



PHARM/PUMP II

OPERATING INSTRUCTIONS

SOFTWARE VERSION 5.01 or COMPATIBLE

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1.0 INTRODUCTION

The Acacia Pharm/Pump II is an easy to use, microprocessor controlled, dual mode, quadruple rotor peristaltic pump.

1.1 Key Features

The Pharm/Pump II has the following key features:

Variable Volume	The pump can be programmed to dispense samples with a volume of between 1.0 and 4095mL.
Variable Drawback	At the end of each individual dispense the pump can be programmed to draw back by a volume of between 0 and 9.9 mL.
Named Drugs	The unit contains a comprehensive list of drug names and concentrations. When the pump is programmed to dispense one of these named drugs then the volume of that dispense is automatically fixed at 10.0 mL. In this mode it is also possible to enter a ten digit lot number. After each dispense a label will be printed on a suitable label printer. The label will list the drug name, concentration, volume, date dispensed and lot number.
Dual Mode	The pump can be operated in either manual or automatic mode. With manual mode a single dispense is made each time the pump is activated. In automatic mode a number of dispenses can be made automatically, each of the same size, with a pre-programmed time delay between each dispense.
Calibration	To compensate for variables such as fluid temperature/density and tube diameter, it is possible to accurately calibrate the pump. This may be done when changing setup, or “on the fly” in the middle of a dispense.
Volume Remain	The volume of fluid in the container being dispensed from can be entered into the Pharm/Pump II. Every time a dispense is made the dispensed volume will be subtracted from this original volume, giving a running total of volume remaining and an advance warning of incomplete dispenses.

Setup Memories	The Pharm/Pump II has twenty-six non-volatile memories, each of which can store a full set of operating parameters. Any of these can be recalled in a moment allowing rapid selection of different repeated job functions.
Foot Switch	A Foot Switch can be connected to the Pharm/Pump II allowing a hands free start, stop and resume of all pumping functions. This switch directly mimics the operation of the <i>START/STOP</i> front panel keys.
Non-Volatile Real Time Clock	The Acacia [®] Pharm/Pump II has an internal hardware real time clock which will maintain the correct date and time, even with the power turned off, automatically compensating for the number of days in each month, including during a leap year. The date information will then be printed on the label when the pump is in Named Drug dispense mode.
RS232 Serial Port	An industry standard RS232 serial port is provided on the rear of the pump to facilitate the connection of a label printer.
Custom Labels	<p>The unit contains an editor that allows a 20 character title to be edited, together with an 8 character 2nd line for concentration values. This, together with the Date, Volume and Lot Number, is printed after each dispense. Any volume can be dispensed.</p> <p>Each memory has a custom label, hence 26 different labels can be produced.</p>

1.2 Front Control Panel Layout

The front control panel is shown in Appendix 4. It is split into four main areas:

- A 2 line by 20 character LCD display is used to display data, menus, warning/error messages and soft key functions.
- The 3 rectangular keys located under the display are known as soft function keys. Their function is denoted by the text located above them on the bottom line of the LCD display. As menus are navigated the function of these keys will change to reflect the current operation being performed.

- Ten number keys, a decimal point and *ENTER* keys allow direct entry of numerical data. Four of these keys also have arrow legends on them, which are used in various menus for selection of data. Note: at no point will it be possible to use the arrow and the number function simultaneously.
- A *START/STOP* button at the bottom of the keypad will start and stop the pump operation for a dispense as well as during priming and calibration operations.

2.0 INITIAL SETUP

2.1 Accessing the User Engineering Setup Mode

NOTE: This operation should only be necessary upon initial delivery of a new PHARM/PUMP II.

The User Engineering Setup Mode is accessed at power up by holding down any key whilst the power is switched on at the rear of the machine. When the key is released the display will show the following message:

ACACIA EQUIP SETUP
ENTER PASSWORD:

Enter the system password (default 1212) and the display will show the following message:

ERASE MEMORY

ACCEPT NEXT QUIT

2.2 Erasing Memory

NOTE: THIS SHOULD ONLY BE NECESSARY AFTER MAINTENANCE WORK OR AFTER A SOFTWARE UPGRADE. THIS OPERATION WILL ERASE ANY SETTINGS STORED IN THE PHARM/PUMP II.

Press the *ACCEPT* button to erase all of the memory locations in the PHARM/PUMP II, the *NEXT* key to proceed to the next menu item or press the *QUIT* key to exit to the main operating menu.

2.3 Selecting UK/US Date Format

The date can be displayed and printed in either American Month/Date/Year format or European Date/Month/Year format. The current format is displayed on the top line of the display.

English / US Selected		
CHANGE	NEXT	QUIT

Press the *CHANGE* button to select the alternative date format.

English / UK Selected		
CHANGE	NEXT	QUIT

Press the *NEXT* key to proceed to the next menu item or press the *QUIT* key to exit to the main operating menu.

2.4 Adjusting the Current Date and Time

The next Engineering Setup menu item allows setting of the current date and time. A dynamic display of the current date and time is given, with the time in standard Hours:Minutes:Seconds format and the date in either American Month/Date/Year format or European Date/Month/Year format. The Acacia[®] Pharm Pump will automatically compensate for the number of days in each month, including during a leap year.

