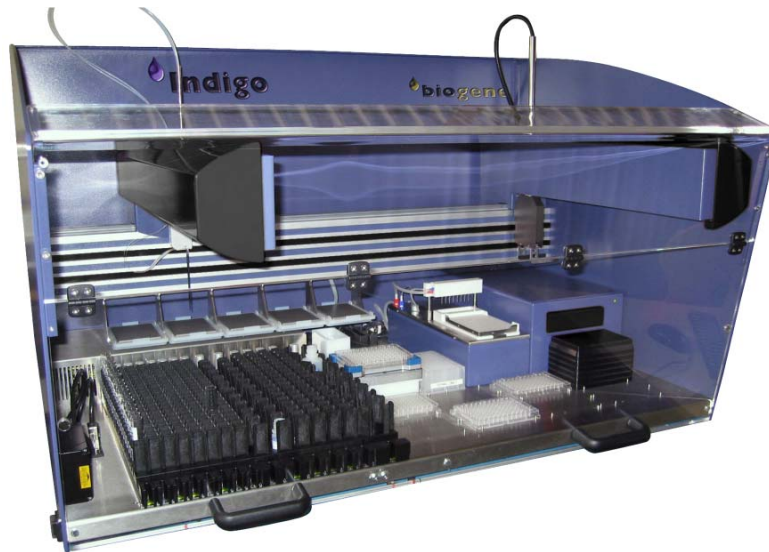


The word "Indigo" in a large, bold, purple 3D font, with a purple drop icon to its left.

Indigo: Innovative, Flexible, Upgradeable Robotic Solutions - Simply By Design!

The Indigo is a truly modular state-of-the-art robotic system, combining sophisticated and flexible liquid handling with robotic manipulation. The modular design allows the hardware to be configured to suit a wide range of applications. The minimal yet functional design integrates robotic and liquid handling functionality into the robotic arm, which glides on an X-rail to access the large flexible deck, and integrated or ancillary off-deck modules.

The unique modular design means that one can select suitable functional elements and performance characteristics to make up the ideal primary workstation to meet initial technical and financial constraints, then upgrade later to increase throughput or to more fully automate a protocol.

Components:

Pipetting Arm

From 1 to 8 tips.
Interchangeable: washable/disposable.

Deck

Continuous single piece of stainless steel for ease of cleaning.

Decktrays

Can be customised for sample tubes, plates, stackers, shakers, reagents and tip wash station.

Robotic Arm

With 270° rotating microplate gripper.

Safety Shield

PCR 'hood' also available.

Customizing Configurations To Suit Your Requirements

By selecting from a wide range of robotic modules, functional “Plug and Play” modules, options and accessories, you can customise your Indigo to suit the evolving needs of your laboratory.

Design Your Own Pipetting Arm

- Up to 8 tips per arm
- VariFlex: Individual Y and Z movement
- Individual level sensors
- Interchangeable washable and disposable tips

Robotic Handling

- Separate arm, same X-slide
- Software controlled for safety and efficiency
- 270° rotating microplate gripper
 - Turn a plate for cross pipetting
 - Improved access to other modules on or off the deck
- Increase deck capacity by stacking plates
- Increase efficiency by moving plates between functional modules
 - Incubators, coolers, shakers, readers and washers, thermocycler, vacuum assembly, centrifuge etc

Deck Layout

- 3 standard X-ranges, 3 standard deck widths (approx. 100cm, 150cm and 200cm)
- Extended X-range option
 - Reach modules outside deck
- Decktrays hold samples, plates, stackers, shakers, reagents and the tip wash station
- Simple to use drag and drop software helps you define the labware layout

Standard Indigo Configurations

ARM 1		ARM 2	
Section 1	Section 2	Section 1	Section 2
4 pipetting tips	–	–	–
4 pipetting tips	–	–	robotic handler
8 pipetting tips	–	–	
8 pipetting tips	–	robotic handler	
8 pipetting tips		8 pipetting tips	

The above table shows some examples of Indigo configurations. Indigo units are available in various deck widths and with optional X-range extension. Other options available on request.

Basic Principles Of Liquid Handling

The robotic pipetting arm module encloses everything necessary to perform the liquid handling, reducing the need for space consuming and breakdown prone external pumps with extended lengths of feed tubing. Indigo uses a principle of positive displacement of liquid in a fluid filled system, where the aliquots of sample and reagent are automatically separated by an air gap. Indigo can pipette using all or only some of the individual channels together, either in single aliquots or by multi-dispensing.

