Syringe Pumps…*And More*

So Advanced They're Simple!

COMPANY OVERVIEW | LEGATO SERIES | ADAGIO SYRINGE PUMP SOFTWARE | LEGACY SERIES | SPECIALTY PRODUCTS | EZFLOW SERIES | SYRINGES & ACCESSORIES

COMPANY OVERVIEW

Table of Contents

The KD Scientific Advantage

Recognized Worldwide...

KD Scientific syringe pumps are the #1 choice of life science and industrial researchers for their:
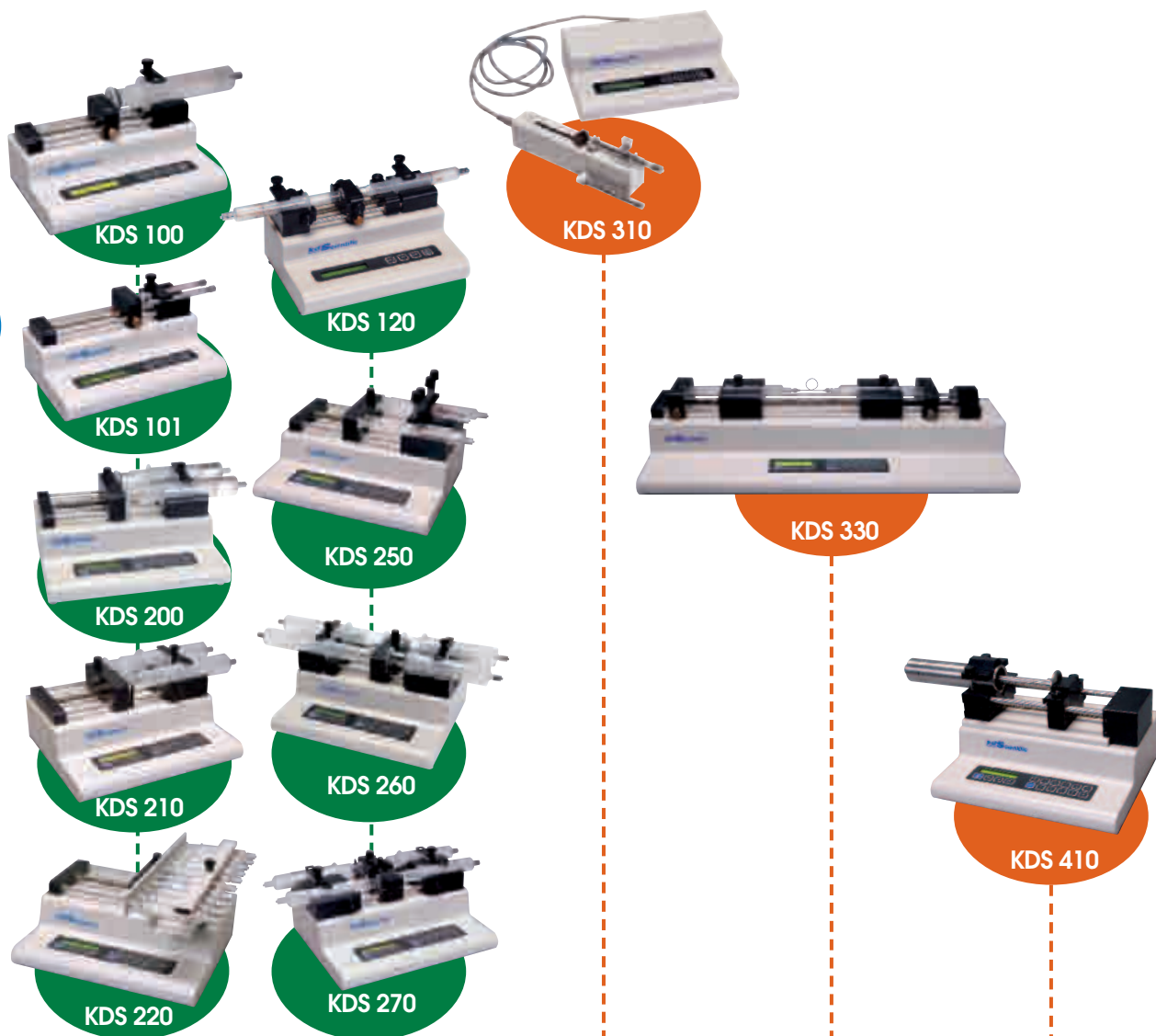
- High performance accuracy and precision
- Easy-to-use interface for simple operation
- Rugged design for long-life and reliability
- Anti-vibration technology eliminating operational noise
- Stall detection and alarms
- Superior engineering design without fans, eliminates thermal and environmental contamination for higher reliability and operation
- Configurability for your applications:
  - *Single, double, four, ten syringes*
  - *Infuse or infuse/withdraw or push pull*
  - *Programmable and advanced programmable*
  - *Specialized systems*
  - *OEM models*
  - *High pressure*
- Broad flow rate range from high to low
- World-wide support when you need it

KD Scientific pumps are acknowleged as the industry's highest valued solution for delivering precise and smooth flow. KD Scientifc is recognized worldwide for quality and reliability at an economical price and has the broadest line of syringe pumps to meet your specific application. KD Scientific is committed to delivering the highest level of customer satisfaction, as well as technical support for all their products.

COMPANY OVERVIEW

History of *kdScientific*

kdS

- KDS 100
- KDS 120
- KDS 310
- KDS 330
- KDS 101
- KDS 250
- KDS 200
- KDS 410
- KDS 210
- KDS 260
- KDS 220
- KDS 270

1991	1992	1995	2000	2002	2005
KD Scientifc Established Released KDS 220	KDS 100, 101, 200, 210	KDS 120, 250, 260, 270	KDS 310	KDS 330	KDS 410

Ultraspense 2000 Dispenser

EZ Flow Pumps

Legato 200

Legato 210

Legato 270

Adagio Software

Legato 100

Legato 101

Legato 110

Legato 111

Legato 130
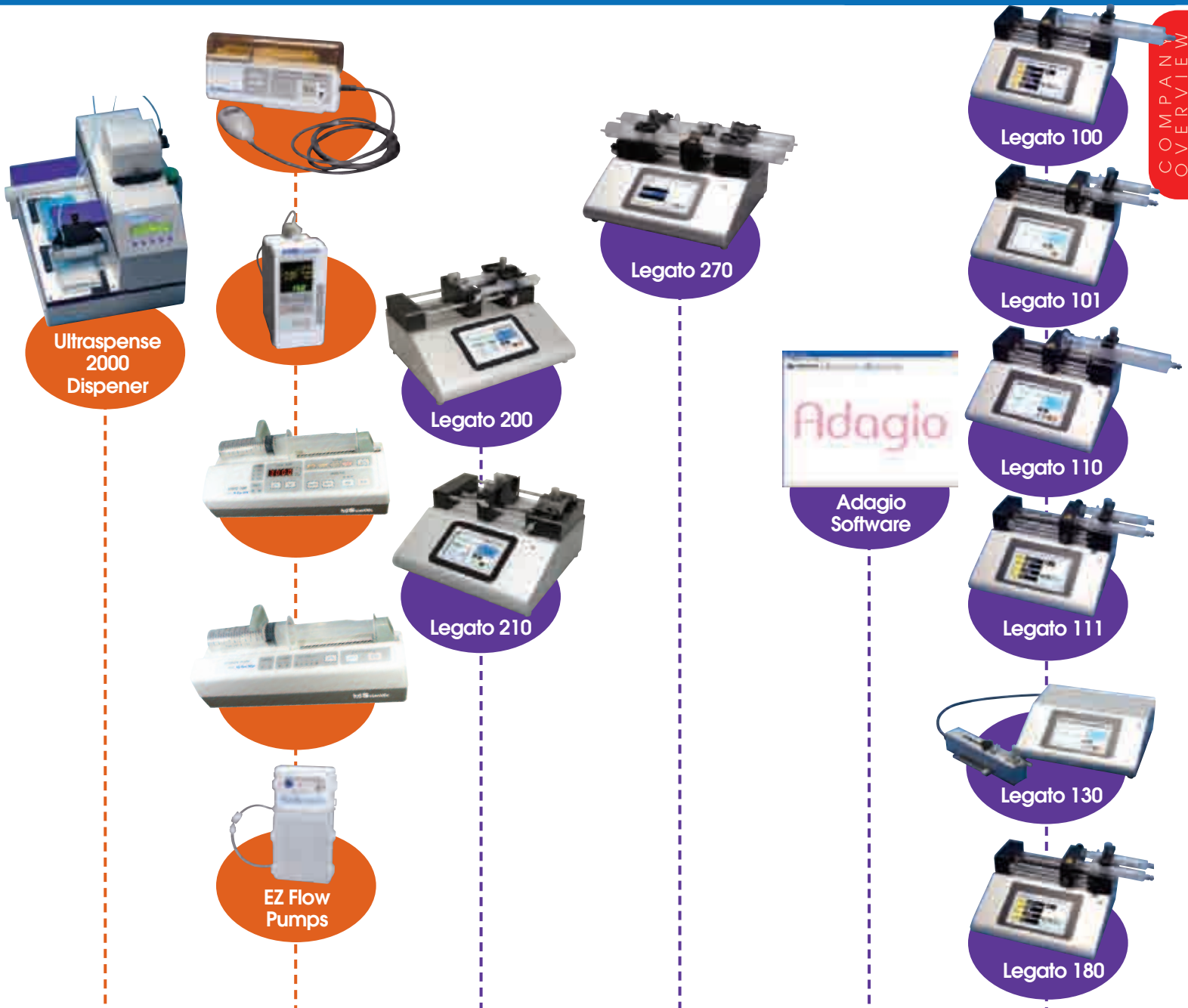
Legato 180

2006	2008	2009	2010 and Beyond		
Ultraspense 2000 Dispener	EZ Flow Pumps	Introduced Legato™ 200 & 210	Legato™ 270	Adagio™ Software	Legato™ 100, 101, 110, 111, 130, 180

COMPANY OVERVIEW

**T**he following is an extensive list of application areas in which syringe pumps are utilized. The superior performance of KD Scientific syringe pumps has made them prominent in publications for their outstanding performance, smooth flow and rugged design. Bibliographies and publications are available at:

www.kdscientific.com

Extensive Applications

- Calibration
- Diluting
- Dispensing
- Dosing
- Emulsification
- Fluid Transfer
- Infusion of Fluids
- Mixing
- Perfusion
- Timed Delivery
- Withdrawal of Fluids
- Slow Infusion
- Volumetric Dispensing
- MS Calibration
- Microfluidics/Microfluidic Channel Injections
- Surface Plasma Resonance
- Biotech Research and Development
- Drug Discovery
- Neuroscience
- Organic Synthesis
- Aerosol Injection/Nebulization
- Agriculture
- Animal Drug/Nutrient Injections
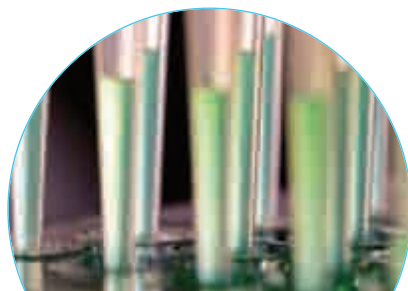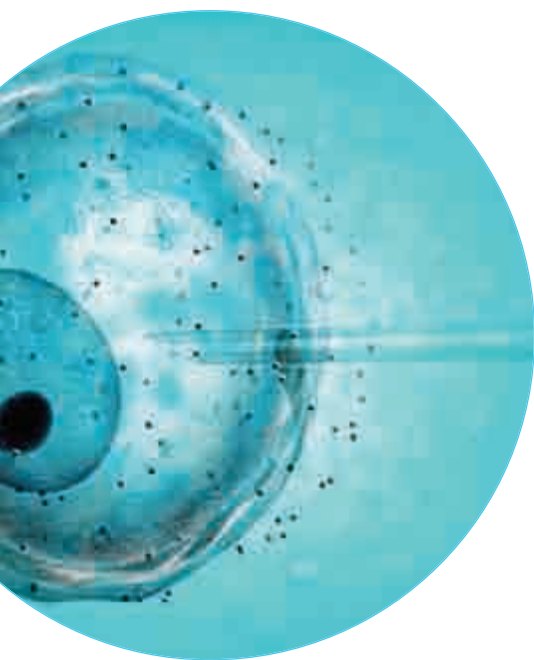- Automotive Research
- Cell Injections
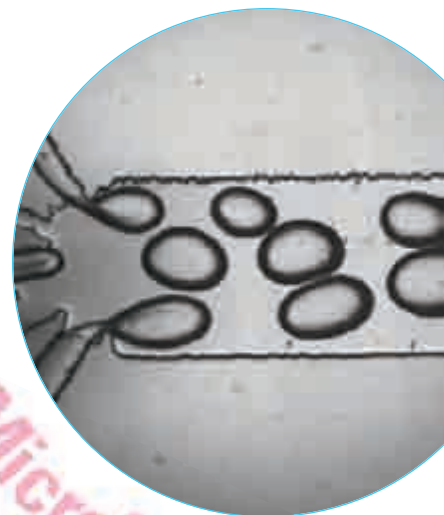
Electrospinning

Microfluidics

Electrospray

Mass Spec

- **Chemical Development**
- **Pilot Plant Reactor Dosing**
- **Continuous Flow**
- **Dye Dilution**
- **Dye/Isotope Injection**
- **Electrospinning**
- **Emulsification**
- **Emulsion Polymerization**
- **Entomology**
- **Geological Sampling**
- **Isotope Injections**
- **Liquid Chromatography Injections**
- **Metered Dispensing**
- **Microdialysis**
- **Micro-Filtration**
- **Perfusion**
- **Pharmaceutical Development**
- **Polymer Research**
- **Post Column Addition**
- **Electrospray (ESI-MS)**
- **HPLC Mass Spec**
- **Lock Mass Infusion/Calibration**
- **MALDI-TOF Matrix Addition**
- **Nano Flow Rates**
- **Precision Mass Spec**
- **Capillary Electrophoresis**

- **Cell Manipulation**
- **Cell Patterning**
- **Cell Separation**
- **Chemical Binding Coefficients**
- **Chemical Gradient Formation**
- **Enzyme Reaction Kinetics**
- **Flow Cytometry**
- **Fluid Viscosity**
- **Immunoassays**
- **Reactor Injections**
- **Toxicology Studies**
- **Viscosity/Viscometer Systems**
- **Weather Research**

Organic Synthesis

Drug Infusions

Emulsifier

Maldi-TOF

LEGATO™ SERIES

The Legato product line is the latest generation of syringe pumps. The Legato™ series offers unparalleled ease of use through the high resolution color touch screen user interface. The full touch screen interface enables the user to quickly create configurations and recall them for easy use. The 4.3" TFT color display with touch pad interface presents all the pump operating parameters on one easy to view run screen.

Legato™ Series: The Newest

- **Displays More Information Simultaneously**
- **Easy to Use and Set up Different Configurations**
- **Intuitive Graphic Interface and Touch screen**
- **International Icons Easy to Use in Any Language**
- **Alarm Indication and Messages**
- **Pump Diagnostic/Information**
- **USB Interface**
- **Graphic Software to configure and monitor the pumps**

Legato™ 100 Series

Legato™ 200 Series

Legato's Design Advantages

In today's economic environment, multiple users with different experiments are using the same pump. The next generation of pump has to meet these demands. The pump's role in the experiment now changes more readily with multiple users using one pump and multiple tests being done with a single pump.

- Programs need to be stored & easily recalled
- Users wanted the flexibility of changing syringe mechanisms in the field: going from large to small syringes, or from 2 to 10 syringes
- Better flow performance and repeatability with measurements down to nl/hour
- Stronger syringe clamping at higher pressures -not just simple spring clamping

Engineered to Meet Global Regulatory Compliance

Worldwide use of the pumps and changing regulatory compliance meant redesigning the unit to meet these new standards including lead free boards. The new Legato™ is a pump that will meet worldwide regulations.

WEEE | CE | ETL | Underwriters Laboratories | RoHS | CB Scheme

Benchmark for Ease of Use
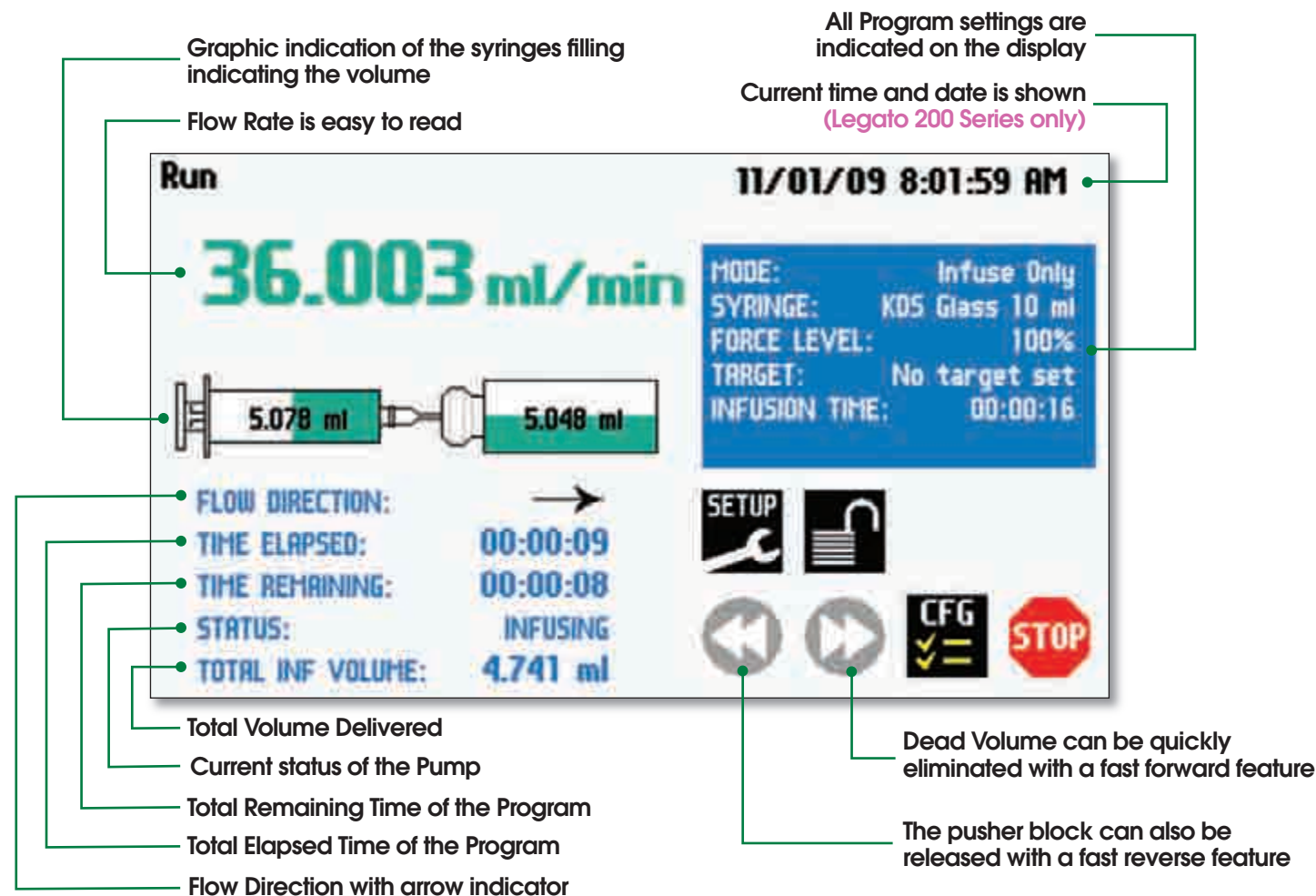
Optimize Bench Space

The Legato™ Series optimizes the bench space in your lab. For limited laboratory space the Legato™ series can be placed on its side to reduce the footprint by 4 Times. The display orientation changes automatically with the Legato™ 200 Series. The Legato™ 100 Series display orientation can be changed manually to allow the user operate the pump vertically.

