



BEST

**Barcode Reader
Installation Manual**

Version 003



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Contents

	Contents	iii
1	Introduction	5
1.1	General	5
2	Adjusting the Z-Tower Height	7
2.1	General	7
2.2	Hardware	7
2.3	Software	8
3	Mounting the Barcode Reader.....	9
3.1	Mounting the Barcode Reader on the Gilson Liquid Handler .	9
3.2	Connecting the Power Supply	12
3.3	Connecting the Serial Cable	12
4	Software.....	13
4.1	General	13
4.2	Defining the Barcode Reader	13
4.3	Programming the Barcode Reader	14
4.4	Calibration	15
5	Barcodes.....	17
5.1	General	17
5.2	Label Size	17
5.3	General Barcode Information	17
5.4	Matrix ID	18
5.5	Matrix Type	18
5.6	Barcode Positioning	20
5.7	Examples	22
	Figures	25
	Tables	27

Introduction

1

General

1.1

This manual will guide you through the installation of the barcode reader for the Gilson Liquid Handler.

The installation process consists of three steps:

1. Changing the height of the Gilson Z-tower
2. Mounting the barcode reader on the Gilson Liquid Handler
3. Defining the barcode reader in the software

These steps will be explained in the upcoming chapters.

Adjusting the Z-Tower Height

2

General

2.1

Before the barcode reader can be used with the Gilson Liquid Handler's robot arm, the working height of the Z-tower must be changed.

Hardware

2.2

The barcode reader set contains two black anodized (e.g. has a black eloxation layer) adjustment cylinders (one with a height of 127 mm, one with a height of 175 mm), which aid you in mounting the Z-tower at the correct height. The 175 mm adjustment cylinder is used for the adjustment when cooling racks are used. In either case the appropriate value must be set up in the Gilson Control Software.



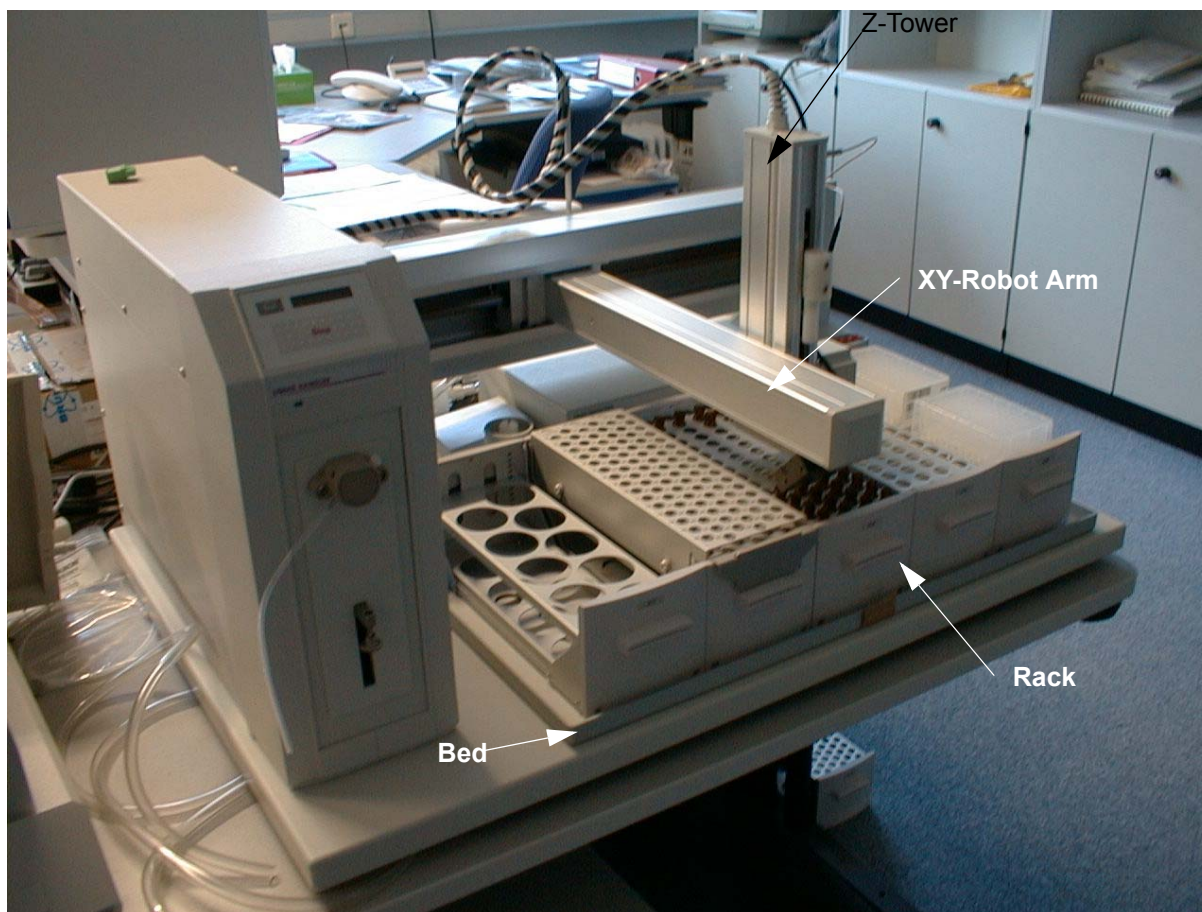
Be sure that you have the correct adjustment cylinder (black anodized). The original gray cylinder has a height of only 124 mm and this may cause problems when reading barcodes!

