

Peristaltic Pump

'1200' Series

User's Manual

<i>Model '1201' Peristaltic Pump</i>	<i>55-xxxx</i>
<i>Model '1203' Peristaltic Pump</i>	<i>55-1762</i>
<i>Model '1210' Peristaltic Pump</i>	<i>55-1788</i>
<i>Model '1210A' Peristaltic Pump</i>	<i>55-1796</i>
<i>Model '1215' Peristaltic Pump</i>	<i>55-1804</i>
<i>Model '1215A' Peristaltic Pump</i>	<i>55-1812</i>



HARVARD
A P P A R A T U S

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General Information

Serial Numbers

All inquiries concerning our product should refer to the serial number of the unit. Serial numbers are located on the rear of the chassis.

Calibrations

All electrical apparatus is calibrated at rated voltage and frequency. While the flow will stay calibrated, the peak will vary.

Warranty

Harvard Apparatus warrants this instrument for a period of one year from date of purchase. At its option, Harvard Apparatus will repair or replace the unit if it is found to be defective as to workmanship or material.

This warranty does not extend to damage resulting from misuse, neglect or abuse, normal wear and tear, or accident.

This warranty extends only to the original customer purchaser.

IN NO EVENT SHALL HARVARD APPARATUS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES. Some states do not allow exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR USE, OR OF ANY OTHER NATURE.** Some states do not allow this limitation on an implied warranty, so the above limitation may not apply to you.

If a defect arises within the one-year warranty period, promptly contact ***Harvard Apparatus, Inc.*** ***84 October Hill Road, Building 7, Holliston, Massachusetts 01746-1371*** using our toll free number 1-800-272-2775. Goods will not be accepted for return unless an RMA (returned materials authorization) number has been issued by our customer service department. The customer is responsible for shipping charges. Please allow a reasonable period of time for completion of repairs, replacement and return. If the unit is replaced, the replacement unit is covered only for the remainder of the original warranty period dating from the purchase of the original device.

This warranty gives you specific rights, and you may also have other rights which vary from state to state.

Repair Facilities and Parts

Harvard Apparatus stocks replacement and repair parts. When ordering, please describe parts as completely as possible, preferably using our part numbers. If practical, enclose a sample or drawing. We offer a complete reconditioning service.

CAUTION

This pump is not registered with the FDA and is not for clinical use on human patients.

CAUTION
NOT FOR CLINICAL USE
ON HUMAN PATIENTS

Specifications

Specifications

Model 1203

Catalog No.	55-1762
Dimensions, H x W x D	250 x 265 x 280 mm (10 x 10-1/2 x 11 in)
Weight	11.4 kg (25 lb)
Power	115/230 VAC, 50/60 Hz

Model 1210

Catalog No.	55-1788
Dimensions, H x W x D	178 x 381 x 265 mm (7 x 15 x 10-1/2 in)
Weight	16.8 kg (37 lb)
Power	115 VAC, 60 Hz, 2 Amp

Model 1210A

Catalog No.	55-1796
Dimensions, H x W x D	178 x 381 x 265 mm (7 x 15 x 10-1/2 in)
Weight	16.8 kg (37 lb)
Power	230 VAC, 50 Hz, 2 Amp

Model 1215

Catalog No.	55-1804
Dimensions, H x W x D	178 x 381 x 267 mm (7 x 15 x 10-1/2 in)
Weight	22 kg (48 lb)
Power	115 VAC, 60 Hz, 1 Amp

Model 1215A

Catalog No.	55-1812
Dimensions, H x W x D	178 x 381 x 267 mm (7 x 15 x 10-1/2 in)
Weight	22 kg (48 lb)
Power	230 VAC, 50 Hz, 1 Amp

Model 1201 & 1203

Description

Models #1201 and #1203 are peristaltic pumps designed for the transfer of liquids by peristaltic action on the outside of rubber or plastic tubing. The pump is composed of a #1200 Basic Pump Mechanism coupled to a heavy duty #600 multi-speed transmission.