LEGATO™ SERIES

Horizontal Orientation

Vertical Orientation
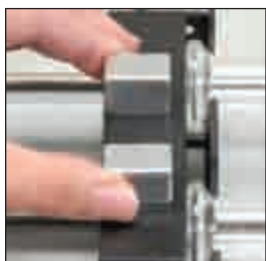Display Rotates 90°

Intuitive Run Screen

Combining multiple parameters simultaneously with internationally recognizable icons allow the Legato™ Series to provide a new level of intuitive syringe pump operation.

Graphic indication of the syringes filling indicating the volume

Flow Rate is easy to read

All Program settings are indicated on the display

Current time and date is shown
(Legato 200 Series only)

Run   11/01/09 8:01:59 AM

36.003 ml/min

5.078 ml   5.048 ml

MODE: Infuse Only
SYRINGE: KDS Glass 10 ml
FORCE LEVEL: 100%
TARGET: No target set
INFUSION TIME: 00:00:16

FLOW DIRECTION: →
TIME ELAPSED: 00:00:09
TIME REMAINING: 00:00:08
STATUS: INFUSING
TOTAL INF VOLUME: 4.741 ml

SETUP   [unlock icon]

CFG   STOP

Total Volume Delivered

Current status of the Pump

Total Remaining Time of the Program

Total Elapsed Time of the Program

Flow Direction with arrow indicator

Dead Volume can be quickly eliminated with a fast forward feature

The pusher block can also be released with a fast reverse feature

LEGATO SERIES

The Legato's proven syringe mechanism design is easy to use and securely holds the syringes for smooth flow performance.

A Rugged Design, Maximum

- One touch quick release pusher block is easy to use and is always engaged.

- Advanced mechanical syringe mechanism incorporates a dual purpose, syringe clamp for large syringes, >30 ml, or simply flip the syringe clamp to hold smaller syringes, <30 ml to 0.5 µl.

- Rubber pads retain syringe in place preventing accidental breakage of glass syringes.

- Curved syringe clamp design securely retains syringes, eliminating slippage of the syringe under high force applications with viscous fluids.

- Adjustable linear force, ensures the right force is applied for the various syringe sizes.

Quick Release Pusher Block

Transparent Cover and sealed to Protect Display

No Stick Metal Guide Rods

Clamp Flips Multi-Size Syringes

Spill Dams to Contain Leaks

Quick Release Pusher Block

Legato 200 Series

SETUP
ENTR
RUN
DELAY
STOP
CFG

Easy-to-Use Graphic Icons

Durable Construction with Welded Metal Chassis

Legato 100 Series

Performance and Reliability

Less Vibration & Deformation

The welded steel chassis out-performs the conventional plastic chassis. The chassis provides a rigid platform without deformation under high pressure. Operation of the pump is quieter and there is less vibration transferred to the syringes because of this unique design.

Conventional Pump

Optimal EMI/RFI Shielding with Welded Steel Chassis

The superior design of the full metal chassis provides noise isolation and anti-vibration features for increased reliability. All syringe racks are hardened rolled steel and will not deform with pressure.

Chemically Resistive Anti-Glare Cover

Protection of the display is through a transparent anti-glare cover. The spill dam is designed to prevent fluids from ingressing into the sealed display.

No other syringe pump performs like the Legato™ Series. It offers a broad flow rate range along with superior accuracy and repeatability.

LEGATO SERIES

Advanced KDS Mechanical
Legato's Superior Flow Performance

Flow performance is optimized with a small step angle microstepping motor that drives a precision lead screw and pusher block. Advanced micro-stepping techniques are employed to further reduce the step angle to eliminate flow pulsation. Legato's 200 Series accuracy is +/- 0.35% and has 0.05% reproducibility. A wide dynamic flow range from 5 pl/min to 220.97 ml/min can be programmed into the pump. The Legato 100 Series has 0.5% accuracy and 0.05% reproducibility. Additionally, flow rates are user selectable with engineering units from ml, μl, nl, pl, and hours, minutes and seconds. Legato 180 is the ultimate picoliter flow pump. It has 0.35% accuracy and 0.05% reproducibility with a flow range from 0.58 pl/min to 11.70 ml/min.
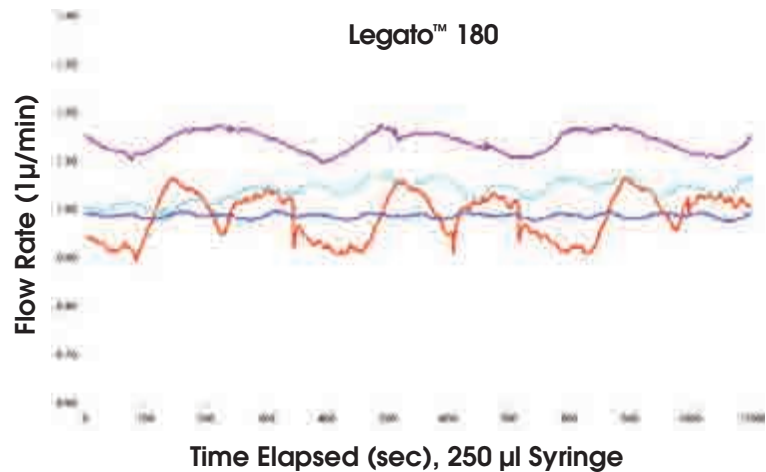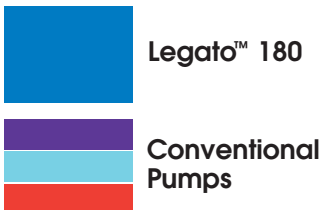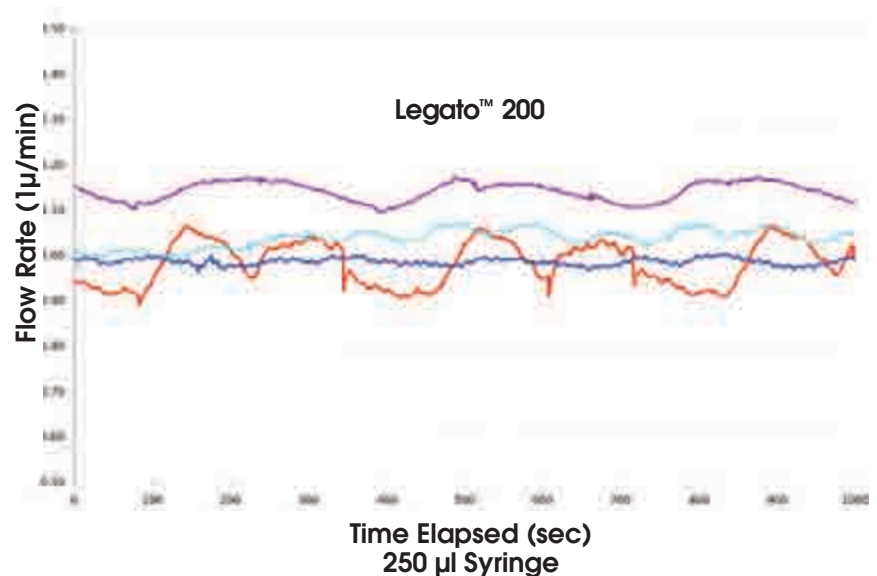
Design for Superior Flow Performance

Legato™ 100 versus Conventional Syringe Pumps

- Legato™ 100, 101, 110, 111
- Conventional Pumps

Legato™ 100

Flow Rate (1µ/min)

Time Elapsed (sec), 250 µl Syringe
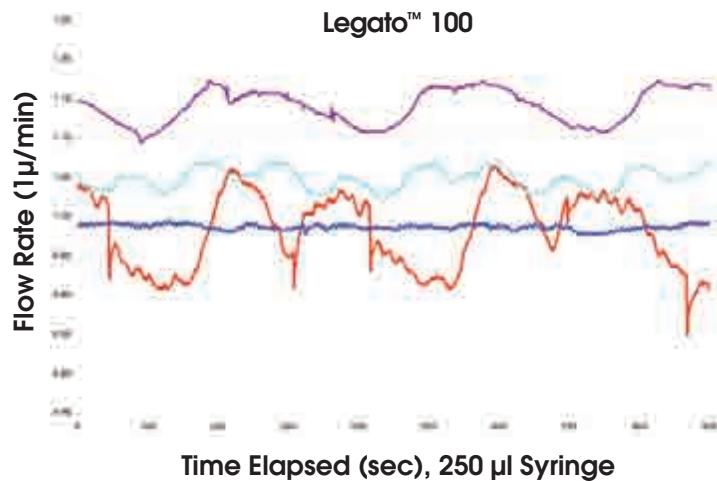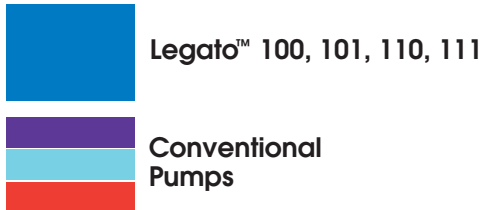
Legato™ 180 versus Conventional Syringe Pumps

- Legato™ 180
- Conventional Pumps

Legato™ 180

Flow Rate (1µ/min)

Time Elapsed (sec), 250 µl Syringe

Legato™ 200 versus Conventional Syringe Pump

- Legato™ 200, 210, 210P, 270, 270P
- Conventional Pumps

Legato™ 200

Flow Rate (1µ/min)

Time Elapsed (sec)
250 µl Syringe
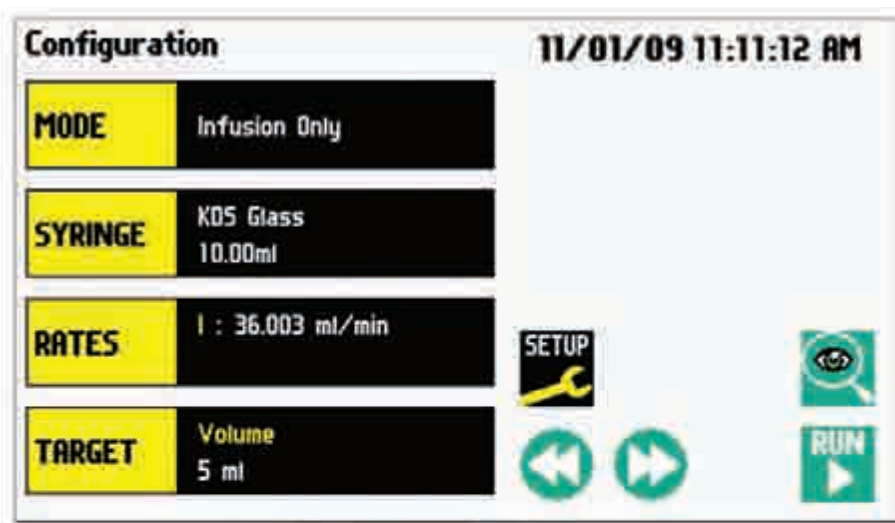
LEGATO SERIES
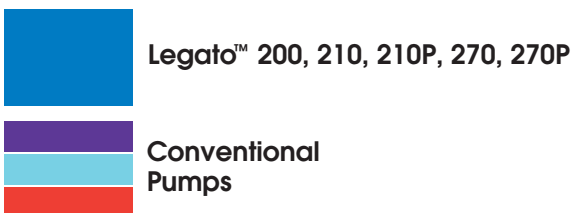
Legato™ is quick to configure; an easy to use screen shows all the parameters in one display. In four quick steps….

1 Select the Mode

2 Select the Syringe Size and Type

3 Select the Flow Rate

4 Select the Total Volume to be delivered or select the Total Time

A Fast Experimental Setup

Configuration   11/01/09 11:11:12 AM

MODE — Infusion Only
SYRINGE — KDS Glass 10.00ml
RATES — I : 36.003 ml/min
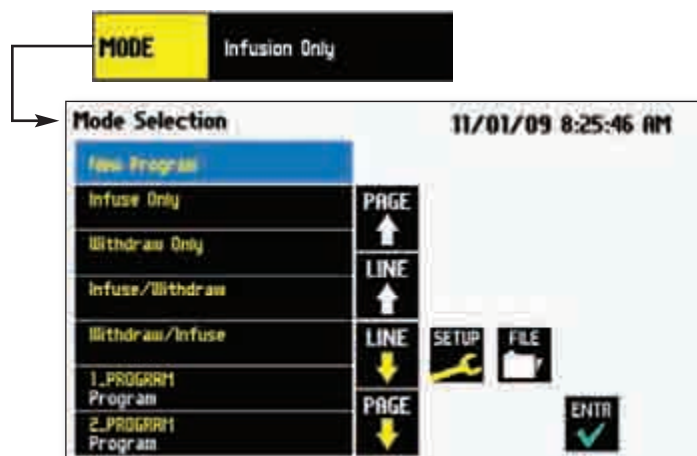TARGET — Volume 5 ml

SETUP   RUN

The interface Configuration Screen with simultaneous display of parameters makes experimental setup and execution as simple as a touch of the screen.
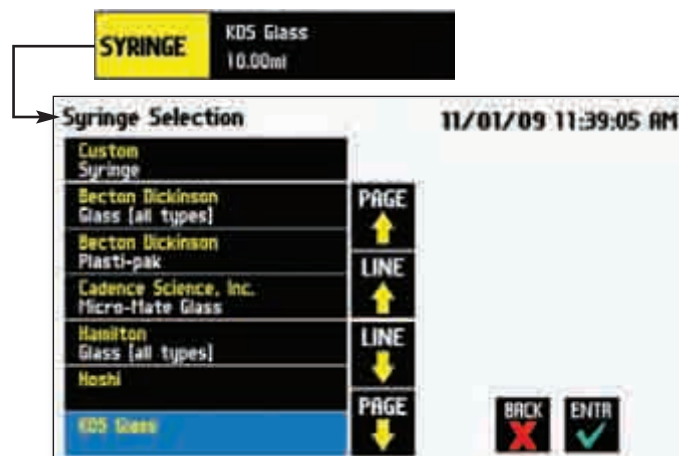
Step 1: Mode Selection

Depending on the model of pump, the unit can be configured to:

- Infuse Only
- Withdraw Only
- Infuse/Withdraw
- Infuse/Withdraw Continuous
- Infuse/Withdraw Programmable
- Withdraw/Infuse
- Withdraw/Infuse Programmable
- Define Your Own Custom Programs/Recipes

MODE — Infusion Only

Mode Selection   11/01/09 8:25:46 AM

New Program / Infuse Only / Withdraw Only / Infuse/Withdraw / Withdraw/Infuse / 1_PROGRAM Program / 2_PROGRAM Program

PAGE ↑ / LINE ↑ / LINE ↓ / PAGE ↓ / SETUP / FILE / ENTR ✓

Step 2: Wide Range of Syringes

Use any manufacturers' syringes, from 0.5 μl to 140 ml. Any type of syringe including glass, plastic and stainless steel syringes.

SYRINGE — KDS Glass 10.00ml

Syringe Selection   11/01/09 11:39:05 AM

Custom Syringe / Becton Dickinson Glass [all types] / Becton Dickinson Plasti-pak / Cadence Science, Inc. Micro-Mate Glass / Hamilton Glass [all types] / Hoshi / KDS Glass

PAGE ↑ / LINE ↑ / LINE ↓ / PAGE ↓ / BACK ✗ / ENTR ✓
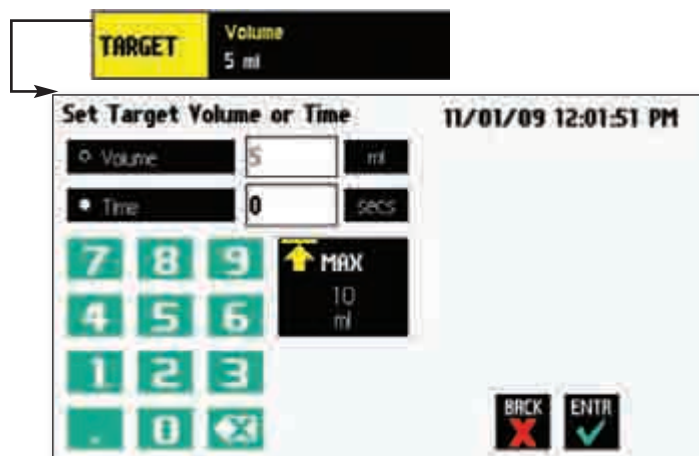
and Execution

Step 3: Wide Flow Rate Range

Minimum and Maximum flow shown for each size of syringe.
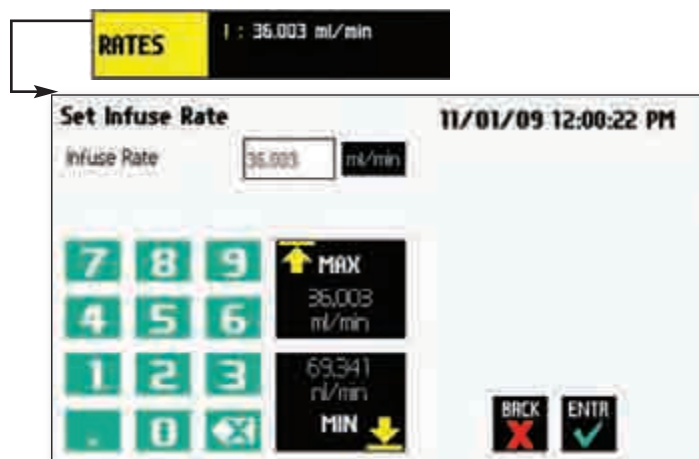
Step 4: Selectable Target Volume & Time

Select the total volume from nl to ml. Units are selectable - or for infuse only, select the time.

Setup is Easy with Diagnostics and Pump Information

Select the parameters for the configuration and display the pump information. The Diagnostic Pump Information screen shows:

• The pump's parameters, including the calibration and maintenance dates.

• Messages indicating when it is time to recalibrate the unit or when it is time for regular maintenance.

• Pump software version, calibration & lubrication intervals.

(Legato 200 Series Shown)

Notifications and Error Messages

Notifications and error messages are displayed for the user to acknowledge, eliminating any guesswork about problems.
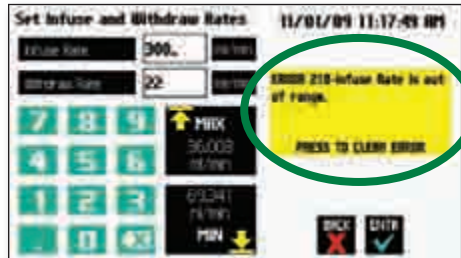
Legato™ Features 5 Different Alarms:

The pump's alarm configurability includes alarms for near-end of run (user selectable), completion of run, power-up, keypad clicks, stall detection and calibration reminder.