The first step in modifying the working height of the Z-tower is to turn the power off and to remove all the racks from the Gilson Liquid Handler's bed. Move the robot arms to the center of the bed as shown in **"The Gilson Liquid Handler" on page 8**.

To achieve the 127 mm (or 175 mm when using a cooling rack) height, loosen the screw on the backside of the Z-tower and pull the Z-tower upwards slightly. Place the **black anodized** adjustment cylinder between the bottom of the Z-tower and the floor of the Liquid Handler's bed. Lower the Z-tower until it sits on top of the adjustment cylinder. The scale should then show the value 127 mm (or 175 mm when using a cooling rack). Tighten the screw and remove the **black anodized** adjustment cylinder.

Adjusting the Z-Tower Height

Figure 2.1. The Gilson Liquid Handler



Software

2.3

The new height must also be entered in the Gilson Liquid Handler software. Refer to the corresponding Gilson Liquid Handler manual to set up this value.

Mounting the Barcode Reader

3

Mounting the Barcode Reader on the Gilson Liquid Handler

3.1

1. Mount the barcode reader on the barcode reader bracket using the 2 M3x10 hexagon screws, as shown below:

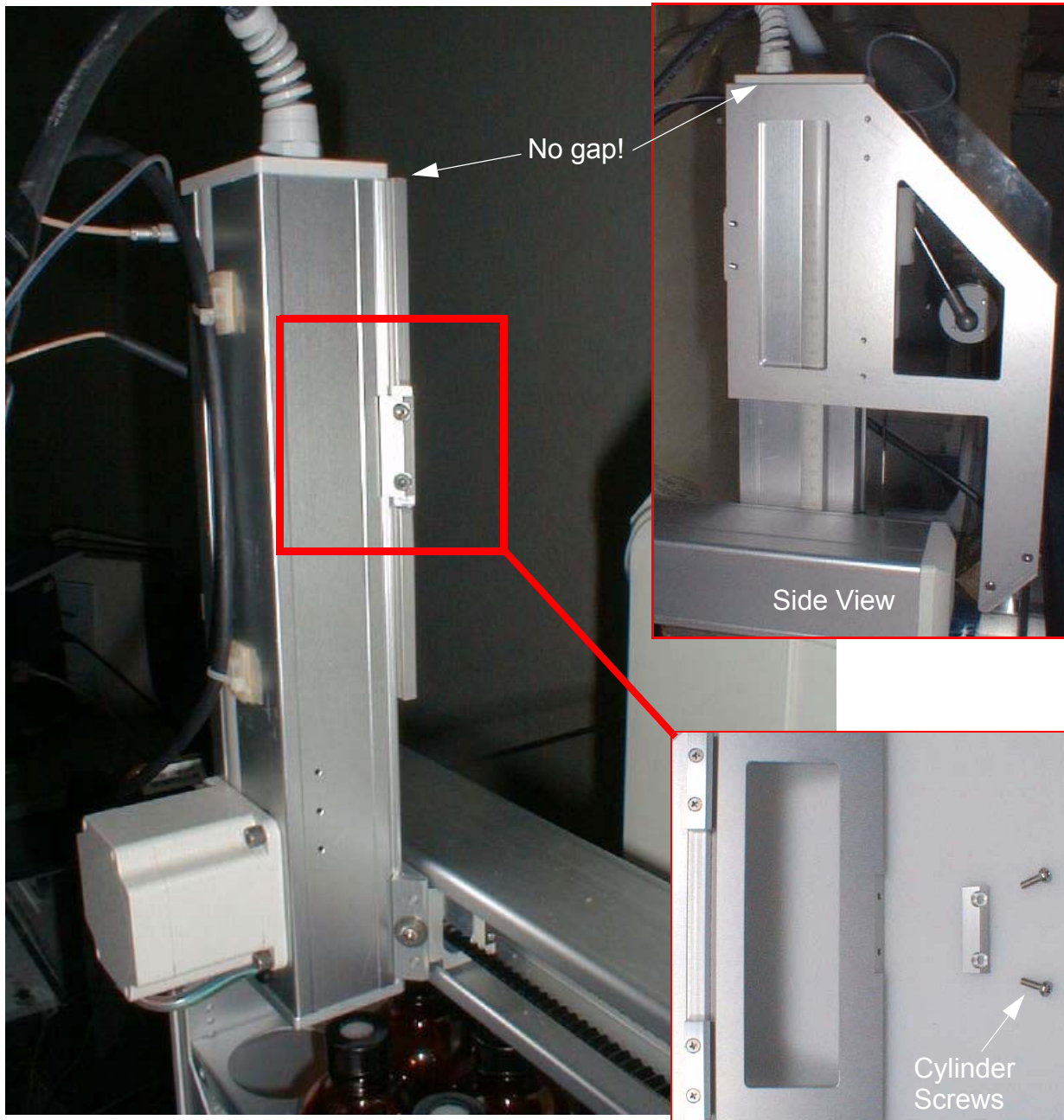
Figure 3.1. Mounting the Barcode Reader to the Bracket



