



Fusion Model 100, 200, 400 Series User Manual

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Chemyx products are made in the USA



Intellectual Property All Intellectual Properties, as defined below, owned by or which is otherwise the property of Chemyx Inc. or its suppliers relating to the Chemyx syringe pumps, including but not limited to, accessories, parts or software relating thereto (Chemyx Syringe pumps), are proprietary to federal and state laws, and international treaty provisions. Intellectual Property includes but is not limited to, inventions (patentable or unpatentable), patents, trade secrets, copyrights, software, firmware, computer programs, and related documentation and other works of authorship. Moreover, you agree that you will not, and will not attempt to, modify, prepare derivative works of, reverse engineer, disassemble the Chemyx syringe pumps, decompile or otherwise attempt to create source code from the related software/firmware. No title to or ownership in Intellectual Property is transferred to you. All applicable rights of the Intellectual Property shall remain with Chemyx and its suppliers.

WEEE and RoHS Compliance

EU Directives WEEE and RoHS:

Chemyx is currently compliant with WEEE (Waste Electrical and Electronic Equipment) and RoHS (Restriction on the use of Hazardous Substances) directives. Our products fall under Category 8, medical equipment and/or Category 9, monitoring and control instruments.

During the next few years, Chemyx will transition ahead of time to meet the expected WEEE and RoHS changes in 2010 and will continue to monitor the RoHS directives to our products.



- **Do Not Dispose Product with Municipal Waste**
- **Special Collection/Disposal Required**

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General Information

Chemyx pumps are easy to use syringe pumps that contain LCD screens and 2 keypads - one directional command keypad and one numeric keypad.

Chemyx syringe pumps work like classic stepper motor driven syringe pumps in that a stepper motor engages a lead screw which drives a pusher to initiate syringe infusion. Our syringe pumps use a technique called "micro-stepping" which allows the stepper motor to achieve much greater motion control and precision than would otherwise allow.

Universal power adapters are supplied for our complete line of stand-alone products, guaranteeing operational usage anywhere in the world.

Chemyx products are not for use on humans – however, veterinary use on animals is acceptable.

Please read the following safety precautions to ensure personal safety and long life of the Chemyx syringe pump. Chemyx, Inc. is not responsible for the equipment if used in a manner not specified by the manufacturer; warranty coverage provided by the equipment may be dropped as a result.

USE PROPER POWER SUPPLY

Chemyx Inc is not responsible for the use of power supplies outside the stated electrical specifications or failure to switch the power converter from 240V to 120V while in the 240V environment or vice versa.

GROUND PRODUCT

Proper grounding is required.

DO NOT OPEN THE PUMP

Warranty coverage will be dropped if the pump is opened without authorization from Chemyx. Do not touch any electric connectors on the product.

DO NOT OPERATE WITH SUSPECTED FAILURES

Even though the pump can operate at extremely fast speeds, the user must determine the proper flow rate for any given application. For instance, pumping at 90ml/min using a 20 gauge needle will cause stalls and/or potential bursting of the syringe. Chemyx is not responsible for any damage that might result from examples similar to above.

PINCH HAZARD

Do not place fingers between the pusher block and end block while the pump is running.