• **End of Run**

• **Near End of Run**

• **Power Up**

• **Stalled Condition**

• **Calibration Reminder** (Only available on the Legato 200 Series)
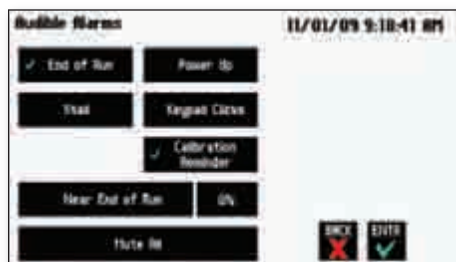
* All screens shown for the Legato 200 Series

L E G A T O™ S E R I E S

Multiple users can use the programmable pump saving their specific configurations and recalling them with a touch of a button. Also, different tests can be setup and stored for quick operation. The Multi-step program models offer maximum flexibility and capability for configuring and running different programs/recipes.

Simple Configurations for

Configure Custom Programs Quickly

Standard profiles make custom programs easy to setup. If more complexity is needed the user can select from advanced preprogrammed functions including:

- **Constant Rate**
- **Ramp**
- **Stepped** (Legato 200 Series Only)
- **Pulse** (Legato 200 Series Only)

Pre-defined profiles for easy configuration.

- Easy retrieval of multiple programs with labels.
- Easy flow configuration with predefined functions such as ramp, constant rate, pulse, link, start, stop, and elapsed time.
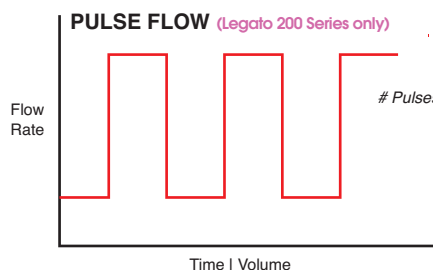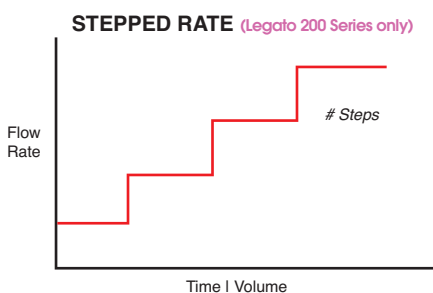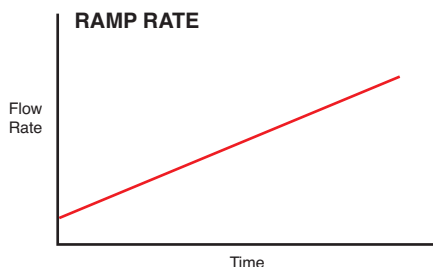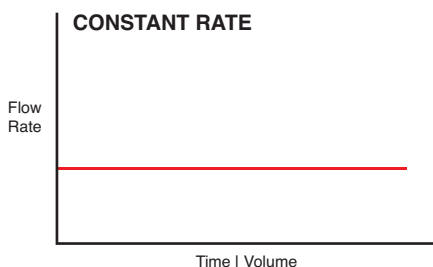
- Control the programs through real and relative clock
- Legato 200 Series Programmable has up to 40 programs of 20 steps each that can be configured and stored in the unit; quickly recalling programs with the touch of a button.
- Legato 110, 111 & 180 have 2 programs with 50 steps each.
- Identify programs with a 15-character alphanumeric name for easy identification. Store custom programs on the computer and download at future dates.
- Start and stop programs with real time clock or using elapsed time (Real time clock with the Legato 200 Series only)

Linking and activating steps is easy with:

Trigger programs with pre-defined options.

- Go-To statements*
- Time Delays
- Repeating steps
- Linking different programs*
- Stopping the pump
- Triggering the pumps using TTL output
- Accepting an event input, such as a user touch or motor stall
- In addition, events can trigger the pump to withdraw or infuse

Note: Only available with Legato 200 Series.

CONSTANT RATE

RAMP RATE

STEPPED RATE (Legato 200 Series only)

PULSE FLOW (Legato 200 Series only)

Routine & Complex Applications
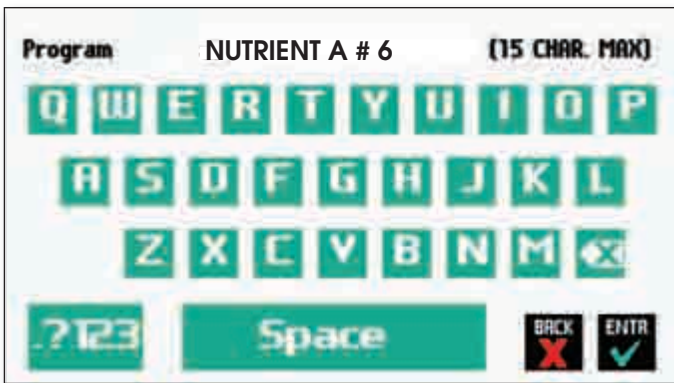
Unique labeling for each program.

NAME: ORGANIC SYN 12

Infuse for 10 minutes at 2 pl/hr. Stop then, toggle Pump 2 to start infusing and pump at 8 pl/hr for 50 minutes.

Organic Syn 12 - Pump 1
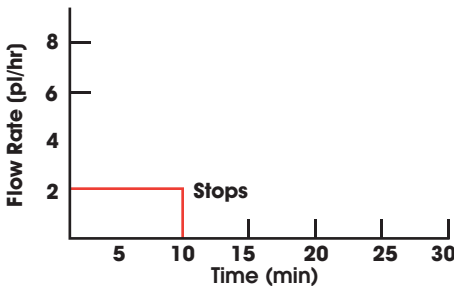
Organic Syn 12 - Pump 2
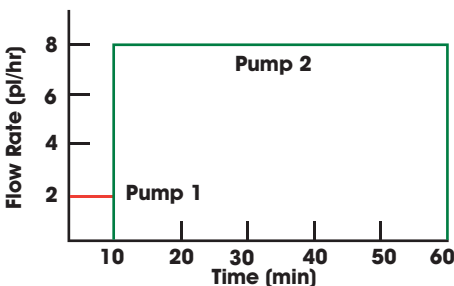
RECIPE NAME: DRUG 8302

Start on December 30 at 12:00 pm. Infuse at 1 nl/min for 2 hours every day at 12:00 pm for 2 days. Then stop.

Drug 8302 - Day 1
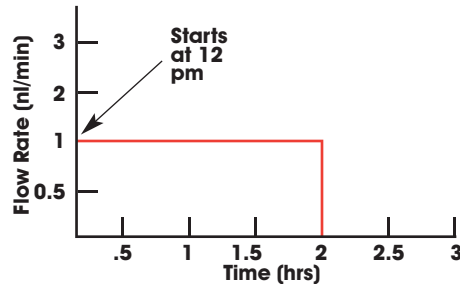
Drug 8302 - Day 2
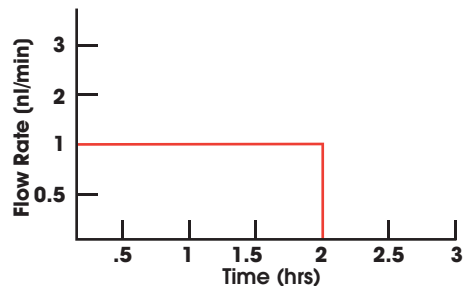
RECIPE NAME: NUTRIENT A #6

A test begins at 4 pm and runs at a flow rate of 5 μl/hr for 1 hour then goes to 10 μl/hr for 30 minutes. Waits for the user to press the display then continues for 1 more hour ramping from 5 μl/hr to 25 μl/hr.

Nutrient A #6

LEGATO™ SERIES
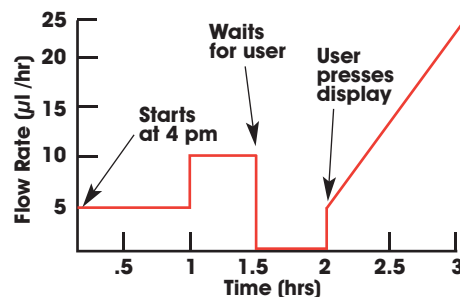
Easy external **c**onnections to a computer or other control devices are through USB interface or RS-232 (9 pin Dsub). Simple ASCII commands make communication with the pump easy. For direct control of the pump the user can use the I/O interface. (15 pin Dsub) Pump direction can be changed. Trigger input & output external events such as a process parameter is available. The footswitch input will allow the control of the pump through an external device. The unit also has an output for run indication allowing connection to a remote light.

The Legato's Versatility is

In Communication — Multi Pump Mode of Operation

The pumps are versatile and can be interconnected through the RS-485 interface. All Legato™ models can be mixed and matched in the daisy chain offering maximum flexibility. Up to 99 pumps can be linked together through the RS-485 interface. This interface is easy to use and each pump has its own unique pump address.

Legato™ 200 Series

Computer Inferface RS-232
Hands Free Connection
Network up to 99 Pumps with RS-485
Remote Start/Stop TTL Interface
USB Serial Input (Type B)
Direct Motor Adjustment Analog Input (Optional)

Legato™ 100 Series

Hands Free Connection
Network up to 99 Pumps with RS-485
Remote Start/Stop TTL Interface
USB Serial Input (Type B)
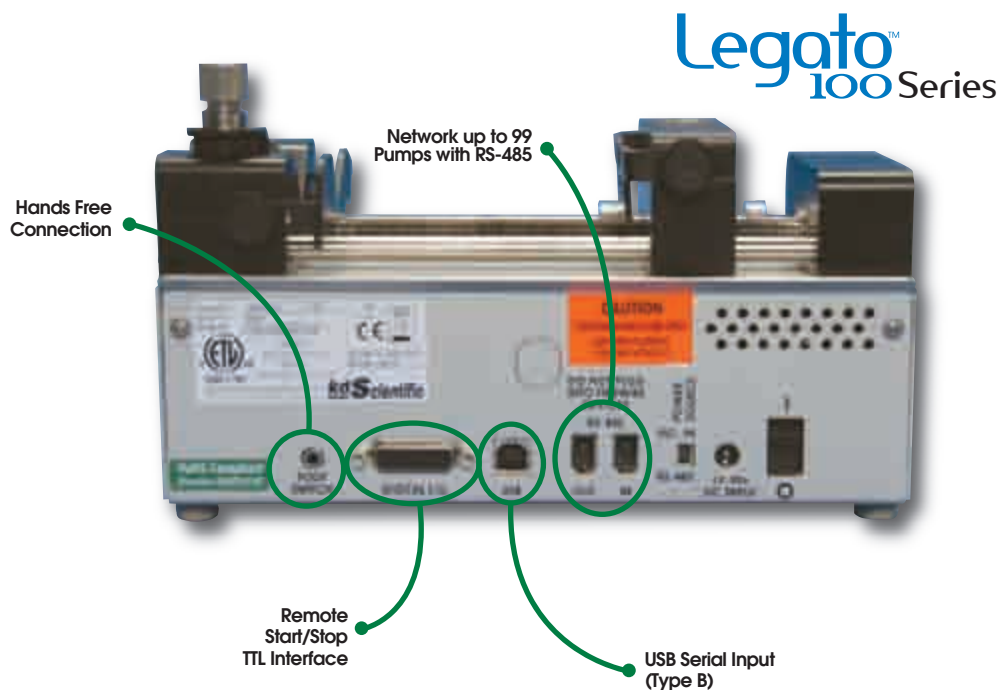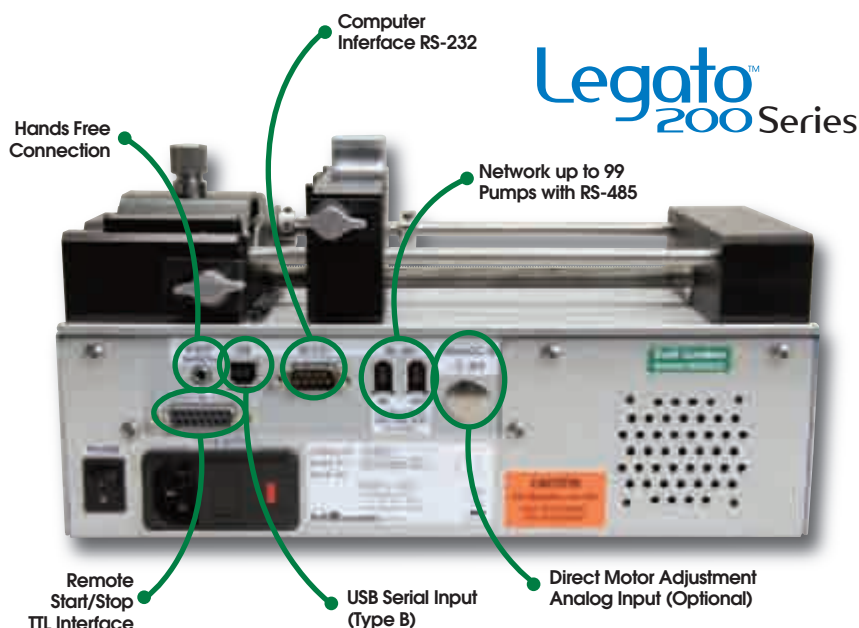
Second to None

Ensure the consistency and accuracy of programs with the ability to:

- export programs to a PC
- export a program to another pump
- duplicate programs
- append one program to another
- rename programs
- delete programs

Multiple tests are easy to run and control, as well as gradients, by linking up to 99 pumps together through the RS-485 interface. This interface is easy to use and each pump can be assigned its own unique pump address.

LEGATO™ SERIES
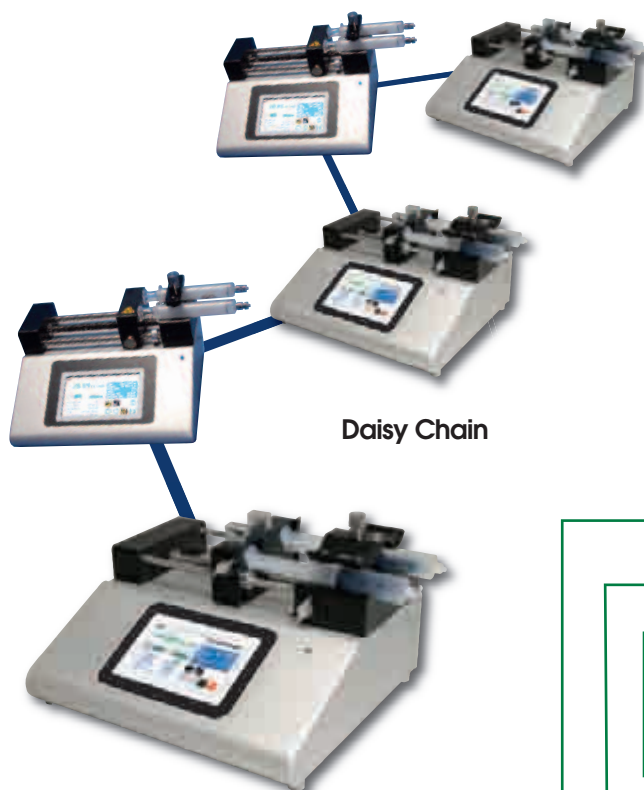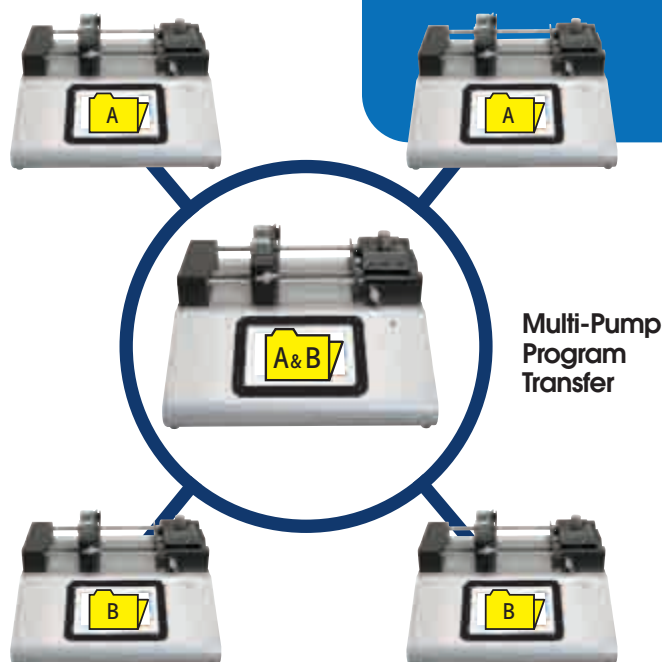
Multi-Pump Program Transfer

Daisy Chain

The Legato™ Series pumps permit the daisy chaining up to 99 pumps. To facilitate operation in these modes, the Legato™ Series application software includes a variety of commands designed to simplify the export/import of programs between the pump and external devices.

Mix and Match Legato™ 100 Series and 200 Series.

Transfer programs to a computer (Legato 210P, 270P, 110, 111 & 180)

Rename Recipes

Store Configurations for easy recall
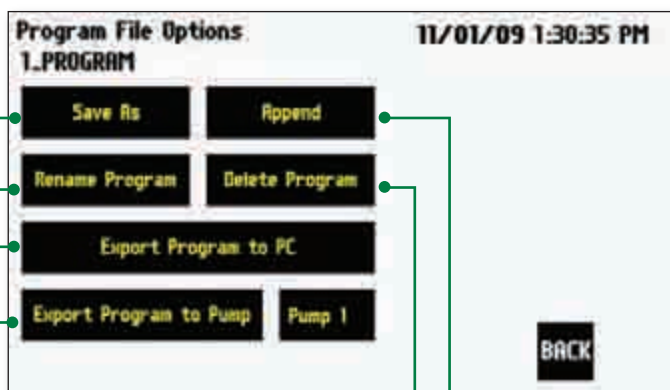
Manipulate programs quickly.

Ensure pump to pump program consistency

Attach a configuration to another configuration

Delete configuration

L E G A T O™ S E R I E S

The Legato™ 200 Series offers three basic pump models ensuring the right pump for your application.
- **Infuse Only**
- **Infuse and Withdraw**
- **Continous Push/Pull**

The infuse and withdraw and push/pull pumps are available in a programmable version for maximum flexibility and capability. Each of the basic models works with one syringe or two and can be reconfigured in the field to use multiple syringes.

A Variety of Legato™ 200

Legato™ 200 Infuse Only Syringe Pump

Legato™ 200
Dual Syringe Infusion Pump

Infuse Only Syringe Pump. Accommodates 2 syringes 0.5 μl to 140 ml. User definable flow rates with selectable target volumes or time values to control the total infusion volume.

Legato™ 210 & 210P
Dual Syringe Infuse/Withdraw Pump & Multi-step Programming

Accommodates 2 syringes 0.5 μl to 140 ml. This unit supports infuse only, withdraw only, infuse/withdraw, withdraw/infuse and continuous mode. User defined flow rates with selectable target volumes.

The Legato™ 210P features multi-step programming with user defined configurations/programs of up to 800 steps. Up to 40 programs of 20 steps each can be stored in memory.

Legato™ 210 & 210P Infuse/Withdraw Syringe Pump

Legato™ 270 & 210P
Continous Syringe Pump & Multi-step Programming

Push/Pull Syringe Pump. Accommodates 2 syringes 0.5 μl to 140 ml for infusion and 2 syringes for withdrawal. This model supports infusion and withdrawal simultaneously at user defined flow rates and with selectable target volumes to control the total volume pumped. It also supports infuse only, withdraw only, infuse/withdraw, withdraw/infuse and continuous mode. User defined flow rates with selectable target volumes.

The Legato™ 270P Push/Pull Pump features multi-step programming with 40 custom programs of up to 20 steps each. Multiple programs can be stored in memory.

Legato™ 270 & 270P Continuous Push/Pull Syringe Pump

Series to Meet Your Needs

Modular syringe racks can be purchased to create a multichannel syringe pump.

