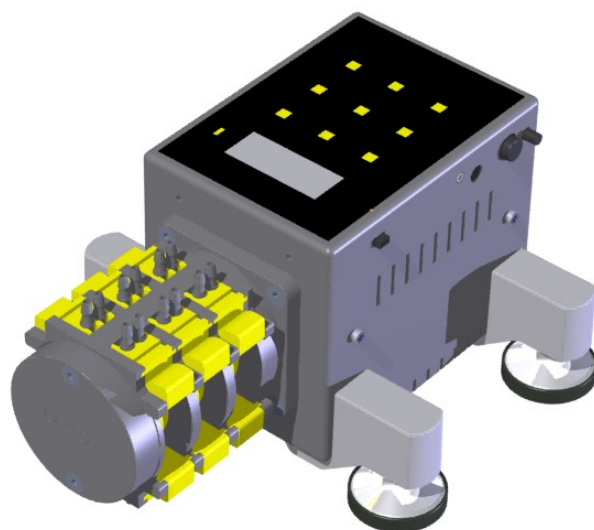


UNOVERSE 6600



**electronically controlled
dispensing pump
User Manual**

Box contains

One of the following pump controllers:

Unoverse 2-4 channel pump unit.....	Cat. No. 6600.001
Unoverse 4-8 channel pump unit.....	Cat. No. 6600.002
Unoverse 6-12 channel pump unit.....	Cat. No. 6600.003

One size of the following tube sets:

Unoverse Pharmed Tubing IDØ0.5mm dual assy.....	Cat.No.6000.506
Unoverse Pharmed Tubing IDØ1.0mm dual assy.....	Cat.No.6000.501
Unoverse Pharmed Tubing IDØ1.5mm dual assy.....	Cat.No.6000.502
Unoverse Pharmed Tubing IDØ2.0mm dual assy.....	Cat.No.6000.503
Unoverse Pharmed Tubing IDØ2.5mm dual assy.....	Cat.No.6000.505
Unoverse Norprene Tubing IDØ3.0mm dual assy.....	Cat.No.6000.504

For Unoverse 1001 - 2 sets of tubes

For Unoverse 1002 - 4 sets of tubes

For Unoverse 1003 - 6 sets of tubes

Foot Switch Cat. No 6013

Power Supply Unit Cat. No.6028

Instruction manual Cat. No.6000.6106

Product Specification:

Mains Voltage.....	100V-240V 1.0A MAX 50-60Hz
Power Supply Unit output	+15VDC 2.0A
Environmental operating temp	+10°C to +40°C
Environmental storage temp	+4°C to +40°C
Fuse.....	3.15A

uno.

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It is the stated philosophy of Uno International Ltd to preserve the environment wherever possible. Uno International Ltd. will only use materials and production techniques that cause least environmental damage.



