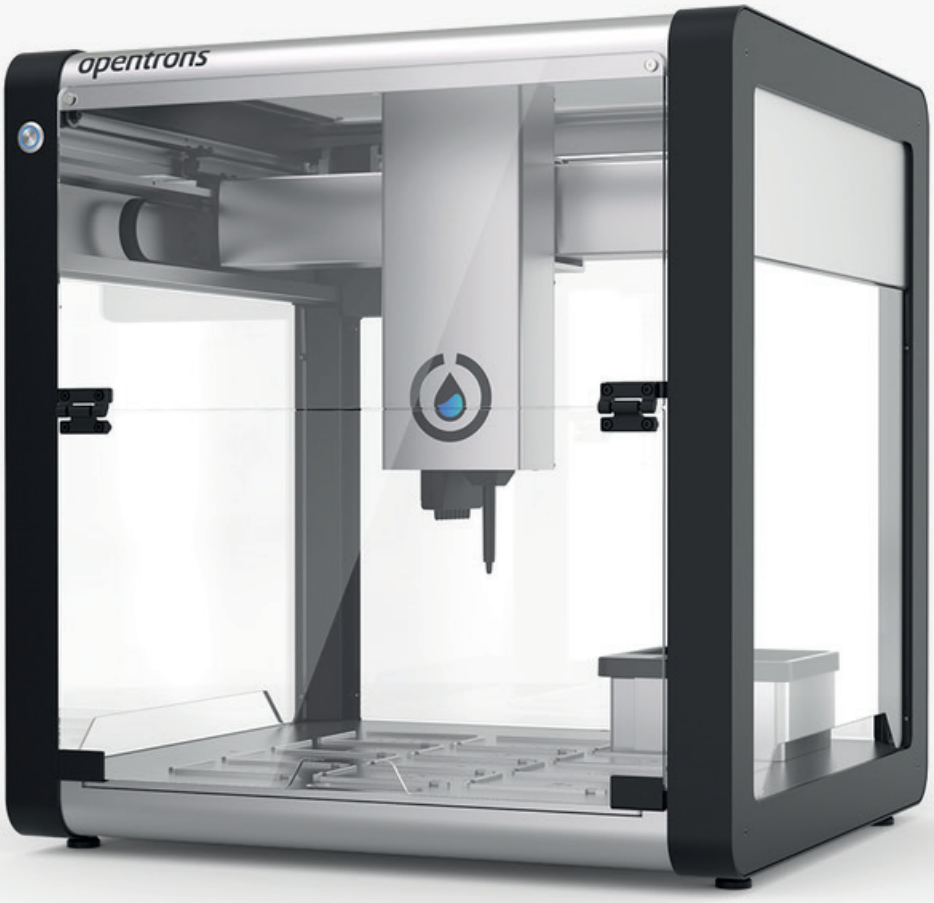
I&L Biosystems

opentrons

Opentrons® OT-2 Brochure
Meet the OT-2: Your Personal Pipetting Robot



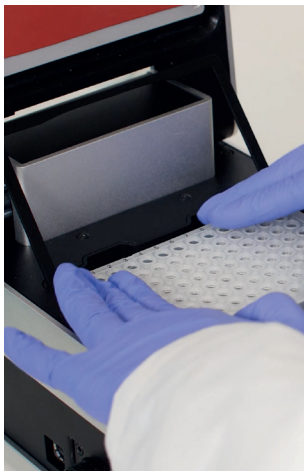
INTRODUCTION

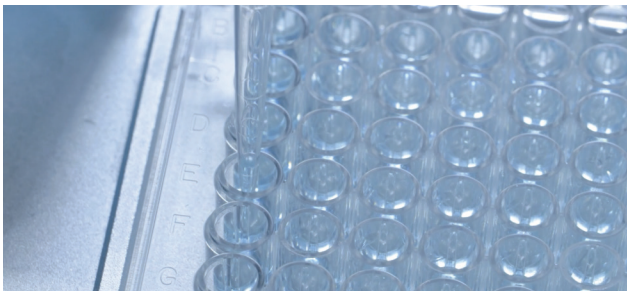
Lab Automation Has Never Been Easier

Scientists should be doing science.

All scientists, regardless of resources or role, should be able to spend their time designing experiments and testing hypotheses. But a lot of scientists spend too much time doing tedious, time-consuming work, like manual pipetting. We built the OT-2 to change that.

