

TubeMarker™

Operation Manual

Version 1.0



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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.

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1 TubeMarker™ Introduction

1.1 The Instrument

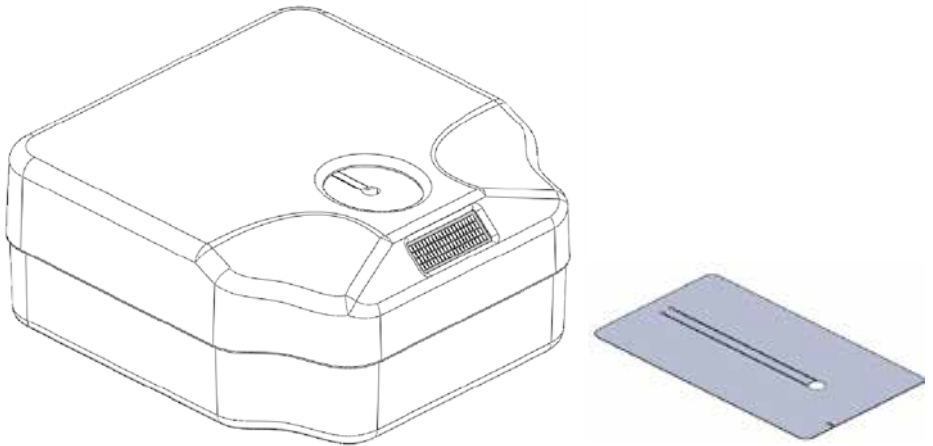
The TubeMarker™ allows printing directly onto the surface of centrifuge and cryogenic tubes from 8 – 25 mm* in diameter. There is no need for using labels or marker pens anymore. Marking is resistant to ethanol, isopropanol, water, DMSO, liquid nitrogen and mechanical stress. The prints are also stable over a wide temperature range (-196°C to 100°C). Markings do not stain your hands when touching the tubes.

Depending on the size of the tube, several lines of text can be printed, for example sample name, sampling site, your name, date, time etc. All TrueType fonts available on the connected computer can be printed with the different font types and sizes determining the maximum printed content. Bold and italic type is also possible.

The instrument also prints linear barcodes, 2D codes and graphic files (monochrome .bmp, .gif, .tiff) such as logos. Print orientation can be vertical or horizontal (except for barcodes which print vertically only).

* *Tube Holder Plates for tubes >11.5 mm in diameter are available on request. Please contact 4titude® at technical@4ti.co.uk*

1.2 Package Contents



- TubeMarker™ (Product code 4ti-0680)
- 3 x Tube Holder Plates

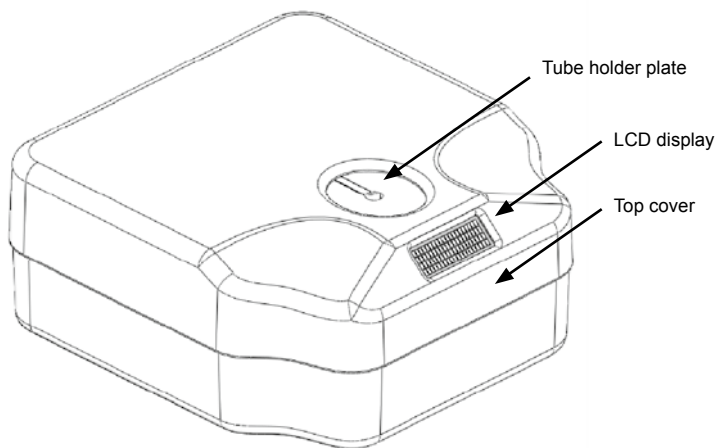
Tube Holder Plate	Hole Diameter	Product Code
Tube Holder Plate for 1.5 ml/2 ml tubes	11.5 mm	4ti-0681
Tube Holder Plate for 0.5 ml tubes	8.5 mm	4ti-0682
Tube Holder Plate for 2D cluster tubes	8.5 mm	4ti-0683

- AC adapter 15W 18VDC (input 100-240VAC)
- USB A-B cable
- Operation manual
- USB Flash Drive

