

OPERATOR
Instructions

PERIMATIC PREMIER™ OPERATOR MANUAL



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N° FM 15114
N° RS 27480



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DOC REV 1.3

JENCONS
(SCIENTIFIC) LTD

**MANUFACTURER & DISTRIBUTOR
OF LABORATORY SUPPLIES
EQUIPMENT • DISPOSABLES • CONSUMABLES**

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INTRODUCTION

OPERATOR

Instructions

The **JENCONS PERIMATIC PREMIER™** has been carefully designed and manufactured as a programmable automatic pump which can be used as a stand alone unit or interfaced with the **JENCONS PERIMATIC ROBOTIC MODULE** filling station.

Packaging This system is supplied complete with an instruction manual, mains lead, a pipe clamp adaptor, foot switch and a range of silicone tubing (3mm, 5mm & 8mm).

Technical Data A full technical specification is detailed on page 17.

Installing the Tubing **PERIMATIC** silicone tubing is fitted by loosening the red knob and lifting off the tubing clamp, both of which are illustrated in *figure 1*. The tubing is then laid into the arc of the rotor casting, facilitated by turning the rotor by hand as required, before clamping the tubing into place and tightening the red knob.

Use a clockwise twisting action to release the flow valve tops. Position the bypass and delivery tubing through the valves then twist the flow valve tops closed to secure the tubing in position. Finally, both inlet and outlet tubing should be fed out through the slots on the right side of the case, with the entire mechanism enclosed by the front panel before operations begin.

NOTE. Ensure that the tubing clamp does not pinch or constrict the tubing through over-tightening of the red knob.

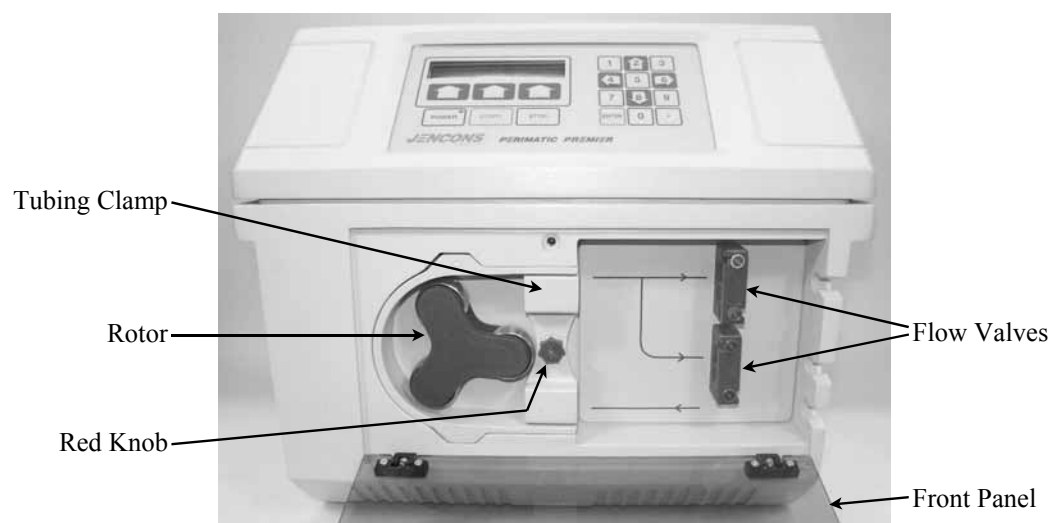


Figure 1 Installing **PERIMATIC** tubing

Interfacing with the **PERIMATIC PREMIER™** The **PERIMATIC PREMIER™** has three sockets on the rear panel:-

- Mains socket
- Interface socket
- Foot switch/ **ROBOTIC MODULE** socket



Figure 2 Rear Panel of **PERIMATIC PREMIER™**

- 1 Ensure that the voltage selector, found on underside of unit, is switched to the appropriate voltage - either 120V for 110-120V operation, or 240V for 220-240V operation.
- 2 Plug the mains lead into the mains socket at rear of unit.
- 3 Use the three pin socket for connecting the foot switch or **PERIMATIC ROBOTIC MODULE**.
- 4 The remaining socket will accept an interface lead for custom applications or PC control.

