TubeMarker™ 2

Operation Manual

Version: 2.0

CE

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Disclaimer

Copyright Notice

Safety Information

This operation manual contains important operating and maintenance instructions which must be read, understood, and followed by the product user. Failure to use this product according to this operation manual may degrade or defeat the protection normally provided by this product. Read this manual prior to product use and keep it for future reference.

Safety Instructions

1. Keep the device away from humidity.
2. Before you connect the equipment to the power outlet, please check the voltage of the power source.
3. Take care not to spill any liquid on the printer.
4. For safety and warranty reasons, only qualified service personnel should unscrew the base of the instrument or touch the back of the LCD display.
5. Turn off the power and unplug the device before maintenance.
6. Do not touch moving parts.
7. Only use the TubeMarker™ 2 with the AC/DC adapter provided with the equipment.
8. If the power supply is damaged please do not attempt to use the TubeMarker™ 2.
9. Do not position the TubeMarker™ 2 so that it is difficult to operate the disconnecting device (detachable plug).

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

This product has been tested to meet the requirements of IEC/EN 61010-1:2010, UL 61010-1 (2012) and CAN/CSA-C22.2 No. 61010 (2012).

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1 TubeMarker™ 2 Introduction

1.1 The Instrument

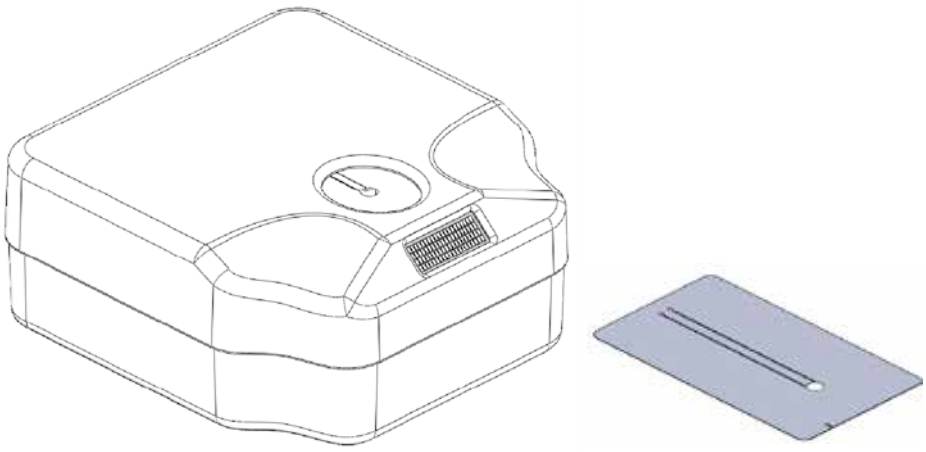
The TubeMarker™ 2 allows printing directly onto the surface of of a wide range of tubes including PCR, centrifuge and cryogenic vials from 0.2 – 50 ml in volume, limiting need and use of sticky labels or marker pens. Markings are resistant to ethanol, isopropanol, water, DMSO, liquid nitrogen and mechanical stress. The prints are also stable over a wide temperature range (-196°C to 100°C). Markings do not stain your hands when touching the tubes.

Note: Resistance varies between ribbon colours. Please refer to the TubeMarker™ 2 website on www.4ti.co.uk for an overview chart of ribbon resistance & compatibility.

Our label design software gives the user complete flexibility when creating their label layout. Each piece of data, be it text, barcodes or graphic files can be placed independently of one another. Depending on the printing needs, this ensures the correct data is called upon for each cell or emphasis is given to the most important information.

The instrument also prints linear barcodes and 2D codes in various module sizes and graphic files (.bmp, .jpg, .gif, .png) such as company logos. Print orientation can be set within 360°.

1.2 Package Contents



- TubeMarker™ 2 (Product code 4ti-0680-1)
- 3 x Tube Adapters

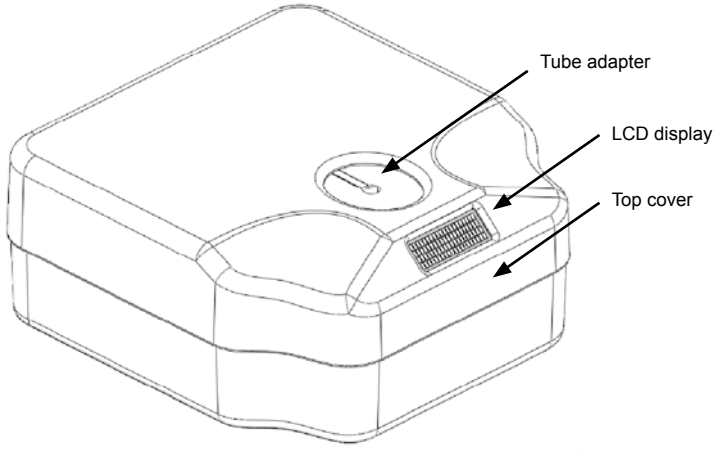
Tube Adapter	Hole Diameter	Product Code
Tube Adapter for 1.5 ml/2 ml tubes	11.5 mm	4ti-0681
Tube Adapter for 2D cluster tubes	8.5 mm	4ti-0683
Tube Adapter for cryo tubes	12.7 mm	4ti-0684

- AC adapter 18W 18VDC (input 100-240VAC)
- 7 mm magnetic pole adapter
- USB A-B cable
- 50 x 2 ml polypropylene tubes (as of serial number 001-000387)
  Note: For printing optimisation only. The smooth surface of the tubes will give best printing results which will serve as a reference for printing optimisation of other tubes.
- Operation manual
- Shipping safety instruction
- USB Flash Drive

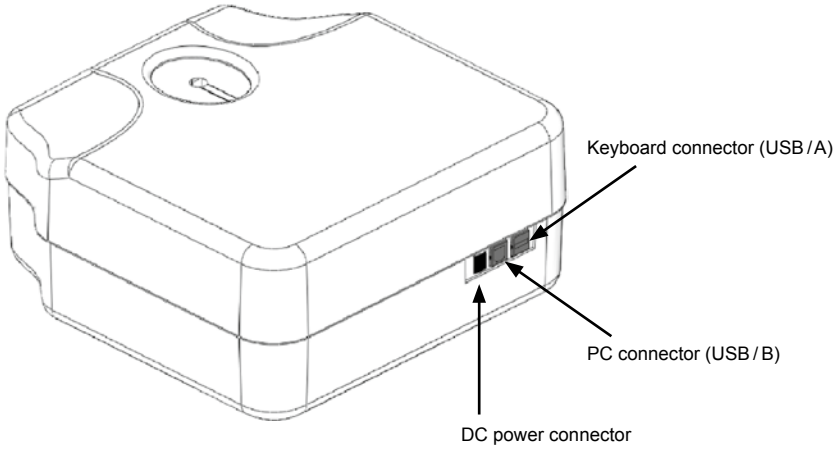
1.3 TubeMarker™ 2 Parts

1.3.1 TubeMarker™ 2 External Parts

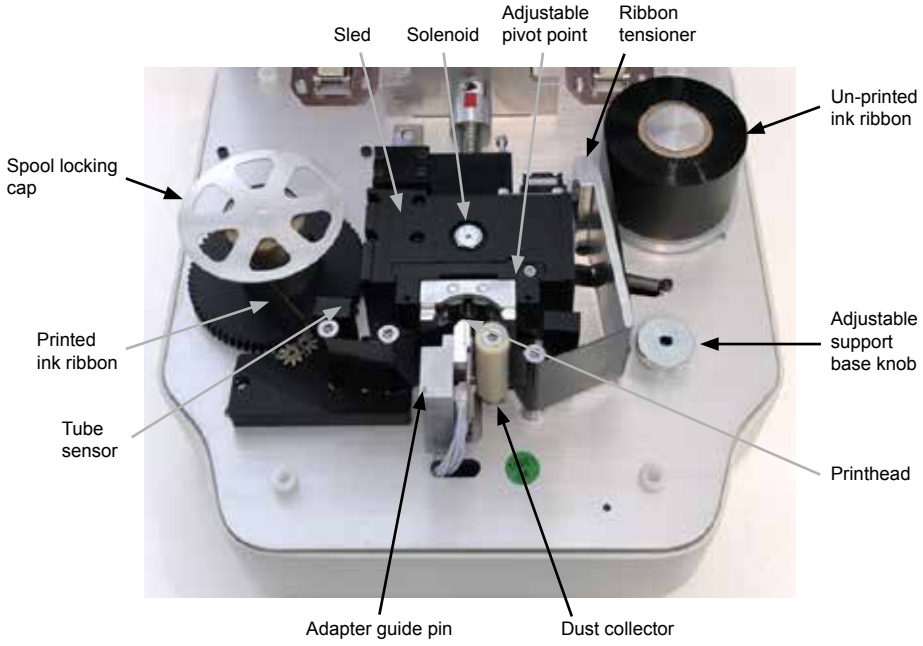
TubeMarker™ 2 front



TubeMarker™ 2 back



1.3.2 TubeMarker™ 2 Internal Parts



2 Software Installation

Supplied with the TubeMarker™ 2 is a USB stick containing a folder to the software installer. Within this folder are two files:

- TubeMarker™ Installer (Windows Installer package .msi)
- Set-up (Application .exe)

To install the software, you must execute the installer file. Follow the steps below to install your new TubeMarker™ software.

Note: Both the installer and set-up files must be located in the same file space for installation to be successful. 4titude recommends you run the installer directly from the USB stick.

Double click on the **Installer**.

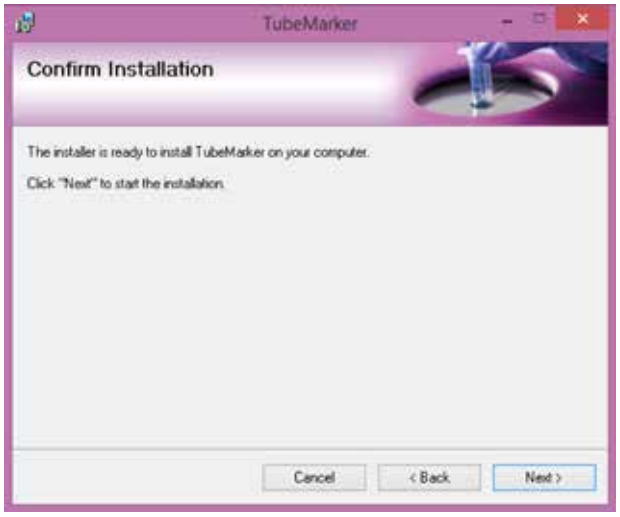
The following message will appear. Upon reading the disclaimer, Click Next > to confirm you are happy to proceed with installing TubeMarker™.

Select a destination folder and click Next > .

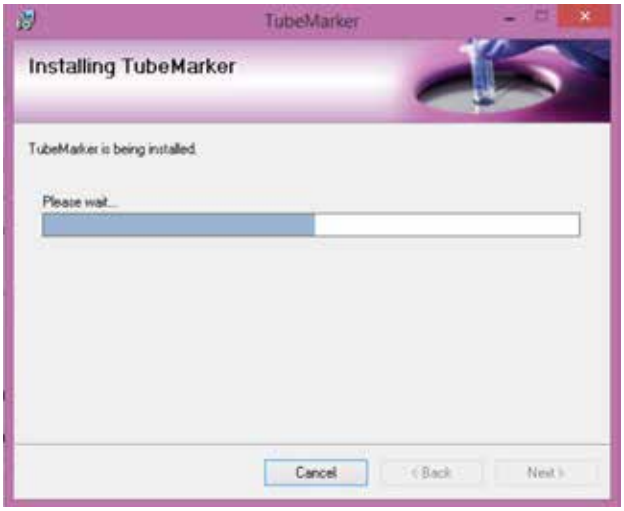
Note: An option to install for all users of the PC or just the one user can also be decided upon at this stage.

The installer is now ready to install TubeMarker™ on to the PC.

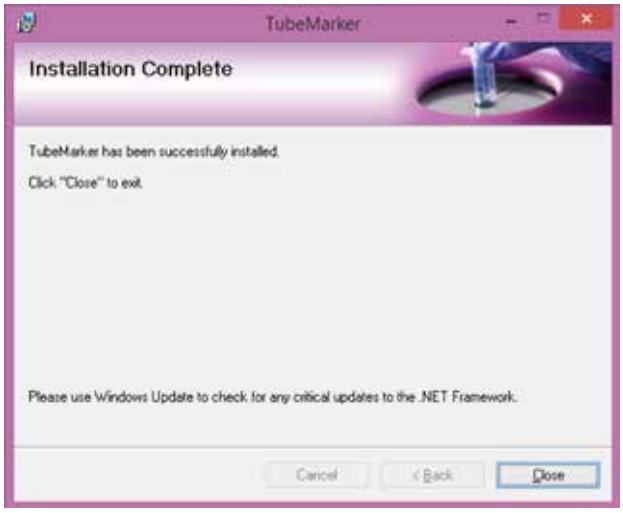
Click Next > and installation will begin.



The following screen will appear displaying the installation progress.



