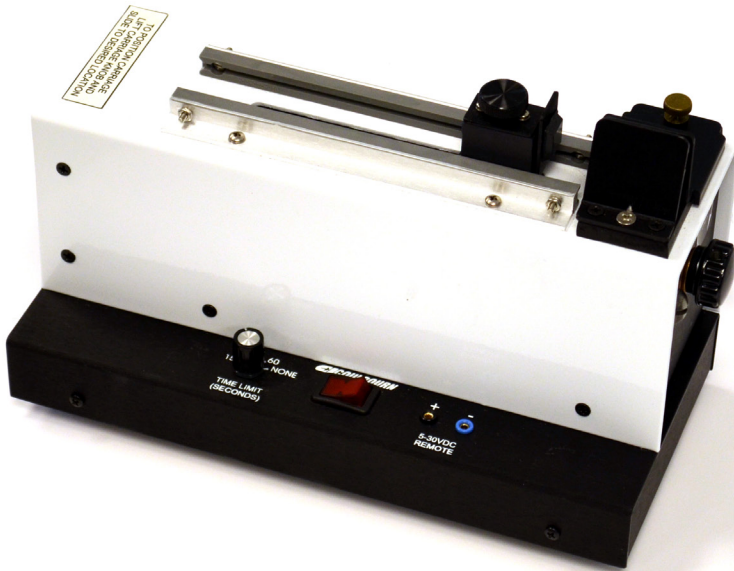


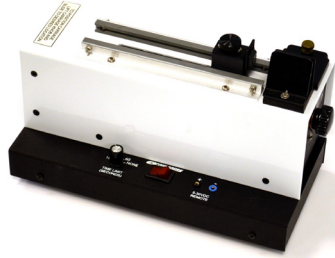
# Modified Syringe Pump User's Manual



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## Description

The 80203 Syringe Pump is designed to connect to the DC control output provided by operant/behavioral control systems while an AC powered synchronous motor guarantees reliable and consistent delivery. A safety stop switch disconnects power from the AC motor when the end of the syringe is reached. Flow rate is controlled by the speed of the motor and the size of the syringe. Sample flow rates are listed on the tables below.



## Specifications

<b>Standard Motor:</b>	3.33 RPM, 115 V AC 60 Hz
<b>Control Voltage:</b>	5 – 30 Volts DC
<b>Safety Timer:</b>	15, 30, 45, 60 seconds
<b>Flow Rate:</b>	0.115 cc/min (1 cc syringe) to 4.02 cc/min (50 cc syringe)
<b>Accuracy:</b>	> 0.50%
<b>Repeatability:</b>	> 0.50%
<b>Overall Size:</b>	9.375" L x 4.75" H x 3.25" W (23.8 cm x 12.1 cm x 8.3 cm)

## Operation

**Electrical:** To operate the pump, connect the control output to the black and blue pin jack on the side of the pump. Make sure that the + side of the power supply connects to the Black pin jack and that the ground side (usually the output line) connects to the Blue pin jack. This may be a little unconventional for some systems so please follow the connections carefully. The cable provided is color-coded. The black and blue end is color coded for the pump. The red and black end is color coded for the ABET control system and other + 24 - 30 V DC systems. Connect the Red wire to + 28 V DC and the black to any available output.

**Syringe Installation:** Pull the pin on the slide bar up and move the slide back. Install a filled syringe connected to a delivery line, swivel and leash or liquid reward area. Move the slide up to the syringe plunger and engage the pin. Use the knob on the front of the unit to prime the system. Turn the AC of the pump ON (Enable). Turn the output line on to dispense the liquid. The pump will continue to dispense as long as the output is turned on up to the time limit set on the safety timer.

## Safety Timer

This standard built in feature is an expensive option on most pumps. It is designed to prevent over dosing of the animal or flooding of the test area should the pump remain energized due to a program error or computer failure that leaves the control output turned on. Set the timer to the limit desired or select "none" to disregard the timer entirely.

## Calibration

The formula for calculating the flow rate for the 80203 Infusion Pump with a 3.33 RPM motor is: Motor RPM x 0.19538 x Cross Sectional Area of Syringe.

The cross sectional area of three popular syringes with the associated infusion rates are given at right.

