# Nanoliter 2010

*Microprocessor controlled nanoliter injection*



# INSTRUCTION MANUAL

Serial No._____

032213

***World Precision Instruments***

# *Other Popular Products From WPI*

**Smart Controller: Micro4**, an optional microprocessor-based controller, can provide an "intelligent" and easy-to-use interface to up to four Nanoliter Injectors. Operating parameters are set with the membrane keypad and LCD display. From the keypad the user can set pump to infusion or withdrawal mode, enter the volume to be infused or withdrawn, and rate of delivery, as well as synchronize the starting and stopping of a combination of Injectors. User parameters can be stored in the device's "non-volatile" memory for instant recall when the unit is powered on. An optional footswitch can be plugged into a connector on the rear of the controller for "hands free" start/stop operation. An **RS-232 port** on the rear of the controller can be used to connect it to a computer for use with computer control programs.


***Optional smart controller for Nanoliter 2010***

## Manual Micromanipulators

Best Seller

**M3301** is a popular, high-quality manual micromanipulator. Weighing just 550g, the x-axis allows for 10µm resolution. Control knobs for all three axes are aligned in a single plane, protruding from the back of the instrument for exceptional control in tight spaces.

M3301

KITE

The **KITE** is the economy version of the **M3301**. The **HS6** is a high precision micromanipulator built on a 12 pound steel plate. With 5µm resolution and 25mm of travel on all three axes, it has 20 times greater resolution than the **M3301**. The **HS6** is a high end manual micromanipulator.

HS6

# CONTENTS

# ABOUT THIS MANUAL

The following symbols are used in this guide:

This symbol indicates a CAUTION. Cautions warn against actions that can cause damage to equipment. Please read these carefully.

This symbol indicates a WARNING. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.

NOTES and TIPS contain helpful information.


*Fig. 1—Nanoliter 2010 setup. Micromanipulator is not included.*

# INTRODUCTION

The **Nanoliter 2010** microinjection system provides you with the capability to inject liquids in discrete aliquots ranging from 2.3nL to 69nL. The **Nanoliter Injector** utilizes a stainless steel plunger to create a mechanical displacement of fluid within a micropipette, thus pushing the contents out through the pipette tip.

## General Notes

- The wire plungers on all injectors have a point on one end. This wire can be reversed if a blunt end is desired. The point should allow bubbles in the oil to escape when backfilling tips.
- The preferred tip opening size for Xenopus injection is about 20µm. Some researchers report using 30µm tips with no increase in mortality.
- Injections of 25nL or less generally require smaller tips, normally 10µm.
- A broken tip is preferable for oocyte injection. Sharp polished tips tend to deflect.
- An excellent reference for all procedures involving the Xenopus oocyte is Kay, B. and H. Peng, "Xenopus Iaevis: Practical Uses in Cell and Molecular Biology." Methods in Cell Biology, Vol. 36, Academic Press.

## Parts List

After unpacking, verify that there is no visible damage to the instrument. Verify that all items are included:

(1) Injector head

(1) Control unit

(1) Universal Power supply, 12V 1000mA with 2.1mm barrel

(1) Universal Adapter for Nanoliter Injector

(1) 3.5" capillaries, 300 pieces in the vial

(1) Replacement O-ring kit, standard

(2) Allen wrench for replacing wire plunger (0.035" for Nanoliter 2010, 0.050" for Nanoliter 2000)

(1) **MF34G** MicroFil™ non-metallic filling needle (used for backfilling)

**1TIP10XV119** pre-pulled pipette (10µm) – 2 pipettes included

(1) Instruction Manual

## Unpacking

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed damage should be reported at once to the carrier and an inspection requested. Please read the section entitled "Claims and Returns" on page 15 of this manual. Please contact WPI Customer Service if any parts are missing at 941.371.1003 or customerservice@wpiinc.com.

**Returns:** Do not return any goods to WPI without obtaining prior approval (RMA # required) and instructions from WPI's Returns Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container, if possible. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100mm (four inches) of shock absorbing material. For further details, please read the section entitled "Claims and Returns" on page 15 of this manual.

