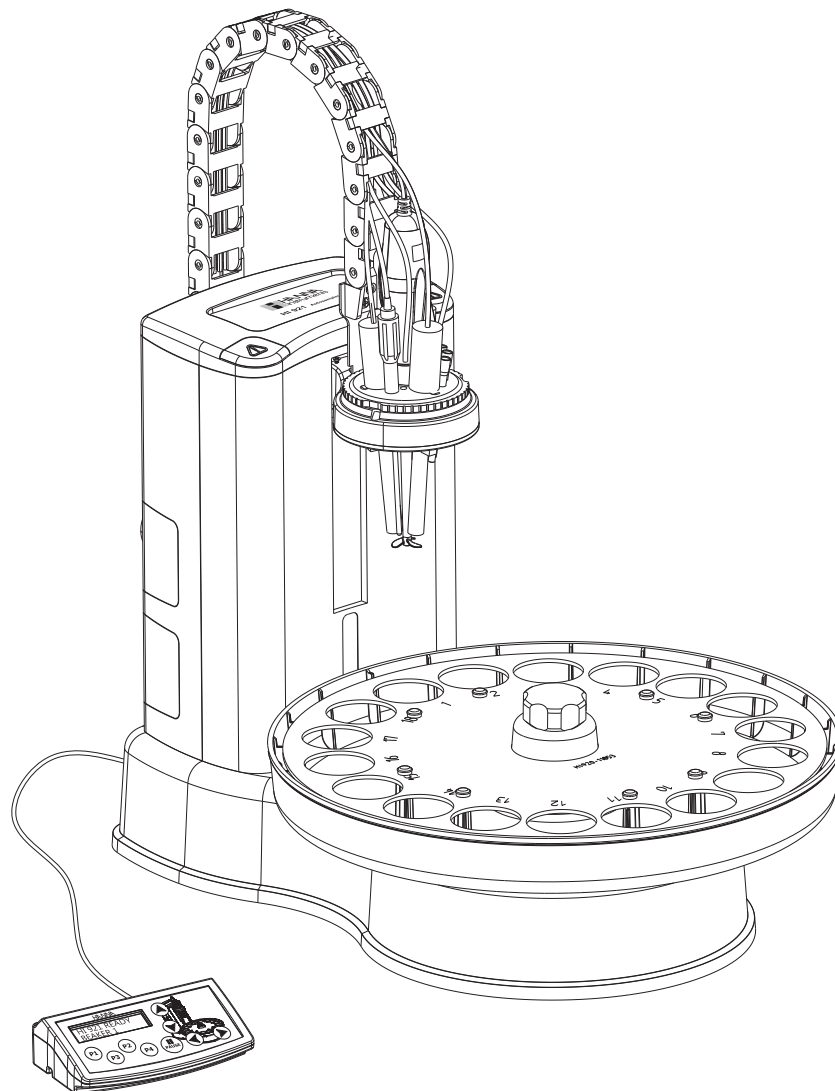

INSTRUCTION MANUAL

HI 921 AUTOSAMPLER

Revision 1.1



 **HANNA**[®]
instruments

www.hannainst.com

Dear customer,

Congratulations on choosing a Hanna Instruments product.

This manual has been written for the **HI 921** Autosampler.

Please read this Instruction Manual carefully before setting up the autosampler. This manual will provide you with the necessary information to correctly set up the autosampler.

For information on the autosampler functionality see Chapter 12 in the **HI 902** Potentiometric Titrator Manual.

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INTRODUCTION

The **HI 921** Autosampler is designed to automate a wide variety of potentiometric titrations in conjunction with the **HI 902C** Automatic Titrator. The **HI 921** allows users to perform high speed analysis while obtaining accurate results with minimal user interference.

Sequence reports and individual titration reports can be transferred to a PC via a USB interface, saved to a USB storage device or printed directly from the Titrator.

A barcode reader, balance, external monitor and keyboard can be attached for added convenience.

UNPACKING

The autosampler and the accessories are shipped in a single box containing:

ITEM	QUANTITY
1. Autosampler	1 pc.
2. Control Panel	1 pc.
3. Tray Locking Screw	1 pc.
4. Titrant dispensing tube	1 pc.
5. Electrode Holder	1 pc.
6. Communication cable	1 pc.
7. BNC cable	1 pc.
8. Temperature Sensor	1 pc.
9. USB Memory Stick (HI 902 Software Update included)	1 pc.
10. Quick Start	1 pc.
11. Quality Certificate	1 pc.

See Autosampler Components on page 19 for pictures.

If any of the items are missing or damaged, please contact your sales representative.

NOTE: Save all packing materials until you are sure that the instrument functions correctly. Any damaged or defective items must be returned in their original packing materials together with the supplied accessories.

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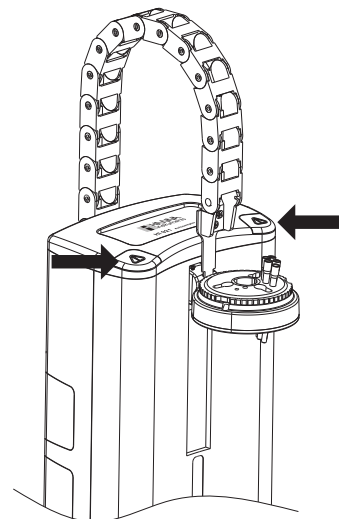
SAFETY MEASURES

The following safety measures must be followed:

1. Never connect or disconnect the pumps assemblies from the Autosampler and Titrator when they are turned on.
2. Verify that the pumps and the attached tubing are assembled correctly.
3. Always check that the reagent and waste bottles are placed on a flat, stable surface and the titration beakers are placed in the tray.
4. Always wipe up spills and splashes immediately.
5. Avoid the following environmental working conditions:
 - Severe vibrations
 - Direct sunlight
 - Atmospheric relative humidity above 95% non-condensing
 - Environment temperatures below 10°C and above 40°C
 - Explosion hazards
6. Have the Autosampler serviced by qualified service personnel only.
7. Keep hands and objects clear of moving parts during operation.