Pump Design

- Mini toothed wheel pump
- Pipettes 1µl to 1ml, plus continuous system liquid dispensing
- Excellent precision
- No maintenance, no replacement parts

Pipetting Tips

- Up to 8 pipetting tips per arm, up to 2 arms per standard Indigo
- Interchangeable washable and disposable tips
 - Select tip format and size for each protocol step
- VariFlex – independent YZ drive and level detector for each tip
 - Access consecutive or unevenly spaced tubes and wells (e.g. for cherry picking)
- Each tip can exert a force of 30N (3Kg)
 - Ideal for piercing septa

Washable Tip

- Unique design optimised for precision and ensures minimal carry-over
 - Various coatings available
- Total volume of 1ml
 - Sample or reagent contained in the tip
 - No interfaces – optimises precision

Disposable Tip

- For applications requiring zero carry over
- Various formats and volumes



Adding A Third Dimension

Robotic Handling

The separation of the robotic and pipetting arms ensures that robotic function can work independently to increase throughput and efficiency. Plates and other labware are quickly and safely carried between stackers, incubators and other functional modules. Plates can be turned for efficient cross pipetting tasks. When installed on a Indigo with extended X-range, the robotic arm can access modules and accessories situated outside the Indigo deck.

- Creates a useful third dimension to the deck
- Transport plates with or without their lids; remove and replace lids
- Pipette to a plate on the top of a stack
- 270° rotating microplate gripper

The Indigo deck is large and open on all sides. It provides a flexible area on which to place labware and optional modules.

Sample tube racks, microplates and reagents are loaded on the decktrays, which accurately position the labware ready for automation. Most Indigo accessories and options are simply placed on the deck and can be removed when not in use, or rearranged to suit another application protocol.

The narrow microplate gripper can access the loading bay of the BioCentrifuge.

Expanding The Sphere Of Automation

The functionality of the Indigo can be expanded by using specialised modules and accessories. Most modules are simply placed on the deck and are fully Plug and Play. Third party modules can also be integrated.

Sample Tracking – ‘Intell-ID’

- Increase security with real-time ID tracking
- Reads barcodes on sample tubes, plates and reagents
- Selective (worklist) pipetting, or batch mode
- Decktop Plug and Play module – can be removed to increase deck capacity when not in use

Incubator

BioCentrifuge – Integrated Microplate Centrifuge

Accommodating 2 microplates, deep well plates or gel cards, the BioCentrifuge can be integrated into the deck of the Indigo, or can be positioned alongside. Loading, unloading and functions of the BioCentrifuge are controlled by the Indigo software.

Features

- RCF up to 2,000g
- Centrifugation time: 5 seconds to 9 hours
- Loading shutter opens and closes under software control
- Automated homing position to permit robotic loading and unloading
- Safety cut out: Motion is prevented if the lid is not fully shut
- Automatic sensor detects imbalance and stops centrifuge if there is excess vibration

Other Modules

The Indigo design utilises a ‘CAN’ protocol to facilitate integration of third party products. The deck is large, and has few limitations for physical integration of hardware. Additionally the Indigo can be delivered with an extended X-range, so that the robotic arms can reach outside the deck to access modules placed alongside. The basic ‘Intell-ID’ module holds 96 samples and can be expanded in batches of 96.

BioXACT – Software For Every Application

Deck-Syn

A drag and drop software used to design the arrangement of samples, reagents, plates, etc. on the deck for each protocol. DeckDSyn is delivered with an extendable library of labware, so you can focus on designing the best deck for your application.

BioXACT

A graphical user interface used to compose and optimise protocols. It has multiple user levels. The programming level allows the definition and optimisation of every step. Simply transpose your application step by step into a BioXACT method. To automate complex tasks, you can combine several methods into a 'Script'.

- Utilises a robust database concept which keeps track of all data and provides a seamless interface with Microsoft® Excel
- Includes a service utilities program, Bio-Util, designed to simplify system diagnostics. Bio-Util can also be used to fully customise unique applications, by addressing each module and function individually
- A powerful simulator software is also available – compose and test your methods prior to running them on the Indigo

Scheduling

- Online scheduling constantly re-evaluates timelines during a run
- Actions shared by different protocols can be consolidated
- Add or remove actions while an application is running
- Time calculation – automatic timing of actions and correction of estimates
- Graphic display
- Active-X control – can be used for external module communications and control

Connectivity

- DDE data exchange
- Integrate external module 'Dlls' and "call" from within a run
- Additional functions can be executed via the optional I/O board
- Import/Export from Excel – methods, labware and pipetting lists can be imported or exported before, during or after a run

Application Software

BioXACT is a very flexible software that can be used to precisely define and optimise your applications. Some pre-optimised application packages are also available (e.g. PCR, ELISA, blood grouping, IFA etc.). The optional ELISA user interface simplifies the complete automation of plate preparation, processing and data reduction. BioXACT stores pre-optimised methods and displays them in a list for easy selection. The software is powerful, flexible software yet intuitive: designed to set-up and automate all your liquid handling tasks. It can be used to communicate with and/or control functional modules for complete assay automation.