**Additional
Components
Available**

Cat. No.	Component
256-065	PERIMATIC ROBOTIC MODULE
686-203	Tubing (bore x ϕ) 3x7mm
686-210	Tubing (bore x ϕ) 5x9mm
686-216	Tubing (bore x ϕ) 8x12mm

Approvals The **PERIMATIC** pump conforms to the following requirements :-

- Machine safety regulations No 3073 (1992)
- Elec equipment for measurement/lab use BS EN 61010-1
- EMC directive BS EN50081-1 / BS EN50082-1 (1992)
- Low voltage directive (73/23/CEE)

Quick-start for a pre-programmed PERIMATIC PREMIER™ In order to initiate a pump sequence on a pre-programmed **PERIMATIC PREMIER™**, the user should switch the unit on (switch located on rear panel), and will be presented with the following screen display:

Software Version X.X
MEMORY SETUP PUMP

Having checked that the silicone tubing is correctly mounted around the rotor and is terminated at appropriate source and recipient vessels, press the 'PUMP' softkey or the <START> button to begin a fill cycle (refer to *figure 4*). The **PERIMATIC PREMIER™** will then operate using the parameters last used or those most recently set up in memory.

The remainder of this manual explains, in detail, how to program the system for a variety of filling applications using different tubing sizes and fluid types.

Introduction The keypad is used to enter values into the operating program of the **PERIMATIC PREMIER™**.

The front panel keypad is shown below in *figure 4*. Beneath the display are three rectangular keys; these are known as soft function keys and their function is denoted by the text located directly above them on the bottom line of the display.

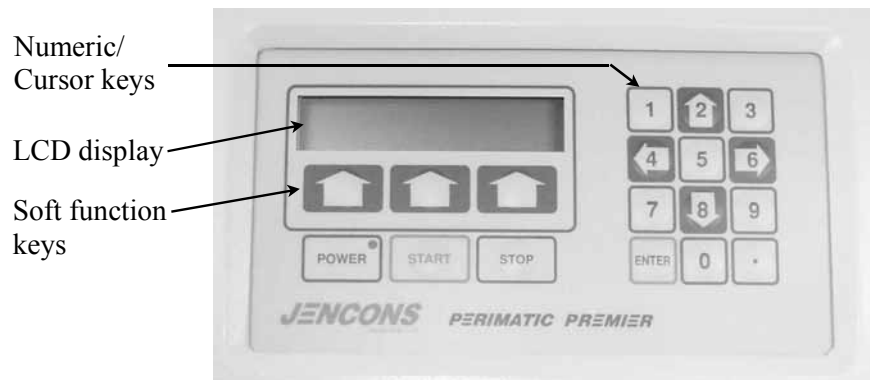


Figure 4 *Front panel keypad*

Conventions used in the manual Throughout the manual the following conventions are used to describe the keyboard keys :

- The soft keys are referred to as ‘buttons’, e.g. from the main menu press the ‘MEMORY’ button.
- The cursor keys and the START/STOP keys are shown enclosed in triangular brackets thus: <START>.

Initial Setup This section illustrates how the user would set up various parameters, such as language used, serial communication speed etc, upon receipt of a new machine. It also shows that this procedure need only be carried out once, as all parameters remain stored, even when the **PERIMATIC PREMIER™** is switched off.

Accessing the Setup Program Menu The Setup Program Menu is accessed by holding down the left hand soft key whilst the power is switched on at the rear of the machine. When the soft key is released the display will show the following message:

Setup Program
Enter Password

Enter the system password (default 1212). The display will show the main Setup Program Menu:

Setup Program
COUNTRY MEM ACCEPT

Selecting a language Press the soft key beneath the 'COUNTRY' option on the display. The display will show the following message:

ENGLISH NEXT ACCEPT

Still using the soft keys press 'NEXT' until the name of the country whose language you wish to use appears, then press 'ACCEPT'. You will be returned to the main Setup Program Menu.

Clearing memory **NOTE.** This should only be necessary after maintenance work or after a software upgrade. This operation will **erase all settings** stored in the **PERIMATIC PREMIER™**.

At the main Setup Program Menu press the 'MEM' button. The display will show the following message:

Erase Memory
ACCEPT QUIT

Press the 'ACCEPT' button to proceed or 'QUIT' to return to the previous menu.

