VARIABLE FLOW PERISTALTIC PUMPS

Model D-21V

Codes 1.9730.14, 1.9730.32, 1.9730.54 and 1.9730.08

MANUAL

May 2024

CE

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INDEX

1- GENERAL INTRODUCTION

Peristaltic pumps pump all kinds of liquid substances without coming into contact with the mechanical elements as occurs in other pumps.

They are simple to use and require minimal maintenance costs.

The pumped substance is propelled inside an elastic tube thanks to the vacuum generated by a set of rotors that successively press and release the surface of the tube.

The liquid passes directly from its container to another without any contamination, avoiding recoil when the pump is stopped since the tube is pressed by the roller.

The nature of some corrosive substances or other characteristics that prevent the use of conventional pumps make peristaltic pumps especially useful for the transfer or dispensing of such substances.

Flow rates up to 2000 ml/minute are obtained.

A large number of tubes or hoses of different sizes are available made of materials resistant to various conflicting substances.

2- PACKING LIST

Item	Code	Quantity
Peristaltic Pump D-21V	1.9730.14 or 1.9730.32 or 1.9730.54 or 1.9730.08	1
Connections set		1
Power cable		1
Instruction Manual		1

3- RECEPTION

To guarantee correct reception, use of the device, and the safety of the user, we recommend reading this manual in detail before proceeding to unpack the device and subsequent use and especially the following points:

3.1- THE MANUAL

This manual must be kept permanently within reach of the user of the equipment.

3.2- UNPACKING

Carefully unpack the device, checking that the contents match the packing list.
Immediately notify any eventuality.

3.3-EXPLOSIVE MIXTURES

Avoid using the device when there is the possibility of generating explosive gas mixtures and flammable.
The ATEX Directive is not contemplated.

3.4-RESPONSIBILITY

In accordance with European usage regulations 89/655/EEC, the lack of adequate maintenance and the alteration or change of any component, exempts the manufacturer from any responsibility for the damage that could occur.

3.5-REPAIRS

The devices to be sent to DINKO technical services *must* be **clean and disinfected.**
Otherwise, they will be rejected and returned with shipping at the expense of the owner.

3.6-SIGNS AND SYMBOLS

Pay attention at all times to the danger warning signs and symbols that will appear on this manual or on labels attached to the body of the Pump such as those shown below.

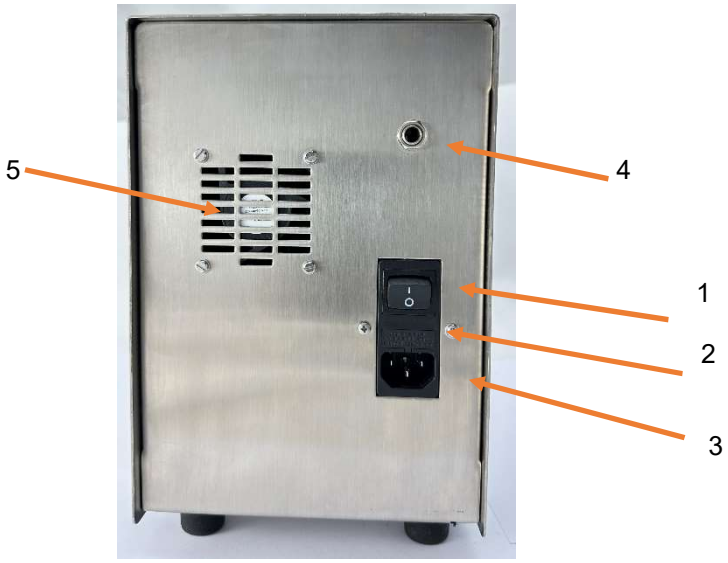
SIGN/SYMBOL	INTERPRETATION-MEANING
	Avoid contact of fingers with moving parts
	Danger-Risk-Caution
Before opening DISCONNECT the network cable Before removing cover PULL-OUT plug 	Before accessing the interior of the Pump, disconnect the power cable from the mains.
	Possible overheating - Do not touch
230V AC 50/60Hz	AC supply voltage
110V AC 60Hz	AC supply voltage
12VDC	DC supply voltage
	Disposal of waste electrical and electronic equipment by users within the European Union. It is not disposable as household waste. Deliver to the agency for recycling electronic equipment. Contact your local office, the store where you purchased the equipment or your household waste disposal service. Recycling helps conserve natural resources. Recycle protecting human health and the environment.

