VARIABLE FLOW PERISTALTIC PUMPS

Model D-25Vplus

Codes 1.9731.15/1.9731.30/1.9731.80/1.9731.24

MANUAL

April 2023

CE

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1- GENERAL INTRODUCTION

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

They are easy to use with minimal maintenance.

The pumped substance is impelled into an elastic tube by the vacuum generated by rotors that successively press and release the surface of the tube.

The liquid passes directly from its container to another without any contamination and without going back when the pump stops, since the tube remains pressed by the roller.

Some aggressive substances prevent the use of conventional pumps and make peristaltic pumps very useful for the transfer or dispensing of such substances.

Flow rates are obtained from 0.02 ml/minute up to 240ml/minute.

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

The following instructions are intended to ensure correct reception and use of the device, and the safety of the user.

To this end, we recommend reading this manual in detail before proceeding to unpack the device and subsequent use.

For proper conservation of the device, it is necessary to avoid its installation in areas with corrosive atmospheres or exposed to liquid splashes.

Avoid using the device when there is the possibility of generating explosive and flammable gas mixtures.

2- PACKING LIST

Description Code	Quantity
Peristaltic Pump D-25V plus 1. 9731.15 / 1.9731.30 / 1.9731.80 /1.9731.24	1
0-10V connector	1
Footswitch connector	1
Set of tubes and seals	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

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

According to European regulation 89/655/CEE, the lack of adequate maintenance and the alteration of component, exempts the manufacturer from any responsibility for any damage that may 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 in 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
100-230V AC 50/60Hz	AC power supply voltage
110V AC 60Hz	AC power supply voltage
12V DC or 24V 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. Make sure it is recycled protecting human health and the environment.

4- DESCRIPTION

The D-25V plus peristaltic pumps are provided with a head that allows access to the tube for its extraction when it must be replaced due to wear or for sterilization.

On CFV-4r head pumps, the head is opened by pulling the top upwards, allowing access for tube replacement.

They admit various tube sizes which, combined with the speed regulation and the different motorizations, give a great variety of flows, as can be seen in the flow chart

With the FULL key, number 3 in the front panel description, the maximum speed of the motor is obtained, in the loading, purging and cleaning operations.

Keys 1 and 2 allow choosing the direction of rotation of the motor for flow inversion.

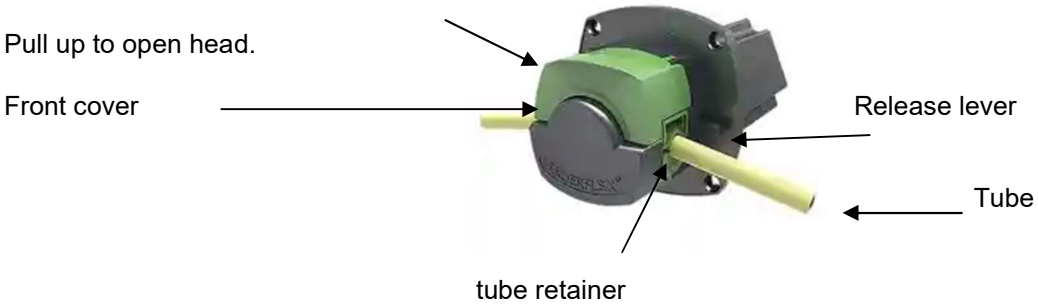
On the back is the connection for the network cable with integrated fuse holder, connection for pedal and input for 0-10V analog signal.

Consult the dosage table and install the appropriate tube.

4.1 HEADS:

CFV-4r HEAD

Pull up to open head.



Included with the pump are 5 pairs of tube retainers for the 6 usable tube sizes:
0.5 - 0.8 / 1.6 / 3.2 / 4.0 and 4.8mm.

HEAD REPLACEMENT

Remove the pump head by depressing the release lever and turning the head counterclockwise 45º.

Push and turn until the lever clicks. Remove the head.

Offer the new head to the back plate at an angle that places the motor shaft to the shaft rotor inside the back plate at approximately 45º, facing the lugs on the housing.

TUBE INSTALLATION

1 2 3 4

The tube retainers for the CFV-4r head are different depending on the size of the tube being installed.