On 'ACCEPT' the display will show:

Erasing Memory 0%

The percentage value will increase as the memory is erased. When all memory is erased the display will change to:

Formatting 0%

The memory is now being formatted for data storage (like a floppy disk is formatted before use). When the display reaches 100%, the main Setup Program Menu is displayed.

Exit Setup Program Menu To exit the Setup Program Menu press the 'ACCEPT' button in the main Setup Program Menu. The **PERIMATIC PREMIER™** will reset and the display will show the Main Menu.

NOTE: Pressing 'ACCEPT' resets the calibration in the working memory of the **PERIMATIC PREMIER™**. Recall a previous memory setup to restore.

Introduction Before dispensing is performed, the **PERIMATIC PREMIER™** needs to know the following data:

- 1 How much liquid to dispense.
- 2 Whether the dispenser is running in Automatic or Manual Mode.
- 3 How many times to repeat dispensing (Automatic Mode only).
- 4 The delay from the finish of one dispense to the start of the next dispense (Automatic Mode only).
- 5 The tubing diameter in use.
- 6 The pumping rate for the duration of the dispensing.
- 7 The serial interface speed.
- 8 Whether warning beeps are required.

Switch on the **PERIMATIC PREMIER™**, at the rear of the machine. When it has initialised the display will show:

Software Version X.X		
MEMORY	SETUP	PUMP

X.X identifies the installed software version number.

Press the 'SETUP' button and the display will show:

Setup Premier		
PRIME	CAL	OPTIONS

Setting the dispensing volume Press the 'OPTIONS' button, the display will show:

Setup Premier		
VOLUME	COUNT	NEXT

Press the 'VOLUME' button, the display will show:

Volume	10.0 ml	
ACCEPT	QUIT	DELETE

The previously set volume will be displayed. Enter the amount of fluid to be dispensed (in millilitres) using the numeric keys. If a mistake is made, press 'DELETE' to erase the character under or to the left of the cursor.

Press <ENTER> to update the display with the new value. Press 'QUIT' to exit from this menu without changing the currently set volume (a quick way of verifying the programmed volume).

Press 'ACCEPT' to store the selected volume and exit to the Setup Options Menu.

Setting the repeat dispense count From the Setup Options Menu press the 'COUNT' button; the display will show :

No of Doses 1
ACCEPT QUIT DELETE

The previously set value will be displayed. Enter the number of times the dispenser is to repeat. Use 'DELETE' to correct any errors. Press <ENTER> to update the display with the entered value and exit to the previous menu. Alternatively, press 'QUIT' to exit from this menu without changing the currently set value (a quick way of verifying the programmed repeat count).

Press 'ACCEPT' to store the selected count and exit to the Setup Options Menu.

Press the 'NEXT' button, the display will read :

Setup Premier
DELAY MODE NEXT

Setting the delay between dispensings When the **PERIMATIC PREMIER™** is operating in Automatic Mode a delay is inserted between dispensings. This delay can be set from 0.1 to 9.8 seconds.

Press the 'DELAY' button; the display will read :

Dose Delay 0.1S
ACCEPT QUIT

Enter the time delay using the keypad (the decimal point is inserted automatically), followed by 'ACCEPT' to store the selected value and exit the menu or 'QUIT' to exit without changing the previous value.

The previous menu will be displayed.

Automatic and Manual Modes In Automatic Mode the **PERIMATIC PREMIER™** will dispense a volume of fluid (set using 'VOLUME') and then wait for a delay time (set using 'DELAY'). This pattern can be repeated a number of times (set using 'COUNT').

In Manual Mode the **PERIMATIC PREMIER™** will dispense one dose (set using 'VOLUME') and return to its main menu.

Selecting Automatic or Manual Mode When 'MODE' is pressed the display will show:

```

Dispensing manual
                NEXT   ACCEPT
    
```

The current selected mode (in this case Manual) is displayed on the top line. Press the 'NEXT' button to change to the other mode; the display will show:

```

Dispensing auto
                NEXT   ACCEPT
    
```

Press 'ACCEPT' to store the selected mode and exit to the previous menu.