The OT-2 is a benchtop liquid handler designed to be affordable, and flexible enough to automate many common applications. With performance equivalent to robots 10x the cost, any life science lab can use the OT-2 to automate their lab work.





Automate the Most Time-Consuming Applications in Your Lab

The OT-2 automates a range of techniques across genomics, protein sciences and other applications, including:

- NGS library preparation
- PCR setup
- Nucleic acid isolation and purification
- Reagent distribution and sample aliquoting
- Serial dilution
- Cherry picking
- Normalization
- Biochemical assays
- Small-scale protein purification
- SP3 sample preparation for LC-MS
- Sitting-drop protein crystallization

OUR COMMUNITY

The OT-2 is Trusted by Thousands of Scientists

Used by 90% of the top 50 research universities and top 10 pharmaceutical companies worldwide

"For a robot that does what the Opentrons does, I was quoted $200,000 - 350,000 dollars."

Kaja Wasik, PhD
CSO at Gencove

"The sky's the limit in terms of customization you could do... that would be impossible to do on any other commercially available system."

Scott Ficcarro, Research Scientist
Farber Cancer Institute

"What used to take a technician an hour can now just be downloading an automatically generated protocol."

Nick Emery, PhD
Boston University

"With a lot of manufacturers, you're locked into how their software handles things. But we simply give the Opentrons robots CSV files with volumes, well IDs. It translates them perfectly and then just runs."

Tom Huckvale, PhD
YouSeq

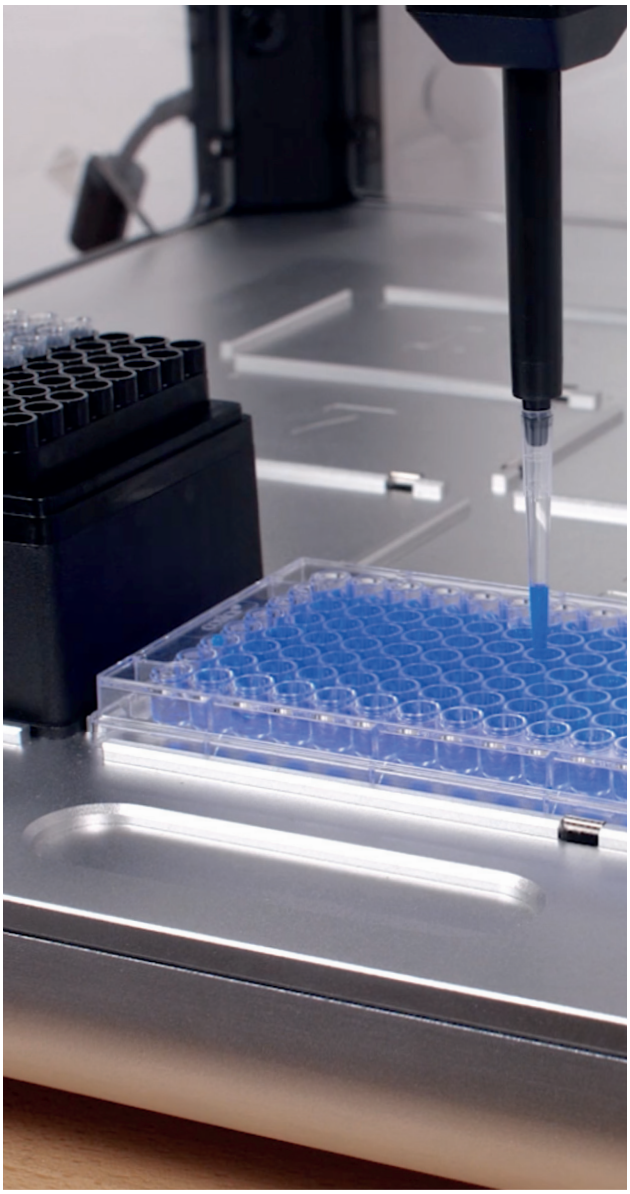
GETTING STARTED

Getting Started is Easy

Thinking Through your Needs

If you check one or more of these boxes, consider a demo of the OT-2

- ☑ Your lab does 5+ hours of wet lab work per week
- ☑ You want to reduce manual pipetting
- ☑ You want accurate and reproducible results
- ☑ You want to improve data quality
- ☑ You want to reduce assay reruns



Everything You Need to Automate your Lab, Including Help at Every Step

DEMO THE OT-2

Get a virtual demo and discover how the OT-2 can work for your application

ORDER THE OT-2

Bundle your OT-2 with the pipettes, hardware and labware you need

RECEIVE AND UNBOX YOUR OT-2

Easy to unbox and set up yourself using our online guide

IN A HURRY OR NEED A CUSTOM SOLUTION?

