

# LPX 440

## Operating Manual



## Important Notice

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

## 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.

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

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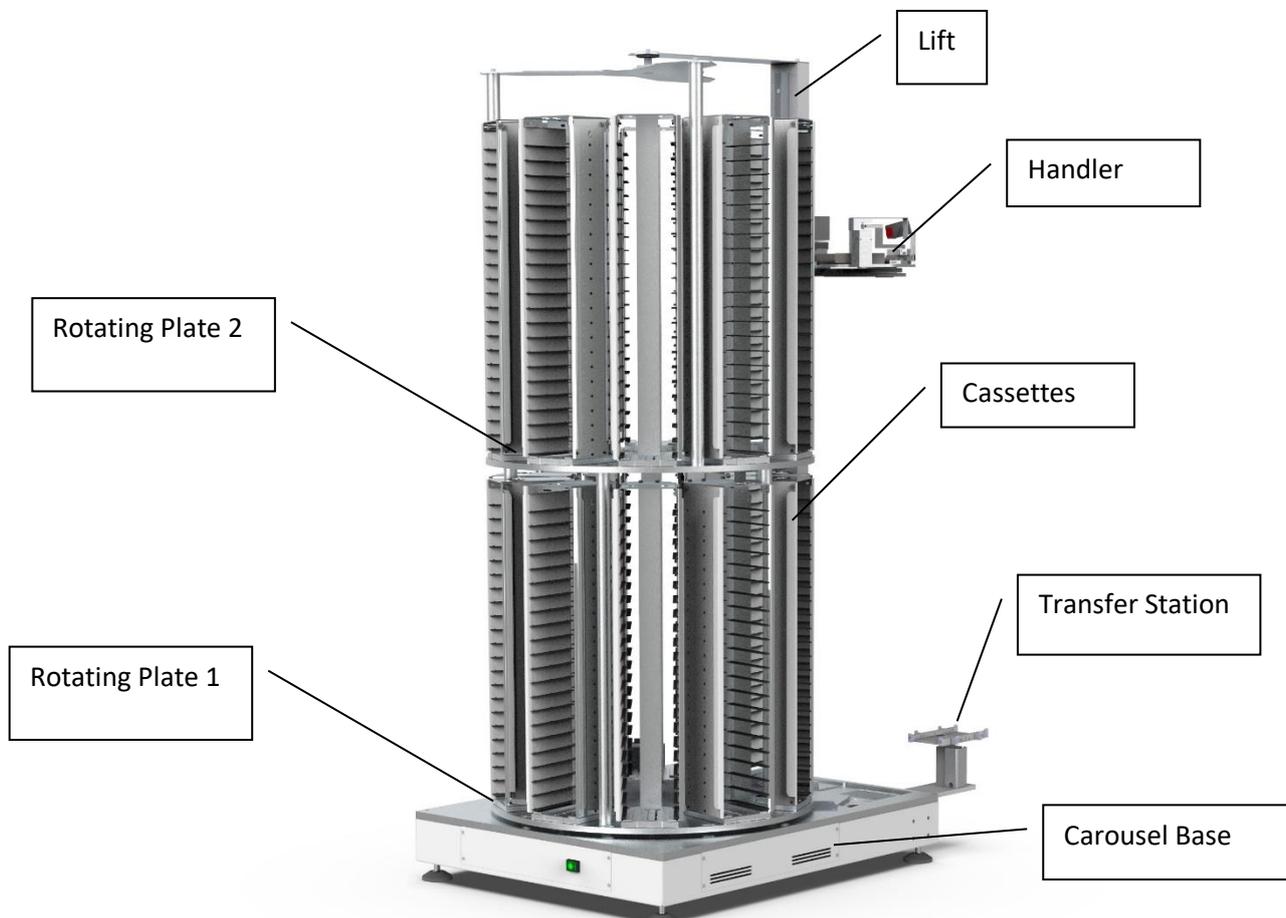
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## 1. Product Description

### 1.1. Introduction

#### 1.1.1. LPX440 Overview



#### 1.1.2. Intended Use

The LPX440 is an Option, expanding the integration Platform. The LPX440 is intended for storage, identification and transfer of microplates. It is to be applied exclusively in the research field. The LPX440 is intended to be part of a liquid handling system and as such installed and put into operation by a trained System Integrator.

