DOSIPUMP 1000

(DosiPump DP1000, DosiPump DP 1000P, DosiPump DP 1000P/I)

USER MANUAL 1.8 - ENGLISH

Contents

1   Overview

1.1 Preface further to the User Manual

The User Manual explains the mode of operation and the operating procedures for the DOSIPUMP 1000.

The User Manual is subdivided into five main sections:

1. Overview
2. Safety information
3. Commissioning
4. Operation of the DOSIPUMP 1000
5. Technical information

Each section consists of a guide to the individual functions, structured step-by-step. The user is also provided with special information relating directly to the relevant task explained (Warning, Important and Note).

Overview
The Overview contains general information on the DOSIPUMP 1000, the intended application and the basic concept.

Safety information
The DOSIPUMP 1000 safety information.

Commissioning
The steps and preparatory work required for commissioning.

Operation of the DOSIPUMP 1000
This section documents all information required for daily operation. It explains both operation and all parameters.

Technical information
This section provides comprehensive technical information on all functions of the DOSIPUMP 1000. This section is structured so that it can be used both as a source of additional useful information on operation and as an independent reference work.

1.2 Dosipump Manual Version 1.2

Dosipump Software Version V 1.8 - 15.09.06
- New Mode Function: Antidrop
- New Mode: Dilute

1.3 Basic information on the DOSIPUMP 1000

1.3.1   Introduction to the DOSIPUMP 1000

Figure 1:   DOSIPUMP 1000

Note: You can find a list of all standard accessories and optional accessories in Chapter "Technical information" in Section "Accessories".

1.3.2   Intended application

The DOSIPUMP 1000 is multi-function pump.

1.3.3   Basic concepts

The DOSIPUMP 1000 offers the user a wide variety of functions and features.
The most important features are outlined in the brief list below:

- Easy-to-understand, user-friendly operation with graphic screen and touch screen
- Variably adjustable sample volumes, speed, pause time and AntiDrop function
- Automatic initialisation and self-test run
- The instrument can be calibrated for the relevant tube diameter used
- The tube fittings can be exchanged easily thanks to the practical lever closure on the pump head
- Self monitoring of all device functions (motors ...)
- Easy maintenance
- Optional: connection to host PC, external printer and footswitch
- External control with footswitch

Equipment variants:

- DosiPump 1000:   Modes: Manual, Dispense   Item No. 700'000
- DosiPump 1000 P: Modes: Manual, Dispense, +Printer Interface RS232   Item No. 710'000
- DosiPump 1000 PI: Modes: Manual, Dispense, Multi-Dispense, Dilute,   Item No. 720'000
                                    Pipette, + Interface to host PC and Printer

1.3.4   Symbols used in the User Manual

The signal words *WARNING, IMPORTANT* and *NOTE,* used in this User Manual, serve to highlight important information and instructions applicable to danger situations. These words can be found together with a special warning symbol in the left-hand column.

Symbol	Definition
	Warning points out a potentially dangerous situation which should be avoided in order to avoid damage to the equipment or injuries. This signal word is used only in extreme situations and thus requires special attention.
	Important points out special problems or important information. Please read through the accompanying text carefully. It is important for understanding the relevant topic or command.
	Note serves to identify information which is useful but not crucial to a task. Read though the accompanying text carefully. It may help you to clarify any questions which you may have.

Table 1: Caption to the symbols

2 Safety information

2.1 Operating environment

Several factors must be noted when selecting the right operating environment for the unit. The room selected may not pose an aggressive environment either for the unit itself or for its intended application.
The DOSIPUMP 1000 should be operated only under ambient conditions corresponding to a normal environment (5°C with maximum 80 % relative humidity). The relative humidity must decrease in linear fashion with a rise in temperature.

NOTE These conditions also apply to transport.

The DOSIPUMP 1000 should be installed on a clean, dry, smooth, horizontal surface. The front panel of the unit should be near to the front edge of the workbench in order to ensure convenient operation and easy access to the touch screen.
The unit should be installed in the direct vicinity of electrical socket outlets.

Summary of the DOSIPUMP 1000 operating environment

Temperature range:	+5°C to +45°C
Relative humidity:	Max. 80 % up to 31°C; decreasing in linear fashion down to 50 % at 40°C
Mains power supply:	Voltage fluctuations +/- 10 % of rated value
Pollution severity:	2 in accordance with IEC 664
Location:	Complying with enclosure IP 21
	Sturdy support surface
Environment:	Avoid splash water and contact with chemicals.
	There must be no risk of explosion

WARNING We are unable to guarantee operability and functional safety of the unit if the ambient conditions applicable to the location are not complied with.

2.2 Safety-conscious working

The DOSIPUMP 1000 complies with the state of the art and is safe to operate. The DOSIPUMP 1000 may pose residual risks and dangers if it is used and operated incorrectly by untrained personnel. All persons entrusted with the task of operating the DOSIPUMP 1000 must have read and understood the User Manual and, in particular, the safety information or must have been instructed by superiors in such a manner that they are able to safely operate the DOSIPUMP 1000.
Besides the safety information listed above, other applicable provisions and regulations such as GLP, GMP, FDA, the regulations of the German Liability Insurance Associations, those of the Heath Authority and those of the Factory Inspectorate must also be followed.

2.3 Qualification of the operating personnel

Specialist technical training is generally required. Special knowledge is required when operating the DOSIPUMP 1000 to prevent potentially dangerous situations with the unit. Semi-skilled staff without the corresponding specialist technical training generally do not have such qualifications and are able to perform these tasks only after instruction and under the supervision of specialist personnel.

2.4 Safety information for the user company

The superiors of the operating personnel must have understood and must comply with Chapter "Safety information" and the aspects of operation relevant to safety. They must ensure that the operating personnel have understood and follow the safety information.

Before placing the unit into operation, superiors must check that operation of the DOSIPUMP 1000 in conjunction with other installations or system sections cannot pose additional risks and dangers.

If necessary, additional technical safety instructions must be drawn up by superiors. In order to preclude the possibility of residual risks and dangers, the company using the DOSIPUMP 1000 may need to draw up in-company instructions and have receipt of these instructions confirmed by the personnel responsible. Moreover, the user company must stipulate the scopes of authority for working with the DOSIPUMP 1000 so that there are clear scopes of authority in relation to technical safety aspects.

2.5 No arbitrary conversion work or modification work

No modifications may be made to the DOSIPUMP 1000. In particular, defective components may be replaced only by original parts. Neither the design nor the technical safety systems of the DOSIPUMP 1000 may be modified without our express consent. In particular, no modifications to safety facilities are permitted. Modifications of any nature will exempt us from liability for resultant damage and injury.

2.6 Supplementary safety information

1. The DOSIPUMP 1000 may be used only for the intended application as stated and for no other purposes.
2. Maintenance work and repair work may be carried out only by qualified staff.
3. The unit must be installed in such a manner that the On/Off switch is easily accessible at all times.
4. Should a situation arise in which safe operation of the DOSIPUMP 1000 can no longer be guaranteed, the unit must be placed out of operation and locked until it can be repaired by qualified staff. Such a situation must be assumed if:
   - there is visible damage to the DOSIPUMP 1000,
   - the DOSIPUMP 1000 is no longer working or
   - the mains-circuit over current release trips.
5. Disconnect the DOSIPUMP 1000 from the mains power supply before moving it to a new location.
6. Connect the power cables of the DOSIPUMP 1000 only to a fully earthed mains system in order to avoid electric shock. Do not use adapters for plugs and do not remove earthing connections from cables. If an extension cable has to be used, please use only three-core cable with correctly earthed plugs.
7. Ensure that all cables and tubes are laid in a safe area to prevent the risk of tripping over them.
8. Do not spill food or liquids on the DOSIPUMP 1000. Please read the technical guide if the DOSIPUMP 1000 requires cleaning.