However, the clock must be altered at the start and end of local daylight saving time if applicable.

14:55:03	11/14/06	
CHANGE	NEXT	QUIT

Pressing the *CHANGE* button places the cursor over the first digit of the time and alters the soft key definitions as shown below. Note that at this time the clock is frozen so, for example, a quick alteration of the hours field will also make the time lag behind by how long it takes to make the alteration.

<u>1</u> 4:55:03	11/14/06	
CHANGE	LEFT	RIGHT

Typing digits on the keypad overwrites the displayed digits, and the cursor moves to the right from digit to digit and field to field. Pressing the *LEFT* and *RIGHT* buttons moves the cursor left and right by one display field respectively.

Note: When entering values they will be “clamped” to the nearest sensible number. At this time no account will be made of the number of days in a month, therefore all dates will be bound between 1 and 31. This will be corrected at midnight when the date increments. Care should be taken when setting the date.

2.5 Printing a Test Label

The final menu allows the printing of a test label to confirm the correct function of the label printer and its interface.

Print Test Label		
ACCEPT	NEXT	QUIT

3.0 BASIC OPERATING PRINCIPLES

The PHARM/PUMP II is switched on by pressing the rear panel rocker switch, located above the main socket. When the PHARM/PUMP II has initialized the display will show:

ACACIA PHARM/PUMP II

SOFTWARE VERSION 5.01

After approximately 1 second, assuming the Erase Memory function above has just been performed, the display will show:

A: Unspecified Name

USE ↑↓ SETUP MENU

At this time the display is showing the main top level operating menu. The top line is indicating that memory “A” has been selected, which contains the setup for a named drug, the name of which has not yet been specified. The bottom line is telling the operator to use the up and down arrow keys to select different memory letters, to press the center soft function key to access the main *SETUP* menu and to press the right soft function key to access the auxiliary control *MENU*. At this moment in time pressing the left soft function key has no effect.

3.1 Setup Memories

The Pharm/Pump II has 26 setup memory locations referred to by a letter in the alphabet A-Z. Each memory location holds the following information:

- Rotor direction and speed
- Volume to dispense
- Drawback volume
- Drawback delay
- Dispense mode, auto or manual
- Number of dispenses in an auto operation
- Delay between auto dispenses
- Dispense type
- Drug name or custom label
- Drug batch number
- Volume remaining
- Calibration information

Note: Calibration information is stored within each memory, which means that when one memory setup is re-calibrated, the other memory locations are unaffected and hold their original calibration values. If several memories require the same calibration they must be individually calibrated, or the memories must be copied. See Section 4.11 for details.

Assuming that one of the stored memories contains valid setup information entered on a previous session then that memory can be accessed by pressing the up and down keys on the keypad until the appropriate menu letter is displayed in the top left hand corner of the display. If the fluid reservoir and pipework has been installed correctly, the dispensing operation can be initiated simply by pressing either the *START/STOP* key or the foot switch.

Note: Holding down the *UP/DOWN* arrow keys for a moment will activate the auto repeat function so the memory can be selected more quickly.

3.2 Volume Remaining

The volume of fluid in the container which is being dispensed from can be entered into the Pharm/Pump II. Every time a dispense is made the dispensed volume will be subtracted from this original volume, giving a running total of volume remaining. If there is insufficient fluid to perform the next dispense operation an audible warning will sound and the user will be prompted whether to abort the operation, continue or alter the volume remaining figure. It is also possible to abort, change the fluid container, enter the new volume remaining, re-prime, and then resume the dispense.

If this feature is not required it can be disabled effectively giving an endless volume remaining.

Note: The volume remaining counter, if enabled, will be decremented for all pumping operations, whether full dispenses, partial aborted dispenses, during priming or during calibration.

3.3 Preparing for a Dispense

Before a dispense is performed, the PHARM/PUMP II needs to know the following information:

- A) Is the operation to be performed with a fixed drug name 10mL dispense with printed label?

If the answer is yes: What is the drug name?
What is the drug batch number?

If the answer is no: What is the fill volume?
What is the fill type?
Is a printed custom label required?

- B) What is to be the rotor direction and speed?
- C) How much liquid needs to be drawn back at the end of each individual dispense, and what is the delay between the end of the initial dispense and the start of the drawback operation?
- D) Is the pumping operation to be a multiple dispense in Automatic mode, or a single dispense in manual mode?

If the answer is Automatic: What is the time delay between fills?
How many fill operations are required?
- E) What is the volume of fluid in the reservoir from which dispenses are taken?

4.0 ENTERING SETUP INFORMATION

Once the above information has been determined it can be entered into a memory location using the *SETUP* and *MENU* menus.

At any time when one of the setup menus is displayed, pressing the *NEXT* soft key will alter the display to show the next setup menu of that sequence, and pressing the *QUIT* soft key will accept all changes made to the currently selected memory and return the user to the main top level operating menu.