#### 1.1.3. Unintended Use

Due to its open architecture, the LPX440 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.

### 1.1.4. Product Identification



The Type Plate is located at the side of the LPX440.

For future reference, please read the instrument Serial No. on the rear of your instrument and write it in the provided space.

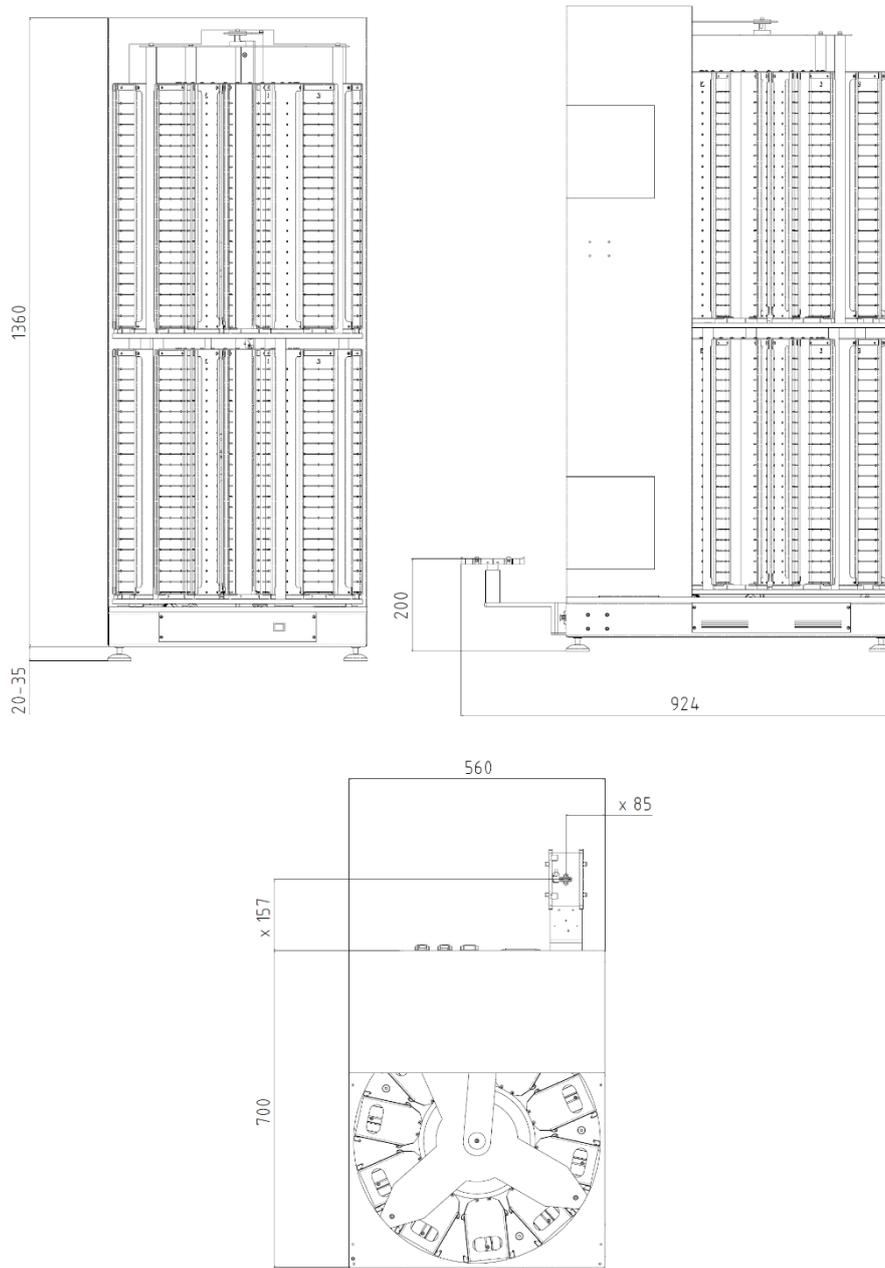


**NOTE !**

The above photos are for reference only

## 1.2. Specifications

### 1.2.1. Overall Dimensions



### 1.2.2. Weights

Carousel complete with nine stacks	71 kg / 156 lbs
Stack, empty	1.8 kg / 3.9 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

A Bar Code Reader can be installed on the Lift Assembly. It allows the reading of Bar Codes on plates stored in the stackers. Bar Codes have to be printed on the shorter side of the plates and have to face outwards to the LPX Lift Assembly. This option is requires presence of PP sensor option which cooperates with BCR.