2.7 Warranty and liability

The Biotektron company provides warranty for this unit covering defects in relation to both components and design. The unit has been thoroughly inspected in order to ensure that it complies with the specifications published. The Biotektron company guarantees that this unit will remain free of defects for a period of 24 months as of the date of delivery. This warranty shall be rendered null and void if the unit is not operated by a trained person in accordance with the instructions supplied by Biotektron or if an unqualified person attempts to repair the unit.

NOTE   Parts subject to wear are not covered by warranty.

3 Commissioning

3.1 Unpacking

The DOSIPUMP 1000 is supplied packaged in a product-specific carton. The recommended unpacking procedure for the DOSIPUMP 1000 is as follows:

1. Remove the securing straps
2. Open the packaging
3. Remove the inside cover of the packaging
4. Lift the unit out of the packaging. Do not grip the unit by the pump head when lifting it out.
5. Place the unit onto a sturdy table or bench.
6. Remove all miscellaneous packaging items (foam rubber and safety stickers...) and place them back into the transport packaging since they may be needed if it becomes necessary to transport the unit again.

WARNING   If there are signs of condensation on the DOSIPUMP 1000, allow at least two hours for the condensation to dry out before switching on or operating the unit.

3.2 Mains connection

The DOSIPUMP 1000 must be connected to the mains power supply using the enclosed mains cable. The electrical connection ratings must correspond to the ratings specified on the sticker on the rear side of the unit and may be neither higher nor lower than these values.

Connect the power cable of the DOSIPUMP 1000 only to a fully earthed mains power supply system in order to avoid electrical shock. Do not use adapters for the plugs and do not remove the earthing connections from the cable. If it is necessary to use an extension cable, please use only three-core cables with correctly earthed plugs for this.

3.3 Inserting the tube fitting in the pump

Perform the following steps to insert the tube fitting in the pump:

1. Move the lever on the pump head to the right
2. Insert the tube fitting into the pump
3. Move the lever back to the left
4. Immerse the end of the tube (intake end) into the medium to be dispensed or connect it to the optional culture medium preparation unit.

3.4 Screw on the stand

A stand can be fitted with quick fixer to fix the tube fitting in order to make work with the DOSIPUMP 1000 easier.

1. Screw the stainless steel stand into the opening on the housing cover.
2. Attach the stainless steel cross-bar with stand cross-clamps.
3. Also firmly clamp the quick fixer clamps.

3.5 Switch the unit on

Press the master switch on the rear panel of the DOSIPUMP 1000. The unit is then reinitialised. If a printer is connected, this printer is also initialised. The software version and type are displayed. You will see the main menu after initialisation is complete.

3.6 Licensing

Before the unit can be operated, you must first enter the license code (supplied license sheet). The DOSIPUMP 1000 is supplied as standard with a permanent license.
Enter the license code with the ENTER key.

```
         LICENCE
      DOSIPUMP LOCKED
  REQUESTCODE FOR NEW LICENCE:

  H78N-LUMO-9TLG-MCLQ

 ENTER             PRINT
  ????.????.????.????
 A  B  C  D  E  F  G  H
 I  J  K  L  M  N  O  P   =>
 Q  R  S  T  U  V  W  X
 Y  Z  SP  .  CLR ESC  OK
```

The entry must be made alphanumerically and concluded with the Enter key (OK).

Switch over between the pages with keys => / <=.

```
  ????.????.????.????
   +  -  /  *        7  8  9
                     4  5  6
 <=   BS     DEL     1  2  3
     <-   ->         0     .
```
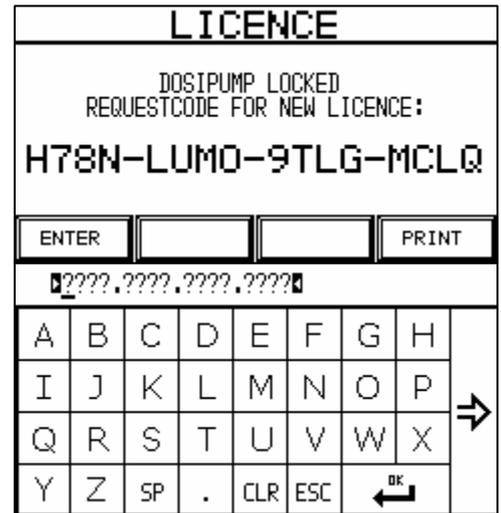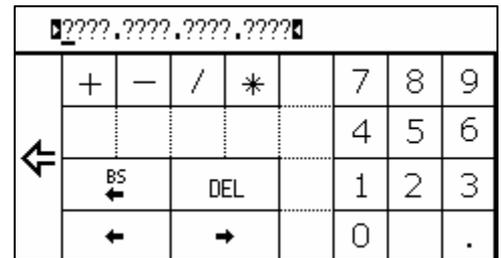
After license code entry is complete, you must then enter the date and time. Use the MENU key to complete the entry, after which the unit is ready for operation.

```
     DATUM, ZEIT

  13 : 55 : 50

  12 . JAN . 2005

 WEITER   +     -    MENU
```
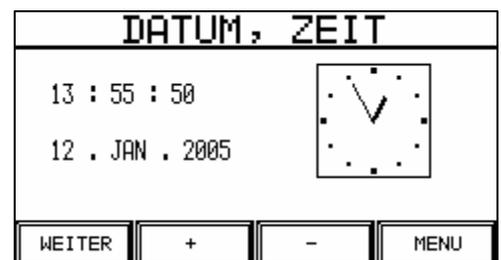
If a unit is used for test purposes for instance, the unit may be activated by the seller for a specific period (time-limited license). The License window with the application code is displayed on screen after this period elapses.

You can use this code to apply for a new license from the seller. You can print out the application code with the key. Use key ENTER to enter the license code.

4 Operation of the DOSIPUMP 1000

4.1 Fundamentals

Significance of the symbols:

T	Program text
◑	Flow rate
▾	Culture medium filling quantity (volume)
✕	AntiDrop function for preventing drips (Pump menu)
⧖	Pause time after filling (Pump menu)
[₊]	Number of volumes in the case of Multi-Dispense
⇔	Air gap between diluent and sample
▾	Diluent
▦	Status for external logging software (DOSIPUMP Recorder). This symbol is displayed in the top right-hand corner of the screen as soon as the software has been launched and communication has been established with the DOSIPUMP 1000.
▥	Cycle pause between two cycles with automatic repetition.

ALPHANUMERIC ENTRIES:

Alphanumeric entries are used for the program name or license code.

The entered value is displayed in the upper sector and can be edited as required.

The entry can be acknowledged with key Enter (OK), after which the entry field is then quit.

You can switch over between the pages with keys => / <=.
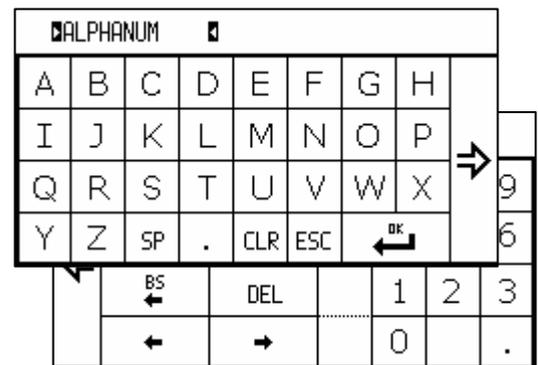
NUMERIC ENTRIES: Name of the entry

Description

Entry field

Value range
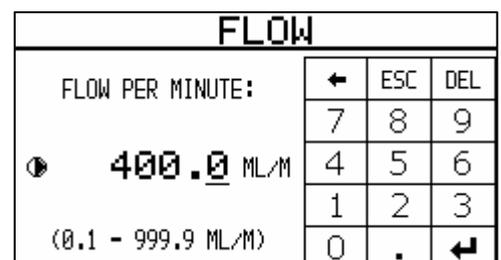
You can acknowledge the entry and quit the entry field with key Enter (OK).