4- DESCRIPTION

4-1 FRONT PANEL DESCRIPTION

1- Green pilot light for network connection indicator.
2- Red pilot light operating indicator
3- Speed regulation dial potentiometer
4-Rotation direction selector ←,→ and stop.
5-Pump head

4-2 BACK PANEL DESCRIPTION



1 - Main ON/OFF switch
2 - Fuse holder box
3- Power socket
4- Voltage-free pedal input
5- Fan

5- HEAD DESCRIPTION

The D-21V peristaltic pumps in this manual have the 153N-3r head that allows easy access to the tube for extraction when it needs to be replaced.

On the easy-load 153N-3r head, simply pull up and to the left on the lever (1) located at the top right of the head to raise the top and open the head for tube replacement.

When removing the tube, slide the buttons (3) upwards to move the tube retainers. Install the new tube, ensuring that it is well centered and proceed to move the lever to the right.

Lightly coating the peristaltic tube with high-density silicone grease improves its durability.

NEVER PERFORM THIS OPERATION WITH THE EQUIPMENT RUNNING.

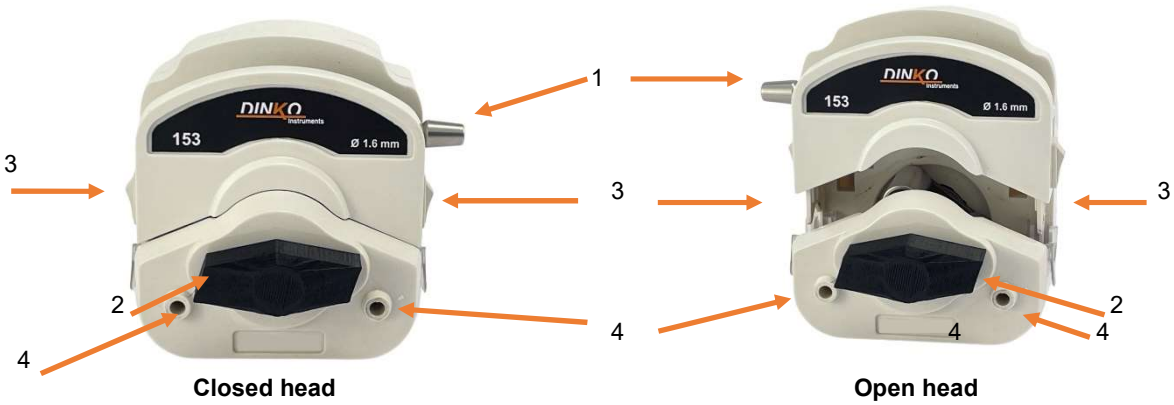
The head accepts various tube sizes which, combined with speed regulation, gives a wide variety of flows, as can be seen in the indicative flow table.

A switch on the front panel allows you to reverse the pumping direction or stop it.

On the back there is the connection for the network cable with integrated fuse holder and connection for a foot pedal or external relay.

Consult the indicative dosage table and install the appropriate tube.

5.1- HEAD 153N-3r:



Closed head **Open head**

1 - Lever to open the head
2 - Tractor axle output protector
3 - Sliding buttons for fixing the peristaltic tube
4 - Drilling holes for complementary head fixing screws

The 153N-3r head accepts another identical head on its same axis of rotation. Remove the protector 2 to face the complementary head with the shaft and insert the two assembly screws into the holes 4.

With 2 heads it is possible to cancel the typical cadence of the peristaltic flow. To do this, when locating the complementary head, the rotor rollers must be oriented in opposition to the rollers of the main head.

When the headers are used as independent channels, each one will provide the flow corresponding to the tube installed in the pump head.

If the flow is to be doubled, the two suction and discharge tubes can be installed directly in the feed and receiver containers.

The option of using a Y connection to join the tubes of both heads (1) will allow the cancellation of the peristaltic pulse. It must be remembered that the final discharge pipes and especially the suction pipes must be larger in diameter than the header pipe. If this is not possible, the total flow will be somewhat less than the expected theoretical amount.

The D-21V peristaltic pumps in this manual mount the 153N-3r head that allows easy access to the tube for extraction when it needs to be replaced.