Press 'NEXT'; the display will show:

```

Setup Premier
PROFILE   TUBE   NEXT
    
```

Setting the pumping rate The pumping rate initially takes two forms; **Slow** pumping and **Fast** pumping. In addition to this the **PERIMATIC PREMIER™** also performs the following combinations:

START	RUN	FINISH
Slow	Slow	Slow
Fast	Fast	Fast
Slow	Fast	Fast
Slow	Fast	Slow
Fast	Fast	Slow

NOTE: Using a slow start and finish reduces the possibility of splashing.

Press 'PROFILE'; the display will show:

Slow NEXT	Slow ACCEPT	Slow
--------------	----------------	------

The first word to the left of the top line denotes the start speed, the middle word the run speed and the right hand word the finish speed. Press 'NEXT' until the desired combination of start, run and finish speeds are displayed.

You will notice that when a combination of slow and fast speeds is selected, an additional 'TIME' function appears; this allows the time spent at the selected start or finish slow speed to be set.

Example using the Slow-Fast-Slow speed option.

Press 'TIME'; the display will show:

Start/Finish Time START	QUIT	FINISH
----------------------------	------	--------

The 'START' and 'FINISH' buttons allow the time spent at the selected start and finish speed to be set respectively

Press the 'START' button; the display will show:

Start Time 0.1 ACCEPT	QUIT
--------------------------	------

Enter the time to spend at the selected start speed (0.1 - 9.8 seconds). Press 'ACCEPT' to store the value and exit to the previous menu or 'QUIT' to exit without changing the previous value.

Press 'FINISH'; the display will show:

Finish Time 0.1 ACCEPT	QUIT
---------------------------	------

Enter the time to spend at the selected finish speed (0.1 - 9.8 seconds). Press 'ACCEPT' to store the value and exit to the previous menu or 'QUIT' to exit without changing the previous value.

Press 'QUIT' again and the display will show:

Slow TIME	Fast NEXT	Slow ACCEPT
--------------	--------------	----------------

Press 'ACCEPT' to store the settings. The previous menu will be displayed.

Setting the tubing diameter To enable the **PERIMATIC PREMIER™** to dispense fluid accurately, it needs to know which size of tubing is in use. Sizes are specified by the **internal diameter** (i.d.). The **PERIMATIC PREMIER™** can accept tubing sizes from i.d. 3.0mm to 8.0mm.

Press 'TUBE'; the display will show:

3mm ID	NEXT	ACCEPT
--------	------	--------

The currently selected tube diameter is displayed. Press the 'NEXT' button until the correct tube sizing appears.

Press 'ACCEPT' to store the selection and exit to the previous menu.

Press 'NEXT'; the display will show:

Setup Premier RS232	BEEP	NEXT
------------------------	------	------

Setting the serial interface speed The serial interface is used to communicate with other pieces of equipment. Information is transmitted and received along an RS232 link. The speed of transmission of information is known as the Baud rate. This option allows the Baud rate to be selected.

Press 'RS232'; the display will show:

1200bps	NEXT	ACCEPT
---------	------	--------

Press 'NEXT' until the desired Baud rate is shown in the display. Press 'ACCEPT' to store the selected value and exit to the previous menu.

NOTE. If the serial interface is not to be used then the speed need not be considered part of the general setup procedure before dispensing.

Setting the alarm The **PERIMATIC PREMIER™** has an alarm option which may be set to alert the operator when a fill has been started or completed. It will “beep” a number of times depending on whether the dispenser is at the start or the end of a fill.

Press ‘BEEP’; the display will show the current alarm status:

Beeps are off
NEXT ACCEPT

Press ‘NEXT’ to change the selection and ‘ACCEPT’ to store the selected value. The previous menu is displayed.

This completes the setup of the **PERIMATIC PREMIER™** options.

Press ‘ENTER’ to return to the Setup Menu. The display will show:

Setup Premier
PRIME CAL OPTIONS

Priming the system Press ‘PRIME’; the display will show:

Ready to Prime
ACCEPT QUIT

Press ‘ACCEPT’ to start the priming action. The rotor will start turning and fluid will be drawn along the inlet tube and out through the bypass flow tubes (which will open and close alternately).

Press ‘QUIT’ to abort the priming operation.

Press ‘ACCEPT’ when the tubing is full. The flow valve will close and the bypass valve will open.