4.2 Main menu

After you switch on the master switch on the rear left-hand side, you will see the DOSIPUMP 1000 main menu after a brief initialisation display. The software version, the time and the current date are displayed. If a printer is connected, this is also included in the switch-on and initialisation routine. The printer version is displayed briefly.
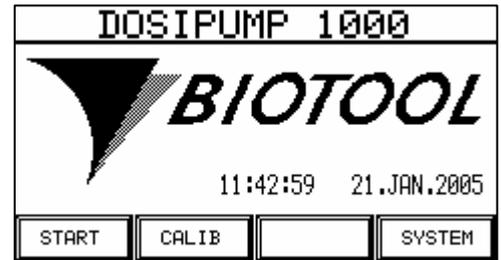
It is possible to branch to three sub-menus from the main menu:

START: Actual operating function of the DOSIPUMP 1000.
CALIB: Calibration of the volume as a function of the tube.
SYSTEM: Allows you to make system settings and presets.

Touch the displayed keys of the touch screen in order to access the required menu. The keys are displayed graphically in such a manner that the key appears to be pressed when you touch it.

The three sub-menus are described in detail in the chapters which follow.

4.3 Start menu

4.3.1   Overview "operating modes"

The individual operating modes are displayed on screen. Func-
tions Multi-Dispense, Dilute and Pipette may not be supported,
depending on pump type.

DosiPump 1000/P: Manual, Dispense
DosiPump 1000 PI: Manual, Dispense, Multi-Dispense,
                   Dilute, Pipette
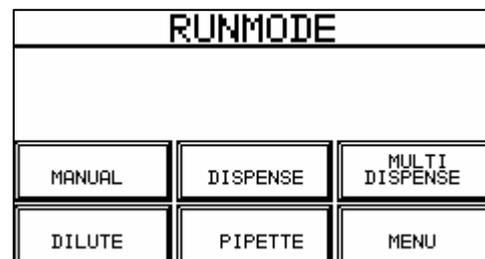
This menu allows two to five different operating functions:

MANUAL: Manual mode is the simplest operating function. The pump is operated manually
                   with Start and Stop.

DISPENSE: Dispense mode dispenses a preset volume.

MULTI -   Multi-Dispense mode allows you to process up to 12 different volumes
DISPENSE: consecutively.

DILUTE: This function allows dilution of a sample (concentrate) with a downstream diluent.

PIPETTE: The function allows pipetting of a volume. This means that a specific volume can
                   be inducted. This volume is then issued again, including a reserve.

MENU: This menu allows you to return to the main menu.

Touch the displayed keys of the touch screen in order to access the required menu. The keys are displayed
graphically in such a manner that the key appears to be pressed when you touch it.

4.3.2   Manual mode

Manual mode is the simplest operating function. The pump speed, the AntiDrop function and a program name can be set. Ten different program memories are available.

If you select an operating mode, you can choose between 10 customer-specific programs.

You can scroll to the next page with key →.

These programs can be selected, edited, deleted or started with the function keys. Keys EDIT and START will now be described.

```
┌─────────────────────────────┐
│          MANUAL             │
│ ┌─────────────────────────┐ │
│ │ NR NAME      FLOW        │ │
│ │ ── ─────────  ────────── │ │
│ │➜ 1 TEST      400.0ML/M   │ │
│ │  2 -                     │ │
│ │  3 -                     │ │
│ │  4 -                     │ │
│ │  5 -                     │ │
│ │    ...                   │ │
│ └─────────────────────────┘ │
│ ┌──────┬──────┬──────┬────┐ │
│ │ NEXT │ PREV │START │--> │ │
│ └──────┴──────┴──────┴────┘ │
└─────────────────────────────┘
  ┌──────┬────────┬──────┬────┐
  │ EDIT │ DELETE │ MENU │--> │
  └──────┴────────┴──────┴────┘
```

4.3.2.1   Manual EDIT

A program can be edited with the EDIT key.

[T] It is important that each program has a name. If you press function key NAME, you can enter the name on the alphanumeric keypad (see 4.1). A maximum of 12 characters can be entered.

```
┌─────────────────────────────┐
│          MANUAL             │
│ ┌───┐ NAME                  │
│ │ T │ TEST                  │
│ └───┘                       │
│ ┌───┐ FLOW                  │
│ │ ◑ │ 400.0ML/M             │
│ └───┘                       │
│ ┌───┐ ANTIDROP              │
│ │ ▧ │ 0.0ML                 │
│ └───┘                       │
│ ┌──────┬────┬────┬────────┐ │
│ │START │    │    │  MENU  │ │
│ └──────┴────┴────┴────────┘ │
└─────────────────────────────┘
```

◑ The FLOW key allows you to set the pump speed. Make the entry with the numeric keypad (see 4.1). You can enter a flow rate of between 0.1 and 999.9 ml/min.

▧ The Anti drop key allows the operator to select any retraction angle between 0-90°. The Dosipump will execute this Auto reverse of the pump head after each individual dispensed volume in all modes of operation. With all consecutive dispensed volumes the pump automatically compensates the selected retraction angle. The entry is made with the numeric keypad. Values from 0° (no Auto-reverse) up to max. 90° are freely selectable.

The Anti drop is recommended to be used when large port tubes together with high viscous samples do form undesirable drops. It increases aseptic / contamination free work security. It is recommended to select smallest possible Auto reverse values.

You can skip one level back with the MENU key.

You can start the program with the START key.
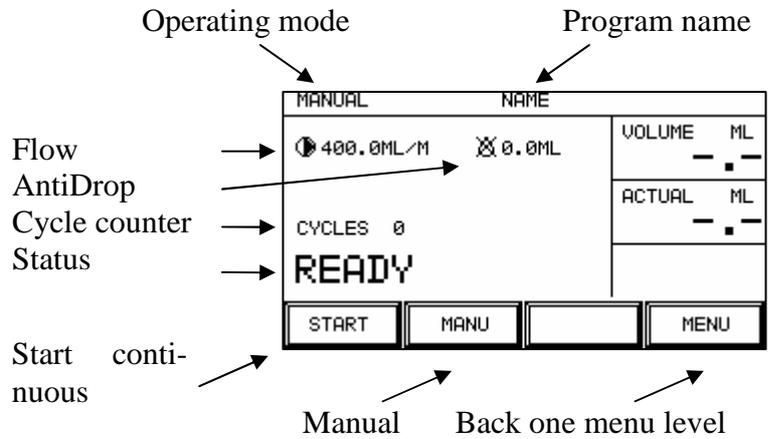
4.3.2.2   Manual START

The Start window contains a wide variety of information which has already been edited or ongoing information such as actual volume, status or the cycle counter. The cycle counter counts how many times the program has run. You can prepare or empty the tube with key MANU (see illustration at right).

Basic mode of operation:

External control:

You can also start Manual mode with the footswitch at the left. The pump doses for as long as the switch is operated.

Operating mode   Program name

Flow
AntiDrop
Cycle counter
Status

Start   conti-
nuous

Manual   Back one menu level

```
MANUAL          NAME
▶ 400.0ML/M   ✕ 0.0ML        VOLUME   ML
                               _ . _
                             ACTUAL   ML
CYCLES  0                      _ . _
READY
START    MANU            MENU
```

Log printout:

If a printer has been installed and its status is 'on', the working log is printed out as soon as the program is quit.

4.3.3   Dispense mode

Dispense mode doses a preset volume. The sample volume, the pump speed, the AntiDrop function and the program name can be set. 10 different program memories are available.

If you choose an operating mode, you can choose between 10 customer-specific programs.

You can scroll to the next page with key →.

These programs can be selected, edited, deleted or started with the function keys. Keys EDIT and START will now be described.

4.3.3.1   EDIT Dispense

A program can be edited with the EDIT key.

[T]   It is important that each program has a name. If you press function key NAME, you can enter the name on the alphanumeric keypad (see 4.1). You can enter a maximum of 12 characters.

◖   The FLOW key allows you to set the pump speed. Make the entry with the numeric keypad (see 4.1). You can enter a flow rate of 0.1 to 999.9 ml/min.