#### 1.2.5.1. Supported Barcode Types

The optional Barcode reader recognizes the following barcode types.

Code 128                    number of characters : 1..32

Code 39                    number of characters : 3..32

Coda bar                   number of characters : 3..32

EAN(UPC (A/E)            EAN 13, EAN 8, UPC-E

ITF

Industrial 2 of 5

COOP 2of5

Code 93

EAN-128

#### 1.2.5.2. Barcode Specifications

Light Source:              Semiconductor Laser

Wavelength:              650nm

Output:                    1.5mW

Class:                      FDA: Class II

IEC 825-1 11.1993:      Class 2

DIN EN 608251 07.1994: Klasse 2

Reading Bar Width:      0.125 – 1.0 mm

0.15 – 1.0 mm for Code 93 and Code 128

Ambient Light:            Sunlight 10'000 lx

Incandescent Lamp:      6'000 lx

## 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.

20 Stacks

Transfer Station

### 1.3.2. Options

The LPX440 can be ordered with or without the Barcode Reader option for microplate identification. It can be equipped with a half housing or a full housing with a door.

### 1.3.3. Accessories

Stack

A total of 20 stacks can be placed on the Rotating Plate for microplate storage. A stack has 22 slots for Standard Microplates, the latter can be identified if Barcode Reader Option is installed.

Transfer Station

The system is also equipped with a transfer station, the location of a transfer station can be selected to match your needs. The location of the transfer station also depends on the fact whether the system is equipped with a housing.

## 2. Safety Instruction

### 2.1. Introduction

#### 2.1.1. General

The LPX440 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 LPX440 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 regulation

### **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



### 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 test kit 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 Safty 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 LPX440.



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 LPX440 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. Safty Panels

The LPX440 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 Half-heights 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 LPX440. 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



**DANGER!**

May be harmful to your eyes.

#### 2.5.5. Functional Notes, Precautions



**NOTE !**

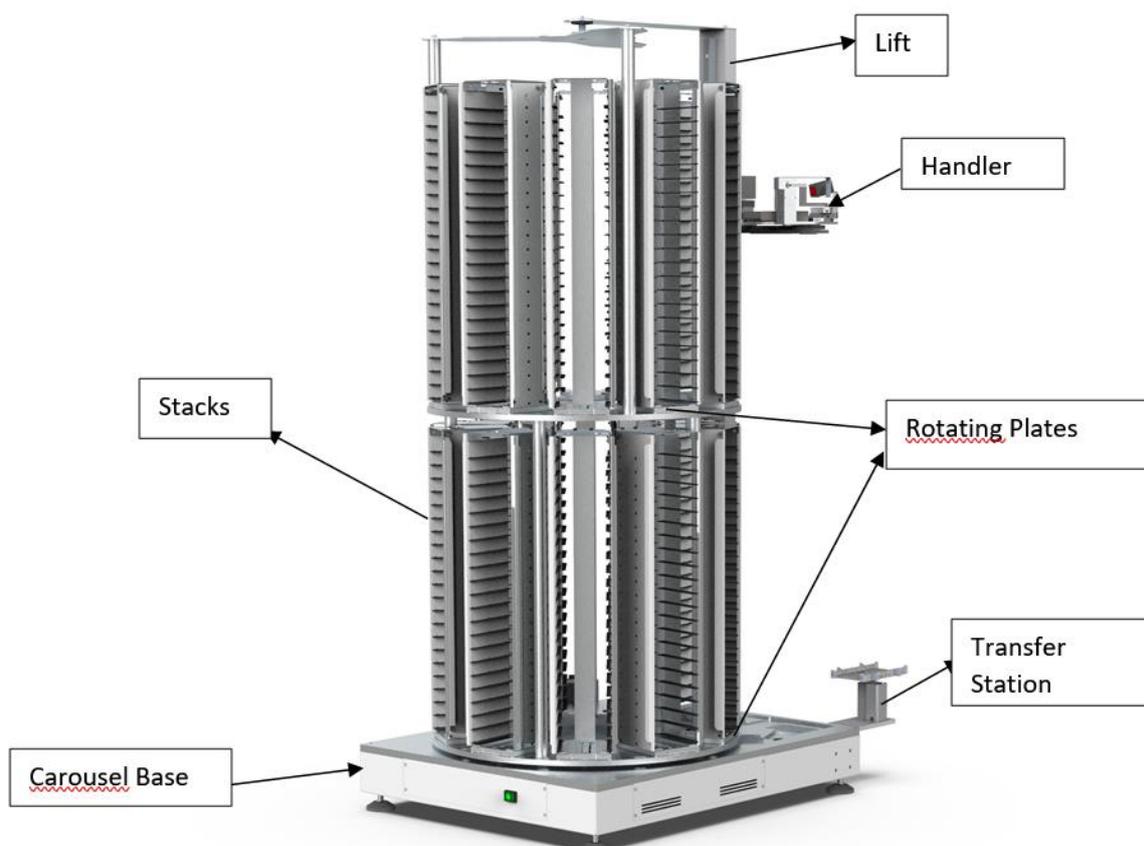
To ensure proper operation, the Laser Beam Output Window must be perfectly clean at all times. Even slight soiling will cause reading errors.