The Main Menu will be displayed.

The **PERIMATIC PREMIER™** has default settings for flow constants with various tubing sizes. These are based on measurements taken using water at 20°C. If the **PERIMATIC PREMIER™** is used to pump liquids that are at higher or lower temperatures and/or have different viscosity then the **PERIMATIC PREMIER™** can be recalibrated to take account of this.

NOTE. The calibration process requires an accurate balance to be available to ascertain the weight of the dispensed volume of liquid. Calculations may be necessary to convert weight from grams into millilitres based on the viscosity and temperature of the liquid.

NOTE. Modifications to the calibration constants are made on the currently selected tubing diameter only. If different tubing sizes are used then each must be calibrated if required.

From the main menu, press 'SETUP' to display:

Setup Premier		
PRIME	CAL	OPTIONS

Press 'CAL'; the display will show:

Calibrate Premier		
VOL	QUIT	TRIM

Press 'VOL'; the display will show:

Volume 10.0ml		
ACCEPT	QUIT	DELETE

The previously set calibration volume will be displayed. Enter the amount of fluid to calibrate to in millilitres. If you make a mistake use the 'DELETE' button to erase the character to the left of or under the cursor.

Press <ENTER> to update the display or 'ACCEPT' to store the volume and exit to the next stage. Press 'QUIT' to exit from this menu without changing the currently set volume.

The **PERIMATIC PREMIER™** will display the pump menu:

Pr. "START" to pump
QUIT

Press 'START' to dispense the volume entered.

When the **PERIMATIC PREMIER™** has finished pumping the display will show:

Actual Vol	10.0 ml		
ACCEPT	QUIT	DELETE	

Ascertain the volume of liquid dispensed by weighing, allowing for the fluid's temperature and viscosity.

Enter the actual volume dispensed in millilitres. If you make a mistake use the 'DELETE' key to erase the character to the left of or under the cursor.

Press <ENTER> to update the display and 'ACCEPT' to store the volume and exit to the next menu. The **PERIMATIC PREMIER™** will recalibrate and then return to the 'Pr. "START" to pump' display.

Press 'QUIT' to store the calibration values and to exit from this menu, or press <START> to pump a new sample for a further check.

Using trim for greater accuracy The **PERIMATIC PREMIER™** will dispense most volumes to an accuracy of ± 0.1 ml. However, large volumes may sometimes fall either side of the required setting. If this happens the 'TRIM' command is provided for fine tuning.

'TRIM' is an arbitrary value that is added to or subtracted from the internally calculated volume counter. The range is ± 128 counts and allows roughly ± 1 rotor turn adjustment to the volume.

From the Setup Calibrate Menu press 'TRIM'; the display will show:

Trim Volume	+0		
ACCEPT	QUIT	CHECK	

Use keys <2> & <8> on the numeric keypad to increase or decrease the trim count. Press 'CHECK' to dispense a test volume, then press 'ACCEPT' to store the value and exit to the Setup Calibrate Menu.

Manual dispensing In Manual Mode press ‘PUMP’ or <START> and the display will show:

1	10.0ml
MAN	SFS

At the same time the **PERIMATIC PREMIER™** will dispense its programmed volume using the programmed speed profile.

During manual dispensing the display shows the following information:

- 1 The total number of manual dispenses since setup is shown on the top left hand side of the display.
- 2 The volume to be dispensed is shown on the right hand side of the top display line.
- 3 The dispensing mode (MAN) is shown on the left side of the bottom display line.
- 4 The pumping rate is shown in the middle of the bottom display line.

When the dispenser has finished, the display reverts to the Main Menu. Subsequent use of the ‘PUMP’ or <START> button repeats the dispensing process.

NOTE. The dispense count will increase each time ‘PUMP’ or <START> is pressed.

Automatic dispensing In Automatic Mode press ‘PUMP’ or <START> and the display will show:

1	of	100	10.0ml
AUTO	SFS		

The **PERIMATIC PREMIER™** will dispense the programmed volume using the programmed speed profile and then wait for the programmed delay time. This will be repeated the required number of times.