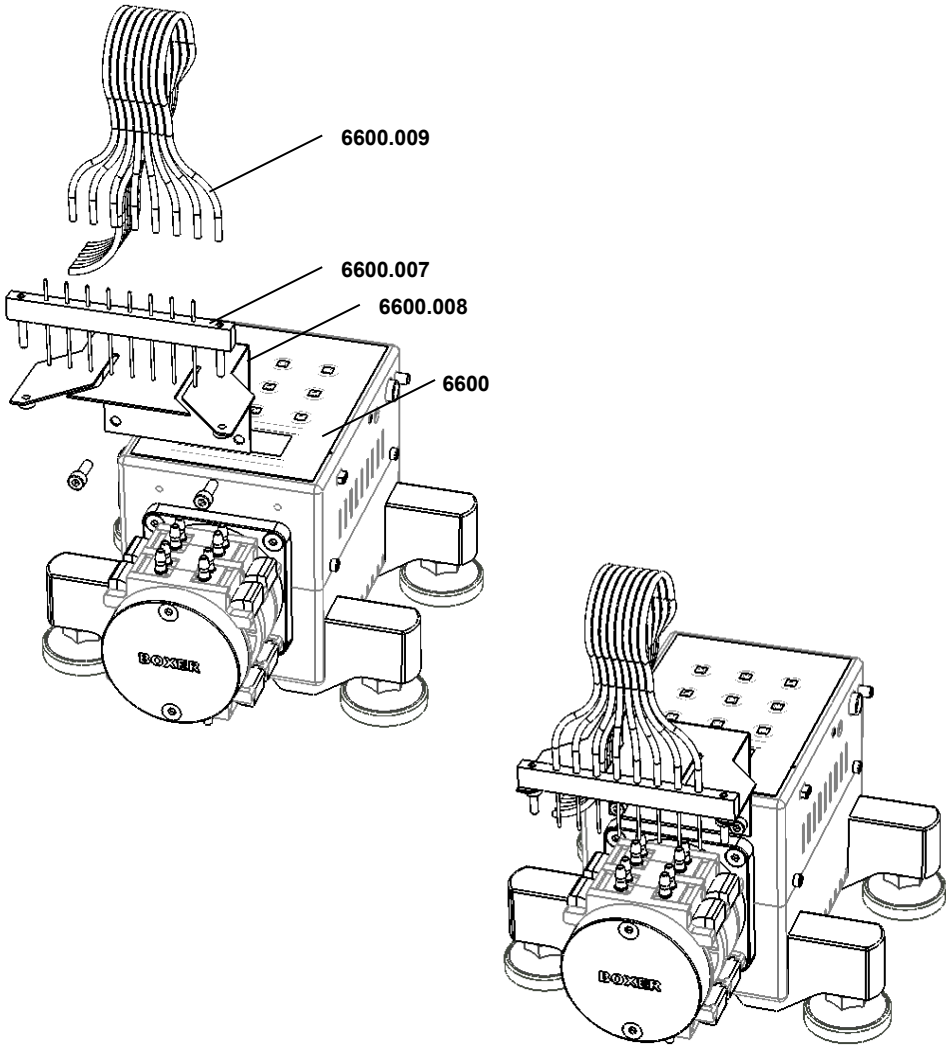
The CE sign certifies that the instrument meets the requirement of the EEC directives and has been tested according to the specified test methods.

Unoverse Pump Accessories

Some accessories are available for the Unoverse Pump Dispenser as standard.
Custom design for dispense heads can be manufactured to order.

The following is a list of standard components

- 8 channel dispense head.....Cat. No. 6600.007
- Support bracket for 8 channel dispense head.....Cat. No. 6600.008
- 8 channel multilumen tubing ID Ø1.0 - 1m long.....Cat. No. 6600.009



The volume delivered by any peristaltic pump is a function of the following factors:

- 1. Tube diameter
- 2. Circular distance between rollers
- 3. Speed in which the rollers pass the tube

A pump equipped with four rollers will deliver approximately double the volume of a pump equipped with eight rollers arranged over an identical circular diameter.

However, a pump equipped with eight rollers will deliver the volume with roughly double the precision of a pump equipped with only four rollers.

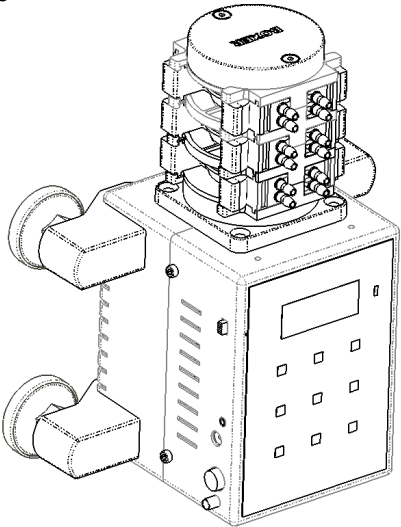
Due to the fact that the dispense precision is among others determined by the ID of the tubes used in the pump, a great emphasis should be given to the correct choice of tube for the intended application.

Generally we recommend to adhere to the following table:

Tube diameter	dispense volume ul	CV%
0.51	4µl/min to 200µl/min	0.75
1.03	20µl/min to 400µl/min	1
1.52	100µl/min to 10ml/min	2.5
2.06	500µl/min to 25ml/min	4
2.54	2ml/min to 50ml/min	5

Dispense volumes are per channel.

To facilitate the fitting of your delivery tubes turn the unit on its back so that the pump unit faces up.