4.1 Entering the Dispense Type

From the main menu, pressing the central *SETUP* soft function key moves the user from the main top level operating menu into the *SETUP* menu. The following display will typically be visible:

Named Syringe 10ml		
TYPE	NEXT	QUIT

Pressing the *TYPE* soft key will cycle the top line of display between the seven different dispense types. These are:

Named Syringe 10mL	-	Fixed 10.0mL dispense
	-	Variable drug name & concentration
	-	Variable lot number
	-	Printed Label with drug name, concentration, date and lot number
Volume	-	Volume Dispense
	-	Variable Dispense from 1.0ml to 4095mL
Syringe	-	Syringe Fill Dispense
	-	Variable Dispense from 1.0ml to 4095mL
Ambul.	-	Ambulatory Sphere Fill Dispense
	-	Variable Dispense from 1.0ml to 4095mL
Trans.	-	Transfer Fill
	-	Variable Dispense from 1.0ml to 4095mL
Usage-1	-	User type 1 dispense
	-	Variable Dispense from 1.0ml to 4095mL
Usage-2	-	User type 2 dispense
	-	Variable Dispense from 1.0ml to 4095mL
Custom	-	Variable dispense from 1.0ml to 4095mL
	-	Edited title and concentration
	-	Variable lot number
	-	Printed label with edited title and concentration, date and lot number

4.2 Setting the amount of fluid to dispense (Unnamed Drug and custom label only)

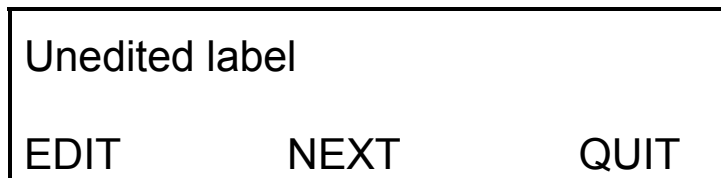
Enter the *SETUP* menu and select a dispense type which has the ability to dispense a variable volume of fluid, as indicated in 4.1 above. The number and decimal point keys will now be activated and it will be possible to enter a new volume between 1.0mL and 4095mL. When the first digit is pressed the volume field will be cleared and a cursor will be placed over the number being entered. Enter the appropriate digits, then press the

ENTER key to accept. If the volume is outside the permissible range a warning will be briefly displayed, then the previous volume will be shown.

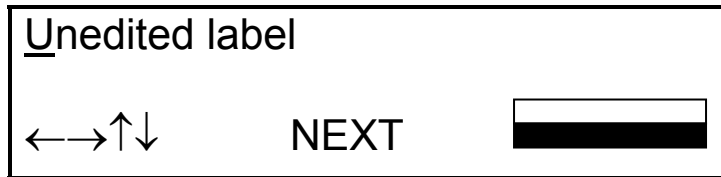
Note: Any digits after the first decimal place will be ignored, and all volumes over 999.9mL can only be entered with no decimal places.

4.3 Custom labels

Enter the *SETUP* menu and select *CUSTOM* dispense type, as indicated in 4.1 above. Pressing the *NEXT* soft key will display the following setup menu screen:



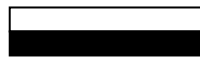
The top line shows the current title that will be printed on the top line of the label by the printer. To edit this title press the *EDIT* soft key and the screen will show:

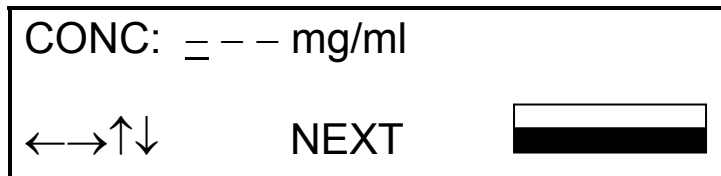


By pressing the left or right arrows the cursor under the first letter will move until you read the letter you wish to alter.

By pressing the Up/Down arrows the letter can be changed through number, upper and lower alphabet and some symbols.

This is repeated until the top line has your label (20 characters max).

By pressing the  key the display shows:



Again the Up/Down Left Right keys can be used to edit the concentration. Mg/ml is already installed to save time, however this can be edited out. Please note CONC: cannot be edited out – it is fixed.

4.4 Setting the Drug Name (Named Drug and custom label only)

Enter the *SETUP* menu and select the Named Syringe or custom label dispense type as indicated in 4.1 above. Pressing the *NEXT* soft key will display the following setup menu screen:

Unspecified Name		
Use ↑↓	NEXT	QUIT

The top line shows the currently selected drug name. In this example no name has been previously selected for this memory, so the default “Unspecified Name” drug name is displayed. Pressing the *UP/DOWN* arrow keys on the numeric keypad will cycle through the available list of drug names. Refer to Appendix 3 for a list of drug names included.

Note: Holding down the *UP/DOWN* arrow keys for a moment will activate the auto repeat function so the desired drug name can be selected more quickly.

4.5 Setting Drug Lot Number (Named Drug only)

Enter the *SETUP* menu and select the Named Syringe dispense type as indicated in 4.1 above. Pressing the *NEXT* soft key twice will display the following setup menu screen:

Lot No.	0000000000	
INC	NEXT	QUIT

The top line shows the lot number from the last time this memory was used. In this example no lot number has previously been used for this memory, so the default ‘0000000000’ lot number is displayed.

