LPX 220

Operating Manual

Issued November 2005
V1.0, November 2005

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PREFACE

General

Before operating the instrument, the user must read and understand this manual.

LiCONiC regularly offers Operator Training Courses. We highly recommend to attend such a course prior to working with the LiCONiC Instrument.

Purpose of this document

This Manual is intended to instruct the Logistics Workstation Operator how to operate the optional LPX220 and do repairs and maintenance on an Operators' level.

Installation and Servicing

Installation, servicing and reinstallation of the instrument shall only be performed by System Integrators and/or service personnel authorized by LiCONiC AG.

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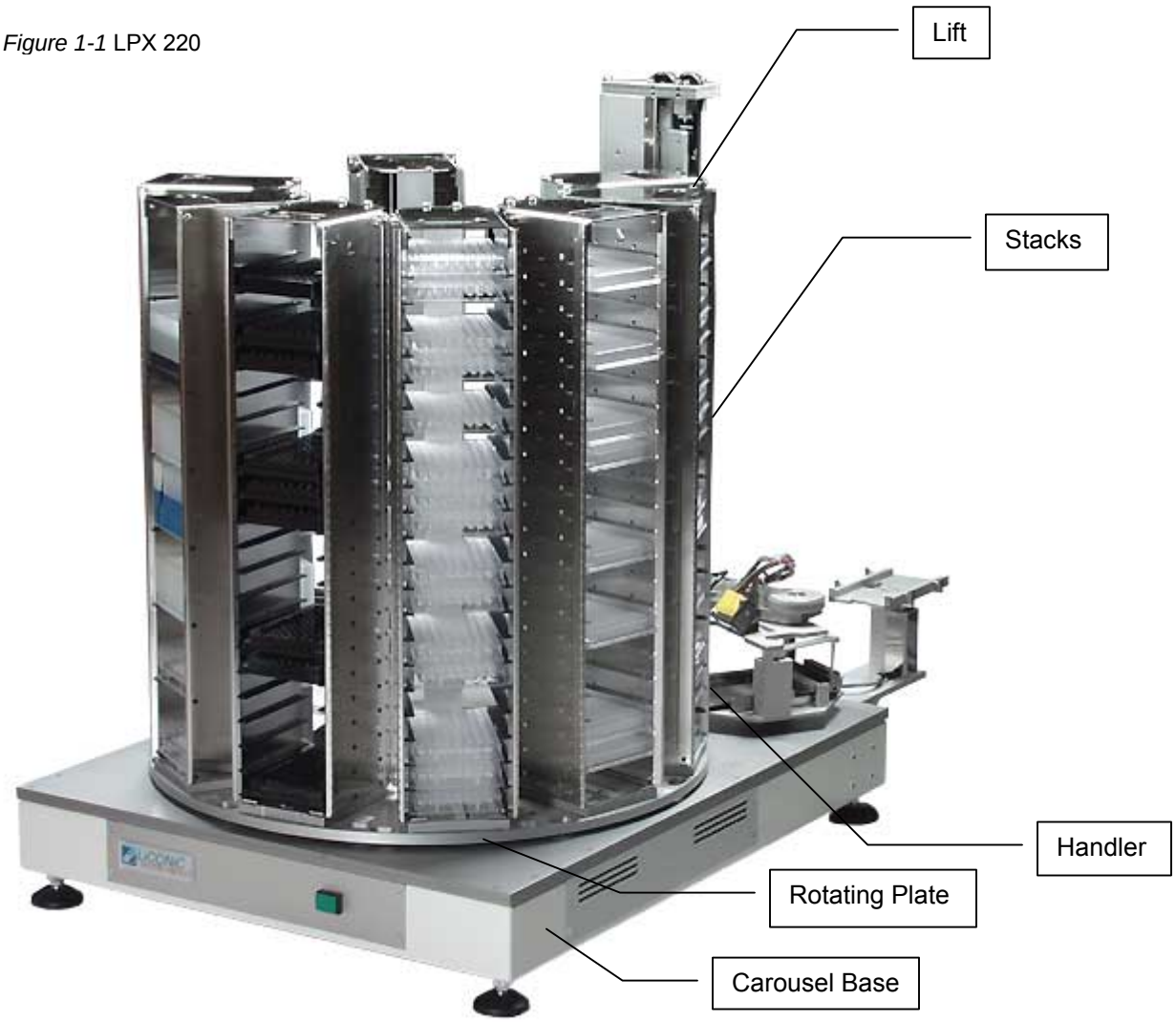
1 Product Description

1.1 Introduction

1.1.1 LPX 220 Overview

Figure 1-1 LPX 220



1.1.2 Intended Use

The LPX220 is an Option, expanding the integration Platform.
The LPX220 is intended for storage, identification and transfer of microplates. It is to be applied exclusively in the research field.
The LPX220 is intended to be part of a liquid handling system and as such installed and put into operation by a trained System Integrator.

Unintended Use
Due to its open architecture, the LPX220 is NOT intended for clinical and diagnostic applications. These applications would be carried out by less qualified people, exposing them to dangerous liquids in case of instrument malfunction.
Carefully observe the Safety Instructions in Chapter 2.

1.1.3 Product Identification

The Type Plate is located at the side of the LPX220.