1. Preparing Unoverse 1000 for use

1. A. Unpacking

Place the shipping box on the floor, open the box’s tabs, carefully remove the packing chips and unpack the sub component.

Following the unpacking of the unit, make sure that you have all the following components. Please contact your supplier immediately if you notice one of the components to be missing or damaged.

Note: Do not attempt to assemble a unit using damaged components.

- Unoverse pump dispenser Cat. No.6600.00X
- Unoverse Tubing Cat. No.6000.XXX
- Power supply unit Cat. No.6028
- Foot Switch Cat. No.6013
- This user manual Cat. No.6000.6106

Retain the packaging in case you have to ship it in the future.

The remote power supply unit is a Switch Mode Power Supply and automatically adjusts itself to the mains power supply characteristics and will work with any mains voltage from 100V to 240V.

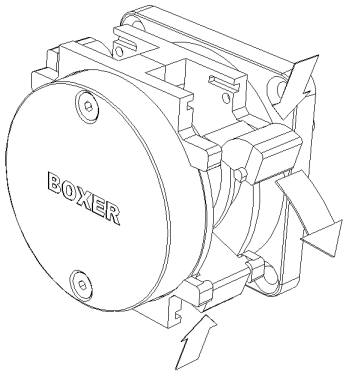
1. B. Positioning the Unoverse

Unoverse 6600 requires an operation environment of between 10 °C – 40 °C

Place the Unoverse unit on a solid surface adjusting the levelling feet by screwing them in or out until the unit is horizontally level and stable.

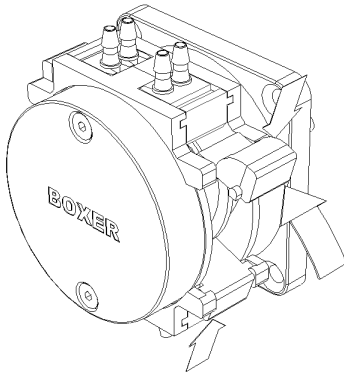
1.C. Inserting the tubes

Unclip the tube clips from the pump head by pressing the two tabs together and hinging the clip from the pump head.



Unpack the tubing and slide the tube holders into the provided slots in the pump head.

Refit the tube clips into their position.



Calibration data:
Volume represents 25 roller rotations.

See page 7 for detailed calibration procedure

Tubeset part no	Tube inner diameter	8 roller system Volume dispensed per channel in ml	4 roller system Volume dispensed per channel in ml
6000.506	0.51	0.445	0.500
6000.501	1.03	1.250	1.515
6000.502	1.52	2.050	2.900
6000.503	2.06	3.200	5.250
6000.505	2.54	4.450	7.750

2. Familiarizing

2. A. General information on peristaltic pumps

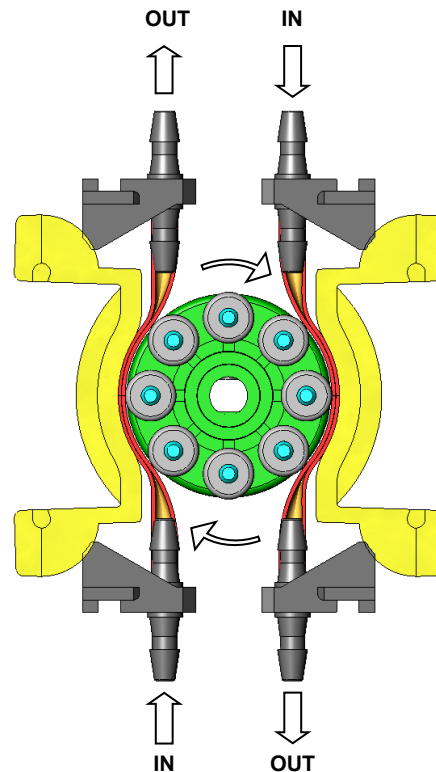
Peristaltic hose pumps are ideal for fluid transfer, metering and dispensing. In contrary to centrifugal and gear pumps, peristaltic pumps handle fluids of various viscosities, are self priming and operate in two flow directions.