At this time the number and decimal point keys will be active and it will be possible to enter a new lot number between 0 and 9999999999. When the first digit is pressed the Lot Number field will be cleared and a cursor will be placed over the number being entered. Enter the appropriate digits, then press the *ENTER* key to accept. Note that unique to the lot number field, the decimal point key has been re-programmed to perform as a delete key, deleting the right most digit from the number display and placing the cursor there ready to enter a new digit.

Also unique to this field, an increment function has been programmed on the left hand soft key. Pressing this key increments the lot number field by one.

4.6 Setting the Rotor Direction & Speed and Priming the Pump

CAUTION: This procedure inherently involves the pump operating and caution should be exercised with regard to liquid spillage.

Enter the *SETUP* menu and press the *NEXT* soft key several times until a menu similar to the following screen is displayed:

CW	Speed 250 RPM	
CCW	NEXT	PRIME

The top line indicates the current rotor direction and speed. The left hand soft key allows the toggling of the rotor direction, between CW (Clockwise) and CCW (Counter-Clockwise).

The number keys will now be activated and it will be possible to enter the two most significant digits of the rotor speed. The least significant digit is fixed at 0, so speeds can only be entered in multiples of 10 RPM.

When the first number digit is pressed the most significant digits of the speed field will be cleared and a cursor will be placed over the number being entered. Enter the appropriate digits, then press the *ENTER* key to accept. If the speed entered is outside the permissible range a warning will briefly be displayed, then the previous speed will be shown.

Pressing the right most soft key, the *START/STOP* key or the foot switch will all have the same effect of starting the pump rotating in the specified direction, at the specified speed, to enable priming of the tube. This priming will continue indefinitely, until either the *START/STOP* key or the foot switch are pressed again.

4.7 Setting the Amount of Fluid to Drawback and the Drawback Delay

The PHARM/PUMP II can automatically draw back volumes from 0 to 9.9mL for each individual dispense. This volume is added to the dispense volume, then after a specified delay time the pump draws back as required giving the correct final volume dispensed. This is a useful feature when filling an item under pressure, for example an ambulatory sphere, to reduce the pressure in the fill tube prior to disconnection of that item.

Enter the *SETUP* menu and press the *NEXT* soft key until a menu screen similar to the following is displayed showing the current value for drawback volume:

Drawback	0.5ml	
DELAY	NEXT	QUIT

The number keys and decimal point will now be activated and it will be possible to enter a drawback volume of between 0.0 and 9.9 mL. When the first number digit is pressed the field will be cleared and a cursor will be placed over the number being entered. Enter the appropriate digits, then press the *ENTER* key to accept. If the volume entered is outside the permissible range a warning will briefly be displayed, then the previous value will be shown.

Pressing the *DELAY* soft key will alter the display to show the current drawback delay time:

Drawback Delay	0.3s	
DB VOL	NEXT	QUIT

Similar to the drawback volume, it will now be possible to enter a new drawback delay value from 0.0 to 9.9 seconds using the keypad. Pressing the *DB VOL* soft function key will revert to the previous drawback volume screen.

4.8 Calibrating the Pharm/Pump II Tube Flow Constants

The PHARM/PUMP II is supplied set up in a default state with flow constants for a standard Acacia[®] single lead pumping chamber set, based on measurements taken

with water at 20°C. If the PHARM/PUMP II is used with different tubing assemblies, or to pump liquids that are at a different temperature and/or have different viscosity then the PHARM/PUMP II can be re-calibrated to take account of this.

Note: The Calibration process requires that the user have an accurate balance available to ascertain the weight of the dispensed volume of liquid. Calculations may be necessary to convert from weight in grams to mL based on the viscosity and temperature of the dispensed liquid.

FOR BEST RESULTS IT IS RECOMMENDED THAT CALIBRATION IS PERFORMED WITH NO DRAWBACK.

Enter the *SETUP* menu and press the *NEXT* soft key several times until a menu screen similar to the following is displayed showing the current dispense volume:

Calibrate	123.4ml	
DEFAULT	NEXT	QUIT

Pressing the *DEFAULT* soft key will restore the standard factory calibration as defined above.

Press the *START/STOP* key or the foot switch to pump the sample. When the PHARM/PUMP II has finished pumping the display will show:

Actual Vol	ml
NEXT	QUIT

Ascertain the volume of liquid by weighing, allowing for temperature and viscosity. Enter the actual volume dispensed in mL up to two decimal places using the numeric keypad. Press the *ENTER* key to store the value and recalculate the flow constants.

It is now advisable to repeat the operation by again starting a dispense and determining its volume as above. Once the measured value is considered acceptable, press *NEXT* or *QUIT* to continue as desired. Otherwise, repeat the operation until the desired accuracy is achieved.

Note: Drawback volume is automatically calibrated during the same operation.

4.9 Setting the Operating Mode

The PHARM/PUMP II can pump in either manual or auto mode. With manual mode a single dispense is made each time the pump is activated. In automatic mode a number of dispenses can be made automatically, each of the same size, with a pre-programmed time delay between each dispense.

Enter the *SETUP* menu and press the *NEXT* key several times until a menu screen is displayed showing the current dispense mode.