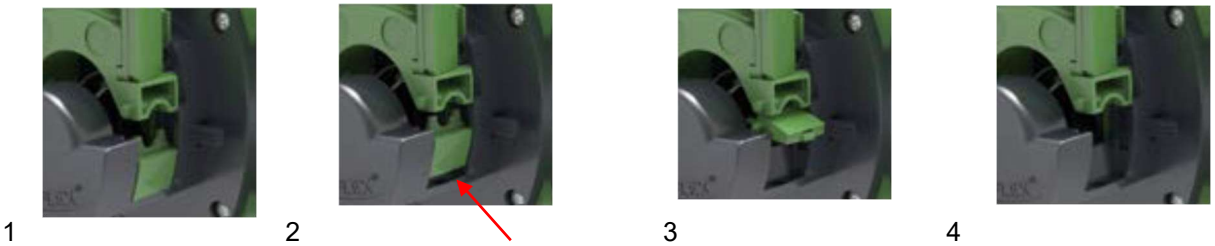
To insert the tube retainers:

1-Lift the head cover by pulling it up.

2-Place the retainer of the horizontal tube to the body of the head.

3-4. Rotate the tube retainer inserting it into the side guides pushing down until it clicks.
hear a click indicating it is locked.

CHANGING THE TUBE SEALS



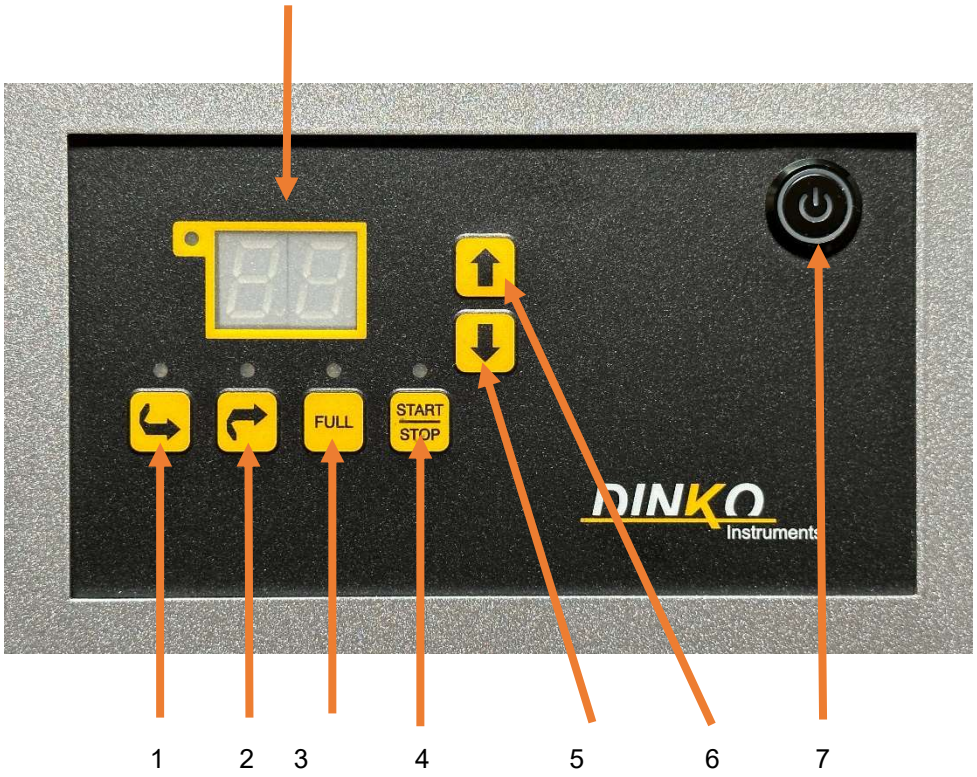
1 2 3 4

To change tube retainers:

1. Gently insert a small flat blade screwdriver (maximum size 5mm) into the gap at the base of the tube retainer.
2. Turn the screwdriver to get past the guide.
3. Make sure the tube is aligned with the gap in the tube retainers and is not damaged.
4. Remove tube retainers by lifting and turning.