Mounting the Barcode Reader

2. Mount the barcode reader bracket on the Z-tower of the Gilson Liquid Handler using the two M3x10 cylinder screws. Ensure that you mount the bracket just under the top plate of the Z-tower cover. There should not be a gap between the Z-tower cover and the bracket. (as shown in **Figure 3.2.**)

Figure 3.2. Mounting the Barcode Reader Bracket

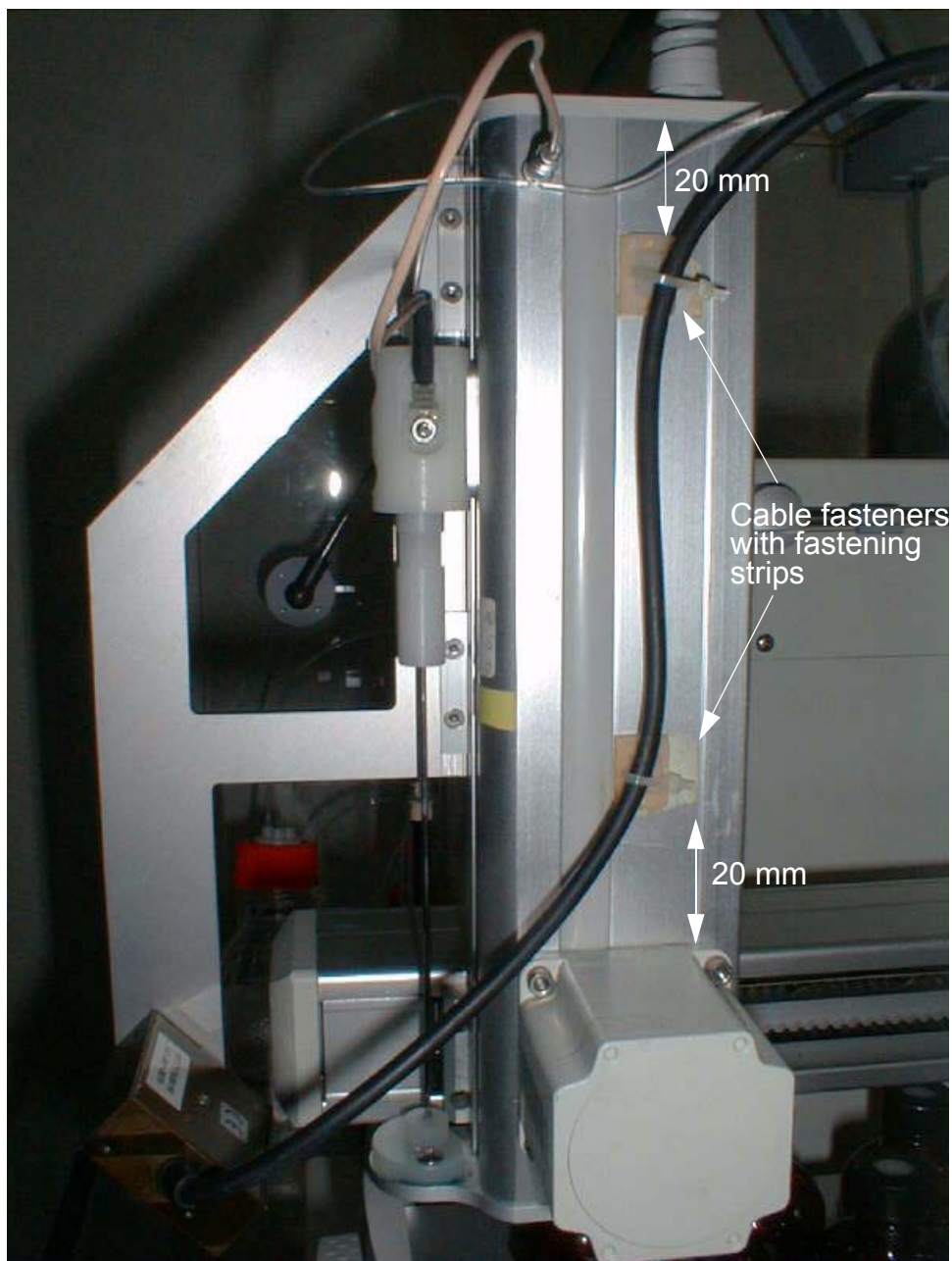


Mounting the Barcode Reader on the Gilson Liquid Handler

3. Affix the two adhesive fasteners to the Z-tower arm as shown in **Figure 3.3.** and fasten the barcode reader cable to them using the two plastic strips.

The lower cable socket should be placed about 20 mm above the motor and the upper socket about 20 mm below the upper end of the Z-tower.

Figure 3.3. Securing the Barcode Cable



Mounting the Barcode Reader