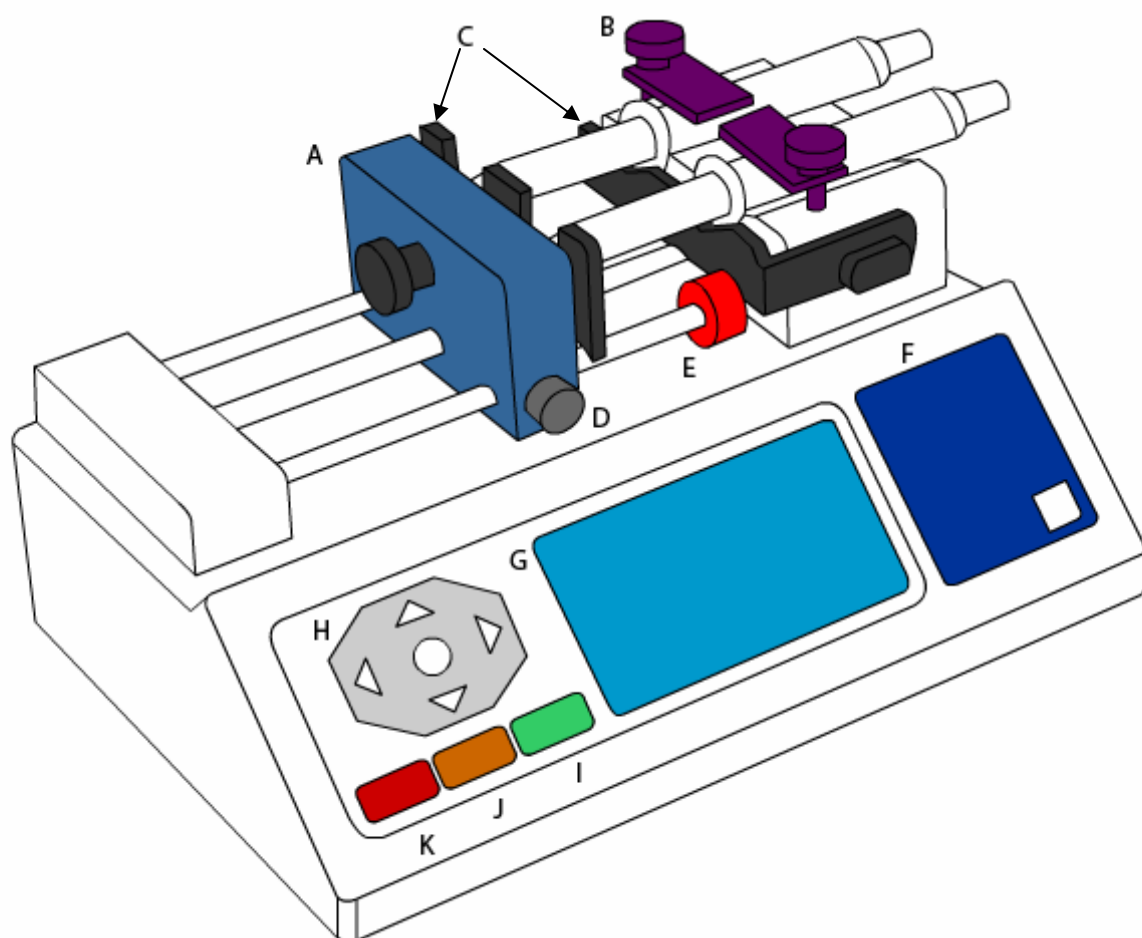
OBSERVE ALL WARNING LABELS ON PRODUCT

Read all labels on product to ensure proper usage.

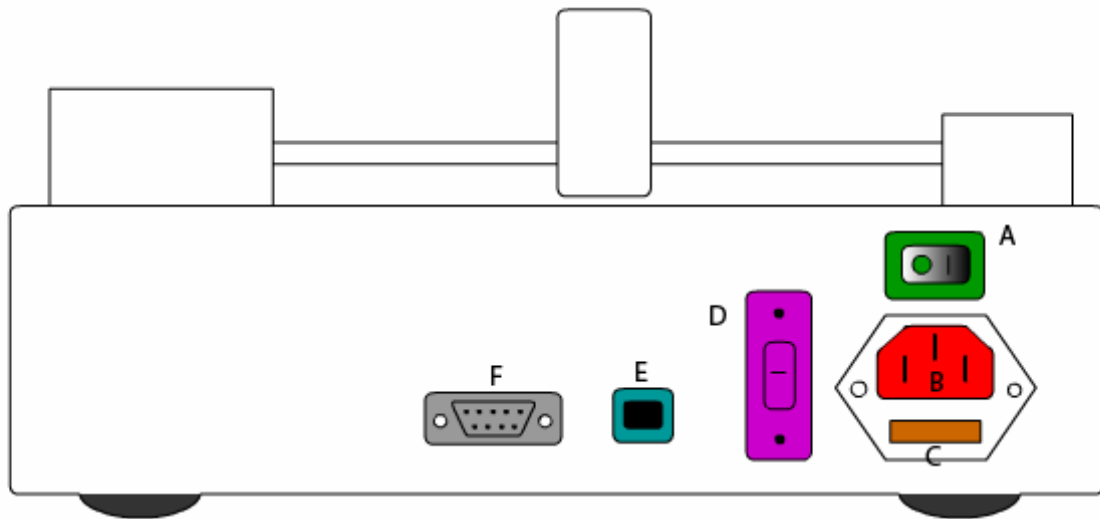
CHEMYX IS NOT RESPONSIBLE FOR SYRINGE DAMAGE

It is the user's responsibility to wet ground glass syringes and set / tighten the safety nut appropriately for microsyringes.