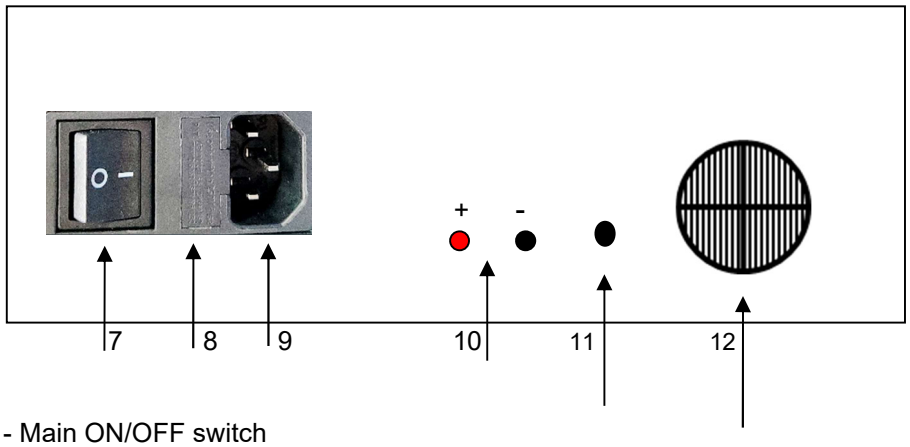
4.2- DESCRIPTION OF THE FRONT PANEL

TO



A-Digital Reader
1-key direction of rotation
2-key direction of rotation
3-Key Full
4-Start / Stop key-Memo start
5 and 6- Decrease and increase keys.
7- Switch for programming

4.3- DESCRIPTION OF THE REAR PANEL



7 - Main ON/OFF switch

8 - Fuse box

9 - Power socket

10 - 0-10 V analog signal input (+ red, – black)

11 - Input for voltage-free foot switch.

12 - Fan.

5- START UP

Make sure that the mains voltage is between 110 and 230 V.
Connect the power cable to the rear plug and to the network.
Consult the indicative flow table and install the appropriate tube.
See tips in the Tube Change and Head Description section.
Select the desired function.

OPERATING MODES.

Available modes:

A- Pumping mode operation.

B- Ramp mode operation.
ramp programming
ramp access

C- Cyclic mode operation.
programming cycles
access cycles

D- Single Cycle mode operation with pedal.
programming cycles
access cycles

· Pumping function - Procedure:

1- Connect to the network
2- Activate rear switch nº7 ON/OFF. The green indicator lights up. Press the front button number 13 of the pumps that mount it.
3- Select the motor speed in % by pressing the decrease or increase keys nº5 or nº 6
4- If it is necessary to change the direction of rotation, press the keys nº1 or nº 2.
5- Press key nº4 Start / Stop / Memo Start to start or stop pumping
6- If you want the pump to resume its operation under the established conditions after an unexpected power cut or voluntary shutdown by the main switch, press key n.4 for 5 seconds. Its pilot light will flash as long as it is not deactivated by simply pressing the 4 Start / Stop / Memo Start button.

To facilitate the loading, purging or cleaning tasks, press the No. 3 Full key. The speed will increase to the maximum. Pressing the Full key again will recover the programmed speed.

· Ramp function - Procedure

1- Connect to the network.
2- Keep keys nº2 and nº3 pressed while operating the rear ON/OFF switch nº7, and then the front switch nº13. The green light will light up and the yellow light of the nº2 key will light intermittently. The displayed value indicates the total ramp time in minutes. Range: 1 to 99 minutes
3- Press keys #5 or #6 to set the time value.
4- Press the No. 4 Start / Stop key to memorize the chosen value.
5- The initial speed of the ramp will be displayed on the screen. Press keys no. 5 or no. 6 to set the initial speed value in %
6- Press key nº4 to memorize the chosen value.
7- The final speed of the ramp appears on the screen. Press keys #5 or #6 to set the final value of the ramp.
8- Press key nº4 to memorize the chosen value.
The ramp can be increasing or decreasing.
9- Activate the rear ON/OFF switch no. 7 or the front switch no. 13. The ramp parameters are loaded.

