

YOUR PERSONAL PIPETTING ROBOT

# PIRO®

Quality creates value

**DORNIER**

LABTECH  
SYSTEMS

## It is a PIRO® pipetting robot...



### ... when easiness meets

- versatility
- precision
- reproducibility
- efficiency
- convenience
- economy
- safety

### ... when it combines

- drag and drop programming
- multi-dispensing functions
- 384-well qPCR in one go
- level sensing with clear tips
- multi-functional plate usage
- interchangeable heads
- multiple language software
- intelligent pipetting from database
- fluid transfer of remaining mixes or reagents
- normalisation and serial dilutions
- automatic tube switching for mixes or reagents
- free software updates

## Easiness meets ...

### ... versatility

The PIRO® Liquid Handling System provides a versatile pipetting platform with many options for the end user.

A large variety of racks, plates and tubes are available starting from 0.1 to 50 ml tubes with a tube depth of up to 95 mm. Deep-well plates, reservoirs and passive cooling blocks can also be used as well as unusual plate formats for various real time PCR platforms like the Rotor-Gene, SmartCycler, Eco, LightCycler and others. Plates and tubes can be selected from the PIRO® database included in the software.

The PIRO® system can use 50, 200, and 1,000 µl tips in order to be precise in low as well as in the higher volume pipetting range. The option of using 1,000 µl tips provides sample pipetting from primary tubes to up to 50 ml with a tube depth up to 95 mm.

### The applications to be used on the PIRO® are versatile

- Sample normalisation
- Serial dilutions
- Rearranging plate formats
- Cherry picking from various plates and formats
- Plate duplications
- Creating various mixes for the same run
- And many more options

## ... precision

The PIRO® Liquid Handling System provides high precision in the x-, y- and z-axis positions. This is due to the stepper motors implemented allowing for steps of 0.02 mm enabling accurate pipetting for all plates and tubes handled by the PIRO®.

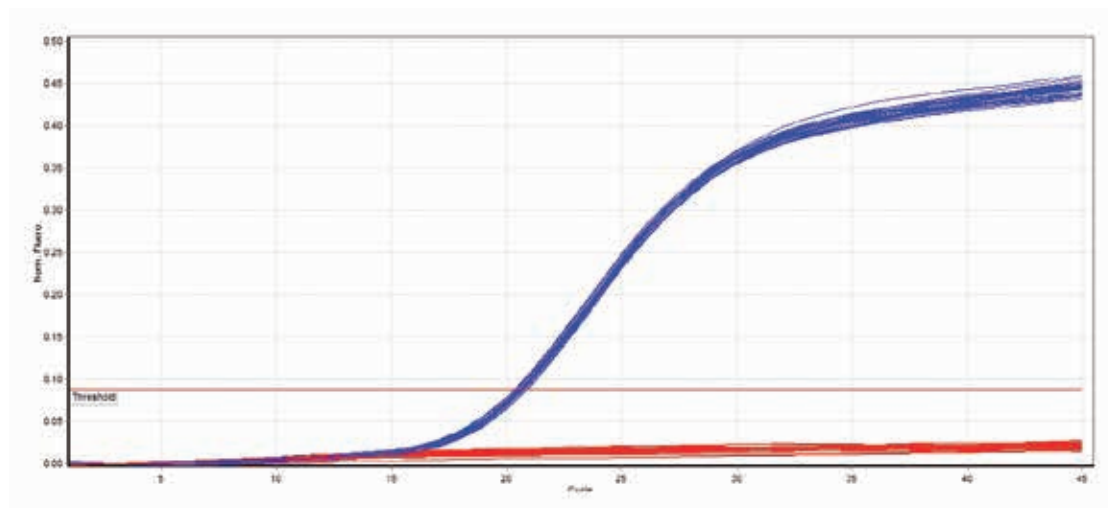
- Coefficient of variation (CV):
  - CV < 1%, 5 - 180 µl
  - CV < 5%, 2 - 5 µl
  - CV < 10%, 1 - 2 µl
- Accurate positioning also allows for small liquid volumes to be placed on the wall of a tube, allowing the user to exactly determine where to dispense the liquid.

## ... reproducibility

The PIRO® Liquid Handling System provides the basis for any PCR or qPCR setup.

With the PIRO® system, automation of any assay setup will guarantee reproducible results, including large numbers of repetitive assays, complicated setups including various mixes, several dilution series in the same run, or normalisations of DNA/ RNA samples.