During automatic dispensing the display shows the following information :

- 1 A continuous tally count of dispenses completed and the programmed number of dispenses to reach is shown on the top left hand side of the display (e.g. 1 of 100).
- 2 The volume to be dispensed is shown on the right hand

- side of the top display line.
- 3 The dispensing mode (AUTO) is shown on the left of the bottom display line.
 - 4 The speed profile is shown in the middle of the bottom display line.

When the programmed number of dispensings is completed, the display reverts to the main menu. Subsequent use of 'PUMP' or <START> repeats the dispensing process.

Dispensing with the PERIMATIC ROBOTIC MODULE

- 1 Set up the **PERIMATIC PREMIER** for manual dispensing.
- 2 Set up the **PERIMATIC ROBOTIC MODULE** for the appropriate fill profile (see separate instruction manual).
- 3 Connect the **PERIMATIC PREMIER** to the **PERIMATIC ROBOTIC MODULE** using the interface lead.
- 4 With the Main Menu shown on both units, press <START> on the **PERIMATIC ROBOTIC MODULE**.

The **PERIMATIC ROBOTIC MODULE** will move to its first start position and the **PERIMATIC PREMIER** will dispense. The **PERIMATIC ROBOTIC MODULE** will then continue to control the **PERIMATIC PREMIER** for all other programmed fill positions.

When the fill sequence is finished both units will stop and revert to their Main Menus.

Using the foot switch

Connect the foot switch to the three pin socket at the rear of the **PERIMATIC PREMIER™**. Press the foot switch once to start the pumping operation and a second time to stop it.

Pressing the foot switch is identical to using the 'PUMP' or <START>/ <STOP> buttons on the front panel. Wherever this manual suggests pressing <START> or 'PUMP' pressing the foot switch will have the same effect.

The foot switch will work in both Manual and Automatic Modes.

The **PERIMATIC PREMIER™** can store and recall up to 99 settings. Each setting may have a 17 character description attached to it to describe the programmed operation.

All operating information for dispensing is stored in the selected memory location, including the language in use as well as pump speed profile, calibration constants and serial interface Baud rate.

From the Setup Menu press 'MEMORY' to show:

Recall/Store/Review		
RECALL	STORE	REVIEW

Storing a program in memory From the memory menu press 'STORE' to show:

Store Memory No	01
ACCEPT	QUIT

Use the numeric keypad to enter the memory number to which you wish to store the current program.

Press 'ACCEPT' to store the program or 'QUIT' to return to the previous menu. When 'ACCEPT' is pressed the memory description screen is displayed:

01: PROGRAM TITLE	
ACCEPT	QUIT

The display will show the current description stored for that location, if any.

Use the <4> or <6> number keys to move the cursor left or right. The <2> and <8> keys change the character under the cursor, <2> moves up the alphabet and <8> moves down. Pressing <5> will copy the character to the left of the cursor.

Press 'ACCEPT' to store the description. The Main Menu will appear.

Recalling a program from memory From the memory menu press 'RECALL' to show:

Enter Memory No	01
ACCEPT	QUIT

Enter the memory number to recall using the numeric keypad. Press 'ACCEPT' to recall the program or 'QUIT' to return to the previous menu.

If the memory number entered does not contain a valid program the display will show:

*****ERROR***** MEMORY IS EMPTY

Re-enter a valid memory location number or use the 'REVIEW' option, below, to select from the valid stored memories.

Reviewing programs in memory From the Memory Menu press 'REVIEW' to display:

01: PROGRAM TITLE
NEXT QUIT RECALL

The title of the first memory location in use is shown, in this example memory location 01. Pressing 'NEXT' moves to the next location containing a valid program. When the last stored location is displayed and 'NEXT' is pressed the first location is shown again.

Press 'RECALL' to load the contents of the selected memory location. The Main Menu will appear.

Press 'QUIT' to return to the previous menu.

NOTE. If 'REVIEW' is pressed when there are currently no programs stored in memory then the button appears to be ignored.