**Multifit syringes manufactured by Becton-Dickinson**

Syringe Size:	1cc	2cc	5cc	10cc	20cc	30cc	50cc
X-Sectional Area:	0.176	0.626	1.084	1.692	3.017	4.047	6.173
Flow Rates:							
mL/min	0.11451	0.40729	0.70527	1.10084	1.96291	2.63304	4.01625
mL/sec	0.00191	0.00679	0.01175	0.01835	0.03272	0.04388	0.06694
uL/sec	1.91	6.79	11.75	18.35	32.72	43.88	66.94

**Plastipak syringes manufactured by Becton-Dickinson**

Syringe Size:	1cc	2cc	5cc	10cc	20cc	30cc	50cc
X-Sectional Area:	0.173	N/A	1.129	1.635	2.85	3.662	5.556
Flow Rates:							
mL/min	0.11256	N/A	0.73454	1.06376	1.85425	2.38255	3.61482
mL/sec	0.00188	N/A	0.01224	0.01773	0.0309	0.03971	0.06025
uL/sec	1.91	N/A	12.24	17.73	30.90	39.71	60.25

**Monoject syringes manufactured by Sherwood Medical**

Syringe Size:	1cc	2cc	5cc	10cc	20cc	30cc	50cc
X-Sectional Area:	0.173	0.622	1.263	1.977	3.308	4.474	5.545
Flow Rates:							
mL/min	0.11256	0.40468	0.82173	1.28627	2.15224	2.91085	3.60766
mL/sec	0.00188	0.00674	0.0137	0.02144	0.03587	0.04851	0.06013
uL/sec	1.88	6.74	13.7	21.44	35.87	48.51	60.13

**Final Calibration**

Use the previous information to obtain an approximate output pulse for the volume desired. Variations in syringes, tubing and the liquid dispensed may affect the final amount of liquid dispensed. Therefore, for precise calibration, arrange for the pump to discharge a sample volume of liquid into a suitable container with multiple pulses from the control system. The receiving container should be weighed accurately, and re-weighed after receiving the sample liquid. From this a precise volume per pulse can be determined.

# Terms and Conditions

## LIC Worldwide Headquarters

Toll-Free: (800) 428-7545 (USA only)

Phone: (765) 423-1505

Fax: (765) 423-4111

Email: [sales@lafayetteinstrument.com](mailto:sales@lafayetteinstrument.com)

[export@lafayetteinstrument.com](mailto:export@lafayetteinstrument.com) (Outside the USA)

## Mailing Address:

Lafayette Instrument Company

PO Box 5729

Lafayette, IN 47903, USA

## Lafayette Instrument Europe:

Phone: +44 1509 817700

Fax: +44 1509 817701

Email: [eusales@lafayetteinstrument.com](mailto:eusales@lafayetteinstrument.com)

## Phone, Fax, Email or Mail-in Orders

All orders need to be accompanied by a hard copy of your purchase order. All orders must include the following information:

- Quantity
- Part Number
- Description
- Your purchase order number or method of pre-payment
- Your tax status (include tax-exempt numbers)
- Shipping address for this order
- Billing address for the invoice we'll mail when this order is shipped
- Signature and typed name of person authorized to order these products
- Your telephone number
- Your email address
- Your FAX number

## Domestic Terms

There is a \$50 minimum order. Open accounts can be extended to most recognized businesses. Net amount due 30 days from the date of shipment unless otherwise specified by us. Enclose payment with the order; charge with VISA, MasterCard, American Express, or pay COD. We must have a hard copy of your purchase order by mail, E-mail or fax. Students, individuals and private companies may call for a credit application.

## International Payment Information

There is a \$50 minimum order. Payment must be made in advance by draft drawn on a major US bank; wire transfers to our account; charge with VISA, MasterCard, American Express, or confirmed irrevocable letter of credit. Proforma invoices will be provided upon request.

## Exports

If ordering instrumentation for use outside the USA, please specify the country of ultimate destination, as well as the power requirements (110V/60Hz or 220V/50Hz). Some model numbers for 220V/50Hz will have a "C" suffix.

## Quotations

Quotations are supplied upon request. Written quotations will include the price of goods, cost of shipping and handling, if requested, and estimated delivery time frame. Quotations are good for 30 days, unless otherwise noted. Following that time, prices are subject to change and will be re-quoted at your request.

## Cancellations

Orders for custom products, custom assemblies or instruments built to customer specifications will be subject to a cancellation penalty of 100%. Payment for up to 100% of the invoice value of custom products may be required in advance. Cancellation for a standard Lafayette Instrument manufactured product once the product has been shipped will normally be assessed a charge of 25% of the invoice value, plus shipping charges. Resell items, like custom products, will be subject to a cancellation penalty of 100%.