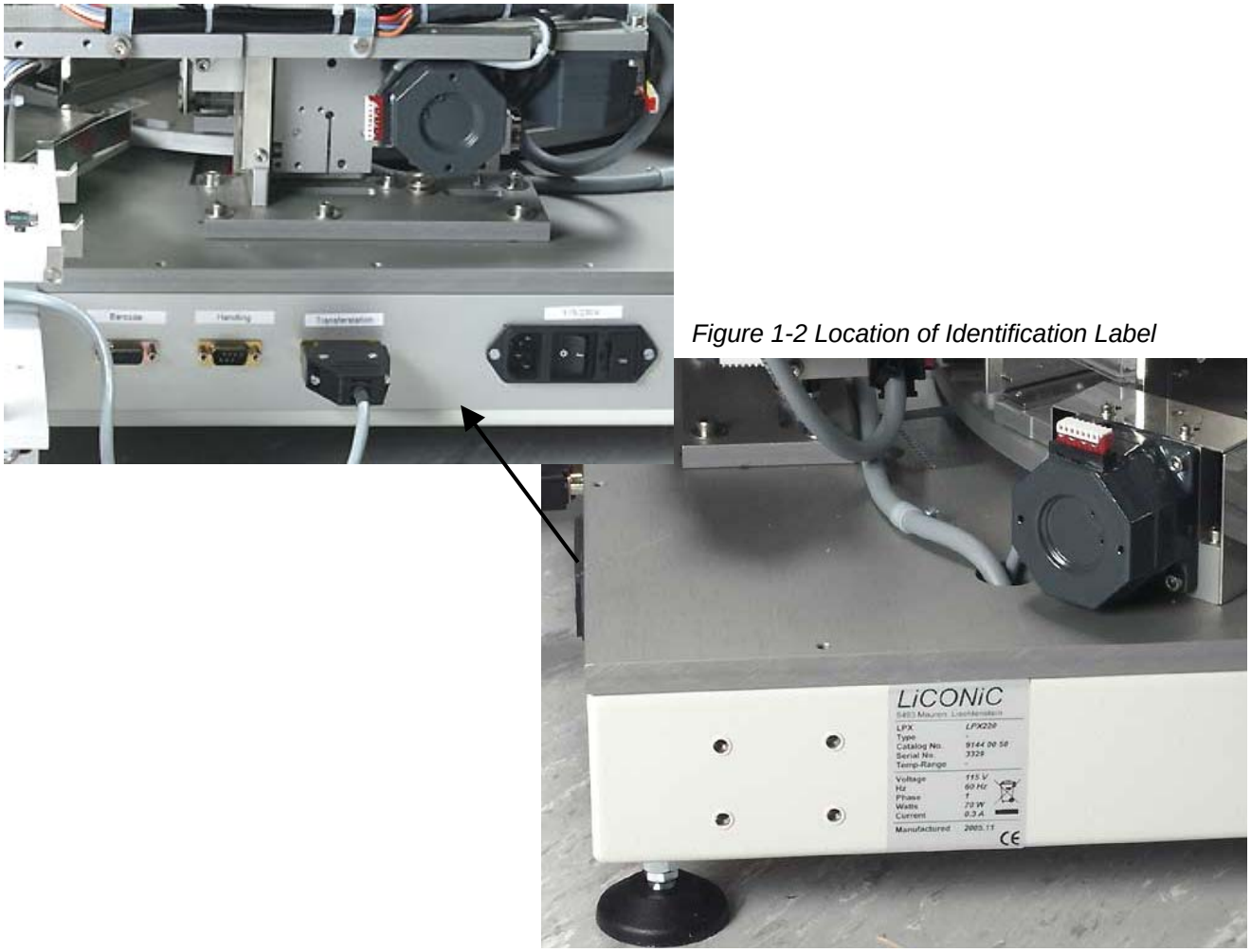
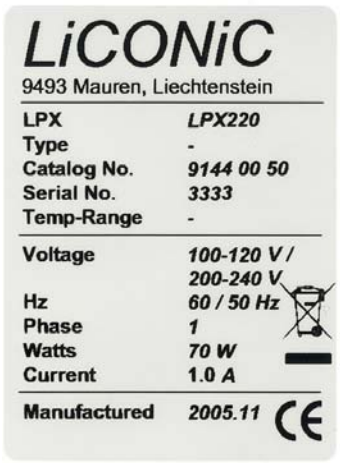


Figure 1-2 Location of Identification Label

Contents of Type Plate

For future reference, please read the Instrument Serial No. from the side of your instrument and write it in the provided space in Figure 1-3.

Figure 1-3 LPX220 Identification Label



1.2 Specifications

1.2.1 Overall Dimensions

Figure 1-4 Overall Dimensions

1.2.2 Weights

Carousel complete with nine stacks	57 kg / 126 lbs
Stack, empty	1.9 kg / 4.2 lbs
Packing	17 kg / 37.5 lbs

1.2.3 Supply Ratings

Supply Voltage:	100-120 / 200-240 V
Supply Frequency:	60 / 50Hz
Power consumption:	70 W
Internally fused:	1.6 AMP (2 fuses)

1.2.4 Environmental Conditions

General:	Indoor use only
	Altitude up to 2000 m
	Mains supply fluctuations +/- 10%
	Transient Overvoltage (Installation) Category 2
	Pollution Degree 2
Operating:	Temperature 18 - 30 °C / 64 - 86 °F
	Relative humidity 30 - 80 % at 30 °C / 86 °F or below (non condensing)
Storage:	Temperature 1 - 60 °C / 34 - 140 °F
	Relative humidity 5 - 80 % at 30 °C / 86 °F or below (non condensing)

1.2.5 Barcode Reader Specifications

Laser Class: Class 2

Barcode Types

The optional Barcode Reader recognizes the following barcode types:

- Code 128 variable number of characters
- Code 39 standard variable number of characters
- Code 39 full ASCII variable number of characters
- Code 2 of 5 interleaved fixed number of characters - must be set in the SW
- Codabar fixed number of characters - must be set in the SW
- UPC A
- UPC E
- EAN-8
- EAN-13

Barcode Specifications

Barcodes to be in accordance with specifications ANSI X3.182 and DIN EN 1635.

- Module width 5 - 15 mils (0.127 - 0.381 mm)
- Quiet zone ≥5 mm
- Print Contrast Ratio PCS >70 %
- Barcode height ≥8 mm
- Barcode length max. 64 mm (without quiet zone)
- Number of characters: max. 32
- Black code on white background

Recommendations in regard to Barcode Quality

Use barcode testing device to verify barcode quality.

Quality Class A, B or C required. Identification of Class D is not guaranteed.