In an emergency situation, the Autosampler can be stopped immediately by pressing either of the illuminated Emergency Stop buttons located at the top corners of the Autosampler tower. This action will immediately deactivate motors and pumps.

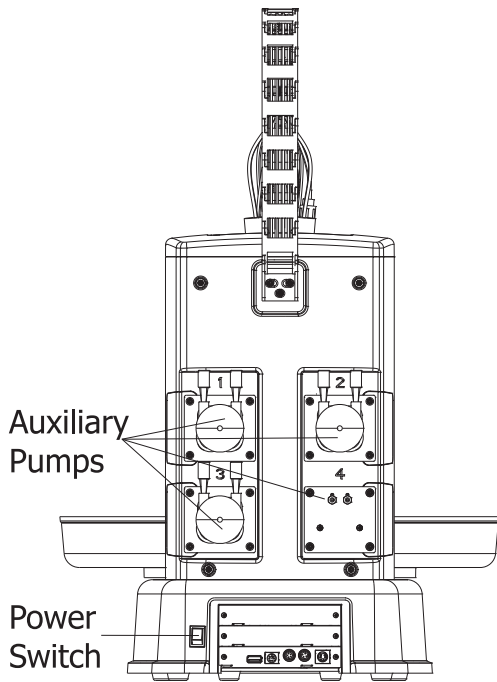
To reset the emergency stop, press and hold both emergency buttons for five seconds until the status lights turn from red to yellow to green.