If manual mode is selected the screen will look like:

Manual Mode Selected		
AUTO	NEXT	QUIT

To change from manual to auto mode press the *AUTO* key and the display will reflect the new mode.

If automatic mode is selected the screen will look similar to the following:

Auto Delay	1.0s	
MANUAL	NEXT	QUIT

To change from auto to manual mode press the *MANUAL* key, and the display will reflect the new mode.

At this time the number and decimal point keys will be active and it will be possible to enter a new Auto Delay between 0.0 and 99.9 seconds. When the first digit is pressed the Auto Delay field will be cleared and a cursor will be placed over the number being entered. Enter the appropriate digits, then press the *ENTER* key to accept. If a value is entered outside the permissible bounds an error message will briefly be displayed and then the previous value will be restored.

4.10 Setting the Auto Mode Count (Auto Mode Only)

When the PHARM/PUMP II is set to automatic mode the operator can enter the number of times to repeat the dispense between 1 and 999. If the PHARM/PUMP II is set to manual mode this menu is not displayed.

Enter the *SETUP* menu and press the *NEXT* key several times until a menu screen is displayed showing the current count required:

Count Required	10
NEXT	QUIT

Enter the new count using the numeric keypad and press the *ENTER* key to store the new value.

4.11 Re-Setting the Auto Count

As the PHARM/PUMP II pumps it maintains a count of how many individual dispenses have been made in the current operating session. This count functions differently depending upon the current operating mode.

- In Automatic mode the count is incremented for each individual dispense and is then automatically reset at the end of the last dispense.
- In manual mode the count is incremented for each individual dispense indefinitely. If the maximum count of 999 is reached then the count will cycle back to 0.

To manually reset this counter at any time, enter the *SETUP* menu and press the *NEXT* key until the following menu screen is displayed:

Reset Auto Count		
ACCEPT	NEXT	QUIT

Pressing *ACCEPT* will reset the counter and a brief message will be flashed on the display indicating that it has been done.

4.12 Setting the Volume Remaining

Enter the *SETUP* menu and press the *NEXT* key several times until a menu screen is displayed showing the current Volume Remaining parameters.

If Volume Remaining is enabled the screen will look similar to:

Vol Remain	1065ml	
OFF	NEXT	QUIT

Enter the amount of fluid remaining in mL using the keypad. The maximum permissible volume is 6000mL, or 6 liters.

To disable the Volume Remaining function press the *OFF* key and the display will reflect the new mode:

Vol Remain	-OFF	
ON	NEXT	QUIT

To enable the Volume Remaining function press the *ON* key.

4.13 Copying a Memory Setup into Another Memory Location

The last option available in the *SETUP* menu allows the current set of operating parameters to be copied into any one of the 26 internal non-volatile memories. Enter the *SETUP* menu and press the *NEXT* key until the following menu screen is displayed:

Copy Setup into	A	
USE ↑↓	NEXT	QUIT

The letter in the top right hand corner of the display denotes the memory location into which the current set of operating parameters will be stored. Use the *UP/DOWN*

number keys to alter this location as required, and then press *COPY* to perform the copy function.

Using this option it is possible to copy memory contents in several different ways. For example:

- A) To produce an entirely new setup in memory F:
- From the main start up menu, use the *UP/DOWN* keys to select memory F
 - Enter the setup menus and alter as required.
 - From any setup menu press the *QUIT* key, or press the *COPY* key from the Copy Setup menu without changing the destination memory.
- B) To produce a new setup in memory H similar to the setup in memory G, but without altering the setup in G:
- From the main start up menu, use the *UP/DOWN* keys to select memory G
 - Enter the setup menu and alter parameters as required.
 - From the Copy Setup menu select the destination memory H using the *UP/DOWN* arrow keys then press the *COPY* key.

Note: Be careful not to press the *QUIT* key once editing has begun otherwise the settings in memory G will be altered accordingly.

Note: Edited labels will also be copied into the new memory.

4.14 Entering the Volume Remaining

From the main menu, pressing the right hand *MENU* soft function key moves the user from the main top level operating menu into the *MENU* menu. The following display will typically be visible:

Vol Remain	1000ml
NEXT	QUIT

Type in the new volume remaining, between 0 and 6000mL, using the numeric keys and press *ENTER* to accept.

If the Volume Remaining function has been disabled in the Setup menu, then this will be indicated as below. It will be necessary to re-enable the function before a new value can be entered:

Vol Remain	-OFF
NEXT	QUIT

4.15 Re-Printing Current Label (Named Drug and custom label only)

If further copies of a printed label are required, for example if one of the automatically printed labels is damaged, it is possible to re-print a label with the current settings on it. Enter the *MENU* menu and press the *NEXT* key. If the current dispense type is a named drug then the following menu screen will be displayed:

Print Current Label		
ACCEPT	NEXT	QUIT

Press the *ACCEPT* key and the current label information will be printed.

4.16 Checking the Current Date & Time

To view the current date & time, enter the *MENU* menu and press the *NEXT* key until a display similar to the following is displayed:

14:55:03	11/03/06
NEXT	QUIT

A dynamic display of the current date and time is given, with the time in standard Hours:Minutes:Seconds format and the date in either American Month/Date/Year or European Date/Month/Year format.

