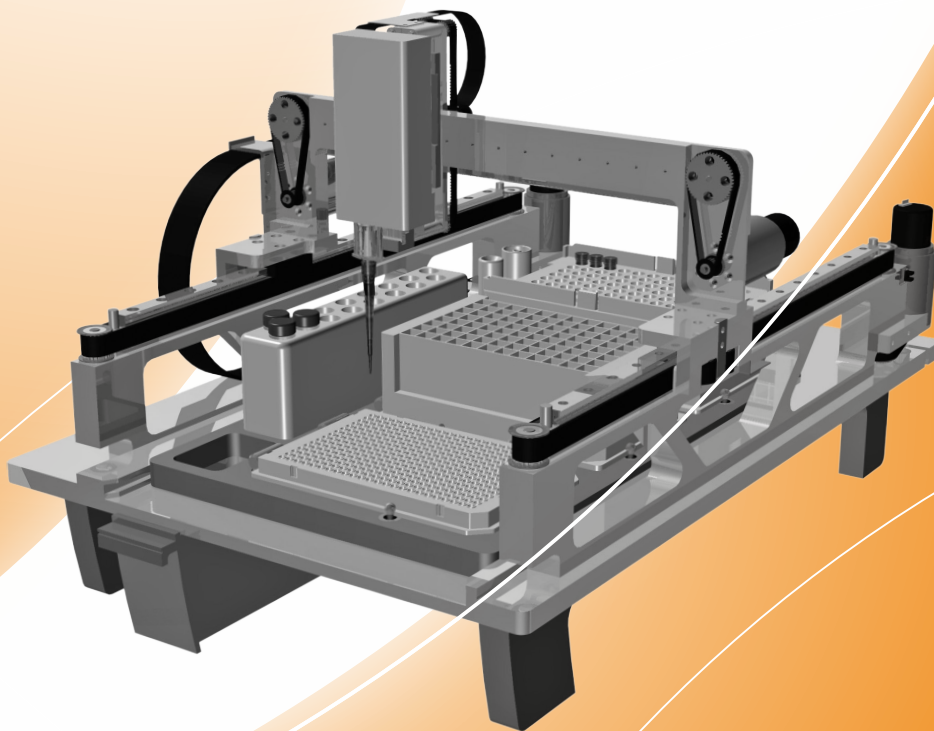# CYBERTRON®

Mini Pipetting Platform

Mini Pipetting Platform

Standard Platform

Our MPPs are equipped with low-friction, high-speed axes systems providing high single increment resolution for demands on precise positioning accuracy by maximum reproducibility.
All MPPs are manufactured by ISO EN 9001:2008 and ISO EN 13485:2003 standards.
For liquid handling we provide up to four mounting heads for adaption a large assortment of syringe-valve-based dosing heads, like Teflon- or stainless steel needles, suitable disposable tips (20, 200, 1000µl) or solenoid-driven jets for even sub-microliter (>100 nl) applications.

If necessary, we can also provide different dosing solutions for solid sample preparations e.g. powders or other grinded/crushed materials.
MPPs can be assembled personally with different work deck/insertion tray configurations.

Depending on your application(s) there are holders/adaptors for SBS-type MTPs, tubes (5 - 50 mL) and micro-tubes (0,5, 1,5, 2,0 mL) but also for slides, membranes, microfluidic systems and biochips available.

Automated processes can be optimized by integrating our functional modules:
wash stations, external pump systems, cooling/heating units, UV-VIS, FL- detection units (bottom read) for direct read outs (end point and kinetics), temperature/speed controlled orbital shakers, magnetic bead station, vacuum manifolds for SPEs, modules for different kinds of MEMS devices .

