



VARIABLE FLOW PERISTALTIC PUMPS

Model D-21V

Codes 1.9730.33, 1.9730.34, 1.9730.55 and 1.9730.06



MANUAL

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1- GENERAL INTRODUCTION

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

They are easy to use and require minimal maintenance.

The pumped substance is impelled 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 backflow when stopping the pump as the tube remains 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 transferring or dispensing such substances.

Flow rates up to 6000 ml/minute are obtained.

Many of different size tubes or hoses made of materials resistant to various hazardous substances are available.

2- PACKING LIST

Code		Quantity
Peristaltic Pump D-21V	1.9730.33 or 1.9730.34 or 1.9730.55 or 1.9730.06	1
Set of connections		1
Power cord		1
Instruction Manual		1

3- RECEPTION

To ensure correct reception, use of the device, and user safety, 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 permanently kept within the equipment user's reach.

3.2- UNPACKING

Carefully unpack the appliance, 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 covered.

3.4-LIABILITY






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

3.5-REPAIRS

Devices to be sent to *DINKO technical services* must be **clean and disinfected**.
Otherwise, they will be rejected and returned with postage paid by 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 finger contact with moving parts
	Danger-Risk-Caution
Before opening. DISCONNECT the network cable. Before remove cover PULL OUT plug 	Before accessing the interior of the Pump, disconnect the power cable from the network.
	Possible overheating - Do not touch
230V AC 50/60Hz	AC power supply voltage
110V AC 60Hz	AC power supply voltage
12V DC	DC power 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 of 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 DESCRIPTION OF THE FRONT PANEL



- 1- Green pilot light indicating network connection
- 2- Yellow pilot light indicating operation
- 3- Speed regulation dial potentiometer
- 4- Direction of rotation selector ← , → and stop O
- 5- Pump head

4-2 REAR PANEL DESCRIPTION



- 1 - Main ON/OFF switch
- 2 - Fuse box
- 3- Power socket
- 4- Input for voltage-free pedal
- 5 - Fan

5- HEADS DESCRIPTION

The D-21V peristaltic pumps in this manual mount the 253-3r head that allows easy access to the tube for removal when it must be replaced.

In order to change the tube, the top of the head must be removed. To be able to extract it, the lever (number 1 in the photo) must always be located to the left of the head. Once located, it must be extracted upwards with the help of the two retainers located on both sides (number 3 in the photo).

Once the upper part has been extracted, we proceed to place the tube with which we want to work, taking care that it is centered in the yellow guides located on both sides (number 8 in the photo).

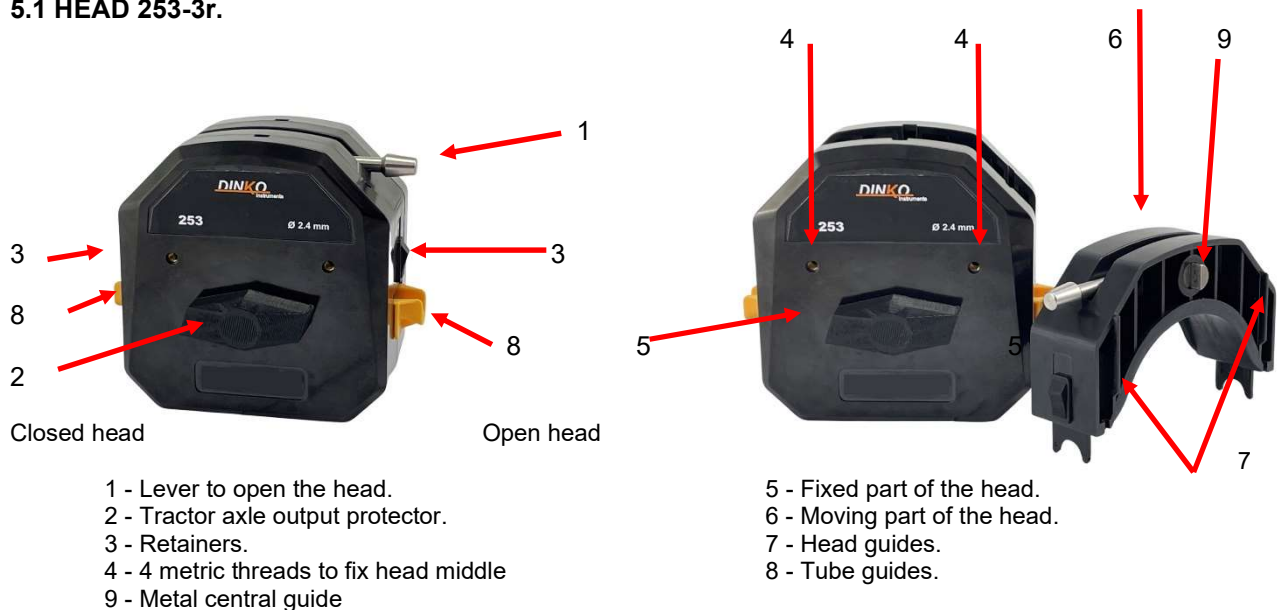
Now we are going to replace the upper part, check that the lever (number 1 in the photo) is located on the left. Insert the upper part carefully and making sure that the 4 rails (number 7 in the photo) that have the removable part and the piece in the central part (number 9 in the photo) enter their corresponding guides. Once correctly oriented, press down until the two parts of the head, the fixed one (number 5 in the photo) and the removable one (number 6 in the photo) are at the same level and we check that the tube has been well centered, once we reach this position, we move the lever (number 1 in the photo), from the left to the right, slowly, checking that all the parts are well aligned.