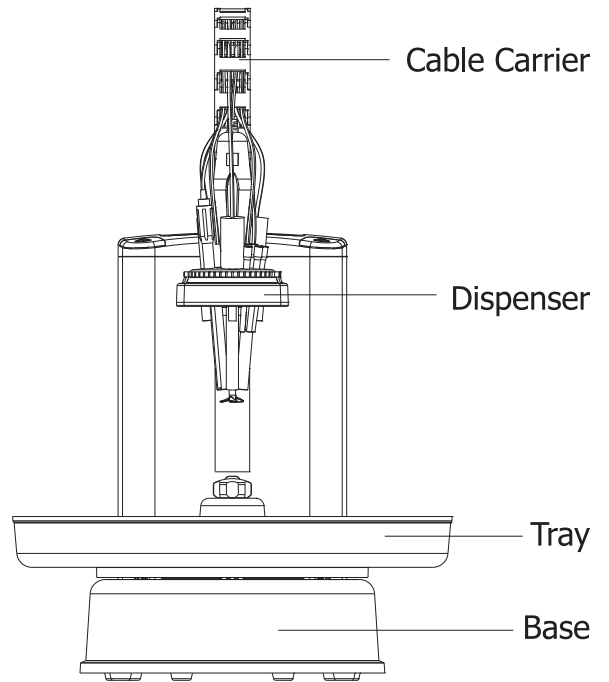
INSTRUCTION MANUAL

INSTALLATION DIAGRAM

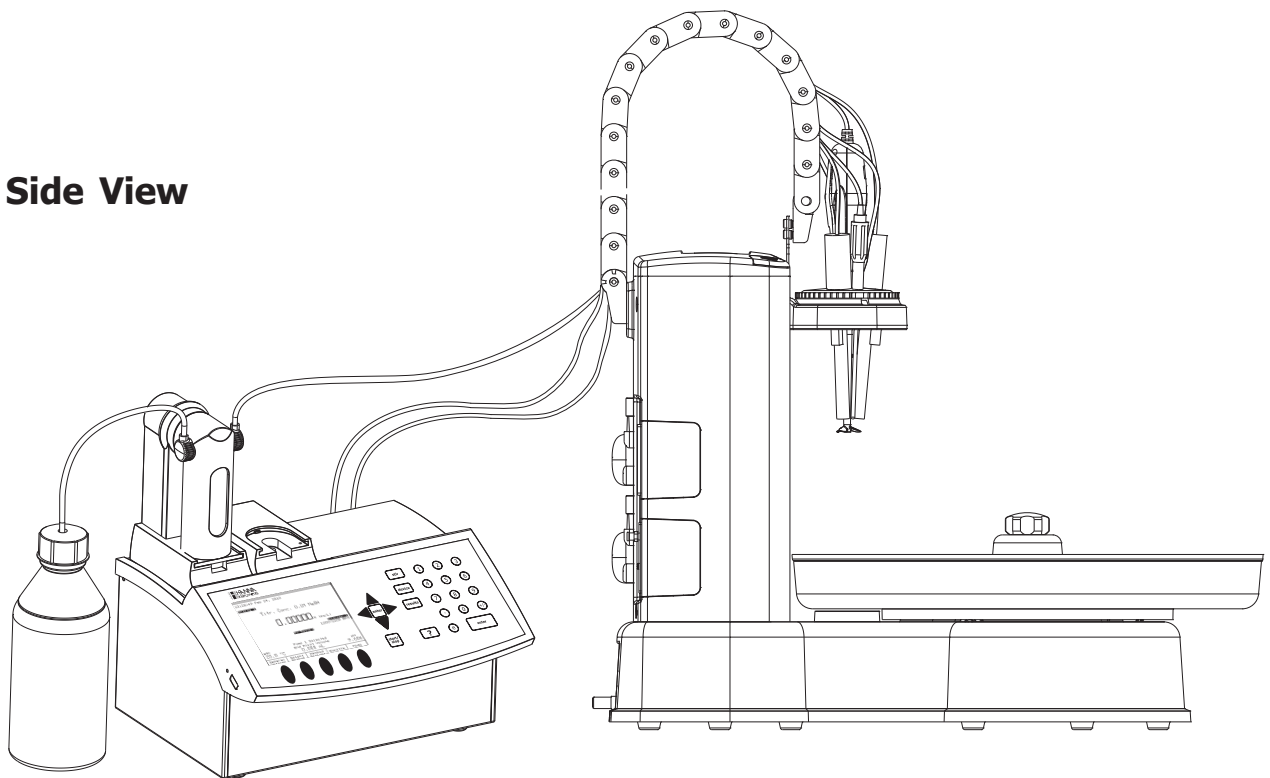
Rear View



Front View



Side View



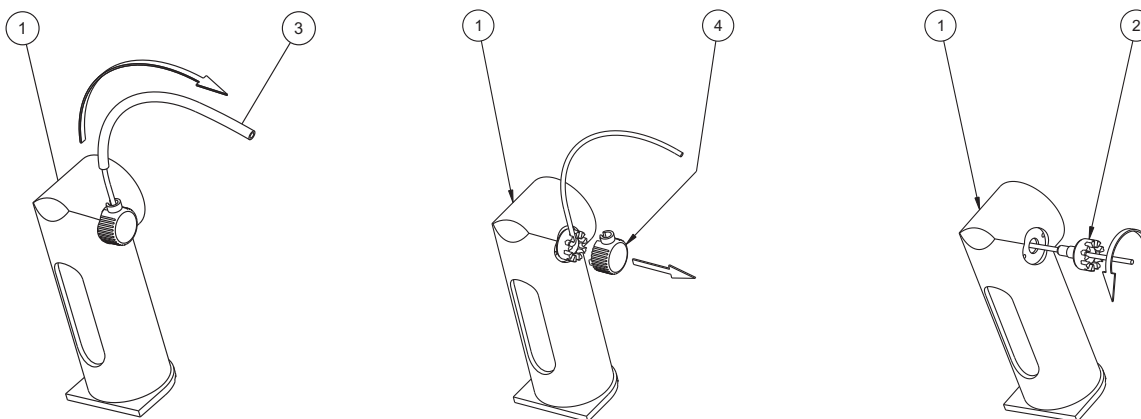
SETUP

1. Install the Burette Dispensing Tube

The dispensing tube is mounted on the right side of the burette. This tube needs to be replaced with a longer one in order to reach the Autosampler.

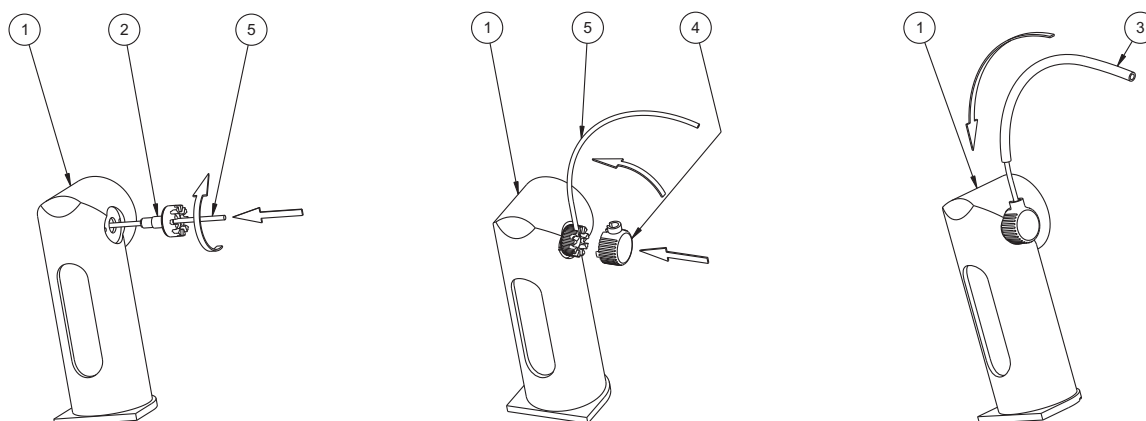
To remove the dispensing tube follow these steps:

- Slide up the tube protector (3).
- Remove the tube lock (4) from the burette holder.
- Unscrew the fitting (2).
- Remove the tube.



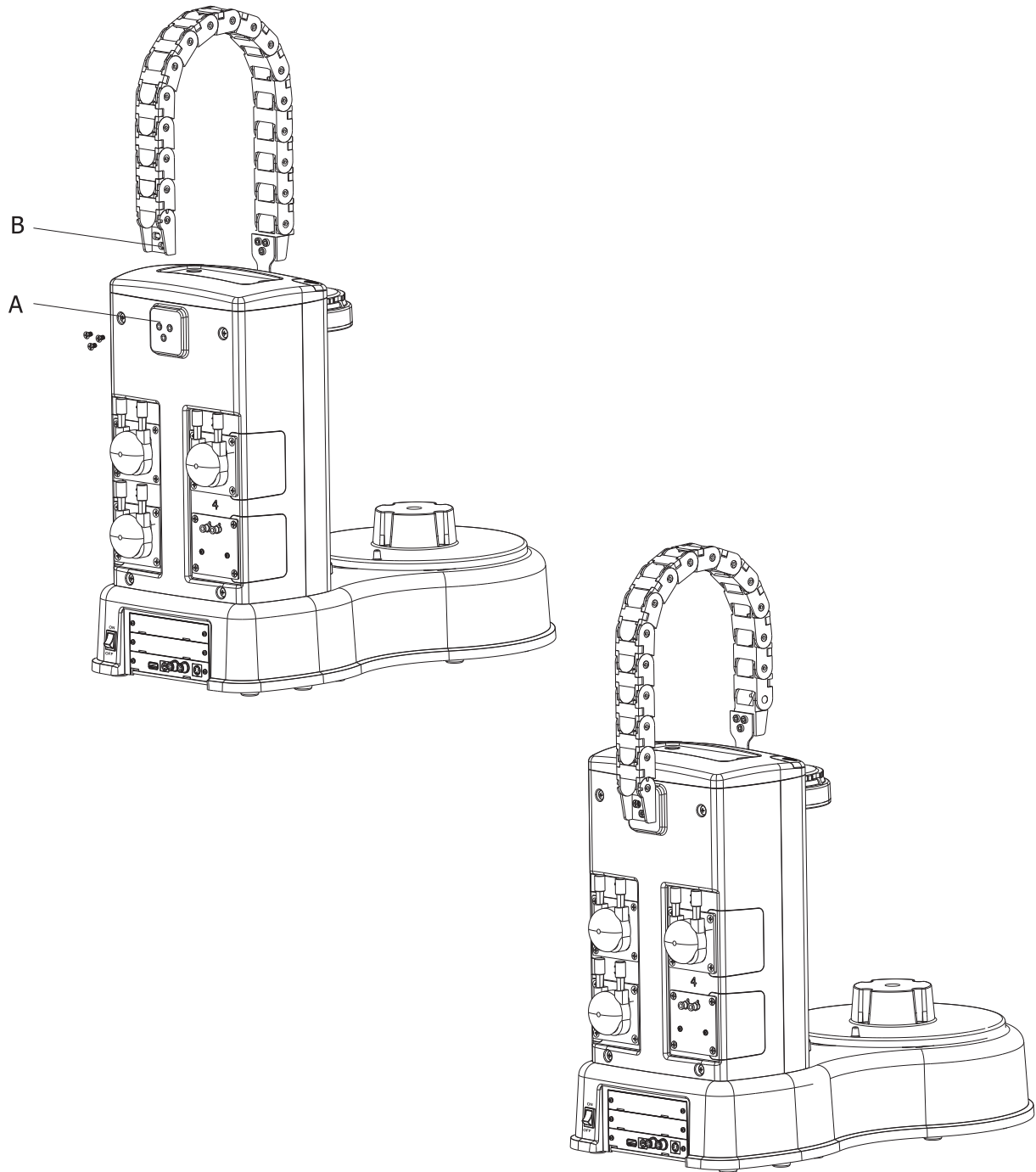
To attach the new dispensing tube follow these steps:

- Insert the flat-shaped end of the dispensing tube into the valve outlet, and screw in the fitting so that the highest of its 9 cuts stays vertically in the final position (2).
- Bend the tube up into the vertical position to enter the highest cut of the fitting (5).
- Put on the tube lock on the fitting (4).
- Slide down tightly the tube protector (3) into the dedicated gap of the tube lock.



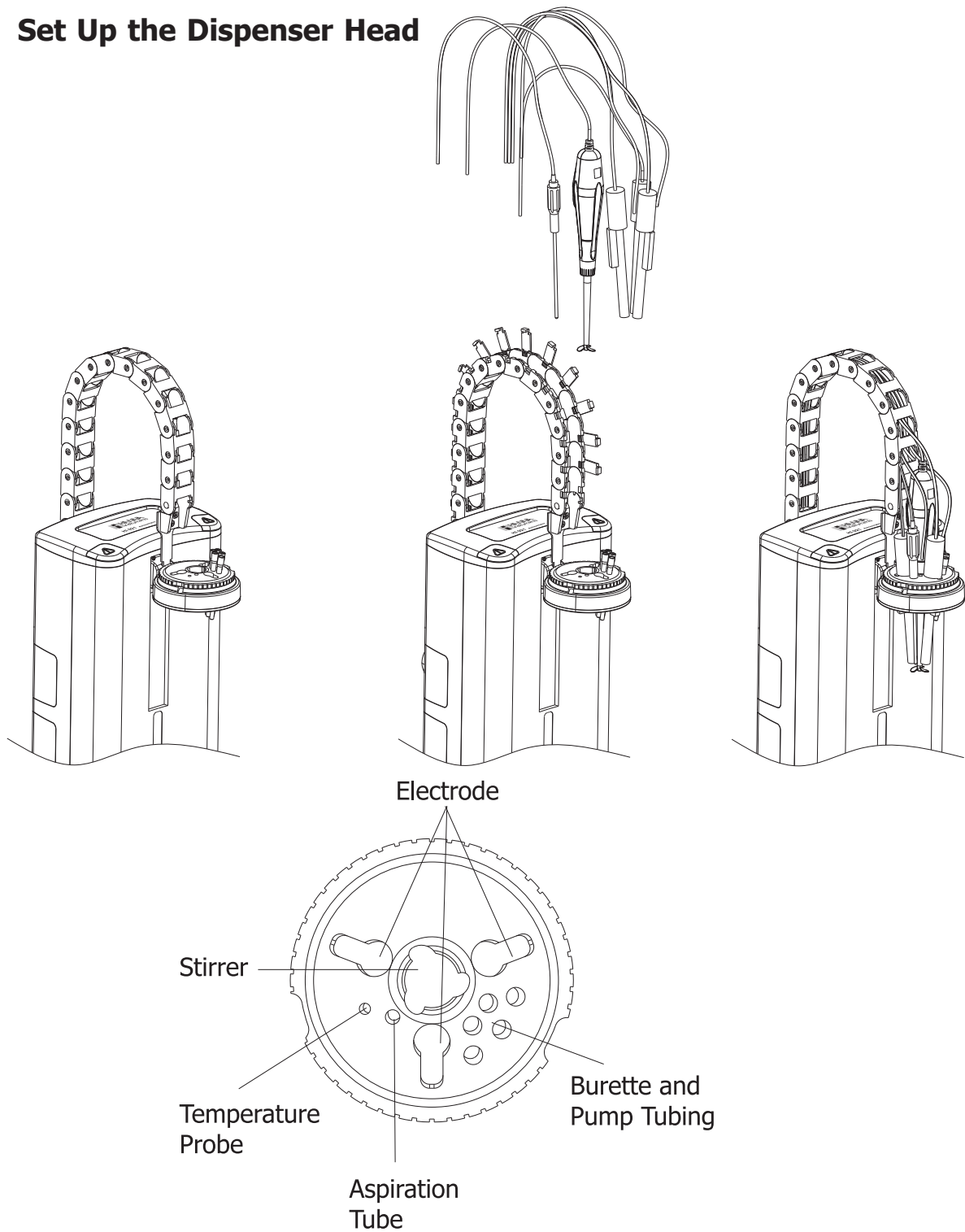
2. Attach the Cable Carrier

To attach the cable carrier remove the three (3) screws from the top rear panel (A). Align the screw holes on the cable carrier (B) to the rear panel and replace the screws.



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3. Set Up the Dispenser Head



- Insert electrode, temperature sensor, stirrer, and aspiration tube (optional) into the dedicated holes in the electrode holder. Push them down until they are in a stable position.
- Insert burette and auxiliary tubing into the appropriate holders.
- Close clips on cable carrier once all cables and tubing are run.