# INSTRUMENT DESCRIPTION

The **Nanoliter 2010** is ready for use as received, requiring only pulled capillary tips. It is essential that only the capillaries supplied (or exact replacements) are used for pulling micropipettes. Additional replacement parts (sold separately) that are available from WPI include:

- Straight capillaries of correct diameter (1.14mm OD and 0.5mm ID) in two lengths: 3.5" (WPI #**4878**) and 7" (WPI #**4879**)
- Pulled micropipettes (WPI #**TIP10XV119**) are available.

The injector head can be mounted in a micromanipulator. WPI's **M3301** model is quite suitable and frequently used. The **500778** Universal Adapter for the Nanoliter Injector (shaft diameter of 8.0mm) is used for mounting the Nanoliter Injector to a micromanipulator.

The **Nanoliter 2010** is comprised of a controller (**Fig. 2**) and an injector handle (**Fig. 4**). **Fig. 3** shows the right side of the controller where the DIP switches are located.


*Fig. 2—(Left) Nanoliter 2010 controller showing the Fill, Empty and Inject buttons on the front of it*

*Fig. 3—(Right) The right side of the controller box has five DIP switches for controlling aliquot injection volumes and injection speeds*

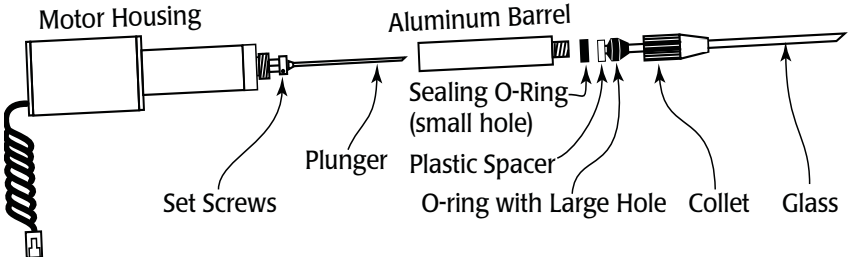


*Fig. 4—Nanoliter 2010 (exploded view) shows the parts of the Nanoliter 2010 injector handle*

## Controller Buttons

**Fill–**The Fill button retracts the wire plunger by one aliquot volume when the button is depressed. A beep sounds at the extreme fill position. DIP switch #5 (**Fig. 3**, **6**) controls the rate of filling.

- #5 up = 46nL/s fill rate
- #5 down = 23nL/s fill rate

**Empty–**The Empty button extends the wire plunger by one aliquot volume when the button is depressed. A beep sounds at the fully extended position (approximately 24mm from end of collet). The empty speed is approximately 92nL/s.

**Fast Fill and Fast Empty–**DIP switch #5 has no effect on the fast empty mode. To empty rapidly, hold down the Empty button and touch the Fill button one time. The empty speed increases to 230nL/s. The plunger maintains the faster speed until the Empty button is released.

The fill mode also has a fast speed. Hold down the Fill button and touch the Empty button one time. The fast rate varies, depending on the position of DIP switch #5 .

- #5 up = 230nL/second
- #5 down = 92nL/second

**NOTE**: When performing fast empty or fast fill, a beep sounds when the plunger reaches the end of travel.

**Inject**–The aliquot volume is selected using the DIP switches on the right side of the control unit. Then, each time the Inject button is depressed, an audible beep is heard and the selected volume is dispensed. See "Setting the Aliquot Volume and Injection Speed" on page 8.

## Plunger in "HOME" Position

When you plug in the **Nanoliter 2010**, it assumes it is in the "home" position. When in this position, the tip of the wire plunger should be slightly recessed from the end of the collet; the controller is at the initial position. This prevents accidental damage to the plunger when it is not in use. When the controller is at the initial position, the controller beeps when you push the **Fill** button. The controller has a memory of the

distance from the initial position and has a stop position at about 24mm from the initial position. The controller can make the wire plunger move up to about 24mm, starting from the initial position. I can move shorter distances if your start from any other position between the initial and stop positions.

**Reset Initial Position for the Nanoliter 2010 Controller**

Disconnect the RJ11 plug (telephone wire connector) that connects the pump and the controller, and then push the **Fill** button until a beep sounds. This resets the control unit to the initial position.

**Reset Home Position for Wire Plunger**

If the wire plunger is not at the home position, you can reset the home position using one of the procedures below.