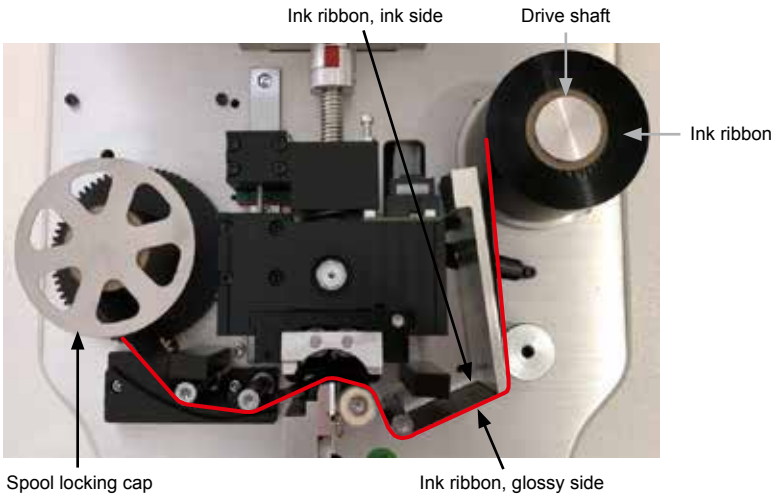
The following screen will appear to show installation is now complete. Click Close to exit and complete installation.



A shortcut to the software application will automatically be saved to the computers desktop. You are now ready to execute the TubeMarker™ software.

3 Hardware Installation

3.1 How to Install Ribbon for Printing



Where possible gloves should be worn when installing the ribbon. This will ensure ink is not removed by the heat emitted from your fingers.

Open the top cover of the printer.

Remove the spool locking cap.

Insert the ink ribbon on the right-hand drive shaft. Make sure that the pin at the base of the drive mechanism shaft goes into the slot on the ink ribbon core. Check that the core goes all the way down and there is no gap between the bottom of the ribbon and the base of the drive mechanism.

Thread the ink ribbon through the path highlighted by the red line in the picture above.

Insert the empty ink ribbon core onto the left-hand drive shaft. Ensuring the slot in the core is flush over the pin at the base of the shaft. Use thin adhesive tape to attach the ribbon to the empty ink ribbon core. Make sure that the lower edge of the ink ribbon is as close to the black drive mechanism as possible and that it is not wrinkled.

Lock the spool and ribbon in place by screwing the spool locking cap down, this will help to align the ribbon.

Turn the drive mechanism and core clockwise until the start of the ink ribbon is on the core. If necessary, turn the right hand side ink ribbon roll clockwise to tighten the ribbon as shown in the picture above.

Close the top cover and proceed to section 3.3. The TubeMarker™ 2 will carry out a calibration procedure at startup.

If startup is interrupted the unit will auto-calibrate before the first print.

Note: The glossy side of the ink ribbon should be against the printhead, otherwise the printhead might be damaged when used.

Avoid touching the unused area (between the printhead and right-hand side roll holder) of the ink ribbon with bare hands. Any dirt or grease on the ink ribbon will reduce the print quality.

3.2 How to Set-up Tube Support

3.2.1 Selecting and Installing Tube Adapter

The TubeMarker™ 2 delivery package contains tube adapters for 1.5 ml / 2 ml tubes (4ti-0681, hole diameter 11.5 mm), 0.5 ml PCR and 96 racked 2D storage tubes (4ti-0683, hole diameter 8.5 mm) and cryo tubes (4ti-0684, hole diameter 12.7 mm).

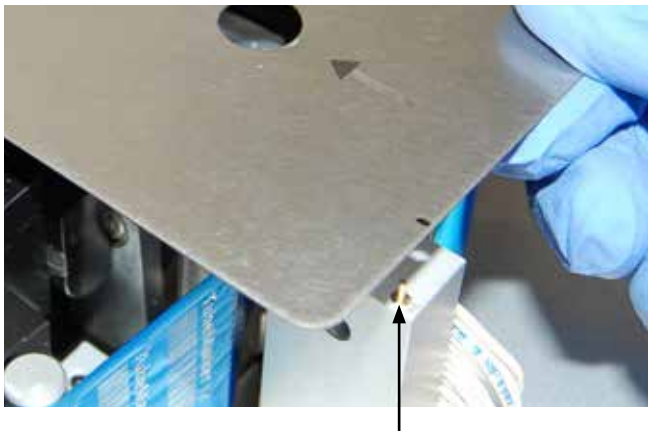
To print on tubes that are not supported by the standard adapters please refer to our website *www.4ti.co.uk* to see the latest additions to the TubeMarker™ 2 portfolio. The tube adapter is selected according to the tube diameter.

TubeMarker™ Tube Adapter	Hole Diameter	Product Code
Tube Adapter for 1.5 ml / 2 ml Tubes	11.5 mm	4ti-0681*
Tube Adapter for 2D Cluster Tubes	8.5 mm	4ti-0683*
Tube Adapter for Cryo Tubes	12.7 mm	4ti-0684*
Tube Adapter for 2 ml Screw Cap Tubes (10 mm Diameter)	10.4 mm	4ti-0685-1
Tube Adapter for 15 ml Tubes	18 mm	4ti-0685-2
Tube Adapter for 50 ml Tubes	30 mm	4ti-0685-3
Tube Adapter for Matrix Tubes	8.2 mm	4ti-0685-4
Tube Adapter for 0.2 ml Tubes	6.4 mm	4ti-0685-5

*These items are included with the TubeMarker™ 2 (Code 4ti-0680-1)

Tubes without a collar will be supported from the bottom via an adjustable adapter. They will also be aligned with the print head from the top via an adapter plate.

Tube adapters for tubes not fitting to any of the existing adapters are available on request. Please contact 4titude® at *4ti-info@brooks.com*.



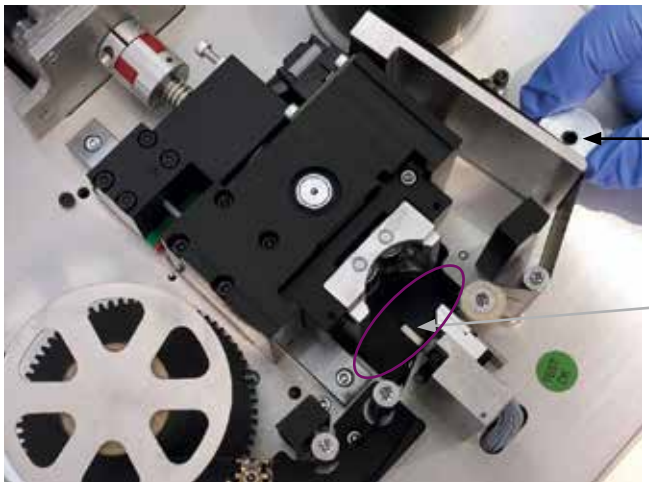
Insert the tube adapter on the sled as shown in the picture above. Check that the plate guide pin slots into the small hole in the tube adapter.

3.2.2 Setting Adjustable Support Platform

Housed within the TubeMarker™ 2 unit is an adjustable support platform from which tubes without a lip or collar can be fully supported. Integrated within the support platform is a magnet which attracts and stabilizes the magnetic pole attachment used to support tubes of less than 65 mm in length and do not have a collar or lip. The magnet within the support platform has been designed and positioned in such a way to help users perfectly locate the pole attachment and eliminate misalignment against the printhead and sled; which could potentially damage these components.

Open the top cover and remove the adapter if applicable.

To raise the support platform turn the knob clockwise. Turning anti-clockwise will lower the platform.

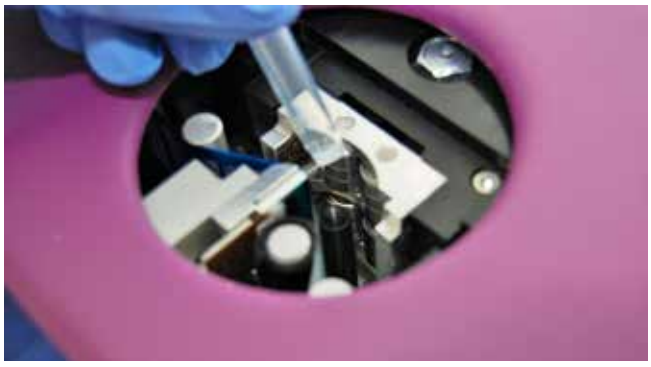


To perfectly optimize print results for your tube(s), you may need to adjust the pivot point of the sled to even out pressure across the whole tube surface area, see section 3.2.4. Additionally, you may also require the use of the 7 mm magnetic pole attachment. See below for details how to correctly position the attachment.

3.2.3 Using Magnetic Pole Adapter

Whilst connected to the software with cover closed, go to Printer settings manager in bottom left corner of home screen. Select Sled tab and use the up arrow ▲ to open up the sled. This will give you extra room to maneuver the pole attachment. Open the cover of the unit and remove the tube adaptor to place the pole attachment.

The attachment should be placed in such a way that is fully supportive to the tube you wish to print onto. Once positioned where you think is optimal, shut the cover and close the sled by using the down arrow ▼ within the sled tab; leaving enough room to insert the tube for printing onto.



Insert the tube and close the sled further so the tube is locked in position. You may need to make fine adjustments to tube platform height and pole attachment to optimise the printed label position. Ensure there is no pressure coming from the sled when making these adjustments.

In other instances where the tubes are larger and more susceptible to falling over, 4titude® recommends the use of an adapter plate to align the tube against the printhead and sled. This will alleviate any possibility of the tube dropping into the unit after a print has been made.

If the tube is over 65 mm in length, there is no need for the pole attachment.

Note: Switch tube lift OFF in the TubeMarker™ printer settings tab for adaptors without a lift design or for tubes without a cap or collar.

3.2.4 Setting the Sled Pivot Point

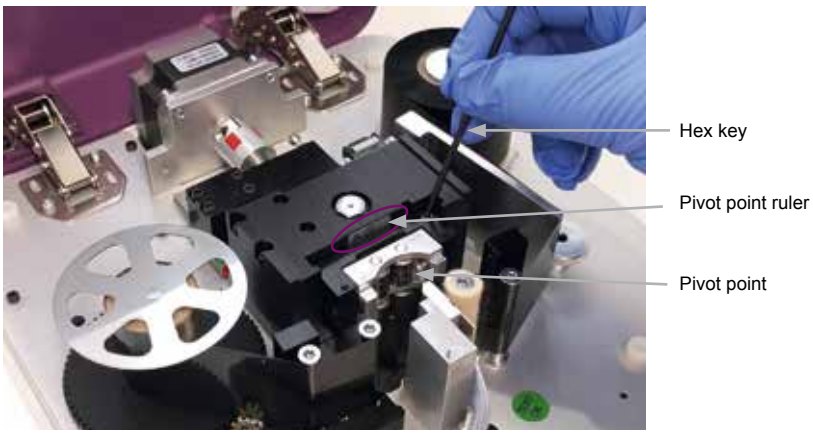
To improve the overall print quality, users have the ability to adjust the position of the sled's pivot point, increasing the surface area of the tube in which pressure is applied. This is particularly useful for larger tubes or those which are not printing fully near the base of the tube. The pivot point can only be lowered to a maximum of 14 mm below the default position. Follow the step-by-step guide below for how to effectively utilize the adjustable pivot point.

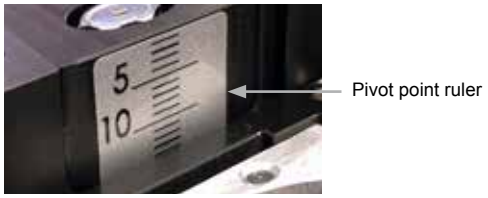
Open the top cover and remove the adapter (if applicable).

Take the 2.5 mm hex key provided and adjust the height of the pivot point. To lower the pivot point turn the hex key clockwise; turning anti-clockwise will raise the pivot point.

For best results, you want to adjust the pivot point so it is applying pressure to the centre or just below the centre of the tube you are printing on. The pivot point is located in the middle roller bearing of the top set of 3 roller bearings, as shown in the photo below.

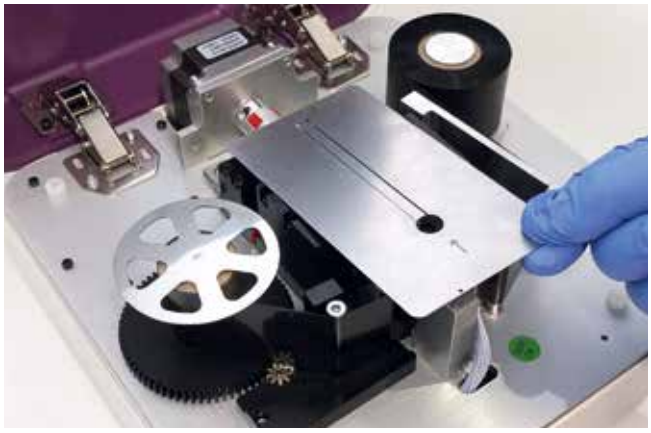
Note: DO NOT raise the pivot point above the default position. Default position is flush with the top of the sled.





Once you are happy with the pivot point positioning, replace the adapter suitable for the tube(s) you wish to print onto and close the top cover. Make a note of the pivot point position by referencing the sled ruler.