With no valves, seals or packing to come in direct contact with the pumped fluid, they are ideal for pumping high purity & corrosive fluids and for contamination free dosing.

The principle of the peristaltic pump is based on a tube which is squeezed by a series of rollers.

All other peristaltic pumps on the market have the rollers arranged radially in a circle with the tube wrapping around the circle in a U shape. The rollers engage with the tubes over a section of 270°. The outlet and the inlet to the tube are adjacent to each other.

The Unoverse pump head adopts a unique principle whereby the tubes are engaged with the rollers over a section of 95° only. This arrangement allows the fitting of two tubes to both sides of the roller wheel with the advantage of 50% space saving, a balanced and much reduced motor load and less wear on the tubes.



2. B. The Unoverse pump controller

Unoverse pump tubing is delivered clipped onto the tube supports using a tube fitting. You should connect your delivery tubes to each of the channels entry and exit taking into account that the entry of each channel will be opposite to the exit and one row exits is situated adjacent to one row of entries to the parallel channel.

The tube fitting is chosen to cater for tube size which will eliminating over pressurizing the peristaltic tubes. An unbalanced pressure in the tubes will effect the dispense precision of the pump.

The delivery tubes should therefore ideally be of similar diameter to the peristaltic tubes in the pump. A smaller diameter tube should form the dispense nozzle if 'drop-tear-off' is required.

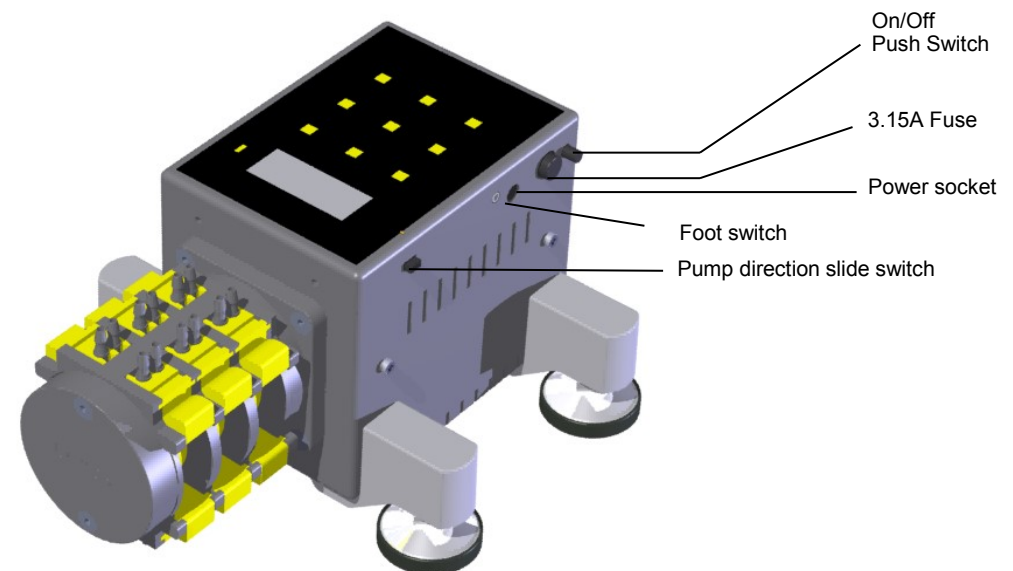
Plug the Power Supply unit into your mains socket. A green light on the power supply unit should indicate that the unit works properly.

Insert the foot switch plug into the provided socket if foot switch operation is desired.

Connect the low voltage power plug into the power socket on the Unoverse unit and switch on the equipment by gently pushing the on/off switch.

The green LED indicates that the pump is fully operational.

The display will read '6600' and default to the value 1.000 . This value is a factory setting and represents 25 rotor rotations.

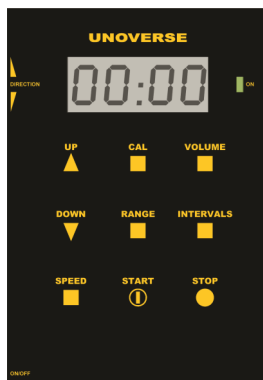


3. The Control Panel

The keys on the control panel are assigned with functions to calibrate the pump, set the volume to be dispensed, to set speed and 'interval dispense'.