Stop the lever travel to the right in the middle and at this point start the pump and continue to move the lever slowly to the right until shortly after the pumped liquid starts to flow. Leave the lever at this point. Continuing to move the stick to the right will noticeably shorten the duration of the tube due to unnecessary pressure on it.

Lightly smearing the peristaltic tube with high-density silicone grease improves its life

NEVER CARRY OUT THIS OPERATION WITH THE EQUIPMENT RUNNING.

5.1 HEAD 253-3r.



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

6- SPECIFICATIONS

6.1 Size/ Weight

165 x305 x 240mm. Width x depth x height. Weight: 7 kg.

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

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

Code ▼	rpm	6.4	8.0	9.6	◀ Tube ID mm
1.9730.34	110	40-615	65-1000	85-1100	flow ml/min
1.9730.33	330	150-1850	200-2970	250-3300	
1.9730.06+					
1.9730.55	500●	220-2700	320-4700	450-6000	

● Brushless motor. + Portable model 12V DC / 100...240V 50/60Hz AC

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 AC and place the main switch in the OFF position.

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

Consult the indicative flow table and install the appropriate tube.

See tips in the Tube Change and Head Description section.

Choose the speed by acting on the unit and tens buttons of the regulating potentiometer.

Position the ends of the peristaltic tube in loading and unloading.

Press ON.

7.1 Engine speed limitation

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

It is not convenient to use the lowest observed adjustable speed, even if the motor starts, since at any moment it can stop and cause the regulation circuit to overheat, which could be damaged 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 revs and extends its life. Silicone grease, 50g. Code 8.0030.03

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

8- CHANGE OF TUBES

Press the OFF switch. Extract the tube according to the indications described in the section "Head description 253-3r" of this manual.

When the new tube is installed, it should 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 fixers. Slide the button to release or clamp the tube. When you release the button, it will recover the position by itself.

In general, new tubes can stretch during the first 30 minutes of operation. If this happens, 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 supply and discharge tubes can have any wall thickness, but not the tube that is installed in the head, whose wall must be 2.4mm.

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

Other materials available are:

The most mechanically resistant tubes are PHARMA, TYGON A-60-C ®, TYGON A-60-G ® and medium-duration SILICONE and VITON ®.

However, the durability also depends to a large extent on the chemical nature of the pumped liquid, the pressure, the existing temperature and naturally the engine revolutions.

Proper choice of tubing ID prevents higher RPM demand from the peristaltic pump motor with small diameter tubing and decreased tubing life.

9- AVAILABLE MATERIALS

PHARMA	Autoclavable multiple times. ETO and Gamma sterilizable. Medical-food grade, class VI USP, 21CFR 177.2600 and FDA. Not hemolytic. Excellent resistance to chemicals. ISO 10993. Low permeability and good resistance to abrasion. Long duration. Use temperature, -51°C to 132°C Beige.
SILICONE	Autoclavable. The most versatile tube. Platinum Cure quality silicone. Average duration. Medical/Food Grade. Excellent biocompatibility. Maximum temperature. 140°C. Translucent.
TYGON A-60-C ®	Autoclavable multiple times. food grade Long duration. Resistant to acids, alkalis, oxidizing agents. Use temperature: -59°C to 135°C. 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 -59°C to 135°C. Black colour.
VITON ®	Autoclavable Suitable for acids and non-acetone solvents. Maximum temperature 300°C. Black colour.