- Print Quality: Use barcodes printed by thermal-transfer or photographic methods
- Code label surface to be mat and clean
- Do not use yellowed, dirty or damaged barcodes

1.3 Equipment

1.3.1 Scope of Delivery

• Basic Unit, consisting of the Rotating Plate and the Handler, both mounted on the Carousel Base.

• 9 Stacks

• Junction Plate to fix Carousel onto Workstation

1.3.2 Options

The LPX220 can be ordered with or without the Barcode Reader option for microplate identification.

NOTE

It is not possible to retrofit the Unit with the Barcode Reader Option.

See Section 3.3.2 for Function Description.

See Chapter 10 for order numbers.

1.3.3 Accessories

Stack

A total of nine stacks can be placed on the Rotating Plate for microplate storage.

A stack has 21 slots for Standard Microplates, the latter can be identified if Barcode Reader Option is installed. If Plate Identification is not used, an additional microplate can be placed in the topmost position of each Stack.

The stacks can be modified to hold 11 Half-heights or 7 Deep Well Plates.

2 Safety Instructions

2.1 Introduction

2.1.1 General

The LPX220 is not a complete product for end use. It is delivered exclusively to professional System Integrators who take full responsibility for safe installation and documentation of the entire system.
Do not operate until it has been established that the system, into which the LPX220 has been incorporated is in compliance with all local safety regulations.

2.1.2 Definition

Operator:	Any person who uses the equipment for its intended purpose.
System Integrator:	Authorized person or company responsible for installation, initial start up and overall safety of the system. Person or company to carry out service and maintenance task and therefore to be contacted in case of any problems with the system.

2.1.3 Target Group

The integration Platform has been conceived for applications in the research field, requiring highly qualified and authorized laboratory personnel.
Instrument operation requires thorough knowledge of applications, instrument functions and software programs as well as all applicable safety rules and regulations.

2.1.4 Importance of the Safety Instructions

This chapter contains general information assuring safe operation of the instrument.
More specific instructions in regard to safety are given throughout this manual, at the respective points where observation is most important.
Make sure that all Safety Instructions in this publication are strictly followed.

2.2 Warning Notices

Throughout this publication, Warning Notices are to be interpreted as follows:

WARNING

Indicates the possibility of severe personal injury, loss of life or equipment damage if instructions are not followed.

CAUTION

Indicates the possibility of severe equipment damage if instructions are not followed.

NOTE

Gives helpful information about the equipment.

2.3 Safety - Basics

General Operating Hazards

Carefully observe the following precautions:

Mechanical Hazards

Keep the housing and safety panels closed and never reach into the instrument work space when the unit is in operating mode.

Chemical, Biological and Radioactive Hazards

All samples and testkit components must be considered as potentially hazardous agents. Therefore a potential risk may arise from the liquids being handled by the pipetting instrument, such as infectious biological samples, toxic or corrosive chemicals, or radioactive substances. Strictly apply appropriate safety precautions according to local, state and federal regulations.

Prior to any first time application, test runs shall be made with a neutral liquid to allow optimization of all liquid handling parameters.

Handling and disposing of waste has to be in accordance with all local, state and federal environmental, health, and safety laws and regulations.

Prior to executing any maintenance task on the instrument or sending it or parts of it for repair, the instrument or the parts have to be thoroughly decontaminated.

See Appendix A.

2.4 General Safety Regulations

2.4.1 Legal Requirements

Please consult the Manufacturer's Declaration, delivered with each unit by LiCONiC AG, listing all applied directives and standards.
In Europe, the System Integrator must provide a Conformity Declaration upon final installation of the entire system.

2.4.2 General Inspection and Maintenance Duties

Only an authorized System Integrator shall carry out inspection, maintenance and repair tasks.

2.4.3 Spare Parts to be used

Use only original LiCONiC Spare Parts. If other parts are used during the normal warranty period, the manufacturer's guarantee may be invalidated.

2.4.4 Modifications

Modifications shall only be carried out by an authorized System Integrator. LiCONiC AG will not accept responsibility for any claim resulting from unauthorized modification or alteration.

2.5 Installation

Only a trained System Integrator shall install the LPX220.

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

CAUTION

The Logistics Workstation and the LPX220 must be installed on the same table.

After installation, do not move either of them. Correct function of microplate *transfer between the Workstation and the Carousel deeply depends on the position of the Carousel in relation to the Logistics Workstation.*

2.5.1 Safety Panels

The LPX220 scope of delivery does not include a front safety panel. The System Integrator and/or Operator are responsible for taking appropriate safety and protective measures.

2.5.2 Stack Configuration

CAUTION

Do not add or remove microplate supports.

If you remove a stack whose platform configuration is set up as to receive Halfheights or Deep Well Plates, make sure to put it back to exactly the same position on the carousel.

The lift has been taught to exactly drive to the respective positions. Altering positions will result in destinations not found or crashes.

Only a trained System Integrator shall alter the instrument configuration and teach the lift accordingly.

2.5.3 Electrical Connection

CAUTION

Switch the Logistics Workstation off before connecting and disconnecting the LPX220.

Electronics of the Carousel will be damaged if done while the instrument is switched on.

Disconnect the RS232 interface only with power switched off.

2.5.4 Barcode Scanner

WARNING

Laser Class 2. Laser light - do not stare into the beam.

Might be harmful for your eyes.

2.5.5 Functional Notes, Precautions

NOTE

To ensure proper operation, the Laser Beam Output Window must be perfectly clean at all times. Even slight soiling will cause reading errors.

NOTE

The Barcode Reader CANNOT read barcodes in the Stack's topmost position. Therefore if working with plate identification, use only 21 positions, i.e. do not place microplates on the topmost platform.