✕   The Anti drop key allows the operator to select any retraction angle between 0-90°. The Dosipump will execute this Auto reverse of the pump head after each individual dispensed volume in all modes of operation. With all consecutive dispensed volumes the pump automatically compensates the selected retraction angle. The entry is made with the numeric keypad. Values from 0° (no Auto-reverse) up to max. 90° are freely selectable.

The Anti drop is recommended to be used when large port tubes together with high viscous samples do form undesirable drops. It increases aseptic / contamination free work security. It is recommended to select smallest possible Auto reverse values.

⊔   The volume to be dosed can be set with the VOLUME key. You can set a dosing volume between 0.1 ml and 9999.9 ml on the numeric keypad (see 4.1).

⊠   Key **CYCLE PAUSE** allows you to set the pause between two cycles with automatic repetition between 0 and 9.9 seconds. If you delete the value, you must start the next cycle manually with the key or footswitch.

You can skip one level back with the MENU key.

You can start the program with the START key.

4.3.3.2   START Dispense

The Start window contains a wide variety of information which has already been edited or ongoing information such as actual volume, status or the cycle counter. The cycle counter counts how many times a program has run. You can prepare or empty the tube with key MANU (see illustration at right)

Basic mode of operation:

External control:

You can also start Dispense mode with the footswitch at the left. The dosing operation can be cancelled with the footswitch at the right.
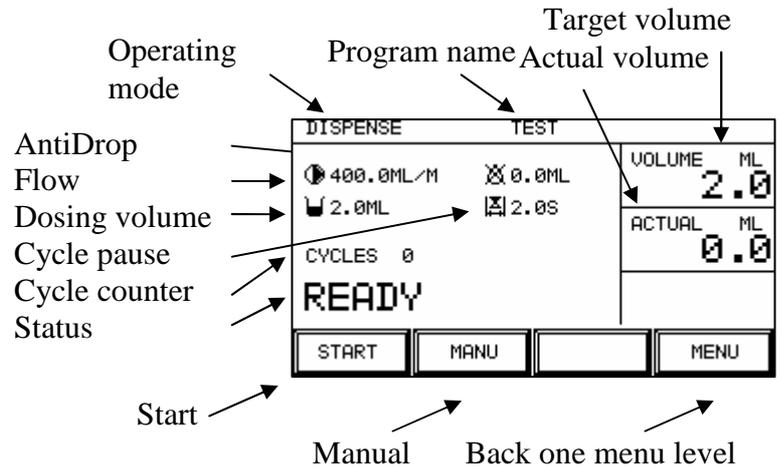
Log printout:

If a printer has been installed and its status is 'on', the working log is printed out as soon as the program is quit.

4.3.4   Multi-Dispense mode

Up to 12 different volumes can be processed consecutively in Multi-Dispense mode. Twelve individual pump volumes, the pump speed, the AntiDrop function, a pause time between dosing operations and the program name can be set. 10 different program memories are available.

If you choose an operating mode, you can choose between 10 customer-specific programs.

You can scroll to the next page with key →.

These programs can be selected, edited, deleted or started with the function keys. Keys EDIT and START will now be described.
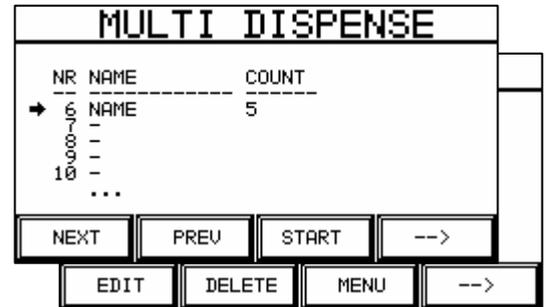
4.3.4.1   EDIT Multi-Dispense

A program can be edited with the EDIT key.

It is important that each program has a name. If you press function key NAME, you can enter the name on the alphanumeric keypad (see 4.1). You can enter a maximum of 12 characters.

The FLOW key allows you to set the pump speed. Make the entry with the numeric keypad (see 4.1). You can enter a flow rate of 0.1 to 999.9 ml/min.

The Anti drop key allows the operator to select any retraction angle between 0-90°. The Dosipump will execute this Auto reverse of the pump head after each individual dispensed volume in all modes of operation. With all consecutive dispensed volumes the pump automatically compensates the selected retraction angle. The entry is made with the numeric keypad. Values from 0° (no Auto-reverse) up to max. 90° are freely selectable.

The Anti drop is recommended to be used when large port tubes together with high viscous samples do form undesirable drops. It increases aseptic / contamination free work security. It is recommended to select smallest possible Auto reverse values.

Key COUNT can be used to set the number of different volumes. This 'count' then enables the entered volumes. You can set the count between 1 and 12 on the numeric keypad (see 4.1).

A pause between dosing of the individual volumes can be set with the PAUSE key. You can set the pause time between 0.0 and 9.9 seconds on the numeric keypad (see 4.1). If the pause is set to 0 seconds, you must start manually after each dosing operation. Otherwise, the various volumes will be dosed automatically with the set pause time.
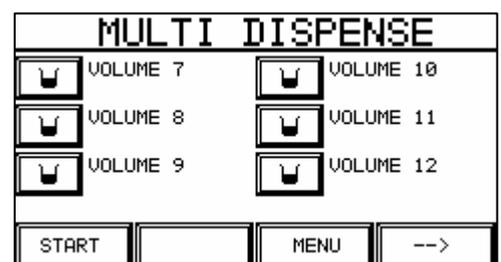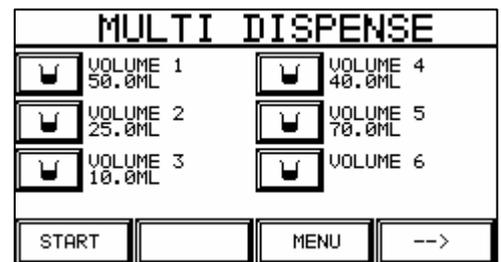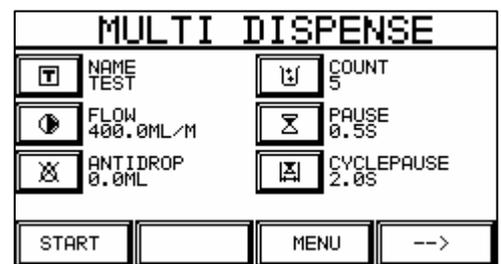
⊞ Key **CYCLE PAUSE** allows you to set the pause between two cycles with automatic repetition between 0 and 9.9 seconds. If you delete the value, you must start the next cycle manually with the key or footswitch.

⊔ The volumes to be dosed are set with keys VOLUMES 1 - 12. You can set the dosing volumes between 0.1 ml and 9999.9 ml on the numeric keypad (see 4.1). If the count is set to 5 for instance, the volume values of 6-12 are not displayed.

You can skip one level back with the MENU key.

You can start the program with the START key.

You can scroll to the next page with key →.
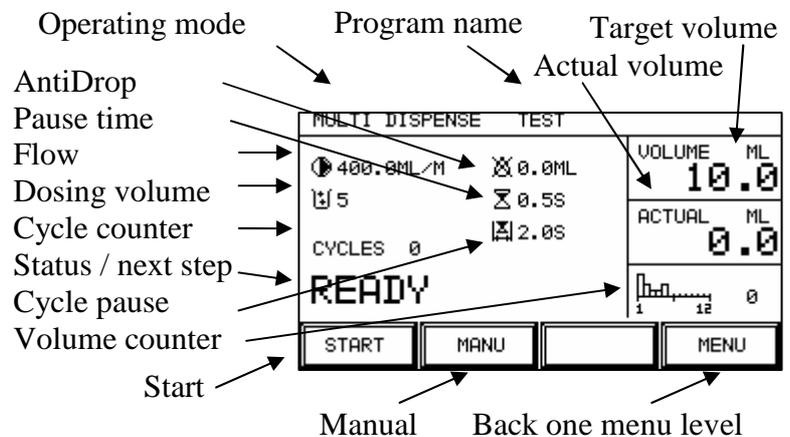
4.3.4.2   START Multi-Dispense

The Start window contains a wide variety of information which has already been edited or ongoing information such as actual volume, status or the cycle counter. The cycle counter counts how many times a program has run. You can prepare or empty the tube with key MANU. The bar chart indicates how many different volumes have already been dosed (see illustration at right).