4. Fix the barcode reader cable to the Gilson Control Unit cable using the spiral hose (see figure 3.4).

Figure 3.4. Securing the Barcode Reader Cable to the Control Unit Cable



Connecting the Power Supply

3.2

Connect the power supply unit to the barcode reader plug (5 mm stereo connector) and the power supply unit to a free mains outlet.

Connecting the Serial Cable

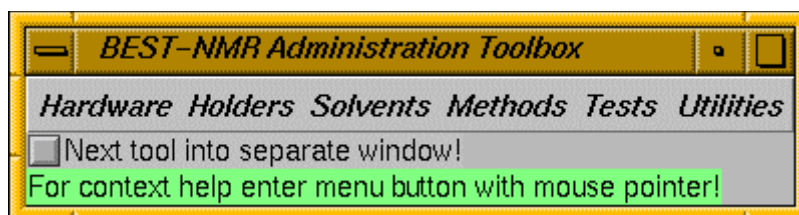
3.3

To send the reader information to the control unit, connect one end of the 10 meter serial cable to the barcode reader plug and the other end to a free serial port (e.g. TTY05) on the CCU of the spectrometer.

The barcode reader must be setup in the XWIN-NMR software. This procedure is described in this chapter.

Using the toolbox *BESTADM* (type in *bestadm* in the command line and press enter) select main menu item *Hardware* (see below).