Contact us for onsite installation, custom protocol development and more!

[1]On-site installation is currently only available in the US

OT-2 SPECIFICATIONS

High-Performance Robotics

OT-2 Features

HIGH PERFORMANCE
Compare to robots 10x the price

FLEXIBLE
Modular hardware and swappable pipettes

OPEN
Use your current reagents and labware

POWERFUL
Beginner-friendly Protocol Designer GUI to advanced Python API

SUPPORTED
From onboarding to protocol development and troubleshooting, we're here for you

The OT-2 is an open-source, precision liquid handling system that automates various genomics, proteomics, and drug discovery assays at a fraction of the cost of traditional robotic systems. The OT-2 lowers costs while maintaining results of exceptional quality, validated in third-party tests and published studies.

The OT-2 is reagent agnostic and accommodates ANSI/SLAS standard labware. So, you can stick with your preferred lab materials while benefiting from the improved performance and throughput of automation. The OT-2's flexibility also allows you to scale up or adapt your protocols as your needs change. In fact, the OT-2 has been adopted for many novel, custom procedures, opening the benefits of automation to the widest applications.

OT-2 Specifications

NUMBER OF DECK SLOTS
11

VOLUME RANGE
1 µL to 1,000 µL

SPEED
Fast-fill a 96-well plate in 22 seconds[2]

ACCURACY
15% accuracy at 1 µL
5% precision at 1 µL

PIPETTE CONFIGURATION
2× 8-Channel, 2× Single-Channel, or one of each

COMPATIBILITY
Any automation-compatible, ANSI/SLAS standard footprint well plates, plus a wide range of snap-cap and screw-cap tubes up to a 50 mL conical with our 4-in-1 Tube Rack

CONNECTIVITY
USB and WiFi

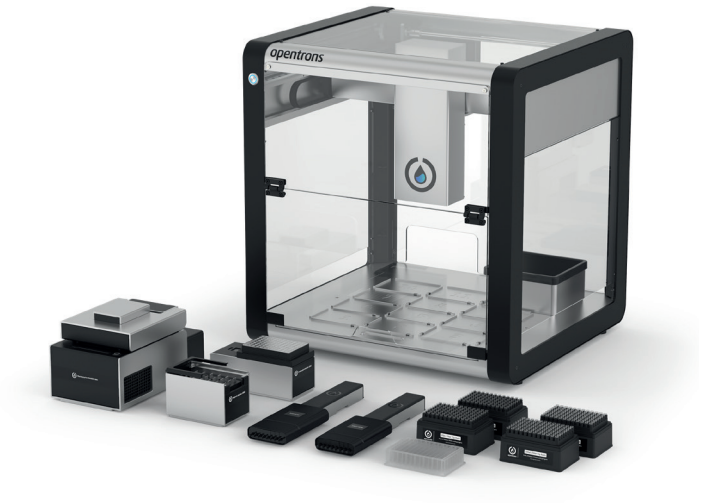
DIMENSIONS
Fits on half a standard lab bench
63 cm × 57 cm × 66 cm (W, D, H)

[2]8-Channel P20 pipette, distribute, same tip

OT-2 WORKSTATIONS

Bundled Solutions for our Most Popular Applications

Opentrons workstations come with the OT-2 robot, modules, pipettes, and the labware you need to support your chosen application. They also come with included custom protocol development services to support your specific assay needs. The workstations are reagent and kit agnostic to minimize changes to your current workflow.



Choose from these workstations, covering some of our most popular applications:

OT-2 NGS Workstation
For end-to-end NGS library prep up to 24 samples

OT-2 PCR Workstation
For PCR setup and thermocycling up to 96 samples

OT-2 Nucleic Acid Extraction Workstation
For nucleic acid extraction up to 24 samples

OT-2 Magnetic Bead Protein Purification Workstation
For small-scale protein purification using magnetic beads up to 96 samples

OT-2 Dual Flow Chromatography Protein Purification Workstation
For small-scale protein purification up to 96 samples using Biotage® PhyTip® columns

OT-2 Sample Aliquoting Workstation
For aliquoting samples from 2 mL, 12 mL or 15 mL tubes to plates up to 96 samples

HARDWARE MODULES

Flexible On-Deck Hardware

THERMOCYCLER MODULE

Opentrons Thermocycler Module is a fully automated on-deck thermocycler with programmable lid and block temperatures. It has performance comparable to machines 5x its price and enables automation of upstream and downstream workflow steps.