Basic mode of operation:

External control:

You can also start Multi-Dispense mode with the footswitch at the left. The dosing operation can be cancelled with the footswitch at the right.

Operating mode   Program name   Target volume

AntiDrop
Pause time
Flow
Dosing volume
Cycle counter
Status / next step
Cycle pause
Volume counter
Start

Actual volume

Manual   Back one menu level

Log printout:

If a printer has been installed and its status is 'on', the working log is printed out as soon as the program is quit.

4.3.5   Dilute mode

This function allows dilution of a sample (concentrate) with a downstream diluent. Any sample volume can be aspirated and dispensed together with any diluent volume, with or without a separation by an air gap. You must ensure that the concentrate volume and the diluent volume can be accommodated in the tube, canulla or serological pipette. The sample quantity, the diluent quantity, the pump speed, the AntiDrop function, the air gap and the program name can be freely set. 10 different program memories are available.

If you choose an operating mode, you can choose between 10 customer-specific programs.


You can scroll to the next page with key →.

These programs can be selected, edited, deleted or started with the function keys. Keys EDIT and START will now be described.
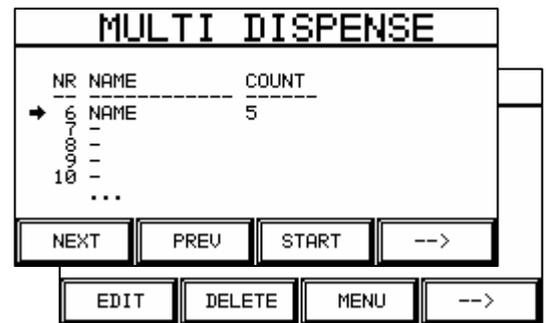
4.3.5.1   EDIT Dilute

A program can be edited with the EDIT key.

It is important that each program has a name. If you press function key NAME, you can enter the name on the alphanumeric keypad (see 4.1). You can enter a maximum of 12 characters.
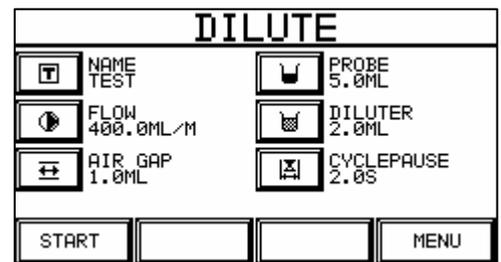
The FLOW key allows you to set the pump speed. Make the entry with the numeric keypad (see 4.1). You can enter a flow rate of 0.1 to 999.9 ml/min.

Key AIR GAP can be used to enter an air gap which separates the two media: sample and diluent. You can make the entry on the numeric keypad (see 4.1). You can enter a value between 0.0 and 9.9 ml.

The SAMPLE key is used to set the volume to be diluted (concentrate). You can set a value between 0.0 ml and 9999.9 ml on the numeric keypad (see 4.1).

The DILUENT key can be used to set the volume of the diluent. You can set a value between 0.1 ml and 9999.9 ml on the numeric keypad (see 4.1).

Key **CYCLE PAUSE** allows you to set the pause between two cycles with automatic repetition between 0 and 9.9 seconds. If you delete the value, you must start the next cycle manually with the key or footswitch.

You can skip one level back with the MENU key.

You can start the program with the START key.
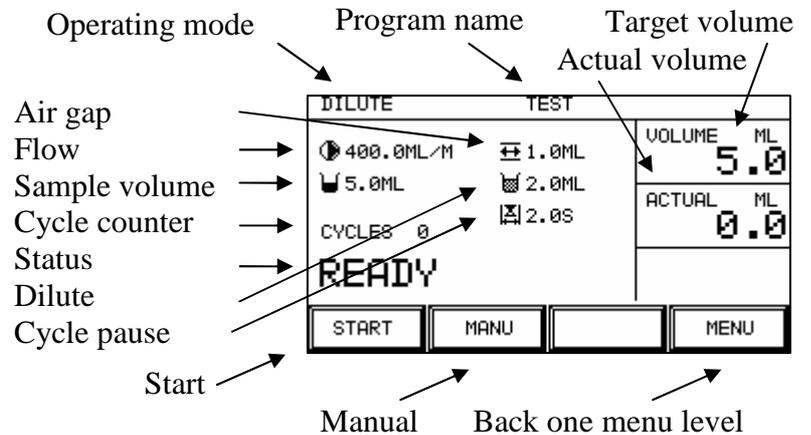
4.3.5.2   START Dilute

The Start window contains a wide variety of information which has already been edited or ongoing information such as actual volume, status or the cycle counter. The cycle counter counts how many times a program has run. You can prepare or empty the tube with key MANU (see illustration at right)

Basic mode of operation:

1.Air + Pause   2.Sample + Pause   3.Dispense w. Diluent
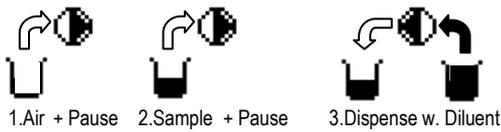
External control:

You can also start the Dilute mode with the footswitch at the left. The dosing operation can be cancelled with the footswitch at the right.

Operating mode   Program name   Target volume
Actual volume

Air gap
Flow
Sample volume
Cycle counter
Status
Dilute
Cycle pause

DILUTE   TEST   VOLUME   ML
                              5.0
400.0ML/M   1.0ML
5.0ML   2.0ML   ACTUAL   ML
                              0.0
CYCLES 0   2.0S

READY

START   MANU   MENU

Start

Manual   Back one menu level

Log printout:

If a printer has been installed and its status is 'on', the working log is printed out as soon as the program is quit.

4.3.6   Pipette mode

This function allows the aspiration and dispensation of any defined volume. The sample volume, the pump speed and the program name can be set. 10 different program memories are available.

If you choose an operating mode, you can choose between 10 customer-specific programs.

```
         PIPETTE
 NR NAME          PROBE
 -- -----------   -------
 ➜  6 NAME         100.0ML
    7 -
    8 -
    9 -
   10 -
    ...
 NEXT    PREV    START    -->
 EDIT    DELETE  MENU     -->
```

You can scroll to the next page with key →.

These programs can be selected, edited, deleted or started with the function keys. Keys EDIT and START will now be described.
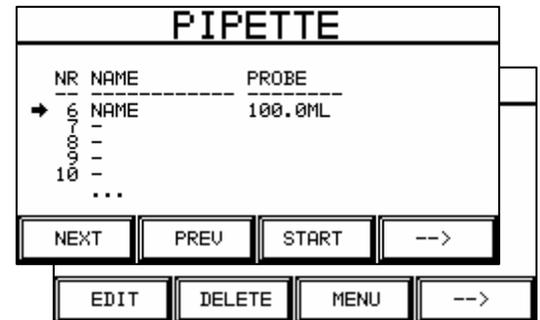
4.3.6.1   EDIT Pipette

A program can be edited with the EDIT key.

```
         PIPETTE
 ┌─┐ NAME          ┌──┐ CYCLEPAUSE
 │T│ TSLM          │  │ 1.6ML
 └─┘               └──┘
 ◑  FLOW
    400.0ML/M
 ⊔  PROBE
    4.0ML
 START                    MENU
```

It is important that each program has a name. If you press ┌T┐ function key NAME, you can enter the name on the alphanumeric keypad (see 4.1). You can enter a maximum of 12 characters.
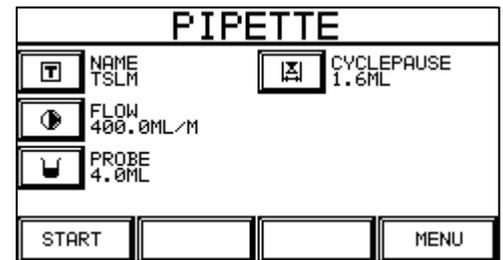
The FLOW key allows you to set the pump speed. Make the entry with the numeric keypad (see 4.1). You can enter a flow rate of 0.1 to 999.9 ml/min.