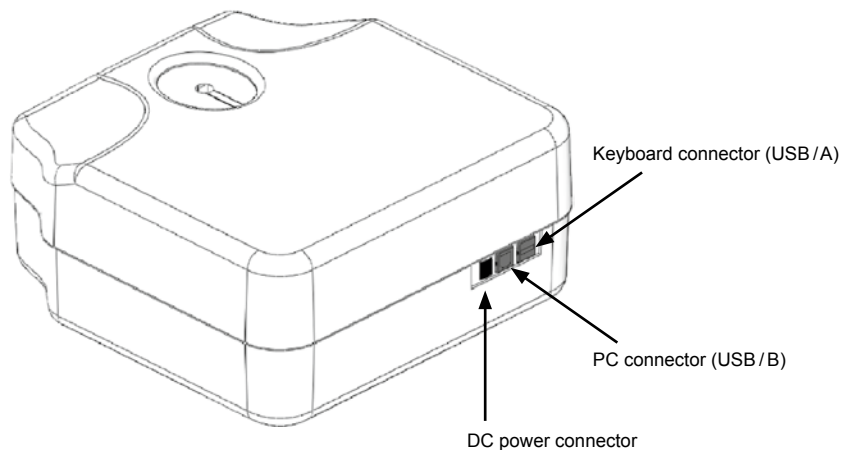
1.3 TubeMarker™ Parts

1.3.1 TubeMarker™ External Parts

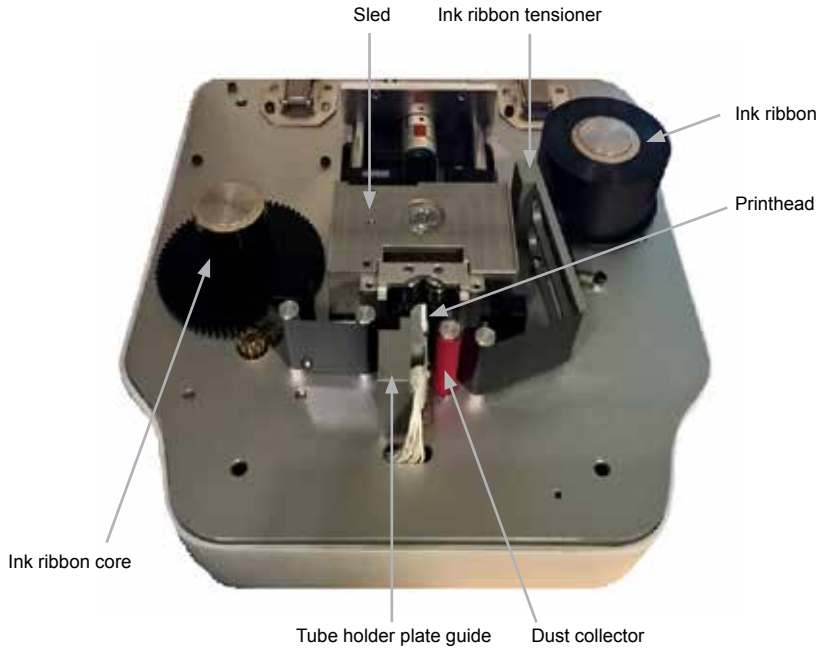
TubeMarker™ front



TubeMarker™ back



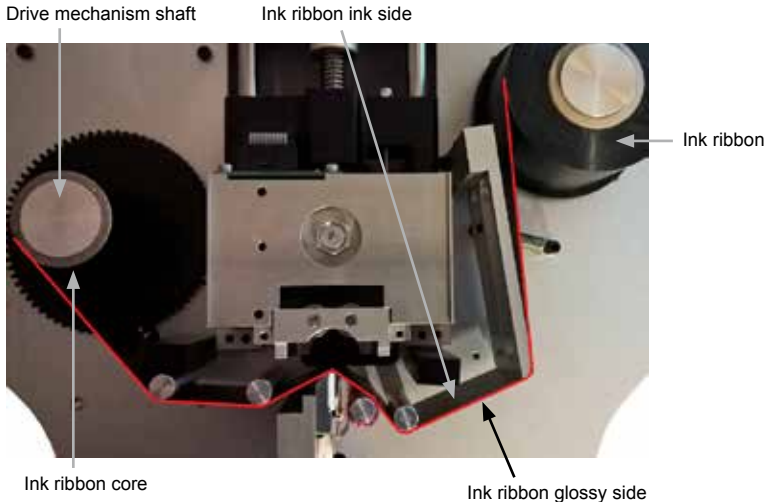
1.3.2 TubeMarker™ Internal Parts



2 Installation

2.1 Hardware Installation

2.1.1 Ink Ribbon Installation



Unplug the power cord and open the top cover.

Insert the empty ink ribbon core onto the drive mechanism shaft on the left hand side of the unit. 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 core and the base of the drive mechanism.

Insert the ink ribbon on the right-hand spindle in the same way as the empty ink ribbon core.

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

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 plastic gear as possible and that it is not wrinkled.

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.

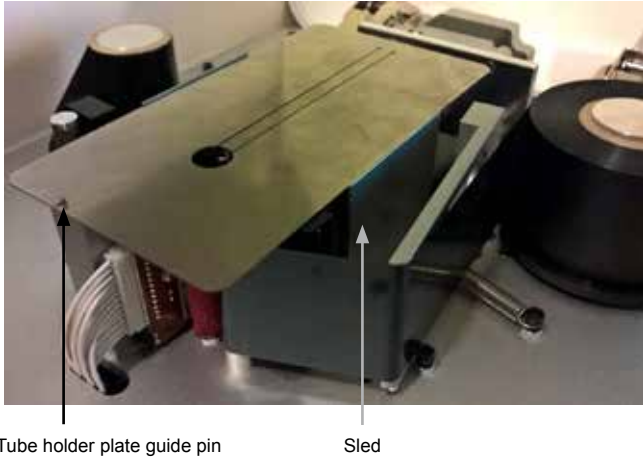
Close the top cover and connect the power source (see section 2.1.3). The TubeMarker™ will carry out a calibration procedure at startup.

Perform a manual calibration of the ink ribbon according to section 2.3.

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 ink ribbon) of the ink ribbon with bare hands. Any dirt or grease on the ink ribbon will lower the printing quality.

2.1.2 Tube Holder Plate Installation



Insert the tube holder plate on the sled as shown in the picture above. The tube holder plate is selected according to the tube diameter.

Check that the plate guide pin slots into the small hole in the tube holder plate.

2.1.3 Connecting the Power Source

Please check the following items before connecting the power source:

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

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

The TubeMarker™ will carry out a calibration procedure at startup. If something goes wrong with the calibration, please restart the TubeMarker™ by disconnecting and reconnecting the power supply.

Perform a manual calibration of the ink ribbon according to section 2.3.

2.2 Software Installation

First time installers should use information and files installed on the USB flash drive included in the TubeMarker™ package contents (section 1.2). Follow the instructions in section 2.2.2 about downloading the software from the internet if you require an update or certain individual files, also if you have no access to the files stored on the USB stick.

2.2.1 Software Installation from USB Flash Drive

Insert the USB flash drive provided with the TubeMarker™ into your PC.

Open folder to view files once driver has been installed.

Copy TubeMarker™ Software folder into My Documents folder and create a shortcut to desktop. You can now remove your USB flash drive. This is important so it doesn't block installation.

Inside this folder you will find

- 32-bit Drivers (folder)
- 64-bit Drivers (folder)
- Lib (folder)
- Settings.cfg
- Link to Java download page
- TubeMarker.jar (software)

Install USB Serial Port Drivers

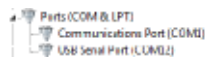
Connect the TubeMarker™ to the PC with the USB A-B cable and **afterwards** connect the DC power source as described in section 2.1.3. Windows will install the USB drivers automatically.