4. Connect the Pump Tubes

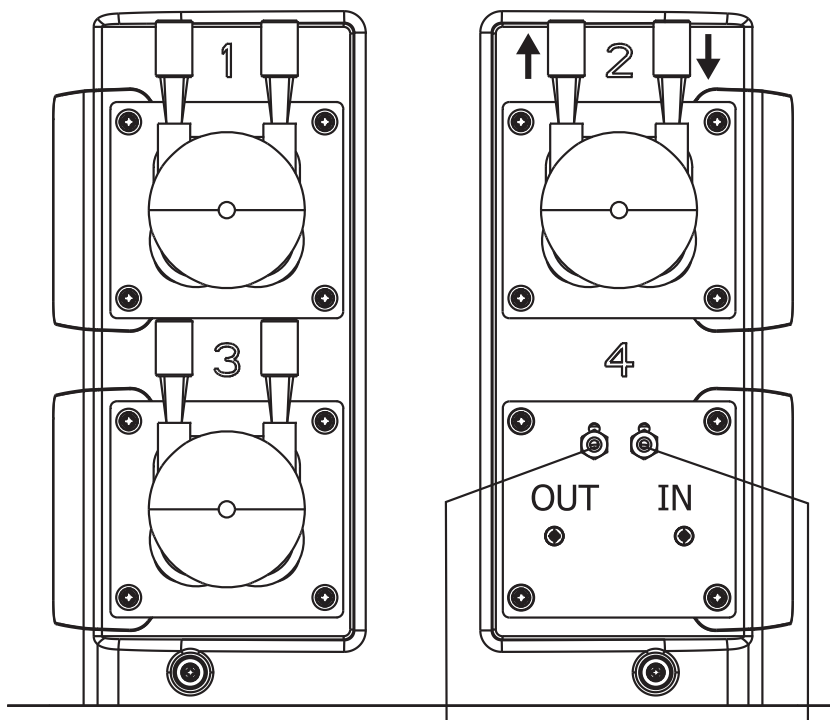
PERISTALTIC PUMPS

Addition Operation:

To dispenser head To reagent container

Aspiration Operation:

To waste container To dispenser head

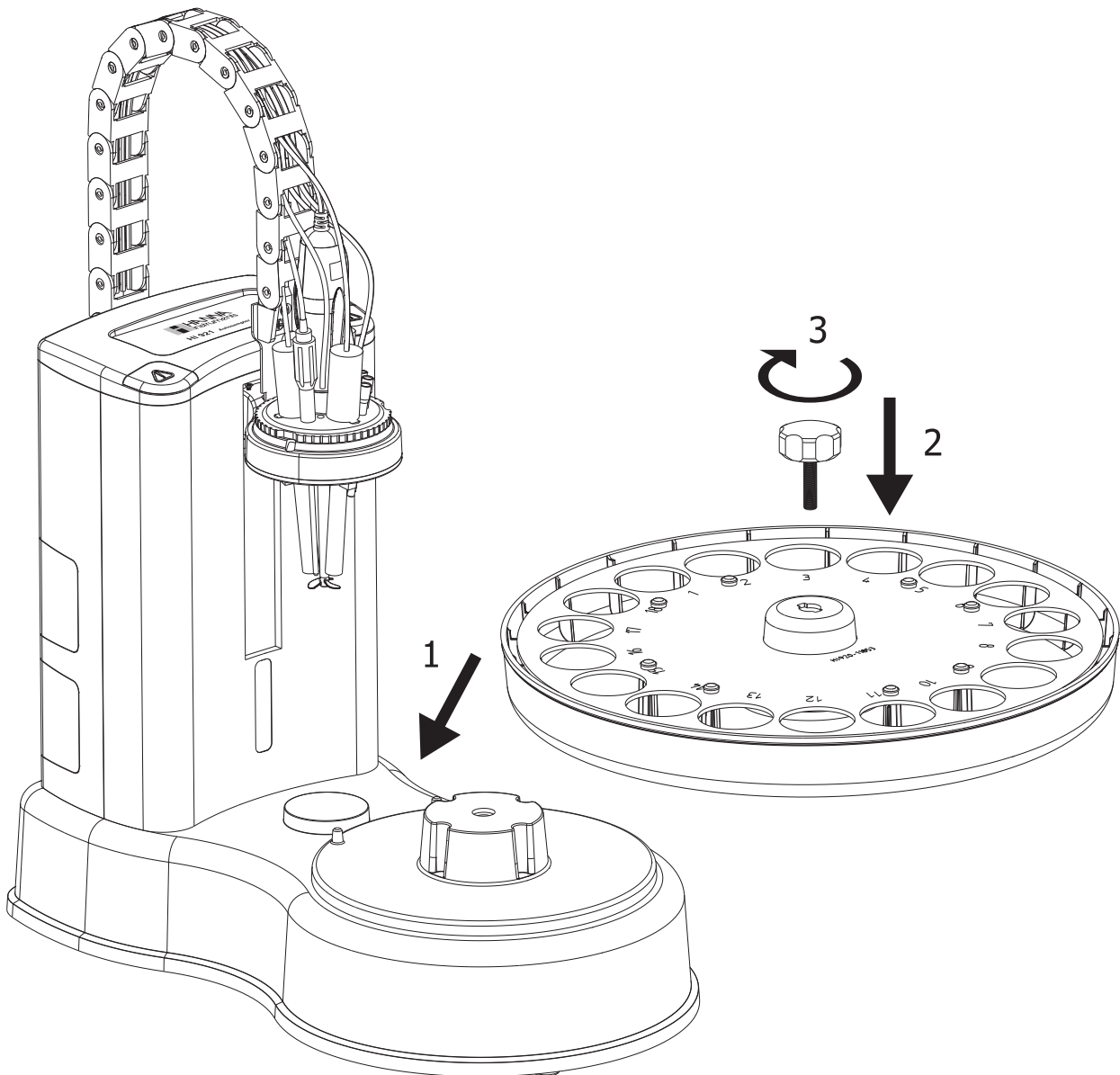


To dispenser head

To deionized water

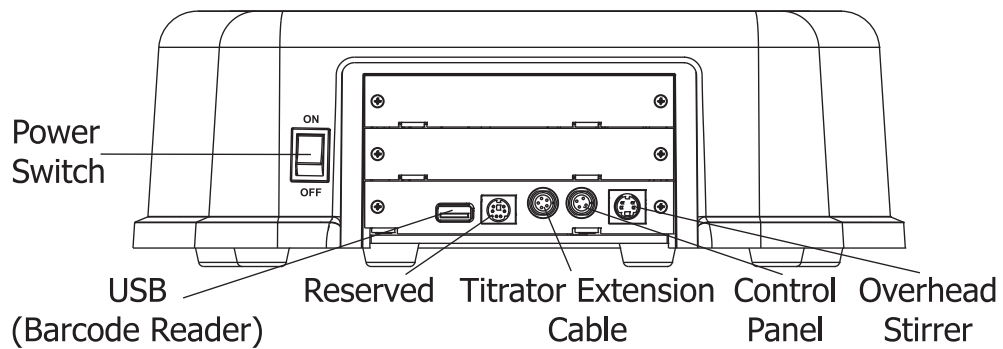
MEMBRANE PUMP

5. Install the Tray



- Place the tray on the turntable with Beaker 1 under the dispenser. Make sure the turntable mounting pins are aligned with the tray.
- Lock the tray in place with the locking screw. Do not over-tighten the locking screw!

6. Electrical Connections



- Connect the **HI 902C** titrator to the 5-pin threaded connector.
- Connect the control panel to the 4-pin threaded connector.
- Connect the overhead stirrer (optional) to the 4-pin mini-DIN connector.
- Connect a USB barcode reader (optional) to the USB slot.

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OPERATION

Status Lights

The status light serve as a visual indication of the current state of the Autosampler:

Green (steady): Idle, ready for commands.

Green (flashing): Running.

Yellow (steady): Firmware is updating.

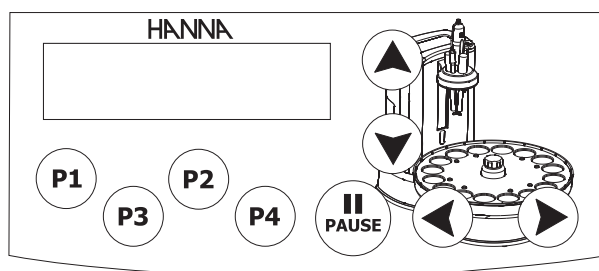
Yellow (flashing): Paused, waiting for user action.

Red (flashing): Error.

Red (steady): Firmware corrupted. Autosampler initializing (first 3 seconds after power on).

Control Panel

The control panel displays the current status of the Autosampler and can be used to manually control the Autosampler while it is idle (green steady status lights).



▲ / ▼: Move the dispenser head up/down.

◀ / ▶: Rotate the turntable clockwise/counter clockwise.

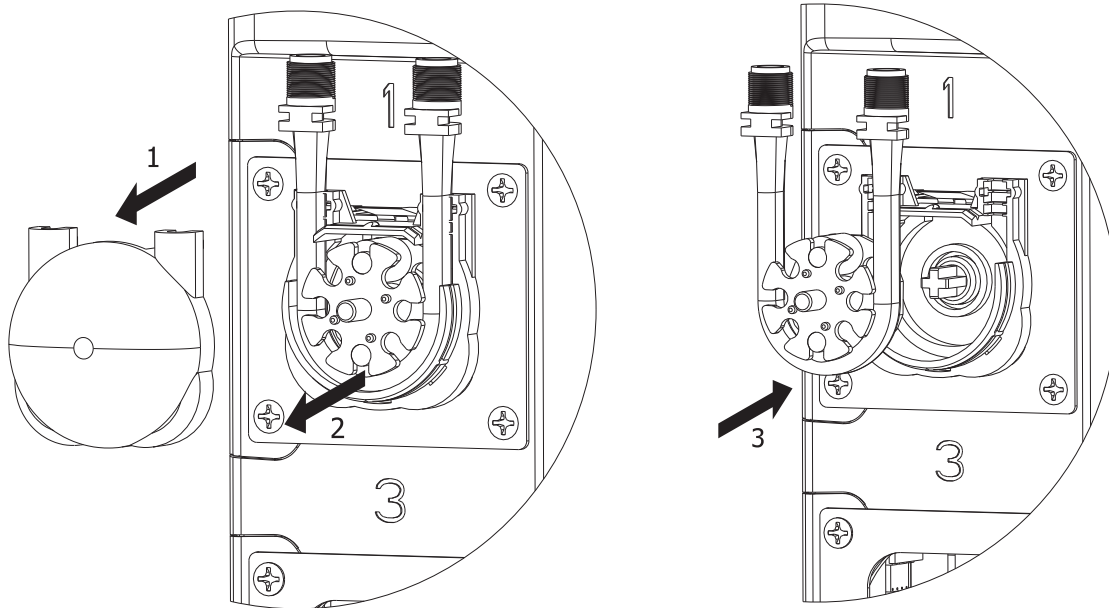
P1 - P4: Power the auxiliary pumps.

||
PAUSE: Suspends/resumes automatic mode.