Model 1201 is furnished with a synchronous motor that provides twelve accurate pump rates.

Model 1203 is furnished with an electronically variable DC motor that provides a continuous range of speeds. Each of the twelve standard speeds is made continuously variable by the SCR motor speed control circuitry (labeled knob on side reading "% of Indicated Rate"). Model 1203 is also furnished with a capped connector on the side. Only the Model 551 Pump Speed Modulator can be used here (see pages 10-11 for Model 551 data). The 1203 can be operated remotely or in response to the Pump Speed Modulator.

The pumping mechanism consists of an aluminum housing containing a central shaft upon which are mounted 13 eccentric cams each 30° apart. Thirteen cam followers fit over the cams, translating the rotating motion into a reciprocal motion. Nylon sheets above and below the cam followers provide a low friction bearing surface. Parallel to the cam shafts are located the two compression plates used to squeeze the tubing. A calibrated dial is provided so that a given compression can be reproduced.

The driving mechanism is a twelve position gear box driven by an 1800 rpm motor. Output speed in position #1 is 60 rpm. A timing belt connects the output of the gear box to the pump with no speed change. The built-in overload clutch is designed to slip when the pump is overloaded.

Operation

Unless otherwise specified on the product label, the 1201 pump operates at 110-125 volt 60 cycle, and the 1203 pump operates at 110-125 volt 50-60 cycle. Frequency differences exist because of the different types of motors used. To operate the pump, insert a piece of rubber or plastic between the cam followers and the pressure plate. Moderately tighten the black calibrated pressure plate knob until the tubing is occluded. **DO NOT OVER-TIGHTEN.** The knurled thumbscrew directly over the black knob is used to lock the pressure plate knob in place. The two thumbscrews on either side of the black knob operate the clamp to hold the tubing in position. In general, it is preferable to use the smallest practical tubing at the highest speed rather than large tubing at slow rates. Since the two sides of the pump are 130° out of phase, it is possible to balance out the pulsatile flow characteristics by using two tubes in parallel, joined by a "Y" connector.

Maintenance

Yearly lubrication of the gear box with a light machine oil is suggested but not mandatory. The gear box is available for lubrication by removing the four socket head screws on the front panel. The peristaltic pump head requires no maintenance.

General Care

These pumps are designed for long-term durability. To insure long life of the pump, carefully follow directions for speed changing as outlined in the "Model 600 Multi-Speed Transmission" section on the next page.

Model 600 Multi-Speed Transmission

Description

Unless otherwise noted, all units are for 110-120 AC, 60 cycle operation. The #600 Multi-Speed Transmission is a standardized, motorized gear reduction assembly complete with panel, motor, switch, cord, pilot light and output coupling. It is designed to be used with a number of associated instruments and in special applications. The unit is designed around a variety of reversible direct current and synchronous motors. The transmission consists of a gear train designed to provide 12 steps of reduction. The gears are always in motion and a selector gear actuated by the shift knob is used to pick off any of 12 speeds. The reduction per step and speeds are as follows:

Knob Position	Reduction	1800 RPM Sec/Rev.
1	1	1
2	.4	2.5
3	.2	5
4	.1	10
5	.05	20
6	.02	50
7	.01	100
8	.005	200
9	.002	500
10	.001	1000
11	.0005	2000
12	.0002	5000

Position “:” is a neutral position meaning that the output shaft is disconnected from the gearing.

Operation

To change speeds, the shift knob must be pulled out and turned to the desired position where it then can be released. The selector gear disengaged when the selector knob is pulled out against the spring. **DO NOT ATTEMPT TO CHANGE SPEEDS WITHOUT FIRST PULLING OUT THE SELECTOR KNOB.** While all the gears can be shifted when the motor is running, it is recommended that the motor be shut off when shifting in Positions 1, 2 and 3. As is typical of all gear trains with large reductions, it sometimes may require a short delay before the slowest gears are in a position to mesh.