Dimension in mm
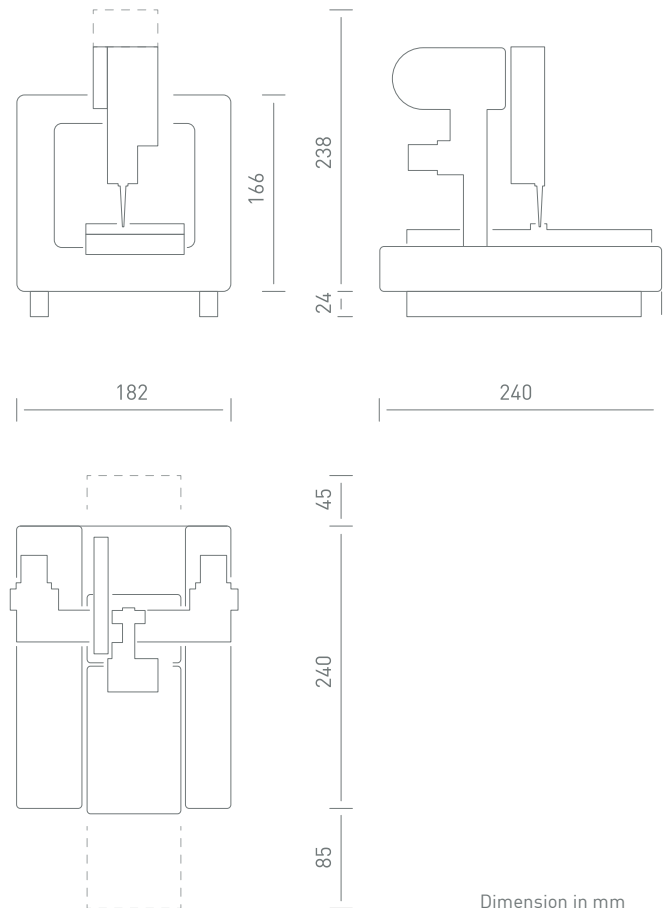
Our MPP can be connected via grippers, 360° roboter arms or belt conveyors to stacker, Cybertron´s capping-/decapping stations or other third-party devices in your lab environment.

Don't be shy about sharing your specific ideas for your individual sample preparation. Our intention with this document is just to show you some examples and, together with you, to develop and manufacture your individual sample preparation or even your complete analysis equipment.

Control

The ST1000 is a compact 4 axis DC servo motor control which combines a variety of interfaces and 4 DC motor output stages on a printed circuit board of an area of only 150 x 90 mm².

The core of the control is a 168 MHz clocked Cortex-M4F controller from ST which is equipped with a generous memory for complex control tasks. The controller can be programmed within an easy to use development environment (Eclipse) in C.

The interfaces and the complete peripherals can be addressed via library functions. There is a wide range of commands available for the motor configuration and motor positioning. Programming in BASIC for simple applications is in development.

As an integral part of the Mini Pipetting Platform, the ST1000 is already equipped with a programme which allows the control of all the functions of the platform via simple commands. Complex peripheral equipment can be easily controlled with the extensive range of inputs and outputs. The digital and analog inputs and outputs enable the connection of various sensors and actuators.
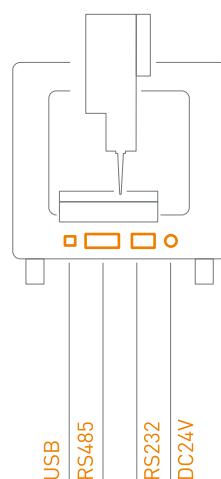A piezo beeper is integrated in the control system.

Serial interfaces (RS232, 2x RS485, I²C, CAN, and USB) and parallel inputs and outputs (8x 24 V inputs, 8x 24 V outputs) are available as interfaces. In addition the control system has a 10/100 MBit Ethernet connection. Via an additional board, the most important interfaces can be relocated for better operator accessibility.
If the internal FLASH memory, for example for data storage, is insufficient then a USB stick can be connected as a data store.

Up to 4 DC servo motors are driven via PWM output stages with a PWM frequency of 20 kHz and a constant current of maximum 2 A, and a maximum peak current of 5 A. Current monitoring and the time of the overcurrent are adjustable with software.

The programmes created on the PC are transferred to the controller with the help of a boot loader.

Electrical Supply

- 24 VDC (+/- 10%)

Dimensions

- 150 x 90 x 16 mm³
- max. H: 25mm (with connecting plugs)

Memory Features

- 1 MB Flash-Rom
- 192 KB internal SRAM
- 16 MB SRAM, with battery back-up
- 32 KB NV-RAM

Inputs

- 8 Inputs 24V
- 4 Inputs 5V as reference switching
  inputs
- 3 Inputs analog 0… 5V
- 4 Inputs incremental encoder 5V with
  index input

Outputs

- 8 Outputs 24 VDC, 500 mA
- 3 PWM outputs 5V
- 2 Analog outputs 0… 5V
- 4 Motor-PWM outputs 2 A constant/
  5 A peak
- Piezo beeper

Interfaces

- 10/100 MBit Ethernet
- RS232
- USB
- 2x RS485
- I²C
- CAN
- DCF77 for radio controlled clock
- USB host for the connection of USB
  memory sticks

USB RS485 RS232 DC24V

Drive Variants

Variant 1	Variant 2	Variant 3

- The *interchangeable head* is positionable in the XZ orientation.
- The *tray* is positionable in the Y orientation
- The *tray* is removable and can be loaded externally.