- **Up to six 10 ml syringe rack**
- **Up to four 140 ml syringe rack**
- **Microliter syringe rack**

Two options are available for the Legato™ Series. The analog input option which allows the analog control of the motor speed. By applying a 10 VDC max to the circuit, the motor speed can be varied. The second option is for an internal fan. These will be factory installed.

LEGATO™ SERIES

Large Syringe Multi-Rack 4 x 140 ml

Small Syringe Multi-Rack 6/10

Microliter Syringe Rack

Small Syringe Multi-Rack
Option (78-8300)

The Small Syringe Multi-Rack option will accommodate up to six 30 to 60 ml syringes or up to ten 0.5 μl to 20 ml syringes. The rack will work with the Legato™ 200, Legato™ 210 or Legato™ 210P.

- **Infuse/Withdraw 6/10 Multi-Rack**
- **Six 30 to 60 ml plastic syringes or ten 0.5 µl to 20 ml syringes**
- **Can be sold for Infuse Only as well**

Large Syringe Multi-Rack
Option (78-8301)

The Large Syringe Multi-Rack option will accommodate up to four 60 to 140 ml plastic syringes. The field installable rack will work with the Legato™ 200, Legato™ 210 or Legato™ 210P.

- **Infuse/Withdraw 4 x 140 Multi-Rack**
- **Four 60 to 140 ml syringeses**
- **Can be sold for Infuse Only as well**

Microliter Syringe Multi-Rack
Option (78-8302)

The Microliter Syringe Multi-Rack Option will accommodate up to four 0.5 μl to 10 ml syringes. The field installable rack will work with the Legato™ 200, Legato™ 210 or Legato™ 210P.

- **Infuse/Withdraw Microliter Rack**
- **Four 0.5 µl to 10 ml syringes**
- **Can be sold for Infuse Only as well**

LEGATO™ SERIES

A Variety of Legato™ 100

The Legato 100 series is the latest generation of pumps from KD Scientific. This 100 series incorporates many of the features in the Legato 200 series including a touch screen graphic interface. The run screen has all the pump parameters, as well as, the pumps current running conditions including instantaneous flow rate, elapsed time and time remaining, total volume dispensed. Set up is easy using the icon driven software. Engineering units can be changed for the flow rate and volume dispensed. This is truly the next generation of entry level pumps.

Legato™ 100
Single Syringe Infusion Pump
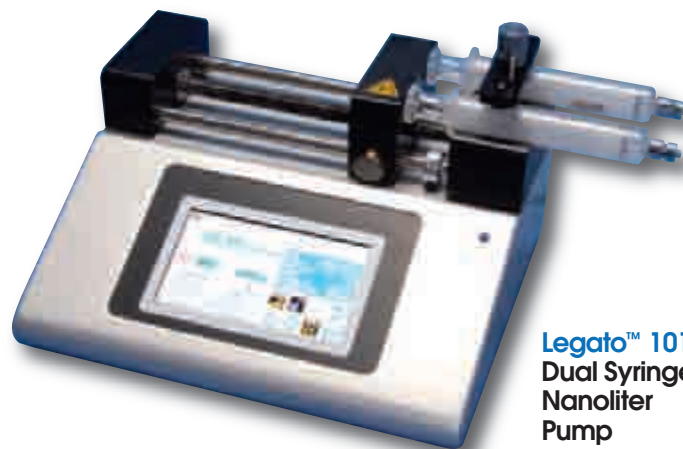
Legato™ 101
Dual Syringe Nanoliter Pump

Legato™ 100
Single Syringe Infusion Pump

Entry level pump in the Legato series. This basic pump offers the same easy to use touch screen configuration and pump "run" screen as the more advanced Legato 200. This pump is ideal for electrospinning, nutrient feeding, mass spec calibration and other applications where a single syringe is used.
- Single syringe 0.5 µl to 60 ml
- Wide flow range up to 88 ml/min

Legato™ 101
Dual Syringe Nanoliter Pump

This infusion only pump is ideal for surface plasma resonance,, organic synthesis, and other applications where a dual syringes are required with small volumes under 10 ml.
- Two syringes 0.5 µl to 10 ml
- Minimum flow rate 1.280 pl/min for a 0.5 µl syringe

Legato™ 110
Single Syringe Infusion/Withdraw Pump

The Legato 110 is based on the Legato 100. It offers infuse/withdraw flow control and programmability for up to two multi-step programs of 50 steps each. This pump is ideal for more complex multi-step dosing and has multi-mode operation including infusion only, withdrawal only, infusion and withdrawal and withdrawal/infusion modes.
- Single Syringe 0.5 µl to 60 ml
- Two Multi-step Programs
- Multi- mode operation

Legato™ 110
Single Syringe Infuse/Withdraw Pump

Series to Meet Your Needs

The Legato 111/130/180 offer the smoothest flow of all the Legato Pumps. Both pumps have multi-mode capability; including infusion only, withdraw only, infusion/withdrawal, withdrawal/infusion. They can be continuously operated repeating the infusion/withdrawal or the withdrawal/infusion modes.

Legato™ 111
Dual Syringe Nanoliter Infuse/Withdraw Pump

The Legato 111 is based on the Legato 101 and is enhanced with multimode capability like the Legato 110 and multi-step programming.

- Two syringes 0.5 µl to 10 ml
- Minimum flow rate 1.280 pl/min for a 0.5 µl syringe
- Two Multi-step Programs
- Multi-mode Operation

Legato™ 111
Dual Syringe Nanoliter
Infuse/Withdraw Pump

Legato™ 130
Single Syringe Nanoliter Infusion/Withdraw Pump

The Legato 130 works exclusively with micro syringes from 0.5 μl to 1000 μl. It has a remote pump head which can be placed close to the experiment to eliminate dead volume with long tubing. The remote pump head makes it ideal for use with a micromanipulator, stereotaxic and other clamping devices.

The syringe plunger can be tightly secured with a movable mounting screw, eliminating any movement of the syringe. The new fixed cable with the remote head to the controller ensures the pump head and the controller are secure.

- Remote Pump head
- 0.5 µl to 1000 µl syringes
- Minimum flow 3.66 pl/min (0.5 µl syringe)
- Maximum flow 3.818 ml/min (1000 µl syringe)

Legato™ 130
Dual Syringe Nanoliter
Infuse/Withdraw Pump

Legato™ 180
Dual Syringe Picoliter Infuse/Withdraw Pump

This pump is the ultimate in precision flow delivery. It offers the most stable flow delivery of all the Legato products. The Legato 180 has a finer lead screw and a different pulley ratio from the Legato 101/111. The Legato 180 offers multi-mode capability and 2 multi-step programs, each with 50 steps. The Legato 180 is the ideal pump for flow chemistry and small volume infusions or withdrawals of <10 ml.

- Two syringes 0.5 µl to 10 ml
- Minimum flow rate 0.580 pl/min for a 0.5 µl syringe
- +/-0.35% Accuracy
- Two Multi-step Programs
- Multi-mode Operation

Legato™ 180
Dual Syringe Picoliter
Infuse/Withdraw
Pump

Legato™ Series Specifications

Legato Model	Legato 100	Legato 101	Legato 200	Legato 110	Legato 111
		Infuse Only			
Order code	78-8100	78-8101	78-8200	78-8110	78-8111
Mode	Infuse Only	Infuse Only	Infuse Only	Infuse/Withdraw	Infuse/Withdraw
# Syringes	One	Two	Two	One	Two
Syringe Size	0.5 µl to 60 ml	0.5 µl to 10 ml	0.5 µl to 140 ml	0.5 µl to 60 ml	0.5 µl to 10 ml
User Interface	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
Display	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display
Accuracy	+/-0.5%	+/-0.5%	+/-0.35%	+/-0.5%	+/-0.5%
Repeatability	+/-0.05%	+/-0.05%	+/-0.05%	+/-0.05%	+/-0.05%
Linear Force	30 lbs/13.6kg	30 lbs/13.6kg	75 lbs (34 kg)	30 lbs/13.6kg	30 lbs/13.6kg
Force Adjustment	Yes	Yes	Yes	Yes	Yes
Minimum Flow Rate 0.5 µl Syringe	1.28 pl/min	1.28 pl/min	3.12 pl/min	1.28 pl/min	1.28 pl/min
Maximum Flow Rate 10 ml Syringe	25.99 ml/min	25.99 ml/min	31.190 ml/min	25.99 ml/min	25.99 ml/min
Maximum Flow Rate 60 ml Syringe	88.28 ml/min	88.28 ml/min	105 ml/min	88.28 ml/min	88.28 ml/min
Drive Motor	0.9" Stepper Motor	0.9" Stepper Motor	1.8" Stepper Motor	0.9" Stepper Motor	0.9" Stepper Motor
Microprocessor Motor Drive Control	1/16 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping
# microsteps/one revolution of lead screw	15360	15360	6400	15360	15360
Advance per Microstep	0.069 µm/ustep	0.069 µm/ustep	0.1656 µm/µstep	0.069 µm/ustep	0.069 µm/µstep
Min Step Rate	27.5 sec/µstep	27.5 sec/µstep	27.5 sec/µstep	27.5 sec/µstep	27.5 sec/µstep
Max. Step Rate	26 µsec/µstep	26 µsec/µstep	26 µsec/µstep	26 µsec/µstep	26 µsec/µstep
Pusher Travel Rate					
Minimum	0.15 µm/min	0.15 µm/min	0.36 µm/min	0.15 µm/min	0.15 µm/min
Maximum	159 mm/min	159 mm/min	190.8 mm/min	159 mm/min	159 mm/min
Multi-step Programming	N/A	N/A	N/A	2 Programs/50 steps each	2 Programs/50 steps each
Constant Rate				Yes	Yes
Ramp				Yes	Yes
Pulsed				No	No
Stepped				No	No
Program Export/Import				Yes	Yes
Pusher Block Stall Detection	Yes	Yes	Yes	Yes	Yes
Computer Interface	USB	USB	USB/RS-232	USB	USB
TTL	Yes	Yes	Yes	Yes	Yes
Networking	RS-485	RS-485	RS-485	RS-485	RS-485
Real Time Clock	No	No	Yes	No	No
External Triggers	One	One	Two	One	One
Analog Output	No	No	Yes (option)	No	No
Footswitch Interface	Yes	Yes	Yes	Yes	Yes
Maintenace Reminder	Yes	Yes	Yes	Yes	Yes
Calibration Reminder	No	No	Yes	No	No
Password Lock	Yes	Yes	Yes	Yes	Yes
Audible Alarm Indication	Yes	Yes	Yes	Yes	Yes
Display Rotation	Manual Selection	Manual Selection	Automatic	Manual Selection	Manual Selection
Multisyringe Rack Accessories	No	No	Yes	No	No
Run LED	Blue	Blue	Blue	Blue	Blue
Power	12-32 VDC	12-32 VDC	100/240 VAC 50/60 Hz	12-32 VDC	12-32 VDC
Weight	2.66 kg/5.9 lbs	2.66 kg/5.9 lbs	4.9 kg/10.97 lbs	2.66 kg/5.9 lbs	2.66 kg/5.9 lbs
Dimensions (in)	9 x 7.5 x 5	9 x 7.5 x 5	3.5 x 10 x 11	9 x 7.5 x 5	9 x 7.5 x 5
Dimensions (cm)	22.6 x 19.05 x 15	22.6 x 19.05 x 15	8.89 x 25.4 x 27.94	22.6 x 19.05 x 15	22.6 x 19.05 x 15
Certifications					
CE, ETL, UL, CSA, CB Scheme	Yes	Yes	Yes	Yes	Yes
EN 61010, EN 61326	Yes	Yes	Yes	Yes	Yes
WEEE, EU RoHS	Compliant	Compliant	Compliant	Compliant	Compliant

L E G A T O™ S E R I E S

	Infuse/ Withdraw Pumps				Continuous Cycle Pump	
	Legato 180	Legato 130	Legato 210	Legato 210P	Legato 270	Legato 270P
	78-8180	78-8130	78-8210	788212	78-8270	78-8272
	Infuse/Withdraw	Infuse/Withdraw	Infuse/Withdraw	Infuse/Withdraw	Infuse/Withdraw/Continuous	Infuse/Withdraw/Continuous
	Two	One	Two	Two	Two and Two (Four total)	Two and Two (Four total)
	0.5 μl to 10 ml	0.5 μl to 1 ml	0.5 μl to 140 ml	0.5 μl to 140 ml	0.5 μl to 140 ml	0.5 μl to 140 ml
	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen	Touchscreen
	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display	4.3" QVGA Display
	+/-0.35%	+/-0.5%	+/-0.35%	+/-0.35%	+/-0.35%	+/-0.35%
	+/-0.05%	+/-.05%	+/-0.05%	+/-0.05%	+/-0.05%	+/-0.05%
	30 lbs/13.6kg	11 lbs/5kg	75 lbs (34 kg)	75 lbs (34 kg)	75 lbs (34 kg)	75 lbs (34 kg)
	Yes	Yes	Yes	Yes	Yes	Yes
	0.58 pl/min	3.66 pl/min	3.12 pl/min	3.12 pl/min	5 pl/min	5 pl/min
	11.7 ml/min	3.818 ml/min (1ml syringe)	31.190 ml/min	31.190 ml/min	31.190 ml/min	31.190 ml/min
	N/A	N/A	105 ml/min	105 ml/min	105 ml/min	105 ml/min
	0.9" Stepper Motor	1.8" Stepper Motor	1.8" Stepper Motor	1.8" Stepper Motor	1.8" Stepper Motor	1.8" Stepper Motor
	1/16 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping
	20480	3200	6400	6400	6400	6400
	0.031 μm/μstep	0.198 μm/μstep	0.1656 μm/μstep	0.1656 μm/μstep	0.1656 μm/μstep	0.1656 μm/μstep
	27.5 sec/μstep	27.5 sec/μstep	27.5 sec/μstep	27.5 sec/μstep	27.5 sec/μstep	27.5 sec/μstep
	26 μsec/μstep	52 μsec/μstep	26 μsec/μstep	26 μsec/μstep	26 μsec/μstep	26 μsec/μstep
	0.02 μm/min	0.433 μm/min	0.36 μm/min	0.36 μm/min	0.36 μm/min	0.36 μm/min
	71.55 mm/min	228.97 mm/min	190.8 mm/min	190.8 mm/min	190.8 mm/min	190.8 mm/min
	2 Programs/50 steps each	2 Programs/50 steps each	N/A	40 Programs/20 steps each	N/A	40 Programs/20 steps each
	Yes	Yes		Yes		yes
	Yes	Yes		Yes		yes
	No	No		Yes		yes
	No	No		Yes		yes
	Yes	Yes		Yes		yes
	Yes	Yes	Yes	Yes	Yes	Yes
	USB	USB	USB/RS-232	USB/RS-232	USB/RS-232	USB/RS-232
	Yes	Yes	Yes	Yes	Yes	Yes
	RS-485	RS-485	RS-485	RS-485	RS-485	RS-485
	No	No	Yes	Yes	Yes	Yes
	One	One	Two	Two	Two	Two
	No	No	Yes (option)	Yes (option)	Yes (option)	Yes (option)
	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes
	No	No	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	yes
	Manual Selection	Manual Selection	Automatic	Automatic	Automatic	Automatic
	No	No	Yes	Yes	Yes	Yes
	Green	Blue	Blue	Blue	Blue	Blue
	12-32 VDC	12-32 VDC	100/240 VAC 50/60 Hz	100/240 VAC 50/60 Hz	100/240 VAC 50/60 Hz	100/240 VAC 50/60 Hz
	2.66 kg/5.9 lbs	1.96 kg/4.32 lbs	4.9 kg/10.97 lbs	4.9 kg/10.97 lbs	4.9 kg/10.97 lbs	4.9 kg/10.97 lbs
	9 x 7.5 x 5	9 x 7.5 x 3.67	3.5 x 10 x 11	3.5 x 10 x 11	3.5 x 10 x 11	3.5 x 10 x 11
	22.6 x 19.05 x 15	22.6 x 19.05 x 9.32	8.89 x 25.4 x 27.94	8.89 x 25.4 x 27.94	8.89 x 25.4 x 27.94	8.89 x 25.4 x 27.94
	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes
	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant

ADAGIO™ SOFTWARE

The Adagio™ Graphic Software adds a new dimension to pump control. Issue manual pump commands or run the pumps automatically with multistep programs. Works with the entire Legato 200 and 100 pump series. Adagio Pump Software – Enhances the Legato Pumps Use.

Adagio™ will allow you to configure the pump through the software as well as operate one or multiple pumps. Programs can be executed as a tabular data drive spreadsheet or as a graphical. Control up to 50 pumps with the Legato 200 series and up to 20 pumps with the Legato 100 series. Pumps can be mixed or matched.

Adagio™ has been designed to maximize the use of the pumps functions and features and does not require knowledge of software programming.

Introducing the all NEW

Adagio's versatile functionality will allow you to:
• Track multiple pumps by serial number and unique name
• Data log and store program information
• Store multiple programs by name
• Define and execute programs in the Adagio Software
• Independent Manual Pump Control Program
• Graphic Interface or Tabular data interface
• Automatic pump communicator program
• Start/Stop/Reset programs in multiple pumps
• View pumps flow profile in multiple windows

Computer requirements include:
• 2 Ghz Pentium processor or higher
• 512 MB of RAM (1 GB recommended)
• Windows XP SP3 or Vista (XP recommended)
• Free RS232 or USB 2.0 ports
• Microsoft Excel 97 or higher.

Adagio™ Syringe Pump Software

Adagio is easy-to-use with a Automatic Configuration Assistant

Assign a unique pump name

List Sortable by Column

Launch Pump Configuration Assistant

Select Pump to edit previously defined pump

Delete configured pump

Auto detection of pump status

Identify the communication port

Enter the pumps serial number

Identify the pump model

Launch manual pump control

Updates status of the pumps

Ignore changes made to the list of pump

Close Pump configurations and store defined pump list

Define the Pump Configuration

Connect the pumps to the computer.

Auto Checks the Pump Model & Identification

Enter A Unique Name

Enter Pump Serial Number

Legato Pump Address

Enter Communication Port Baud Rate

Lists All Available Communication Ports

Quick & Easy Manual Pump Control

The manual pump control tool allows easy direct control of the pump.

Select Syringe Type & Size

Define Flow Rate

Stop Pump

Select Flow Direction

Time Stamped Log of Commands

Easily Accessible Programs List

Manage programs easily. Programs are stored in a list and can be easily retrieved.

Unique program name up to 255 characters

Sortable by columns

Duplicate Programs

Total Volume Infused

Date Program last modified

Program Duration

Total Number of Program Step

Identifies Legato Model

Edit Existing Programs

Program Definition

Easily configure multiple steps in the programs by dragging the cursor or in table format

Pump Duration Meter

Flow Rate Zoom In & Out

Two different program displays (Graph or Table)

Select Syringe Type and Size

Select a pump

Name the Program

Loop steps

Describe the Program

Maxiumum and Minimum flow indicator for syringe size

Start flow marker

Time Zoom In & Out

Infuse

Withdraw

Indicates information where the cursor is pointed

Spreadsheet View to See Progam in a Table Format

Enter Parameters in a table format

Flow Direction

Start and End Flow Rate

Program Name

ADAGIO™ SOFTWARE

Total Volume

Step Volume

Adding Step is Easy

Manually enter the step information or drag and drop the duration marker on the graph.