TEMPERATURE MODULE

The Opentrons Temperature Module is an easy-to-use hot and cold plate module that can maintain constant temperatures. Temperature capacity ranges from 4°C to 95°C and can be used with or without the Opentrons thermal blocks. Each temperature module comes with an aluminum block set.

MAGNETIC MODULE

The Opentrons Magnetic Module uses high strength N42 neodymium magnets to support various magnetic bead-based processes such as extraction and purification. It automatically engages and disengages these high strength magnetic bars and includes adjustable plate brackets.

HEPA MODULE

The Opentrons HEPA Module enables you to run sensitive contamination-prone applications by using positive pressure to cycle, filter and move cleaner air through the OT-2's workspace. It removes 99.99% of 0.3 µm DNA-containing particulates and biological contaminants, like bacteria, fungi, and other microorganisms.

HEATER-SHAKER MODULE

The Opentrons Heater-Shaker Module provides on-deck heating and orbital shaking of microplates. The module can be heated to 95°C, and can shake samples from 200 to 3000 rpm. It is compatible with a number of deep-well and 96-well plates.

PIPETTES

Swappable Single- and 8-Channel Pipettes

Opentrons pipettes are designed and optimized for use with the OT-2. They provide accurate and reliable liquid transfers from 1 µL to 1,000 µL. We offer both single and 8-channel pipettes with a variety of volume ranges.

Single-Channel

AVAILABLE MODELS	VOLUME	ACCURACY		PRECISION	
		%D	µL	%CV	µL
P20 GEN2	1	±15%	0.15 µL	±5%	0.05 µL
	10	±2%	0.2 µL	±1%	0.1 µL
	20	±1.5%	0.3 µL	±0.8%	0.16 µL
P300 GEN2	20	±4%	0.8 µL	±2.5%	0.5 µL
	150	±1%	1.5 µL	±0.4%	0.6 µL
	300	±0.6%	1.8 µL	±0.3%	0.9 µL
P1000 GEN2	100	±2%	2.0 µL	±1%	1 µL
	500	±1%	5.0 µL	±0.2%	1 µL
	1000	±0.7%	7.0 µL	±0.15%	1.5 µL

8-Channel

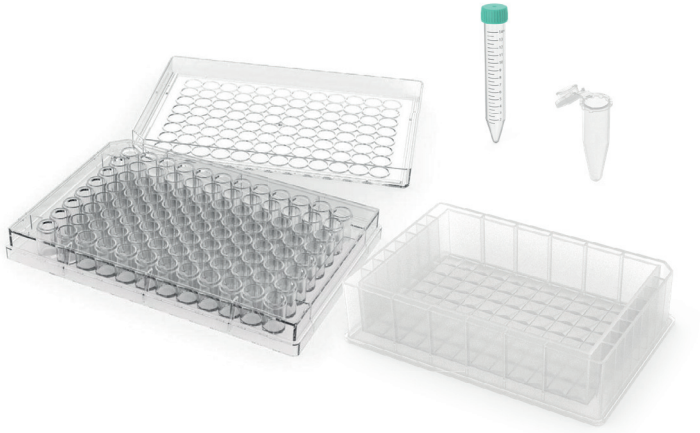
AVAILABLE MODELS	VOLUME	ACCURACY		PRECISION	
		%D	µL	%CV	µL
P20 GEN2	1	±20%	0.2 µL	±10%	0.1 µL
	10	±3%	0.3 µL	±2%	0.2 µL
	20	±2.2%	0.44 µL	±1.5%	0.3 µL
P300 GEN2	20	±10%	2.0 µL	±4%	0.8 µL
	150	±2.5%	3.75 µL	±0.8%	1.2 µL
	300	±1.5%	4.5 µL	±0.5%	1.5 µL

CONSUMABLES

Use Any ANSI/SLAS Compliant Labware

The OT-2 is compatible with ANSI/SLAS compliant labware and automation friendly consumables. Our software has labware definitions for the following brands in our labware library:

- Agilent®
- Axygen®
- Bio-Rad®
- Corning®
- Eppendorf®
- Falcon®
- GEB®
- NEST®
- Opentrons®
- USA Scientific®



Don't See Your Labware Here?

Our team can guide you through our Labware Creator or create a custom labware definition for you. Contact us to learn more: support@opentrons.com

Your Labware from Us

We offer an array of microplates, reservoirs, tubes, tube vials and racks. Check out our catalog at the end of this brochure.

