to release the lid.
- Disconnect the quick-action plug from the motor assembly.
- Lift the chamber lid straight up with both hands, under the motor assembly, to avoid knocking and possibly damaging the equipment underneath the lid (temperature probe, dispensing tube and mixing paddle).

NB : Never lift the lid by holding the motor assembly cover.

- Place the lid on its stand.
- Remove the medium chamber for cleaning with plenty of water.

NB : The medium chamber may stick to the heating chamber. This is caused by a slight vacuum in the seal. If this happens, never use tools to try to free the lid. This could damage the seal. Use the following procedure :

- Before removing the lid, unscrew the locking handles until there is no more compression on the seals.
- As the unit is pressurised, press the rapid cooling button briefly (a fraction of a second).

This produces a slight over pressure in the heating chamber which automatically frees the chamber lid. Because of the break in the pressure seal there will be some splashing on the surface of the unit.

- Clean off with a sponge.
- Remove the lid and the medium chamber.
- Remove excess water in the heating chamber (about 100 ml).

5 HAZARDS, PRECAUTIONS AND LIMITATIONS OF USE

5.1. RISKS

5.1.1 HAZARDS DUE TO THE HIGH TEMPERATURES AND PRESSURES

During the sterilising phase (usually at 121°C), the medium chamber and hydraulic circuit are both subjected to about 2.2 bars of pressure. The media preparator is equipped with all the necessary safety systems (see § 5.2). However, in the event of malfunction or mishandling (e.g. forgetting to put the culture medium or water in the chamber) :

Never attempt to induce the safety systems during the sterilising cycle.

Never attempt to open the chamber lid while the unit is working at over 50°C.

Never attempt to again access to the interior while the unit is working or as long as the pressure is not equal to zero.

5.1.2 ELECTRICAL HAZARDS

Disconnect the media precessor before replacing fuses or working on the interior of the unit.

Ensure that the unit is properly earthed when connected to the mains.

5.1.3 IN CASE OF CONTACT WITH FLAMES

Have the instrument checked by the JOUAN Service Department or take it out of service.

5.1.4 MODIFICATION OF THE INSTRUMENT

Any modification of the instrument is forbidden without the manufacturer's agreement.

5.2. SAFETY

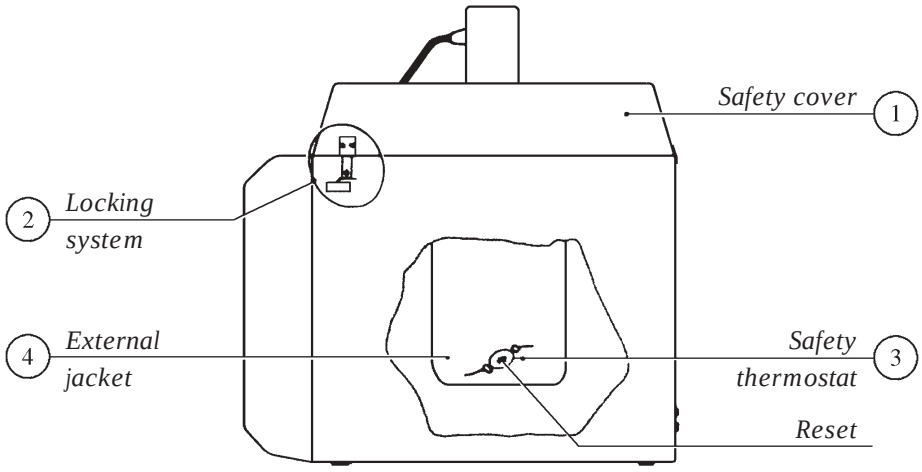

FIG. 5.1 - SAFETY DEVICES

5.2.1 THERMAL PROTECTION

The unit is fitted with two thermal cut-outs.

- An electronic overheating sensor. If the temperature in the medium chamber exceeds 130°C, the heater is cut out and the cold water circulation system automatically cuts in.
- A manually re-set safety thermostat mounted on the outside of the heating cuts out the heating circuit if the temperature is no longer controlled (breakdown in the electronic control system). The thermostat operates at 140°C. The heating circuit must not be re-set until the electronic control system has been repaired.

5.2.2 WATER DETECTOR

During the starting up phase (see 4.3 phase 2) water circulates in the heating chamber and fills the chamber.