## 3. Structure and Function

### 3.1. Introduction

The LPX440 is a LiCONiC Plate Hotel. The LPX440 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 robotic plate gripper.

### 3.2. Structure



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

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

Up to 10 Stacks can be placed on the each Rotating Plate.

The Stacks provide shelves for plates.

## 4. Function Description

### 4.1. LPX440

Rotating Hotel 10 stacks placed on the each Rotating Plate provide storage for 440 standard microplates. Rotates to bring appropriate Stack to microplate transfer position.

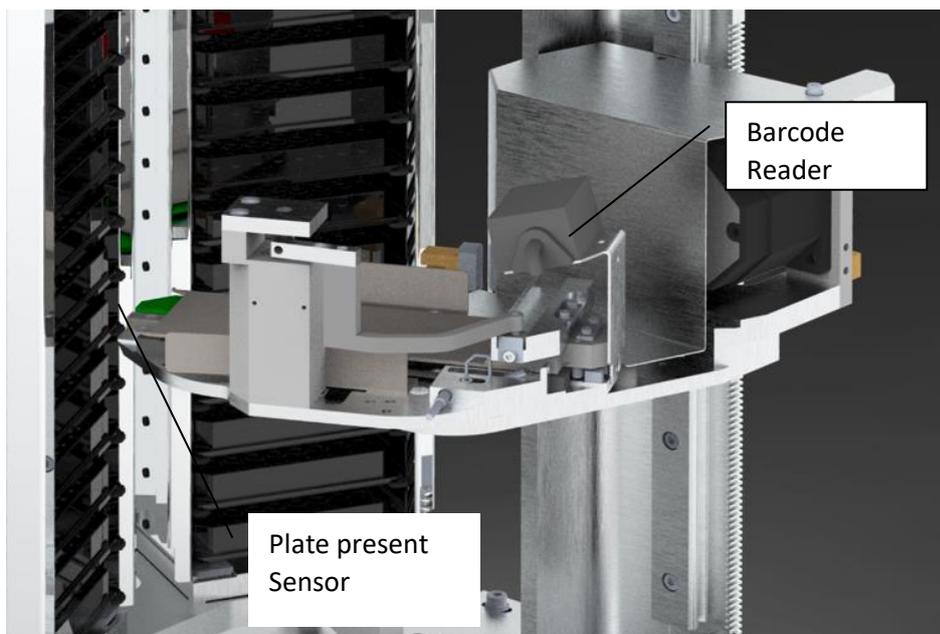
Handler

Transfers microplates between the carousel and the pickup position on the transfer station and vice versa. Identifies plates on the carousel using an optional barcode reader mounted underneath the lift

### 4.2. Options

Barcode Reader

Barcode Reader an optional barcode reader for plate identification is mounted underneath the lift. For Barcode Scanner Specification. The Plate Sensor determines if there is a plate in the facing slot or not.



### 4.3. Accessories

Stack

Each Stack provides shelves for 22 standard microplates, which can be identified by the optional Barcode Reader. Stack shelf positions can be altered as to hold 18 Half-heights or 10 Deep Well plates. However, this must be carried out by a trained System Integrator.