(Manual installation:

<http://www.ftdichip.com/Drivers/CDM/CDM%20v2.12.04%20WHQL%20Certified.exe>)

You can check correct installation in Control Panel → Device Manager

The TubeMarker™ will be shown as a USB Serial Port



Detect whether your Windows Version is 32 bit or 64 bit

To detect whether your Windows version is 32 bit or 64 bit follow one of the instructions below:

- Search “system information” in the Windows search bar **OR**
- For Windows 10 users use Cortana and search “system information” **OR**
- Check the automatic version detection results from:
<https://support.microsoft.com/en-us/kb/827218>

Install Java

If you already have a Java environment installed and up-to-date you can skip this step. To be sure to have a clean installation of Java, go to “Programs and Features” and uninstall any previous versions of Java.

Go to download page via the link found in your TubeMarker™ Software folder.

- Choose Windows Offline (32-bit) if you have 32 bit Windows
- Choose Windows Offline (64-bit) if you have 64 bit Windows

Note: Do not use online installation because it is made only for browser use.

Double-click on the saved file to start the installation process and follow the on screen instructions.

Copy Dynamic-Link Library Files (.dll) to Correct Locations

Copy jd2xx.dll and ftd2xx.dll from the TubeMarker™ software folder to your Windows/System32 folder.

- If you have 32bit Windows, copy files from 32-bit drivers folder
- If you have 64bit Windows, copy files from 64-bit drivers folder

Remove the power supply from the TubeMarker™ and the USB cable from your PC.

Now you will need to restart your PC.

Once restarted, connect the USB cable to the PC and the power supply to the TubeMarker™, allow for sled calibration.

Create Shortcuts for the Program

It is important to have the “lib”-folder in the same place as you have the TubeMarker.jar file. You can make a shortcut by right-clicking the TubeMarker.jar file and choose Create Shortcut. You can move this shortcut to your Desktop and rename it in there.

You can also start the program by double clicking the .jar file

Open the shortcut to the TubeMarker™ Software folder and execute the TubeMarker.jar file. Connection will happen automatically.

The TubeMarker™ is now ready for use.

2.2.2 Software Installation via Download

Install USB Serial Port Drivers

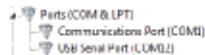
Connect the TubeMarker™ to the PC with the USB A-B cable and **afterwards** connect the DC power source as described in section 2.1.3.. Windows will install the USB drivers automatically.

(Manual installation:

<http://www.ftdichip.com/Drivers/CDM/CDM%20v2.12.04%20WHQL%20Certified.exe>)

You can check correct installation in Control Panel → Device Manager

The TubeMarker™ will be shown as a USB Serial Port



Detect whether your Windows Version is 32 bit or 64 bit

To detect whether your Windows version is 32 bit or 64 bit follow one of the instructions below:

- Search “system information” in the Windows search bar **OR**
- For Windows 10 users use Cortana and search “system information” **OR**
- Check the automatic version detection results from:
<https://support.microsoft.com/en-us/kb/827218>

Install Java

If you already have a Java environment installed and up-to-date you can skip this step.

To be sure to have a clean installation of Java, go to “Programs and Features” and uninstall any previous versions of Java. 

Go to download page: <https://www.java.com/en/download/manual.jsp>

- Choose Windows Offline (32-bit) if you have 32 bit Windows
- Choose Windows Offline (64-bit) if you have 64 bit Windows

Note: Do not use online installation because it is made only for browser use.

Double-click on the saved file to start the installation process.

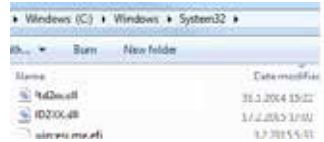
Copy Dynamic-Link Library Files (.dll) to Correct Locations

You can find the newest version of the software on the TubeMarker™ webpage at <http://4ti.co.uk/>

Unzip the TubeMarker.zip package into My Documents folder.

Now copy *jd2xx.dll* and *ftd2xx.dll* to your Windows/System32 folder.

- If you have 32bit Windows, copy files from 32-bit drivers-folder
- If you have 64bit Windows, copy files from 64-bit drivers-folder



Create Shortcuts for the Program

It is important to have the “lib”-folder in the same place as you have the TubeMarker.jar file. You can make a shortcut by right-clicking the TubeMarker.jar file and choose Create Shortcut. You can move this shortcut to your Desktop and rename it in there.

You can also start the program by double clicking the .jar file.

Open the shortcut to the TubeMarker™ Software folder and execute the TubeMarker.jar file. Connection will happen automatically.

The TubeMarker™ is now ready for use.

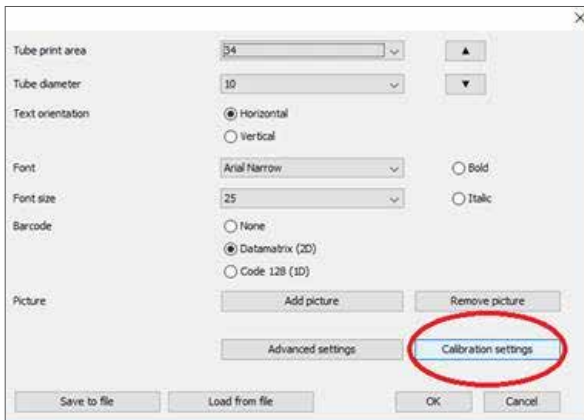
2.3 Ribbon Calibration

The calibration needs to be performed once the unit has been installed and is fully operational as well as after ink ribbon changes. It also must have a roll loaded on the unit (see section 2.1.1).