Ramp Access

To access the loaded ramp, keep key nº2 pressed while operating the rear ON/OFF switch nº7 or the front switch nº13.
The indicator will indicate the engine speed %.
The ramp starts.
All keys will remain inactive during the process.
At the end of the ramp, press any key to repeat the ramp.
To exit the ramp function, activate the rear ON/OFF switch no. 7 or the front switch no. 13.

· Cycle Programming Function

1- Connect to the network.
2- Keep keys nº1 and nº3 pressed while operating the rear ON/OFF general switch nº7 and then the front switch nº13. The green light will light up and the yellow light of the nº1 key will light intermittently. The displayed value indicates the operating time in seconds. Range: 1 to 99 seconds
3- Press keys no. 5 or no. 6 to set the value of the operating time in seconds.
4- Press the No. 4 Start / Stop key to memorize the chosen value.
5- The standby time will appear on the screen. Press keys #5 or #6 to set the value between 1 and 99 seconds.
6- Press key nº4 to memorize the chosen value.
7- The motor speed in % appears on the display. Press keys #5 or #6 to set the chosen value.
8- Press key nº4 to memorize the chosen value.
9- Activate the rear ON/OFF general switch no. 7 or the front switch no. 13. The cycle is loaded.

Access to the Cycle

To access the loaded cyclic, keep key nº1 pressed while operating the rear ON/OFF switch nº7 or the front switch nº13.
The display will alternately indicate the remaining time of each cycle.
To stop the process, activate the rear ON/OFF general switch no. 7 or the front switch no.13.

Single Cycle function with pedal-Programming

1- Connect to the network.
2- Keep keys nº1 and nº3 pressed while operating the rear general ON/OFF switch nº7 or the front switch nº13. The green light will light up and the yellow light of the nº1 key will light intermittently. The displayed value indicates the operating time in seconds. Range: 1 to 99 seconds
3- Press keys no. 5 or no. 6 to set the value of the operating time in seconds.
4- Press the No. 4 Start / Stop key to memorize the chosen value.
5- The standby time will appear on the screen. Press the number 5 or number 6 keys to set the value 0
6- Press key nº4 to memorize the chosen value.
7- The motor speed in % appears on the display. Press keys #5 or #6 to set the chosen value.
8- Press key nº4 to memorize the chosen value.
9- Activate the rear main ON/OFF switch no. 7 or the front switch no. 13. The cycle is loaded.

Access to the Cycle with pedal

Install the pedal.
To access the loaded cyclic, keep key nº1 pressed while operating the rear ON/OFF switch nº7 or the front switch nº 13.

Press the foot switch and the cycle will begin.

The display will alternately indicate the remaining time of the cycle after each press of the pedal.
To stop the process, activate the rear ON/OFF general switch no. 7 or the front switch No. 13.

NOTE:

While using the 0-10V and rear 4-20mA analog input, the ramp and cycle functions are not accessible.

The footswitch connection is active during use of the footswitch pump and cycle function.

When using the 0-10V / 4-20mA regulation, the regulation keys 5 and 6 are inactivated.

6- CHANGE OF TUBES

Press the OFF switch. Extract the tube according to the indications described in the “Description” and “Heads” section.

When the new tube is installed, it should be centered over the rollers to prevent the rotor from pinching it. Install the tube retainers on each side of the tube, at the outlet and inlet, corresponding to the size of the tube chosen.

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. Open the head by pulling up on its upper part and recondition the seals at each end.

To detect elongation or insufficient fixation of the tube to the head, it is useful to properly mark the tube with a marker.

Due to the fact that the friction of the tubes with the rollers increases with the diameter of the tubes, the minimum adjustable speed increases the greater the diameter of the tube.

It is not convenient to use the lowest speed observed, 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.
It is preferable to select a speed somewhat higher than the minimum observed.

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 1.6mm.

The silicone tubes supplied with each pump are medical/food grade according to FDA and USP standards, autoclavable at 140ºC, with a peristaltic range of use up to 80ºC and medium duration.

AVAILABLE MATERIALS

The most mechanically resistant tubes are PHARMA, TYGON A-60-C ®, TYGON A-60-G ® and SILICONE with medium duration, but durability also depends to a large extent on the chemical nature of the pumped liquid, the pressure, 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.