A flow meter gives a measured rate of flow. The chamber is full after water has been circulating for at least 45 seconds. The heating cycle only operates when the space between the chambers is full.

5.2.3 MOTOR PLUG SAFETY

If the quick action plug is not connected to the motor assembly, a safety relay cuts out the electrovalves and the heating systems.

5.2.4 SAFETY COVER

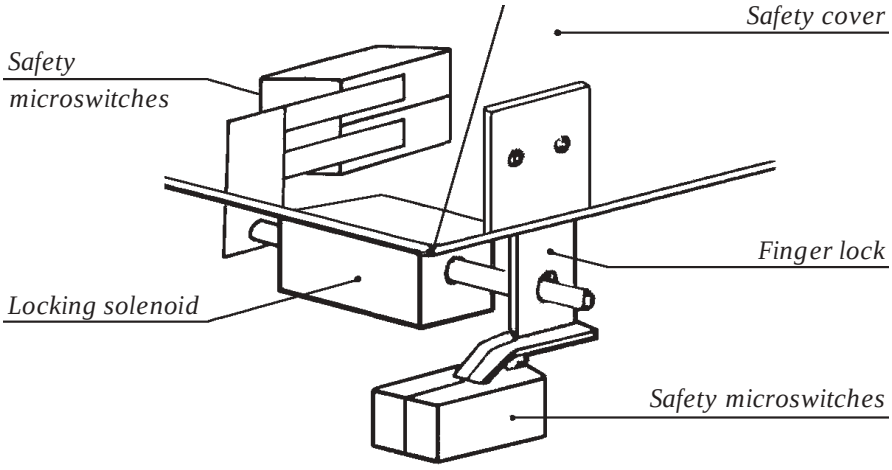

FIG. 5.2 - DETAIL OF SAFETY COVER SYSTEM

Locking system

An automatically locking acrylic cover prevents access to the metal parts of the safety cover when the medium temperature is above 65°C. Switching off the unit also engages the locking system if the cover was in the "down" position.

Unlocking : Normal procedure

The cover is normally unlocked by a solenoid switch. Unlocking can only be carried out if the unit is switched on and the medium temperatures below 65°C.

Unlocking : Manual procedure

In case of power cut, the cover will remain locked. It can be unlocked manually by removing the right side panel and using the special unlocking tool : part n°25535010 (see figure 5.3).

Important :

Before carrying out the manual unlocking procedure disconnect the unit to avoid the risk of electric shock.

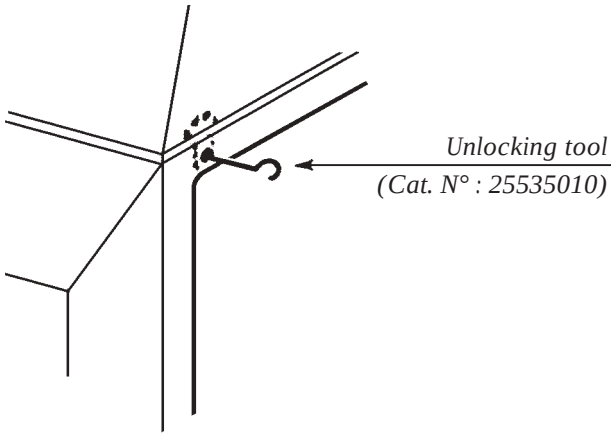

FIG. 5.3 - UNLOCKING THE SAFETY COVER

5.2.5 SAFETY COVER LOCKING DETECTION

Microswitches are built into the locking system to detect the presence of the safety cover. The sterilising cycle cannot begin unless the safety cover is in the "down" position.

5.2.6 AUTOMATIC DECOMPRESSION OF THE HEATING CHAMBER

After use, opening the safety cover automatically engages the discharge electrovalve and decompresses the chamber.

5.2.7 RELIEF VALVE

In the event of abnormal overpressure in the medium chamber, the relief valve in the lid releases pressure above 2.2 bars. In such cases the safety cover protects the operators against scalding.

5.2.8 ON-LINE RELEASE VALVE

This is incorporated in the hydraulic circuit and maintains the pressure in the heating chamber at 2.2 bars by releasing excess pressure by discharging water.