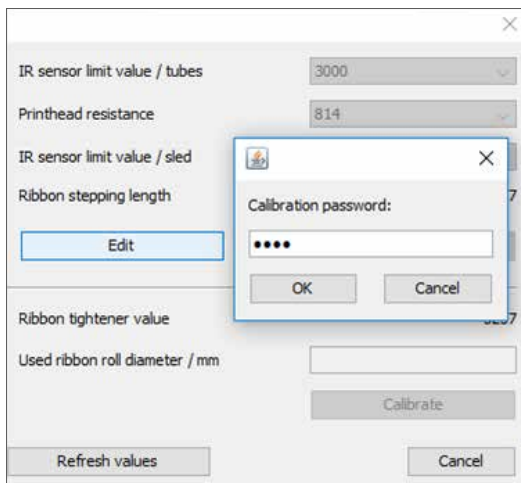
Connect the TubeMarker™ and the PC.

Execute the TubeMarker.jar file and wait until the connection is made. The TubeMarker™ display shows **PC connected**.

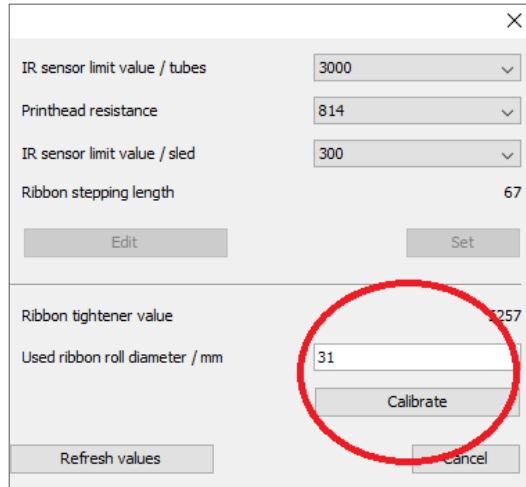
Now go to **Menu** > **Settings** > **Calibration settings**



Pressing **Edit** will prompt for a password, write “adam” and press **OK**

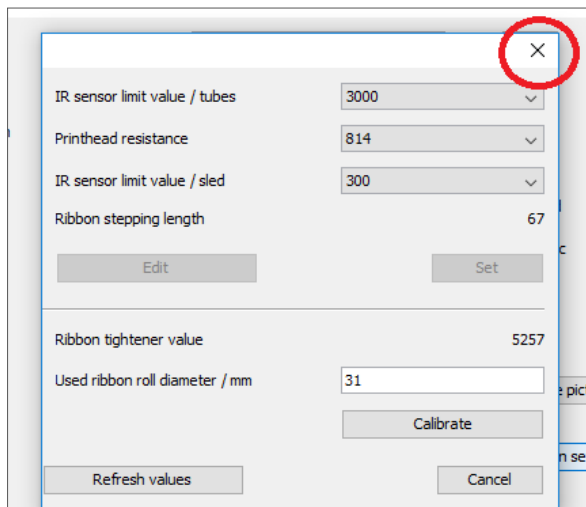


In the box write "31" for empty roll holders and press . If the left hand roll already has ribbon on it then write in the new diameter.



You will hear the calibration of the ribbon.

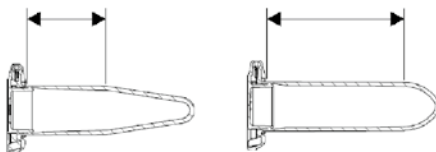


Once this has finished close the menu by pressing (top right), please do NOT close the menu by pressing .



Your unit is now calibrated. Perform some test prints to check for the quality of the prints.

3 TubeMarker™ Menu Settings

3.1 Settings

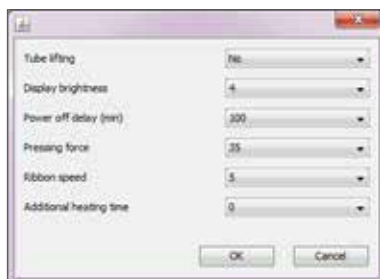
Menu	Description	Settings								
Tube print area	<p>Set printing area width of the tube in mm. Choose area according to the length of the straight part of the tube to be printed on. For ≥ 40 mm tube writing areas the tube type should be set to 40 mm</p> 	<p>6 - 40 mm</p> <p>Example centrifuge tube volumes and tube types</p> <table border="1"> <thead> <tr> <th>Volume</th> <th>Tube Type</th> </tr> </thead> <tbody> <tr> <td>0.5 ml</td> <td>14 mm</td> </tr> <tr> <td>1.5 ml</td> <td>19 mm</td> </tr> <tr> <td>2.0 ml</td> <td>34 mm</td> </tr> </tbody> </table>	Volume	Tube Type	0.5 ml	14 mm	1.5 ml	19 mm	2.0 ml	34 mm
Volume	Tube Type									
0.5 ml	14 mm									
1.5 ml	19 mm									
2.0 ml	34 mm									
<p><i>NOTE! It is very important to select the correct tube type before printing. Too high values can damage the tube and the printhead or break the ink ribbon.</i></p>										
Tube diameter	Set tube diameter in mm									
 / 	Manual sled movement, backwards (away from the printhead) or forwards (towards the printhead)									
Text orientation	Set text orientation	Horizontal (perpendicular to a tube) or Vertical (parallel to a tube)								
Font	Set text font type	Choose from the fonts installed on the computer*								
Font size	Set text font size (default value is 20)	10 (smaller) - 90 (larger)								
Barcode	Set barcode format									
	None:	No barcode is created from the data.								
	Datamatrix (2D):	A datamatrix 2D code is created from the text in the first column of each row.								
	Code 128 (1D):	A Code 128 linear barcode is created from the text in the first column of each row.								
Picture	Add or remove a picture such as a logo which will be printed on every tube.	Select file format monochrome .bmp, .gif, .tiff See section 4.4								
Advanced settings, see section 3.2										
Calibration settings, see section 8										
Save to file	Save current settings to a configuration file.									
Load from file	Load settings from a configuration file.									