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, -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 ® Long life.
Compatible with disinfectants and cleaning products. resistant to acids, alkalis, oxidizing agents such as Oxygen, Ozone, Peroxides and Hypochlorite's, etc.
Food grade
Repeatedly autoclavable.
Use temperature: -59ºC to 135ºC.
Beige.

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

VITON ® Suitable for acids and non-acetone solvents.
Maximum temperature 300ºC.
Black colour.

7- ORDERING INFORMATION

Code ▼	rpm	Head	Article
1.9731.15	fifteen	CFV-4r	Complete peristaltic pump
1.9731.30	30	CFV-4r	Complete peristaltic pump
1.9731.80	80	CFV-4r	Complete peristaltic pump
1.9731.24	240	CFV-4r	Complete peristaltic pump
1.0078.34		CFV-4r	CFV-4r head
1.9740.01			Foot switch (pedal).

8- 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 and tube, especially if they have been washed. See Figure. Pull the top of the head up to access the rollers.

The head tube must be replaced periodically in a systematic way to avoid the inconvenience of its breakage in full operation of the pump.

code-	Description
1.0078.34	CFV-4r head
1.0063.30	Main control circuit.
1.8093.16	Power supply, except for pump 1.9731.15
1.8093.23	Power supply for pump 1.9731.15
1.9740.02	Foot switch.
1.0077.01	Motor, 24V DC 240rpm.
1.0077.10	Motor, 24V DC 80rpm
1.0077.24	Motor, 24V DC 30rpm. (For Pumps 1.9731.15 and 1.9731.30)

1.6mm wall calibrated tube codes, 1 meter

▼Tube / ID ►	0.5mm	0.8mm	1.6mm	3.2mm	4.0mm	4.8mm
PHARMA		1.8801.08	1.8801.16	1.8801.32		1.8801.48
TYGON A-60-C ®			1.8740.16	1.8740.32		
TYGONA-60-G ®			1.8750.16			1.8750.48
SILICONE	1.8760.05	1.8760.08	1.8760.16	1.8760.32	1.8760.40	1.8760.48
VITON ®		1.8790.08	1.8790.16	1.8790.32		1.8790.48

Important: Head tubes should be lightly coated with silicone grease to extend life and ease starting at low rpm.

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

9- ACCESSORIES

CONNECTORS FOR PERISTALTIC TUBES

9.1: Reducing Connectors - Splice / Same Ends, Polypropylene

For 1.6/3.2 mm internal Ø tubes. Code1.0080.15
For 3.2/4.8 mm internal Ø tubes. Code 1.0080.18
For 4.8/6.4 mm internal Ø tubes. Code 1.0080.05
For 6.4/8 mm internal Ø tubes. Code 1.0080.14
For 8/12.7mm internal Ø tubes. Code 1.0080.20

9.2: Straight connector for fitting/reducer, polypropylene

Straight connector / reducer Ø 4-5-8 to 7-10-12mm. Light 1.6/4.6mm. Code 1.0120.31

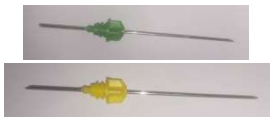
9.3: Connectors form Y, polypropylene

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

9.4: Connectors-stainless steel micro-tube- Connection and dosage

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

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



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

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

9.5: 304 stainless steel anti-floaters for suction tubes

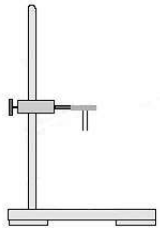
For peristaltic tubes with 1.6 and 3.2 mm internal diameter. Code 1.0303.10
For 4.8mm inner diameter peristaltic tubing. Code 1.0303.11
For 6.4mm inner diameter peristaltic tubing. Code 1.0303.12
For 8.0mm inner diameter peristaltic tubing. Code 1.0303.13
For 9.6mm inner diameter peristaltic tubing.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

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

For tubes of 3.2 and 4.8 mm of Ø int. stainless tip 4mm OD wall 1mm. Code 1.0302.10
For tubes of 4.8 and 6.4 mm of Ø int. stainless tip 6mm OD wall 1mm. Code 1.0302.11
For tubes of 6.4 and 8 mm of Ø int. stainless tip 8mm OD wall 1mm. Code 1.0302.12
For tubes of 8 and 9.6 mm of Ø int. stainless tip 10 mm OD wall 1mm. Code 1.0302.13