5.2.9 NON-RETURN VALVE

Because of the high temperatures involved, the pressure in the hydraulic could exceed the mains water pressure. The non-return valve avoids any back-pressure to the water main.

5.2.10 STEAM CONDENSER

The steam condenser outlet port is located above its inlet port. The condenser is therefore filled with cold water when the media preparator is carrying out the cooling phase between the sterilising and dispensing phases. This restricts the release of steam into the flexible water discharge tubes.

5.2.11 RAPID COOLING CONTROL

In the event of mis-handling or an operating fault, the operator can initiate the rapid cooling of the unit's chambers manually.

Simply press and hold down the push button located at the right of the control panel. Water flows freely in the hydraulic circuit and quickly reduces the internal temperature in both chambers (approximately 5 minutes to drop from 121° to 30°C in the SH110 instead of 25 minutes on automatic).

5.2.12 FUSES

The fuses must not be changed by the operator but by an authorised technician who will make a diagnostic the fault before choosing to change the fuses.

The unit is protected against current overload by three fuses located at the rear of the unit and one fuse located at the inside of the rack electronic.

1 x 12.5 A : mains fuse
1 x 0.5 A : fuse for the electronic rack
1 x 0.25 A : fuse for the mixing motor
1 x 0.25 A : fuse for the transformer (fuse F5).

To remove the fuse F5 it is necessary to lower the front panel.

NB :

Disconnect the unit before replacing a fuse. Use only the types of fuse stated on the rear of the unit.

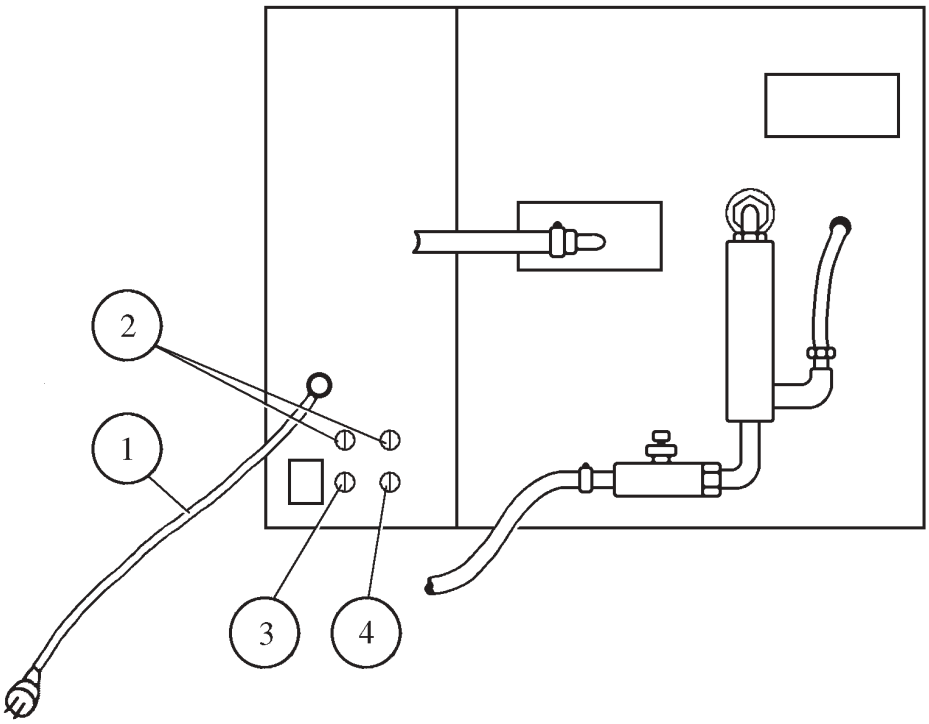

FIG. 5.4 - FUSE

1. Mains cable
2. Mains fuse (Q = 1)
3. Electronic fuse (F2)
4. Motor fuse (F3)

5.3. PRECAUTIONS

5.3.1 WATER CIRCUIT

- Avoid introducing any foreign bodies into the heating chamber as this could damage the electro valves in the hydraulic circuit.
- Only connect the media preparator to a pre-filtered supply.
- See that the flexible connecting pipes are correctly fitted using the couplings supplied with the unit.
- See that the discharge pipe is correctly fixed at the far end, because of the temperature and pressure of the water during cooling after the sterilising cycle.
- As the electrovalves are normally closed, the media preparator may be permanently connected to the water supply.