Figure 4.1. BEST-NMR Administration Toolbox



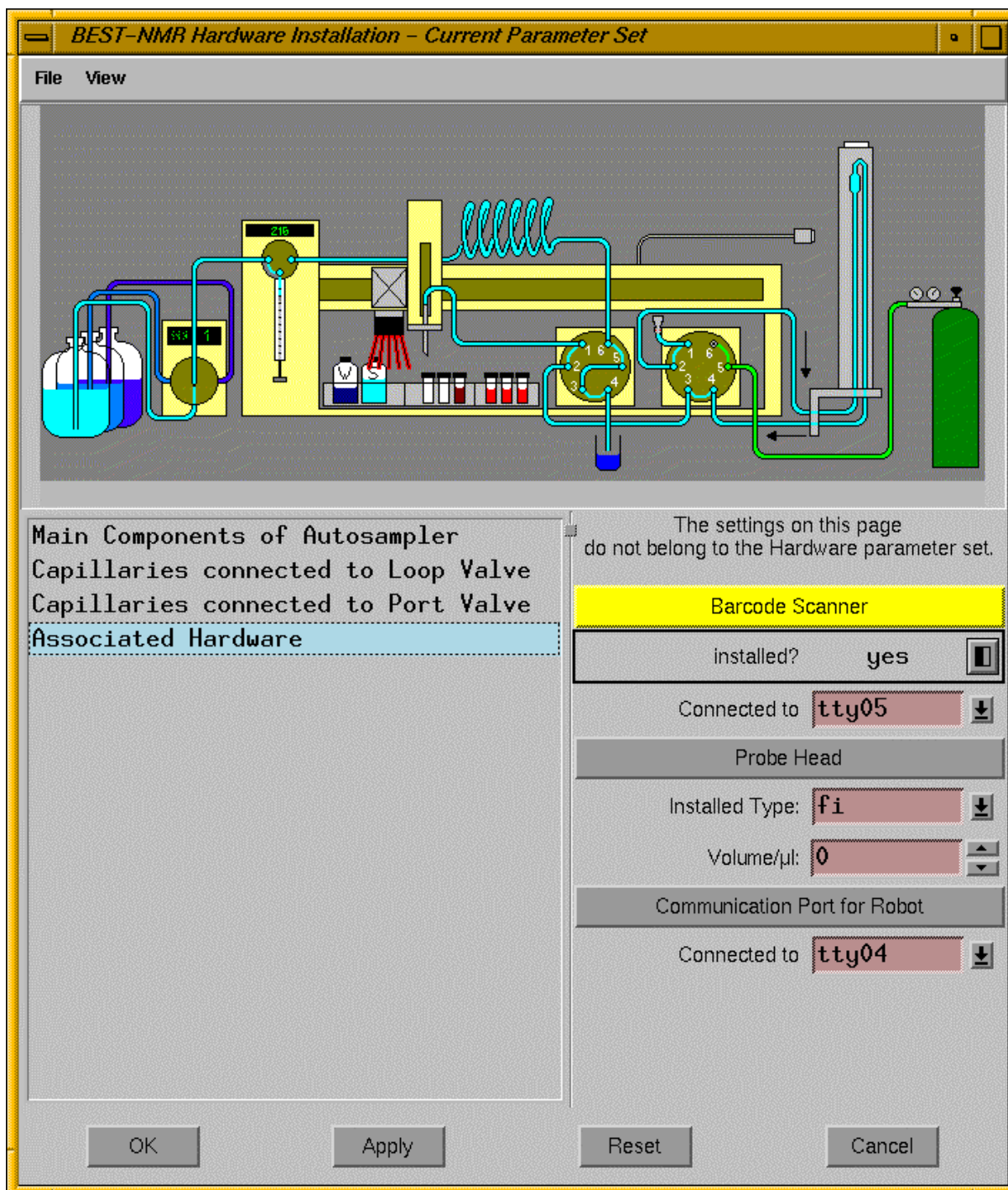
The window shown in **Figure 4.2.** will open. Select *Associated Hardware* from the left panel and set the barcode readers parameters in the right panel as follows:

„Installed?“ **Yes**

„Connected to“ means the serial port on the CCU of the spectrometer, where you connected to barcode reader, e.g. TTY05. Select the appropriate serial port.

Press *Apply* and then *OK*. The barcode reader should now be recognized by the software.