Some of the keys must be operated in pairs to enter certain functions of the dispenser. In such cases, the keys should be activated in the following sequence :

CAL+UP Increase the calibrated volume
CAL+DOWN Decrease the calibrated volume
VOLUME+UP Increase volume
VOLUME+DOWN Decrease volume
CAL+RANGE Moves the decimal point
CAL+START Set default 1.000
INTERVALS Enter interval dispense mode
INTERVALS + UP/DOWN Set interval duration
INTERVALS + UP/DOWN Set number of dispenses
SPEED+UP Increase dispense speed to max (255)
SPEED+DOWN Decrease dispense speed
START Start dispense operation
VOLUME+START Continuous dispense
STOP Stop dispense ('panic button')
STOP (>2 seconds) Stop & cancel interval dispense mode



4. Pump calibration procedure

Due to the fact that pump heads can be fitted with various tubes, each pump requires calibration before the pump can be commissioned.

Although the tubes are precision extruded and the tubes which we supply in pairs generate from a single batch, there are small tube to tube tolerances which will effect the overall dispense accuracy of the pump.

Tube to tube calibration can only be achieved by measuring the volume dispensed from each of the channels, and adjusting each tube separately to the tube which delivered the lowest volume.

Adjustment to tube is achieved by stretching the tube.

In the majority of cases, a calibration for the pump head as a whole will be sufficient. The following section refers to calibration of the pump head as a whole whilst running all channels in parallel.

We recommend carrying out gravimetric or volumetric calibration. The most common practice is to set the unit to display the dispensed volume per channel. You can however also set the display to read the total dispensed volume.

4.A. Quick Calibration for 8 roller head system

For a quick pre calibration procedure we collected the nominal dispense volume data for each of the popular tube diameters. This data will help you towards a rough pump calibration.

Follow the following steps:

1. Press **CAL+START**: Unoverse will display 1.000 . This is a default calibration value.
2. Press **CAL+UP** or **CAL+DOWN** until the unit displays the figure in table Page 2
3. Press **CAL+RANGE** to set the decimal point in the correct position

4.B. Gravimetric or volumetric calibration

You can set Unoverse to display the dispensed volume per channel, per group of channels, or as a total for the whole pump head.

As the peristaltic tubes change their diameter with use, a periodic calibration of the unit is required.

By calculating the mean volume for each of the channels you will detect whether any one of the channels is widely different in delivery from all other channels and therefore requires replacement.

For general use, the dispensed volume used for calibration purpose should be taken from the table in page 4. Alternatively, you can calibrate the pump using the volume you are most likely to use in your application.

1. Press '**VOLUME+UP**' or '**VOLUME+DOWN**' until the desired volume for calibration is displayed.
2. Carry out five dispenses and establish the volume dispensed from the total number of channels
3. Calculate the mean delivery volume for each channel ($\Sigma V/n$ channels)
4. Enter the value into the Unoverse unit by pressing '**CAL+UP**' to increase the displayed volume or '**CAL+DOWN**' to decrease the dispensed volume
5. Press '**CAL+RANGE**' to move the decimal place so that the unit displays the volume in ml.

Unoverse is now ready for dispense.

5. Adjusting the dispense volume

Press keys '**VOLUME+UP**' or '**VOLUME+DOWN**' to enter the volume nearest to your desired volume.

Make sure the tubes terminate in a receiving vessel and press '**START**' to begin dispensing. For priming or to dispense more than the set volume, hold down the **START** key.

6. Interval Dispense

You can set the unit to dispense the desired volume for a number of times in predefined intervals. This feature is useful in repeatable operations either in manual mode or when the dispense head is held by a robotic arm.

To set repeat dispensing in selectable intervals:

1. Interval range selection: Press and hold down the '**INTERVAL**' key. You will see 01 for range of 1-99 seconds intervals or 10 for a range of 10-990 seconds intervals. Press '**DOWN**' to select 1 to 99 seconds or '**UP**' key to for 10 to 990 seconds. Release the '**INTERVAL**' key. The display flashes the first two digits to the left. These digits denote the time in seconds between the dispense operations—either 1-99 or 10 to 990 seconds.