The SAMPLE key is used to set the volume to be pipetted. You can set a value between 0.0 ml and 9999.9 ml on the numeric keypad (see 4.1).

Key **CYCLE PAUSE** allows you to set the pause between two cycles with automatic repetition between 0 and 9.9 seconds. If you delete the value, you must start the next cycle manually with the key or footswitch.

⚠ IMPORTANT   The set value of the sample must be able to be accommodated in the tube, canulla or serological pipette.

You can skip one level back with the MENU key.

You can start the program with the START key.
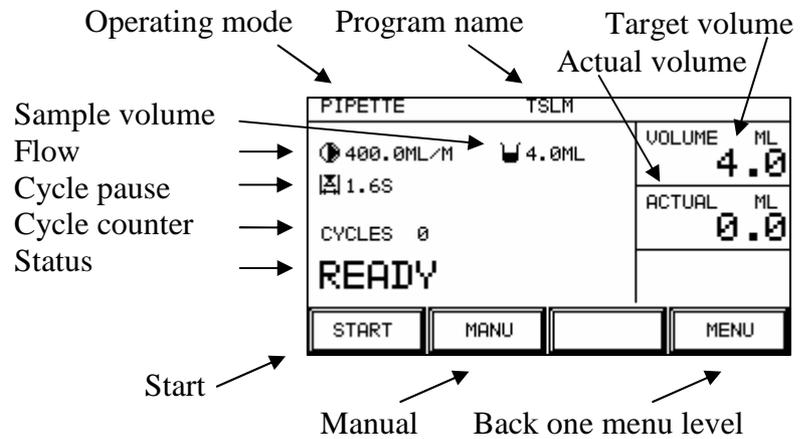
4.3.6.2   START Pipette

The Start window contains a wide variety of information which has already been edited or ongoing information such as actual volume, status or the cycle counter. The cycle counter counts how many times a program has run. You can prepare or empty the tube with key MANU (see illustration at right)

Basic mode of operation:
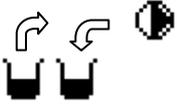
External control:

You can also start Pipette mode with the footswitch at the left. The dosing operation can be cancelled with the footswitch at the right.

Operating mode   Program name   Target volume
                                Actual volume

Sample volume
Flow →
Cycle pause →
Cycle counter →
Status →

PIPETTE   TSLM
◐400.0ML/M   ⊌4.0ML   VOLUME ML
⧖1.6S   4.0
CYCLES 0   ACTUAL ML
READY   0.0
START   MANU   MENU

Start

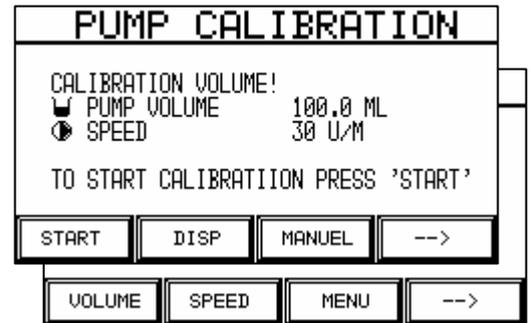Manual   Back one menu level

Log printout:

If a printer has been installed and its status is 'on', the working log is printed out as soon as the program is quit.

4.4 Calibration menu

It is advisable to adapt calibration to the application. The pump accuracy depends on the speed and the tube diameter.
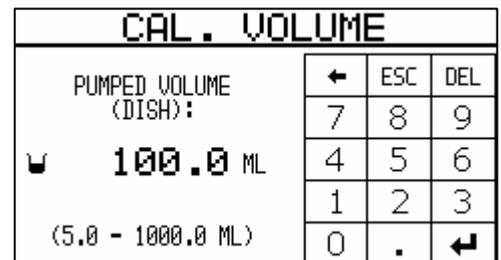
4.4.1 Overview

Calibration is performed with the seven keys
Start, Disp, Manual, →, Volume, Speed and Menu.

```
┌─────────────────────────────────┐
│      PUMP  CALIBRATION          │
│                                 │
│  CALIBRATION VOLUME!            │
│  ♨ PUMP VOLUME      100.0 ML    │
│  ◑ SPEED            30 U/M      │
│                                 │
│  TO START CALIBRATIION PRESS 'START' │
│                                 │
│  ┌───────┐ ┌──────┐ ┌────────┐ ┌────┐ │
│  │ START │ │ DISP │ │ MANUEL │ │ --> │ │
│  └───────┘ └──────┘ └────────┘ └────┘ │
│  ┌────────┐ ┌───────┐ ┌──────┐ ┌────┐ │
│  │ VOLUME │ │ SPEED │ │ MENU │ │ --> │ │
│  └────────┘ └───────┘ └──────┘ └────┘ │
└─────────────────────────────────┘
```
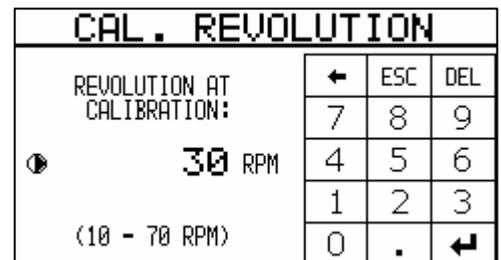
4.4.2 Description of the key functions

VOLUME: You can set the pump volume to be calibrated with the VOLUME key.

You can complete and save the entry with the Enter key.

```
┌──────────────────────────────┐
│     CAL.  VOLUME             │
│  PUMPED VOLUME    ┌──┬─────┬─────┐│
│     (DISH):       │ ← │ ESC │ DEL ││
│                   ├──┼─────┼─────┤│
│                   │ 7 │  8  │  9  ││
│  ♨   100.0 ML     ├──┼─────┼─────┤│
│                   │ 4 │  5  │  6  ││
│                   ├──┼─────┼─────┤│
│                   │ 1 │  2  │  3  ││
│  (5.0 - 1000.0 ML)├──┼─────┼─────┤│
│                   │ 0 │  .  │  ↵  ││
│                   └──┴─────┴─────┘│
└──────────────────────────────┘
```

Speed: You can set the speed (pump speed) at which calibration is to be performed with the SPEED key.

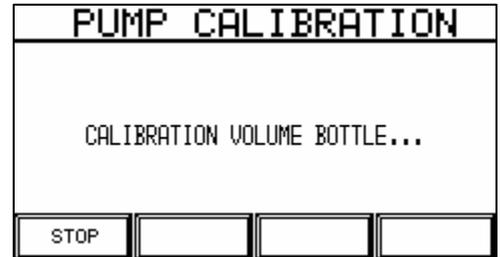You can complete and save the entry with the Enter key.

```
┌──────────────────────────────┐
│    CAL.  REVOLUTION          │
│  REVOLUTION AT    ┌──┬─────┬─────┐│
│   CALIBRATION:    │ ← │ ESC │ DEL ││
│                   ├──┼─────┼─────┤│
│                   │ 7 │  8  │  9  ││
│  ◑   30 RPM       ├──┼─────┼─────┤│
│                   │ 4 │  5  │  6  ││
│                   ├──┼─────┼─────┤│
│                   │ 1 │  2  │  3  ││
│  (10 - 70 RPM)    ├──┼─────┼─────┤│
│                   │ 0 │  .  │  ↵  ││
│                   └──┴─────┴─────┘│
└──────────────────────────────┘
```

MENU: You can switch back to the main menu with the MENU key.