6- SPECIFICATIONS

6.1 Dimensions: 165 x305 x 240mm. Width x depth x height.

Weight: 7 Kg.
Operation: 100…230V 50/60Hz. 1Amp. Portable model: 12V DC / 100…240V 50/60Hz AC

6.2 FLOW TABLE - Indicative regulation intervals for each tube, ml/min

Code ▼	Pump head	rpm	0.5	0.8	1.6	3.2	4.0	4.8	6.4	8.0	◄ Tube Ø mm
1.9730.32	153-3r	330	0.5-8.5	1.5-20	8.0-85	20-330	*	56-700	80-1050	175-1300	Flow rate ml/min
1.9730.08+											
1.9730.54	153-3r	500●	0.7-12	2-29	12-120	29-470	*	8-1000	115-1500	250-2000	
1.9730.14	153-3r	110	0.2-2.8	0.5-6.5	2.6-28	6-110	*	18-233	26-350	58-430	

* Values not determined ● Brushless motor. + Portable model with transport handle, battery 12V DC, charger, and connector for car battery.
The indicated flows are approximate and refer to liquids with a viscosity similar to water under normal conditions and without outlet back pressure.

7- START UP

Make sure that the mains voltage is 100…230V DC and place the main switch in the OFF position.

Connect the power cable to the rear plug and to the mains.

Consult the indicative flow table and install the appropriate tube.

See tips in the section on Changing tubes and Description of pumps heads.

Choose the speed by using the unit and tens buttons on the regulator potentiometer.

Place the ends of the peristaltic tube in loading and unloading.
Press ON.

7 .1 Engine speed limitation

Because the friction of the tubes with the rollers increases with the diameter of the tubes, the minimum adjustable speed increases with the tube diameter.

It is not advisable to use the lowest adjustable speed observed, even if the motor starts, since at any moment it can stop and cause the regulation circuit to overheat, which could break down if it remains in this situation for a long time. Choose a speed slightly higher than the minimum observed. Lightly smearing the tubes with silicone grease favors starting at lower revolutions and prolongs their life. Silicone grease, 50g. Code 8.0030.03

In installations for processes or assemblies that include a *DINKO Pump* , they must not be put into service before verifying that the safety standards of the European Machinery Directive 2006/42/EC are met!

8- CHANGE OF TUBES

Press the OFF switch. Extract the tube according to the instructions described in the “153N-3r head description” section of this manual.

When the new tube is installed, it must be centered over the rollers to prevent the rotor from pinching it.

Check that the pump is OFF.

On the sides of the head where the peristaltic tube enters and exits there is a sliding button that acts on the tube fixators. Slide the button to release or hold the tube. Releasing the button will restore the position by itself.

In general, new tubes can lengthen during the first 30 minutes of operation. If this occurs, they must be tightened again to avoid unexpected breakage. To detect the elongation of the tube to the head, it is useful to conveniently mark the tube with a marker**.**

The pump feed and discharge tubes can have any wall thickness, but not the tube that is installed in the pump head, whose wall must be 1.6mm.

The silicone tubes supplied with each pump are medical/food grade according to FDA and USP standards, autoclavable at 120º C, with peristaltic use range up to 80º C and medium duration.

Other materials available are:

The most mechanically resistant tubes are PHARMA, TYGON A-60-G ® and the medium-durable ones are SILICONE and VITON ®.

However, durability also depends largely on the chemical nature of the pumped liquid, the pressure, the existing temperature and, of course, the motor revolutions.

Proper choice of tube inner diameter avoids the demand for higher revolutions of the peristaltic pump motor with a small diameter tube and decreased tube life.

9- AVAILABLE MATERIALS:

PHARMA
Autoclavable multiple times.
Sterilizable by ETO and Gamma**.**
Food-medical grade, USP class VI, 21CFR 177.2600 and FDA. Not hemolytic.
Excellent resistance to chemicals.
ISO 10993. Low permeability and good abrasion resistance.
Long duration.
Use temperature, -51ºC to 132ºC .
Beige.

SILICONE
Autoclavable .
The most versatile tube. Platinum Cure quality silicone .
Average duration.
Medical/Food Grade. Excellent biocompatibility.
Maximum temperature. 140ºC.
Translucent.

TYGON A-60-C ®
Autoclavable multiple times.
Food grade.
Long duration.
Resistant to acids, alkalis, oxidizing agents.
Use temperature: -59ºC to 135ºC.
Beige.