2. Hold the '**INTERVALS**' key down and using the '**UP**' & '**DOWN**' keys enter the number of seconds or 10Xsec you wish to have between the dispenses—from 1 second to 990 seconds. Release the '**INTERVALS**' key to save your settings.

The second set of digits will flash. This digits denote the number of dispenses you wish to have—from 1 to 98 dispenses.

3. Press '**INTERVALS**' + '**UP**' & '**DOWN**' keys enter the number of dispense events—between 1 and 98. Release the '**INTERVALS**' key to save your settings.

The display will show the volume. The colon between the two sets of digits flashes to indicate that an interval dispense mode has been entered into the unit. You can now adjust the volume as indicated in the previous paragraph.

4. Press '**START**' and the controller will dispense the set volume in the interval mode which you have entered into the unit.

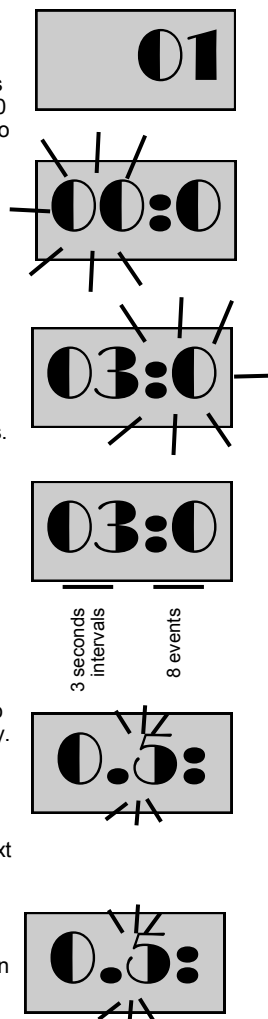
5. Panic stop: You can press the '**STOP**' button at any point throughout the dispense mode to terminate the automated dispense operation.

6. To exit interval mode: press + hold '**STOP**' button for more than 2 seconds to terminate the intervals mode. The flashing colon will disappear from the display.

To change any of the interval parameters simply press the '**INTERVALS**' key again and enter new parameters

Note that in the dispense process the display shows the seconds left before next dispense and the running event number.

7. Continuous interval dispense: To dispense your chosen volume continuously at the interval time you selected, enter '99' as the number of repeats. This will prompt the unit to dispense continuously until the **STOP** button is pressed. Remember to check the tubing condition from time to time.



8. Changing the pumps direction

Unoverse pumps can be used for dispensing or aspirating. The slide switch on the side of the unit sets the direction in which the motor rotates.

When the slide is in the forward position the roller wheel will rotate clockwise as seen from the operators angle and anti clockwise when the slide switch is in its backward position.

9. Pump speed adjustment

The speed control adjusts the voltage supply to the motor.

To adjust the speed of dispense press '**SPEED+UP**' or '**SPEED+DOWN**' to increase or decrease the speed.

Please note that a speed set too low may stall the motor.

10. Continuous dispense mode

To run the pump continuously press '**VOLUME+START**'. You can stop the pump at any point by pressing the '**STOP**' button.

The pump displays 'Cont' to indicate continuous running.

Please note that running the dispense tubes dry over a long period may shorten their life.

11. Overload Protection Mode

Whenever the motor is overloaded beyond it's safe operation capability, an overload protection circuitry will switch the motor off. The display will read O-L (meaning **Over-Load**). To restart normal dispense operation, press the **STOP** button.

12. Care & maintenance

The control unit is maintenance free. The peristaltic tubes however require replacement as soon as excessive wear or a large variation in dispense volume is noticed.

The operational life of the tubes is a function of the speed and load on the tubes.

Avoid running the tubes dry for longer than a few minutes.

Check the peristaltic tubes on a weekly basis and renew if required.

Pump tubes which remain clamped in the pump deform with time. Therefore, unclip the tube clip at one side of the clip to relieve the pressure from the tube whenever the pump is idle for longer periods and overnight.

13. Exclusion

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment might be impaired.
Not suitable for use in explosion hazard environments.