For tubes that do not have a lip or collar, please refer to section 3.2.2.



See below, examples of prints which were printed with the pivot point at default position and again with the pivot point adjusted to the centre of the tube. The print quality has drastically improved and important label data hasn't been lost as a result of the lowered pivot point.

Pivot point default

Pivot point 10 mm lower

3.3 How to Connect Printer to PC

Please check the following items before connecting the power source:

- There is no tube inside the TubeMarker™ 2
- The ink ribbon is inserted correctly
- The tube adapter is inserted correctly
- The TubeMarker™ 2 top cover is closed

Connect the DC power source plug to the connector shown in section 1.3.1.

The TubeMarker™ 2 will carry out a calibration procedure at startup. Wait for calibration to finish before proceeding. If calibration is interrupted it will auto-calibrate once the first print is triggered. Alternatively, you can restart the TubeMarker™ 2 by disconnecting and reconnecting the power supply.

Execute TubeMarker™ 2 software!

4 Preparation for Printing

4.1 How to Create Label Content

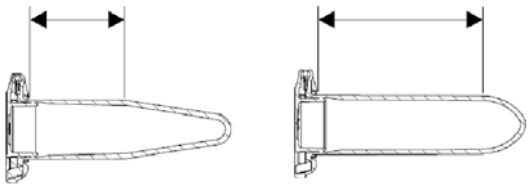
4.1.1 How to Set the Tube Label Dimensions

In order to set the optimum tube label dimensions, ensuring all label content is printed onto the tube being used, you must first measure your tube to find the height and diameter parameters.

The max label height is specified according to the measurement of the straight part of the tube. This is between the cap and the conical part of the tube, as shown below. The maximum printing height is 40 mm. For tubes that exceed 40 mm in length, label heights should be set to 40 mm.

The max label width is specified according to the diameter of the tube being used. Whatever the diameter is of the tube, this will be converted in to its measurement as a circumference. This ensures the end of the label will not overlap the beginning of the label.

Note: The actual tube dimensions specify the MAX label dimensions.



Example Tube Dimensions

Tube Type and Volume	Tube Height	Tube Diameter
0.5 ml PCR Tube	14 mm	8 mm
1.4 ml 96 Racked Storage Tube	35 mm	8 mm
1.5 ml Microcentrifuge Tube	18 mm	11 mm
2.0 ml Microcentrifuge Tube	30 mm	11 mm
1.8 ml Cryo Tube	25 mm	12 mm
15 ml Centrifuge Tube	40 mm	16 mm
50 ml Centrifuge Tube	40 mm	28 mm

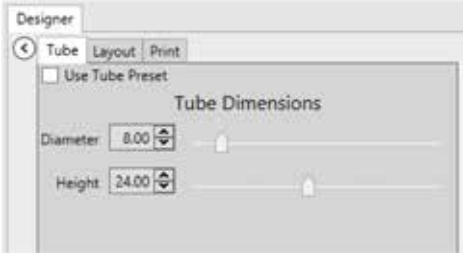
Inputting these values into the software, is done according to the following:

Start by accessing the Designer tab on the main software screen and collapse the Cell properties by clicking the ⊲ icon.

This will reveal the Tube, Layout and Print tabs.

For enhanced accessibility go to View > Designer. This will open the Designer tab in a separate pop-out window making placement of Cells and overall label design easier to manage.

To set the tube label dimensions, click on the Tube tab.

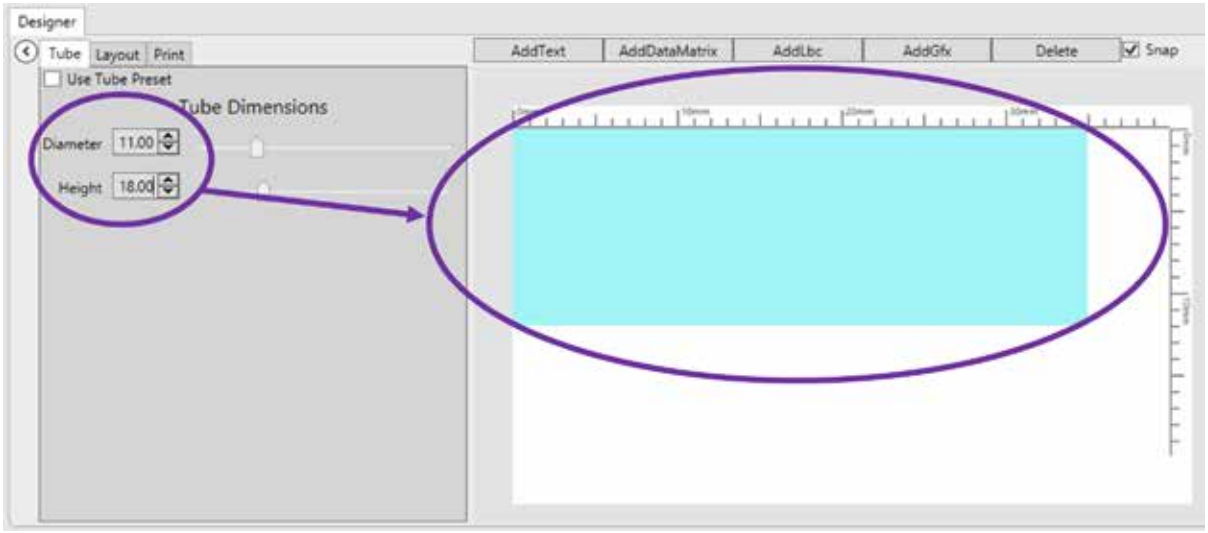


Setting the Height and Diameter value can be done in three ways:

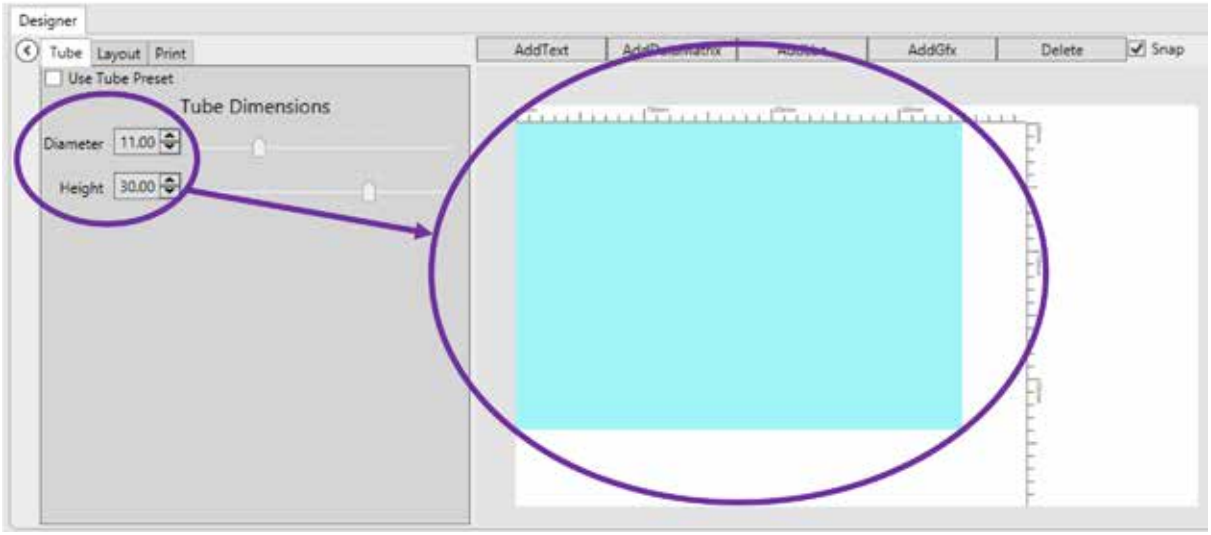
1. By highlighting and typing in the actual number
   Or
2. By clicking on ▲ or ▼. Value is adjusted in 1 mm increments/decrements.
   Or
3. By using the slider; this will adjust the dimension in 1 mm increments/decrements.

Once the tube parameters have been set, your label format will change to represent these. Two examples have been shown below:

Example - Label format for 1.5 ml Microcentrifuge Tube (4ti-0797)

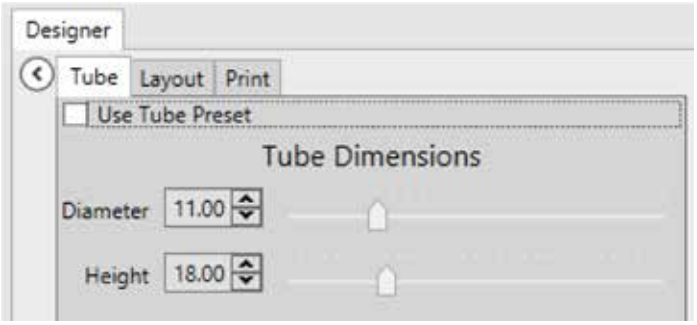


Example - Label format for 2.0 ml Microcentrifuge Tube (4ti-0798)

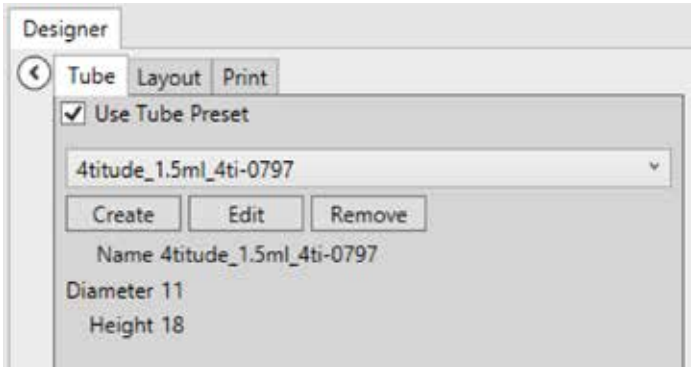


You can **create** tube preset profiles and save them to a drop-down menu for easy access.

To access the tube preset profiles, tick the **Use Tube Preset** box



The following menu will appear

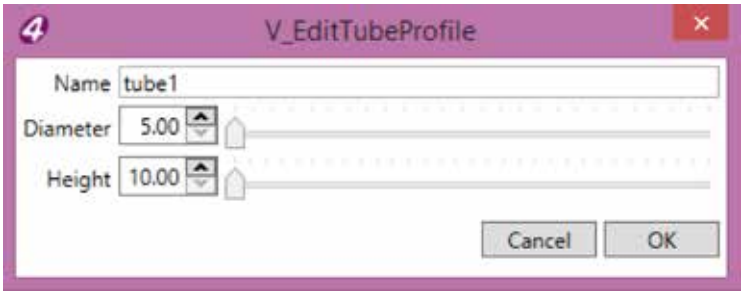


Added as defaults to the **Tube Preset** menu are 8 compatible Brooks tubes.

You can add to this list by clicking on Create .

You will then be able set the **Diameter** and **Height** parameters and edit the tube profile **Name**.

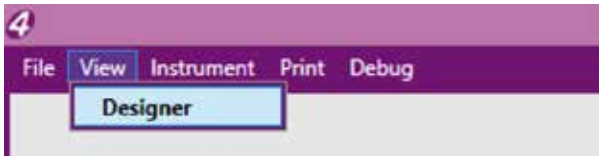
Click OK to confirm and save settings.



Once a tube profile is created you will be able to **Edit** or **Remove** it from the list.

4.1.2 How to Create Text Cells

Once your label layout has been set you can begin filling it with data. If you wish to make your design area larger, go to [View] > [Designer] . This will pop the screen out to a separate window, allowing you to maximise the view.

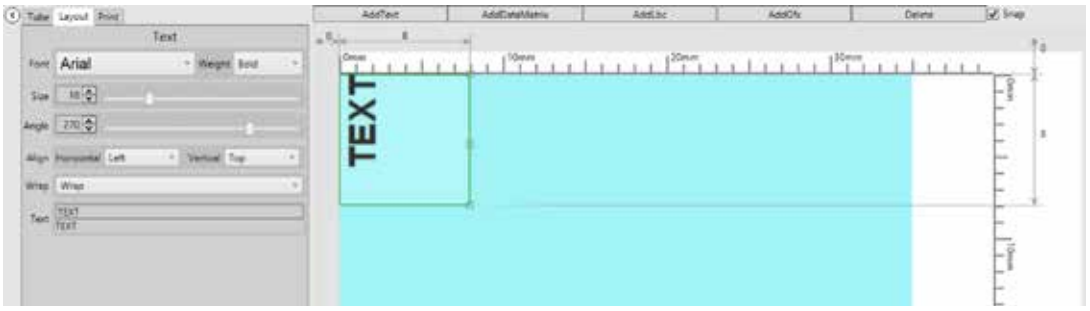


Within the **Designer** click on the [AddText] button. This will place an 8 x 8 mm Cell in the top left corner of the label.

Go to the [Layout] tab, here you will be able to set the following parameters:

Font (all TrueType fonts), **Weight** (Regular, Bold and Heavy), **Text size** (4 to 64), **Angle of text** (360°), **Alignment of text** (horizontal and vertical placement), **Wrap** (NoWrap, Wrap and WrapWithOverflow) and **Text** (Cell content entry).