5.0 PERFORMING A DISPENSE

Before a dispense can be performed it is assumed that the operator has correctly installed the necessary tube, fluid reservoir and dispense receptacle.

IMPORTANT **WHEN FITTING A NEW TUBING ASSEMBLY** – Before using a new tubing assembly it is important that the rotor is rotated several times by hand to “bed” the tubing into the rotor and rotor casting.

5.1 Manual dispense

A manual dispense can be initiated from the main menu by pressing either the *START/STOP* key or the foot switch. The PHARM/PUMP II will dispense its programmed volume, using the programmed speed profile & direction. During a manual dispense the display shows the following information:

A: Syringe	25.0ml
Dispense 1	6.9ml

The currently selected memory letter is shown in the top left hand corner of the display. Immediately after this is either the drug name (when in named drug mode) or the dispense type description, eg. Ambul. (when in unnamed drug mode). When not in named drug mode the right hand side of the top line displays the volume of fluid to be dispensed, otherwise this is assumed to be 10.0mL.

On the bottom line of the display can be found the number of manual dispenses performed in this session, including the current dispense, and a running total of the volume of fluid being pumped.

When the dispense has finished a label is printed if necessary and the display reverts to the main menu where the pumping operation can be repeated if required.

Note: The dispense count will increment each time the pumping operation is initiated.

5.2 Automatic dispense

An automatic dispense can be initiated from the main menu in an identical manner to a manual dispense, by pressing either the *START/STOP* key or the foot switch. The PHARM/PUMP II will dispense its programmed volume, using the programmed speed profile & direction. During an automatic dispense the display typically shows the following information:

C: AMIKACIN 250mg		
1 of 10		8.5ml

The top line of the display is identical to that during a manual dispense, with the currently selected memory letter, drug name or dispense type description and the volume fluid to be dispensed, if applicable.

On the bottom line of the display as well as the number of dispenses performed in this session can be found the total number of dispenses which will be performed. A running total of the volume of fluid being pumped is again shown in the bottom right hand corner.

At the end of each individual dispense a label is printed if necessary. When all dispenses have finished the display reverts to the main menu, where the pumping operation can be repeated if required.

Note: The dispense count will increment as each individual dispense is initiated.

5.3 Pausing/Aborting a Dispense

During a dispense the pumping operation can be paused by pressing either the *START/STOP* key or the foot switch. The following display will be seen:

PAUSED AT		12.6ml
RESUME	ABORT	CAL

Note: Since the pump cannot monitor user inputs while printing, if a label is being printed as the *START/STOP* key/foot switch is pressed it will be necessary to hold the key/switch for one second until recognized.

The amount of fluid dispensed so far is shown on the top line, and the user is asked to *RESUME* the dispense, or *ABORT*. The resume operation can be performed by pressing the *START/STOP* key or the foot switch, as well as with the soft key. The abort operation can only be performed by pressing the middle soft key.

If the pumping operation is aborted the running dispense counter is neither incremented nor initialized. The next time a dispense operation is initiated the count will resume from where it left off previously. This allows the user to abort during an automatic dispense, make setup changes, for example to change the fluid reservoir and re-prime, and then continue the dispense where it left off.

If after an abort the user wishes to start the count from 1 then he or she must use the *Reset Auto Count* option in the setup menu.

5.4 Calibration On-The-Fly

At any time during a manual or automatic dispense it is possible to pause the dispense, measure how much fluid has been dispensed so far and re-calibrate before resuming the dispense. This can be done several times during a dispense depending upon the length of the dispense, and allows true Calibration “On-The-Fly”.

During a dispense pause the pumping operation by pressing either the *START/STOP* key or the foot switch. The following display will be seen:

PAUSED AT	12.6ml	
RESUME	ABORT	CAL

Measure the amount of fluid which has been dispensed so far and compare with the value indicated in the *PAUSED AT* field. If the difference is considered unacceptable then press the *CAL* soft key. The following screen will be displayed:

Calibrate	ml
DEFAULT	QUIT

Pressing the *DEFAULT* soft key will restore the standard factory calibration. Enter the measured value of fluid dispensed using the keypad with up to 2 decimal places

accuracy, then press *ENTER*, *QUIT*. The new calibration value will be calculated and stored in the current memory, and the *PAUSED AT* screen above will be re-displayed reflecting the new value.

Note: If drawback is enabled it is not possible to enter the *CAL* menu during either the forward or reverse drawback portions of a dispense. For example, if pumping 100mL with 5mL drawback, the *CAL* option will be disabled both when pumping from 100mL to 105mL as well as when drawing back from 105mL to 100mL. A suitable error message will be displayed.

5.5 Operation of the Foot Switch

The foot switch has an identical function to the *START/STOP* key and so can be used to start, pause or resume a dispense.

Note: If it is permanently held down the pump will cease to function and a “RELEASE FOOTSWITCH” error message will be displayed.