Figure 4.2. BEST-NMR Hardware Installation



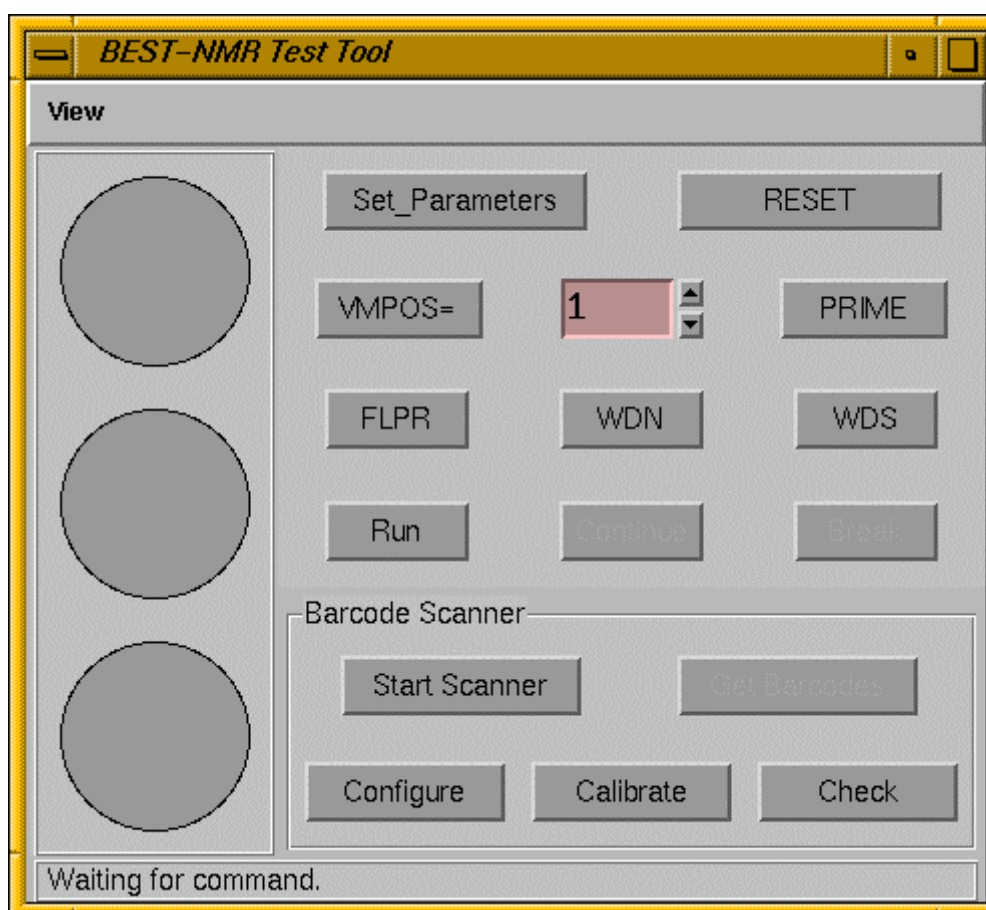
Programming the Barcode Reader

4.3

The barcode reader must be programmed once after the first installation to ensure that it reads all the barcodes correctly.

Normally you only need to click the menu item *Tests* in the *BESTADM* toolbox (see **Figure 4.3**). In some cases this will not work, whereas you will need to manually select all the other menu items from the main menu (reading left to right: *Holders*, *Solvents*, *Methods*) and then close the opening windows once again. After this procedure it will be possible to correctly select the menu item *Tests*. The following window will then open:

Figure 4.3. *BEST-NMR Test Tool*



Select the button *Configure* on the bottom left panel to program the barcode reader. If the barcode reader has been correctly programmed, it sends a beep and the red light on the scanner top will blink once.

Calibration

4.4

The next step is to calibrate the scanner's position. It is possible that the barcode reader delays in finding the barcodes due to mechanical tolerance. To ensure a fast barcode reading with your system a reading profile can be defined. A rack with a correct barcode label (refer to the chapter "[Barcodes](#)" on page 17) is necessary for this test. Place this rack in the second rack position (directly to the right of the position where the rack type 211 with the solvents is normally placed) and press the *Calibrate* button. The system will search different positions to find the best position for barcode reading. This position is saved in the file SCAN-NER.SRC. This test takes approximately 10 minutes.

Barcodes

5

General

5.1

This chapter provides information about the barcodes and the barcode labels used in the Gilson BEST System.

Label Size

5.2

The BEST System is designed to work with barcode labels with a size of 70 mm x 35 mm, e.g. No 3422 from Zweckform.

General Barcode Information

5.3

Each label which is adhered on a rack or wellplate must have two barcodes:

The upper barcode contains the Matrix ID and the lower barcode contains the Matrix Type.

Notice:

1. The term „Matrix“ is the generic term used for racks and wellplates. So Rack Type and Wellplate Type are both Matrix Types, and likewise Rack ID and Wellplate ID are both Matrix ID's.
2. If a TECAN preparation robot is also used to read the Wellplate ID, the barcode for this robot must also be placed in the free space located in the lower part of the wellplate labels as shown in **Figure 5.1.**)



It is recommended that you also place the barcode information as human-readable text on the labels.

Barcode type Code 128 is used for all barcodes. Other barcode types are ignored by the barcode reader due to its initialization sequence.

Figure 5.1. Matrix ID and Matrix Type on a Wellplate Label Example



Matrix ID

5.4

The Matrix ID is a user specific, unique ID which may contain a three-character company name, followed by a serial number, and optionally by the analytical method divided by a hash - character (#).



The Matrix ID is the first part of the spectrometer search string for order files for this matrix.