#### 4.4. Safty 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 LPX440 as supplied by LiCONiC AG. Carefully read the Safety Instructions in Chapter 2.

#### 4.5. Connections

All sockets for connecting the LPX440 are at the rear of the unit.



##### CAUTION

Always switch the Logistics Workstation off before connecting and disconnecting the LPX440. Electronics of the Carousel will be damaged if done while the instrument is switched on

#### 4.6. Software

The LPX series is intended for integration and therefore to be used by driver software integrated with the overall platform. Service tools to directly control the LPX is available from Liconic.

## 5. Operation

### 5.1. Intruduction

#### 5.1.1. User Qualification

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

#### 5.1.2. Safty Instructions

Carefully read and observe the Safety Instructions in Chapter 2 before operating the LPX440. There are two critical Plate Transfer Positions. So please strictly follow the instructions hereafter: Plate transfer from Stack to 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 10) that has been set 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 9-10 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 - 10.

#### **Plate transfer from Lift to Robotic plate gripper**

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

## 6. Instrument Setup

### 6.1. 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 18 Half-heights or 10 Deep Well plates.



#### CAUTION

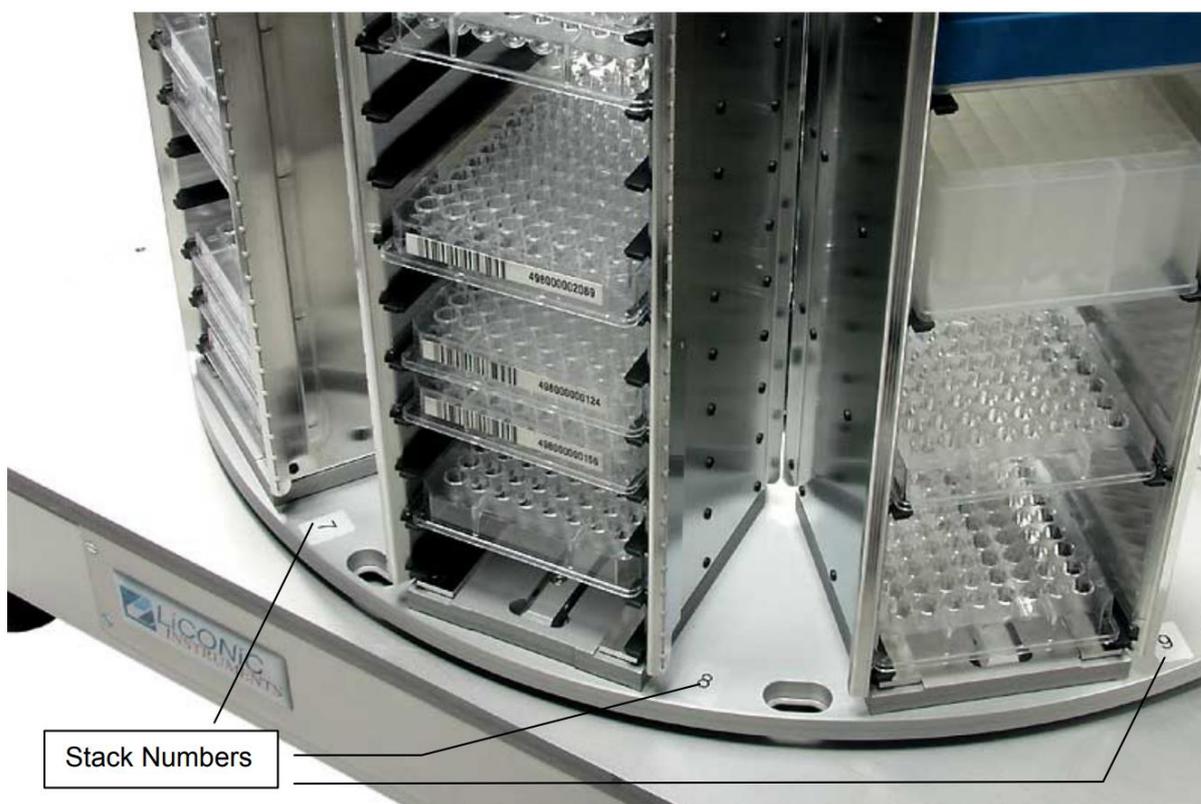
Positions of microplate platforms shall only be altered by a trained System Integrator. The Software Program will have to be altered accordingly before resuming operation.





