

## Model NE-4000 Double Syringe Pump



NEW ERA PUMP SYSTEMS  
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## Model NE-4000 Double Syringe Pump NE-1000 Family of Syringe Pumps

Programmable Double Syringe Pump

**Note: This model operates the same as the NE-1010 except it can use**

**two different sized syringes.**

If your product, production, or research requires precise control of fluid dispensing, the NE-1000 family of syringe pumps is your most cost effective solution. The NE-4000 is a stand-alone, fully automated, dispensing system.

The NE-4000 was developed after years of design experience responding to requests for what an Infusion/Withdrawal pump should be:

- . An economical pump packed with features.
- . A pump designed for control and automation.
- . A pump designed for a real world environment.
- . A pump built with common sense.

Whether you are an end-user of syringe pumps or have an OEM application, New Era Pump Systems wants to be your source for syringe pumps. New Era Pump Systems will work with you to solve your most complex dispensing applications. The mechanics and firmware can be modified to meet any custom application.

- . Automate your research. Generate consistent and reliable test results.
- . Quickly program complex dispenses from the keypad with built-in programming.

. **Communicate with computers and sensors with RS-232 and TTL.**

. **Reduce labor costs.**

**Problem:** How do I get control of the dispensing of multiple fluids?

**Solution:** Attach two or more NE-4000 family of syringe pumps to each other and external sensors. Each pump can be individually setup to coordinate its dispensing with the other pumps and sensors. With a computer attached to the system, new production setups can be sent to the pumps to quickly reconfigure the pumps for a new application.

**Get the most out of your capital equipment budget**

Instead of purchasing limited function equipment, hire design personnel to build hardware and program computers - purchase a system that can be quickly reconfigured for new applications. Contact , us today to discuss how the NE-1000 family of syringe pumps can meet your fluid dispensing needs

## Features

Infuses and withdraws.

- . Accepts 2 different sized small syringes or large syringes, up to 60 cc and partially filled.
- . Dispense continuously at a fixed pumping rate

As low as 1.459  $\mu\text{l/hr}$  with a 1 mL syringe or as high as 127.2 ml/min with a 60 mL syringe. Change pumping rate and direction while pumping.

Selectable rate units:  $\mu\text{l/hr}$ ,  $\mu\text{l/mn}$ , ml/hr, ml/mn.

- . Dispense a specified volume.
- . Total volume pumped separately accumulated for infusion and withdrawal.
- . Dispense according to a pumping program to:

Pre-program dispense volumes. Each volume can be different.

Automatically change pumping rates or pumping direction.

Ramp up or down the pumping rate.

Timed delays between dispenses.

Automatically pause the program and wait for the user to continue the dispense.

Synchronize dispenses with other equipment or pumps to change pumping rates in reaction to a sensor or signals from other pumps.

Send signals to other equipment. Change pumping rates in reaction to a sensor.

Program the audible alarm to beep at any time to alert the operator.

- . Operates stand-alone, from an RS-232 computer network or from the TTL logic interface.

## Example Applications

- . Quickly and economically create a continuous operation dispensing system with 2 pumps in reciprocating operation. With just an automation cable and a valve system, the pumps can be synchronized to infuse while the other is refilling, and start and stop simultaneously.
- . The NE-1000 can be setup for an automated dispensing system which dispenses a set volume after a time delay. Then after each dispense, a small volume can be sucked back to prevent dripping.
- . A multiple chemical dispensing application can be implemented with multiple pumps. The pumps can be configured to send signals between them to synchronize the dispense and react to changes in sensors.
- . Setup an infusion/withdrawal dispensing system to automatically synchronize itself after a power failure by attaching a refill sensor.
- . Pre-program an entire production shift's dispenses on an automated production line. Each dispense can be a different volume and flow rate. Change flow rates during dispenses. Synchronize the start of each dispense with an external signal from other equipment, the operator pressing the 'Start' button, pressing a foot switch, or automatically after a time delay. Have the pump sound a beep to alert the operator at any time.
- . Prevent dripping after a dispense by programming a volume to be sucked back after each dispense.