3 Structure and Function

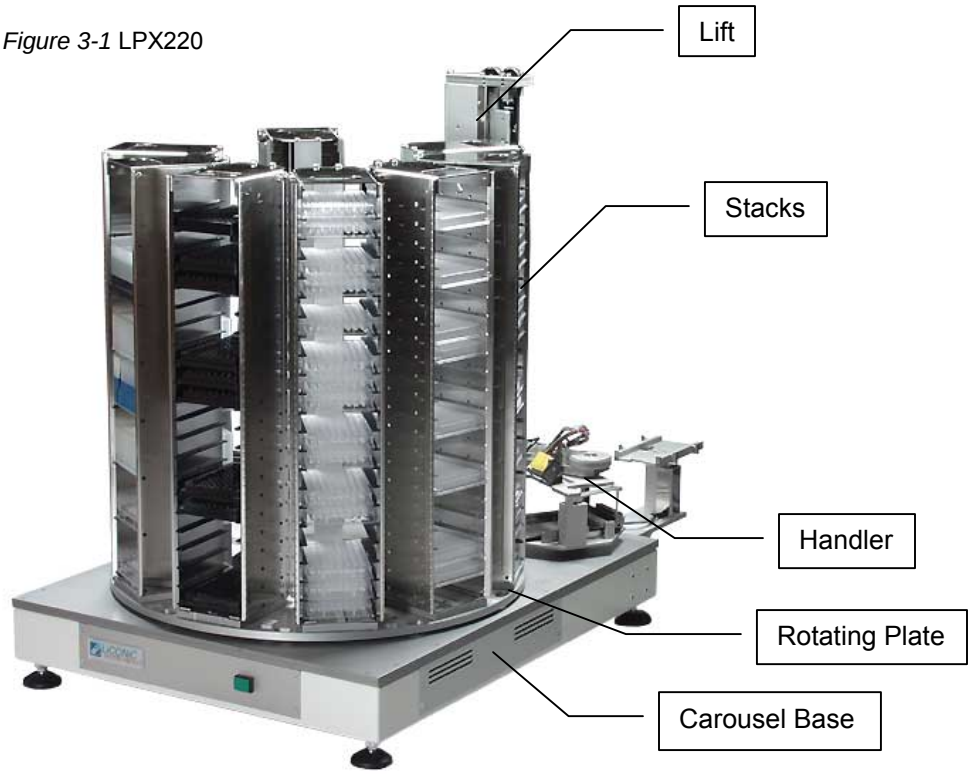
3.1 Introduction

The LPX220 is a LiCONiC Plate Hotel.

The LPX220 can also be placed in front of a LiCONiC Assay Workstation, or complement any other instrument capable of picking up microplates off the lift with a RoMa-like device.

3.2 Structure

Figure 3-1 LPX220



The **Carousel Base** contains all electronic and mechanical components controlling and driving the **Rotating Plate**.

The **Handler** Unit contains electronical and mechanical components for **Lift** and optional **Barcode Reader** manipulation.

Up to nine **Stacks** can be placed on the **Rotating Plate**.

The **Stacks** provide shelves for microplates.

3.3 Function Description

3.3.1 LPX 220

Rotating Hotel

Nine stacks placed on the Rotating Plate provide storage for 189 standard microplates, 198 if barcode reader option not installed. Rotates to bring appropriate Stack to microplate transfer position.

Handler

Transfers microplates from carousel to RoMa pickup position an vice versa. Identification of plates on the carousel with optional barcode reader, mounted underneath the lift.

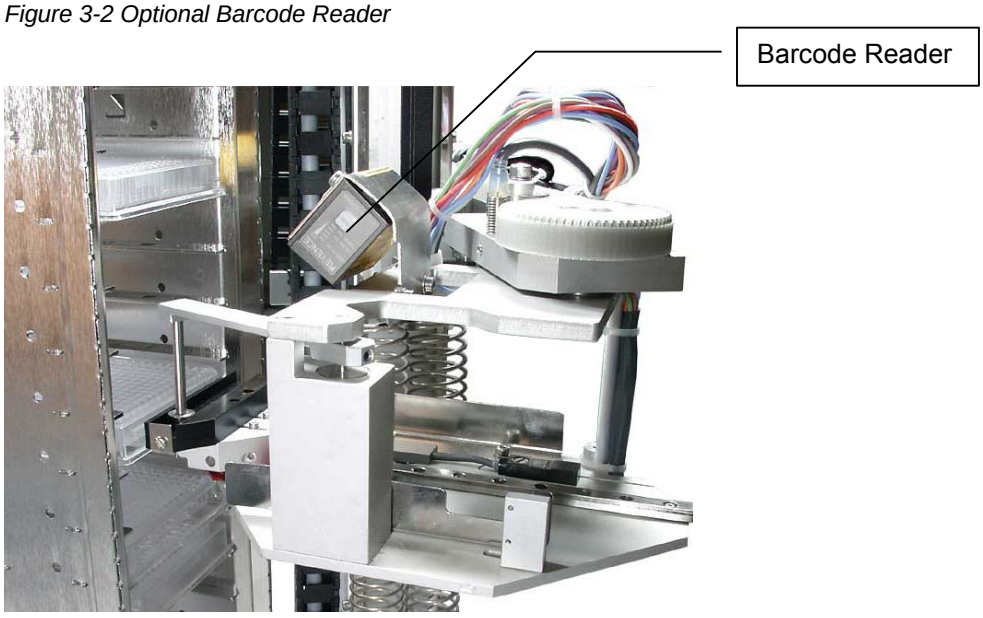
NOTE

The Barcode Reader cannot identify microplates in the topmost position.

3.3.2 Options

Barcode Reader

Figure 3-2 Optional Barcode Reader



An optional barcode reader for microplate identification is mounted underneath the lift. For Barcode Scanner Specification see Section 1.2.5.

The Plate Sensor determines if there is a microplate in the facing slot or not.