This variant is the most compact one. Active units in the tray are, however, not possible as it is removable for the benefit of user- friendliness.

- The *interchangeable head* is positionable in the XZ orientation.
- The *tray* is permanently fixed to a Y axis.
- An active *tray temperature control* is to a limited extent possible as an option.

This variant is very compact and has very high positional accuracy in the Y axis. The tray is permanently mounted on the adjustable Y axis, the supply of electrical substructures, as for example, cooling stations or shakers is possible but limited.

- The *interchangeable head* is positionable in the XYZ orientation.
- The *tray* is set in or pushed into the working area.
- The *trays* can be divided in the working area.
- An active *tray temperature control* is possible as an option.

Due to the fixed position of the trays, supply lines and hoses for e.g. cooling, shaking and vacuum stations can be laid.


Dimension in mm
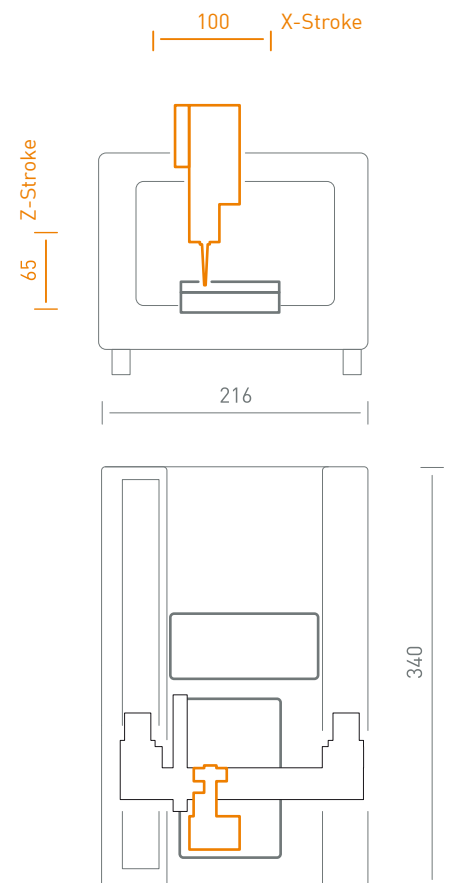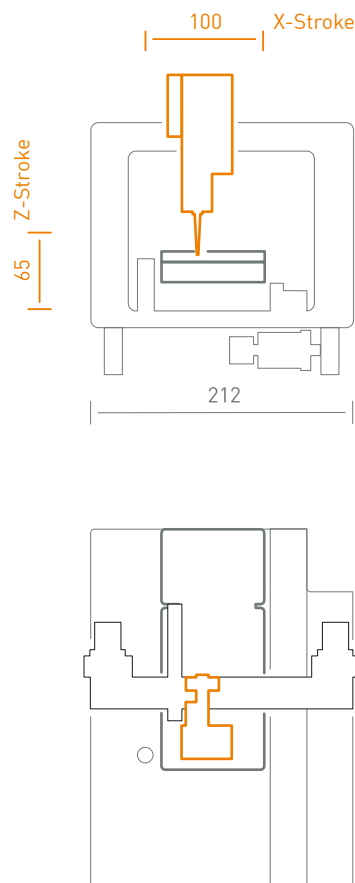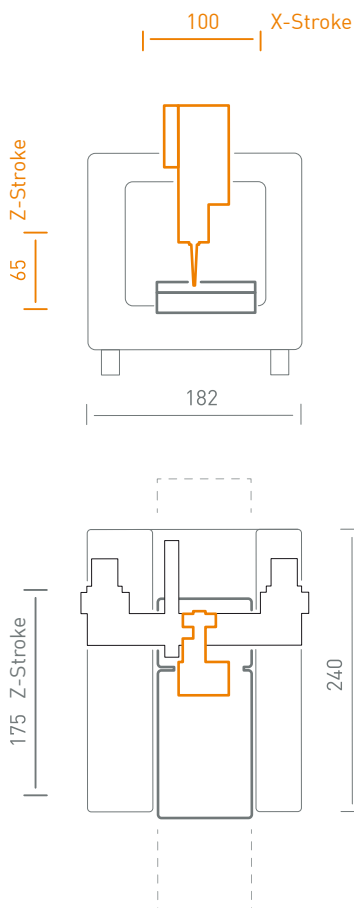
Options

The drive variants listed up until now represent the basic platform for your future sample preparation.