5.6 Opening the Door During a Dispense

If the pump rotor access door is opened during a dispense then the rotor will stop immediately and the following message will be displayed:

DOOR OPEN

Closing the door will allow the dispense to be either resumed or aborted. The following screen will be displayed:

PAUSED AT	12.6ml
RESUME	ABORT

The amount of fluid dispensed so far is shown on the top line, and the user is asked to *RESUME* the dispense, or *ABORT*. The resume operation can be performed by pressing the *START/STOP* key or the foot switch, as well as with the soft key. The abort operation can only be performed by pressing the middle soft key.

If after an abort the user wishes to start the count from 1 then he or she must use the *Reset Auto Count* option in the setup menu.

Note: This is not a preferred method of aborting or pausing a dispense and accuracy of the current dispense cannot be guaranteed. Use the *Pausing/Aborting a Dispense* option above.

6.0 LABEL PRINTER

The PHARM/PUMP II hardware and software has been designed to operate with one specific make and model of label printer, and with one specific size and format of label medium. No other combinations are recommended.

Immediately before and after printing a label the PHARM/PUMP II checks the status of the printer. If there is a problem with the printer, the interface, or if the printer is simply switched off, then the following message will be displayed:

Printer Error	
RETRY	ABORT

This message could take up to 7 seconds to appear. Ensure that the green light on the front of the printer is on, that the connection between the printer and pump is made correctly and securely, and then *RETRY*. If problems still exist consult the printer manual, print a test label and ensure the printer is configured correctly as described below.

If the printer is out of paper but otherwise OK, the following message will be displayed:

Printer Out Of paper	
RETRY	ABORT

Load a new roll of label media correctly in the printer and press the feed button on the printer. Ensure that the label feeds to the next position, that the light on the front of the printer is glowing green and then press the *RETRY* key.

6.1 Configuring the Printer

When connecting a printer for the first time, it is important that the serial port parameters of the printer are set to their default settings of:

9600 Baud, no parity, eight data bits, 1 stop bit

It can be assumed that this is the case with a new printer and so it should not be necessary to check unless problems are encountered. If problems with label printing are encountered it is possible to ascertain the printer status by printing a test label in the following manner:

- Verify that the printer is ready to print labels (label media installed and power connected)
- Ensure that the power is turned off
- Press and hold the Feed button
- Turn the printer on
- Release the feed button
- After a few seconds a test printout will be made. On the printout should be found the text "COMM 096,N,8,1". If similar text is visible, but with different numeric values, the pump will not be able to communicate with the printer. Consult Acacia[®] for more information.
- Turn the printer off for at least 5 seconds before proceeding.

Next it is necessary to allow the PHARM/PUMP II to download the correct operating parameters to the printer. This is done automatically every time the pump is turned on but the printer must be correctly connected and turned on first to allow it to receive them. Therefore, connect the printer to the power and the pump, turn the printer on, and then a few seconds later turn the pump on. This only needs to be done once as the settings are stored in the printer's internal non-volatile memory.

The cable between printer and the pump is a standard 9 pin male to 9 pin female D-type lead with all connections made straight through. Contact Acacia[®] if spares are required.

APPENDIX 1 – SUMMARY OF ERROR MESSAGES

ERROR	DESCRIPTION	See Section
RANGE 1.0 TO 4095ml	An attempt was made to enter a volume less than 1.0mL or greater than 4095mL	4.2
RANGE 0 TO 9.9ml	An attempt was made to enter a drawback volume greater than 9.9mL	4.6
RANGE 0.5 TO 99.9s	An attempt was made to enter an auto time delay less than 0.5s or greater than 99.9s	4.8
RANGE 1 TO 999	An attempt was made to enter an auto repeat count of 0	4.9
RANGE 0 TO 9.9s	An attempt was made to enter a drawback delay greater than 9.9s	4.6
Range 0 to 6000ml	An attempt was made to enter a volume remaining greater than 6000mL	4.14
* Reservoir Empty *	Volume remaining reservoir probably empty	4.14
Insufficient Fluid	There is probably insufficient fluid remaining to perform the next dispense	4.14
Printer Out Of Paper	Label printer media is finished or incorrectly installed	6.0
Printer Error	An error occurred while attempting to communicate with the label printer	6.0
DOOR OPEN	Safety door over the rotor is open	5.6
RELEASE FOOTSWITCH	Foot switch permanently held down	5.5
In Drawback Portion Cannot Calibrate	An attempt was made to calibrate on the fly during the drawback portion of a dispense	5.4

APPENDIX 2 – PHARM/PUMP II SPECIFICATION

Power Supply	110/115V 220/230V	50/60Hz single phase 50/60Hz single phase
Power Consumption	90W	
Fuse Rating	T1.6A	
Electronics	Microprocessor controlled	
No of Memories	26 with custom label for printed labels	
No of Label Names	86 Pre-programmed drug names for printed labels	
I/O Ports	Foot switch/ XY, RS232 printer	
Size	Width	290mm
	Height	150mm
	Depth	250mm
Weight	7Kg	
Pumping Method	Peristaltic	
Rotor Speed Range	30 – 300 RPM	
Minimum Tubing Bore	3mm	
Maximum Tubing Bore	5mm	
Tubing wall thickness	2mm	
Maximum Dispense Volume	4095mL	
Minimum Dispense Volume	1.0mL	
Maximum Drawback Volume	9.9mL	
Minimum Drawback Volume	0mL	
Accuracy	+/- 1.0% for volume over 10mL	
Repeatability Error	Generally < 1%	