Fewer repeats will be needed due to accurate pipetting and human errors can be excluded. What previously has been considered to be a luxury is becoming a necessity today.





## ... efficiency

### The PIRO® has a variety of smart functions to choose from

- Various functions can be assigned on one plate
- The deck positions on the PIRO® are interchangeable, thus the arrangement of racks can be close together, resulting in shorter ways for the pipetting arm to travel decreasing running times
- Waste handling can be managed by the user. Prior to a run the user can decide if the waste should stay inside the PIRO® or discarded to the outside of the robot, both options are available
- While running, the PIRO® lightens up depending on the status it is in, pausing, level sensing, interruptions, pipetting, or the UV-procedure are indicated by different light signals
- Various mixing options are available for the user to choose from
- Using the multi-dispensing functions of the PIRO® the overall speed of any assay setup can be seriously improved.

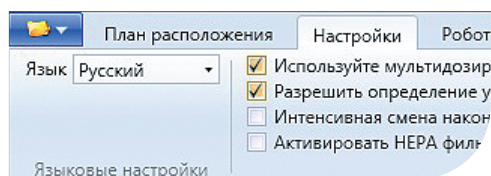
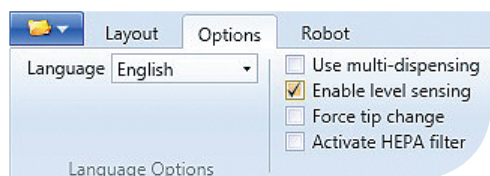
## ... convenience

The software of the PIRO® is easy to program and no training of specialists is required. From simple liquid transfers to highly complex applications, regardless of what it is, it can be programmed within minutes.

The PIRO® works with comprehensive data logging for all steps in each pipetting project.

Any programming step as well as every movement will be recorded and presented in the pre-run report. After completion of the run, this comprehensive record is compiled in a post-run report which includes information about the samples, pipetted volumes, pipetting steps and recorded exceptions like run interruptions by the user and much more. Results can be exported as various file formats including .csv files to be used in downstream applications but also imported from .csv files allowing for PIRO® run setups to be created outside the PIRO® software.

The PIRO® is developed as an open system supporting the integration between many systems. The software is designed to be used in many languages.



## ...economy

The PIRO® reuses tips where possible meaning when for example a liquid is used several times. It also has multi-dispensing functions implemented saving additional tips to be used. Less repeats have to be done due to potential pipetting errors or mixing up of samples. Only required standards created need to be used, resulting in fewer reactions to be done. As the liquid level sensing is working with pressure, clear tips can be used and no conductive tips are needed. This turns the PIRO® in a cost saving instrument.

The PIRO® also helps to save time. It allows for import and export functions to be used minimising the time for typing sample names and other information into the software. The use of a barcode reader for sample or plate details is another option as well as using pre-saved templates to start a run quickly. The above mentioned multi-dispensing mode will also save running times.

Using the PIRO® results in cost and time saving performance of any pipetting task to be performed.

## ...safety

The PIRO® Liquid Handling System provides many features for a safe pipetting performance. The hood interlock sensors ensure the instrument pauses when opening the hood during a run. Any manipulation will be recorded. The newly designed liquid level sensing system uses non-conductive tips and also monitors the amount of liquid in each tube during all steps in real time in the protocol.

The PIRO® has a tip detection implemented making sure a tip is attached to the pipetting head. If no tip is presented in the tip rack, the pipetting head moves to the next position until it finds a tip to continue the run. A run will therefore not be interrupted. The PIRO® system is setup to prevent any possible contamination risk and follows strict defined rules to avoid any cross contamination. Every aspiration is followed by an intake of an air cushion before the transport to the target vessel continues. An UV-light and HEPA filter are two further options to be installed on the PIRO®.

### Liquid Level Sensing

The liquid level sensor is a sensitive electronic device. The PIRO® level sensor relies on the detection of pressure changes and allows the robot to automatically detect when the pipetting tip is reaching the surface of the liquid. As soon as the tip reaches the liquid level surface, pressure is built up and is measured by the pressure sensor in the pipetting head, which then allows the pipetting head to lower the tip to a level aspirating the required volume. The advantages are obvious:

- A PIRO® run will not continue when liquid is missing, unless specified differently by the user, ensuring that the required volumes are transferred. If a vessel is empty, the PIRO® will ask for confirmation to continue or allow the user to add liquid to the system and continue the run without losing the tasks performed so far
- When picking up liquid, the level sensing feature will determine to enter the liquid only as deep as it is needed and will prevent any droplets on the outside of the tips to be transferred to the next tube
- In addition, using pressure as a detection system allows for all liquids to be detected and pipetted and no difference is made if a solution is conductive or not.