Selectable Step Volume

Start/End Flow Rate

Duration of the Step

Accummulated Time

Accummulated Volume

Multiple Pump Control

Start/Stop/Pause programs from the method execution display.

Pump Name

Program Name

Control individual or all pumps simultaneously

Current Pump Status

Total Program Duration

Program Progress (0 to 100%)

Elapsed Program Time

Current Flow Rate with Pump Direction

Monitor One or More Pumps

Mulitple programs can be opened at the same time the programs progression is tracked and can be stored in a file for later access.

Log the data to a file. *.bmp, *.xls or *.txt

Add a comment to the test

Data Logging

Data can be stored in a file. Selectable formats include *.bmp, *.xls or *.txt. Comments in the text can be manually entered and will be stored in the data file.

Pump parameters are stored as well as an event record table.

Pump Parameters

• Start time
• Name of the program executed
• Pump, rack and syringe models used
• Total duration of the program execution (in format hh:mm:ss)
• Total volume infused (accumulated positive flows)
• Total volume withdrawn (accumulated negative flows)
• Total volume disposed by the program (difference between infused and withdrawn)
• Flow units considered

The KDS Legacy Series

The Legacy series is the foundation for all KD Scientific Pumps. The Legacy pumps are acknowledged as the industry's highest valued solution for delivering precise and smooth flow in research, pilot plants and production applications. Simple and easy to use, these pumps are the favorite of research scientists and engineers. They use the KDS 100/KDS 200 syringe pumps more than any other for the their outstanding reliability and performance. The KDS 100 series pumps give customers the most cost effective solution for infusing fluids. Alternatively, the KDS 200/KDS 400 series gives the cusotmer advanced features with RS232 and TTL interfaces. All KDS 200/KDS 400 series pumps can be daisy chained together to create a pumping network.

L E G A C Y S E R I E S

Simple Syringe Installation, Quick Release Drive Nut

Prevent Syringe Damage–Guide Rod Clamp

Power Failure Indication

Easy to Read Backlit LCD

Durable Construction Welded Seams

Pump Direction Displayed

Automatic Shutoff Volume Dispense Mode

Fast Set-up, Built-in Syringe Size Table

Rapid Adjustments, Fast Forward/Reverse
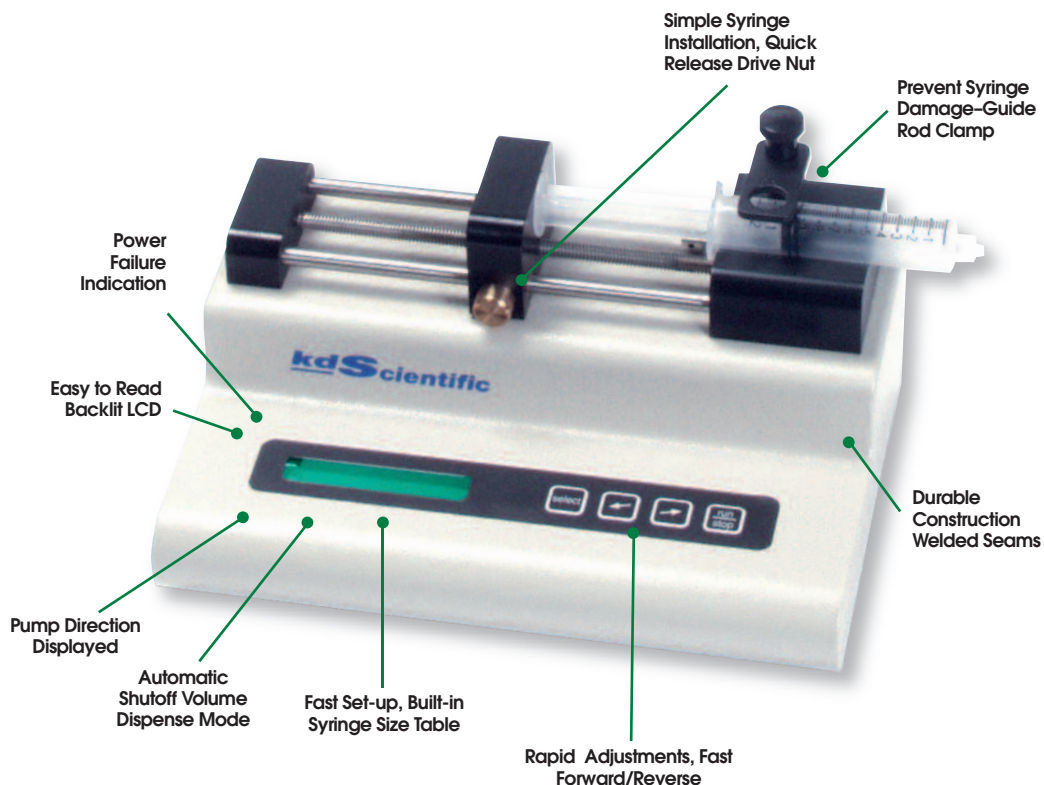
General Features Available on ALL Legacy pumps:

- Vibration Elimination System
- Flow Direction Indicator
- Fast Forward/Reverse
- Antisiphon Clamp (I/W Models only)
- CE Approved Model 100 series are ETL listed and conforms to ANSI/UL Standard 61010-1:2004 2ND ED. Certified to CAN/CSA STD C22.2NO.61010.1:2004 2ND ED
- Power Recovery Diagnostics
- Optional Foot Pedal Interface
- NIST Certificate Option
- Alarm Option
- CE Approved Models

Basic Programming
- Syringe Library
- Flow Rate Selection
- Volume Dispense Mode
- Direct Entry Syringe Diameter

Standard on KDS 200/KDS 400 Pumps
- Daisy Chain Connection
- RS232
- TTL
- Foot Switch Interface Standard
- Stall Detection
- Numeric Keypad
- Engineering Unit Selection

Expanded Capabilities

Network Multiple Pumps

Network up to 100 Pumps–Mix and Match any KDS 200/400 Series Pump!

All KDS 200/400 series pumps can be networked together. Each pump has a unique address to control its rate and volume remotely from a computer. Pump start/stop activation can be easily controlled. National Instruments certified Labview™ drivers are available at no charge.

Advanced Programmable Pumps

Keypad programmable option now available with all KDS 200/KDS 400 Series syringe pumps. Lets you program right from the keypad with software program on computer.

Simply follow a few menu-driven prompts and in just minutes you can customize a program to: control the pump from seconds to days, change flow rates, pause, ramp rates up or down automatically, control outputs and respond to external TTL signals.

Unlike other programmable pumps, there's no need to enter time increments or decrements between start and end flow rates. KDS pumps provide a smooth, linear transition automatically.

A program is divided into eight variable time periods called steps. A step can be up to 12 hours long and may be changed without affecting other steps.

Each step offers these options:

1. Time duration, from one second up to 12 hours
2. Travel direction – Infuse or withdraw (where available)
3. Beginning flow rate (µl/hr to ml/min range)
4. End flow rate (µl/hr to ml/min range)
5. Pause – Waits for an external trigger to start
6. Status of output TTL pins
7. Loop option – Loops back to any previous step and repeats the intermediate steps. Two separate loops available.
8. Set the count in the loop cycle. Steps may be repeated up to 100 times.
9. Program stored in non volatile memory.
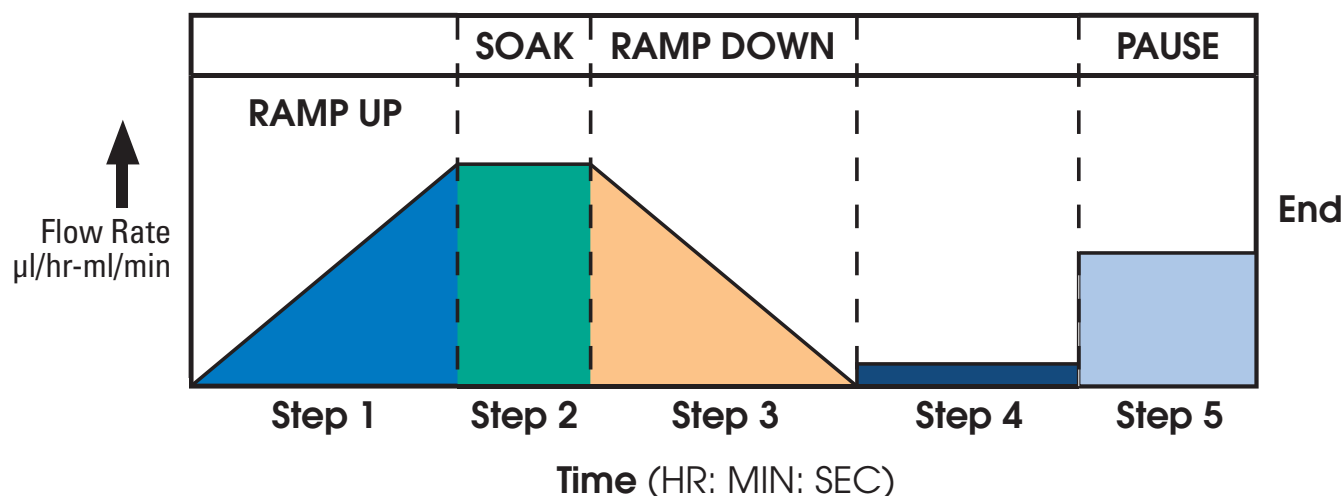
KD scientific infusion pumps are ideal for delivering accurate and precise amounts of fluids for a multitude of applications, including injection of calibrant into a mass spectrometer or reaction chamber, long term drug delivery to animals and general infusion applications.

Infusion Pumps

KDS 100
Single-Syringe Infusion Pump

KDS 200
Two-Syringe Infusion Pump

KDS 101
Two-Syringe Nanoliter Pump

KDS 220
Multi-Syringe Infusion Pump

KDS 250
Four-Syringe Microliter Infusion Pump

LEGACY SERIES

KDS 100
Single-Syringe Infusion Pump

This economical Single Syringe Infusion Pump combines precision flow with outstanding ease-of-use and exceptional durability.

- Single syringe 10 µl to 60 ml
- Wide flow range up to 423 ml/hr (60 ml syringe)

KDS 101
Two-Syringe Nanoliter Pump

The KDS 101 Two-Syringe Nanoliter Pump is ideal for microdialysis and similar applications which require virtually pulseless flow at very low flow rates.

- Holds 2 syringes, 10 µl to 10 ml each
- Minimum flow 0.001 µl/hr (10 µl syringe)

KDS 200
Two-Syringe Infusion Pump

This feature-laden Two-Syringe Infusion Pump combines a broad speed range and holds a wide range of syringe sizes to meet the requirements of virtually any laboratory application.

- Minimum flow 0.001 µl/hr with 10 µl syringe
- Holds one or two syringes, 10 µl to 140 ml each

KDS 220
Multi-Syringe Infusion Pump

KDS 220 Multi-Syringe Infusion Pump is ideal for applications requiring multiple syringes. This pump has been modified to hold up to 10 syringes.

- Multiple syringe holder:
  - One to ten syringes, 10 µl to 10 ml
  - One to six syringes, 20 ml to 60 ml
  - One to four syringes, 100 ml to 140 ml

KDS 250
Four-Syringe Microliter Infusion Pump

Each syringe can be sized differently and is clamped independently.

- Multiple syringe holder
  - Four syringes, 10 µl to 10 ml each
- Separate clamping accommodates various sizes
- Syringes may be positioned independently for sequential dispensing by the pusher block.

Infusion/Withdrawal Pumps

Infuse and withdraw capabilities provide maximum flexibility for varied applications. This feature permits applications, such as automatic withdrawal of samples and unattended filling of syringes at very low flow rates. The unique KDS 310 offers a remote pump head, which is perfect when space is limited. The small size and exceptional low flow rate capability allows direct mounting of the KDS 310 on a stereotaxic manipulator without the need for long narrow tubing which is both difficult to use and requires larger volumes of valuable fluids.

KDS 210
Two-Syringe
Infusion/Withdrawal Pump

KDS 230
Multi-Syringe
Infusion/Withdrawal Pump

KDS 310
Nanoliter
Syringe Pump

KDS 230
Multi-Syringe Infusion/Withdrawal Pump

Ideal for applications requiring multiple syringes, the KDS 230 is an adaptation of the KDS 210. The pump has been modified to hold up to 10 syringes.

- **Multiple syringe holder:**
  - One to ten syringes, 10 µl to 10 ml
  - One to six syringes, 20 ml to 60 ml
  - One to four syringes, 100 ml to 140 ml
- **Multiple mode selection:**
  - Infusion, Withdrawal, Infusion then withdrawal, Withdrawal then Infusion, Continuous Cycle

KDS 210
Two-Syringe Infusion/Withdrawal Pump

The KDS 210 offers you more advanced features than any other infusion/withdrawal pump in its price range- including five operating modes plus independent rate and volume settings for both infusion and withdrawal.

- **Holds two syringes, 10 µl to 140 ml each**
- **Multiple mode selection:**
  - Infusion, Withdrawal, Infusion then withdrawal, Withdrawal then Infusion, Continuous Cycle

KDS 310 Plus
Nanoliter Syringe Pump

The KDS 310 Nano Pump is used exclusively with micro syringes. Small size, remote pump head and a rugged mounting arm make it ideal for use with micromanipulator, stereotaxic and other clamping devices.

- **Mini size pump**
- **Remote pump head**
- **1 µl to 250 µl syringe**
- **Minimum flow of 1.456 µl/min (100 µl syringe)**

KD Scientific specialty pumps are engineered to meet the demands of specific applications. These pumps use the basic design of our standard pumps but are modified to provide specific functionality for any application.

The Legacy Series fits your
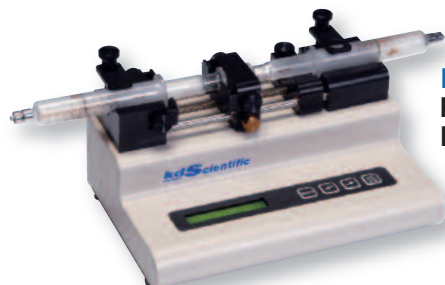
KDS 120
Two-Syringe Nanoliter Push-Pull Pump

KDS 260
Four-Syringe Push-Pull Pump

KDS 270
Continuous Cycle Syringe Pump

KDS 410
High Pressure Syringe Pump

LEGACY SERIES
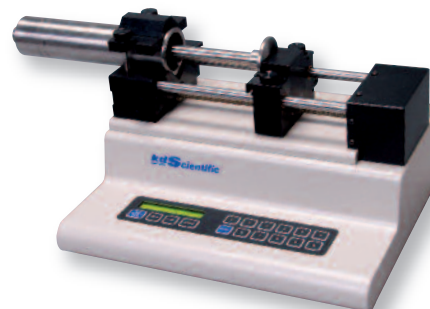
KDS 120
Two-Syringe Nanoliter Push-Pull Pump

This pump provides simultaneous infusion and withdrawal at the same rate with opposing syringes on the same drive screw. The Push/Pull mode is designed for one cycle only.

- **Holds two syringes 10 µl to 10 ml each**
- **Minimum flow 0.1 µl/hr (10 µl syringe)**

KDS 260
Four-Syringe Push-Pull Pump

This KDS 260 pump provides simultaneous infusion and withdrawal with opposing syringes on a single drive. This is a single cycle pump (due to brackets).

Note: When not used in push/pull mode, the pump has all the features of KDS 210

- **Holds up to four syringes, 10 µl to 60 ml each. With large syringes, the full volume may not be usable.**

KDS 270
Continuous Cycle Syringe Pump

The KDS 270 can hold up to four syringes and can cycle continuously back and forth in a push-pull action. As two syringes are infusing, two syringes are withdrawing at the same rate. At the end of the set volume the direction is automatically reversed and the next cycle begins. With the use of 3-way valves, the pump can empty and refill syringes for a continuous dispense.

- **Holds four syringes, 10 µl to 60 ml each. With large syringes the full volume may not be useable. (60 ml syringe - 40 ml useable, 30 ml syringe - full)**

KDS 410
High Pressure Syringe Pump

The KDS 410 is ideal for delivering fluid to reactors in chemical applications or for working with viscous fluids. The robust design ensures the syringe is kept level during delivery of the fluid. The KDS 410 more than doubles the linear force available in the KDS 200 series.

- **Single syringe 10 µl to 140 ml**
- **Minimum flow 0.001 µl/hr with a 10 µl syringe**
- **> 100 lbs linear force**

Everyday Applications

KDS 520
Volume Dispense System

KDS 510
Dual Rate Pump System
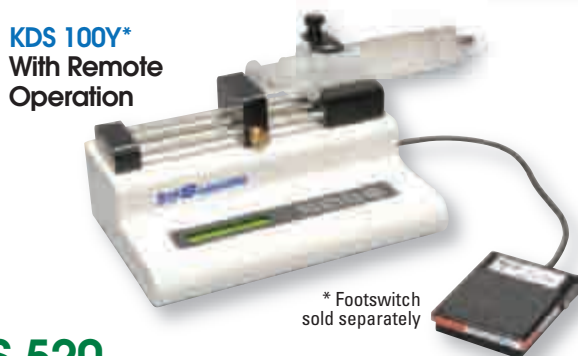
KDS 100Y*
With Remote Operation

* Footswitch sold separately

KDS 100L
With LED Indication

The KDS 100 series has been modified with new hardware and software features for specific applications. Integrating multiple pumps in a system allows the individual pumps to interact with other ones. This will provide a system linked together based on information from one pump being transferred to another.

In addition, new features have been added to the KDS 100 Series including a new remote interface or an LED on the pump to indicate it is running. Contact KD Scientific for more information on other requirements you have for your specific applications.

KDS 520
Volume Dispense System

Sequential volume dispensing is easy with the new volume dispensing system. The system includes two KDS 100 pumps and the cable to link the pumps together. Set the same or different volume[s] in pump A and B; pump A will dispense the predetermined volume and start pump B automatically. Pump A and B can have unique flow rates. The two pumps can also be operated as standard independent KDS 100's.

KDS 510
Dual Rate Pump System

Activate two KDS 100 pumps simultaneously with one push of the start key. Set each pump with a different flow rate and the pumps will infuse at the same time. The system includes two KDS 100 pumps and the cable to link the pumps together. The two pumps can also be operated as standard independent KDS 100's.