START: You can start calibration with the START key. However, you should have set the calibration parameters beforehand.
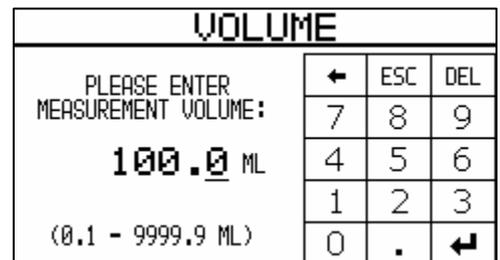
After starting calibration, the user is prompted to insert the tube into the pump and measuring beaker.

```
┌─────────────────────────────┐
│  PUMP  CALIBRATION          │
│                             │
│                             │
│   PLEASE INSERT TUBE IN PUMP│
│      AND MEASURING CUP.     │
│                             │
│ ┌──────┐┌────┐┌────┐┌──────┐│
│ │START ││    ││    ││ MENU ││
│ └──────┘└────┘└────┘└──────┘│
└─────────────────────────────┘
```

The calibration volume is dispensed into the measuring beaker after restart.

```
┌─────────────────────────────┐
│  PUMP  CALIBRATION          │
│                             │
│                             │
│   CALIBRATION VOLUME BOTTLE...│
│                             │
│                             │
│ ┌──────┐┌────┐┌────┐┌──────┐│
│ │ STOP ││    ││    ││      ││
│ └──────┘└────┘└────┘└──────┘│
└─────────────────────────────┘
```

After completion of pumping, the pumped volume must be measured (e.g. with measuring beaker or scales...) and the result must be entered on the numeric keypad.
Pressing key Enter completes pump calibration and saves the results.

```
┌─────────────────────────────┐
│  VOLUME                     │
│                  ┌──┬───┬───┐│
│ PLEASE ENTER     │← │ESC│DEL││
│ MEASUREMENT VOLUME:┼──┼───┼──┤│
│                  │ 7│ 8 │ 9 ││
│   100.0 ML       ├──┼───┼───┤│
│                  │ 4│ 5 │ 6 ││
│                  ├──┼───┼───┤│
│                  │ 1│ 2 │ 3 ││
│ (0.1 - 9999.9 ML)├──┼───┼───┤│
│                  │ 0│ . │ ↵ ││
│                  └──┴───┴───┘│
└─────────────────────────────┘
```

The calibrated pump volume is taken as the basis for all volume and speed changes after calibration. It is advisable to also recalibrate the tube after speed changes.

DISP: Using the DISP key, you can check whether the volume is being dispensed precisely after calibration is complete. You can abort this with the STOP key.

MANUAL: You can use key MANUAL to induct the medium or empty the tube.

4.5 System menu

4.5.1   Overview

The system-wide settings and presets are made in this menu. In addition, detailed information on the software versions can be retrieved in this menu.

The System menu consists of six sub-menus:

1. Language   Selects the national language
2. Date, Time   Sets the date and time
3. Touch   Calibration of the touch screen
4. Printer   Activates and deactivates the printer function
5. Display   Display contrast setting
6. About   Information about the DOSIPUMP 1000
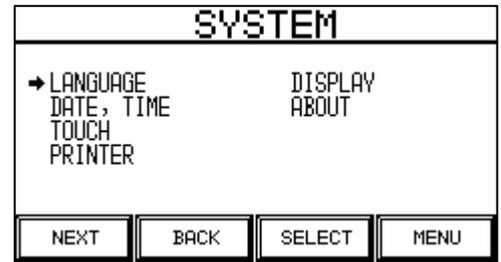
4.5.2   Language

The user can set his or her required language in the Language menu.

Chose the required language with the CONTINUE key. The selected language becomes the current language immediately on advancing with the CONTINUE key.
If you touch the MENU key, the selected language remains saved even after a restart of the DOSIPUMP 1000.

4.5.3   Date and Time

The device time and the device date can be set in the Date and Time menu. The date and time are required for any log printout. The date and time can be disabled by the license generator. This disable function is used to prevent the date being reset, thus by-passing the licensing process.

Choose the required field with the CONTINUE key. The time is set in format "Hours : Minutes : Seconds" in the first line and the date is set in format "Day . Month . Year" in the second line. The entries directly update the current time. Keys + and – are used to change the values and key MENU is used to quit the menu.
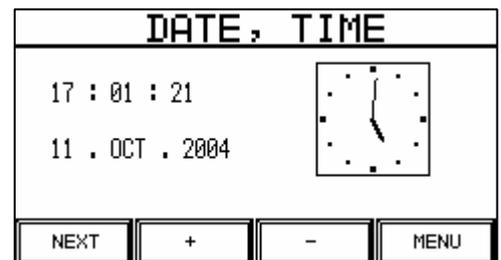
4.5.4   Touch

The device's touch screen can be calibrated in the Touch menu. On delivery, the touch screen is already pre-calibrated. However, it may be necessary to recalibrate the touch screen. In order to do this, touch $\boxed{+}$ at the top left-hand corner directly. You will then see $\boxed{+}$ at the bottom right-hand corner. This completes the touch screen calibration process and you then quit the menu.

```
⊞
TOUCH CALIBRATION
PLEASE PRESS '+' ON TOUCH:
```

4.5.5   Printer

The optional log printer can be activated and deactivated in the Printer menu. You can press the TEST key in order to test the function of the printer. The basic data of the DOSIPUMP 1000 is then printed out.

Key + activates the printer and key – deactivates it. Pressing the MENU key moves you back to the SYSTEM menu.
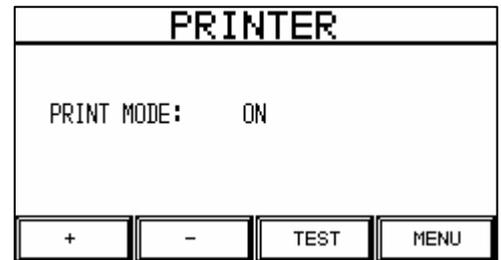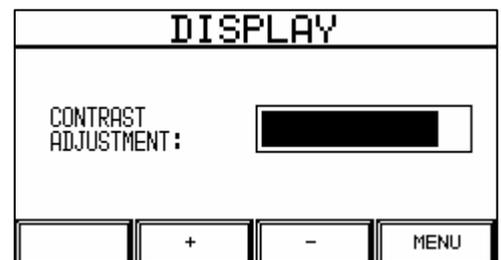
Types of printout: test printout, license printout, log printout

```
PRINTER

PRINT MODE:    ON

  +       –      TEST    MENU
```

4.5.6   Display

You can set the display contrast in the Display menu.

The contrast can be set to optimum contrast with keys + and –.

```
DISPLAY

CONTRAST
ADJUSTMENT:     ▓▓▓▓▓▓

          +      –      MENU
```

4.5.7   About

The About menu displays the device-specific information:

1. The software version with the date of the DOSIPUMP 1000
2. The serial number of the device
3. Current date and time
4. License number

```
ABOUT

VERSION NDO: 1.2.3 – 170904
SERIAL NR. : 500.04.00000
DATE, TIME : 12.10.2004 – 10:37:06
LICENCE    : ENDLESS

                        MENU
```
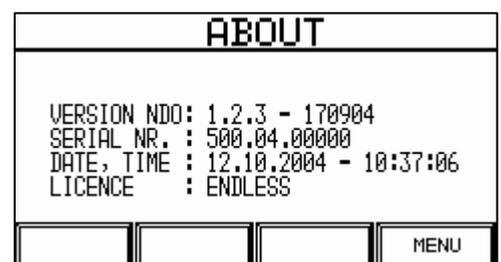
There may also be an expiry date for the license number. After this date, the device is barred until a new license is applied for and the licence code has been entered.

5 Technical information

5.1 Introduction

Chapter "Technical information" contains additional information on operation of the DOSIPUMP 1000. It is assumed that the unit is operated by a trained DOSIPUMP 1000 user with the required access rights.

5.2 Cleaning

Cleaning procedures must be performed regularly in order to ensure optimum performance of the DOSIPUMP 1000. The cleaning routine described below must not be considered as absolutely essential. It serves as a guideline to assist efficient operation of the DOSIPUMP 1000. The decision on when and how to clean must be made by the individual laboratory.