Further advantages of the PIRO® software in relation to the level-sensing function are that it can be used plate independently and the user has the option to determine how often it should be performed. If missing liquid is detected by the, it will be recorded in the post-run report.



## Technical data PIRO®

### Pipetting volume range

1 - 180 µl

5 - 1,000 µl

### X-, Y-, Z-axis drive resolution

0.0065 mm

### Tip disposal

All used tips ejected externally or internally, customers' choice

### HEPA-Filter (optional)

High Efficiency Particulate Air filter system provides positive pressure

### Temperature range

4 - 35 °C

### UV sterilization (optional)

UV light system for deck sterilization under closed lid conditions

### Precision, Accuracy

CV < 1%, 5 - 180 µl (dry-well transfer)

CV < 5%, 2 - 5 µl (wet-well transfer)

CV < 10%, 1 - 2 µl (wet-well transfer, or better)

### Electrical

100 - 250 VAC, 50/60 Hz, 60 watts

### Dimensions (WxD xH)

600 x 515 x 470 mm

### Weight

35 kg

### Relative Humidity

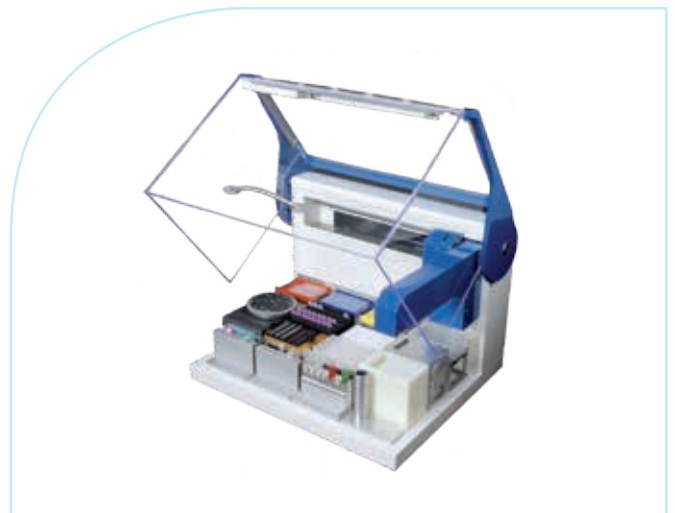
40 - 70%

### Communication

USB

### Recommended computer requirements

Windows 7, Intel core 3.2 GHz





## It's easy to use – it must be a PIRO®!

### What you see is what you get

A space wonder on a small footprint. 16 deck positions can be used on a PIRO®. This provides enough space for reagents and mixes to be pipetted and the setup of 384 different samples without adding tips.

Deck Layout – the software mirrors the actual deck layout. For “Drag and Drop” programming with comfort functions, some features of the interface are described below.

The image shows a screenshot of the PIRO software interface. The main window displays a 4x4 grid of deck positions, each containing a grid of sample wells. Various callouts point to specific features:

- Reactions can be generated automatically due to the drag and drop principles**: Points to a well in the top row, second column.
- Tip positions can be marked as available or unavailable**: Points to a well in the top row, third column.
- Standards can be created and calculated as dilution series with dynamical variation**: Points to a well in the top row, fourth column.
- Waste box for disposing used tips on the deck**: Points to a well in the bottom row, fourth column.
- Waste channel for transporting used tips to the outside of the robot**: Points to a well in the bottom row, third column.
- Reagents can be placed and copied to any deck position**: Points to a well in the bottom row, first column.
- Mixes, either home-made or ready-to-use mixes can be created and used within a run**: Points to a well in the bottom row, second column.
- Diluent can be placed and used even several diluents**: Points to a well in the bottom row, third column.
- Samples can be used in various racks and tube types; number of samples and positions can be used and changed to suit different runs**: Points to a well in the bottom row, fourth column.
- Feature tree for a quick overview and change of layout and functions**: Points to the left sidebar menu.
- Feature table for changing features and programming from tables and menus**: Points to a table in the bottom left corner.

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