PROTOCOLS

Choose the Method That's Right for You

The OT-2 is adaptable for various biology laboratory workflows. The software that runs the robot through each procedure, known as the protocol, can be created in the four following ways.

OT-2

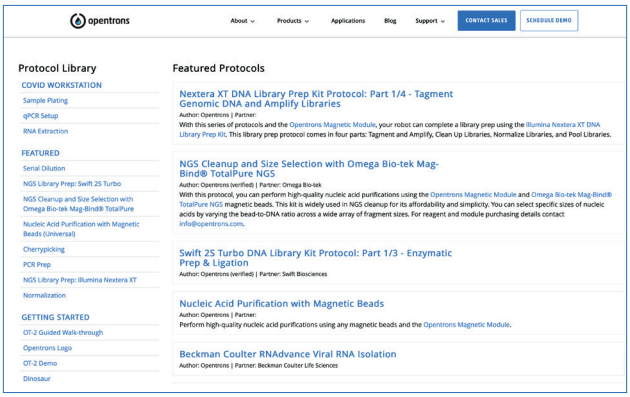
4 Ways to Create Protocols

- **Protocol Library**
- **Protocol Designer**
- **Python API**
- **Custom Protocol Development**

Protocol Library

The Protocol Library provides users with open-source and well-documented protocols. Users can browse and download ready-to-use OT-2 protocols – without needing to write code. The Protocol Library contains hundreds of protocols developed by the Opentrons team.

We recognize that workflows vary, and further protocol optimization may be required. So, we provide these pre-validated protocols as a great place to start.

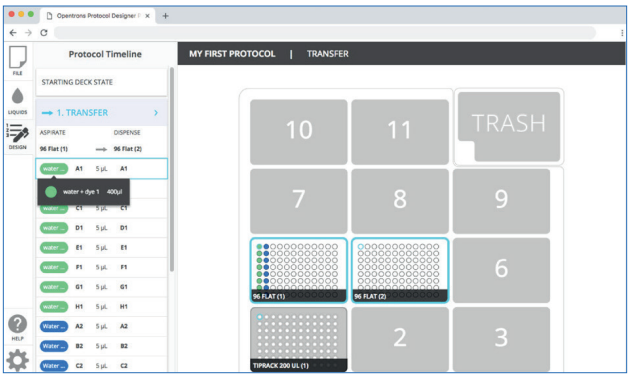


Protocol Designer

The Opentrons Protocol Designer is a graphical interface that allows users to create or adjust protocols using existing scripts – all without having to write code.

The Opentrons Protocol Designer is visual, intuitive, and provides batch-edit multiple steps for optimizing the OT-2 protocol. These protocols can perform liquid handling management and customized pipetting techniques and can integrate labware and automated modules.

The Protocol Designer does have limitations in user-defined variables, conditional logic, looping steps, and integrating higher liquid handling actions. The Protocol Designer also does not integrate with the Python program. For more complete control, we provide direct software coding with our Python API and a custom protocol development service.



Python API

Users with Python experience can easily and quickly automate protocols using the Opentrons Python API. The API is a simple Python framework designed to code automated biology laboratory protocols in a way that reads like a lab notebook. The Opentrons Python API is open source, well-documented, accessible, and supports the reproducibility of automated protocols.

Users can get acquainted with our Python API by accessing, modifying, and running an existing Python protocol from our Protocol Library.

Custom Protocol Development

For users with unique needs, or high time sensitivity, we have service options available for standard and expedited protocol development performed by the Opentrons Applications Engineering team. Our team can develop a standard protocol for your workflow applications— in under two weeks. Our team can also create an expedited protocol— in under one week.

```python
def get_values(*names):
    import json
    _all_values = json.loads("""{"pip_type":"p50_single","pip_mount":"right","no_of_samps"
    return [_all_values[n] for n in names]


metadata = {
    'protocolName': 'Illumina Nextera XT NGS Prep 2: Clean-Up Libraries',
    'author': 'Opentrons <protocols@opentrons.com>',
    'source': 'Protocol Library',
    'apiLevel': '2.2'
    }


def run(protocol):
    [pip_type, pip_mount, no_of_samps, pcr_vol,
     bead_ratio, dry_time] = get_values(  # noqa: F821
    'pip_type', 'pip_mount', 'no_of_samps', 'pcr_vol',
    'bead_ratio', 'dry_time')