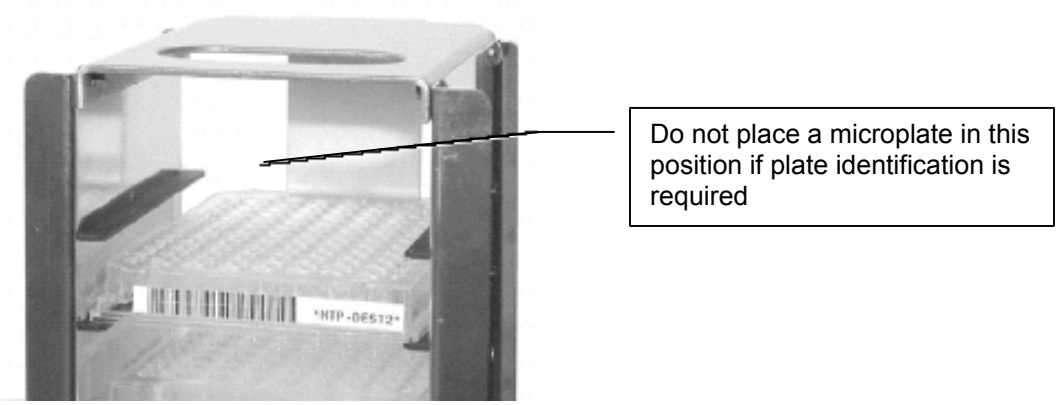
3.3.3 Accessories

Stack

NOTE

The Barcode Reader CANNOT read barcodes in the Stack's topmost position. Therefore if working with plate identification, use only 21 positions, i.e. do not place microplates on the topmost platform.

Figure 3-3 Topmost Stack Position



Each Stack provides shelves for 21 standard microplates, which can be identified by the optional Barcode Reader. An additional microplate can be placed in the topmost position if plate identification is not required.

Stack shelve positions can be altered as to hold 11 Half-heights or 7 Deep Well plates. However, this must be carried out by a trained System Integrator. See Section 4.2.1.

3.4 Safety Panels and Covers

The System Integrator and/or System Operator is responsible to take all necessary measures to assure overall System Safety. Do not operate the LPX220 as supplied by LiCONiC AG.

Carefully read the Safety Instructions in Chapter 2.

3.5 Connections

All sockets for connecting the LPX220 are at the rear of the unit.

CAUTION

Always switch the Logistics Workstation off before connecting and disconnecting the LPX220.

Electronics of the Carousel will be damaged if done while the instrument is switched on.

Figure 3-4 Connectors

3.6 Software

The LPX220 is controlled by the appropriate module of the FACTS Software Package, controlling the Logistics Workstation.

4 Operation

4.1 Introduction

4.1.1 User Qualification

Only Qualified Laboratory Personnel shall operate the instrument. Level of qualification determined by liquids handled with the instrument.

4.1.2 Safety Instructions

Carefully read and observe the Safety Instructions in Chapter 2 before operating the LPX220.

There are two critical **Plate Transfer Positions**. So please strictly follow the instructions hereafter:

Plate transfer from Stack to Lift

Figure 4-1 Plate transfer Stack - Lift

CAUTION

Each microplate position is recorded in the software program to assure proper functioning of the plate transfer. Altering platform positions without making the corresponding changes in the software will result in destinations not found or crashes. Positions of microplate platforms shall only be altered by a trained System Integrator. The Software Program will have to be altered accordingly before resuming operation.

Therefore:

• Use the stacks only as set up by the System Integrator. Do not remove/add any microplate supports.

• Be careful when operating the Carousel with different stack configurations, i.e. Standard, Half-heights and Deep Well Plates. Place a stack only in the stack position (1 to 9) that has been set p in the software for that specific stack. *EXAMPLE: The Stack configuration of stack-positions 1 to 7 is for standard microplates, stack-position 8 for Half-heights and stack-position 9 for Deep Well*

Plates. Make sure to place stacks with standard plates only in stack-positions 1 to *7, stacks with Half-heights ONLY in stack-position 8 and stacks with Deep Well Plates ONLY in stack-position 9.*

Plate transfer from Lift to RoMa

Figure 4-2 Plate transfer Lift - RoMa

The Carousel is securely fixed to the Workstation and the transfer position is stored in the software program to guarantee proper function of plate transfer from Lift to RoMa and vice versa.

In case of transfer problems, only a trained Service Engineer shall take the necessary readjusting measures.

4.2 Instrument Setup

4.2.1 Setting up Stacks for Half-heights and DeepWell Plates

The standard stack configuration provides 22 slots for Standard Microplates. Slot heights can be altered as to receive 11 Half-heights or 7 Deep Well plates.

NOTE

Standard Microplates: The Barcode Reader cannot read barcodes in the stack's topmost position. If working with plate identification, use only 21 positions, i.e. do not place microplates on the topmost platform.

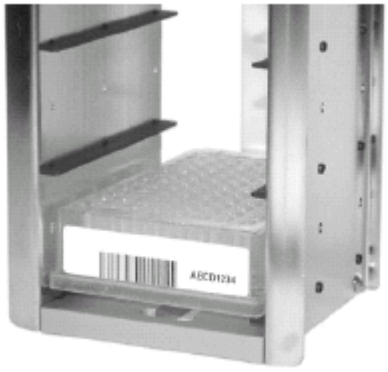
CAUTION

Positions of microplate platforms shall only be altered by a trained System Integrator. **The Software Program will have to be altered accordingly before resuming** ***operation.***