**Using Nanoliter 2010 Controller**

Push the **Fill** button or the **Fast Reverse** button to retract the plunger to the home position. If a beep sounds when you push the **Fill** button, but the plunger is not in the home position, then you can reset the controller manually.

1. Disconnect the RJ11 plug that connects the pump and the controller.
2. Push the **Empty** button for 10 seconds or until a beep sounds. This gives the control unit more range to retract the plunger.
3. Insert the RJ11 plug back into the controller connection port.
4. Push the **Fill** button to retract the plunger to the home position.
5. If a beep sounds and the plunger is still not in the home position, repeat steps 1–4.
6. Reset the initial position for the Nanoliter 2010 controller.

**Using the Micro4 Controller**

1. Select the Withdraw mode
2. Set the controller at a high volume and high speed (for example, 1000nL and 200nL/sec.).
3. Run the unit until the wire plunger is at the home position. It may require several runs to reset the home position.

# OPERATING INSTRUCTIONS

The precise operation of the **Nanoliter 2010** depends greatly on the use of tips prepared from the glass provided. Micropipettes pulled from capillaries with other dimensions may not work.

**CAUTION**: Never attempt to use micropipettes pulled from glass containing a filament. Damage to the wire plunger will result and injection volumes will not be accurate.

## Micropipette Pulling

Ideally, the tip size should be pulled to 10-30µm. The capillary glass provided has a softening point of 780°C. Many researchers pull the tips smaller than required and then (using forceps) break them off at the desired size. The sharp broken edge works well to pierce the cell membrane.

Once the tips are pulled, they are typically "backfilled" with oil before attachment to the injector. Silicone or mineral oil is frequently used. Backfilling is facilitated by using the flexible MicroFil™ non-metallic needle and a syringe.

**NOTE**: **Nanoliter 2010** will not operate properly without backfilling the micropipette.

## Securing the Micropipette to the Injector

The injector is supplied with the standard collet/O-ring configuration.

### Standard Collet/O-ring Configuration

1. Once the micropipette is backfilled, loosen the collet (**Fig. 5**). The pointed wire plunger should be positioned so you can just see the tip flush with the end of the collet (slightly recessed is also acceptable). This is referred to as the "home" position.
2. Push the micropipette onto the wire plunger. As you push the tip on, feel it go through the large O-ring and seat in the white spacer. See **Fig. 5** for the proper configuration of the O-rings and the white spacer. It is absolutely essential that these components are properly configured.

   **NOTE**: The O-ring is cone shaped, and the conical surface fits inside the collet as shown in the drawing (Fig. 5).

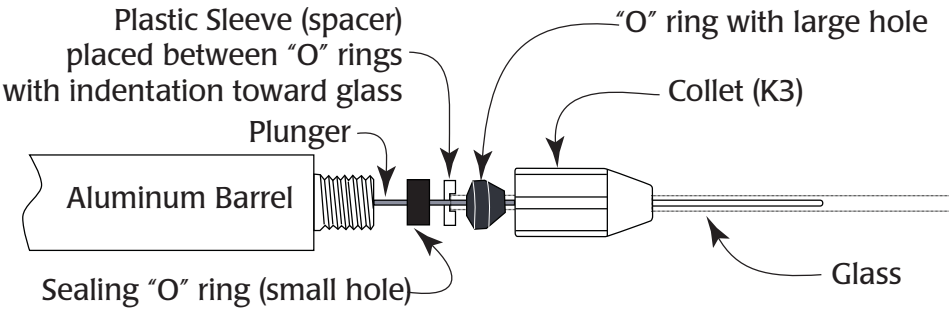


*Fig. 5—Standard configuration for installing the micropipette*

3. Once positioned, tighten the collet securely. Give the micropipette a pull to confirm it is securely mounted.

   **NOTE**: The white spacer has one flat side and one side with a recess machined around the hole. This recess receives the back end of the pipette and protects the plunger sealing O-ring from damage.

# Micropipette Filling Techniques

There are various methods for loading liquid samples into micropipettes for microinjection. A pulled micropipette has a back side and a front side.