KDS 100Y
with Remote Operation

A new version of the rugged KDS 100 can now be remotely triggered with a footswitch or external switch. Starting and stopping dispense or infusion can be automated or remotely activated.
Also Available: 101Y, 120Y, 310Y

KDS 100L
with LED Indication

The KDS 100 is now available with an optional LED to indicate the pump is on or running. This feature is ideal to get a quick indication if the pump is dispensing, especially if multiple pumps are in operation.
Also Available: 101L, 120L, 310L

Legacy Series Specifications

	Infuse Only Pumps						
Legacy Model	KDS 100	KDS 100L	KDS 100Y	KDS 101	KDS 200	KDS 220	KDS 250
Order Code 110 VAC	78-0100	78-0100ZZ	78-0100Y	78-0101	78-0200	78-0220	78-0250
Order Code 220 VAC	78-1100	78-1100ZZ	78-1100Y	78-1101	78-1200	78-1220	78-1250
Order Code 220 VAC with CE Mark	78-9100	78-9100ZZ	78-9100Y	78-9101	78-9200	78-9220	78-9250
Mode	Infuse	Infuse	Infuse	Infuse	Infuse	Infuse	Infuse
# Syringes	One	One	One	Two	Two	10 Maximum	Four
Syringe Size	10 µl to 60 ml	10 µl to 60 ml	10 µl to 60 ml	10 µl to 10 ml	10 µl to 140 ml	10 µl to 10 ml (up to 10)	10 µl to 10 ml
						20 ml to 60 ml (up to 6)	
						100 ml to 140 ml (up to 4)	
User Interface	Keypad	Keypad	Keypad	Keypad	Keypad with numerics	Keypad with numerics	Keypad with numerics
Display	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD
Accuracy	+/-<1%	+/-<1%	+/-<1%	+/-<1%	+/-<1%	+/-<1%	+/-<1%
Repeatability	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%
Linear Force	20 lb/9 kg	20 lb/9 kg	20 lb/9 kg	40 lb/18 kg	40 lb/18 kg	40 lb/18 kg	40 lb/18 kg
Force Adjustment	-	-	-	-	-	-	-
Minimum Flow Rate 10 ul syr	0.1 µl/hr	0.1 µl/hr	0.1 µl/hr	0.001 µl/min	0.001 µl/hr	0.001 µl/hr	0.001 µl/hr
Maximum Flow Rate 10 ml syr	127 ml/hr	127 ml/hr	127 ml/hr	0.351 ml/min	1270 ml/hr	1270 ml/hr	1270 ml/hr
Maximum Flow Rate 60 ml syr	423 ml/hr	423 ml/hr	423 ml/hr	-	4235 ml/hr	4235 ml/hr	-
Maximum Flow Rate 140 ml syr	-	-	-	-	8824 ml/hr	8824 ml/hr	-
Drive Motor	7.5 ' Stepper Motor	7.5 ' Stepper Motor	7.5 ' Stepper Motor	7.5 ' Stepper Motor	1.8 ' Stepper Motor	1.8 ' Stepper Motor	1.8 ' Stepper Motor
Motor Gearbox	25:1	25:1	25:1	150:1	N/A	N/A	N/A
Microprocessor Motor Drive Control	1/2 microstepping	1/2 microstepping	1/2 microstepping	1/2 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping
# microsteps/one revolution of lead screw	2400	2400	2400	14400	6400	6400	6400
Advance per Microstep	0.529 µm	0.529 µm	0.529 µm	0.088 µm	0.1654 µm	0.1654 µm	0.1654 µm
Min Step Rate	30 sec/µstep	30 sec/µstep	30 sec/µstep	30 sec/µstep	120 sec/µstep	120 sec/µstep	120 sec/µstep
Max. Step Rate	0.0025 sec/ustep	0.0025 sec/ustep	0.0025 sec/ustep	0.0025 sec/ustep	0.000625 sec/µstep	0.000625 sec/µstep	0.000625 sec/µstep
Pusher Travel Rate							
Minimum	0.10583 µm/min	0.10583 µm/min	0.10583 µm/min	0.001767 µm/min	0.10583 µm/min	0.10583 µm/min	0.10583 µm/min
Maximum	0.00127 µm/min	0.00127 µm/min	0.00127 µm/min	203.33 µm/min	0.00127 µm/min	0.00127 µm/min	0.00127 µm/min
Multi-step Programming	No	No	No	No	Programmable Model	Programmable Model	Programmable Model
Pusher Block Stall Detection	No	No	No	No	Yes	Yes	Yes
Computer Interface	No	No	No	No	RS-232	RS-232	RS-232
TTL	No	No	No	No	Yes	Yes	Yes
Networking (Daisy-chain)	No	No	No	No	Yes	Yes	Yes
Audible Alarm Indication							
End of Run	Optional	Yes	Optional	Optional	Optional	Optional	Optional
Run LED	No	Yes	No	No	No	No	No
Power Domestic	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz
Power CE and International	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz
Weight	4.5 lb/2 kg	4.5 lb/2 kg	4.5 lb/2 kg	4.5 lb/2 kg	9.5 lb/4 kg	9.5 lb/4 kg	9.5 lb/4 kg
Dimensions (in)	9 X 6 x 5	9 X 6 x 5	9 X 6 x 5	9 X 6 x 5	11 x 9 x 5.5	11 x 9 x 5.5	11 x 9 x 5.5
Dimensions (cm)	23 x 15.25 x 13	23 x 15.25 x 13	23 x 15.25 x 13	23 x 15.25 x 13	28 x 23.5 x 14	28 x 23.5 x 14	28 x 23.5 x 14
Certifications							
CE, ETL, UL, CSA, CB Scheme	CE Model	CE Model	CE Model	CE Model	CE Only (no ETL)	CE Only (no ETL)	CE Only (no ETL)
EN 61010, EN 61326							
WEEE (just WEEE - not RoHS)	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
Programmable Model	N/A	N/A	N/A	N/A	KDS 200P	KDS 220P	KDS 250P
Order Code 110 VAC					78-0202	78-0222	78-0252
Order Code 220 VAC					78-1202	78-1222	78-1252
Order Code 220 VAC with CE Mark					78-9202	78-9222	78-9252

LEGACY SERIES

Infuse/Withdraw Pumps		Push/Pull Pumps		Continuous Pump	High Pressure Pump	Remote Injector Pump
KDS 210	KDS 230	KDS 120	KDS 260	KDS 270	KDS 410	KDS 310 Plus
78-0210	78-0230	78-0120	78-0260	78-0270	78-0410	78-0311
78-1210	78-1230	78-1120	78-1260	78-1270	78-1410	78-1311
78-9210	78-9230	78-9120	78-9260	78-9270	78-9410	78-9311
Infuse/Withdraw	Infuse/Withdraw	Push/Pull	Push/Pull	Infuse/Withdraw/Continuous	Infuse/Withdraw	Infuse/Withdraw
Two	10 Maximum	One and One	Two and Two	Two and Two (Four total)	One	One
10 µl to 140 ml	10 µl to 10 ml (up to 10)	10 µl 10 ml	10 µl to 60 ml	10 µl to 60 ml (up to 4)	10 µl to 140 ml	1 µl to 250 µl
	20 ml to 60 ml (up to 6)					
	100 ml to 140 ml (up to 4)					
Keypad with numerics	Keypad with numerics	Keypad	Keypad with numerics	Keypad with numerics	Keypad with numerics	Keypad
Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD	Backlit LCD
+/-<1%	+/-<1%	+/-<1%	+/-<1%	+/-<1%	+/-<1%	+/-<1%
+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%	+/-0.1%
40 lb/18 kg	40 lb/18 kg	20 lb/9 kg	40 lb/18 kg	40 lb/18 kg	>100 lb/45 kg	2 lb/ 0.9kg
-	-	-	-	-		
0.001 µl/hr	0.001 µl/hr	0.1 µl/hr	0.001 µl/hr	0.001 µl/hr		1.456 µl/min (100 µl syr)
1270 ml/hr	1270 ml/hr	127 ml/hr	1270 ml/hr	1270 ml/hr	1270 ml/hr	-
4235 ml/hr	4235 ml/hr	423 ml/hr	4235 ml/hr	4235 ml/hr	4235 ml/hr	-
8824 ml/hr	8824 ml/hr	-	8824 ml/hr	8824 ml/hr	8824 ml/hr	-
1.8 ' Stepper Motor	1.8 ' Stepper Motor	7.5 ' Stepper Motor	1.8 ' Stepper Motor	1.8 ' Stepper Motor	1.8 ' Stepper Motor	-
n/a	n/a	25:1	N/A	N/A	N/A	N/A
1/16 microstepping	1/16 microstepping	1/2 microstepping	1/16 microstepping	1/16 microstepping	1/16 microstepping	
6400	6400	2400	6400	6400	6400	-
0.1654 µm	0.1654 µm	0.529 µm	0.1654 µm	0.1654 µm	0.1654 µm	1.58 µm
120 sec/µstep	120 sec/µstep	30 sec/µstep	120 sec/µstep	120 sec/µstep	120 sec/µstep	-
0.000625 sec/µstep	0.000625 sec/µstep	0.0025 sec/µstep	0.000625 sec/µstep	0.000625 sec/µstep	0.000625 sec/µstep	-
						-
0.10583 µm/min	0.10583 µm/min	0.10583 µm/min	0.10583 µm/min	0.10583 um/min	0.10583 um/min	-
0.00127 µm/min	0.00127 µm/min	0.00127 µm/min	0.00127 µm/min	0.00127 um/min	0.00127 um/min	-
Programmable Model	Programmable Model	No	Programmable Model	Programmable Model	Programmable Model	No
Yes	Yes	No	Yes	Yes	Yes	No
RS-232	RS-232	No	RS-232	RS-232	RS-232	No
Yes	Yes	No	Yes	Yes	Yes	No
Yes	Yes	No	Yes	Yes	Yes	No
Optional	Optional	Optional	Optional	Optional	Optional	Optional
No	No	No	No	No	No	
100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz	100 ~ 120 VAC 50/60Hz
200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz	200 ~ 240 VAC, 50/60Hz
9.5 lb/4 kg	9.5 lb/4 kg	4.5 lb/2 kg	9.5 lb/4 kg	9.5 lb/4 kg	14.1 lb/6.4 kg	4.5 lb/2 kg
11 x 9 x 5.5	11 x 9 x 5.5	9 X 6 x 5	11 x 9 x 5.5	11 x 9 x 5.5	6 x 11 x 9.5	7 X 1.7 x 2
28 x 23.5 x 14	28 x 23.5 x 14	23 x 15.25 x 13	28 x 23.5 x 14	28 x 23.5 x 14	15 x 28 x 24	17.8 x 4.4 x 5.1
CE Only (no ETL)	CE Only (no ETL)	CE Model	CE Only (no ETL)	CE Only (no ETL)	CE Only (no ETL)	CE Model
Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
KDS 210P	KDS 230P	N/A	KDS 260P	KDS 270P	KDS 410 P	
78-0212	78-0232		78-0262	78-0272	78-0412	
78-1212	78-1232		78-1262	78-1272	78-1412	
78-9212	78-9232		78-9262	78-9272	78-9412	

LEGACY SERIES

Pump customization is now easier with the new KDS OEM modules. Integrate these modules into your systems or work with our KDS engineering staff to design different syringe mechanisms or controllers. KDS offers the technology and engineering expertise to meet your demanding applications.

Specialty Pumps for Custom

Microliter & Milliliter Syringe Pump Modules are Highly Precise

This is the ideal pump for OEM applications. It has two modes of operation–constant flow rate or volume dispense. Infuse and withdraw limit switches indicate when the syringe has reached the end of travel (infuse switch) or the syringe plunger has been withdrawn to its limit (withdraw switch). If either switch is activated, the pusher block movement is stopped.

Syringe diameter, flow rates, and target volumes are stored in non-volatile memory. Interface to the pump modules is through RS-232.

- Constant Current Drive offers more consistent force delivery over the entire dynamic flow rate range.
- Independent infuse and withdraw limit switches
- Linear Force – minimum of 25 lbs over entire range (KDS 910)
  Minimum 7 lbs over entire range (KDS 900)
- Emergency stop switch at pump
- Start/stop at pump
- Encoder for stall detection
- Power and run LED on the PC Board
- Supports external run LED

- Network up to 16 pumps
- <+/- 0.5% Accuracy (KDS 910)
- <+/- 0.35% Accuracy (KDS 900)
- Pump setting retained in NVRAM
- Adjustable force control
- Easily mounts to panel openings
- Customizable syringe mechanisms available
- Customizable chassis designs available
- Lead Free Design, RoHS compliant
- CE approved
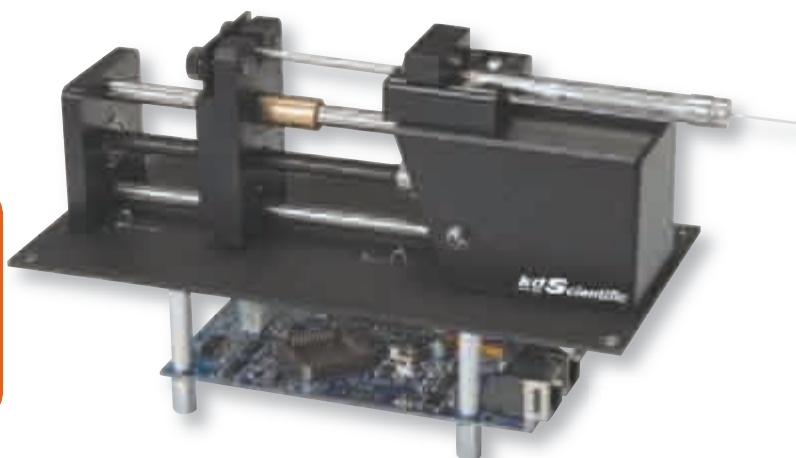
KDS 900
Customizable µl OEM Module
- 0.5 µl to 1 ml syringe
- Minimum flow rate 0.001 µl/hr (0.5 µl syringe)
- < ±0.35% Accuracy
- Maximum flow rate 1.330 ml/min (1 ml syringe)
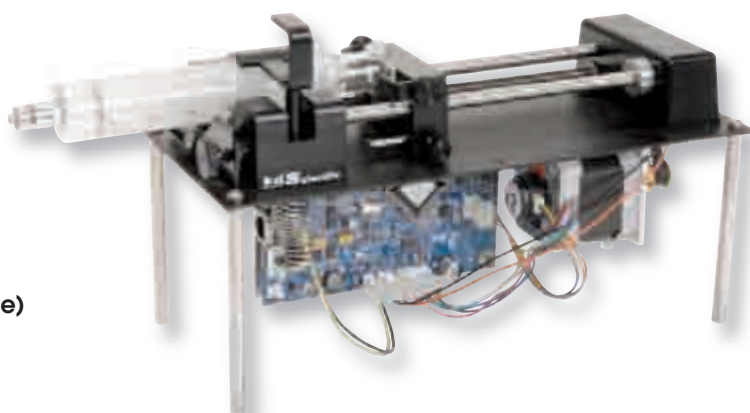
KDS 910
Customizable milliliter OEM Module
- 0.5 µl to 50/60 ml syringes
- Minimum flow rate 0.001 µl/hr (0.5 µl syringe)
- < ±0.35% Accuracy
- Maximum flow rate 44.28 ml/min (50/60 ml syringe)

SPECIALTY PRODUCTS

& Unique Applications

KDS 900 Shown
(KDS 910 features are similiar)

Withdraw Bracket

Secure Syringe Clamp

Robust Motor

Stall Detection Optical Encoder

12-30 VDC Power

Prevents Plunger Withdrawal (limit switch)

RS-232 Connection

Digital I/O
• Run Indicator
• Run/Stop

Indicates End of Travel (limit switch)

Power-On LED

• **Reciprocal/Parallel Mode** - Syringe mechanisms can run in the same or opposite directions (i.e. both infusing/withdrawing at the same time or one infusing and the other withdrawing)
• **Proportional Mode** - Different flow rates and syringe diameters can be set for each syringe mechanism
• **AutoStop Mode** - Pump stops operation when a limit switch is activated.
• **Continuous Run Mode** - When a limit switch is activated each syringe mechanism reverses direction.
• 57 lbs of linear force

KDS Gemini 88
Dual Rate Pump

This unique pump is really two pumps in one. Each side of the Gemini 88 has its own syringe rack, motor and leadscrew. The pump can infuse simultaneously at different rates, or infuse with one syringe and withdraw with the other. When combined with a valve box it provides continuous delivery.

Item No.	Model	Description
78-0388	Gemini 88	Dual Rate Syringe Pump
78-0389	Gemini 88	30 PSI Valve Box
78-0390	Gemini 88	HP Valve Box
78-0392		Foot Swtich
78-0393		Daisy Chain
78-0394		RS-232 Connector Cable

Specialty Product Specifications

	KDS 900	KDS 910	Gemini 88
Model (110 VAC/220 VAC/CE MARKED 220 VAC)	**Microliter OEM**	**Milliliter**	**Independent Rate Control**
Mode	Infuse/Withdraw	Infuse/Withdraw	Infuse/Withdraw/Continuous
# syringes	One	One	Two Independent
Syringe Size	0.5 µl to 1 ml max	0.5 µl to 60 ml	0.5 µl to 140 ml
User Interface	Computer	Computer	Keypad with Numerics
Display	n/a	n/a	Backlit LCD
Accuracy	+/-<0.35%	+/-<0.35%	+/-<0.35%
Repeatability	+/-0.1%	+/-0.1%	+/-0.1%
Linear Force	7 lbs Peak Min Adjustable	25 lbs Peak Min Adjustable	57 lbs
Force Adjustment	-	-	-
Minimum Flow Rate 10 µl Syringe	216 pl/hr	216 pl/hr	6600 pl/hr
Maximum Flow Rate 10 ml Syringe	1330 µl/min (1 ml syringe)	13.286 ml/min	15.733 ml/min
Maximum Flow Rate 60 ml Syringe	-	44.283 ml/min	53.346 ml/min
Maximum Flow Rate 140 ml Syringe	-	-	106.6 ml/min
Drive Motor	0.9 ' Stepper Motor	0.9' Stepper Motor	0.9' Stepper Motor
Microprocessor Motor Drive Control	1/4 and 1/16 Microstepping	1/4 and 1/16 Microstepping	1/2 to 1/4 Microstepping
# Microsteps/One Revolution of Lead Screw	-	-	1600 steps at 1/2 stepping or 3200 steps at 1/4 steppping
Advance per Microstep	-	-	0.33 µm/µstep
Min Step Rate	3.8 sec/µstep	3.8 sec/ustep	27.3 sec/µstep
Max. Step Rate	250 µsec/µstep	250 µsec/µstep	416.7 µsec/µstep
Pusher Travel Rate			
Minimum	1.3 µm/min	1.3 µm/min	0.726699 µm/min
Maximium	83.4 mm/min	83.4 mm/min	95.25 mm/min
Multi-step Programming	No	No	No
Constant Rate	-	-	-
Ramp	-	-	-
Pulsed	-	-	-
Stepped	-	-	-
Program Export/Import	No	No	No
Pusher Block Stall Detection	No	Yes	Yes
Computer Interface	RS-232	RS-232	RS-232
TTL	No	No	Yes
Networking	Yes	Yes	Yes
Real Time Clock	No	No	No
External Triggers	No	No	No
Analog Output	No	No	No
Footswitch Interface	Yes	Yes	No
Maintenace Reminder	No	No	No
Calibration Reminder	No	No	No
Password Lock	No	No	No
Audible Alarm Indication	-	-	-
End of Run	-	-	Optional
Near end of run	-	-	-
Stall detection	-	-	-
Power-up	-	-	-
Keypad Clicks	-	-	-
Calibration Reminder	-	-	-
Display Rotation	N/A	N/A	No
Multisyringe Rack Accessories	No	No	No
Run LED	No	No	No
Power Domestic	12 to 30 VDC 0.5 A max	12 to 30 VDC 0.5 A max	36 VDC 1.4 A
Power CE and International	-	-	-
Weight	1.8 lbs	2.72 lbs/1.23 kg	15 lb/ 6.8 kg
Dimensions (in)	7.25 x 3.63 x 4.5	9 x 6 x 5	12.5 x 11.25 x 6
Dimensions (cm)	18.4 x 9.2 x 11.4	23 x 15.25 x 13	-
Certifications	-	-	-
CE, ETL, UL, CSA, CB Scheme	CE	CE	CE
EN 61010, EN 61326	-	-	-
WEEE, RoHS	Compliant	Compliant	Exempt

Fast & Flexible Dual Plate Dispenser

KDS Ultraspense 2000
Plate Dispenser

UltraSpense 2000 is the answer to the increasing demand for an automated yet affordable dispenser for 96 and 384 well microplates. High accuracy and precision dispensing into deep well or low profile microplates, coupled with low dead volume and easy programming makes UltraSpense 2000 the ideal solution for virtually all dispensing applications. Dispense a wide range of solvents, acids, bases and other aggressive liquids with confidence through the completely inert liquids path. Optimize performance for a wide viscosity range through the adjustable pump speed. Ultraspense is very fast and accurate; dispense 100 μl into each well of a 96 well plate within 14 seconds with better than 0.5% C.V. precision.