Figure 4-3 Possible Stack Configurations

21 (22) Standard Microplates

11 Half-heights

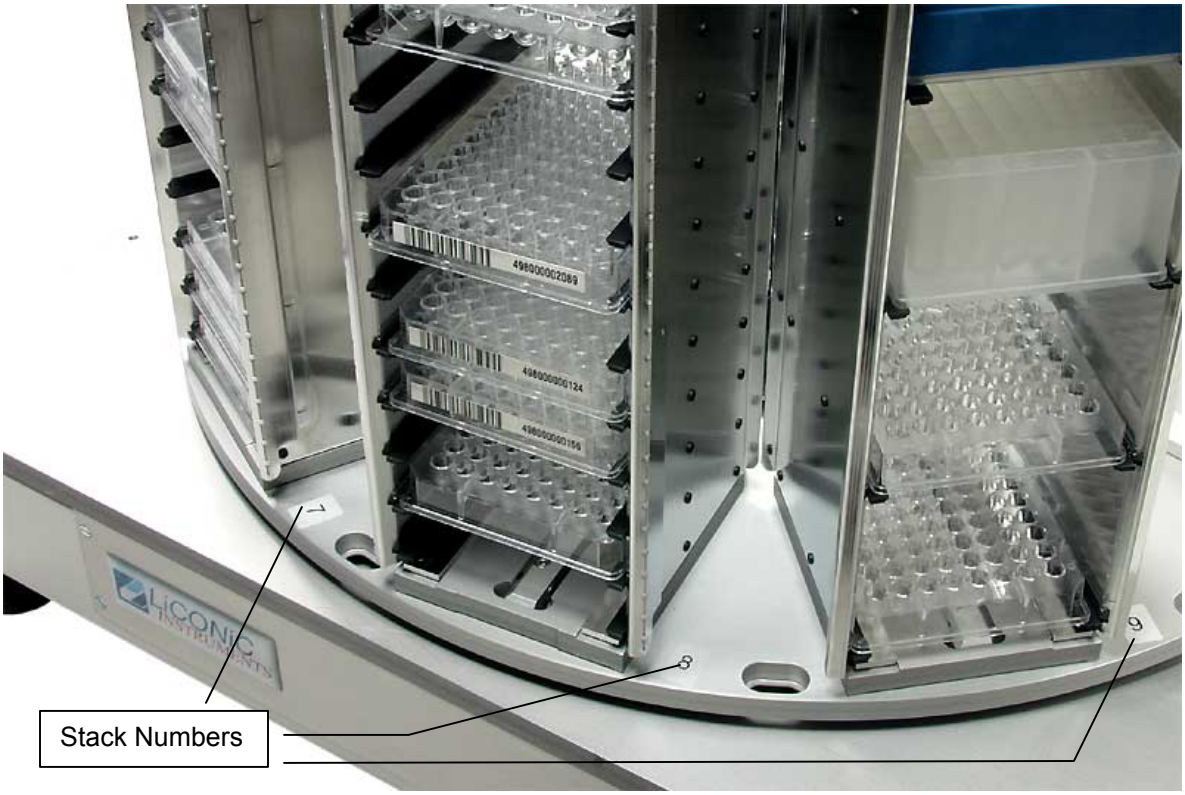


7 Deep Weel Plates

CAUTION

Place stacks (Standard, Half-heights, Deep Well) only in the stack positions (1 to 9) that have been set up in the software for the specific stack configuration!
For easy control, the stack positions on the rotating plate are numbered.

Figure 4-4 Stack Numbering on the Rotating Plate



4.2.2 Placing microplates in the Stack

Slide the microplates into the stack until they touch the rear wall.

NOTE

Standard Microplates*: If working with Microplate Identification, do not place plates in the topmost position (pos. 22). The Barcode Reader cannot read in this position.*

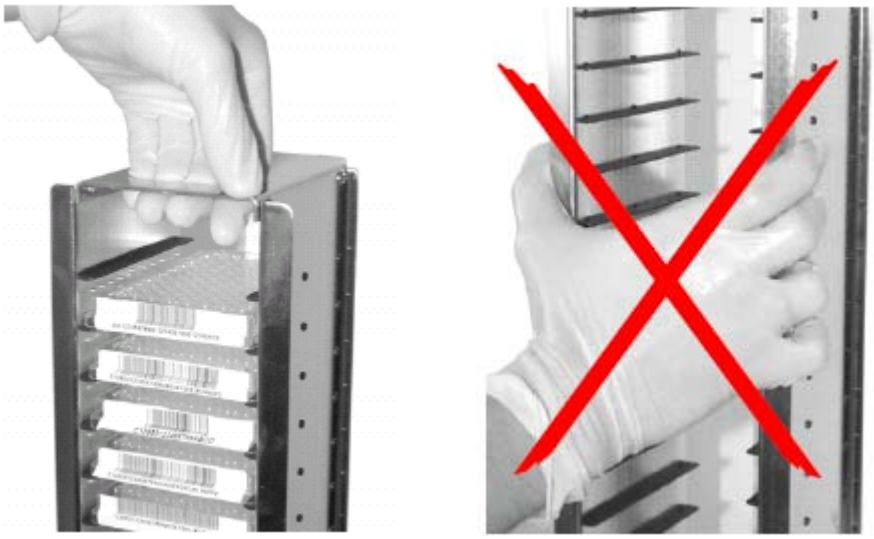
If you work exclusively with Microplate Identification, it might be best to remove the topmost supports.

4.2.3 Stack Installation

CAUTION

Lift the stack only by the provided handle. Do NOT lift it by the frame as it bends easily, causing microplates to get stuck.

Figure 4-5 Stack Handling



Place the Positioning Slot in the bottom of the stack on the corresponding Positioning Key on the Rotating Plate, the stack slightly tilted towards you.

Press the bottom against the key (see Figure 4-6) and push the top of the stack back and down so the stack rests evenly on the Rotating Plate.

Figure 4-6 Stack Installation

4.2.4 Stack Removal

Tilt the top of the stack SLIGHTLY towards you. Be careful no microplates fall off the stack.

Hold the bottom and lift the stack off the Rotating Plate.

Figure 4-7 Stack Removal

4.2.5 Stack Handling

The Stacks are generally delicate - always handle them with care. The two sides must be exactly perpendicular to the base plate for proper plate transfer by the RoMa.

Be especially careful when storing stacks. Store them straight up or evenly lying down.