Note: A visual representation of the Cell size and placement is shown via the X and Y axis.



To alter the width, length or position of the **Cell**, see section 4.1.8.

To edit the text in the **Cell** you can do so in two ways:

1. By manually typing in text via the Text Cell within the Layout tab. See section 4.1.6.
   Or
2. By linking the Cell to a specified column in the Data Spreadsheet. See section 4.1.7.

4.1.3 How to Create Linear Barcode Cells

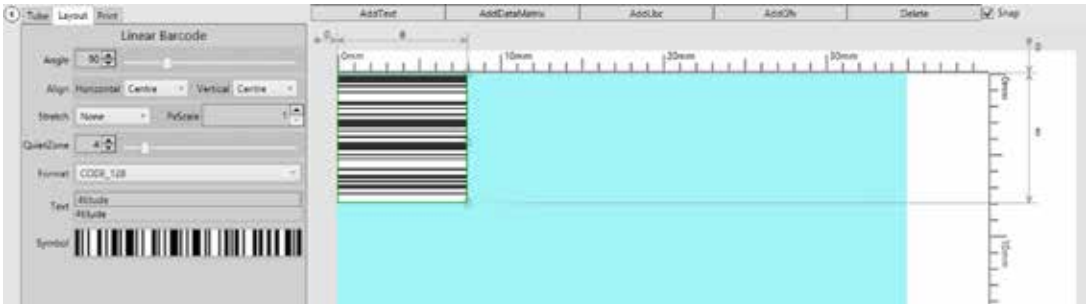
There are four variations of linear barcode to choose from: **Code_128**, **Code_93**, **Code_39** and **EAN_8** with module sizes ranging from 125 µm to 375 µm.

Within the Designer click on AddLbc. This will place an 8 x 8 mm Cell in the top left corner of the label.

Go to the Layout tab, here you will be able to set the following parameters:

Angle of barcode (360°), **Alignment** of barcode (horizontal and vertical placement), **Stretch** (Fill, Uniform, None and UniformToFill), **Module Size** (125 µm, 250 µm and 375 µm), **Format** (Code_128, Code_93, Code_39 and EAN_8) and **Text** (code content entry).

Note: A visual representation of the Cell size and placement is shown via the X and Y axis.



To alter the width, length or position of the Cell, see section 4.1.8.

To edit the barcode type, select from the **Format** drop down menu.

To edit the module size, select from the **Module Size** menu.

To edit the text in the Cell you can do so in two ways:

1. By manually typing in text via the Text Cell within the Layout tab. See section 4.1.6.
   Or
2. By linking the Cell to a specified column in the Data Spreadsheet. See section 4.1.7.

4.1.4 How to Create Datamatrix Cells

There are two variations of **Datamatrix ECC200** to choose from: **Square** and **Rectangular**. Module sizes range from 125 µm to 375 µm.

Within the Designer click on AddGfx. This will place an 8 x 8 mm Cell in the top left corner of the label.

Go to the Layout tab, here you will be able to set the following parameters:

Angle of Barcode (360°), **Alignment** of barcode (horizontal and vertical placement), **Stretch** (Fill, Uniform, None and UniformToFill), **Module Size** (125 µm, 250 µm and 375 µm), **Quiet Zone** (0-32), **Text** (code content entry) and **Shape** (Square and Rectangle).

Note: A visual representation of the Cell size and placement is shown via the X and Y axis.

To alter the width, length or position of the Cell, see section 4.1.8.

To edit the barcode **shape**, select from the **Square** or **Rectangle** from the **Shape** drop down menu.

To edit the **module size**, select from the **Module Size** menu.

To edit the text in the Cell you can do so in two ways:

1. By manually typing in text via the Text Cell within the Layout tab. See section 4.1.6.
   Or
2. By linking the Cell to a specified column in the Data Spreadsheet. See section 4.1.7

4.1.5 How to Create Graphic Files

There are four graphic file types that can be imported into the software: **.bmp**, **.jpg**, **.gif** and **.png**. Optimisation of the graphic files should be done prior to importation.

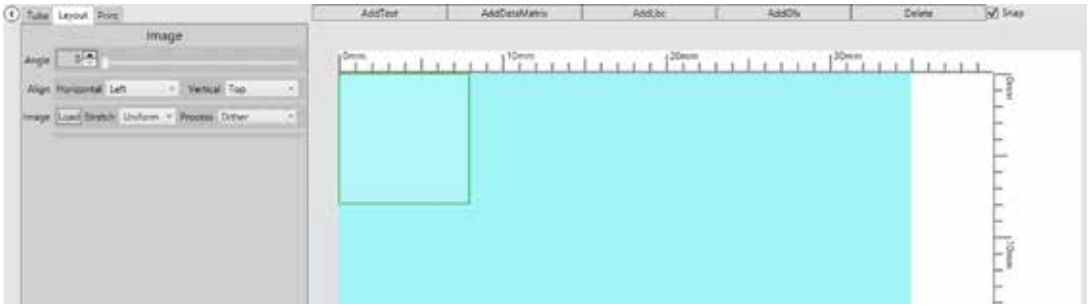
You should aim to get your graphic as small as possible, without pixelating the content. If the graphic size needs to be reduced, keep in mind that 1 pixel corresponds to 0.125 mm. For example, a picture of 100 x 100 pixels is 12.5 mm in width. Re-sizing of the graphic file needs to be done in an external program.

Within the [Designer] click on [AddLbc]. This will place an 8 x 8 mm Cell in the top left corner of the label.

Go to the [Layout] tab, here you will be able to set the following parameters:

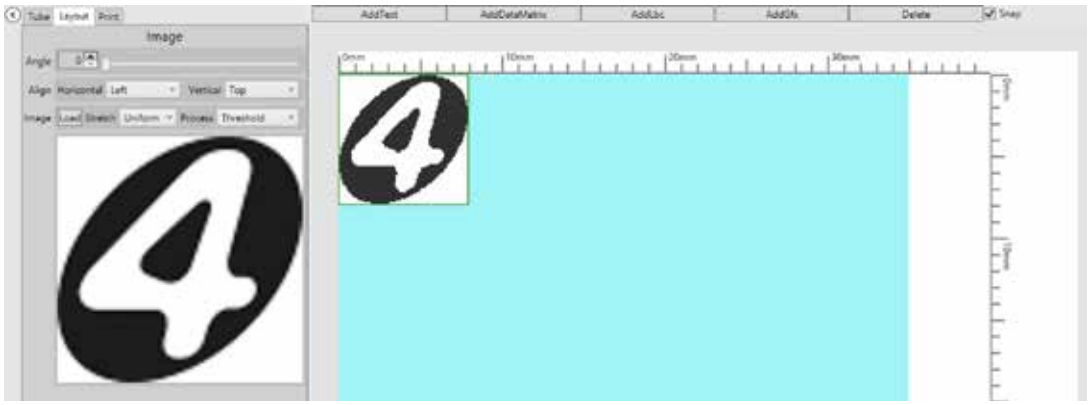
Angle of Graphic (360°), **Alignment** of Graphic (horizontal and vertical placement), **Image** (Load), **Stretch** (Fill, Uniform, None and UniformToFill), **Process** (Dither, Threshold).

Note: A visual representation of the Cell size and placement is shown via the X and Y axis.



Click on [Load] under the Image header, file explorer will open.

Locate your graphic file within the File Explorer and click [OK].



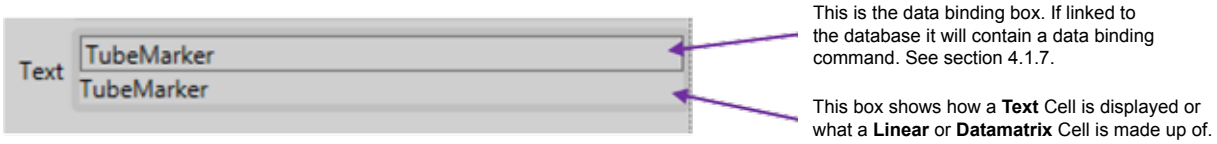
To alter the width, length or position of the Cell, see section 4.1.8.

To enhance the graphic process, select from the **Threshold** from the **Process** drop down menu.

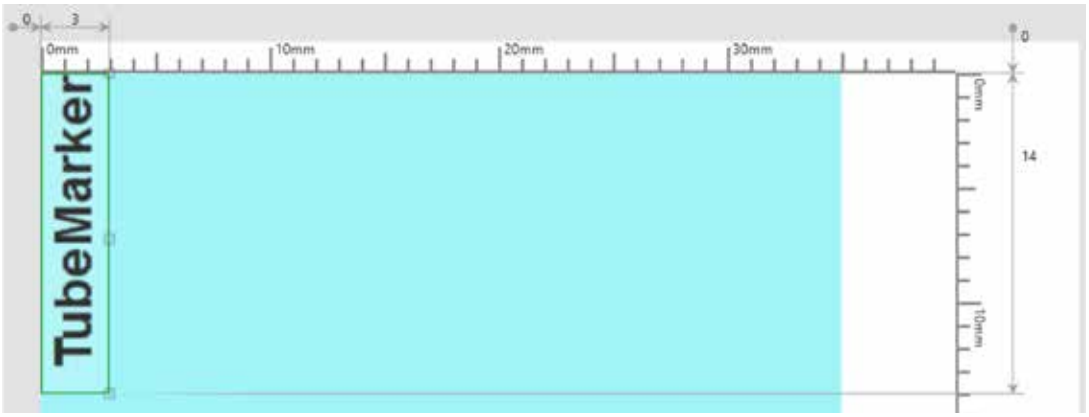
4.1.6 How to Edit Cell Content Manually

Click on the Cell you would like to edit, this includes **Text**, **Linear Barcode** and **Datamatrix** Cells.

Go to the **Text** box within the Layout tab of the Cell you would like to edit and write in the new data.



Shows on the label as:



4.1.7 How to Bind Cell Content to Data Spreadsheet.

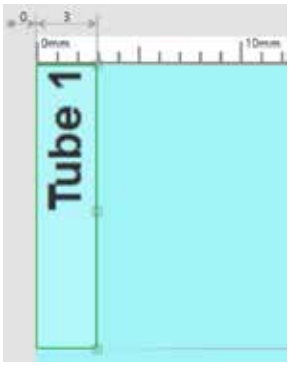
To link Cell content to the Data Spreadsheet you must first have it populated with information. Please see section 4.2.

Click on the Cell you would like to edit, this includes **Text**, **Linear Barcode** and **Datamatrix** Cells.

Go to the **Text** box within the Layout tab of the Cell you would like to edit. Write in the column header proceeded by "**$(**" and ended by "**)**".

*Example: If the column you wish to extract data from is headed **Tube Name** you must write "**$(Tube Name)**" in the **Text box** within the **Layout** tab.*

Shows on the label as



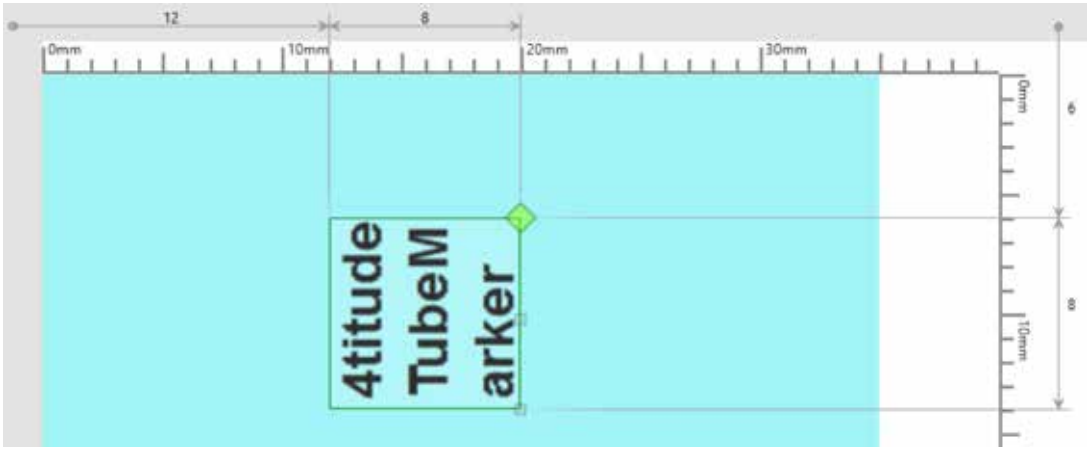
You can repeat this process for other **Cells** that require alternative or the same information or formatting.

You can also link other sections of the **Data Spreadsheet** by entering other data binding codes, within the same Cell if unique formatting is not essential. This works for **Text Cells** only!