Lubrication

A light machine oil or grease is recommended for the gears. For motor lubrication, see the motor manufacturer's card.

Model 1210 & 1215 Peristaltic Pumps

Description

Models 1210 and 1215 are peristaltic pumps designed for the transfer of liquids or slurries by peristaltic action on the outside of rubber or plastic tubing. The pump is composed of a #1200 Basic Pump Mechanism coupled to a shunt wound DC motor. A silicon control rectifier system, with a feed-back circuit is used to control the motor speed.

Models #1210 and #1215 are furnished with a capped-connector on the front panel. Only the Model 551 Pump Speed Modulator can be used here (see pages 10-11 for Model 551 data). The two modules can be operated remotely or in response to the Pump Speed Modulator.

The pumping mechanism consists of an aluminum housing containing a central shaft upon which are mounted 13 cams, each 30° apart. Thirteen cam followers fit over the cams, translating the rotating motion into a reciprocal motion. Nylon sheets above and below the cam followers provide a low friction bearing surface. Parallel to the cam shafts are located the two compression plates used to occlude the tubing. A calibrated dial is provided so that a given compression can be reproduced.

Operation

Unless otherwise specified on the product label, these pump operate at 110-125 volt 50-60 cycle. To operate the pump, insert a piece of rubber or plastic between the cam followers and the pressure plate. Moderately tighten the black calibrated pressure plate knob until the tubing is occluded. DO NOT OVER-TIGHTEN. The knurled thumbscrew directly over the black knob is used to lock the pressure plate knob in place. The two thumbscrews on either side of the black knob operate the clamp to hold the tubing in position.

In general, it is preferable to use the smallest practical tubing at the highest speed rather than large tubing at slow rates. Since the two sides of the pump are 180° out of phase, it is possible to balance out the pulsatile flow characteristics by using two tubes in parallel, joined by a "Y" connector. For more efficient reduction of pulses, a trapped air buffer chamber can be set up.

Maintenance

The pump mechanism should require no major maintenance. Normal care and cleaning will ensure proper function. To maintain the motor, remove the front or rear panels to expose the motor, and follow manufacturer's instructions. Tampering with the motor is not recommended. Service should be performed by a qualified technician.

Multiple Tube Adapter

Installation Instructions

The 1220 Multiple Tube Adapter can be assembled to any 1200 Series Peristaltic Pump without altering the pump mechanism. This adapter allows for the use of three 1/4" ID by 1/16" wall tubes, five 1/8" ID by 1/16" wall tubes, or ten 1/16" ID by 1/32" wall tubes. A 1-1/4" adjustable space slot provides vertical alignment for the inserted tubing. Refer to the instructions listed below and the diagram on the following page for the correct assembly procedure.

1. Remove existing 4 screws from the middle section of the #1200 Pump Mechanism and assemble stamped plate (1200-005) over cover. Replace screws.
2. Remove the 2 end cover plates and large thumb screws from pump (discard end cover plates). Attach bracket with thumb screws (1220-002) and slide plate (1220-004) over. Use existing hardware and reassemble. Replace large thumb screw.

Silastic Tubing Information

Silastic brand medical-grade tubing is an inert tubing for surgical and pharmaceutical use. It is unaffected by prolonged shelf storage, exhibits high flexural durability, and may be sterilized repeatedly without deterioration. Its compatibility with body tissues and fluids permits long-term implantation, and its adhesive character resists incrustation and clogging, thereby improving flow characteristics. Silastic tubing will not support bacterial or fungal growth.

Foreign body reactions can be evoked by surface contaminants such as dust, talc, skin oil deposited during handling, etc. Extreme care must be taken to prevent such contamination after cleaning and sterilization.

To Clean

Wash thoroughly in a hot water-soap solution to remove sodium bicarbonate (dusted on surface to facilitate handling) and other possible surface contaminants.