## Programming Features Include:

- . 41 programmable phases

- . Set event interrupts from external signals to cause automatic jumps to another part of the program.
- . Conditional jumps based on external inputs
- . Nested loops: Repeat a section of the program continuously or a set number of times.
- . Program editing functions: Insert and delete program phases
- . Download or upload pumping programs from or to a computer. Write dispensing programs in a file on your computer, then download them to one or more pumps. Specify in the file to send a different pumping program to each pump in the pump network.

### **Bi-directional RS-232 Interface:**

- . Network up to 100 pumps. Baud rates up to 19200.
- . Directly control one or more pumps from a computer, including set the pumping rate, direction and volume. Set the operational and setup configurations. Also the TTL interface can be queried and the programmable output set.
- . Or download the pumping program to the pump to unload computer overhead to the pump, then allow the pump to operate independently.

### **2 modes of operation: Basic and Safe.**

- . Basic mode is a simple interface which is easy to implement or use from any terminal emulator.
- . Safe mode provides a reliable interface for a real-world environment.

Bi-directional error detection via a 16 bit CCITT CRC

Automatic signaling of alarm conditions such as pump reset or stalling.

Configurable communications time out alarm. The pump will stop and alarm if the communications link is lost.

### **TTL Interface:**

- . Attach foot switches, valves, timers or other control devices.
- . Configurable trigger input:

Edge trigger: Starts or stops the pump, such as from a foot switch.

Level trigger: Start or stops the pump, such as from a timer or relay control.

Start only trigger: Edge trigger will only start the pump, such as from a lab animal trained to press a lever to receive a dosage.

**Audible Buzzer:** Configurable to sound when an alarm condition occurs or the pumping program stops. Also can be configured to beep whenever the keypad is pressed. A beep can be programmed into a pumping program or on command from a host computer.

**Power Failure Mode:** Restarts a pumping program interrupted by a power failure.

**Stall Detection:** The pumps stops when the motor's operation is impeded. Optionally sound the buzzer and/or automatically send an alarm message to a host computer.

**Elastomer Keypad with Raised Keys:** NOT a membrane keypad!

**Chassis Foot Print Size:** 5 3/4" x 8 3/4"

**Functional Description:** The NE-4000 uses a step motor, drive-screw and drive-nut mechanism controlled by a microcontroller. An optical encoder is used to detect a stall condition. Non-volatile memory stores all configuration and programming setups. Power is supplied to the pump via an external power supply adapter.

### **MAXIMIZE YOUR CAPITAL EQUIPMENT BUDGET**

- Instead of buying pumps for a dedicated application -
- Purchase a pump that can be easily reconfigured as your dispensing needs change -

### **Specifications**

#### **1.1.1 Mechanical & Electrical**

Syringe sizes: Up to 60 cc

Number of syringes: 1

Motor type: Step motor

Motor steps per revolution: 200

Motor to drive screw ratio: 15/28

Drive screw pitch: 20 revolutions/”

DC connector: 2.5 mm, center positive  
Voltage at DC connector: 12V DC at full load  
Amperage: 1000 mA at full load  
Power supply type: Unregulated linear external wall adapter, country and power source specific  
Power supply output rating: 12V DC @ 1000 mA  
Dimensions: 8 3/4" x 5 3/4" x 4 1/2" High  
(22.86 cm x 14.605 cm x 11.43 cm)  
Weight: 3.8 lbs. (1.63 kg)  
Allen Wrench 3/32 Hex

### **1.1.2 Operational**

Maximum speed: 18.36964 cm/min  
Minimum speed: 0.008409 cm/hr  
Maximum pumping rate: 6120 ml/hr with a B-D 60 cc syringe  
Minimum pumping rate: 1.459 µl/hr with a B-D 1 cc syringe  
Maximum force: 100 lbs. at minimum speed, 18 lbs. at maximum speed  
Number of Program Phases: 41  
RS-232 pump network: 100 pumps maximum  
RS-232 selectable baud rates: 300, 1200, 2400, 9600, 19200  
Syringe inside diameter range: 0.100 to 50.00 mm

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