TYGON A-60-G ®
Autoclavable
Compatible with Ozone, UV light and disinfectants.
Great resistance to fatigue and abrasion.
Resistant to acids, alkalis and alcohols.
Use temperature -59ºC to 135ºC.
Black color.

VITON ®
Autoclavable
Suitable for acids and non- acetonic solvents .
Maximum temperature 300ºC.
Black color.

Important: The head tubes should be lightly greased with silicone grease to extend their life and facilitate starting at low rpm.

Silicone Grease, 50 g for lubricating peristaltic tubes. Code 8.0030.03

Consult the table of Chemical incompatibilities between the type of rubber in the tubes and the substances pumped on our website www.dinko.es

10- ORDERING INFORMATION

Code ▼	Motor-rpm	Head	Article
1.9730.54	500●	153-3r	Peristaltic Pump with pump head
1.9730.32	330		Peristaltic Pump with pump head
1.9730.08+			Peristaltic Pump with pump head
1.9730.14	110		Peristaltic Pump with pump head

● Brushless motor. Portable model 12V DC/100…230V 50/60Hz AC with battery, charger and connector for car battery

11- MAINTENANCE-SPARE PARTS

Before any examination or repair of the device, it is necessary to disconnect the mains socket.
All initiatives must be carried out by qualified personnel to avoid greater harm.

Entrust your device to a technical service authorized by *DINKO Instruments.*

The engine and its block do not require lubrication, so they do not have maintenance.
The rotor bearings are self-lubricating, but it is advisable to lubricate them lightly with silicone grease ref. 8.0030.03 or similar from time to time next to the rollers or the head opening lever and its guides, especially if they have been washed.
See Figure.

The head tube must be replaced periodically in a systematic manner to avoid the inconvenience of breaking it while the pump is in full operation.

Code	Spare parts
1.0066.17	Battery T-pack Ion-Lithium 14.8V DC.
1.0066.18	Charger 12.6V DC.
Ask	Connector for car battery.
1.0077.38	Control driver for 500rpm motor.
1.9740.01	Foot switch.
1.0063.30	Main control circuit.
1.0077.37	Motor for pump head 153-3r, 500rpm. Brushless motor.
1.0080.01	Motor for pump head 153-3r, 330rpm.
1.0080.13	Motor for pump head 153-3r, 110rpm.
1.8093.21	Power supply 100-24.
1.0078.63	Pump head 153N-3r
1.0078.60	Pump head 153N-3r, middle

Calibrated tube codes 1.6mm WT, 1 meter

Tube ID	0,5mm	0,8mm	1,6mm	3,2mm	4,0mm	4,8mm	6,4mm	8,0mm
PHARMA		1.8801.08	1.8801.16	1.8801.32		1.8801.48	1.8801.64	1.8801.80
Tygon A-60-C ®			1.8740.16	1.8740.32				
Tygon A-60-G ®			1.8750.16			1.8750.48	1.8750.64	1.8750.80
Silicone	1.8760.05	1.8760.08	1.8760.16	1.8760.32	1.8760.40	1.8760.48	1.8760.64	1.8760.80
Tygon L®			1.8770.16	1.8770.32		1.8770.48	1.8770.64	1.8770.80
Viton®		1.8790.08	1.8790.16	1.8790.32		1.8790.48	1.8790.64	1.8790.80

Figure 2 shows the connectors used for connections corresponding to 0.5- and 0.8-mm internal diameter tubes in the 153N-3r head.

Figure 2

Stainless steel capillary tube connector for 0.5mm tube. Code 1.0077.23*
Stainless steel capillary tube connector for 0.8mm tube. Code 1.0077.26*
*Bag of 10 units

12- ACCESSORIES

12.1 Scale for calibration of flow rates and dosages

Reproducibility 0.1 g. Capacity 600g. Code 8.9812.02

To measure the dosed quantity in the Calibration process of peristaltic pumps, it is very effective to use a precision scale with digital reading.

If the liquid to be pumped has a density of “1” there will be no difference between grams and milliliters. Otherwise, calculate the density by weighing a quantity of the liquid with the help of a test tube, for example, 25ml, previously weighing the test tube on the balance.

Divide the weight indicated on the digital reader of the scale in grams by the milliliters contained in the test tube to obtain the density according to the relationship,

D= M / V.