* For Chinese characters, set a compatible font type (e.g. Sans Serif) and import text information from a Microsoft® Excel file (see section 4.3).

3.2 Advanced settings

Go to Menu > Settings > Advanced settings

Menu	Description	Settings
Tube lifting	Tube lifting can be used to ease the removal of the tubes	No or Yes
Display brightness	Adjust screen brightness	1 (darker) - 5 (brighter)
Power save delay	Adjust power save delay, the TubeMarker™ goes into power saving mode within the set delay period when no keys are pressed.	1 - 1,000 min
Pressing force	Pressing force is adjusted automatically according to the selected tube type. It is important to select the correct tube type according to the tube print area explained in section 3.1. Default value is 30	0 (lower) - 51 (higher)
Ribbon speed	Faster ribbon movement during ink cooling time. Can be increased with some difficult tube / ribbon configurations. Recommended value is 5.	1 (slow) - 500 (fast)
Additional heating time	Heat transfer energy can be increased by setting additional heating. It slows down the print process and is recommended only for special tubes. Default value is 0.	0 - 100%



4 Printing

4.1 Preparation for Printing

Select Ink Ribbon

Metallic blue and silver ink ribbons are available to print on all kind of tube colours and tubes with dark coloured content (see section 9.2). Choose the ribbon colour that gives the best contrast to the tube colour and the colour of the tube content respectively.

Select Tube Holder Plate

Tube Holder Plates exist for for 1.5 ml/2 ml tubes (4ti-0681, hole diameter 11.5 mm), for 0.5 ml tubes (4ti-0682, hole diameter 8.5 mm) and for 2D cluster tubes (4ti-0683, hole diameter 8.5 mm).

Wider tubes like 2 ml cryovials and anything bigger can currently only be labelled by holding the tube without a tube holder plate supporting it. For details please refer to section 4.6.

Tube Holder Plates for tubes >11.5 mm in diameter are available on request. Please contact 4titude® at technical@4ti.co.uk.

Prepare the TubeMarker™

Connect the TubeMarker™ to the PC with the USB cable and connect the DC power source as described in section 2.1.3.

Open the shortcut to the TubeMarker™ Software folder and execute the TubeMarker.jar file. Connection will happen automatically.

The TubeMarker™ is now ready for use.

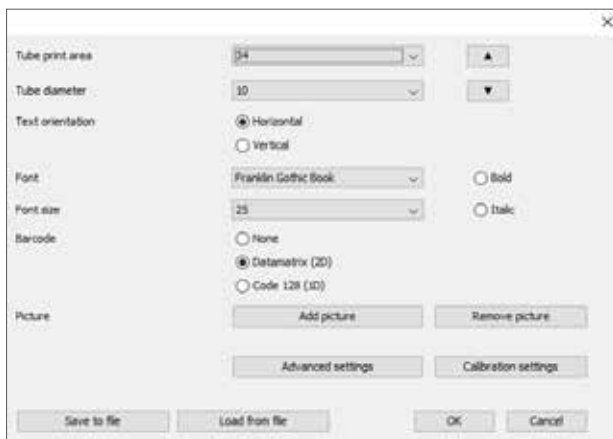
4.2 Printing - Data Entered Manually

NOTE: Touching the tubes with bare hands before printing should be avoided, because any dirt or grease on the tube surface markedly lowers the printing quality. Nitrile gloves or similar are recommended for use when handling the tubes before printing. After printing the tubes can be handled without gloves

Select the right settings for the tube that you want to print on in the **Settings** menu. You will find a list of various settings that you can change at your convenience.

You can also select whether you would like to add a Datamatrix (2D) code or Linear barcode (code 128 (1D)).

Please refer to section 3.1 for a detailed overview.



The screenshot shows the 'Settings' dialog box for TubeMarker. It contains the following fields and options:

- Tube print area:** A dropdown menu set to '34' with an upward arrow button.
- Tube diameter:** A dropdown menu set to '10' with a downward arrow button.
- Text orientation:** Radio buttons for 'Horizontal' (selected) and 'Vertical'.
- Font:** A dropdown menu set to 'Franklin Gothic Book' with radio buttons for 'Bold' and 'Italic'.
- Font size:** A dropdown menu set to '25' with radio buttons for 'Bold' and 'Italic'.
- Barcode:** Radio buttons for 'None', 'Datamatrix (2D)' (selected), and 'Code 128 (1D)'.
- Picture:** 'Add picture' and 'Remove picture' buttons.
- Advanced settings:** 'Advanced settings' and 'Calibration settings' buttons.
- Bottom row:** 'Save to file', 'Load from file', 'OK', and 'Cancel' buttons.

Type the required information in the main TubeMarker™ window (see below).

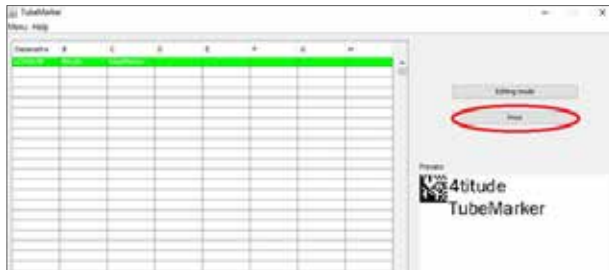
The text in the first row will be printed on the first tube etc.. Adjacent columns are printed on subsequent lines of the same tube, each row = 1 tube print. Each box represents the line the text will appear on.

Note: If a human readable information with the barcode is preferred, the information of the barcode needs to be entered in the first AND second column of the table in the main TubeMarker™ window.

The preview box will show you how the printed outcome will transfer onto the tube. The preview picture is created from the data of the row which is selected.

Press the button to send the information to the TubeMarker™.

Change back to editing mode by pressing .