```

Product Catalog

PRODUCT	PART NUMBER
Robots and Workstations	
OT-2	999-00111
NGS Workstation	999-00176
PCR Workstation (with Thermocycler)	999-00177
PCR Workstation (no Thermocycler)	999-00178
Protein Purification Workstation (Bead Based)	999-00180
Protein Purification Workstation (Dual Flow Chromatography)	999-00181
Nucleic Acid Extraction Workstation (with Heater-Shaker)	999-00182
Nucleic Acid Extraction Workstation (no Heater-Shaker)	999-00183
Sample Aliquoting Workstation (2 mL tubes)	999-00184
Sample Aliquoting Workstation (12 or 15 mL tubes)	999-00185
Pipettes	
P20 Single Channel Pipette	999-00002
P20 8-Channel Pipette	999-00005
P300 Single Chanel Pipette	999-00003
P300 8-Channel Pipette	999-00006
P1000 Single Channel Pipette	999-00004
Modules	
Magnetic Module (GEN2)	999-00098
Temperature Module w/ Aluminum Block Set (GEN2)	999-00097
Aluminum Block Set	999-00028
Thermocycler Module (GEN2)	999-00174
Thermocycler Seals (for Thermocycler GEN2)	991-00078
Heater-Shaker Module (GEN1)	999-00157
HEPA Module (110-130 V 60 Hz Model)	999-00137
Replacement H14 Filter for HEPA Module	999-00112
Tips	
Opentrons 20 µL Tips	
100 Racks (9600 Tips)	999-00007
1000 Racks (96,000 Tips)	999-00083
100 Refills (9600 Tips)	999-00011
1000 Refills (96,000 Tips)	999-00086
16 Racks & 80 Refills (9216 Tips)	999-00014
160 Racks & 800 Refills (92,160 Tips)	999-00089
Opentrons 20 µL Filter Tips 100 Racks (9600 Tips)	999-00099
Opentrons 300 µL Tips	
100 Racks (9600 Tips)	999-00009

1000 Racks (96,000 Tips)	999-00084
100 Refills (9600 Tips)	999-00012
1000 Refills (96,000 Tips)	999-00087
16 Racks & 80 Refills (9216 Tips)	999-00015
160 Racks & 800 Refills (92,160 Tips)	999-00090
Opentrons 200 µL Filter Tips 100 Racks (9600 Tips)	999-00081
Opentrons 1000 µL Tips	
100 Racks (9600 Tips)	999-00010
1000 Racks (96,000 Tips)	999-00085
100 Refills (9600 Tips)	999-00013
1000 Refills (96,000 Tips)	999-00088
16 Racks & 80 Refills (9216 Tips)	999-00016
160 Racks & 800 Refills (92,160 Tips)	999-00091
Opentrons 1000 µL Filter Tips 100 Racks (9600 Tips)	999-00082
Labware	
4-in-1 Tube Rack Set	999-00030
32 Tube Rack for 15 mL Tubes	417-00081
Opentrons Tough 0.2 mL 96-Well PCR Plate, Full Skirt (25 Count)	991-00076
NEST® 12-Well Reservoirs, 15 mL (50 Count)	999-00076
NEST 1-Well Reservoirs, 195 mL (50 Count)	999-00078
NEST 2 mL 96-Well Deep Well Plate, V Bottom (50 Count)	999-00103
NEST 0.2 mL 96-Well PCR Plate, Full Skirt (100 Count)	999-00050
NEST 96-Well Plate Flat (100 Count)	999-00048
NEST 0.5 mL Sample Vial (500 Count)	999-00070
NEST 2.0 mL Sample Vial (500 Count)	999-00074
NEST 1.5 mL Sample Vial (500 Count)	999-00072
NEST 50 mL Centrifuge Tube (500 Count)	999-00068
NEST 15 mL Centrifuge Tube (500 Count)	999-00066
NEST 2.0 mL Microcentrifuge Tube (500 Count)	999-00093
NEST 1.5 mL Microcentrifuge Tube (500 Count)	999-00092
Services	
Opentrons Care (Premium Service Contract)	
Opentrons Protect (Extended Warranty)	
Custom Protocol Development	
1 Workflow, Standard Turnaround	715-00001
1 Workflow, Expedited Turnaround	302-00001
3 Workflows, Standard Turnaround	715-00002
3 Workflows, Expedited Turnaround	302-00002
Onsite Support Scripting*	302-00006-OP
Onsite Support Setup*	302-00014-OP

Get in touch for more information

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