There is always the option to Calibrate the pump directly based on weight instead of volume.

Characteristics:

♦ Mono digital reading plate, with highly visible backlit LCD screen.

♦ Easy use and great robustness with ABS casing and airtight, moisture-proof membrane keyboard

♦ Stainless steel plate, 157x128mm ♦ External auto calibration ♦ Measurement units: grams, pounds and ounces

♦ Continuous tare up to 600g ♦ Power supply 230V 50/60Hz ♦ Non - slip rubber feet

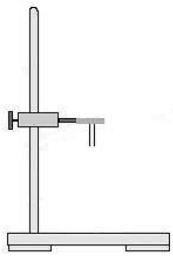
♦ Working temperature: from +5ºC to +40ºC. Maximum use humidity, 85% RH

12.2 Graduated cylinder, 25 ml. Code 1.9808.20

12.3 Silicone Grease, 50g. Lubrication of peristaltic tubes. Code 8.0030.03

12.4 Foot support. Code 1.8003.08

Useful as a support for the dosing tube/tip. Foot: 150 x 70cm. Bar, height 70cm. Sliding support for dispensing tip.



CONNECTORS FOR PERISTALTIC TUBES

12.5 Straight Splice/Equal End Connectors, Polypropylene

Straight connector for 1.6mm ID tubes. Code 1.0080.15
Straight connector for 3.2mm ID tubes. Code 1.0080.18
Straight connector for 4.8mm ID tubes. Code 1.0080.05
Straight connector for 6.4/8mm ID tubes. Code 1.0080.14
Straight connector for 9/12mm ID tubes. Code 1.0080.20

12.6: Y-shaped connectors, polypropylene

Y shape connector, 6mm. Ø. Code 1.0120.26
Y shape connector, 8mm. Ø. Code 1.0120.48
Y shape connector,10mm. Ø. Code 1.0120.32
Y shape connector,12mm. Ø. Code 1.0120.33

12.7: Stainless steel tube connectors - Splicing and dosage

Straight splice 40mm length
Stainless steel tube for 0.5 and 0.8mm Ø tubes, 25 Units. Code 8.0056.14
Stainless steel tube for 1.6mm Ø tubes, 25 Units. Code 8.0056.06
Stainless steel tube for 3.2mm Ø tubes, 25 Units. Code 8.0056.08
Stainless steel tube for 4.8mm Ø tubes, 25 Units. Code 8.0056.10
Stainless steel tube for 6.4mm Ø tubes, 25 Units. Code 8.0056.12

Dosing 130mm length with a bevel
Dosing tube for 0.5 and 0.8 mm Ø tubes, 10 Units. Code 8.0056.15
Dosing tube for 1.6 mm Ø tubes, 10 Units. Code 8.0056.07
Dosing tube for 3.2 mm Ø tubes, 10 Units. Code 8.0056.09
Dosing tube for 4.8 mm Ø tubes, 10 Units. Code 8.0056.11
Dosing tube for 6.4 mm Ø tubes, 10 Units. Code 8.0056.13

Length 38mm
Micro-tube 0.8mm external Ø, 10 Units. Code 1.0077.23
Micro-tube 0.9mm external Ø, 10 Units. Code 1.0077.26

Clamping flange P. Code 1.0120.01
Clamping flange G. Code 1.0120.12

12.8: 304 Stainless steel anti-floats for suction tubes

For peristaltic tubes with 1.6 and 3.2mm inner diameter. Code 1.0303.10
For peristaltic tubes with an ID of 4.8 mm. Code 1.0303.11
For peristaltic tubes with an ID of 6.4 mm. Code 1.0303.12
For peristaltic tubes with an ID of 8.0 mm. Code 1.0303.13
For peristaltic tubes with an ID of 9.6 mm. Code 1.0303.14
For peristaltic tubes with an ID of 12.7 mm. Code 1.0303.15

12.9: Stainless steel tubes. for dosing with non-return valve

For 3.2 and 4.8mm ID tubes. Stainless steel tip 4mm OD. 1mm. TW. Code 1.0302.10
For 4.8 and 6.4mm ID tubes. Stainless steel tip 6mm OD. 1mm. TW. Code 1.0302.11
For 6.4 and 8mm ID tubes. Stainless steel tip 8mm OD. 1mm.TW. Code 1.0302.12
For 8 and 9.6mm ID tubes. Stainless steel tip 10mm OD. 1mm. TW. Code 1.0302.13

13- CHANGING FUSES

The fuse holder box is part of the power supply base located at the back of the pump. See Figure.