Example: When the label with the Matrix ID „XYZ000001#NMR“ (which represents company XYZ’s first NMR experiment) is placed on a wellplate, all order files which start with the string „XYZ000001#NMR“ (e.g. XYZ000001#NMR A1, XYZ000001#NMR A2 etc.) are associated with this wellplate.

Matrix Type

5.5

The Matrix Type is a string in a specific format which contains information about the geometry of the rack, the position of samples in the rack, the numbering of the sample in the rack (Arrangement), the Working Order and the Submersion Offset.

The first 5 characters of the string are a code representing the rack type used, followed by a hash character (#), e.g. 209 # for a rack code 209 or WH12# for a Wellplate having positions from A to H and from 1 to 12.

Following the Matrix Type code are characters representing the Arrangement and Working Order. These are encoded as follows:

Table 5.1. Encoding of Arrangement and Working Order

	Upper Left (ul)	Upper Right (ur)	Lower Left (ll)	Lower Right (lr)
	ulhs =Code 0	urhs =Code 1	llhs =Code 2	lrhs =Code 3
Horizontal Stacked (hs)				
	ulhf =Code 4	urhf =Code 5	llhf =Code 6	lrhf =Code 7
Horizontal Folded (hf)				
	ulvs =Code 8	urvs =Code 9	llvs =Code A	lrvs =Code B
Vertical Stacked (vs)				
	ulvf =Code C	urvf =Code D	llvf =Code E	lrvf =Code F
Vertical Folded (vf)				

If the rack contains wellplates (e.g. Rack Type 205), the Matrix Type string ends after the Working Order. In this case the Wellplate Matrix Type contains the missing information about the Submersion Offset. Otherwise, the Submersion Offset is added to that string following a hash - character (#). The Submersion Offset is always a number from -99.9 to 999.9 or the string Rcovr for recover-racks and has **always 5 characters!**

Example 1:

You are using Rack Type 209 and you want to count through the rack using the „llvs“ method. The probes should be measured and/or prepared using the „urvf“-method. The Submersion Offset for the whole rack is 2.7 mm. You would encode the string as follows:

Matrix Type = 209 #AD#002.7

Example 2:

You are using Rack Type 205. In this case the Arrangement on the rack label and on the Wellplate label have to be identical and can only be Code 9 or Code A. Likewise, the Working Order on the Rack label can only be code 9 or code A, whereas the Working Order on the Wellplate label can be any code from 0 to F. The Submersion Offset (here recover-rack) is visible and encoded only on the Wellplate label:

Matrix Type on the rack = 205 #AA

Matrix Type on the Wellplate = e.g. WH12#A3#Rcovr

It is recommended that you use the Label Designer tool which provides an easy way to create Matrix Types.

Barcode Positioning

5.6

It is necessary to always place the barcodes in the correct position on the label to ensure correct barcode reading:

Figure 5.2. Barcode positions on the barcode label



The following specifications should be met by the barcodes:

Table 5.2. Maximum Barcode Dimensions

Variable	Min	Best	Max
a	0 mm	1mm	2 mm
b	7 mm	8 mm	10 mm
c	0.5 mm		
d	8.5 mm	9.5 mm	10.5 mm
e	16.5 mm	17.5 mm	
f	9 mm	10 mm	
g	0 mm	2 mm	3 mm
h	5 mm	7 mm	15 mm
i			45 mm
j	5 mm		

Other important specifications

1. Module width: 8 - 15 mils (0.2 mm - 0.381 mm)
2. Print Contrast Ratio: PCS > 70%
3. Number of characters: max. 20
4. Colors: black code on white background
5. Code Type: code 128

When you paste the labels on the racks be sure to align the edges of the metal plate at the front of the rack. Working precisely here avoids barcode reading errors.

When you paste the labels on the wellplates, be sure to place them on the lower edge of the wellplate feet as shown in **Figure 5.3.**