Features

- Height-adjustable manifold
- Deep-well, standard & low-profile microplates can be used
- Pump-back capability and low dead volume
- User selectable volumes
- Programmable: flexible dispensing patterns, start and stop position, and omitted columns
- Automatic, repeatable, precise dispensing
- Long life piston pump
- No required calibration or maintenance intervals
- Easy operation and programming
- Completely inert liquid path - only PTFE, PVDF, glass and ceramic contact liquid
- Single and dual plate high speed dispensing: < 14 seconds for a 96-well plate; < 20 seconds for a 384-well plate
- User dialog in four languages

Benefits

- Accommodates low profile through deep well microplates
- Multiple formats with one system - 96 Well/384 Well Microplates
- Minimizes reagent loss
- Saves reagent waste
- Optimize expensive reagent usage
- Minimize assay errors; maximize reproducibility
- No required service or calibration intervals
- High precision over life time and low operating cost
- Repeated assays or dispensing profiles are only programmed once, saving time and money
- Compatible with a wide range of solvents, acids, bases and other aggressive liquids
- Maximize productivity and throughput
- Standardize on one piece of equipment in all your labs to produce consistent results everywhere

Applications

- Low Volume dispensing
- Protein Crystallizations
- Assay Development
- Primary Screening
- Secondary Screening
- Compound Storage

Specifications

Volume Range	5 μl to 2.5 ml
Volume Increments	5 μl standard, others selectable
Accuracy	+/- 1.5% (mean volume/column)
Precision	+/- 0.5%
Dead Volume	< 2.5 ml
Start/End Position	Programmable
Column Exclusion	Programmable by Column
Dispensing Speed 96 well plate	14 sec., 100 μl/well
Dispensing Speed 384 well plate	20 sec., 20 μl/well
Computer Interface	RS-232
Number of Plates	1 or 2
Plate Formats	96 and 384 well; Low profile to deep well
Number of Stored Programs	15
Dimensions (W x D x H) (440 x 550 x 220 mm)	11.0 x 16.1 x 10.6 in
Weight	24 lbs (11 kg)
Power Supply 70 Watts max.	85 - 260 VAC 47 - 440 Hz,
Environmental	Humidity 5 to 90% non-condensing
Maximum Altitude	2000 m
Temperature	5 to 40˚C

The new KD Scientific EZFlow Pump Series, is a line of economical pumps for simple infusions and dosing applications. The pumps are designed to combine high levels of performance together with ease of use and reliable operation. KD Scientific EZFlow products offer a complete line of pumps to meet many different applications. Micro-infusion pumps, volumetric infusion pumps, syringe pumps, portable pumps and disposable pumps are available at affordable prices.

EZFlow Series
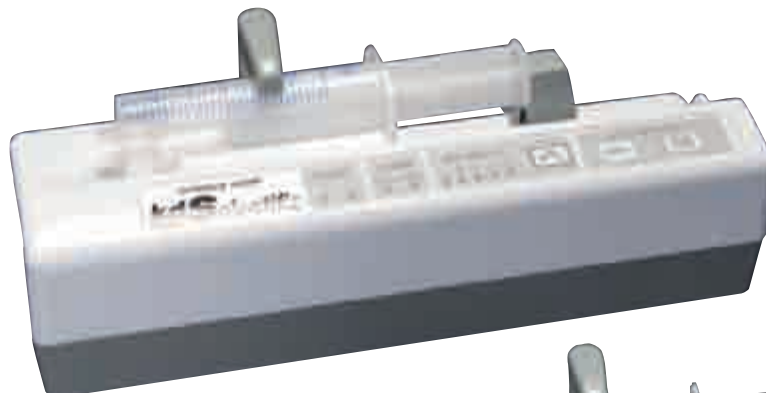
EZFlow 2020/2021
Time Based Syringe Pump

EZFlow 2010/2011
Flow Rate Syringe Pump

KDS EZFlow 2020/2021

Time Based Syringe Pump

KDS EZFlow 2020/2021 is a durable syringe pump useful in high rate infusions. It is designed to enhance quick efficient operation while maintaining simplicity.

- Waterproof ergonomic touch control panel
- Broad infusion capability
- Typical accuracy ±20 sec
- Set time indicator
- Set time button
- Fast purge feature
- Occlusion detection
- Wide range of plastic syringes
- 20/30 ml, 50/60 ml and 100 ml
- Audible & visual alarms
- Complete, occlusion detection,
- Low battery & near empty alarms
- Self test & self diagnostic

KDS EZFlow 2010/2011

Flow Rate Syringe Pump

User selected flow rates are easy, with simple increment and decrement arrow keys. A rapid delivery key will allow the user to eliminate the dead volume and also eliminate excess air in the tubing prior to delivery of the fluids. The pump offers continuous mode of operation and reliable long-term fluid deliveries. The unit has occlusion detection from 5.0 kg to 5.5 kg.

- Large LED display for flow rate indication
- Wide flow rate range 0.1 – 300 ml/hr
- Typical accuracy ±2.5%
- Quick flow rate selection
- Fast purge feature
- Visual run indicator
- Toggle to indicate total volume dispensed
- Occlusion detection
- Wide range of plastic syringes
- 20/30 ml, 50/60 ml and 100 ml
- Easy calibration for different syringes
- Audible & visual alarms
- Complete, occlusion detection,
- Low battery & near empty
- Self test & self diagnostic
- IPX1 enclosure

EZFLOW SERIES

EZFlow 2040
Infusion Pump

EZFlow 2030
Portable
Syringe Pump

EZFlow 2050
Disposable
Syringe Pump

KDS EZFlow 2040
Infusion Pump

The KDS EZFlow 2040 is a volumetric infusion syringe pump designed to enhance quick efficient operation while maintaining simplicity. It meets the CE directive and is EC 93/42 EEC.

It is designed to deliver precise infusions at rates from 0.1 to 1200 ml/hr. It features a bright 2.7 inch OLED with separate display which shows volume delivered, volume rate, time and date. There are 5 preset languages and many other advanced features that make the KDS EZFlow 2040 one of the most outstanding infusion pumps in its class.

The KDS EZFlow 2040 it is portable, user friendly and offers a new alternative for micro reliable infusions. The ergonomic touch screen panel for ease of selection and programming.

- Dual infusion modes
- Set at ml/hr or drops/min
- Flow rate range 01. to 1200 ml/hr
- Typical accuracy ±2.0%
- Audible & visual alarms
- Programmable infusion mode
- Store up to 10 memory settings
- Battery capacity 3 hours
- IPX1 enclosure
- CE 0197 certified
- 12 month warranty

KDS EZFlow 2050
Disposable Syringe Pump

The KDS EZFlow 2050 disposable infusion pump is simple, convenient, and affordable. It is designed to electronically deliver continuous, constant controlled infusions.

Simply dial to set infusion rate in seconds, with flow rates ranging from 2 to 10 ml/hr. Choice of 100 ml or 260 ml sterilized reservoir box. The pump can be used multiple times, the reservoir needs to be disposed of after each use.

The KDS EZFlow 2050 disposable infusion pump is portable and user friendly. It offers a new alternative for micro reliable infusions. It comes complete with a convenient carrying belt. The KDS EZFlow 2050 uses 2 AA batteries, up to 400 hours at 1 ml/hr. The pump is completely portable weighing less than 100 g (less than 0.5 pounds).

- Ergonomic touch buttons
- Simple operation
- Flow rate options 1 to 10 ml/hr
- Typical Accuracy ±5%
- Audible & visual alarms
- Disposable pump and reservoir
- Convenient carrying belt
- CE 0197 certified
- 12 month warranty
- Weight 100 g (without battery)

KDS EZFlow 2030
Portable Syringe Pump

KDS EZFlow 2030 is a small, light and completely portable syringe pump. It is designed to deliver small volumes with a linear flow rate of 1 - 99 mm per/hr with ±2% accuracy and can be used in a wide variety of applications. It is cost effective and the most compact and lightest pump in its class.

This portable, user friendly syringe pump offers a new alternative for micro reliable infusions. It can accommodate a wide variety of plastic syringes from 1 ml to 60 ml. Ergonomic, easy to use, horizontal design protects the syringe barrel and allows single-handed loading.

- Easy to use
- Linear flow rate 0.1 – 99 mm/hr
- Typical accuracy ±2.0%
- Bolus feature
- Wide range of plastic syringes from 1 - 60 ml
- Audible & visual alarms
- Complete occlusion detection
- Low battery
- Battery operation 30 days
- DC power supply 4.5V
- IPX1 enclosure
- 12 month warranty

EZFlow Series Specifications

	EZFLOW 2010	EZFLOW 2011	EZFLOW 2020	
Model	78-0550	78-1550	78-0560	
Syringe Size	20/30 ml; 50/60 ml; 100 ml	20/30 ml; 50/60 ml; 100 ml	20/30 ml; 50/60 ml; 100 ml	
Syringe Type	Plastic Only	Plastic Only	Plastic Only	
Resevoir Size	N/A	N/A	N/A	
Accuracy	+/-2.5%	+/-2.5%	+/-20 sec	
Flow Rate	-	-	-	
5 ml Syringe	-	-	-	
20/30 ml Syringe	0.1 ml/hr to 150 ml/hr	0.1 ml/hr to 150 ml/hr	-	
50/60 ml Syringe	0.1 ml/hr to 300 ml/hr	0.1 ml/hr to 300 ml/hr	-	
100 ml Syringe	0.1 ml/hr to 300 ml/hr	0.1 ml/hr to 300 ml/hr	-	
Flow Rate Increment	0.1 ml/hr increment	0.1 ml/hr increment	-	
Time Settings	-	-	4, 8, 12, 16, 20 min	
Alarms	-	-	-	
Near Empty	Yes	Yes	Yes	
Complete	Yes	Yes	Yes	
Occlusion	Yes	Yes	Yes	
Low Battery	Yes	Yes	Yes	
Power Supply	110 VAC 60 Hz 12 VDC	220 VAC 50 hz 12 VDC	110 VAC 60 Hz 12 VDC	
Enclosure	Drip Proof IPX1	Drip Proof IPX1	Drip Proof IPX1	
Battery Operation	4 Hours Continuously Operation at 50 ml/hr	4 Hours Continuously Operation at 50 ml/hr		
Dimensions (mm)	120 x 335 x 142 mm	120 x 335 x 142 mm	120 x 366 x 115 mm	
Dimensions (in)	4.72 x 13.2 x 5.59 in	4.72 x 13.2 x 5.59 in	4.72 x 14.1 x 4.53 in	
Weight	2.5 kg/5.5 lb	2.5 kg/5.5 lb	1.8 kg/3.96 lb	
Certifications	-	-	-	
CE 0197	Yes	Yes	No	
EC Directive 93/42/EEC, Annex II Article 3	Yes	Yes	No	

	EZFLOW 2021	EZFLOW 2030	EZFLOW 2040	EZFLOW 2050
	78-1560	78-0570	78-0580	58-0590
	20/30 ml; 50/60 ml; 100 ml	20/30 ml; 50/60 ml; 100 ml	infusion pump	-
	Plastic Only	Plastic Only	-	-
	N/A	N/A	N/A	100 or 260 ml
	+/-20 sec	<+/-2.0%	<+/-2.0% (pump only)	+/-5%
	-	-	-	-
	-	0.7 up to 65 ml/hr	-	Flow rate Option Purge 1,2,3,4,6,8, 10 ml/hr
	-	0.35 up to 34 ml/hr	-	-
	-	0.7 up to 65 ml/hr	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	-	-	-	-
	Yes	No	-	No
	Yes	Yes	-	Yes
	Yes	Yes	-	Yes
	Yes	Yes	-	Yes
	220 VAC 50 hz 12 VDC	DC 4.5 V 3 AA Batteries	100 AC to 240 VAC or 12 VDC	2 AA batteries
	Drip Proof IPX1	-	-	-
	-	-	-	-
	-	60 x 166 x 30	240 x 105 x 172	140 x 95 x 35
	-	2.4 x 6.5 x 1.2	6.5 x 4 x 6.75	5.12 x 3.74 x 1.38
	-	180 g/0.55 lb (without batteries)	2.9 kg/6.4 lb	100 g (without battery)
	-	-	-	-
	No	-	-	-
	No	-	-	-

A premier line of stainless steel syringes is now offered by KD Scientific. Rugged stainless steel syringes are an ideal solution when the pressures and the force are high, completely eliminating the problem of breaking glass syringes.

S tainless steel offers good resistance to most aggressive liquids. Wetted parts are #316 stainless steel and Viton or Perfluoroelastomer. Syringes are available in 2.5, 8, 20, 50 and 100 ml sizes with removable, replaceable tips. Genuine SWAGELOK™ syringe to tube fittings are available in 1/16, 1/8 and 1/4 inch sizes. A luer lock end fitting is also available. Tips are interchangeable with all syringes from 20 to 100 ml in size.

Premier Line of Steel and

Stainless Steel Syringes

Premium Line of Stainless Steel Syringes

- **Compatible with Most Syringe Pumps**
- **Eliminate Hazards of Glass Syringe Breakage**
- **Adaptable to Luer Lock or Swagelok™ Fittings**
- **Rugged Construction #316 Stainless Steel**
- **Reuseable - Fully Autoclavable**
- **Resistance to Most Chemicals**

20 ml

50 ml

100 ml

2.5 ml

8 ml

Syringe	Fitting	L3 in (mm)
2.5 to 8 ml	1/16	0.74 (18.8)
2.5 to 8 ml	1/8	0.91 (23.1)
20 to 200 ml	1/16	0.67 (17.0)
20 to 200 ml	1/8	0.84 (21.3)
20 to 200 ml	1/4	0.94 (23.9)
20 to 200 ml	Luer	1.34 (34.0)
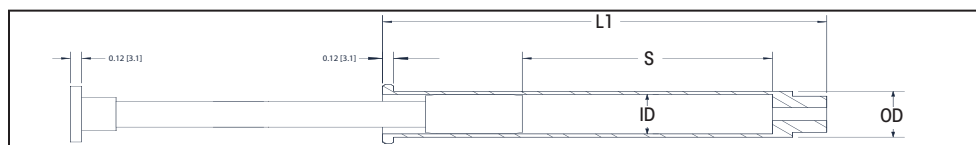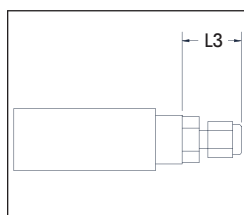
Specifications

Volume	2.5 ml		8 ml		20 ml		50 ml		100 ml	
Dimensions:	in	(mm)	in	(mm)	in	(mm)	in	(mm)	in	(mm)
Overall Length of Barrel - (L1)	6.64	(168.7)	6.73	(170.8)	4.73	(120.0)	5.49	(139.3)	6.73	(170.9)
Stroke - (S)	5.41	(137.4)	4.42	(112.4)	2.74	(69.6)	3.06	(77.83)	4.12	(104.5)
Outside Diameter - (OD)	0.50	(12.7)	0.50	(12.7)	0.88	(22.2)	1.25	(31.8)	1.50	(38.1)
Inside Diameter - (ID)	0.191	(4.85)	0.375	(9.525)	0.753	(19.13)	1.126	(28.60)	1.374	(34.90)
Maximum Test Pressure	9000 psi		4000 psi		1500 psi		1500 psi		1500 psi	
Working Pressure	7000 psi		1500 psi		700 psi		700 psi		700 psi	
O-Ring Material Standard	Perfluoroelastomer		Perfluoroelastomer		Viton		Viton		Viton	
O-Ring Specials (optional)	N/A		N/A		Perfluoroelastomer		Perfluoroelastomer		Perfluoroelastomer	
Order Code Syringe with Swagelok™ 1/16"	**78-0801**		**78-0802**		**78-0803**		**78-0804**		**78-0805**	
Order Code Syringe with Swagelok™ 1/8"	**N/A**		**78-0807**		**78-0808**		**78-0809**		**78-0810**	
Order Code Syringe with Swagelok™ 1/4"	**N/A**		**N/A**		**78-0812**		**78-0813**		**78-0814**	
Order Code Syringe with Luer Lock	**N/A**		**N/A**		**78-0816**		**78-0817**		**78-0818**	

SYRINGES & ACCESSORIES

Glass Syringes by KDS

Glass Syringes

Premium Line of Glass Syringes

- Easy to clean and maintain
- Accurate dispensing
- Reusable
- Economical
- Durable
- Chemically resistant
- Resistant to thermal shock

150 ml

100 ml

50 ml

30 ml

20 ml

10 ml

5 ml

2 ml
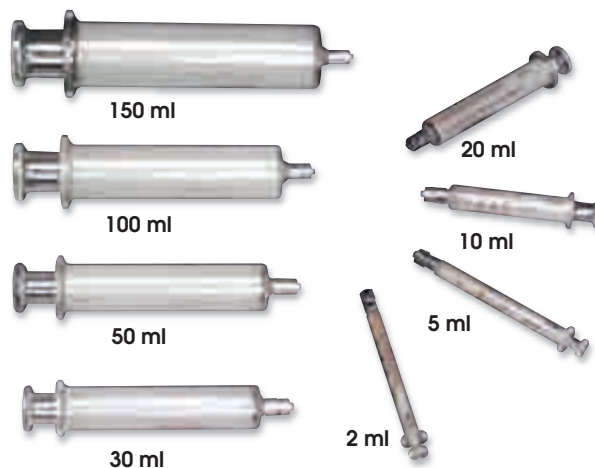
KD Scientific offers a new line of glass syringes to meet scientific applications in the laboratory environment. Over ten different sizes of glass syringes ranging from 1.0 ml to 150 ml are available.

All syringes are made from heat resistant borosilicate glass. The material and construction are resistant to breakage from shock and sudden temperature changes. They are all annealed and tested until free of internal strain to withstand repeated washing.