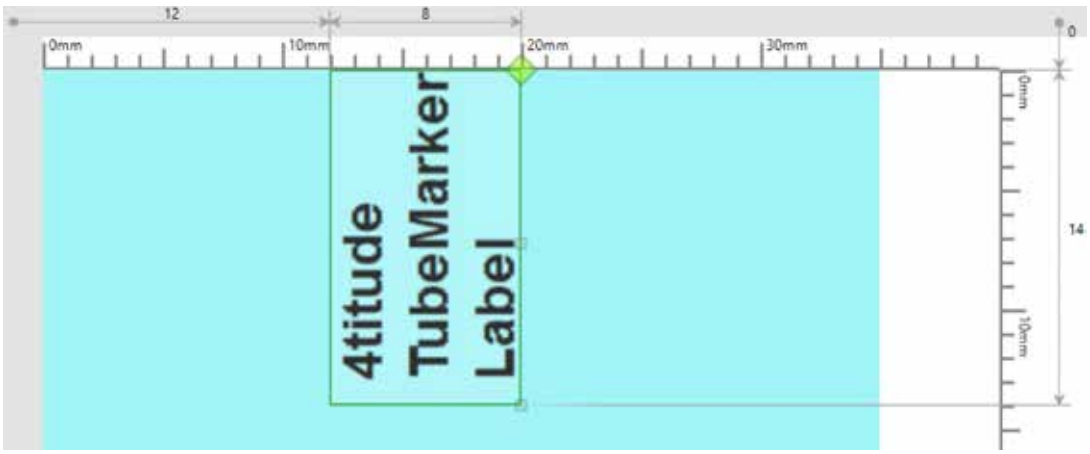
*Example: If you wish to populate one **Text Cell** from two or more columns, you must write the data binding codes to both columns on separate lines in the same **Text Cell**.*

4.1.8 How to Edit Cell Size and Placement

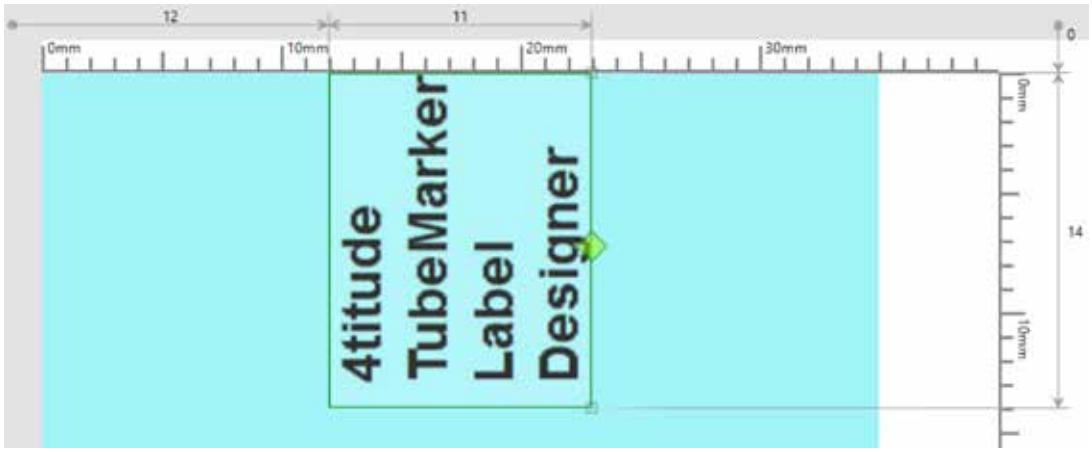
All Cells are loaded into the label, defaulted to 8 x 8 mm. This means that depending on the size of **Text** or **Barcodes**, the content may be “squashed” within the **Cell** and need adjusting to suit.



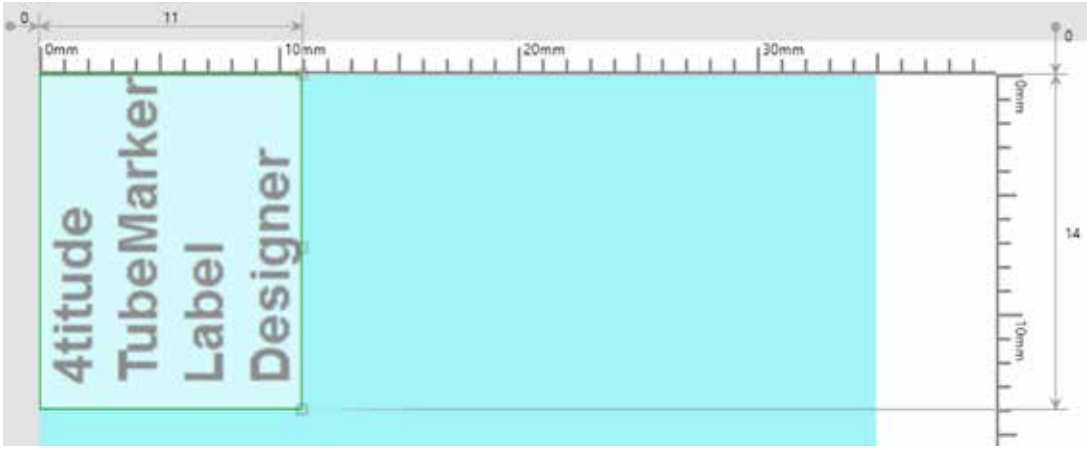
To lengthen and/or widen the **Cell**, you can click and drag on the Cell corner diamonds.



To widen the **Cell**, click and drag on the centre diamond.



To alter the position of the **Cell**, click in the centre of the Cell and drag to your chosen location



To delete a **Cell** within a label, click on the **Cell** and press Delete .

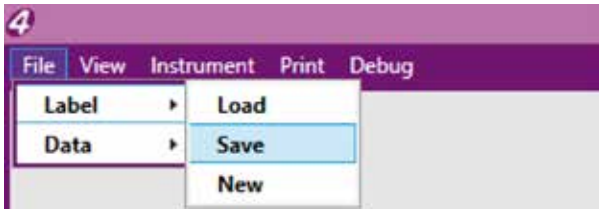
Alternatively, you can clear the label contents by going to File > Label > New .

4.1.9 How to Save and Load Labels

Saving a Label

Once you have fully designed your label for production, you can **Save** it for future use.

Go to File > Label > Save .



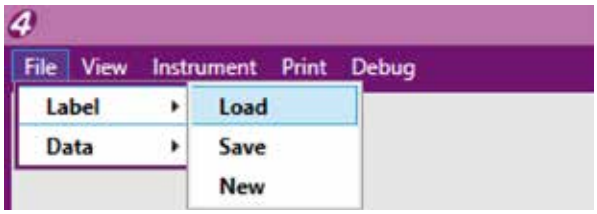
File Explorer will open, from here decide where to save the optimised label and click Save .

Your label will be **Saved** ready for the next time you need to **Load** it.

Loading a Label

Should your label have already been designed, you can **Load** a previously saved file.

Go to File > Label > Load .



File Explorer will open, from here locate the label you wish to **Load**.

Once located, double click on the file to **Load** it.

4.2 How to Enter Data into the TubeMarker™ Spreadsheet

There are two ways in which the TubeMarker™ **Data** spreadsheet can be filled: manual entry or imported from a .csv file.

Each row represents an individual tube and is numbered; starting from **1**.

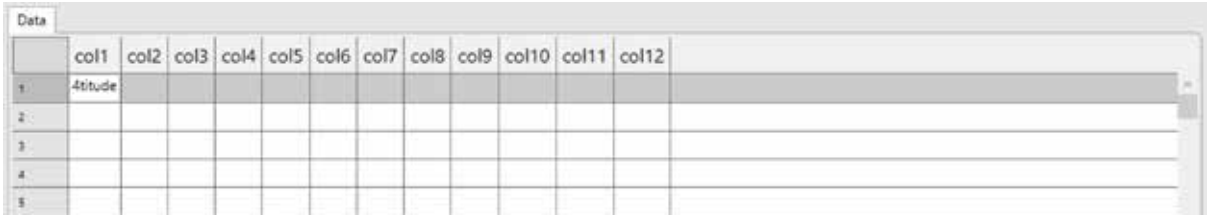
Each column represents individual pieces of information relating to the tube sample and is headed; starting with **col1**.

4.2.1 How to Manually Enter Data into TubeMarker™ Spreadsheet

Data Entry

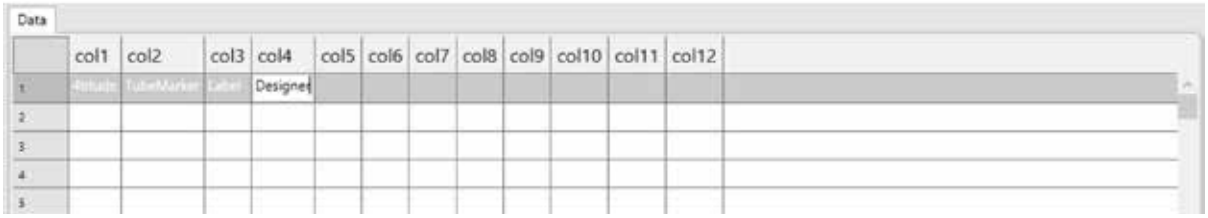
Double click in **Data Cell** row 1, column 1.

Type in the information you wish to print on to your tube



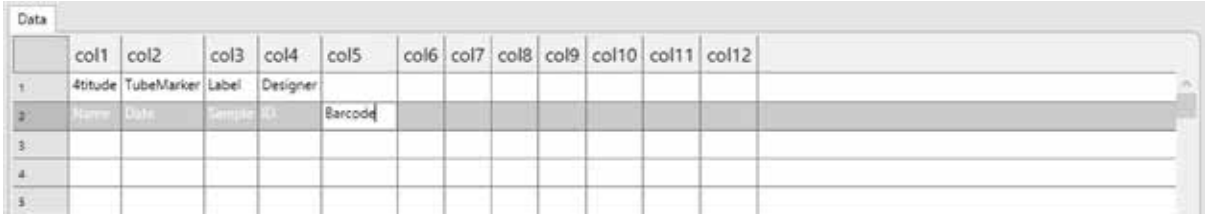
Navigate to the next **Data Cell** on the same row using the ***Tab*** button on your PC keyboard.

Continue this for all information.



To enter **Data** for a new tube, click on **row 2**.

Continue by typing information you wish to print onto the new tube.



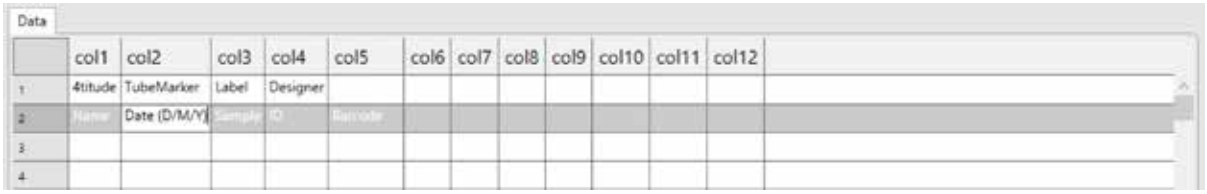
Repeat the process to fill the **Data** spreadsheet for all tubes that need labelling.

Note: If multiple tubes need to be printed with the same information you only need to fill one row of information. You can bind the data to a label (see section 4.1.7) and print multiple copies of that one label (see section 5.3)

Editing Data

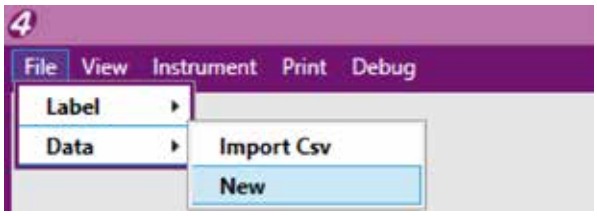
To edit a particular piece of information, double click on the **Data Cell** and re-type the new information.

*Note the inclusion of (D/M/Y) in **row 2**, **col 2**.*



To delete a piece of information, simply double click on the **Data Cell**, highlight the text and press the ***Delete*** or ***Backspace*** button on your PC keyboard.

To clear the whole Data spreadsheet, go to File > Data > New .

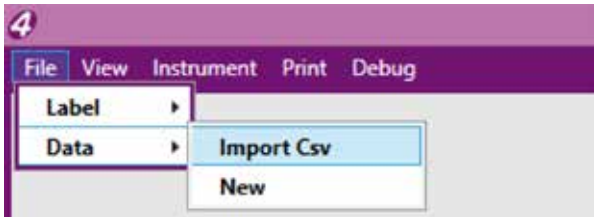


4.2.2 How to Import Data from Microsoft® Excel into TubeMarker™ Spreadsheet

TubeMarker™ software only accepts Microsoft® Excel .csv files. You must first save any spreadsheet as a .csv file before importing into TubeMarker.

Data Entry

Go to File > Data > Import Csv .

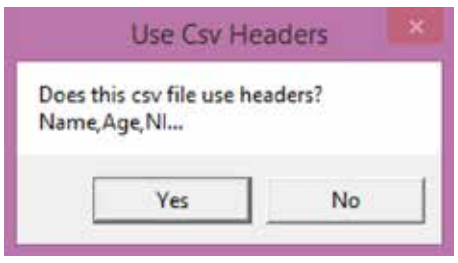


File Explorer will open, from here locate the .csv file you wish to **Load**.