**Use a non-oily mild soap, such as Ivory Flakes.
Do Not use synthetic detergents or oil-based soaps.**

Rinse copiously in hot water and follow with a thorough rinse in distilled water. Flush the lumen of the tubing thoroughly to insure the removal of all traces of soap.

To Sterilize

Wet the tubing lumen just prior to autoclaving. Wrap the tubing in lint-free cloth or place in a clean, open tray.

Autoclave by one of the following methods:

1. High speed instrument (flash) sterilizer - 10 minutes at 270°F (30 psi)
2. Standard gravity sterilizer - 30 minutes at 250°F (15 psi)
3. Prevacuum high temperature sterilizer - normal cycle (30-35 minutes) at 250°F

Silastic medical-grade tubing is heat stable up to 500°F and retains its physical properties such as tensile strength, elasticity, and other elastometric characteristics under repeated sterilizations. Ethylene oxide sterilization is not recommended because it is difficult to determine when gas emission is complete.

Silastic Tubing Information (Contd)

Applications

Clinically reported applications of Silastic brand medical-grade tubing include arterial venous shunts, perfusion tubing for open heart surgery, permanent ureteral prosthesis, intravenous and intra-arterial catheters, intestinal decompression tubes, blood transfusion and parenteral solutions administration tubing, and lacrimal drainage tubes. In published animal test evaluations, favorable results have been reported using Silastic medical-grade tubing for abdominal drains and ureteral prostheses.

Caution

If tubing is cut or nicked, the damaged portion should be removed; cuts can reduce tubing tear strength.

Note: Tubing is not sterile upon delivery. Follow the abovedirections carefully for cleaning and sterilization.

Availability

Silastic tubing is available in 1/8" and 1/4" inner diameters x 1/16" wall thickness directly from Harvard Apparatus Company (#2325P and #2327P, respectively) in 50 feet lengths. Tubing is also available from Dow-Corning Corporation in Midland, Michigan.

Tubing & Flow Rates

Model 1203 Peristaltic Pump

Silastic Tubing, 7.7 m (25 ft) Coils

Tubing ID x OD	Flow Rate Minimum	Maximum	Catalog Number
1/16 x 3/16 inches	0.000133 ml/min	6.8 ml/min	56-4850
1/8 x 1/4 inches	0.00042 ml/min	21 ml/min	56-4849
3/16 x 5/16 inches	0.0008 ml/min	39 ml/min	56-4831
1/4 x 3/8 inches	0.0012 ml/min	60 ml/min	56-4823
5/16 x 7/16 inches	0.0017 ml/min	84 ml/min	56-4815
3/8 x 1/2 inches	0.002 ml/min	114 ml/min	56-4807

Model 1210 & 1210A Peristaltic Pump

Silastic Tubing, 7.7 m (25 ft) Coils

Tubing ID x OD	Flow Rate Minimum	Maximum	Catalog Number
1/16 x 3/16 in	1.2 ml/min	20 ml/min	56-4850
1/8 x 1/4 in	3.5 ml/min	70 ml/min	56-4849
3/16 x 3/16 in	6.5 ml/min	130 ml/min	56-4831
1/4 x 3/8 in	10 ml/min	200 ml/min	56-4823
5/16 x 7/16 in	14 ml/min	280 ml/min	56-4815
3/8 x 1/2 in	19 ml/min	380 ml/min	56-4807

Model 1215 & 1215A Peristaltic Pump

Silastic Tubing, 7.7 m (25 ft) Coils

Tubing ID x OD	Flow Rate Minimum	Maximum	Catalog Number
1/16 x 3/16 in	3.3 ml/min	70 ml/min	56-4850
1/8 x 1/4 in	10.5 ml/min	210 ml/min	56-4849
3/16 x 3/16 in	18.5 ml/min	390 ml/min	56-4831
1/4 x 3/8 in	310 ml/min	600 ml/min	56-4823
5/16 x 7/16 in	42 ml/min	840 ml/min	56-4815
3/8 x 1/2 in	57 ml/min	1140 ml/min	56-4807