Some options require a variety of supply lines and tubing. In a few applications the availability of space must be especially taken into account, in other applications the flexible accommodation of a variety of additional modules.

All possible options must be considered according to the compatibility with the drive variant.
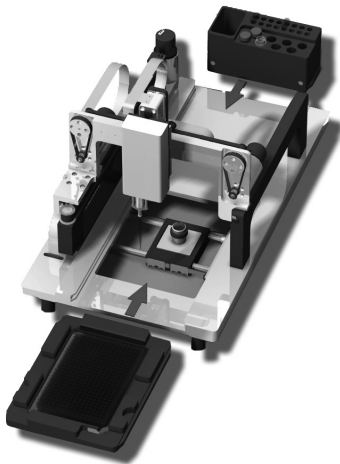
Reagents and tips are separate from the purification tray. The purification tray is fitted with a translucent 386-well MTP (microtitre plate). Both trays are pushed into a stationary position before processing.

After pipetting is finished the wells of the plate are analysed from below. With the aid of a special mechanism, a detection camera scans every well position from under the plate.

You receive OEM platforms as a subassembly for direct integration into your equipment.

Alternatively we offer, in accordance with your ideas, a completely housed unit inclusive of all legally specified tests and inspections.

We have a variety of sample solutions available.

Adaption Possibilities

- Tray size and special adaptations
- Working area in all axes, XYZ
- Mounting holes for reagents in the tray
- Additional tray for interchangeable tips
- Waste stations adjacent to the ports and washing stations
- Tray adaption for MTP's, deep wells, biochips
- Number of stationary ports and wash stations
- Adaption of the interchangeable heads and dosing channels
- Adaption of the dosing volume
- Application of additional external pumps
- Barcode reader for the samples, tubes, MTP
- Temperature control and temperature control stations
- Shake stations for MTPs and tubes
- Additional XZ portal for detectors
- Additional XZ portal for additional interchangeable heads
- Additional axis systems for detectors
- Dosing above, measurement below the trays
- Additional handling system for cross linking
- Additional tray guide unit
- Integration of your detector system
- Adaption of the firmware to your terms of reference
- Adaption of the electronic to your terms of reference
- Individual housing
- Stacker and automated tray loading
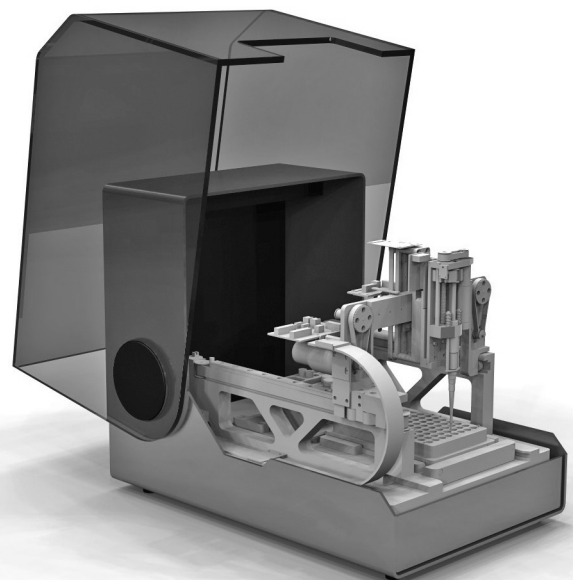
Customer solution in accordance with drive variant 3

Interchangeable Heads

Single-channel Heads

Multi-channel Heads

We offer our **Standard Single-channel Heads (1, 2, 3)**, depending upon the stipulated requirements, with 3 different tip types and various dosing volumes. Because of good experience regarding the quality and price, we preferentially use the **BioRobotix Tips (1)**.

In addition to the possibility of using the same clamping cone for 20, 50 and 200µl tips, these tips are also offered for the automatic extraction from the 96-times rack.