2,4mm wall calibrated tube codes, 1 meter

▼ Internal Ø tube ►	6.4mm	8.0mm	9.6mm
PHARMA	1.8802.64	1.8802.80	1.8802.96
SILICONE	1.8762.64	1.8762.80	1.8762.96
TYGON A-60-G ®	1.8756.64	1.8756.80	1.8756.96
VITON ®	1.8791.64	1.8791.80	1.8791.96

Important: Head tubes should be lightly coated with silicone grease to extend life and ease 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 of the tubes and the pumped substances on our website www.dinko.es

10- ORDERING INFORMATION

Code ▼	motor-rpm	Pump head	Article
1.9730.55	500●	253-3r	Complete peristaltic pump
1.9730.33	330		Complete peristaltic pump
1.9730.06+			
1.9730.34	110		Complete peristaltic pumps
1.9740.01			Foot switch (pedal).
1.8119.00			Cyclic timer

- Brushless motor. + Portable model 12V DC / 100...240V 50/60Hz AC

11- MAINTENANCE-SPARE PARTS

Before any examination or repair of the appliance, it is necessary to disconnect the mains plug.
Any initiative must be carried out by qualified personnel to avoid greater evils.

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



The engine and its block do not require greasing, so they do not have maintenance.

The rotor bearings are self-lubricating, but it is advisable to lightly lubricate them 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 way to avoid the inconvenience of its breaking during full operation of the pump.

code- Description

1.0066.17	Battery T-pack Ion-Lithium 14.8V
1.0077.37	Brushless motor for head 253-3r, 500 rpm
1.0066.18	Charger 12.6V
1.0077.38	Control driver for motor 500 rpm
1.0042.01	Fan
1.0025.01	Flow switch knob
1.9740.01	Foot switch.
1.0015.05	Flow direction change and stop switch.
1.0060.01	Main control circuit.
1.0080.01	Motor for head 253-3r, 330 rpm
1.0080.13	Motor for head 253-3r, 110rpm
1.0062.06	Potentiometer 10 turns
1.8093.21	Power supply 100 W - 24 V.
1.0078.40	Pump head 253-3r
1.0078.61	Pump head 253-3r, middle

12- ACCESSORIES

12.1 Balance for flow and dosage calibration.



Reproducibility 0.1 g. 600g capacity. Code 8.9812.02

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

If the liquid to be pumped has density "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 25ml test tube, for example, previously taring the test tube on the scale.

Divide the weight indicated on the digital readout 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:

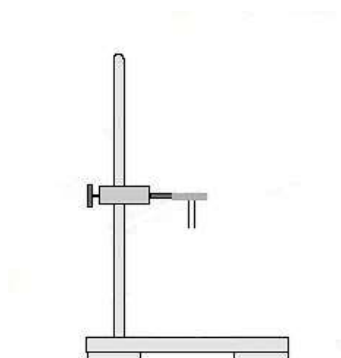
- ◆ Single digital reading platter, with highly visible backlit LCD screen.
- ◆ Simple use of great robustness with ABS casing and hermetic anti-humidity membrane keyboard
- ◆ Stainless steel pan, 157x128mm ◆ External auto calibration ◆ Units of measure: grams, pounds and ounces
- ◆ Continuous tare up to 600 g ◆ Power supply 230V 50/60Hz ◆ Non-slip rubber feet
- ◆ Working temperature: from +5°C to +40°C. Maximum use humidity, 85% RH

12.2 Graduated cylinder, 25ml. Code 1.9808.20

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

12.4 Standing support. Code 1.8003.08

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



CONNECTORS FOR PERISTALTIC TUBES

12.5 Straight Splice Connectors / Same Ends, 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: Form Y connectors, polypropylene



Y shape connector, 6mm. either. Code 1.0120.26
Y shape connector, 8mm. either. Code 1.0120.48
Y shape connector, 10mm. either. Code 1.0120.32
Y-shaped connector, 12mm. either. Code 1.0120.33

12.7 Connectors-stainless steel micro-tube- Connection and dosage

Straight connection 40 mm length

Microtube for 0.5 and 0.8mm Ø tubes , 25 Units. Code 8.0056.14
Microtube for 1.6mm Ø tubes, 25 Units Code 8.0056.06
Microtube for tubes 3.2mm Ø, 25 Units. Code 8.0056.08
Microtube for 4.8mm Ø tubes, 25 Units Code 8.0056.10
Microtube for 6.4mm Ø tubes, 25 Units Code 8.0056.12

Dosage 130 mm length with a bevel

Dosage microtube for 0.5 and 0.8mm Ø tubes, 10 Units. Code 8.0056.15
Dosage microtube for 1.6mm Ø tubes, 10 Units. Code 8.0056.07
Dosage microtube for 3.2mm Ø tubes, 10 Units. Code 8.0056.09
Dosage microtube for tubes 4.8mm Ø, 10 Units. Code 8.0056.11
Dosage microtube for tubes 6.4mm Ø, 10 Units. Code 8.0056.13