Features



- A: Pusher block
- B: Spring loaded syringe holder
- C: * Withdraw holder (Fusion 200 only) *Fusion 400 has a four screw clamp holder.
- D: Quick release drive nut
- E: Safety nut
- F: Numeric keypad
- G: LCD screen
- H: Directional navigation keypad
- I: Start button
- J: Pause button
- K: Stop button

Features continue

- A: Power switch
- B: Power plug
- C: 2 Amp fuse
- D: 120/240 voltage converter switch
- E: TTL triggering port for foot switch
- F: D9 RS232 serial port

Operational Usage

Hardware:

Syringes are loaded in the V-shaped syringe block and locked in with spring-loaded syringe holders. Fusion 200 systems come with options for a withdraw rack and multiple channel rack. Both these racks lock in the lip of the syringe and allow the pusher to pull on the plunger of the syringe.

Chemyx recommends locking the safety nut to prevent damage to syringes. However, it is up to the user's discretion to use this feature.

It is generally recommended the users load more liquid into the syringe than will be infused.

Fusion 100/200/400 Specifications

Specifications

Syringe size	0.5 microliter to 60 milliliter (0.5 microliter to 10ml Fusion400)
Voltage operating range	115 V~240V, 0.25 A, 55-60 Hz
Drive mechanism	Stepper motor
Step resolution (advance per microstep)	0.195 microns (.098 microns Fusion 200) (0.02 microns Fusion 400)
Flow rate range	0.001 µl/hr (10µl) to 90 ml/min (60 ml) (15picoliters/min Fusion 400)
Nominal linear force	29 lbs (50lbs Fusion 200/400)
Dimensions	9.6x6.5x4.5 inch
Weight	6 lbs
Temperature range	-25°C ~ 80°C
Humidity	20% - 80% RH

Operational Usage Continues

Software:

Notification area: This area display input limitations

Syringe inner diameter(ID) input and library: Look up stored syringe ID or enter custom ID

Rate input: Enter desired rate. If desired rate is out of bounds, the pump will notify user.

Volume input: Input desired volume. (Must be smaller than max syringe volume.)

Delay input: Input a delay time before infusion. The pump will wait for specified time and then start the infusion process.

Use the directional keypad to navigate around the interface and the numeric keypad to input numbers. A clear button is on the numeric keypad to erase entry errors.

1. Input a Syringe Inner Diameter in millimeters. Common syringe IDs can be found in the syringe library listed by brand and size.
2. Tab down to Rate and enter in a rate. The min and max rates possible for a certain type of syringe are shown in the notification area. If you enter in an incorrect rate the pump will not start until a valid rate is entered.
3. Tab down to volume and enter a volume. Max volume must be equal or less than the volume of your syringe.
4. Press start and the pump will begin the infusion process if all the inputs are within limits.

RS232 Protocols

Chemyx provides easy to use RS232 protocols so users do not have to purchase a pump control program and can run the pump from any computer with a RS232 port and the MS Windows Utility HyperTerminal. The brackets [x.x] denote numbers.

Comport Setup:

Baud Rate - 9600, Data Bits - 8, Parity - none, Stop bits - 1, Flow control - Hardware.

Protocols:

help	- Show help information
stop	- Pump Stop
pause	- Pump Pause
start	- Pump Run
status	- Pump Return Status
set units [xxx]	- Pump Set units
set diameter [x.x]	- Pump Set diameter
set rate [x.x]	- Pump Set rate
set time [xxx]	- Pump Set time@volume
set volume [x.x]	- Pump Set volume
set delay [xxx]	- Pump Set delay@start
save setting	- Pump parameter saved
read limit parameter	- Pump Returns Limit Parameter
view parameter	- Pump parameter settings
restart	- Pump restart

Limited Warranty

Chemyx warrants its products against defects in materials and workmanship for period of one year from the shipment date. Chemyx will repair any product that proves defective during its stated warranty period.

The foregoing warranty will not apply to defects resulting from:

- Improper or inadequate maintenance or operation
- Unauthorized modification or misuse of the product
- Operation outside the electrical specifications for the product
- Operation outside the temperature specifications for the product
- User-induced internal and external contaminations of the instrument
- Failure to use proper surge protection
- Improper product return, packaging, and shipping

You must contact either by e-mail or phone Chemyx Inc. before returning a product. Chemyx will issue a Return Authorization (RA) number to you.

Return products to:

Chemyx Inc.
3727 Greenbriar St, Bldg 301
Stafford, TX 77477
USA

Declaration of Conformity

We

Chemyx, Inc.
3727 Greenbriar, Bldg 301
Stafford, TX 77477
USA

declare under our sole responsibility that the product,

Chemyx Syringe Pumps

to which this declaration relates is in conformity with the following standard(s) or other normative documents.

73/023/EEC, Low Voltage Directive

89/336/EEC, Electromagnetic Compatibility Directive



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