5.2.1 Materials required

- Washing-up liquid - use a mixture of one part washing-up liquid and three parts water.
- Deionised water
- Soft-lint-free cleaning cloth and paper tissues

⚠	WARNING	Do not use cleaning agents containing acetone or other aggressive cleaning agents (nitrocellulose thinners,...).
⚠	WARNING	Disconnect the mains plug each time before cleaning.

5.2.2 Cleaning procedures

Cleaning the unit
- Clean the surface of the unit with a lightly moistened cloth.
- Wipe off the plexiglass covers with a lightly moistened cloth.

Cleaning the touch screen
- The touch screen may be cleaned only with water (or soapy water). Never remove residue by scratching or scraping the touch screen.

❗	IMPORTANT	Never use too much water since this could otherwise result in water entering the unit. Never remove residue by scratching or scraping.

5.3 Transporting the DOSIPUMP 1000

| | IMPORTANT | Remove all tubes and disconnect the unit from the mains power supply before moving the unit. |

| | IMPORTANT | When moving the unit, always grip it at the bottom and not on the pump head. |

5.4 Calibration

Corporate guidelines prescribe that all companies operating with a quality assurance system must regularly calibrate their instruments and equipment. Calibration must ensure that the unit complies with the stipulated specifications.

When should calibration be carried out?

Calibration relates to the dosing volume of the pump as a function of the tube. You are advised to calibrate the pump at the following times:

- After changing a tube fitting.
- If using culture media with greatly differing viscosities.
- At regular intervals, e.g. every 3 months.

| | NOTE | The calibration procedure is described in Chapter "Calibration menu". |

5.5 Troubleshooting

5.5.1 Overview

The DOSIPUMP 1000 software incorporates troubleshooting routines which can be used to correct certain problems without action on the part of after-sales servicing technicians.
If a problem occurs on the DOSIPUMP 1000, the unit attempts to correct the problem by providing the operator with prompts on the graphical user interface. If these on-screen prompts are followed, the fault or error can then normally be remedied without action on the part of after-sales servicing technicians.
Each error message with alarm function also contains a description of the fault or error.

5.5.2 Fault clearance

The table below can be used to help you to remedy certain problems which may occur during operation of the DOSIPUMP 1000. This table contains information on the symptom, its possible causes and the remedial action for the relevant fault or error involved.

Errors which occur before operation

Symptom	Possible cause	Correction
Device does not start	Plug not plugged in	Check power connection
	Master switch not switched on	Switch on
	Master switch fuse defective	Check fuse. See details of description.
		Check power connection
	No mains power	

Replacing the device fuse

In order to replace the device fuse, use a small screwdriver to lever the fuse holder of the power receptacle down and out.

Fuse: 3.15 A - 250 V AC - slow-blow
               No fuses with other ratings may be used!
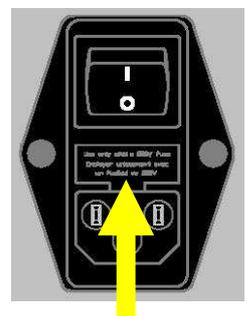
WARNING   Always disconnect the mains cable first before replacing the fuse!

Faults and errors occurring during operation

Symptom	Possible cause	Correction
Fault signal Pump blocked	The culture medium in the tube is too viscous. You have used a tube which is too large.	Remove the tube and run the pump manually with the "PUMP" menu.
Fault signal: No program entered	The selected program has no name (has not been edited).	Edit the selected program and assign it a program name.
Fault signal: DosiPump barred No valid license	License has expired	Apply for a new license from the seller with the license application code and enter the license code.

5.6 Accessories

Accessory list for the DOSIPUMP DP1000

- MAINS CABLE
- GERMAN OR ENGLISH USER GUIDE
- DOUBLE TUBESET (ART. 179080)

5.7 Options

Option list for the DOSIPUMP 1000

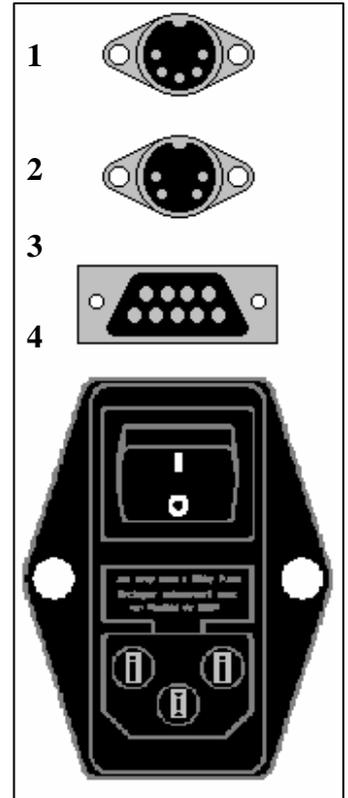- FOOTSWITCH
- PRINTER INTERFACE RS232   (DP1000P/PI)
- PRINTER CABLE   (DP1000P/PI)
- RS232 HOST INTERFACE CABLE   (DP1000PI)
- RS485 BIOLINK INTERFACE
- DIV. TUBE SET'S
- STAINLESS STEEL STAND 200 MM / Ø12 MM OPTION
- REST MAT (DOSIPUMP COVER)

- Additional operator prompting languages (e.g. French, Italian, Spanish and Portuguese) not provided by default

5.8 Electrical connections

The connections for the mains power supply and the optional interfaces are located on the right-hand side of the DOSIPUMP 1000 rear panel.

Caption
1. Footswitch   Socket DIN41524 5-pin
2. PC / printer connection   SUB-D socket 9-pin
3. RS485 Biolink   SUB-D socket 9-pin
4. Power receptacle with fuse and master switch

1 Footswitch pin assignment

Pin 1: Footswitch contact 1
Pin 3: Footswitch contact 2
Pin 2: 29 V

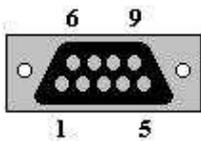The two footswitch contacts are designed as normally open contacts (NO).

2 PC / printer connection pin assignment (RS232)   Version P/PI

Pin 1: RxD
Pin 2: TxD
Pin 3: GND
      Pin 4: VMOT (24 V – 29 V for printer only)

3 RS485 connector pin assignment   Option

Pin 1: Internal GND
Pin 3: A
Pin 7: B
Pin 9: Signal GND

	NOTE	Do not connect with pin assignments other than those shown above!

	NOTE	Use only the RS232 Host interface cable (original cable) as the interface cable to the PC host.

	NOTE	Connections are provided on the device rear panel depending on options. Only the power receptacle is provided by default.

5.9 Technical data

Length	305 mm
Depth	275 mm
Height	205 mm
Net weight	7.1 kg
Mains connections	85 – 132 V AC and 176 – 264 V AC 47 – 63 Hz
Mains fuse	3.15 A / 250 V AC slow-blow
Dosing quantity	0.1 – 9999.9ml (one decimal place)
Dosing accuracy (calibrated tube without AntiDrop)	0.5 – 1% (depending on tube diameter)
Delivery rate	1000 ml/min (tube-dependent)
Filling cycle delay	0.0 – 9.9 seconds
AntiDrop	0 – 90° selectable Auto-reverse angle of pump head
Display	240 x 128 pixels with LED backlighting
Sound pressure level	< 79 dB(A)
Pollution severity	II
Safety class	IP 21
Ambient temperature	+ 5°C to 45°C (also during transport)
Unit support surface	Sturdy support surface
Remote control / footswitch	The two footswitch contacts are designed as normally open contacts (NO).
Interface RS232 DP1000P/PI	RS232 for connection to host and printer
Interface RS485 (option)	RS485 for BioLink (communication with laboratory instruments)
Stand (option)	Stainless steel, length = 200 mm, Ø 12 mm
Item number	700000 DosiPump DP1000 710000 DosiPump DP1000P 720000 DosiPump DP1000PI