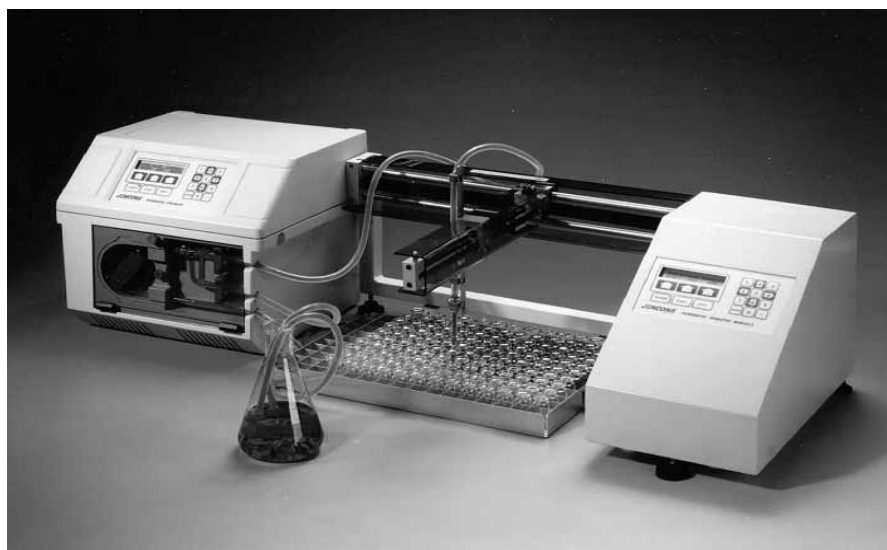
Error Message	Description
<p>*****ERROR***** MEMORY IS EMPTY</p>	<p>An empty memory location was selected. Re-enter a valid memory number or use review to select.</p>
<p>*****ERROR***** ONLY 01 - 99 ALLOWED</p>	<p>Memory number 0 was entered (invalid). Re-type with a number between 01 and 99.</p>
<p>*****ERROR***** Cannot Pump 0 ml</p>	<p>A dispensing volume of 0ml was entered (invalid). Try again with a volume between 0.5ml and 9999.9ml.</p>
<p>*****ERROR***** ONLY 0.1 - 9.9 ALLOWED</p>	<p>Time delay was entered as 0 (invalid). Re-type with a number between 0.1 and 9.8</p>
<p>*****ERROR***** Max doses is 999</p>	<p>The PERIMATIC PREMIER™ can only repeat a dispense count of between 1 and 999. Re-enter a valid figure.</p>
<p>*****ERROR***** ONLY 1 - 999 ALLOWED</p>	<p>The PERIMATIC PREMIER™ can only repeat a dispense count of between 1 and 999. Re-enter a valid figure.</p>
Operating Error	Description
<p>Speed profile set to Slow/Fast/Slow but the PERIMATIC PREMIER™ pumps all of the dose on fast.</p>	<p>The SPEED profile has been selected but the START and FINISH times have been set very low.</p>
<p>Speed profile set to Slow /Fast/Slow but the PERIMATIC PREMIER™ pumps all of the dose on slow.</p>	<p>The time allocated for the START SLOW run is too long OR the volume specified is dispensed before the START SLOW run time has expired.</p>

SPECIFICATION

OPERATOR
Instructions

- Accuracy** - $\pm 1.0\%$ for volumes over 20ml
- Repeatability** - Generally $<1\%$ Discrepancy
- Dispensing volume** - 0.5ml (min) 9999.9ml
- Tubing bore** - 3mm (min) 8mm (max)
- Tubing wall** - 2mm thick (max)
- Pumping method** - Peristaltic
- Rotor speed** - 70rpm (slow) 230rpm (fast)
- Pumping rate**
 - 3mm bore** - 2.1ml/s (slow) 6.0ml/s (fast)
 - 5mm bore** - 5.6ml/s (slow) 16.7ml/s (fast)
 - 8mm bore** - 13.3ml/s (slow) 33.3ml/s (fast)
- Electronics** - Microprocessor controlled
- Program Storage** - 20
- Languages** - English, French, German, Italian, & Spanish (selectable)
- Power supply** - 110/120 and 220/240V (selectable)
50/60Hz single phase
- Power consumption** - 150W
- Fuse rating** - T1.6A
- I/O ports** - Foot switch/XY Module, Serial RS232
Baud rate 300, 600, 1200, 4800 or 9600 (selectable)
- Dimensions** - 310 x 360 x 320mm (WxDxH)
- Weight** - 16Kg (net)

PERIMATIC PREMIER™



PERIMATIC ROBOTIC MODULE - available as option

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