Length 38mm

Micro-tube 0.8mm outer Ø, 10 Units Code 1.0077.23
Micro-tube 0.9mm outer 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-floaters for suction tubes

For 1.6 and 3,2mm ID peristaltic tubes. Code 1.0303.10
For 4.8mm ID peristaltic tube. Code 1.0303.11
For 6.4mm ID diameter peristaltic tube. Code 1.0303.12
For 8.0mm ID peristaltic tube. Code 1.0303.13
For 9.6mm ID peristaltic tube. Code 1.0303.14
For 12.7mm ID peristaltic tube. Code 1.0303.15

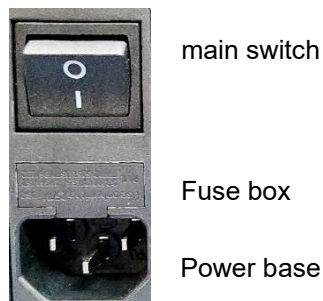
12.9: Stainless steel tubes. for dosing with non-return valve

For tubes 3.2 and 4.8mm ID. Stainless steel tip 4 mm Ø ext. WT 1mm. Code 1.0302.10
For tubes 4.8 and 6.4mm ID. Stainless steel tip 6 mm Ø ext. WT 1mm. Code 1.0302.11
For tubes 6.4 and 8mm ID. Stainless steel tip 8 mm Ø ext. WT 1mm. Code 1.0302.12
For tubes of 8 and 9.6mm ID. Stainless steel tip 10 mm Ø ext. WT 1mm. Code 1.0302.13



13- CHANGE OF FUSES

The fuse box is part of the power base located at the rear of the pump. See Figure.



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

The box remains attached without being fully extracted. There are two fuses.

Press the box in 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, inconveniences to the user can be avoided which actually have easily avoidable causes.

PROBLEM	CAUSE	SOLUTION
It does not start and the pilot lights do not light	Lack of food Blown fuse Unknown	Check cable and plugs Change fuse Request Technical Service
The head rotor does not turn, but the pilots shine	Broken tube that prevents it faulty engine	Change 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 suitable pipe Charge the deposit Choose suitable tube
Flow below theoretical	high viscosity excessive pump circuit Internal obstruction in the tube Insufficient tube wall High discharge back pressure Tube Chemical Incompatibility	Use a larger tube Ø Short circuit Clean Install suitable tube Lower back pressure Choose suitable tube
The head tube moves	small tube diameter Faulty tube installation	Choosing a suitable tube Check the fixings

15- WARRANTY

DURATION:

The guarantee is established for a period of 1 year from the date of commissioning of the device, provided that the guaranteed card is returned to us within 8 days of 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 work week of 40 hours. The guarantee is reduced proportionally to the increase in working hours.

Repairs will be made in our factory. Otherwise, the guarantee will only include the replacement of the defective elements.

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

The parts replaced free of charge remain our property, reserving the right to request their return, free of postage to our address.

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

Our responsibility is limited to the attached guarantee and not to possible accidents to persons or other things.

Any alteration of the device by the user voids the guarantee.

16- DECLARATION OF CONFORMITY " CE"

DINTER SA

DINKO INSTRUMENTS c/ Encarnació, 123-125 / 08024- Barcelona

Declares that the items 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/CEE of May 17, 2006.
- Electromagnetic compatibility EC relative to the Directive of electromagnetic compatibility 2014/30/EU, according with EMC Directive
- Safety for electrical measurement, control and laboratory devices. CEM requirements EN 61326
- Safety rules for electrical measurement, control and laboratory devices. Part I. Prescriptions general EN 61010-1

However, the user must observe the instructions for assembly and connections indicated in the catalogs of Technical instructions.

Name: Joan A Bravo
Position: Technical Director

Josep X. Sensada
Responsible for Quality

Signature



Peristaltic Pumps D-21V

DINKO APPLIANCES / OTHER DINKO APPARATUS

- Colorimeters
- Extractor for mince analysis
- Heater Metallic Blocks
- Heater Plates
- Infrared Ovens
- Kits for Water Analysis
- Magnetic Stirrers.
- Nephelometers
- Orbital Shakers
- Peristaltic Pumps
- Photometers
- Respirometers
- Rod Stirrers
- Rotary Stirrers
- Sand Baths
- Spectrophotometers
- Temperature Controllers
- Timers
- Trichinoscope
- Turbidimeters
- Turn Dishes
- Vacuum Pumps



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