**CAUTION**

Place stacks (Standard, Half-heights, Deep Well) only in the stack positions 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.



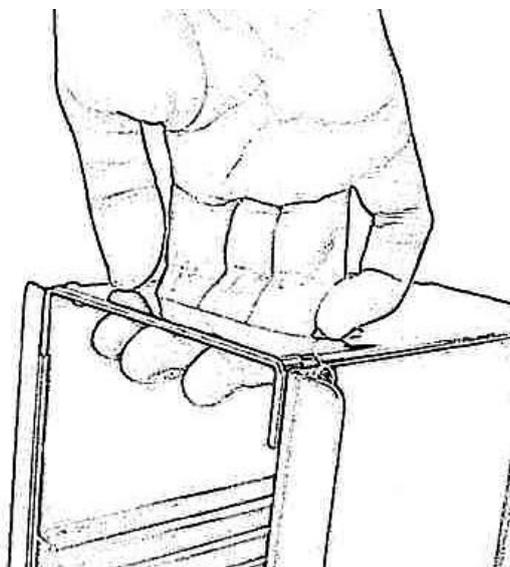
**6.1.1. Placing microplates in the Stack**

The stackers are open at their front for loading. To put a plate in the stacker choose the level and slide the plate along the rails towards the back of the stacker. Slightly lift the front of the plate to avoid excessive wear of the retaining nozzles at the front end of the rails. When the plates are loaded make sure that they are all pushed towards the back of the stacker. Plates that jut out may cause collision with the handler and may result in damage to the handler.

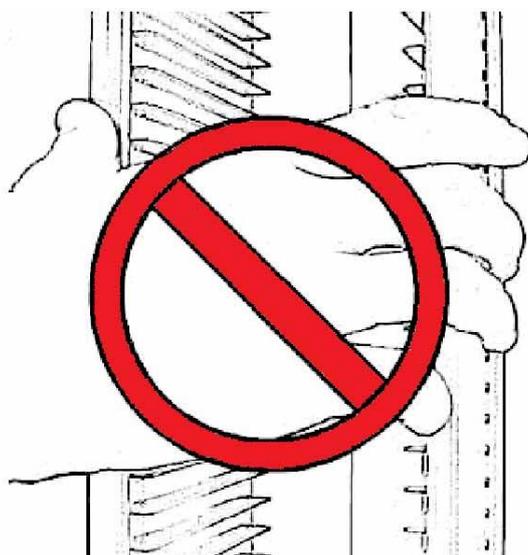
Stackers must be treated with great care. They are aligned within 1mm when leaving the factory. Misaligned stackers must be returned for re-alignment. Misaligned, tilted or bent stackers are frequent causes for handling failures. Special care must be taken when stackers are fully loaded with plates.

### 6.1.2. Stack Installation

Use stacker handle for transport. When lifting the stacker by its handle it will tilt backward slightly in order to prevent plates from shifting to the front.



Never apply force to the stackers. Do not drop stackers as Mechanical shock will misalign the stacker. Never lift a stacker by its side walls for this may bend the side walls of the stacker. Bent side walls cause the plates to block when being loaded or unloaded.



### 6.1.3. 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 robotic plate gripper. Be especially careful when storing stacks. Store them straight up or evenly lying down.

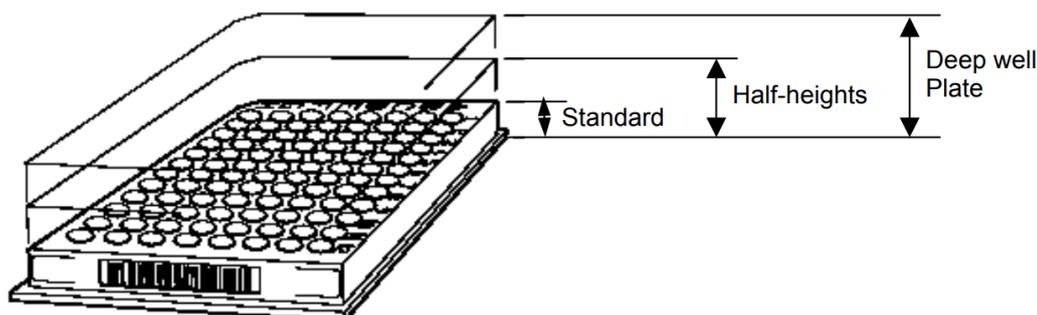
### 6.1.4. Barcode Labels on Microplates

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.