- Back side–the non-pulled end, which has the relatively large opening that allows for rapid bulk filling
- Front side–the pulled end of the micropipette, the sharp side

The filling method of choice is usually dictated by experimental requirements and is chosen at your discretion.

## Back Filling

The term "back filling" refers to the process of filling the pipette from the large, non-pulled end. Back filling offers a great advantage when performing a bulk fill, because the large opening allows you to use a syringe and MicroFil flexible needles. (See "Optional Accessories" on page 11.) The bulk filling process occurs rapidly with little mess.

1. Attach a MicroFil needle to a syringe, immerse the tip of the needle into the filling liquid and use the syringe to pull the fluid into the MicroFil needle.
2. Place the MicroFil needle into the micropipette from the back side so that the needle's tip is pushed all the way into the front part of the pipette near the pulled end.
3. Eject the liquid into the micropipette and slowly withdraw the MicroFil needle as the liquid fills the micropipette.

## Front Filling

"Front filling" is the term to describe filling a micropipette through the small, pulled front end of the pipette. Front filling is achieved by creating a vacuum at the back end of the pipette that pulls the filling liquid into the micropipette. Once the micropipette is installed on the **Nanoliter 2010**, it is possible to front fill. Front filling is advantageous for small volumes or expensive samples. Because of the small opening in the front, it is not preferred for bulk filling of large volumes.

## Typical Technique

The technique described below is a typical process for filling a micropipette with a small volume for microinjection.

1. Backfill the micropipette with mineral oil.
2. Use the **Nanoliter 2010** controller to eject the plunger from the home position. This is necessary in order to allow the plunger to move backwards to create a vacuum for front filling.

3. **Fig. 5** shows the assembly of the micropipette to the **Nanoliter 2010**.
4. Once the micropipette is installed, submerge the micropipette tip into the sample.
5. Press the Fill button on the **Nanoliter 2010** controller to pull the sample into the tip of the micropipette.

## Injecting

Injection aliquot volumes are determined by the position of the DIP switches, located on the right side of the **Nanoliter 2010**. DIP switches #1–4 control the aliquot volume (**Fig. 6**). DIP switch #5 selects the fast injection rate and fill rates. See "Setting the Aliquot Volume and Injection Speed" on page 8.

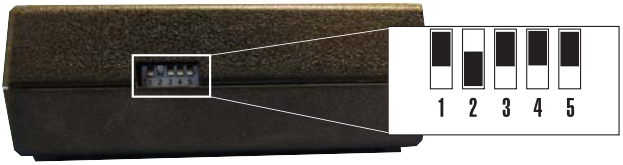


*Fig. 6—The DIP switches, located on the right side of the control unit, determine the injection volumes. See Table 1.*

Once the desired aliquot volume is selected, then each time the Inject button is depressed, an audible beep is heard and the aliquot is dispensed.

Pressing Inject before the first aliquot is dispensed will not produce a second injection. Wait for the beep (which indicates the injection is complete) before beginning a second injection.

## Setting the Aliquot Volume and Injection Speed

Aliquot volumes and injection speeds are controlled by the positions of the DIP switches located on the side of the control box. Table 1 lists the DIP switch settings to use for DIP switches 1–4 to select the various aliquot volumes. ("U" = up, "D" = down). DIP switch 5 determines the fast injection and fill rates.

- Up (Fast) = 46nL/s
- Down (slow) = 23nL/s

**TIP**: To set the DIP switches, use a ball point pen or a jeweler's flat head screw driver.

**NOTE**: DIP switch settings for the **Nanoliter 2010** are completely different from the Nanoliter Injector A203.

**DIP Switch Settings**

| Volume (nL) | DIP Switch Settings | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| 2.3 | U | U | U | U |
| 4.6 | D | U | U | U |
| 9.2 | U | D | U | U |
| 13.8 | D | D | U | U |
| 18.4 | U | U | D | U |
| 23.0 | D | U | D | U |
| 27.6 | U | D | D | U |
| 32.2 | D | D | D | U |
| 36.8 | U | U | U | D |
| 41.4 | D | U | U | D |
| 46.0 | U | D | U | D |
| 50.6 | D | D | U | D |
| 55.2 | U | U | D | D |
| 59.8 | D | U | D | D |
| 64.4 | U | D | D | D |
| 69.0 | D | D | D | D |

# MAINTENANCE

## Replacing O-Rings

After a period of time or heavy use, you may observe some leakage around the seals. To correct this, replace the O-rings. Replacement O-rings are included with your **Nanoliter 2010**. Additional O-rings (WPI #**300521**) may also be ordered. See "Securing the Micropipette to the Injector" on page 6. **Fig. 5** shows the proper installation configurations. Correct orientation of the O-rings is critical for proper operation.