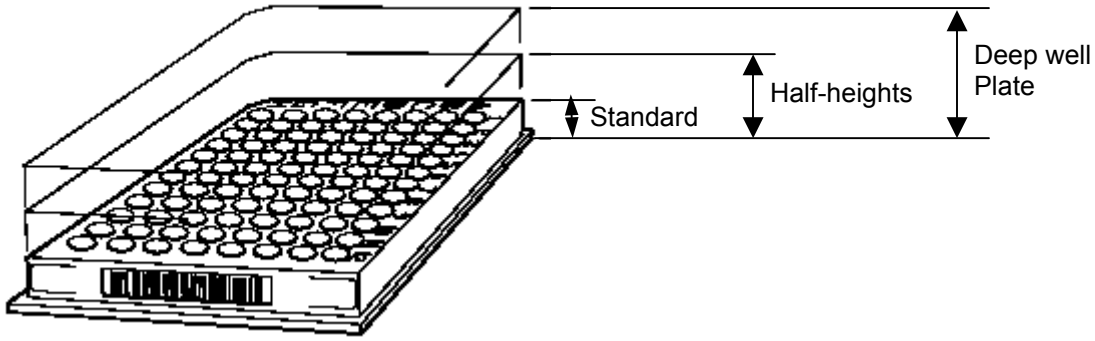
4.2.6 Barcode Labels on Microplates

In order to increase legibility of the barcodes, use clean, good quality barcode labels and carefully position them on the microplates as shown in the following picture.

NOTE

Labels on Deep Well and Half-height plates to be positioned in the lower part of the respective face of the plate, as shown in the following picture.

Figure 4-8 Barcode Label Position on Microplates



For Barcode Specifications, please refer to Section 1.2.5.

4.3 Operation

4.3.1 Switching the Instrument On

Electrically connected to the Logistics Workstation, the LPX220 is switched on upon switching on the Workstation.

Automatic initialization:

DANGER

Laser Class 2. Laser light - do not stare into the beam.

Might be harmful for your eyes.

- The Barcode Scanner will light up. It will go off as soon as successfully initialized by the FACTS Software.
- The Carousel will rotate and stop at position 1. If it does not stop at position 1:
  - Switch the instrument off and on again
  - Check the settings in Module and Tool configuration.

4.3.2 FACTS Software

Refer to the FACTS Software Manual P/N 391 252.

4.3.3 Switching the Instrument Off

CAUTION

Always exit the FACTS Software BEFORE switching the instrument off.

Data will be lost if not done so.

After the Instrument is switched off, the rotating mirror inside the Barcode Scanner might be heard for several minutes. This is normal.

4.4 Failure

4.4.1 Trouble Shooting Guide

Table 4 - 9 Troubleshooting guide

Problem / Error	Possible Cause	Corrective Action
Shovel in wrong X-position (resulting in Time Out error (FACTS SW))	Shovel has been manually moved in X	Adjust shovel position as described in Section 4.4.21

4.4.2 Failure Recovery

4.4.2.1 Shovel X-Position

At the left and right end-positions, the guide pin must be at the respective end of the groove in the center of the shovel.

1 Push the shovel lever to the left stop.

Figure 4-10 Shovel X-adjustment

2 Now push the shovel to the left stop.

Figure 4-11 Shovel X-adjustment

5 Maintenance

For optimum performance and reliability of the instrument, regularly carry out the Maintenance and Cleaning Tasks described in this Chapter.

5.1 Decontamination

In order to protect Service and Repair Personnel, contaminated instruments or instrument parts must be decontaminated according to standard laboratory regulations. Copy and fill in the Decontamination Form, Appendix A, and follow the instructions in this form before:

- a Service Technician carries out any service or repair work,
- an instrument or parts of an instrument are shipped to the Sales Representative or the manufacturer, e.g. for repair. The filled-out form must be enclosed with the material.

5.2 Cleaning

CAUTION

To clean instrument surfaces (e.g. Rotating Plate, Stacks etc.), always turn off the power by switching off the Workstation.

CAUTION

Strong detergents might dissolve casing surface coating.

5.2.1 Cleaning Agents

Alcohol: Use Ethanol, 2-Propanol or Isopropanol.

Instrument part	Agent	See Section
Casing	Alcohol	
Stacks	Alcohol, acetone	
Scanner output window	Alcohol	Barcode Scanner
Shovel guide	None	Section 5.3.2

5.2.2 Cleaning Tasks

5.2.2.1 Barcode Scanner

WARNING

Laser Class 2.
Clean the Laser Beam Output Window only when the laser beam is deactivated.

The Laser Beam Output Window must be perfectly clean at all times. Even slight soiling will cause reading errors.

Daily Maintenance:
Thoroughly clean the Laser Beam Output Window.
Use soft material and alcohol to clean the window. Avoid any abrasive substances.

Figure 5-1 Position of Laser Beam Output Window

5.3 Lubrication

Before applying any lubricant, thoroughly clean parts to be lubricated using a lint free tissue.

5.3.1 Lubricants

Use one of the following lubricants (DIN 51825 KP2K) for Lift Guide, Lift Rack and Shovel Guide:

- KLUBER Paraliq GA351
- SHELL Retinex A
- MOBIL Savavex Grease L2

CAUTION

Too much grease will lead to malfunctioning of the instrument and/or contaminate liquids in the microplates.

5.3.2 Shovel Guide

If grease has been removed during cleaning, lubricate the shovel guide as follows:

Figure 5-2 Lubrification of Shovel Guide

If you encounter any problems with your instrument, please contact your System Integrator or nearest LiCONiC Service Center.

6 Repair

There are no Repair tasks at Operator's level to be performed on the LPX220.

If you encounter any problems with your instrument, please contact the authorized System Integrator or LiCONiC. Addresses see rear of title page.

For Troubleshooting, refer to Section 4.4 Failure.

7 Instrument Shut down, Storage

7.1 Unit Shut down

WARNING

Depending on the applications run, parts of the unit may have been in contact with biohazardous, poisonous or even radioactive materials. Thoroughly decontaminate all relevant parts!

Strictly follow the applicable laboratory safety regulations.

If you intend to shut down the LPX220 for a longer period, thoroughly clean and decontaminate the entire unit. Put a copy of the filled-out Decontamination Form with the instrument. See Appendix A.

7.2 Storage

LiCONiC recommends to store the instrument in its original packaging.