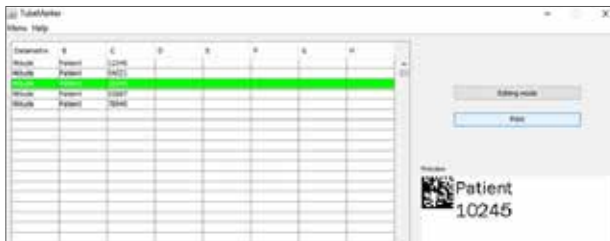


Once the information has been sent to the TubeMarker™ the row will turn green.

Enter the tube into the TubeMarker™ and press in the menu or of the computer keyboard.

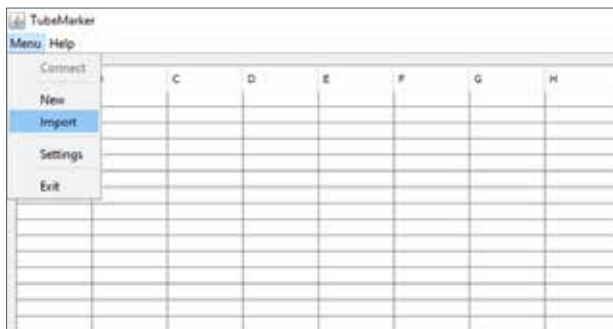
During the print process the tube will rotate clockwise.

For multiple prints all information will be sent to the TubeMarker™ once printing mode has been selected. Once a line of information has been printed, the next line will be highlighted green and the text will be shown in the preview box.

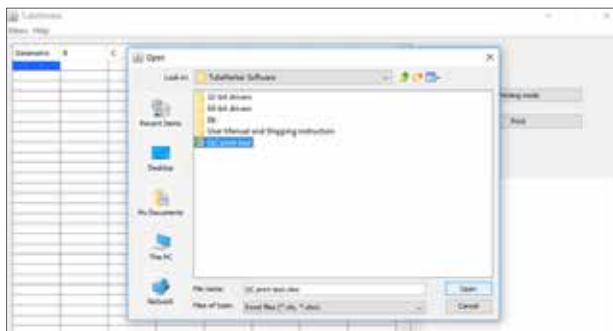


4.3 Printing - Data Import from Microsoft® Excel

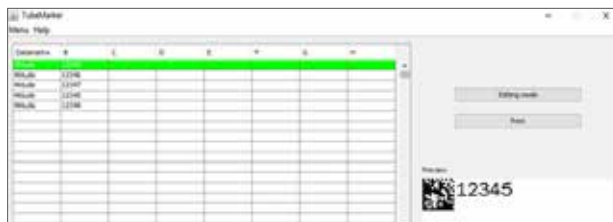
Go to >



You will be directed to the *My Documents* folder. From here locate the place of the file to import and double click on the file name. In this instance the program will import the data.



Once the file has been imported it will show up on the TubeMarker™ main window. From here follow the steps detailed in section 4.2 on how to print the information on a tube.

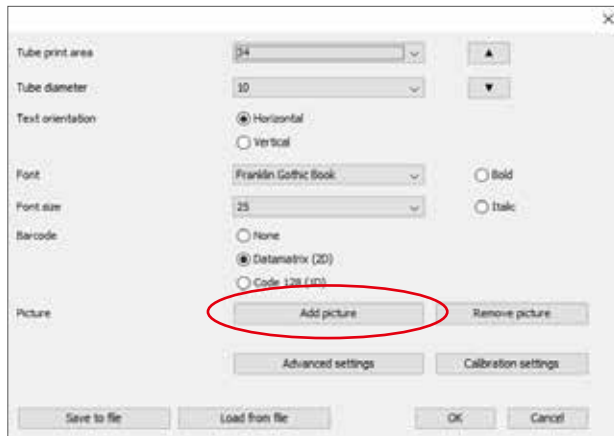


4.4 Printing - Adding a Picture/Logo

Save the picture such as a logo in a suitable file format (monochrome .bmp, .gif, .tiff) and resolution.

1 pixel corresponds to 0.125 mm so a picture of e.g. 100 x 100 pixels is 12.5 mm in width.

Go to Menu > Settings > Add picture



You will be directed to the *My Documents* folder. From here locate the place of the file to import and double click on the file name. In this instance the program will import the graphic file.

Once the file has been imported it will show up in the preview box of the TubeMarker™ main window.

The picture will be printed on every tube automatically until it is removed by pressing Remove picture in the Settings menu.

From here follow the steps detailed in section 4.2 on how to print the information on a tube.

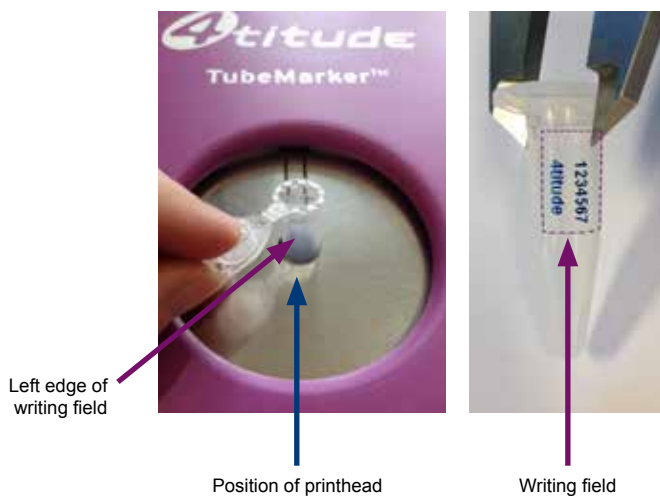
Note: The orientation of the picture cannot be changed in the TubeMarker™ software so the picture may need to be rotated in a graphic program (e.g. Microsoft® Paint) before saving. By default the picture will be printed on the tube in horizontal orientation.

4.5 Printing - Use of Tubes with Writing Field

Although optimal print results can be achieved with clear tubes without any frosted or printed areas, the TubeMarker™ is able to print on some writing fields.

The performance of the print will vary depending on how even the surface is and may require additional print optimisation.