## 6.2. Operation

### 6.2.1. Switching the Instrument On

The LPX440 is electrically connected to the Logistics Workstation and is powered on simultaneously with the workstation.

Automatic initialization:

**DANGER Laser Class 2. Laser light - do not stare into the beam. Might be harmful for your eyes.**

The initialization of the handling turnover will be executed.

The lift will be initialized.

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.



**NOTE !**

To perform the initialization, it is necessary to connect the transfer station. If the transfer station requires initialization, this process will also be executed

**6.2.2. Facts Software**

The LPX series is intended for integration and therefore to be used by driver software integrated with the overall platform. Service tools to directly control the LPX is available from Liconic.

**6.2.3. 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.

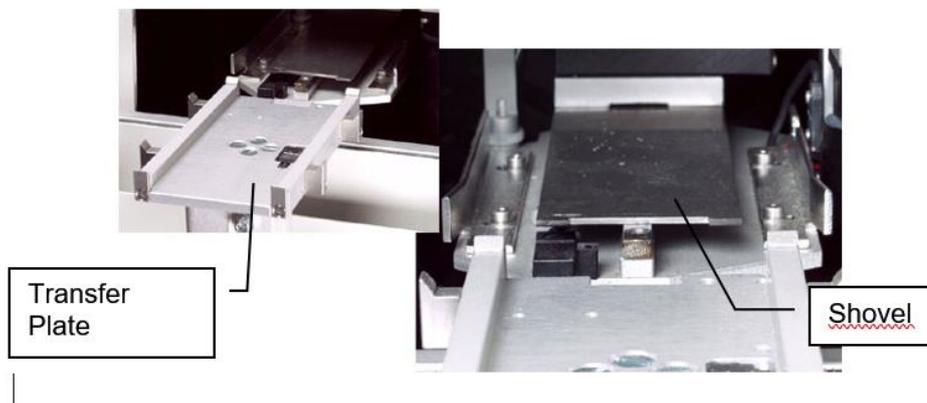
**6.3. Trouble Shooting**

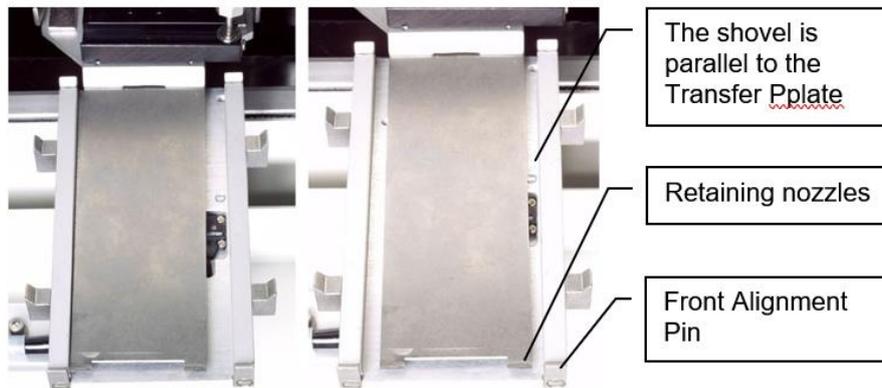
**6.3.1. Trouble Shooting Guide**

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 4.4.2.1

**6.3.2. Error Recovery**

Visually inspect whether the Transfer Station is adjusted to allow unobstructed travel of the shovel into the Transfer Plate. Check both the angular and height positions of the shovel in relation to the Transfer Plate.





With the shovel extracted, you can now adjust the Transfer Station more accurately. The Transfer Plate should be parallel to the Transfer Station. The two retaining nozzles at the front of the shovel should be parallel to the front edge of the Transfer Plate and positioned behind the two front alignment pins.

## 7. Maintenance

### 7.1. 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 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.

### 7.2. 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.

#### 7.2.1. 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

#### 7.2.2. Cleaning Tasks

#### 7.2.4. Barcode Scanner



##### Laser Hazard

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.