Specifications

Min. Order Qty.	6	6	6	6	6	6	6	1	1
Volume*	1.0 ml	2.0 ml	5.0 ml	10.0 ml	20.0 ml	30.0 ml	50.0 ml	100.0 ml	150.0 ml
Piston Outside Diameter (mm)	4.80 ±0.10	6.45 ±0.10	12.60 ±0.10	15.15 ±0.15	20.40 ±0.20	22.9 ±0.20	27.45 ±0.20	35.90 ±0.25	34.20 ±0.25
Piston Outside Diameter (in)	0.189 ±0.004	0.254 ±0.004	0.496 ±0.004	0.596 ±0.006	0.80 3±0.008	0.902 ±0.008	1.081 ±0.008	1.413 ±0.010	1.346 ±0.010
Barrel Diameter Outside (mm) D1	8.30 ±0.20	9.95 ±0.20	15.4 ±0.30	18.35 ±0.35	24.20 ±0.40	27.30 ±0.40	32.35 ±0.55	41.20 ±0.75	39.60 ±0.75
Barrel Diameter Outside (in) D1	0.327 ±0.008	0.392 ±0.008	0.606 ±0.012	0.722 ±0.014	0.953 ±0.016	1.075 ±0.016	1.274 ±0.022	1.622 ±0.030	1.559 ±0.030
Barrel Collar Diameter (mm) D2	14.95 ±0.50	16.40 ±0.50	22.25 ±0.75	26.20 ±0.75	33.25 ±0.75	37.55 ±0.75	44.00 ±0.75	55.50 ±0.75	52.00 ±0.75
Barrel Collar Diameter (in) D2	0.589 ±0.020	0.646 ±0.020	0.876 ±0.030	1.031 ±0.030	1.309 ±0.030	1.478 ±0.030	1.732 ±0.030	2.185 ±0.030	2.047 ±0.030
Piston Collar Diameter (mm) D3	11.5 ±0.50	12.25 ±0.75	17.25 ±0.55	19.95 ±0.60	24.65 ±0.65	27.95 ±0.65	34.05 ±0.65	42.05 ±0.65	42.00 ±0.65
Piston Collar Diameter (in) D3	0.453 ±0.020	0.482 ±0.030	0.679 ±0.022	0.785 ±0.024	0.97 ±0.026	1.10 ±0.026	1.341 ±0.026	1.656 ±0.026	1.654 ±0.026
Length (mm) L	115.00 ±0.50	115.00 ±0.50	105.00 ±0.50	128.50 ±0.50	145.50 ±0.50	163.00 ±0.50	178.00 ±0.50	215.00 ±0.65	275.00 ±0.65
Length (in) L	4.528 ±0.020	4.528 ±0.020	4.134 ±0.020	5.059 ±0.020	5.728 ±0.020	6.417 ±0.020	7.008 ±0.020	8.465 ±0.026	10.827 ±0.026
Increment (ml)	0.02	0.05	0.2	0.2	1.0	1.0	2.0	5.0	5.0
Order No.	78-0871	78-0872	78-0873	78-0874	78-0875	78-0876	78-0877	78-0878	78-0879
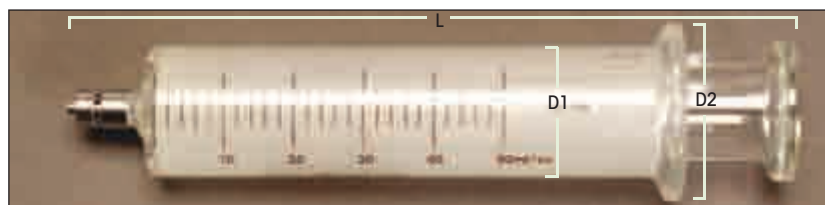
Glass Properties

|	
Volume	*±1.5% of rated volume
Expansion Coefficient	52 x 10-7/˚C
Density	2.36 g/cm3 ±0.03 g/cm3
Modulus of Elasticity	64 x 103 N/m2
Water Resistance	First Class
Acid Resistance	First Class
Alkali Resistance	First Class
Softening Point	785˚C
Melting Temperature	1260˚C
Strain Point	525˚C
Annealing Point	570˚C
Hardness	7
Color	Clear

S Y R I N G E S & A C C E S S O R I E S

KD Scientific offers a new line of disposable Plastic Sterile Syringes for all scientific applications. Available in sizes ranging from 3ml to 50ml with Luer Lock (LL) or Luer Slip (LS) Tip. Norm-ject syringes are the ideal solution for any situation. Their unique two-part system is latex free and contains no silicone lubricant or rubber.

Our syringes are made from laboratory grade polypropylene and polyethylene. There is no rubber tip on the plunger making them more chemically resistant than rubber tipped syringes. These unique plastic syringes have a positive safety stop to prevent accidental spills.

Cost Effective Plastic Syringes

Premium Line of Plastic Syringes

- **Sterile Packed and Disposable**
- **Compatible with Most Syringe Pumps**
- **Disposable Substitute for Glass Syringes**
- **No Silicone Lubricant or Rubber**
- **Economical**

50 cc

30 cc

3 cc

20 cc

5 cc

10 cc
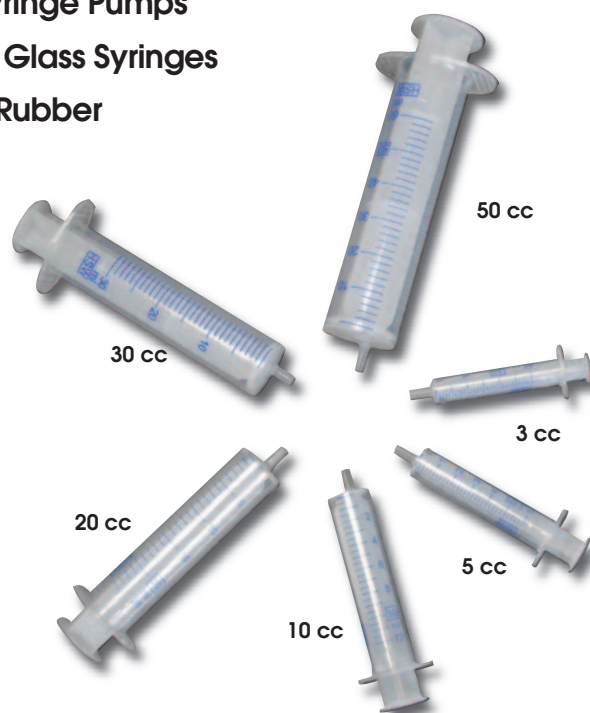
Specifications

Luer Lock (Pkg. of 25)

Volume (cc)	3	5	10	20	30	50
Total Length (mm)	74.9	87	98.5	115.1	132.5	150.0
Length of Cylinder (mm)	65.1	73.8	85.3	102.4	105.2	120.3
Outside Diameter (mm)	10.8	13.7	17.3	21.55	24.1	30.9
Inside Diameter (mm)	9.65	12.45	15.9	20.05	22.9	29.2
Nozzle Configuration	Centric	Centric	Centric	Centric	Centric	Centric
Order Code	78-0851	78-0852	78-0853	78-0854	78-0855	78-0856

Dose saver design with 0.025 low dead space plug on the piston to minimize waste.
The 5 cc has graduations to 6 cc, 10ml has graduations to 12 cc, 20 cc has graduations to 24 cc and 50 cc has graduations to 60 cc.

Slip Lock (Pkg. of 25)

Volume (cc)	1	3	5	10	20	30	50
Total Length (mm)	94.8	74.9	87	98.5	115.1	132.5	150.0
Length of Cylinder (mm)	84.7	65.1	73.8	85.3	102.4	105.2	120.3
Outside Diameter (mm)	6.4	10.8	13.7	17.3	21.55	24.1	30.9
Inside Diameter (mm)	4.69	9.65	12.45	15.9	20.05	22.9	29.2
Nozzle Configuration	Tuberculin	Centric	Centric	Eccentric	Eccentric	Eccentric	Eccentric
Order Code	78-0850	78-0857	78-0858	78-0859	78-0860	78-0861	78-0862

The 5 cc has graduations to 6 cc, 10ml has graduations to 12 cc, 20 cc has graduations to 24 cc and 50 cc has graduations to 60 cc.
Total length is piston thumb rest to syringe tip on an assembled syringe. Cylinder Length is cylinder only, finger grip to tip. The barrel is polypropylene, piston is high density polyethylene.

SYRINGES & ACCESSORIES

Accessories

Item No.	Description
• **78-8000**	Adagio Software **(A)**
• **78-0223**	RS-232 Cable with RJ11 **(B)**
• **78-0393**	Daisy Chain Cable **(B)**
• **78-8320**	Auto Fill Valve Box Low Pressure **(A)**
• **78-0389**	Auto Fill Valve Box Low Pressure **(D)**
• **78-8321**	Auto Fill Valve Box High Pressure **(A)**
• **78-0390**	Auto Fill Valve Box High Pressure **(D)**
• **78-8303**	Anti-Siphon Kit **(F)**
• **78-8325**	Anti-Siphon Kit **(E)**
• **78-8304**	RS-485 Pump to Pump Communication, 0.5 m (1.6 ft) **(A)**
• **78-8305**	RS-485 Pump to Pump Communication, 2 m (6.6 ft) **(A)**
• **78-8306**	USB Cable PC to Pump Communication, 2 m (6.6 ft) **(A)**
• **78-8307**	USB Cable PC to Pump Communication, 5 m (16.4 ft) **(A)**
• **78-8308**	RS-232 Cable (9 pin d-sub), 2 m (6.6 ft) **(F)**
• **78-8309**	Line Cord US, 115 VAC **(B,C,F)**
• **78-8310**	Line Cord European **(B,C,F)**
• **78-8311**	Line Cord UK **(B,C,F)**
• **78-8312**	Adapter Digital I/O (15 pin to 9 pin) **(A)**
• **78-8313**	Adapter D Sub 15 to Terminal Block **(A)**
• **78-0225**	Footswitch with Phono Jack Plug **(A,C)**
• **78-0224**	Footswitch with Phono Jack Plug **(B)**
• **78-8314**	Adapter for 25 ml, 50 ml, 100 ml Hamilton Gastight Syringe
• **78-8315**	Hex Key
• **78-8316**	Lubricant SuperLube, 1 cc
• **78-8324**	Protective Shield for display **(A)**
• **78-8326**	Line Cord with Power Supply, 115V **(E)**
• **78-8327**	Line Cord with Power Supply, European **(E)**
• **78-8328**	Line Cord with Power Supply, UK **(E)**
• **78-8329**	Upgrade Infuse Only to Infuse/Withdrawl **(E)**
• **78-8317**	Upgrade Infuse Only to Infuse/Withdraw **(F)**
• **78-8318**	Upgrade Infuse/Withdraw Only to Programmable **(F)**
• **78-8319**	Upgrade Infuse/Withdraw to Programmable **(F)**

Optional

FN	Internal Fan Option **(F)**
AI	Analog Control Input Option (0 to 10 VDC)* **(F)**
• **78-8322**	Analog Control Connector **(F)**
• **78-8323**	Analog Control Cable **(F)**
• **5146037**	Replacement Fuse **(A)**
• **5155288**	Replacement Battery **(F)**

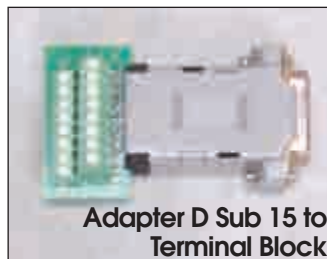* Only available with 78-8212, 78-8272

A Compatible with Legato
B Compatible with Legacy
C Compatible with KDS 310, KDS 100Y
D Compatible with Gemini 88
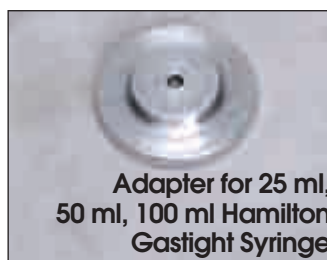**E** Compatible with Legato 100 Series
F Compatible with Legato 200 Series

Adapter D Sub 15 to Terminal Block

Adapter Digital I/O (15 pin to 9 pin)

Adapter for 25 ml, 50 ml, 100 ml Hamilton Gastight Syringe
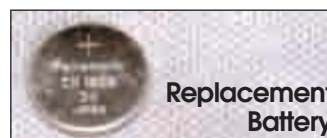

Analog Control Cable

Analog Control Connector

Footswitch with Phono Jack Plug

Lubricant SuperLube, 1 cc

Replacement Battery

USB Cable PC to Pump Communication

RS-232 Cable (9 pin d-sub), 2m

RS-485 Pump to Pump Communication

Line Cord UK

Line Cord US 115 V

Temperature Controllers

- **Easy to use**
- **Command temperatures digitally set**
- **Ambient to 65°C temperature range**
- **Can be powered from 12 V battery for sensitive electrophysiology applications**

TC-124A

Specifications

Input Voltage Range	9 to 16 VDC
Max. Output Current	1.2 A
Max. Output Power	13 W
Temperature Ranges (4)	Set by DIP Switch: Ambient to +65°C
Meter	3-Digit LED display
Meter Resolution	0.1°C
Panel Indicators	Red: Heat-up Condition Green: Heat-down Condition Yellow: Displaying Set-Temperature
Features	Pushbutton entry of Set-Temperature displayed for 3 seconds after adjustment
Enclosure Dimensions	2.1 x 6.6 x 11.1 cm (H x W x D)
Weight	92 grams
Warranty	One year, parts & labor

Item No.	Description
78-0521	TC-124A, Temperature Controller, 120 VAC US
78-0522	TC-124AE, Temperature Controller, 240 VAC Europe
78-0523	BAC-1, Battery Adapter Cable

- **Ambient to 65°C temperature range**
- **Can be powered from 12 Vvolt battery for sensitive electrophysiology applications**
- **Large, easy to read LED display**

TC-144

Specifications

Input Voltage Range	9 to 16 VDC
Max Output Current	1.2 A (per channel)
Max Output Power	13 W (per channel)
Temperature Ranges (4)	Set by DIP switch: ambient to +65C
Meter Resolution	0.1 °C
Display	LED, 3 digit, 10 mm (0.4 in) high
Panel Indicators:	Red: Heat-up condition Green: Heat-down condition Yellow: Displaying set-temperature or view temperature
Features	Pushbutton entry of modes, dust-proof, splash-proof case
Physical Dimensions:	
Case Size	2.1 x 6.6 x 11.1 cm (H x W x D)
Shipping Weight	0.5 kg
Warranty	One year, parts & labor

Item No.	Description
78-0524	TC-144, Temperature Controller Dual
78-0523	BAC-1, Battery Adapter Cable

Model TM-3 Three-Scale Thermistor Temperature Monitor

- **Celsius, Fahrenheit, or Absolute (Kelvin) scales**
- **Analog output for data acquisition systems or pen recorders**
- **Dust-proof, splash-proof & battery powered for use in the field**
- **Compatible with any 10kΩ unical thermistor**
- **Large easy to read LCD display**
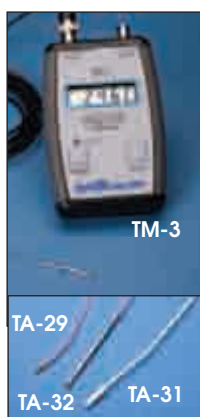
TM-3

TA-29

TA-32   TA-31

Specifications Continued:

Display	LCD, 4 digit, 10 mm (0.4in) high
Sensor	10kΩ Unical Thermistor
Input & Output Connectors	BNC female
Analog Output	10 mV/°C
Power Requirements	9 Volt transistor alkaline battery or supplied AC wall adapter
Physical Dimensions:	
Case Size	2.4 x 7.9 x 12.8 cm (H x W x D)
Shipping Weight	0.5 kg
Warranty	Two years, parts & labor

Item No.	Description
78-0525	TM-3, Three-Scale Temperature Monitor
78-0526	TM-3, Three-Scale Temperature Monitor 230 VAC

Thermistor Options

78-0527	TA-29. Bead Thermistor 1 mm Diameter
78-0528	TA-31. Probe Thermistor 2 mm Diameter 10 mm Long Plastic Housing
78-0529	TA-32, Probe Thermistor 1.63 mm Diameter 32 mm Long Stainless Steel Housing

Specifications

Temperature Range:	
Celsius	0 °C to 104 °C
Fahrenheit	2 °F to 220 °F
Absolute (Kelvin)	256 K to 378 K
Accuracy	0.3°C ± 1 digit between 20° to 60°C
Meter Resolution	0.1 degrees

SYRINGES & ACCESSORIES

Warmed Platforms for 35 mm Petri Dishes

- **Temperature control from 25 to 65 C**
- **Stage adapters for all major brand microscopes**
- **Low Cost Systems available**

Specifications

Temperature Range	25° to 65°C
Accuracy	±0.1°C
Feedback Thermistor	Built in Unical 10kΩ at 25°C
Controller	TC-124A / TC-144 Single and Dual Channel Controllers
Physical Dimensions:	
Warmed Platforms (D x L)	79.4 x 3.2 mm
Aperture Size (D)	10 mm-WP-10, 16 mm- WP-16
Weight	50 g
Cable Length	2.4 m
Connector Type	4 pin Male RJ-22
Warranty	One Year

Item No.	Description
78-0530	WP-10, Warmed Platform 10 mm Aperture
78-0531	WP-10D, Warmed Platform 10 mm Aperture
78-0532	WP-16, Warmed Platform 16 mm Aperture
78-0533	WP-16D, Warmed Platform 16 mm Aperture
78-0523	BAC-1, Battery Adapter Cable

Syringe Warmers

10 cc   60 cc   140 cc

- **Use on a syringe pump or support stand**
- **Accommodates 10, 60 and 140 cc syringes**
- **Scale marking ports permit volume monitoring**
- **Can be powered from 12 volt battery for sensitive electrophysiology applications**

Specifications

Heater Resistance	18 Ω
Voltage Requirement	Variable to 12 V maximum
Temperature Range	Ambient to 65°C
Temperature Accuracy	±1°C
Cable Length	2.4 m
Warranty	One year

Model	Weight	Length	OD	ID	Syringe Type
SWS-10	32.7 g	38.2 mm	22.2 mm	16.2 mm	Becton Dickinson
SWS-60	76 g	83.7 mm	35.0 mm	29.1 mm	Becton Dickinson
SWS-140	192 g	109.5 mm	51.0 mm	41.4 mm	Monoject

Item No.	Description
78-0534	SWS-10, Syringe Heater for 10 cc Syringes
78-0535	SWS-60, Syringe Heater for 60 cc Syringes
78-0536	SWS-140, Syringe Heater for 140 cc Syringes
78-0523	BAC-1, Battery Adapter Cable

OS-250, Overflow Sensor System

Item No.	Description
78-0500	OS-250, Overflow Sensor System
78-0501	Replacement Mats

OS-250 - Spill Sensor System

- **Quick and easy to set up**
- **Peak response with 10 to 75% RH**
- **Compatible w/upright & interverted microscopes**
- **1 year warranty**

Specifications

Power Requirements	92-240 VAC, 50/60 Hz, 0.5 VA
Operating Humidity	10% to 75%
Switched Outlet Current	8 A
Enclosure Dimensions	4.6 x 8.2 x 18 cm (H x W x D)
Shipping Weight	1.4 kg
Warranty	one year

SYRINGES & ACCESSORIES

KD Scientific Offers a Wide Range of Syringe Pumps to Meet Different Applications

We can assist you with selecting the right pump.

Simply fill out the questionnaire below and fax it to 1-508-429-6809
or send us the answers in an email to info@kdscientific.com

1. **How many syringes will you use?** _____
2. **What is the size of syringe(s)?** _____
3. **Do you want to**:
    Infuse only _____
    Withdraw only _____
    Infuse/withdraw _____
    Withdraw/Infuse _____
    Multi-step Programming _____
4. **Is there any back pressure in your application or are you dispensing into ambient?**
    Indicate Backpressure _____
5. **Required flow rate?** _____
6. **Volume to be dispensed?**
7. **Computer Interface:**
    LabView Software _____   KDS Adagio Software _____   Custom Software _____
8. **Please describe your application?**
9. **Describe any special requirements in your applications?** _____
    _____
10. **How many pumps do you need?** _____
11. **Do you need syringes?** _____   Plastic (indicate size and quantity) _____
    Glass (indicate size and quantity _____   Stainless Steel (indicate size and quantity) _____
12. **Next step:**
    Send Quote _____
    Contact me via email _____
    Contact me via phone _____

Name _____
Title _____
Company/Organization _____
Address _____
City _____
State _____
Zip _____
Country _____

Email _____
Phone _____
Fax _____

kdScientific

W W W . K D S C I E N T I F I C . C O M

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Specifications subject to change at any time.
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