To align the print with the writing field, the left edge of the writing field should be aligned with the printhead at the front of the adapter opening (see picture below). To simplify correct alignment an arrow has been etched onto the tube holder plates marking the position of the printhead.



During the print process the tube will rotate clockwise.

For best print results adjust the height of the printing field to the reduced size of the writing field.

4.6 Printing - Use of Tubes with Large Diameter

Tube Holder Plates exist for for 1.5 ml/2 ml tubes (4ti-0681, hole diameter 11.5 mm), for 0.5 ml tubes (4ti-0682, hole diameter 8.5 mm) and for 2D cluster tubes (4ti-0683, hole diameter 8.5 mm).

Tubes that are too wide for these tube holder plates can be labelled without an adaptor supporting it.

For this, follow the steps detailed in section 4.2 on how print on a tube and **instead of entering the tube into the TubeMarker™** follow the instructions below.

Position the tube in the TubeMarker™ between the printhead and the two rollers of the sled.

Adjust sled position if necessary. For this, go to the menu and move the sled further away from the printhead by pressing or closer to the printhead by pressing .

Once is pressed the rollers will engage the tube. You need to let go of the tube to allow rotation during printing.


At the end of the printing process it is necessary to intercept the tube from dropping into the housing by taking hold of it again.

5 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.

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 menu and drive the sled further away from the printhead by pressing .
2. Unplug the power cord and open the top cover.
3. Remove the tube holder plate.
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 centimeters away from the printhead. A pen or similar tool can be used to move the ink ribbon.
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. Also 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 using the same right-hand side ink ribbon roll clockwise until the ink ribbon is according to the picture in section 2.1.1. Check that the upper edge of the ink ribbon is on the same level with the ceramic (white) part of the printhead.

6 Error Messages/Troubleshooting

6.1 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.
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 technical@4ti.co.uk .
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 technical@4ti.co.uk .
Tube detector fault	Tube detection components might be damaged. Contact 4titude® at technical@4ti.co.uk .
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™. <i>NOTE! The device might be damaged if incorrect power supply is used.</i>
Hardware error	Some of the electric components might have a fault. Contact 4titude® at technical@4ti.co.uk .
Memory error	Some of the electric components might have a fault. Contact 4titude® at technical@4ti.co.uk .

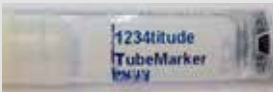





6.2 Troubleshooting

6.2.1 Troubleshooting - General

Problem	Solution
Power supply connected but the display is not on	<p>The TubeMarker™ is in power save mode.</p> <p>Press <input type="button" value="Printing mode"/> to end the power saving mode.</p> <p>Alternatively, press <input type="button" value="OK"/> in the <input type="button" value="Settings"/> menu to end power saving mode .</p>
There is an error message on the display	<p>Check the message in section 6 and act according to the instructions. The message disappears by pressing <input type="button" value="Space"/> .</p>
The ink ribbon is broken	<p>Insert the ink ribbon according to the instructions in section 2.1.1.</p> <p>Make sure that the chosen tube type is correct before continuing printing.</p>
The ink ribbon does not move	<p>Check that the ink ribbon is set correctly (see section 2.1.1).</p> <p>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.</p>
The TubeMarker™ appears to be working, but no text can be seen on the tube surface	<p>Check that the chosen tube type is correct (see section 3.1) and that the ink ribbon is set correctly (see section 2.1.1).</p>
Bad quality printing	<p>Check that the chosen tube type is correct (see section 3.1)</p> <p>Check that the ink ribbon is set correctly (see section 2.1.1).</p> <p>Please also refer to section 6.2.2.</p>
<p><i>NOTE! The surface of the tubes must be flat. The use of tubes with frosted area and embossed scale should be avoided.</i></p>	

If the problems persist, contact 4titude® at technical@4ti.co.uk.

6.2.2 Troubleshooting - Insufficient Printing Quality

Problem	Example	Solution
Bad quality printing, general		<p>Check that the chosen tube type is correct (see section 3.1).</p> <p>Check that the ink ribbon is set correctly (see section 2.1.1). 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.</p> <p><i>NOTE! The surface of the tubes must be flat. Tubes with frosted area and embossed scale should be avoided.</i></p>
Bad quality printing at top edge		Check that the ribbon is flat and not wrinkled. If necessary, correct the position of the ribbon and carry out ribbon calibration (see section 2.3).
Patchy print image		Tube surface or ribbon may have been touched, try again with a clean tube (the ink ribbon moves forward after every print automatically).
Distorted/stretched print image		Carry out ribbon calibration (see section 2.3).
Print correct, but faint print image		Use bold font (see section 3.1) and increase the pressing force stepwise (see section 3.2).
Print does not fit in the tube writing area - printing field too small		Check that the chosen tube type is correct (see section 3.1) and that the ink ribbon is set correctly (see section 2.1.1).
Print does not fit in the tube writing area - printing field too large		Check that the chosen tube type is correct (see section 3.1) and that the ink ribbon is set correctly (see section 2.1.1).
Print correct, but not lasting (scratches off)		Add additional heating time (see section 3.2).

7 Appendix A: Using the TubeMarker™ with a Keyboard (not provided)

7.1 Connecting the Keyboard

It is possible to control the TubeMarker™ via a keyboard using the onscreen commands to input data, change the settings on the instrument and initiate the print process.

Connect the keyboard to the USB /A connector shown in the picture of section 1.3.1.

NOTE! Only standard keyboards are compatible with the TubeMarker™.




7.2 Menu Structure




Use to choose the menu and to go back.

Use / / / to select the values in the menu.