5.3.2 CHAMBER LID

See description in chapter 4.1.4

The chamber lid must be handled with care to avoid damaging the sensitive instruments such as : temperature probe, dispensing tube, mixing blade.

Never lift the lid by the motor cover nor the temperature connecting lead.

The decompression system must be filled with fresh carded cotton-wool every time the unit is used :

- The chamber is decompressed by screwing the valve in.
- It is pressure sealed by unscrewing the valve.
- Always decompress before undoing the lid.
- Checking the threaded caps. Before every cycle, check that the additive and dispensing ports are fully screwed on.

Checking the decompression system :

Before use, check that :

- The decompression system is filled with fresh carded cotton-wool.
- The milled knob is unscrewed to ensure a pressure seal for the sterilising phase.

Before dispensing : Decompress the medium chamber by screwing in the milled knob on the decompression system.

6 SERVICING AND PREVENTATIVE MAINTENANCE

6.1. CLEANING

It is essentiel to clean the instrument after each use.

6.1.1 INTERNAL CHAMBER AND LID

The underneath of the lid and the preparation chamber must be cleaned immediately after dispensing to prevent the agar gelling and sticking to parts of the unit.

To clean, simply run the chamber and lid under very hot water. If necessary, use a nylon brush.

The lid contains electrical components : do not splash the protective cover. In the event of accidental splashing ask your technical department to dry the components.

6.1.2 HEATING CHAMBER

After several cycles, depending on the purity of the mains water, the heating chamber becomes furred.

During the next few cycles, particles of scale could break off and damage the output electrovalve.

Descaling is therefore necessary as soon as the scale is visible to the naked eye :

- Remove the inner bowl and lid.
- Add approximately 1/4 litre of wine vinegar or N/10 acetic acid to the water remaining in the chamber.
- Leave overnight (approximately 12 hours).
- Pump out the chamber.
- Refill with clean water and use a nylon brush if necessary.
- Pump out the chamber again.

6.2 TROUBLESHOOTING

Problem	Remedy
The cycle only starts after 60 seconds.	Check that the cold water supply is on.
	Increase flow rate of water at tap or by unscrewing brass flow control valve at the back of the unit (1/4 turn at a time !).
Temperature will not go over 67°C.	Is plastic safety lid down ?
	If the lid was lowered before the unit was switched on, the weight of the lid might have stopped the lid lock solenoid pin withdrawing so it cannot lock.
	The latch on the safety lid may need to be realigned. Loosen the 2 screws and move the latch until the solenoid pin engages.
No power getting to the SH.	Check fuses at the rear (and in the plug, if fuses are fitted there). Note : Disconnect from mains first.
	Check that the power point is switched on.

Symptom	Action
Fluctuating dispense temp. during start-up.	Check water flow rate (2-3 litres per minute) .
Contaminated media.	Check that carded cotton filter in decompression valve is clean.
	Check that the decompression valve screw is closed (UP) during the run.
Lumpy media.	Too little water in the bowl at the start.
	Water pressure too high causing supercooling during cooling phase.
	Poor cleaning allows old encrusted media to fall into the chamber during the next cycle.
	All the water was put into the bowl before the powder. (Add 3/4 water, then powder, then 1/4 water).
	Tubing too long or runs across cold surface to pourer.

6.3. SPARE PARTS LIST

	SH105	SH110
Fuses (for 220 V - 50 Hz version) : - 250 mA (Q = 2) - 500 mA - 12.5 A	 26387045 26387046 26387047	 26387045 26387046 26387047
Chamber seal Lid seal	26436807 26436800	26436808 26436805
Dispensing tube (per metre)	26949800	26949800
Lid stand	25847801	25847802
Pressure gauge	26477800	26477800
10 recorder paper rolls 10 temperature graduated paper rolls	14000114 14000117	14000114 14000117
Dispensing port locking cap Dispensing port hose nipple Additions port cap Dispensing port closing cap	25084800 25312802 25084801 20502967	25084800 25312802 25084801 20502967
Decompression valve adjustment screw	25970800	25970800
Acrylic safety cover	25144052	25144052