Barcodes

Figure 5.3. Position of a Barcode Label on a Wellplate



Examples

5.7

Figure 5.4. Example of a Label for Rack Type 205

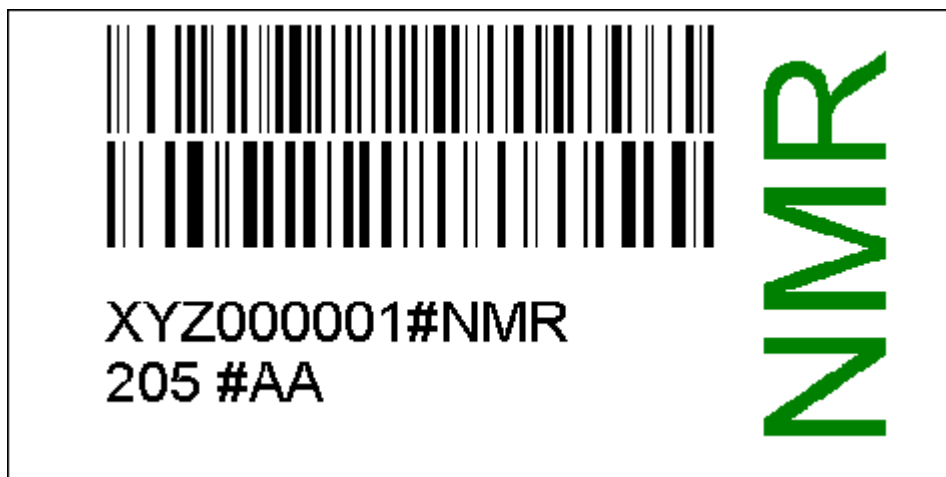


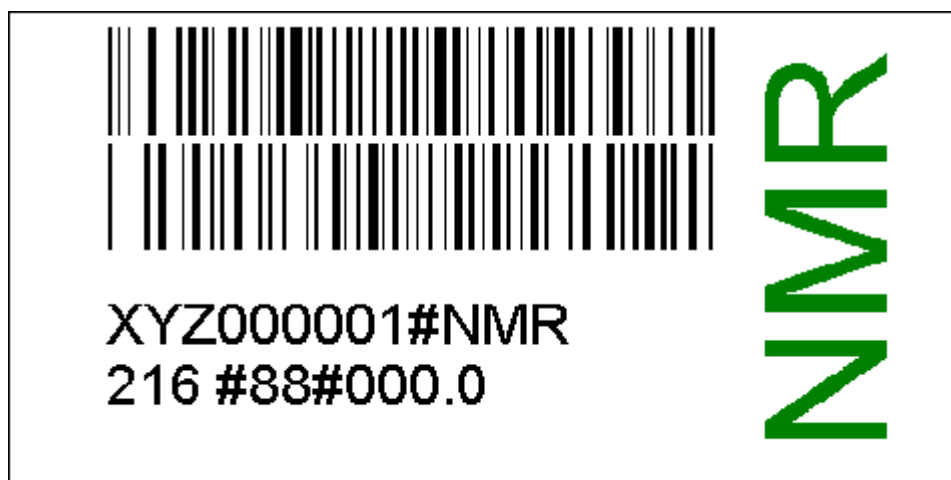
Figure 5.5. Example of a Wellplate Label



Figure 5.6. Example of a Label for Rack Type 209



Figure 5.7. Example of a Label for Rack Type 216



Barcodes

Figures

1	Introduction	5
2	Adjusting the Z-Tower Height	7
	Figure 2.1. The Gilson Liquid Handler	8
3	Mounting the Barcode Reader	9
	Figure 3.1. Mounting the Barcode Reader to the Bracket	9
	Figure 3.2. Mounting the Barcode Reader Bracket	10
	Figure 3.3. Securing the Barcode Cable	11
	Figure 3.4. Securing the Barcode Reader Cable to the Control Unit Cable 12	
4	Software	13
	Figure 4.1. BEST-NMR Administration Toolbox	13
	Figure 4.2. BEST-NMR Hardware Installation	14
	Figure 4.3. BEST-NMR Test Tool	15
5	Barcodes	17
	Figure 5.1. Matrix ID and Matrix Type on a Wellplate Label Example	18
	Figure 5.2. Barcode positions on the barcode label	20
	Figure 5.3. Position of a Barcode Label on a Wellplate	22
	Figure 5.4. Example of a Label for Rack Type 205	22
	Figure 5.5. Example of a Wellplate Label	23
	Figure 5.6. Example of a Label for Rack Type 209	23
	Figure 5.7. Example of a Label for Rack Type 216	23

Tables

1	<i>Introduction</i>	5
2	<i>Adjusting the Z-Tower Height</i>	7
3	<i>Mounting the Barcode Reader</i>	9
4	<i>Software</i>	13
5	<i>Barcodes</i>	17
Table 5.1.	Encoding of Arrangement and Working Order	19
Table 5.2.	Maximum Barcode Dimensions	21