### 7.3. Lubrication

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

#### 7.3.1. Lubricants

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

- 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.

## 8. Repair

There are no Repair tasks at Operator's level to be performed on the LPX440.

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

## 9. Instrument Shut down for Storage

### 9.1. 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 LPX440 for a longer period, thoroughly clean and decontaminate the entire unit. Put a copy of the filled-out Decontamination Form with the instrument.

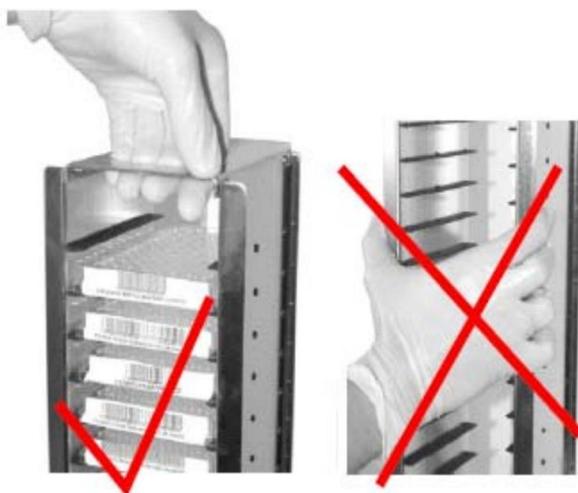
### 9.2. Storage

LiCONiC recommends to store the instrument in its original packaging. For environmental conditions during instrument storage see Section 1.2 Specifications.

## 10. Packing and Transport

### 10.1. Packing

#### Carrying 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. 20 kg / 44 lbs.



#### WARNING !

Never lift the LPX440 by the Handler Hood or Rotating Plate as this would cause damage to critical parts.

#### Repacking to prevent damage in transport

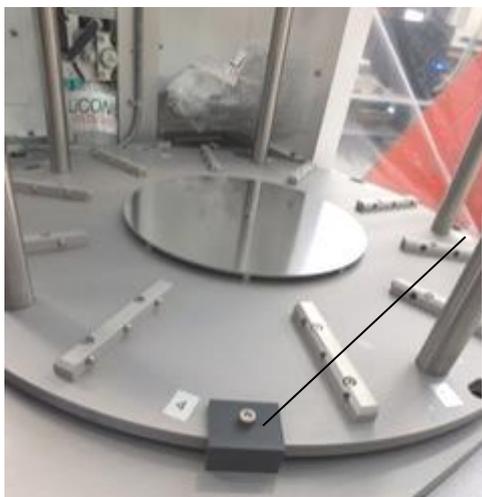
The instrument packaging has been carefully designed to prevent damage during shipping. Faulty packaging might cause instrument damage.



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



Secure and pack handling



Secure turntable

Support the lift column with Etafon on the cover

(1x center, 1x top)



Wrap LPX with plastic and place on wooden floor



3 Screw on the wooden walls

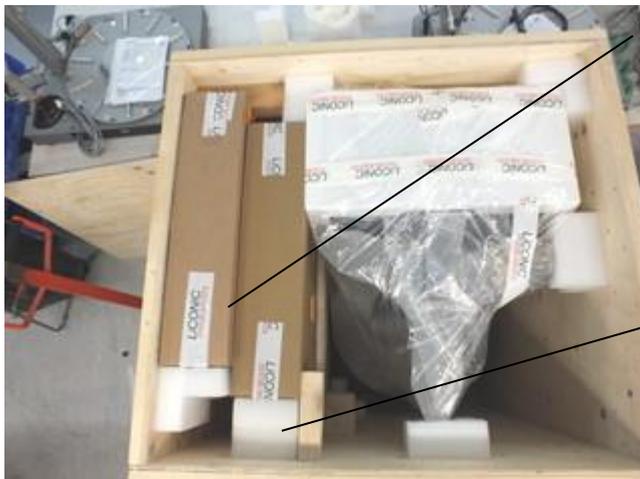
Secure LPX in the corners with Etafon angle brackets. Use wooden blocks on one side



Adjust and glue in the etafon angle to secure the turntable



Store wrapped cassettes safely in a box



Secure cassettes

Papers, cables and X-Fer in separate cassette box

Screw on the lid

Screw on the last side panel;  
adjust and glue in the  
etafon angle to secure the  
turntable