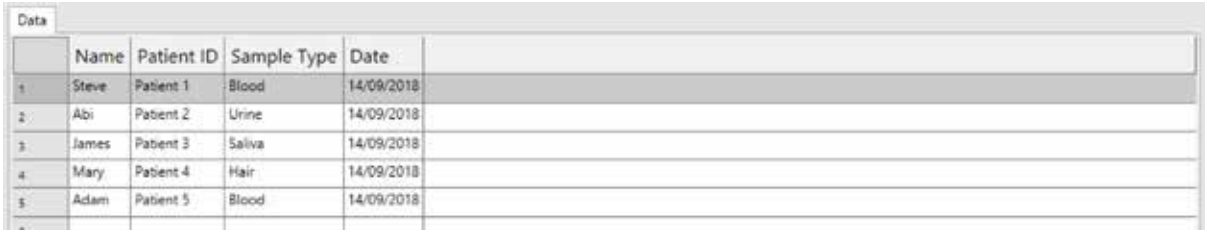
Once located, double click on the file to **Load** it.

Before completing the **Import**, a message asking if .csv file uses headers will pop-up.

If your .csv file does use headers, click Yes .

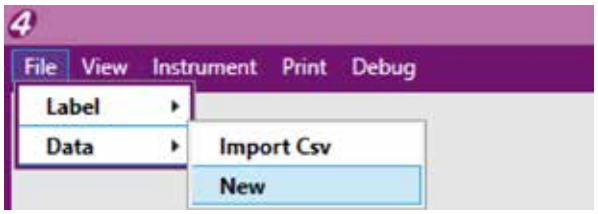


The column headers will change to represent those of the .csv file. In this case **Name**, **Patient ID**, **Sample Type** and **Date**.



To replace this information with another .csv file, simply repeat the steps above.

To clear the whole Data spreadsheet, go to File > Data > New .



4.3 How to Set the Printer Settings

Within the TubeMarker™ printer tab, are three sub tabs: **Settings**, **Firmware** and **Sled**. These control the settings which directly affect the hardware performance. Subtle changes can be made depending on the application to enhance productivity.

4.3.1 How to Set Print Settings

To ensure clear and legible print quality, there are two parameters that need to be optimised for printing.

Pressing force increases or decreases the amount of pressure the sled applies to the tube during printing.

Pre heat increases or decreases the amount of heat applied to the tube via the printhead.

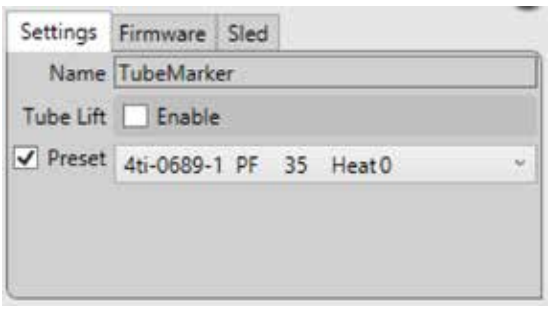
To change these settings, click on the Settings tab.

Setting the Pressing Force and Pre Heat values can be done in three ways:

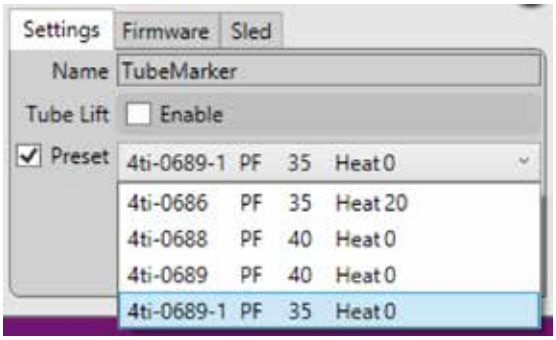
1. By highlighting and typing in the actual number
   Or
2. By clicking on ▲ or ▼. Value is adjusted in 1 mm increments/decrements.
   Or
3. By using the slider; this will adjust the dimension in 1 mm increments/decrements.

Alternatively, you can choose to use the default settings, as recommended by 4titude.

To do so, tick the **Preset** box.



And click on the drop-down menu to choose from 4 options: **4ti-0686** (blue), **4ti-0688** (white), **4ti-0689** (black) and **4ti-0689-1** (black, universal).



4.3.2 How to Enable Tube Lift (on/off)

To enable/disable the Tube Lift, click on the Settings tab.

To enable **Tube Lift** tick the **Tube Lift** box.

To disable **Tube Lift** un-tick the **Tube Lift** box.

4.3.3 How to Control the Sled Movement

To manually control the Sled, click on the Sled tab.

Ensure the top cover is closed.

Use ⇧ to move the Sled back.

Use ⇩ to move the Sled forward.

4.3.4 How to Perform a Firmware Update

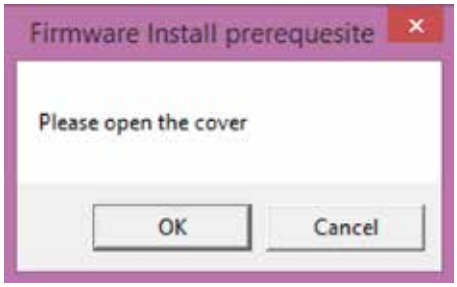
To upload the latest version of firmware, click on the Firmware tab.

The current, minimum and available firmware versions for the software will be displayed.

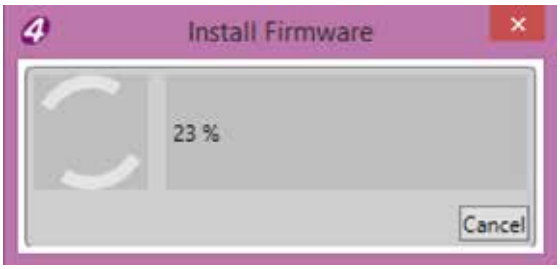
To load the latest version of firmware, click on the drop-down menu and select the latest version number.

Click Install .

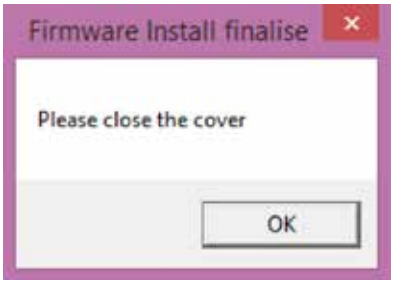
Open the cover and click OK .



Wait for the firmware to load.

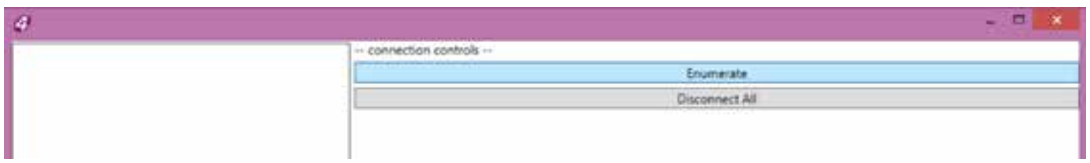


Close the cover and click OK .



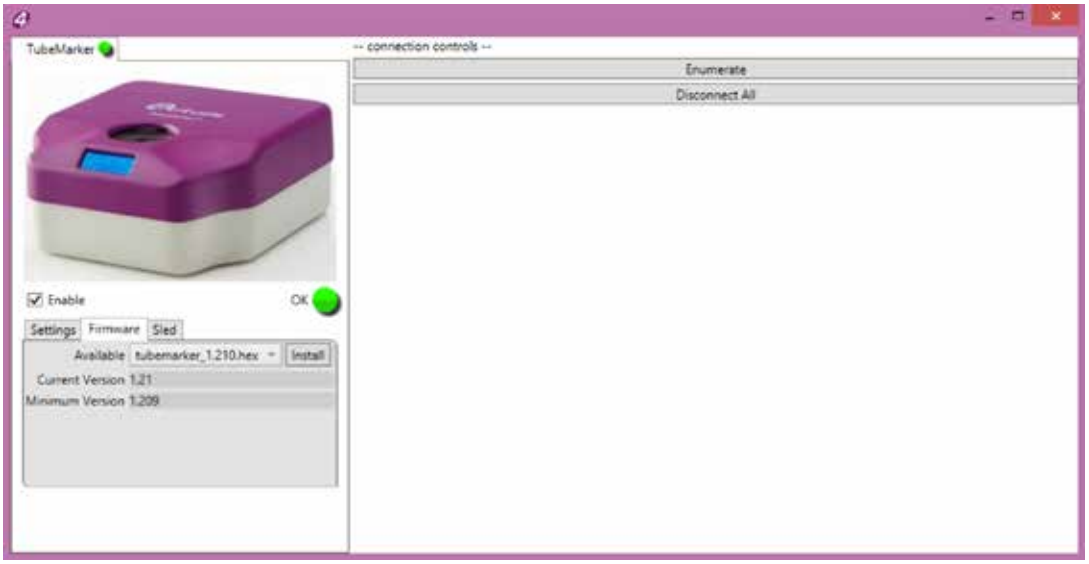
Go to Instrument > Manager within the Navigation bar.

Click on Enumerate .



The TubeMarker™ will now re-connect to the PC and show on the left-hand side of the screen.

Click on the Firmware tab to ensure the firmware has updated properly, as it will now be shown as the latest version.



5 Printing Modes

There are three methods to print your tube labels.

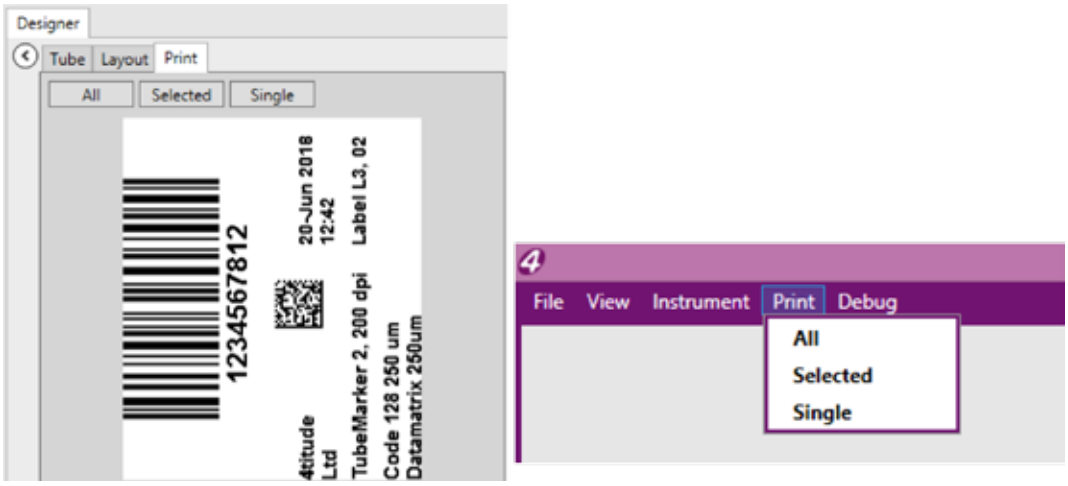
If the whole spreadsheet needs to be printed onto multiple tubes where the data varies from tube to tube, Print > All should be used.

If only selected data is needed to print onto several tubes, Print > Selected should be used.

If only one variation of label needs to be printed onto several tubes, Print > Single should be used.

Follow sections 3 and 4 to create your label.

Go to the Print tab, found in the Designer or on the **Navigation Bar**.



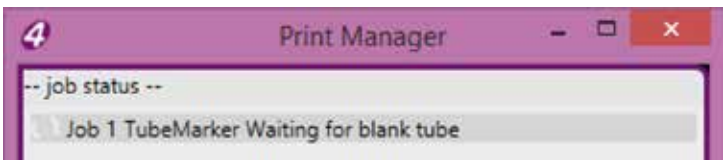
*Note: Choosing to print via the **Designer**, gives you access to the **Print Preview**.*

5.1 How to Use Print Mode – All

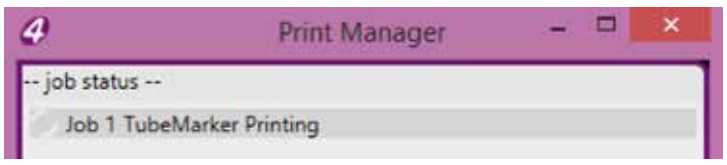
Go to the Print tab, found in the Designer or on the **Navigation Bar**.

Press All, printing will commence from data found in **row 1**.

The **Print Manager** window will pop-out and provide a live and visual representation of the label data it is waiting to print.



Insert a blank tube, TubeMarker™ will automatically begin to print. The **Print Manager** will confirm this.



Continue this process for the whole spreadsheet. Printing will automatically finish once the last tube has been printed onto.

Note: To improve and speed up throughput, you can connect multiple printers to one PC and control them all through one piece of software. See section 6.

5.2 How to Use Print Mode – Selected

Go to the Print tab, found in the Designer or on the **Navigation Bar**.

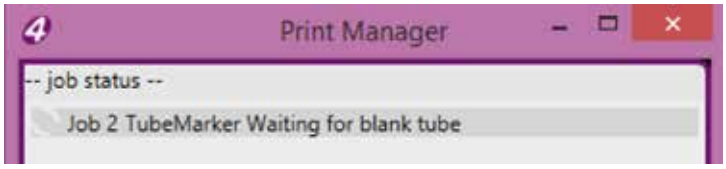
Highlight the rows of data you wish to print by clicking and dragging over them, or, by holding down the ***Ctrl*** key and selecting individual rows of data within the spreadsheet.