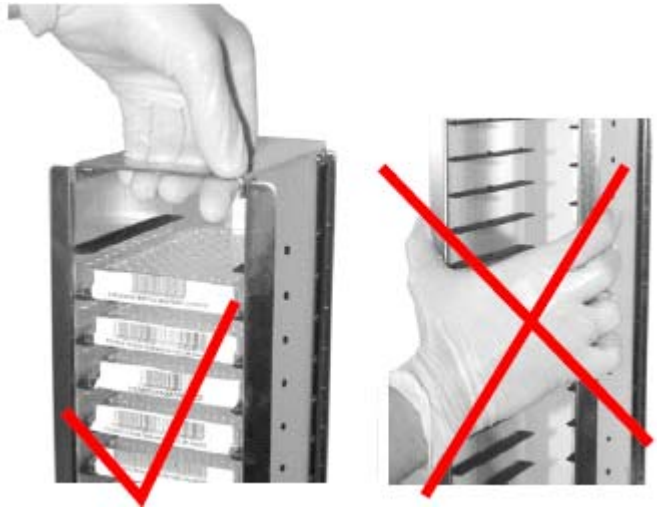
For environmental conditions during instrument storage see Section 1.2 Specifications.

8 Packing and Transport

8.1 Packing

Carrying Stacks

Figure 8-1 Handling the stacks



1 Before lifting the Carousel, remove all stacks.

2 Lift the stack only by the provided handle

3 Do NOT lift it by the frame as it bends easily, causing the microplates to get stuck

Carrying the Instrument

Remove all stacks from the instrument.

Carousel weight without stacks approx. 40 kg / 182 lbs.

WARNING

Never lift the LPX220 by the Handler Hood or Rotating Plate as this would cause damage to critical parts.

Carry the instrument by holding it at the base, as shown in Figure 8-2.

Figure 8-2 Carrying the LPX220

Repacking to prevent damage in transport

The instrument packaging has been carefully designed to prevent damage during shipping. Faulty packaging might cause instrument damage. Therefore:

CAUTION

All LiCONiC guarantees are void if the instrument is not correctly packed by authorized personnel for shipping. Contact your LiCONiC representative. Use only original packaging.

1 Set Carousel onto pallet

Figure 8-3 Packing - Rotating Plate

3 Put all accessories in boxes, pile boxes on Rotating Plate

Figure 8-4 Packing - Accessory Boxes

Boxes contents:

Box 1

1 Stack

1 Transparent cover

2 Cables with 25-pin Sub-D connectors

for RS 232 interface

1 Power cable 24 V

1 Test Sheet

1 Doc 391218 Packing List

1 Doc 391209 Operating Manual

1 Doc 391220 Handling Instructions

1 Junction plate with screws

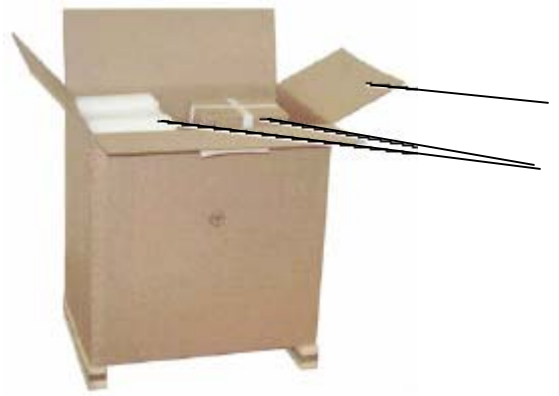
Box 2

4 Stacks

Box 3

4 Stacks

Figure 8-5 Packing - Instrument Box

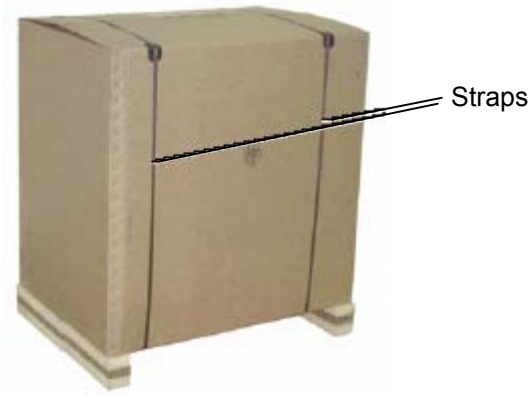


4 Slip cardboard box over the instrument

5 Place filler-box handler padding

6 Close the box, fasten with two straps around box and pallet.

Figure 8-6 Packing - Straps



8.2 Transport

LiCONiC recommends to transport the instrument in its original packaging.

Refer to Section 8.1 Packing.

CAUTION

Unit to be transported and installed by authorized personnel only.

9 Disposal

9.1 Disposal

LiCONiC instruments and parts are made of environmentally inert materials which can all be discarded according to the normal waste regulations applicable in the specific country. However,

WARNING

Depending on the applications run, parts of the unit may have been in contact with biohazardous, poisonous or even radioactive materials.

Make sure to treat these materials according to the applicable safety standards and regulations!

10 Accessories and Spare Parts List

10.1 Instruments, Accessories

Part No.	Description
612 302	Stack
612 310	LPX220 without Barcode Reader
612 311	LPX220 with Barcode Reader
612 312	LPX220 with Barcode Reader

10.2 Spare Parts List

No Spare Parts at Operator's level.

Appendix A

Decontamination Form

Copy the form on the following page, fill it out and put it with the instrument/parts whenever asked to do so throughout this manual.

DECONTAMINATION FORM

Prior to repairing or servicing the instrument or parts, shipping it to the distributor or manufacturer,
the instrument or affected parts must be thoroughly decontaminated and this form filled-out and enclosed.

I hereby declare that the contents of this package have never been exposed to hazardous biological and/or radioactive material or that such parts have been decontaminated or disinfected to remove or inactivate any biological and/or radioactive material which could be dangerous to service personnel.

Instrument Type: ..... Serial No.: .....

Parts:

❑ ..... ❑ .....
❑ ..... ❑ .....
❑ ..... ❑ .....
❑ ..... ❑ .....

Name: .....

Function: .....

Company: .....

Address: .....

.....

.....

Country: .....

Date of Decontamination: .....

Type of Disinfectant used: .....

.....

Date: ..... Signature: .....