MAINTENANCE

Replacing Peristaltic Pump Tubing

Peristaltic pump tubing wears over time and will occasionally require replacement. To replace tubing:

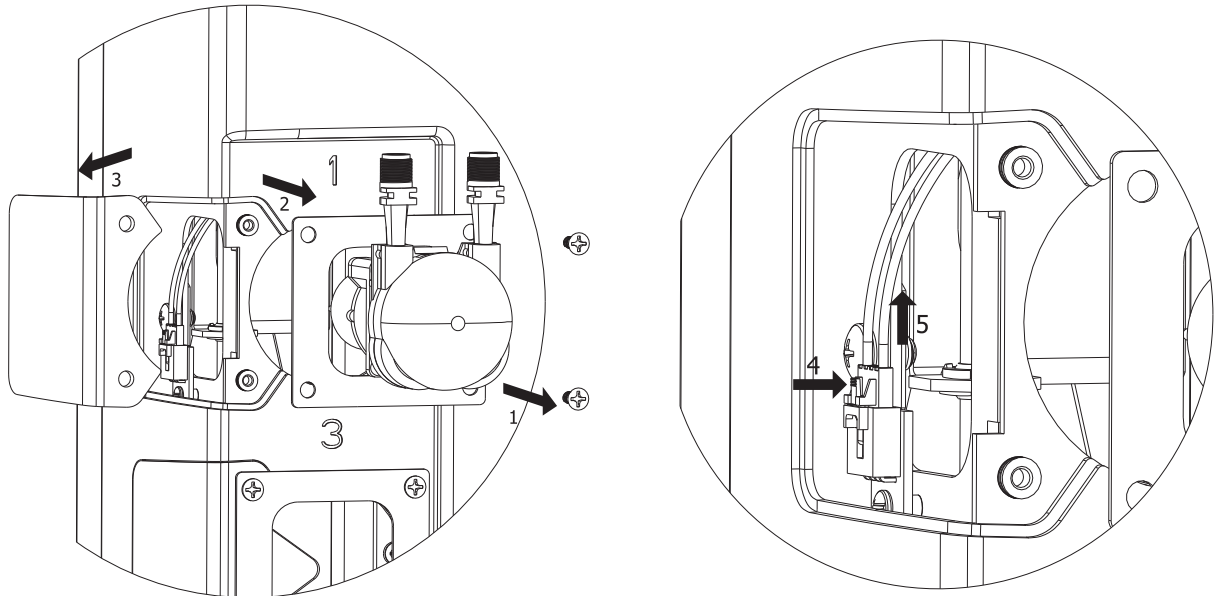


- Pull the clear plastic cover off of the pump (1).
- Remove the plastic rotor and tubing (2).
- Thoroughly grease the outside of the replacement tube and the rollers of the rotor.
- Wrap the replacement tubing around the rotor and press into the pump housing (3). The tubing in contact with the rollers will need to be compressed with a finger in order to fit in the housing.
- Replace the clear plastic cover.

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WARNING! Turn off the Autosampler and disconnect from the Titrator before adding or removing pumps! Failure to do so could cause damage to the pump and/or Autosampler.

Removing a Pump



- Remove the 4 screws holding the pump in the Autosampler tower (1).
- Pull the pump out (2) of the tower slightly so that the pump's side cover can be removed (3).
- Disconnect the pump electrical connection by holding down the connector release tab (4) while pulling the connector away from the circuit board (5).
- Pull the pump out of the Autosampler tower.
- If the pump bay is no longer being used, replace the side and back covers and fasten with the 4 screws.

Adding a Pump

Peristaltic pumps can only be connected to bay #1, #2, and #3. Membrane pump can only be connected to bay #4.

- Remove the 4 screws holding side and rear covers of the pump bay.
- Insert the pump into the rear of the Autosampler tower.
- Once in the tower, pull the pump electrical connector out of the side of the tower. Push the connector into the circuit board with the push-tab facing the outside of the tower.
- Replace the side cover. You will need to pull the pump out of the tower slightly.
- Fasten the pump in place with 4 screws.

Upgrading Firmware

The **HI 921** firmware can be upgraded via the USB connector. The current firmware version is displayed on the control panel during boot-up and on the Autosampler Information screen. To upgrade the firmware:

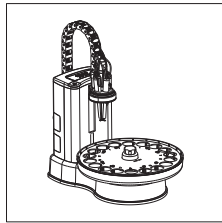
1. Load the upgrade file into the root directory of a flash drive. Firmware files are named with the format "921v####.hex".
2. Power off the **HI 921** Autosampler using the power switch, but leave the cable connected to the **HI 902** Titrator.
3. Insert the USB flash drive with upgrade file in the **HI 921** USB slot.
4. While holding down both emergency stop buttons, turn on the **HI 921** Autosampler. Keep the buttons pressed until the status lights turn yellow. The control panel should display the message "Upgrading FW, please wait...". After this message appears, release the buttons and wait upgrading operation to completed.
5. When the upgrade is complete, the status lights will turn green and the control panel will display "Upgrade Complete". Remove the USB flash drive.

INSTRUCTION MANUAL

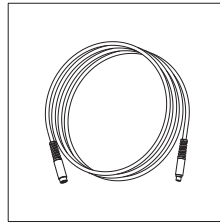
TECHNICAL SPECIFICATIONS

Electrode Holder Slots	3 x 12-mm Electrodes Slots 1 Temperature Sensor Slot 1 Aspiration Tube Slot 5 Multi - purpose Slots (titrant/reagent tubes) 1 Overhead Stirrer Slot
Temperature Sensor	HI 7662-A (Included)
Stirrer	Magnetic Stirrer (Built in) Overhead Propeller Stirrer (optional)
Peristaltic Pumps	Up to 3 (Slots 1, 2 & 3)
Diaphragm Pump	One (Slot #4)
Peripheral Units	USB Barcode Reader
Trays	16 beakers x 150 mL with Built-in RFID 18 beakers x 100 mL with Built-in RFID
Beakers	ASTM short-form glass beakers, 100 & 150 mL HI 920-060 (150 mL), Plastic beakers HI 920-053 (100 mL), Plastic beakers
Control Panel	Buttons for manual operation of tray Manual operation of peristaltic or diaphragm pumps 2-line backlit display with status information
Enclosure Material	ABS plastic and steel
Electrode Holder Material	PVC
Tray Material	ABS plastic and acrylic
Keypad Material	ABS plastic and polycarbonate
Dimensions	with tray 438 x 356 x 438 (Width x Depth x Height)
Weight	approx. 20 lbs (9 kg)
Operating Environment	10 to 40°C, up to 95% relative humidity
Storage Environment	-20 to 70°C, up to 95% relative humidity