*Example - Only Rows 3 – 5 that have been highlighted, will be printed when using the **Selected** print mode.*

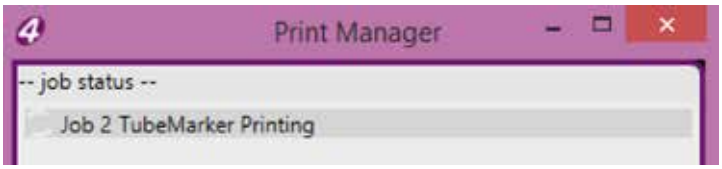
*Example - Only Rows 2, 4 and 6 that have been highlighted, will be printed when using the **Selected** print mode*

Press Selected .

The **Print Manager** window will pop-out and provide a live and visual representation of the label data it is waiting to print. It will start from the lowest numbered row.



Insert a blank tube, TubeMarker™ will automatically begin to print. The **Print Manager** will confirm this.



Continue this process until the last tube is printed. Printing will automatically finish once the last tube has been printed onto.

Note: If for any reason a label(s) hasn't printed properly, this feature is particularly useful, so you can print them again without having to select and print the data one by one.

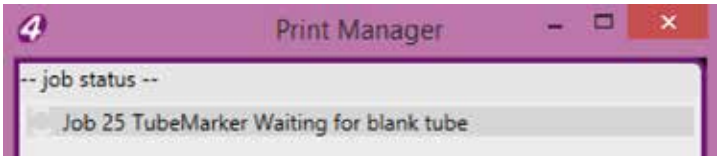
5.3 How to Use Print Mode – Single

Go to the [Print] tab, found in the [Designer] or on the **Navigation Bar**.

Highlight the row of data you would like to print.

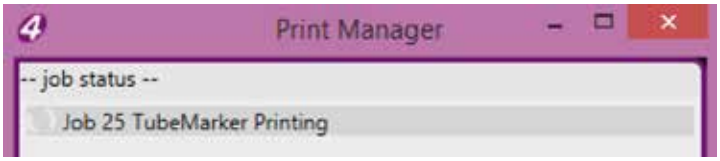
Press [Single].

The **Print Manager** window will pop-out and provide a live and visual representation of the label data it is waiting to print.



Insert a blank tube, TubeMarker™ will automatically begin to print.

The **Print Manager** will confirm this.



Continue this process until you are done printing.

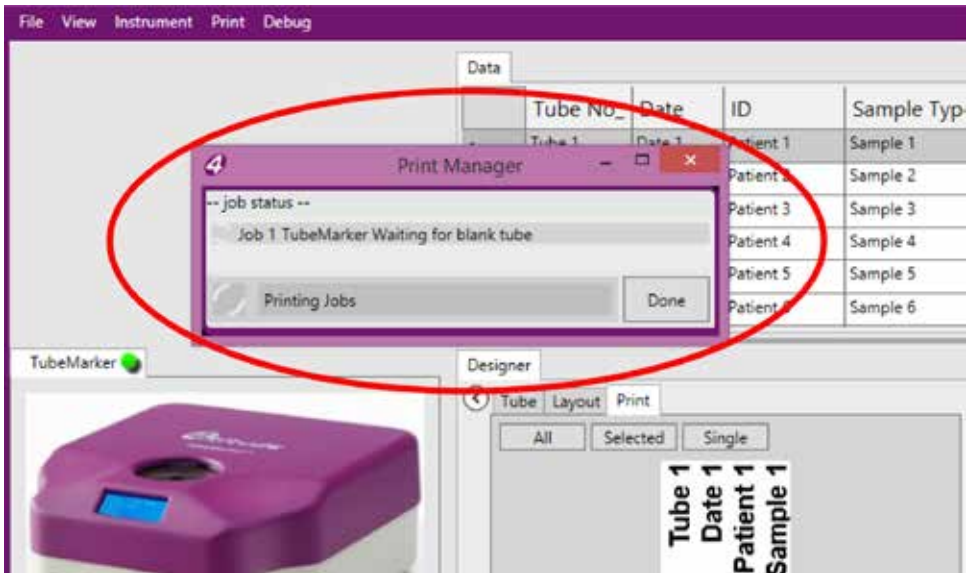
When you are finished printing on your tubes, press [Done].

5.4 How to Adjust the Ribbon during Print Mode

In the event the ink ribbon needs changing *OR* in the unlikely event the ribbon becomes snagged or tears during a print, you can immediately open the cover of the instrument to repair or replace it.

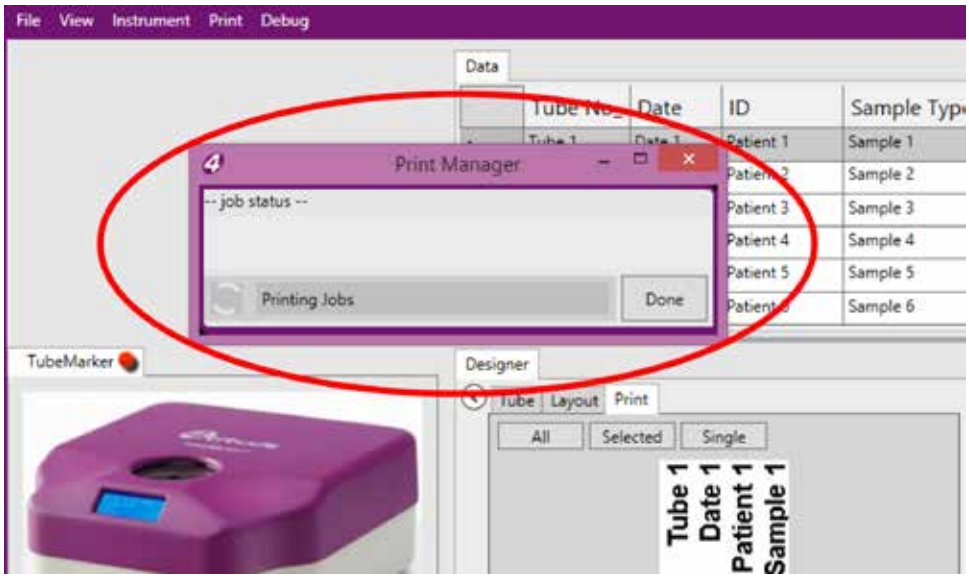
Being able to adjust the ribbon ensures no loss of data is experienced or your position in the print queue compromised. Follow the steps below:

1. Leave the Print Manager Open, see RED circle

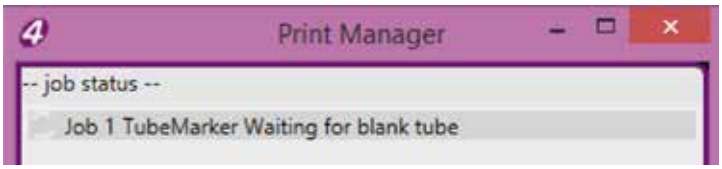


2. Remove Tube
3. Open cover

Note: Upon opening the cover, the green light will turn red and show the instrument is disconnected, the Print Manager's job status will go blank.



4. Remove Tube Adapter
5. Repair or replace the ink ribbon
6. Reposition the Tube Adapter
7. Close the cover and wait for calibration to complete
8. Wait a further 2 seconds for the Print Manager's job status to update to "Waiting for blank tube"



9. Insert tube and continue printing

6 How to Print using Multiple Printers

The TubeMarker™ software can control and send label data up to 16 printers. This increases throughput and productivity whilst ensuring labels are not duplicated. Together with the three automatic printing modes. Whether feeding the printers manually or via a robot, labelling your tubes couldn't be simpler.

6.1 How to Connect a Printer to Software

Connect the required amount of TubeMarker™ printers to your PC following section 3.3.

Once the hardware is connected, you will need to connect to the software. Upon execution of the software, all printers connected to the PC will **Enumerate** and connect automatically.

Connected printers will be displayed in the bottom left corner of the main screen, each printer will have its own individual **Tab**.

Each printer **Tab** is unique to one another, meaning completely different settings can be used from printer to another. For example, you may load different settings depending on if some labels require printing in blue ink and some require printing in black ink.

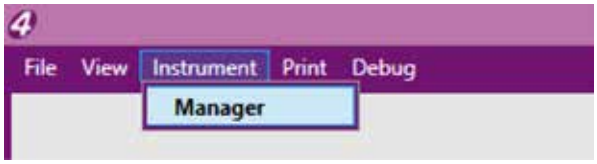
Below you will see that the first printer (TubeMarker) is loaded with the 4ti-0689-1 (universal black) ribbon, whereas, the second printer (TubeMarker2) is loaded with 4ti-0686 (blue) ribbon.

You can also re-name each printer. For example the printers have been re-named to show the ink ribbon they have been loaded with.

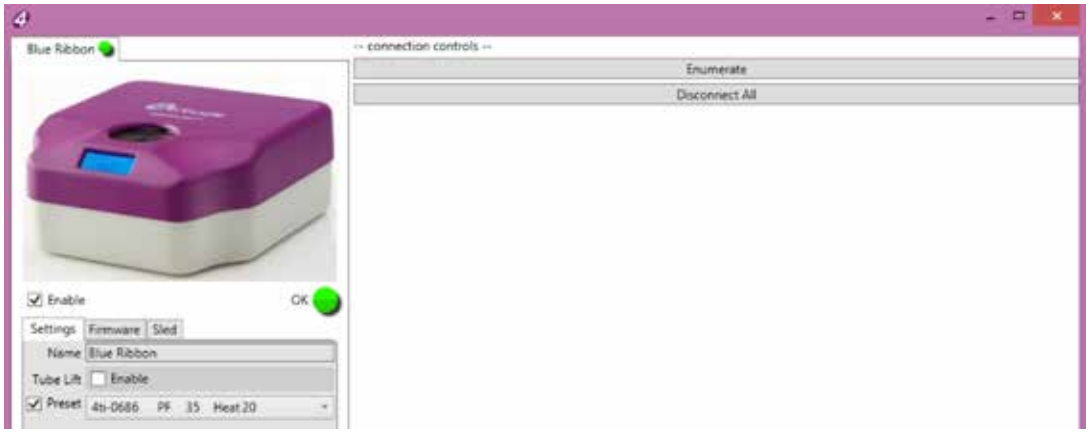
If connecting a printer with the software open and connected to a printer already you must follow the instructions below.

Connect the printer and PC following section 3.3.

Go to Instrument > Manager within the Navigation bar.

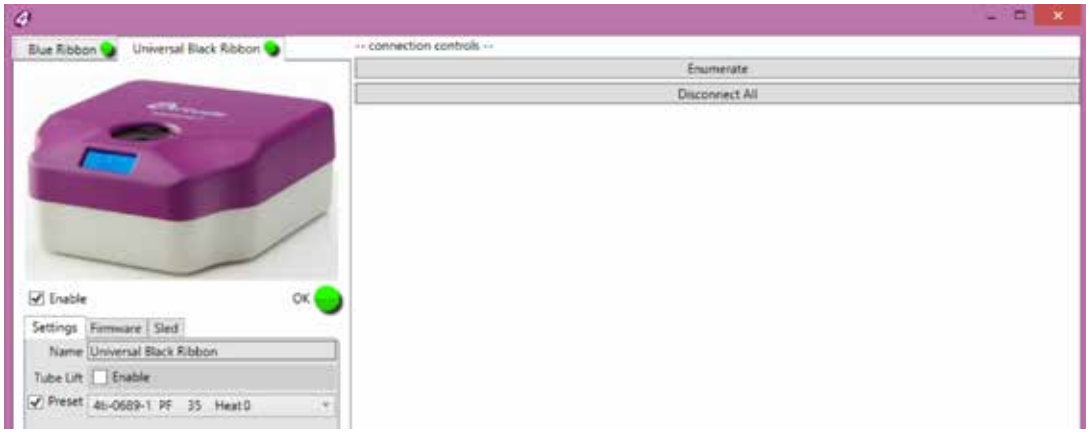


A pop-out window will open, displaying connected printers.



To connect a printer(s) to the software that are not connected to the software already, click Enumerate .

Previously connected printers will appear with the last known name and settings. New printers will appear with default name and settings.

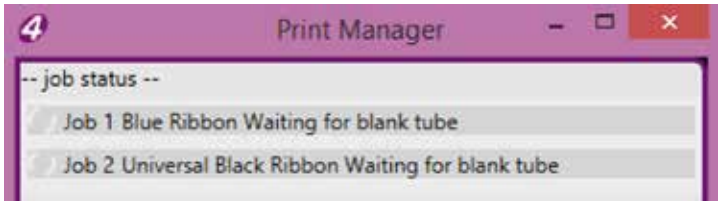


6.2 How to Print using Multiple Printers

Once all printers have been connected and settings for each printer have been established, you can begin printing your tubes.

Depending on the amount of labels you need to print, you can choose from the three **Print Modes** available; see section 5.