If the price plays an important role, then we recommend a 250µl **Sarstedt Tip (2)**. This tip, however, due to its manufacturing tolerances is for exclusive use in single-channel head applications. Alternatively we recommend the **Eppendorf Tip (3)**, due to its overall length, this one has the greatest volume. This high-quality automatic tip we also recommend alongside the BioRobotix Tip for multi-channel heads. This tip can also be obtained in a 96 rack.

Our **Four-channel Head (4)**) represents just one example of the possible channels and the tip mounting.

Multi-channel heads from 2 - 8 channels can be adapted individually or to other automatic tips and to the desired dosing volumes.
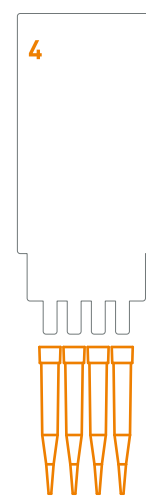
| 1 | 2 | 3 | 4 |
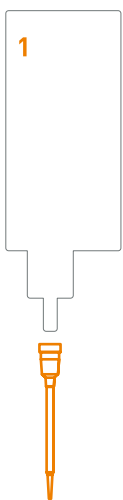
20µl, 50µl, 200µl
BioRobotix Tip

250µl
Sarstedt Tip

300µl
Eppendorf Tip

4 x Tips parallel for example
Eppendorf Tips

Please contact us regarding to this this topic.

For the preparation of some samples it is important to feed large volumes of buffer solutions from an external reserve with the aid of an additional pump.

In this case it may be necessary to use a cross-flush inlet on the piston system.

Our *Example (5)* shows two cross-flush connections.
In *Example (6)* the largest tip we know in a 96 rack comes into use. With this interchangeable head we can process a maximum of 850µl liquid in one dosing operation. Some applications require the use of a steel needle, see *Example (7)*.

Our interchangeable steel needle heads can as in our example be equipped actively with piston pumps or be prepared passively with a hose connection for an external pump. For cleaning or for pressurized applications there is a variety of probe ports and washing stations with various functional principles available.

If the dosing of fluids below 1µl is required and, if necessary, contactless spotting as well, we are able, together with our partners, to offer solutions

Powders can also be dosed.
Example (8) is a special solution for the dosing of zirconia beads. With this head the volume of powder to be dosed can be set between 10 and 50µl. The powder must be free-flowing, not hygroscopic and be as antistatic as possible. Otherwise, detailed pilot tests are necessary.

Here also, in-depth advice is possible.
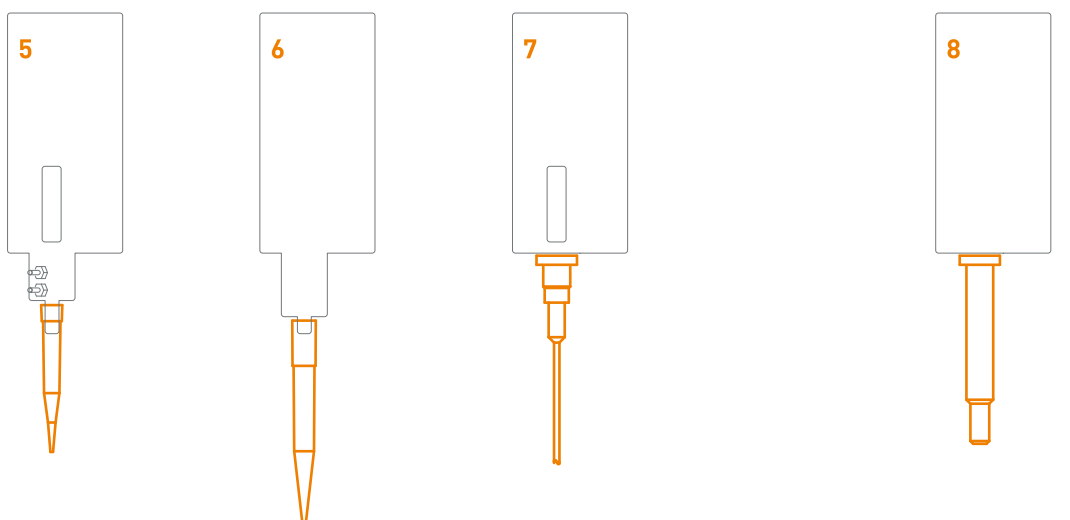
Glass Piston System
- 300µl Tips
- Cross Flushing

1250µl
Eppendorf Tips

Glass Piston System
- 300µl Volume
- Steel Needle

Powder Doser
10-50µl Volume

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