APPENDIX 3 – DRUG NAMES

Number	Drug Name	Concentration @ 10mL Dispense
0	Unspecified Name	-----
1	AMIKACIN 250mg	25mg/mL
2	AMIKACIN 500mg	50mg/mL
3	AMPICILLIN 250mg	25mg/mL
4	AMPICILLIN 500mg	50mg/mL
5	AMPICILLIN 1g	100mg/mL
6	AMPICILLIN 1.5g	150mg/mL
7	AMPICILLIN 2g	200mg/mL
8	AMP. SULBACTAM 1.5g	150mg/mL
9	AMP. SULBACTAM 3g	300mg/mL
10	ANECTINE 200mg	20mg/mL
11	AZLOCILLIN 2g	200mg/mL
12	AZLOCILLIN 3g	300mg/mL
13	AZLOCILLIN 4g	400mg/mL
14	AZTREONAM 1g	100mg/mL
15	AZTREONAM 2g	200mg/mL
16	CEFAMANDOLE 1g	100mg/mL
17	CEFAMANDOLE 2g	200mg/mL
18	CEFAZOLIN 500mg	50mg/mL
19	CEFAZOLIN 1g	100mg/mL
20	CEFAZOLIN 2g	200mg/mL
21	CEFONICID 1g	100mg/mL
22	CEFONICID 2g	200mg/mL
23	CEFOPERAZONE 1g	100mg/mL
24	CEFOPERAZONE 2g	200mg/mL
25	CEFOTAXIME 1g	100mg/mL
26	CEFOTAXIME 2g	200mg/mL
27	CEFOTEXAN 1g	100mg/mL
28	CEFOTEXAN 2g	200mg/mL
29	CEFOXITIN 1g	100mg/mL
30	CEFOXITIN 2g	200mg/mL
31	CEFTAZIDIME 1g	100mg/mL
32	CEFTAZIDIME 2g	200mg/mL
33	CEFTIZOXIME 1g	100mg/mL
34	CEFTIZOXIME 2g	200mg/mL
35	CEFTRIAZONE 500mg	50mg/mL

Number	Drug Name	Concentration @ 10mL Dispense
36	CEFTRIAZONE 1g	100mg/mL
37	CEFTRIAZONE 2g	200mg/mL
38	CEFUROXIME 750mg	75mg/mL
39	CEFUROXIME 1.5g	150mg/mL
40	CEPHALOTHIN 1g	100mg/mL
41	CEPHALOTHIN 2g	200mg/mL
42	CEPHAPIRIN 1g	100mg/mL
43	CEPHAPIRIN 2g	200mg/mL
44	CHLORAMPHENICOL 1g	100mg/mL
45	CIMETIDINE 300mg	30mg/mL
46	CIMETIDINE 450mg	45mg/mL
47	CLINDAMYCIN 300mg	30mg/mL
48	CLINDAMYCIN 600mg	60mg/mL
49	CLINDAMYCIN 900mg	90mg/mL
50	DILANTIN 300mg	30mg/mL
51	DILANTIN 500mg	50mg/mL
52	DILANTIN 600mg	60mg/mL
53	FAMOTIDINE 20	-----
54	GENTAMICIN 40	-----
55	GENTAMICIN 60	-----
56	GENTAMICIN 80	-----
57	GENTAMICIN 100	-----
58	GENTAMICIN 120	-----
59	GENTAMICIN 140	-----
60	METOCLOPRAMIDE 5mg	0.5mg/mL
61	METOCLOPRAMIDE 10mg	1mg/mL
62	METOCLOPRAMIDE 50mg	5mg/mL
63	MEZLOCILLIN 2g	200mg/mL
64	MEZLOCILLIN 3g	300mg/mL
65	MEZLOCILLIN 4g	400mg/mL
66	NAFCILLIN 1g	100mg/mL
67	OXACILLIN 1g	100mg/mL
68	OXACILLIN 2g	200mg/mL
69	PENICILLIN G 1 MIL	-----
70	PENICILLIN G 1.5 MIL	-----
71	PENICILLIN G 2 MIL	-----
72	PENICILLIN G 2.5 MIL	-----
73	PIPERACILLIN 1g	100mg/mL
74	PIPERACILLIN 2g	200mg/mL

Number	Drug Name	Concentration @ 10mL Dispense
75	PIPERACILLIN 3g	300mg/mL
76	PIPERACILLIN 4g	400mg/mL
77	RANITIDINE 50mg	5mg/mL
78	TICARICILLIN 3g	300mg/mL
79	TIMENTIN 3.1g	310mg/mL
80	TOBRAMYCIN 40mg	4mg/mL
81	TOBRAMYCIN 60mg	6mg/mL
82	TOBRAMYCIN 80mg	8mg/mL
83	TOBRAMYCIN 100mg	10mg/mL
84	TOBRAMYCIN 120mg	12mg/mL
85	TOBRAMYCIN 140mg	14mg/mL
86	ZOFRAN 8mg	0.8mg/mL
87	ZOFRAN 12mg	1.2mg/mL

APPENDIX 4 – FRONT CONTROL PANEL