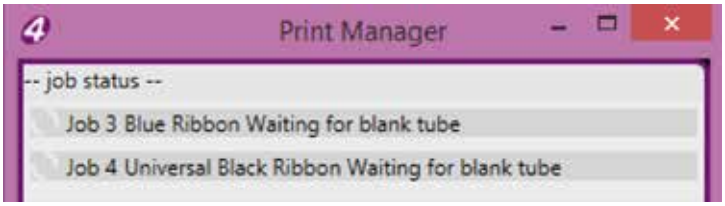
Upon selecting your chosen print method, the **Print Manager** will appear and display a label per connected printer.



Insert blank tubes, each TubeMarker™ will automatically begin to print.

The **Print Manager** will confirm this.

Once those tubes have been printed onto, the TubeMarker™ printers will wait to print the next labels in queue.



To end printing early, press Done .

6.3 How to Disconnect a Printer from Software

Select the printer you would like to disconnect, by clicking on the applicable Tab.

Click on **Enable**, to un-tick the box.

Remove the power supply.

The selected printer will now be **Disabled**, printing will commence from the printers connected.

7 Maintenance / Cleaning the Printhead

To ensure high quality printing, the ceramic surface of the printhead should be cleaned at a regular interval to remove any dirt or dust that might accumulate. This also applies to the ribbon tensioner surface.

Note: Touching the printhead with bare fingers should be avoided. Any dirt or grease might cause corrosion and damage the printhead.

Cleaning is carried out as follows:

1. Go to the Printer Settings menu and drive the sled further away from the printhead by pressing ▲.
2. Open the top cover.
3. Remove the tube adapter.
4. Loosen the ink ribbon by twisting the right-hand side ink ribbon roll anticlockwise until the ink ribbon is loose enough to be moved a few centimetres away from the printhead.
5. Twist the dust collector (see section 1.3) a little until the cleaner area is located towards the ink ribbon. In case the dust collector is dirty, remove it, clean it and put it back again. Pressurised air can be used to remove the dust.
6. Wipe the ceramic area of the printhead (the area which is against the ink ribbon in normal use) with a lint-free cloth moistened with alcohol.
7. Wait until the alcohol evaporates from the surface of the printhead.
8. Tighten the ink ribbon by turning the right-hand side ink ribbon roll clockwise until the ink ribbon is according to the picture in section 3.1. Check that the upper edge of the ink ribbon is on the same level with the ceramic (white) part of the printhead.
9. Close the top cover.

8 Error Messages / Troubleshooting

8.1 Error Messages

Message	Reason
Insert new tube	Printing is ready but the tube has not been changed before printing the next tube.
No tube	No tube inserted and trying to print.
Cover open	The top cover is open or not completely closed. When in automatic printing mode, if the top cover is opened the data sent to the printer will be erased.
Text field empty	The text field is empty and numbering is not in use.
Force sensor fault	The pressing force sensor might be damaged. Contact 4titude® at 4ti-info@brooks.com.
Ribbon fault	The ink ribbon is loose, broken or not inserted. Check that the ribbon is inserted correctly. If the problem persists, contact 4titude® at 4ti-info@brooks.com.
Tube detector fault	Tube detection components might be damaged. Contact 4titude® at 4ti-info@brooks.com.
Power supply fault	Incorrect DC power supply connected to the device. Check that the device is connected to the power supply which came with the device. The operating voltage is marked on the label on the back of the TubeMarker™ 2. *Note: The device might be damaged if incorrect power supply is used.*
Hardware error	Some of the electric components might have a fault. Contact 4titude® at 4ti-info@brooks.com.
Memory error	Some of the electric components might have a fault. Contact 4titude® at 4ti-info@brooks.com.

8.2 Troubleshooting

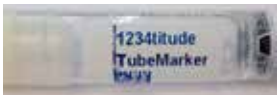
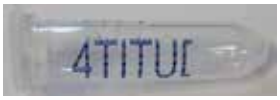
8.2.1 Troubleshooting – General

Problem	Solution
Power supply connected but the display is not on	The TubeMarker™ 2 is in power save mode. Execute software if closed, this will wake the TubeMarker™ 2 up and connect to the PC. Press [Enter printing mode] to end the power saving mode. Alternatively, press [OK] in the [Settings] menu to end power saving mode. Press [Space] when using the TubeMarker™ 2 with the keyboard.
There is an error message on the display	Check the message in section 8.1 and act according to the instructions. The message disappears by pressing [Space] in keyboard use or press [OK] on the pop-up message in software.
The ink ribbon is broken	Open cover and close software down first to send TubeMarker™ 2 to sleep mode. Shutdown in keyboard use. Insert the ink ribbon according to the instructions in section 3.1. Once inserted, close the cover, wait for auto-calibration to finish and re-execute the software or press the space bar when in keyboard use. Make sure that the chosen tube type is correct before continuing printing.
The ink ribbon does not move	Open cover and close software down first to send TubeMarker™ 2 to sleep mode. Shutdown in keyboard use. Check that the ink ribbon is set correctly (see section 3.1). Make sure that the ribbon core sits firmly on the shaft and the pin at the base of the drive mechanism shaft goes into the slot on the ink ribbon core to allow for correct movement of the ribbon core.

Problem	Solution
The TubeMarker™ 2 appears to be working, but no text can be seen on the tube surface	Check that the settings are optimised for the tube chosen (see section 4.1) and that the ink ribbon is set correctly (see section 3.1).
Bad quality printing	check that the settings are optimised for the tube chosen (see section 4.1) Check that the ink ribbon is set correctly (see section 3.1). Please also refer to section 8.2.2.
Note: The surface of the tubes must be flat. The use of tubes with embossed scale should be avoided.	

If the problems persist, contact 4titude® at 4ti-info@brooks.com.

8.2.2 Troubleshooting – Insufficient Printing Quality

Problem	Example	Solution
Bad quality printing at top edge		Check that the ribbon is flat and not wrinkled. If necessary, correct the position of the ribbon but remember to switch unit off first.
Patchy print image		As the print head in the TubeMarker™ 2 is flat, it is very sensitive to surface changes. Try to ensure tubes are as flat as possible. Additionally, you can increase pressing force, clean the print head and ribbon tensioner. Ensure the ribbon is set correctly and is clean.
Distorted / stretched print image		Contact 4titude® at 4ti-info@brooks.com.
Print correct, but faint print image		Increase pressing force and additional heating time, for more details see section 4.3. Please contact 4titude® at 4ti-info@brooks.com should the problem persist.
Print is not complete		Check that the settings are optimised for the tube chosen (see section 4.1) The preview box shows what the print outcome will look like. You may have to adjust font type, size and text orientation to fit it within the tube area. Adjust the pivot point of the sled so that the pressure is centralised in the middle of the printing area.
Print correct, but not lasting (scratches off)		Add additional heating time (see section 4.3).

9 Appendix A: Technical Specifications

Dimensions (W x L x H)	270 x 280 x 122 mm
Weight	4.8 kg
Printing Area Height	6 - 40 mm
Power Supply	18V ⎓ 1000mA ⊖—C—⊕
Operating Temperature	18° to 26°C
Operating Humidity	20% to 70% relative humidity, noncondensing
Storage Temperature	10° to 40°C
Fuses	Non customer-replaceable fuses in system
Computer Interface	USB 2.0

Note: Technical specifications are subject to change without prior notice.

10 Appendix B: Accessories / Ordering Information

10.1 Accessories

10.1.1 Tube Adapter

Different sized tube adapters are available on request. For details please see section 10.2, refer to our webpage *www.4ti.co.uk* or contact 4titude® at 4ti-info@brooks.com.

Delivery package contains tube adapters with hole diameters of 8.5 mm, 11.5 mm and 12.7 mm. These sizes are compatible with the most common 0.5 ml, 1.5 ml and 2.0 ml centrifuge tubes as well as cryo tubes.

10.1.2 Ink Ribbon

Metallic blue, black and white ink ribbons are available to print on all kind of tube colours and tubes with dark coloured content. Choose the ribbon colour that gives the best contrast to the tube colour and the colour of the tube content respectively.

For details please see section 10.2, refer to our webpage *www.4ti.co.uk* or contact 4titude® at 4ti-info@brooks.com.

10.2 Ordering Information

Code	Description	Quantity
4ti-0680-1	TubeMarker™ 2 *Includes: 3 x tube adapters (4ti-0681, 4ti-0683 and 4ti-0684); power supply; power adapters for UK, EU and USA; magnetic support pole adapter (4ti-0680-084); allen key (4ti-0680-088); USB A-B cable, manual, TubeMarker™ software (on USB-Stick), 12 months warranty*	1
4ti-0686	TubeMarker™ Ribbon, Metallic Blue; roll (300 m x 40 mm)	1 roll
4ti-0688	TubeMarker™ Ribbon, White; roll (300 m x 40 mm)	1 roll
4ti-0689	TubeMarker™ Ribbon, Black; roll (300 m x 40 mm)	1 roll
4ti-0689-1	TubeMarker™ Ribbon, Black, Universal; roll (300 m x 40 mm)	1 roll
4ti-0681*	Tube Adapter for 1.5 ml/2 ml Tubes; hole diameter 11.5 mm	1 adapter
4ti-0683*	Tube Adapter for 2D Cluster Tubes; hole diameter 8.5 mm	1 adapter
4ti-0684*	Tube Adapter for Cryo Tubes; hole diameter 12.7 mm	1 adapter
4ti-0685-1	Tube Adapter for 2 ml Screw Cap Tubes (10 mm Diameter); hole diameter 10.4 mm	1 adapter
4ti-0685-2	Tube Adapter for 15 ml Tubes; hole diameter 18 mm	1 adapter
4ti-0685-3	Tube Adapter for 50 ml Tubes; hole diameter 30 mm	1 adapter
4ti-0685-4	Tube Adapter for Matrix Tubes; hole diameter 8.2 mm	1 adapter
4ti-0685-5	Tube Adapter for 0.2 ml Tubes; hole diameter 6.4 mm	1 adapter

*These items are included with the TubeMarker™ 2 (Code 4ti-0680-1)

11 Appendix C: Warranty

4titude® warrants that the TubeMarker™ 2 (4ti-0680-1) should be free from defects in materials and workmanship for a period of **12 months** from the date of purchase. The purchase date is determined by the invoice date from 4titude® to the customer. If the instrument is being incorporated into an automated system by a third party, the warranty period may be extended by a maximum of 6 months or the date the system is commissioned, whichever is the shorter. For this automation extension to be valid, 4titude® must be notified of this requirement along with the details of the integrator at the point of purchase.

Each TubeMarker™ 2 is tested and documented by the manufacturer before shipping. 4titude® Ltd's Quality Control System guarantees that the performance of the TubeMarker™ 2 you have purchased is within its specifications.

The warranty covers all parts and labour costs associated with a repair of the unit within the first 12 months. The need for returning a unit for service must first be agreed with 4titude® via telephone support. Once it is established a return is necessary, 4titude® will issue a returns number, details of which must be returned with the unit.

The warranty does not cover defects caused by excessive wear and tear or damage due to shipping, accident, abuse, misuse, problems with electrical power, or usage not in accordance with product instructions or if other than original spare parts supplied by the manufacturer have been used.

The warranty does not automatically cover shipping charges. Shipping costs (both ways) will be covered by 4titude® where a returns number is issued within 8 weeks of the original delivery date (as confirmed by the invoice date). Shipping costs after this period will need to be covered by the customer.

Once returned to a 4titude® designated service centre, the unit will be inspected and repaired accordingly and a report provided to the customer. 4titude® would expect to carry out this work and return the unit within 10 working days of receiving the unit.

Onsite service or a swap out service (where a loaner instrument is shipped to the customer whilst theirs is repaired) can be arranged at extra cost. Please contact 4titude® if you are interested in this service.

This standard warranty can be extended to 24 or 36 months respectively.

Extended warranty must be purchased within 4 weeks of the original invoice address.

Code	Description
4ti-0680-10	12 months parts and labour warranty for 4ti-0680-1 TubeMarker™ 2
4ti-0680-11	12 month warranty extension to 4ti-0680-10 for TubeMarker™ 2, second year
4ti-0680-12	24 month warranty extension to 4ti-0680-10 for TubeMarker™ 2, second and third year
4ti-0680-113	12 month warranty extension to 4ti-0680-11 for TubeMarker™ 2, third year

Please contact 4titude® or your local distributor for pricing details.

The warranty does not cover damage caused to the unit in shipping due to unsuitable or insufficient packaging being used. Wherever possible, the original shipping box should be retained by the customer and used for returning the unit. Please also refer to section 12, TubeMarker™ 2 Shipping Instruction.

12 Appendix D: Shipping Instruction

When packing the TubeMarker™ 2 for shipping YOU must ensure that the sled is tight up against the printhead.

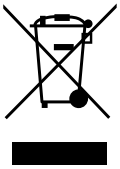
Disconnect the instrument from the power source and turn the sled screw locking nut so that it cannot be turned anymore. Please refer to the picture below.

Once screwed up as tight as possible the sled position will look like this:

Note: After shipping, the sled will automatically move backwards during calibration which happens straight after supplying power. There is no need to unlock the sled manually.

If the sled does not move after supplying power, loosening the nut by turning it once can resolve the problem.

13 Appendix E: Disposal Information



If you want to dispose this product, do not mix it with general household waste. There is a separate collection system for used electronic products in accordance with legislation that requires proper treatment, recovery and recycling.