## Replacing the Wire Plunger

Refer to **Fig. 4** on page 4 to see the exploded diagram of the **Nanoliter 2010** injection handle.

1. Verify that the plunger is in the home position.
2. Unscrew the collet one turn and remove the O-rings.
3. Hold the motor housing with one hand while loosening the aluminum barrel. To remove it, unscrew it counter-clockwise with your other hand.This exposes a brass fitting with two Allen screws on opposite sides of the brass fitting and the clear stop.

**CAUTION**: Do NOT disassemble the Motor Housing. Doing so may damage the plunger drive assembly.

4. Using the 0.035″ hex wrench provided with the replacement plunger, loosen the two set screws.

   **NOTE**: The 0.050″ hex wrench is for use with the Nanoliter 2000.

5. Remove the plunger.

6. Insert the new plunger and tighten the set screws snugly. Do NOT overtighten. Set screws must be flush with the edge or the aluminum barrel will not seat properly.

   **NOTE**: The pointed end of the plunger is normally oriented out, be it can be inserted either way.

7. Slide the clear stop over the plunger so that the narrow side is toward the brass fitting. This stop prevents the plunger from advancing too far into the aluminum barrel.

8. Slide the aluminum barrel over the tip of the plunger. Hold the handle so the plunger is point straight up. Gently shake the unit until the barrel hole lines up with the plunger and slides down over it.

**CAUTION**: DO NOT FORCE THE ALUMINUM BARREL OVER THE PLUNGER. The plunger is easily bent.

9. Tighten the aluminum barrel in place.

10. Carefully position the washers and collet on the tip of the plunger. Make sure the washers are assembled in the proper order. Do not puncture new holes in the washers or fluid will leak through them.

11. Tighten the collet.

## Cleaning Recommendations

The injector can be cleaned by removing the collet, O-rings and spacers and wiping them with alcohol.

**CAUTION**: Do NOT soak the **Nanoliter 2010** parts in liquid. Do NOT autoclave the **Nanoliter 2010**.

The control box may be cleaned by wiping it with a clean, damp cloth.

# OPTIONAL ACCESSORIES

| Part Number | Description |
|---|---|
| **4878** | Replacement 3.5-in. glass capillaries (300) |
| **4879** | Replacement 7-in. glass capillaries (300) |
| **300521** | Spare Parts Kit (includes MicroFil™ MF34G, displacement plunger, five O-ring sets, tools) |
| **13142** | Footswitch for Nanoliter 2010 |
| **15867** | Footswitch for Micro4 Controller |
| **300033** | Adapter cable, Nanoliter 2010 to Micro4 |
| **500299** | Replacement Plungers, 5-pack |
| **500778** | Replacement Nanoliter Injector Universal Adapter |
| **503043** | Replacement Universal Power Supply for Nanoliter 2010 controller |
| **504139** | Nanoliter 2010 Replacement collet |
| **MF34G-5** | MicroFil, 34g ( pkg. of 5) |
| **MICRO4** | Micro4 Controller, 4-Channel |
| **TIP10XV119** | Pre-pulled Micropipettes for Nanoliter Injector (10) |

# TROUBLESHOOTING

| Issue | Possible Cause | Solution |
|---|---|---|
| Glass pipette pushes off the pump tip | The front O-ring seal is worn out | Replace the O-ring seals. See "Replacing O-Rings" on page 9. |
| | The wire plunger is bent enough to add friction to the glass, which pushes it off | If it is bent, replace the wire plunger. See "Replacing the Wire Plunger" on page 9. |
| | O-ring seal is soaked in oil and tightening the collet is not enough to secure the glass | Wash the front O-ring in alcohol before placing it on the glass pipette shank. |
| Plunger doesn't retract completely | Home position is set incorrectly | See "Plunger in "HOME" Position" on page 4 for instruction on resetting the home position. |

**NOTE**: If you have a problem/issue with that falls outside the definitions of this troubleshooting section, contact the WPI Technical Support team at 941.371.1003 or technicalsupport@wpiinc.com.