DeckDSyn allows you to easily define the Indigo deck layout.

Specifications

Accessories									
Microplate Shaker	Capacity: 1 MTP or deep-well plate; linear, orbital and customised shaking modes								
Decktrays	A decktray holds 96 sample tubes; or up to 5 microplates/stacks of 10; DT racks; or reagent racks etc The deck model 200 can accommodate 13 trays The deck model 150 can accommodate 9 trays The deck model 100 can accommodate 5 trays (Tip access to some wells of the 4 & 5 plate trays may be limited)								
Pipetting Performance									
Carry Over	Washable tip: down to 10^{-7} with sufficient tip wash. Disposable tip: Zero								
Liquid Detector	Principle: Capacitance Clot detector: Standard – activated by software Minimum detectable volume: 50µl deionised water in a microplate								
Precision and Accuracy	Accuracy: better than 1%, Pumps can be calibrated through software Pipetting precision: gravimetric evaluation: <table border="1" data-bbox="507 987 817 1182"> <thead> <tr> <th>Vol (µl)</th> <th>CV</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5%</td> </tr> <tr> <td>10</td> <td>1-2%</td> </tr> <tr> <td>>50</td> <td><1%</td> </tr> </tbody> </table>	Vol (µl)	CV	1	5%	10	1-2%	>50	<1%
Vol (µl)	CV								
1	5%								
10	1-2%								
>50	<1%								
Pumps	Individual mini-toothed wheel pump for each tip. Other pumps may be integrated for special applications.								
Tip Wash	Station can be placed anywhere on the deck								
Tip wash speed/pump flow rate	600µl / sec								
Tip Design	Washable: Low iron stainless steel coated in and out with Teflon®. Other materials may be available. <table border="1" data-bbox="507 1458 968 1653"> <thead> <tr> <th colspan="2">Regular tip</th> </tr> </thead> <tbody> <tr> <td>Total volume</td> <td>220µl</td> </tr> <tr> <td>Inner diameter</td> <td>1.45 mm</td> </tr> <tr> <td>Tip outlet diam</td> <td>0.5 mm</td> </tr> </tbody> </table> Disposable: Conductive, (Rainin) 10µl, 100µl, 1000µl, 5000µl	Regular tip		Total volume	220µl	Inner diameter	1.45 mm	Tip outlet diam	0.5 mm
Regular tip									
Total volume	220µl								
Inner diameter	1.45 mm								
Tip outlet diam	0.5 mm								
VariFlex	Minimum equal spacing 9mm Maximum equal spacing 55mm Maximum single spacing 350mm								
Volumes	Minimum sample/reagent volume 1µl. Maximum sample/reagent volume 1ml. Volumes outside this range on request								

Robotic Performance	
Force in z-direction	30N
Arm force	240N at the full reach
Handler	Can lift 3 kg
Position Accuracy	+/- 0.2mm (384 well plates)
z-travel	Range 150mm
Intell-ID (barcode reader)	
CCD camera reads most commercially available barcodes, max digits 20 Standard capacity 96 samples, extendable in batches of 96	
Incubator Tower	
Capacity 4 microplates. Temperature controllable from 5°C above ambient temperature to 49°C, in steps of 0.1°C, accuracy 0.2°C	
Operating Conditions	
Temperature	15°C to 30°C/60°F to 85°F
Relative humidity	10-85% at 30°C/85°F or below
Electrical And Communication	
Plug and Play modules simplify the composition of an application system RS232, multiple I/O ports, and a CAN bus facilitate systems integration	
Power	Self regulating power supply, 85 to 264 volts AC; 350 watts
Safety And Security	
Safety Operator	Safety is ensured by the safety guard or an optional cover Indigo is designed for IEC 1010 compliance and bears the CE mark.
Security	Sophisticated software combined with real time barcode tracking can eliminate sample tracking errors. Software user level definition prevents unauthorised changing of performance data Processes and actions are monitored and logged.