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INSTRUMENTS

# NANOLITER2020 INJECTOR

## Precise nanoliter-volume injections with intuitive SMARTouch™ controller


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# Nanoliter2020 Injector

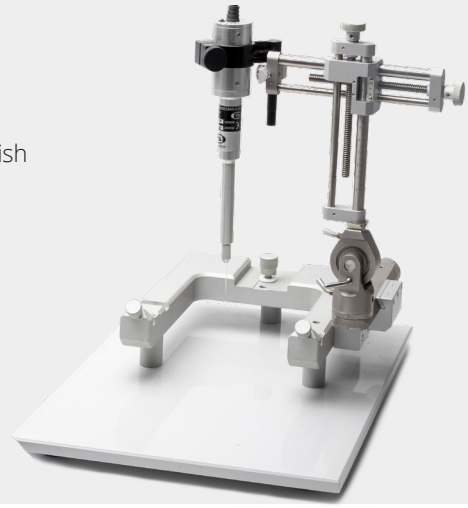
## *NANOLITER2020*


NANOLITER2020 is the updated version of WPI's popular NANOLITER2010 Injector that is capable of performing precision injections in the nanoliter range using a variety of glass micropipette sizes. The new model connects directly to the WPI MICRO2T SMARTouch™ controller, which can also be used with WPI's UMP3 pump, allowing the pumps to be controlled individually or synchronously. The new injector head has a LED indicator which shows proper communication between the pump and controller. NANOLITER2020 offers improved precision by in-depth plunger displacement validation. The system is easier to use and has a chic silver injector head.

- Perform nanoliter volume injections using glass micropipettes
- Nanoliter Injector works on the principle of positive displacement. An internal micrometer step motor precisely moves the metal plunger which pushes the oil inside the micropipette, and the oil-layer pushes nanoliter volumes of aqueous sample out of the pipette tip.
- Fine control of plunger displacement (along with proper sealing among gasket, glass micropipette and oil) ensures precision and accuracy
- NANOLITER2020 system includes the 300704 Injector, the MICRO2T SMARTouch™ Controller and many accessories. The 300704 Injector is also sold separately, but it requires the MICRO2T SMARTouch™ controller, glass micropipettes and the 300746 Spare Parts Kit for use.
- Control up to two pumps simultaneously
- Mounts easily on a stereotaxic frame or a micromanipulator
- LED run indicator offers a visual indication of connectivity
- Injector accepts a range of glass micropipettes (OD 1.1-1.5 mm)

## APPLICATIONS

Nanoliter to microliter injection into frogs (Xenopus oocytes), rats, mice, mosquitoes, shrimps, insects (e.g., Brown Planthopper), flies (e.g., Drosophila) and fish (Zebrafish) embryos using glass micropipettes



## BENEFITS

Minimize the use of costly or scarce samples by performing injections with mineral oil back-filled glass micropipettes

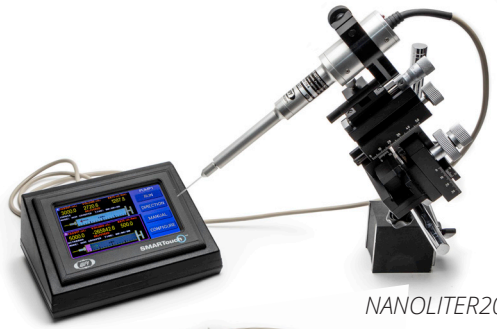
Precise control over injection volumes (in the nanoliter to microliter range) and injection rates

Simple to use touchscreen interface and graphical representation of volume status on MICRO2T controller

Perform injections with a foot switch (optional)

15% LESS

NANOLITER2020 costs 15% less than the previous model (NL2010MC2T)



*NANOLITER2020 System*

*300704 NANOLITER2020 Injector Head*

NANOLITER2020 is the complete system. 300704 is the NANOLITER2020 Injector Head only. The controller and the accessories are not included.

## ACCESSORIES

| | |
|---|---|
| **TIP10XV119** | Glass Micropipettes (ID: 0.53 mm, OD: 1.14 mm) |
| **504949** | Glass Capillary (ID: 0.53 mm, OD: 1.14 mm), pkg of 300 |
| **501981** | Tweezers to scoop out gaskets |
| **13142** | Optional Foot Switch |

## REFERENCES

WPI's previous versions of NANOLITER2020 (NANOLITER2010, NL2010MC2T and NANOLITER2000) that worked on same oil-plunger based, positive-displacement technique were used for research studies involving injection into rats, mice, mosquitoes, shrimps, frogs, insects, flies and fish embryos. Here are a few selected citations. (More can be found on the WPI website or by using web search engines.)