9.7: Polypropylene stopcock
Wrench for internal Ø tubes 4.8-8.00mm. Code 1.0120.39

9. 8: Foot support with clamp. Code 1.8003.08
Useful as a support for the tube/dispensing tip. Foot: 30 x 15cm. Bar, height 70cm. sliding clamp



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

9.10 Balance for flow and dosage calibration.

Reproducibility 0.01 g. 1000g capacity. Code 1.9812.02

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 self-calibration ♦ Units of measure: grams, pounds and ounces

♦ Continuous tare up to 1000 g ♦ Power supply 230V 50/60Hz ♦ Non-slip rubber feet

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

10- CHANGE OF FUSES

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

main switch

Fuse box

power base

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.

11- FLOW TABLES

Indicative adjustment intervals for each tube diameter

Code ▼	rpm	0.5mm	0.8mm	1.6mm	3.2mm	4.0mm	4.8mm	◀Tube Ø
1.9731.15	15	0,02-0,3	0,05-0,8	0,20-3,0	0,8-12	1,3-18	1,5-25	flow ml/min
1.9731.30	30	0,03-0,5	0,07-1,2	0,3-4,60	1,2-18	1,8-29	2,2-30	
1.9731.80	80	0,08-1,2	0,2-3,0	0,8-12	3,0-48	4,5-78	5,0-85	
1.9731.24	240	0,25-3,0	0,8-8,0	3,0-30	11-122	18-192	25-250	

Flows calculated with water under normal conditions without outlet back pressure.

12- WARRANTY

12.1 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.

12.2 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 transportation 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 warranty.

13- “CE” DECLARATION OF CONFORMITY

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 Directive D2006/95/CEE of December 12, 2006

- Essential requirements of Annex I of the Machinery Directive 2006/42/CEE of May 17 from 2006

- EC Electromagnetic Compatibility relating to the Electromagnetic Compatibility Directive 2004/108/CEE of December 15, 2004

- Safety for electrical measurement, control and laboratory devices. Requirements relating to the EMF. IN 61326

- Safety rules for electrical measurement, control and laboratory devices. Part I. General prescriptions EN 61010-1

However, the user must observe the assembly and connection instructions indicated in the technical instructions catalogues.

Name	Joan A. Bravo	Josep X. Sensada
Position:	Technical Director	Responsible for Quality
Signature		

Model: Peristaltic Pumps D-25Vplus. Codes 1. 9731.XX

DINKO APPLIANCES / *OTHER DINKO APPARATUS*

- Magnetic Stirrers / *Magnetic Stirerrs.*
- Orbital Shakers / *Orbital Shakers*
- Rotary Stirrers / Rotary *Stirrers*
- Rod Stirrers / R *od Stirrers*
- Sand Baths / S *and Baths*
- Dosing Pumps / *Proportioner Pumps*
- Vacuum Pumps / Vacuum Pumps
- Peristaltic Pumps / *Peristaltic Pumps*
- Metallic block heaters / *Heater Metallic Blocks*
- Colorimeters / *Colorimeters*
- Conductimeters / *Conductimeters*
- Temperature Controllers / *Temperature Controllers*
- Extractor for meat analysis / *Extractor for mince analysis*
- Infrared Stoves / *Infrared Ovens*
- Spectrophotometers / *Spectrophotometers*
- Photometers / *Photometers*
- Giraplacas / *Turn Dishes*
- Kits for water analysis / *Kits for Water Analysis*
- Microscopes / *Microscopes*
- Nephelometers / *Nephelometers*
- Oximeters / *Oxygen Meters*
- pH-meters / *pH-meters*
- Heating Plates / *Heater Plates*
- Respirometers */ Respirometers*
- Timers / *Timers*
- TrichinoscopeTriquiVisor */ TrichinoscopeTriquiVisor*
- Crushers-Homogenizers / *Blenders-Homogenizers*
- Turbidimeters / *Turbidimeters*