## Exchanges and Refunds

Please see the cancellation penalty as described above. No item may be returned without prior authorization of Lafayette Instrument Company and a completed Return Form. A copy of the Return Form or your assigned Return # (you will receive this via email after submitting the form) must be included with the returned goods. The merchandise should be packed well and fully insured. Unopened merchandise may be returned prepaid within thirty (30) days after receipt of the item and in the original shipping carton. Collect shipments will not be accepted. Returned products must be in saleable condition, and credit is subject to inspection of the merchandise.

## Repairs

**Instrumentation may not be returned without prior authorization by Lafayette Instrument Company and a completed Return Form. When you**

**complete the Form, or call Lafayette Instrument, you will receive a Return #. Your Return # number will be good for 30 days. Address the shipment to:**

Lafayette Instrument Company  
3700 Sagamore Parkway North  
Lafayette, IN 47904, USA.

Shipments cannot be received at the LIC PO Box. Items should be packed well, insured for full value, and returned along with a copy of the Return Form or the Return #. An estimate of repair will be given prior to completion ONLY if requested in an enclosed cover letter. We must have a completed purchase order by mail or fax, or repair work cannot commence for non-warranty repairs.

## Damaged Goods

Damaged instrumentation should not be returned to Lafayette Instrument prior to a thorough inspection. If a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. If damage is not detected at the time of delivery, contact the carrier/shipper and request an inspection within 10 days of the original delivery. Please call the Lafayette Instrument Customer Service Department for repair or replacement of the damaged merchandise.

## Limited Warranty

Lafayette Instrument Company warrants equipment manufactured by the company to be free of defects in material and workmanship for a period of one year from the date of shipment, except as provided hereinafter. The original manufacturer's warranty will be honored by Lafayette Instrument for items not manufactured by Lafayette Instrument Company, i.e. resell items. This assumes normal usage under commonly accepted operating parameters and excludes consumable products.

Warranty period for repairs or used instrumentation purchased from Lafayette Instrument is 90 days. Lafayette Instrument Company agrees either to repair or replace, at its sole option and free of part charges to the customer, instrumentation which, under proper and normal conditions of use, proves to be defective within the warranty period. Warranty for any parts of such repaired or replaced instrumentation shall be covered under the same limited warranty and shall have a warranty period of 90 days from the date of shipment or the remainder of the original warranty period whichever is greater. This warranty and remedy are given expressly and in lieu of all other warranties, expressed or implied, of merchantability or fitness for a particular purpose and constitutes the only warranty made by Lafayette Instrument Company.

Lafayette Instrument Company neither assumes nor authorizes any person to assume for it any other liability in connection with the sale, installation, service or use of its instrumentation. Lafayette Instrument Company shall have no liability whatsoever for special, consequential, or punitive damages of any kind from any cause arising out of the sale, installation, service or use of its instrumentation. All products manufactured by Lafayette Instrument Company are tested and inspected prior to shipment. Upon prompt notification by the Customer, Lafayette Instrument Company will correct any defect in warranted equipment of its manufacture either, at its option, by return of the item to the factory, or shipment of a repaired or replacement part. Lafayette Instrument Company will not be obliged, however, to replace or repair any piece of equipment, which has been abused, improperly installed, altered, damaged, or repaired by others. Defects in equipment do not include decomposition, wear, or damage by chemical action or corrosion, or damage incurred during shipment.

## Limited Obligations Covered by this Warranty

1. In the case of instruments not of Lafayette Instrument Company manufacture, the original manufacturer's warranty applies.
2. Shipping charges under warranty are covered only in one direction. The customer is responsible for shipping charges to the factory if return of the part is required.
3. This warranty does not cover damage to components due to improper installation by the customer.
4. Consumable and/or expendable items, including but not limited to electrodes, lights, batteries, fuses, O-rings, gaskets, and tubing, are excluded from warranty.
5. Failure by the customer to perform normal and reasonable maintenance on instruments will void warranty claims.
6. If the original invoice for the instrument is issued to a company that is not the company of the end user, and not an authorized Lafayette Instrument Company distributor, then all requests for warranty must be processed through the company that sold the product to the end user, and not directly to Lafayette Instrument Company.

## Export License

The U.S. Department of Commerce requires an export license for any polygraph system shipment with an ULTIMATE destination other than: Australia, Japan, New Zealand or any NATO Member Countries. It is against U.S. law to ship a Polygraph system to any other country without an export license. If the ultimate destination is not one of the above listed countries, contact us for the required license application forms.