# SPECIFICATIONS

The **Nanoliter 2010** conforms to the following specifications:

Injection Volume ..... Variable-discreet aliquot volumes (See Table 1, page 9)
Remote Control ..... Yes
Glass OD ..... 1.14mm
Glass ID ..... 0.5mm
Step ..... 12.7µm/step
Injection Speed ..... Slow: 23nL/s
..... Fast: 45nL/s
Fill Speed ..... Slow: 23nL/s
..... Fast: 46nL/s
Empty Speed ..... 92nL/s
Smallest Volume ..... 2.3nL
Injections Per Filling, Max. ..... 100 injections
Power ..... 100–240VAC, 12V DC 1000mA
..... 5.5x2.1mm (positive center) barrel
Shipping Weight ..... 3 lb. (1.1kg)

# APPENDIX: NANOLITER 2010/MICRO4 VOLUME SETTINGS

When using the **Micro4** to control injections with the **Nanoliter 2010**, take care when entering the injection volume. The **Nanoliter 2010** injector's volume per step is based on the movement of the plunger wire inside a pulled glass pipette. This plunger moves 0.0005" (12.7µm) for each step of the motor. The volume of 2.3nL per step is based on the inside diameter of a 0.5mm pipette and the 12.7µm movement of the plunger wire. As shown in the table below, use Type K when programming the **Micro4** for use with the **Nanoliter 2010**.

**NOTE: FOR FULL OPERATING INSTRUCTIONS FOR THE MICRO4 AS IT RELATES TO THE NANOLITER 2010 OPERATION, REFER TO THE UMP3 INSTRUCTION MANUAL.**

**Micro4 Volume Setting Table**

| Type | Syringe Volume | Scale Length | ID (mm) | nL / step REV K | Max. Rate nL/s | Max. Rate Microstep Mode nL/s |
|---|---|---|---|---|---|---|
| **A** | 0.5µL | 54.1mm | 0.1085 | 0.0294 | 20 | 1 |
| **B** | 1.0µL | 54.1mm | 0.1534 | 0.0587 | 40 | 2 |
| **C** | 5µL | 54.1mm | 0.343 | 0.2934 | 202 | 14 |
| **D** | 10µL | 54.1mm | 0.485 | 0.5868 | 451 | 29 |
| **E** | 25µL | 60mm | 0.73 | 1.329 | 1022 | 66 |
| **F** | 50µL | 60mm | 1.03 | 2.646 | 2035 | 132 |
| **G** | 100µL | 60mm | 1.46 | 5.315 | 4088 | 265 |
| **H** | 250µL | 60mm | 2.3 | 13.191 | 9999 | 659 |
| **I** | 500µL | 60mm | 3.26 | 26.501 | 9999 | 1325 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **J** | 1000µL | | 4.61 | 52.995 | 9999 | 2649 |
| **K** | Nanoliter 2010 | | 0.48 plunger in 0.50 glass | 2.3 nL /step (0.0005″ step) | 884 | 115 |
| **L** | 10µL | 60mm | 0.4607 | 0.5293 | 407 | 29 |
| **M N O P** | User Defined | | | See page 14 | custom rate* | |
| ** | ILS005 | | 0.4856 | 0.5880 compensates for length as TYPE M | | |

*The rate maximum is calculated internally and is determined by the nL/step value times 10000 and divided by 13. The microstepping maximum rate is nL/step*10000/200.

## Setting the Correct Volume on the Micro4

Since the aliquot volume per step is 2.3nL, the volume to be entered on the **Micro4** touch panel must be a multiple of 2.3. The normal injection error is < 2%.