Menu	Settings	
Tube print area	Printing area width [mm] 6 - 40	
Numbering	No	
	Yes Start number 0 - 60,000 End number 0 - 60,000	
Text	Write your text here	
Print	Press <input type="button" value="Space"/> to activate printing	
Settings	Tube lift No Yes	
	Text orientation Vertical Horizontal	
	Display brightness 1 - 5	
	Power save delay 1 - 1,000	
	Font size 1 - 4	
	Pressing force 0 - 51	
	Pixel preheat 0 - 100	
	Language English Finnish Swedish	
	Serial number	
	Shut down	














Numbering

Sequential numbering is set on/off by pressing  /  in the **Numbering** menu. If the numbering is in use, the start and end numbers can be set by pressing  in the **Numbering** menu.

The numbers increase/decrease by pressing  / . Numbers can also be set by using the number keys + pressing .

When the numbering is in use, it is shown in the **Text** menu as **Sequential numbering**. This text indicates the row on which the sequential number will be printed.

Advanced Settings

Setting	Description
Tube lift	Tube lifting can be used to ease the removal of the tubes from the TubeMarker™. It can be set on/off by pressing  /  in the Tube lift menu.
Text orientation	Text orientation can be selected as Vertical (parallel to the tube) or Horizontal (perpendicular to the tube).
Display brightness	The screen brightness can be adjusted between 1 - 5 (darker - brighter) by pressing  /  . The brightness can also be set by using the number keys + pressing  .
Power save delay	Power saving delay (in minutes) can be set by pressing  /  between 1-1000. The delay can also be set by using the number keys + pressing  . The TubeMarker™ goes into power saving mode when no keys are pressed within the set delay period. Power saving mode is ended by pressing  .
Font size	Font size can be decreased / increased between 1 - 4 by pressing  /  . Default value is 2.
Pressing force	Pressing force is adjusted automatically according to the selected tube type. It is important to select the correct tube type according to the tube area explained in section 5.1. Pressing force can be adjusted between 0 - 51. Default value is 30.
Additional heating	Heat transfer energy can be increased by setting additional heating. It slows down the print process and is recommended only for special tubes. Percentage value can be adjusted between 0 - 100. Default value is 0.
Language	The language can be changed by pressing  /  . Options are English, Finnish, and Swedish.

Serial Number

Device-specific serial number and installed software revision are shown by pressing in **Serial number** menu.

Shut Down

The TubeMarker™ goes into power save mode by pressing in **Shut down** menu. Power saving mode is ended by pressing .

7.3 Printing

If the tube type is changed to a greater diameter tube or the tube doesn't fit in the printer, you can increase the gap by pressing in the **Print** menu.

Printing is started by pressing in the **Print** menu after a tube is inserted. Sequential numbers are shown in the **Print** menu if it is in use. It can be decreased/increased by pressing / .

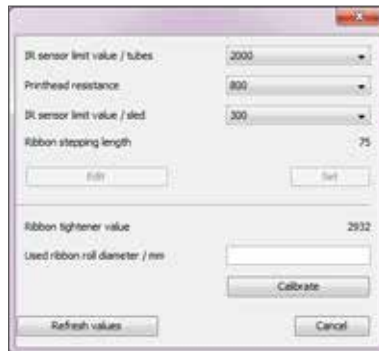
Message **Printing done** is given when the tube corresponding to the end number is printed.

8 Appendix B: Calibration Settings

Caution: Apart from the calibration of the used ribbon roll diameter, users should not make any changes to the calibration settings unless instructed to by the technical support of 4titude®.

Go to > >

Menu	Description
IR sensor limit value / tubes	Adjust the limit value for tubes.
Printhead resistance	Set the printhead average heating element resistance.
IR sensor limit value / sled	Adjust the limit value for the sled.
Ribbon stepping length	Read only value for step count of one pixel.
Edit	Enable editing the values (needs a password).
Set	Save the settings.
Ribbon tensioner value	Read only value for ribbon tensioner moving distance.
Used ribbon roll diameter [mm]	Adjust the diameter of the left side ribbon diameter.
Calibrate	Calculate new value for ribbon tensioner and save the value.
Refresh values	Read current values from TubeMarker™.



9 Appendix C: Accessories / Ordering Information

9.1 Accessories

9.1.1 Tube Holder Plate

Different sized tube holders are available on request. For details please refer to our webpage www.4ti.co.uk or contact 4titude® at info@4ti.co.uk.

Delivery package contains tube holder plates with hole diameters of 8.5 mm and 11.5 mm. These sizes are compatible with the most common 0.5 ml, 1.5 ml and 2.0 ml centrifuge tubes.

9.1.2 Ink Ribbon

Metallic blue and silver 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 refer to the ordering information (section 8.2), our webpage www.4ti.co.uk or contact 4titude® at info@4ti.co.uk.

9.2 Ordering Information

Code	Description	Quantity
4ti-0680	TubeMarker™, Printer for marking the side of 0.5 to 15 ml tubes	1
4ti-0686	TubeMarker™ Ribbon, metallic blue, 300M x 40mm	1 roll
4ti-0686/10	TubeMarker™ Ribbon, metallic blue, 300M x 40mm	10 rolls
4ti-0687	TubeMarker™ Ribbon, silver, 300M x 40mm	1 roll
4ti-0687/10	TubeMarker™ Ribbon, silver, 300M x 40mm	10 rolls
4ti-0681	Tube Holder Plate for 1.5 ml/2 ml tubes, hole diameter 11.5 mm	1
4ti-0682	Tube Holder Plate for 0.5 ml tubes, hole diameter 8.5 mm	1
4ti-0683	Tube Holder Plate for 2D cluster tubes, hole diameter 8.5 mm	1

10 Appendix D: Warranty

4titude® warrants that the TubeMarker™ (4ti-0680) 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™ is tested and documented by the manufacturer before shipping. 4titude® Ltd's Quality Control System guarantees that the performance of the TubeMarker™ 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	Standard warranty (12 months)
4ti-0680-11	Warranty extension year 2
4ti-0680-12	Warranty extension year 2 and 3

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 11, TubeMarker™ Shipping Instruction.

11 Appendix E: Shipping Instruction

When packing the TubeMarker™ 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.