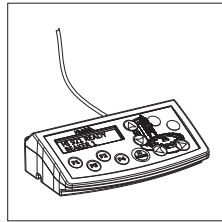
AUTOSAMPLER COMPONENTS



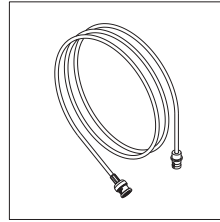
Autosampler
HI 921 - XY



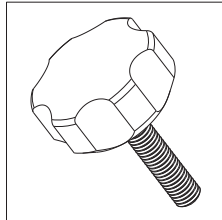
Communication Cable
HI 920-930



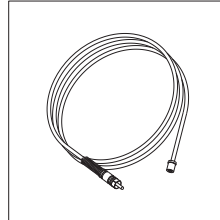
Control Panel
HI 920-921



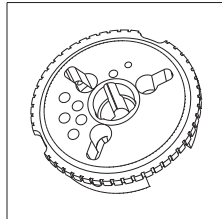
BNC Extension Cable (1 m)
HI 920-931



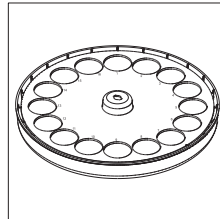
Tray Locking Screw
HI 920-960



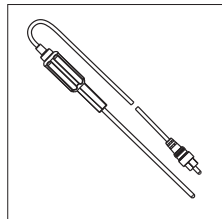
Reference Extension Cable
(1 m)
HI 920-932



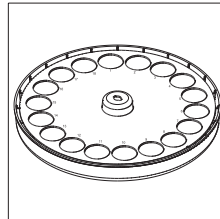
Electrode Holder
HI 920-310



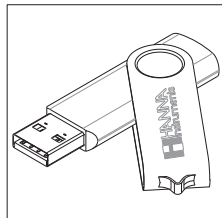
16 Beaker Tray, 60 mm dia.
Single Row with RFID
HI 920-11660



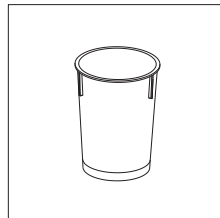
Temperature Sensor
HI 7662-A



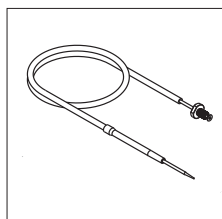
18 Beaker Tray, 53 mm dia.
Single Row with RFID
HI 920-11853



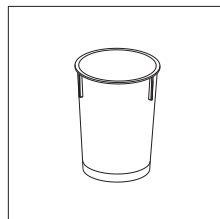
USB Memory Stick
HI 920-900



Plastic Beaker for
HI 920-11660 (20 pcs.)
HI 920-060

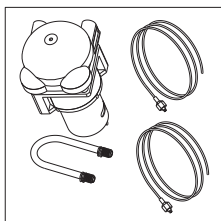


Titrant Dispensing Tube
(1.5 m)
HI 920-280

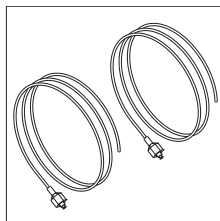


Plastic Beaker for
HI 920-11853 (20 pcs.)
HI 920-053

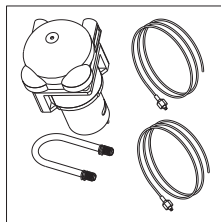
INSTRUCTION MANUAL



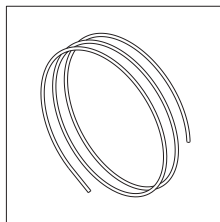
Persitaltic Pump with
dispensing tubing
HI 920-101



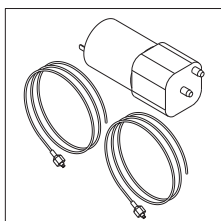
Membrane Pump Complete
Tubing Set
HI 920-212



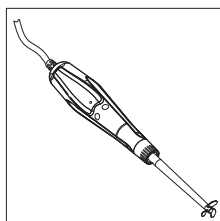
Persitaltic Pump with
aspiration tubing
HI 920-102



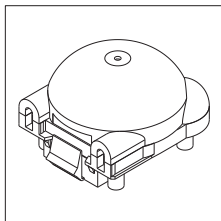
TYGON Tube (5 m)
HI 920-290



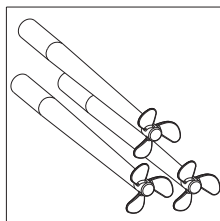
Membrane Pump with
tubing
HI 920-111



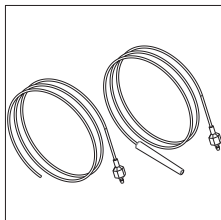
Overhead Stirrer
HI 920-301



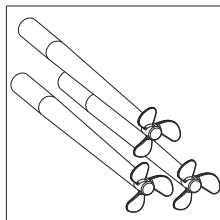
Replacement Cap and
Rotor for Peristaltic Pump
HI 920-201



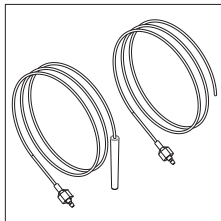
Replacement Propellers
(3 pcs.)
HI 920-302



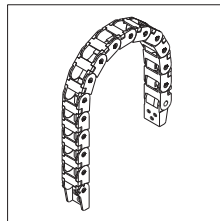
Tubing Set with plastic
dispensing tube for
peristaltic pump
HI 920-202



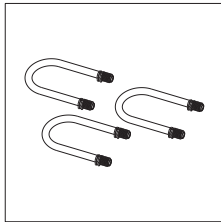
High Chemical Resistance
Propellers
(3 pcs.)
HI 920-303



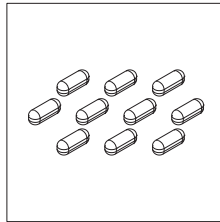
Tubing Set with stainless
steel aspiration tube for
peristaltic pump
HI 920-203



Cable Chain
HI 920-320



Roller Tube for peristaltic
pump (3 pcs.)
HI 920-204



25 mm x 7 mm Stir Bars
(10 pcs.)
HI 731319