### Recent Publications


Gaete, P., Lillo, M., López, W., Liu, Y., Harris, A., & Contreras, J. (2020). A novel voltage clamp/dye uptake assay reveals saturable transport of molecules through CALHM1 and connexin channels. BioRxiv, 2020.02.15.950923. https://doi.org/10.1101/2020.02.15.950923

Atif, M., Lynch, J. W., & Keramidas, A. (2020). The effects of insecticides on two splice variants of the glutamate gated chloride channel receptor of the major malaria vector, Anopheles gambiae. British Journal of Pharmacology, 177(1), 175–187. https://doi.org/10.1111/bph.14855

Hao, D.-L., Yang, S.-Y., Liu, S.-X., Zhou, J.-Y., Huang, Y.-N., Véry, A.-A., … Su, Y.-H. (2020). Functional Characterization of the Arabidopsis Ammonium Transporter AtAMT1;3 With the Emphasis on Structural Determinants of Substrate Binding and Permeation Properties. Frontiers in Plant Science, 11, 571. https://doi.org/10.3389/fpls.2020.00571

Li, Y., Liu, Z., Guo, Q., & Luo, M. (2019). Long-term Fiber Photometry for Neuroscience Studies. Neuroscience Bulletin, 35(3), 425–433. https://doi.org/10.1007/s12264-019-00379-4

Li, R., Weng, J., Wang, X., Meng, Q., Wang, Y., & Sun, J. (2019). Bursicon homodimers induce innate immune by activating the expression of anti-microbial peptide genes in the shrimp Neocaridina heteropoda. Fish and Shellfish Immunology, 84, 906–911. https://doi.org/10.1016/j.fsi.2018.10.080

## SYSTEM COMPONENTS

| WHAT IS INCLUDED | QTY | NANOLITER2020 | 300704 |
|---|---|---|---|
| **300704** Nanoliter 2020 Injector Head with Universal Adapter (500778) | 1 | ✓ | ✓ |
| **MICRO2T** SMARTouch™ Controller | 1 | ✓ | |
| **501981** Tweezers to scoop out gaskets | 1 | ✓ | |
| **504949** Glass Capillary (ID: 0.53 mm, OD: 1.14 mm), pkg of 300 | 1 | ✓ | |
| **1TIP10XV119** Glass Micropipettes (ID: 0.53 mm, OD: 1.14 mm), | 2 | ✓ | |
| **300746 SPARE PARTS KIT INCLUDES** | | | |
| **14456** Allen Wrench 0.035" Hex Tool | 1 | ✓ | |
| **MF34G** MicroFil, 34 gauge | 1 | ✓ | |
| **300733** O-Ring Kit for NANOLITER2020 | 5 | ✓ | |
| **3563** 1 cc Syringe | 1 | ✓ | |
| **300514** Replacement Piston for NANOLITER2020 | 2 | ✓ | |
| Instruction Manual (download from www.wpiinc.com/manuals) | | | |

*NOTE:* One set of gaskets (Front Green Gasket) to use with 1.1-1.15 mm glass is installed in the Injector when the unit ships from the factory.
*NOTE*: Two sample glass micropipettes are included with the NANOLITER2020 system. Use WPI pre-pulled glass micropipettes or use a glass capillary (504949 or 504950) (included with NANOLITER2020) and a puller to make your own micropipettes.

## SPECIFICATIONS

| | |
|---|---|
| NANOLITER2020 Plunger Outer Diameter | 482 µm |
| Plunger Movement for 100 nL Volume Dispensed | 550 µm ± 55 µm |
| Piston Movement per dispensed volume (nL) | 5.5 µm/nL |
| Linear Travel Per Full Step | 12.7 µm/step |
| Minimum Volume (Injection) | 5 nL |
| Recommended Glass | |
| | TIP10XV119 (Micropipette) |
| | 1.14 mm OD Fire Polished Glass Capillaries (504949 & 504950) |
| Glass Use Capabilities | |
| | 1.10-1.15 mm OD Glass with Green Front Gasket |
| | 1.30-1.35 mm OD Fire-polished Glass with Black Front Gasket |
| | 1.5 mm OD Fire-polished Glass with Red Front Gasket |
| Minimum Recommended Volume Injection | |
| | 25 nL with 1.14 OD Glass (TIP10XV119 and Green Front Gasket) |
| | 50 nL with 1.5 mm OD Glass (Fire Polished 1.5 mm Glass and Red Gasket) |
| Maximum Possible Volume | 4200 nL |
| Maximum Rate | 644 nL/sec |

Specifications subject to change without notice.