Main switch

Fuse holder box

Power base

Pry with a screwdriver between the central part of the fuse holder box and the top part of the power supply base to remove the fuse holder box.

The box remains attached without being completely removed. There are two fuses.

Press the box inwards to restore its original position.

Remember that you have already used the spare fuse.

14- TROUBLESHOOTING

The following table of faults, their causes and possible solutions, is not intended to cover all possibilities. However, user inconveniences that actually have easily avoidable causes can be avoided.

PROBLEM	CAUSE	SOLUTION
It doesn't start and the pilot lights don't come on.	Lack of food Blown fuse Unknown	Check cable and plugs Change fuse Request Technical Service
The head rotor does not rotate, but the pilot lights shine	Broken tube that prevents it defective engine	Change the tube Request Technical Service
The rotor turns, the tube is not broken, but it does not pump	Exhausted, worn tube Insufficient tube wall Empty feed tank Tube chemical incompatibility	Change tube Install proper tube Load deposit Choose suitable tube
Flow below theoretical	High viscosity Excessive pumping circuit Internal obstruction in the tube Insufficient tube wall High discharge back pressure Tube chemical incompatibility	Use a larger tube Ø Shorten circuit Clean Install proper tube Lower back pressure Choose suitable tube
Head tube moves	Small tube diameter Faulty tube installation	Choose a suitable tube Check the fixings

15- WARRANTY

DURATION:

The warranty is established for a period of 1 year from the date of commissioning of the device as long as the warranty card is returned to us within 8 days following said commissioning.

Without this condition the guarantee will not be valid.

SCOPE OF WARRANTY:

The guarantee is given against manufacturing and material defects for an average of 40 hours of work per week. The guarantee is reduced proportionally to the increase in working hours.

Repairs will be carried out in our factory. Otherwise, the warranty will only include the replacement of defective elements.

DINKO will not be responsible for transportation costs, nor will it assume responsibility for the consequences caused by the immobilization of the device.

The free replaced parts remain our property, reserving the right to request their return, free of shipping to our home.

Repairs or replacement of parts during the warranty period do not extend the initial warranty.

Our liability is limited to the attached warranty and not to possible accidents to people or other things.
Any alteration of the device by the user voids the warranty.

16- *CE"* DECLARATION OF CONFORMITY

DINTER SA

***DINKO I** NSTRUMENTS* **c/ Encarnació, 123-125 / 08024- Barcelona**

Declares that the articles mentioned in the attached list, to which this declaration refers, comply with the essential safety requirements of the applicable European Directive:

- Low Voltage Directive D2014/35/EU of february 26, 2014 applicable since 2016 and according with LVD Directive.

- Essential requirements of Annex I of the Machinery Directive 2006/42/EEC of May 17, 2006

- Electromagnetic compatibility EC relative to the Directive for Electromagnetic Compatibility Directive 2014/30/EU according with EMC Directive.

- Safety for electrical measurement, control and laboratory devices. CEM regulations. EN 61326 61326

- Safety rules for electrical measurement devices, control and laboratory use. Part I. General requirements concerning general EN 61010-1

However, the user must observe the assembly and connection instructions indicated in the product catalogs. Technical instructions.

Name:	Joan A. Bravo	Josep X. Sensada
Post:	Technical director	Quality manager
Signature		

Peristaltic Pumps D-21V

OTHER *DINKO APPARATUS* / *OTHER DINKO APPARATUS*

- Blenders-Homogenizers

- Colorimeters

- Conductivity Meters

- Dosing Pumps

- Extractor for meat analysis

- Heating Plates

- Infrared Stoves

- Kits for water analysis

- Magnetic Stirrers

- Metallic block heaters

- Microscopes

- Nephelometers

- Orbital Shakers

- Oximeters

- Peristaltic Pumps

- pH-meters

- Photometers

-Respirometers

- Rod Stirrers

- Rotary Stirrers

- Sand Baths

- Spectrophotometers

- Temperature Controllers

- Timers / *Timers*

-Trichinoscope - TriquiVisor

- Turbidity Meters

- Turn dishes

- Vacuum Pumps

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