**TECHNICAL NOTE:** For example, if you wish to inject 100nL, the setting on the **Micro4** panel will be calculated as 100/2.3 or 43.47 steps. The motor can only step in whole numbers, so the volume must be adjusted, up or down, to the nearest whole step value. Increasing to 44 steps gives a volume of 101.2nL (43 * 2.3=101.2). Deceasing to 43 steps gives a volume of 98.9nL (43 * 2.3=98.9) One of these two volumes should be used to insure a proper injection. By default, if you leave the value on the **Micro4** at 100nL, 98.9nL is injected.
Difficulty can arise when the volume value is half or more of the next 2.3nL step. For example, setting the **Micro4** for an injection of 10nL results in a theoretical injection volume of 9.2nL, produced by 4 whole steps of the injector. Five whole steps results in 11.5nL. Entering a value of 11.0nL in the controller, however, generates a spurious value in the **Micro4** display (10.35nL), but the actual injection is still only 9.2nL. To avoid this error, enter only multiples of 2.3nL when calculating required volumes.


*Fig. 7—Micro4- an optional microprocessor-based controller, can provide an intelligent and easy-to-use interface for up to four Nanoliter 2010 injections.*

# DECLARATION OF CONFORMITY

**WORLD PRECISION INSTRUMENTS, INC.**
175 Sarasota Center Boulevard
Sarasota, FL 34240-9258 USA
Telephone: (941) 371-1003 Fax.: (941) 377-5428
e-mail: wpi@wpiinc.com

## DECLARATION OF CONFORMITY

We: World Precision Instruments, Inc.
175 Sarasota Center Boulevard
Sarasota, FL 34240-9258 USA

As the distributors of the apparatus listed, declare that the product(s):
**NANOLITER 2010**

to which this declaration relates is/are in conformity with the following standards or other normative documents:

**Safety:** **EN 61010-1:2010**
**Emc:** **EN 61326-2-3:2006**
**EN 61326:1997+A1:1998+A2:2001+A3:2003**

and therefore conform(s) with the protection requirements of Council Directive 2004/108/EC relating to electromagnetic compatibility and Council Directive 2006/95/EC relating to safety requirements:

Issued on: August 2, 2011

*Cliff Bredenberg*
*President*

World Precision Instruments, Inc.
175 Sarasota Center Boulevard
Sarasota, FL 34240-9258 USA

*Glen Carlquist*
*Vice President of Production*

World Precision Instruments, Inc.
175 Sarasota Center Boulevard
Sarasota, FL 34240-9258 USA

# WARRANTY

WPI (World Precision Instruments, Inc.) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of 30 days* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

## Claims and Returns

Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within ten (10) days after receipt of shipment. Claims for lost shipments must be made within thirty (30) days of receipt of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim is settled. In some instances, photographic documentation may be required. Some items are time-sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container

Do not return any goods to us without obtaining prior approval and instructions from our Returns Department. Goods returned (unauthorized) by collect freight may be refused. Goods accepted for restocking will be exchanged or credited to your WPI account. Goods returned which were ordered by customers in error are subject to a 25% restocking charge. Equipment which was built as a special order cannot be returned.

## Repairs

Contact our Customer Service Department for assistance in the repair of apparatus. Do not return goods until instructions have been received. Returned items must be securely packed to prevent further damage in transit. The Customer is responsible for paying shipping expenses, including adequate insurance on all items returned for repairs. Identification of the item(s) by model number, name, as well as complete description of the difficulties experienced should be written on the repair purchase order and on a tag attached to the item.

** Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.*


## *World Precision Instruments, Inc.*

**USA**

International Trade Center, 175 Sarasota Center Blvd., Sarasota FL 34240-9258
Tel: 941-371-1003 • Fax: 941-377-5428 • E-mail: sales@wpiinc.com

**UK**

1 Hunting Gate, Hitchin, Hertfordshire SG4 0TJ
Tel: 44 (0)1462 424700 • Fax: 44 (0)1462 424701 • E-mail: wpiuk@wpi-europe.com

**Germany**

Zossener Str. 55, 10961 Berlin
Tel: 030-6188845 • Fax: 030-6188670 • E-mail: wpide@wpi-europe.com

**China & Hong Kong**

WPI Shanghai Trading Co., Ltd.
Rm 20a, No8 Dong Fang Rd., Lu Jia Zui Financial District, Shanghai PRC
Tel: +86 688 85517 • E-mail:chinasales@china.wpiinc.com

**Internet**

www.wpiinc.com • store.wpiinc.com
www.wpi-europe.com • www.wpiinc.cn