IVARO Tube Handler
Innovative automated processing of screw cap micro tubes
Filling, labelling, scanning, sorting, weighing – sophisticated and sensitive laboratory processes require a precise, specialised yet flexible system. The innovative concept of the IVARO Tube Handler enables you to adapt the automation system to your applications in the best possible way.

You can equip the two standard devices IVARO FD – for filling and dosing – and IVARO AP – for aliquoting and pipetting – with specialised modules tailored to your processes. This allows you to automate even complex, manual steps in your laboratory – easily and safely.

Whether you use screw cap micro tubes, cryo tubes, micro test plates or special vessels, the IVARO adapts to your requirements and processes. Whether you work with open or closed tubes, feed tubes or closures separately or in a rack, is entirely up to you thanks to the flexible system.

The user-friendly and intuitive software helps you organise your process. It documents, manages and plans your sample processing and can be easily integrated into your existing workflow and software solutions.

The IVARO Tube Handler is the automated solution for safe, fast and reproducible processing of your samples.
Labeling

The balance with a precision of up to 0.01 mg automatically performs an additional control step. The determination of sample weights, as required for example in analytics and highly sensitive applications, is carried out fully automatically. Measurement results for each tube can be clearly documented and traced. The tubes are clearly identified by a variably programmable label printer. Barcodes, data matrix codes or other identification features can be printed on a label and affixed to the tube at any time. Current information such as the just determined weight or the exact time can also be part of the automated marking process. The design of the label can be easily adapted by the user.

Identifying

The unique Duplex Lifter design guarantees optimum process speed when tubes are to be opened or closed. The cap can be screwed on or off while your tubes are being transported. Individual closures can be supplied through a cap feeder so that also open tubes can be capped quickly and easily. The precise gripper arm can lift individual tubes out of any rack arrangement. The integrated scanner identifies the tube already on the way to the target position. The tube is rotated in the gripper arm to read the barcode or data matrix code at any position. The vessel can then be placed in the planned rack arrangement, or processing of the sample which has now been uniquely identified, can begin.

Capping

Filling

The precise pipetting module transfers liquids from tube to tube (vial-to-vial), tube to microtiter plate (vial-to-MTP) or microtiter plate to tube (MTP-to-vial). Sensor systems such as capacity and pressure-based liquid level detection (cLLD and pLLD) and Qualitative Pipetting Monitoring (QPM) guarantee excellent pipetting results.

The application-optimised dispensing channels enable convenient filling of liquids. Depending on the requirement and liquid, vessels can be filled via a tubing, piston or gear pump or using the “Positive Air Pressure” principle. This allows typical dilution or dissolution steps in the volume range of less than one microlitre up to several millilitres to be carried out quickly and reliably.

Pipetting

The balance with a precision of up to 0.01 mg automatically performs an additional control step. The determination of sample weights empty containers, as required for example in analytics and highly sensitive applications, is carried out fully automatically. Measurement results for each tube can be clearly documented and traced.

Weighing
The IVARO basic unit is the basis for your customised tube handler.

With its variable deck structure and flexible setting parameters, the IVARO Tube Handler can be individually adapted to almost all applications and workflows. Time-consuming, complex or monotonous workflows can now be conveniently handled by just one instrument.

Maximum reliability, safety and transparency are the requirements that the IVARO Tube Handler meets. Technically advanced, endlessly rotating gripper arms move your samples safely from one rack to the other. On the way, closed vessels can be decapped and recapped, the filling level in the vessel detected, and the barcode scanned. Sensors monitor loading of each individual rack.

The integrated PC system facilitates the complete documentation of each sample. The appropriate software is database-driven and intuitive to operate.

Thanks to its compact design, the IVARO Tube Handler fits even in confined spaces. The work area is completely enclosed. The sliding door can be closed with a handle. In addition to quiet operation, sensitive applications or the handling of hazardous substances can also be controlled easily and without any problem via the software. This provides you with a completely enclosed work area that protects you and your samples.

Independent, space-saving and flexible, the IVARO Tube Handler is the ideal automated solution for your workflow.
IVARO FD is the ideal solution for filling stock solutions, buffers and other liquids into smaller containers. The preparation of samples, the production of small product series, the production of kits and other time-consuming applications are no problem with IVARO FD. Without manual effort, with optimal speed and complete documentation, IVARO FD supports you in your processes.

Different dosing systems can be selected for the dosing of liquids, including various highly viscous, highly volatile or critical liquids. IVARO FD allows both fast and safe dosing of particularly small volumes from 0.1 μl, as well as filling tubes with several millilitres of liquid. A scale for additional filling quantity control and documentation is optionally available. Multi-step and complex workflows such as filling, labelling and weighing in enclosed tubes are just as easy to implement with IVARO FD as uncomplicated filling of open tubes. Programs can be called up flexibly and easily and adapted to your requirements.

Parallel processing of several working steps enable optimal process speed, saving time and increasing your throughput.

Precise filling
Short processing times
Consistent documentation
IVARO AP
PRECISE ALIQUOTING AND PIPETTING

IVARO AP is more than just a liquid handler. It supports you in all types of sample preparation. Filling liquids into several identical tubes is just as easy as aliquoting samples into different containers and microtest plates, or creating dilution series.

Whether you are processing open or closed tubes, whether these are to be labelled or weighted - IVARO AP adapts to your process. Depending on the application, you can flexibly determine the use of micro screw tubes, 15/50 ml tubes or other screw cap tubes, reservoirs or plates. Complex applications can be accomplished by combining the different IVARO modules. Time-consuming, manual and monotonous workflows are carried out safely and reliably with just one instrument.

The heart of IVARO AP is the state-of-the-art pipetting system. Equipped with a capacity- and pressure-based liquid level detection system (cLLD and pLLD) as well as a precise Qualitative Pipette Monitoring (QPM) module, pipetting inaccuracies are minimised and dosing processes optimised.

IVARO AP guarantees excellent pipetting results - even with volatile substances such as acetone or ethanol. In addition, IVARO AP can be equipped with a scale for precise documentation of the total filling quantity.

Precise and flexible processing of your samples on IVARO AP guarantees maximum safety and consistent documentation for any sample and aliquot.

- Reliable pipetting/aliquoting
- High flexibility
- Safe processing
- Reproducible processes
With an IVARO Tube Handler you do not simply purchase a device, but a solution. We are your partner for the conception of automated solutions and the design of applications. We support you with helpful documentation for installation and operation qualification (IQ/OQ), user training and routine device maintenance. IVARO devices can be used even in regulated environments such as GLP or GMP.

In addition, a maintenance and service contract protects you against unexpected operating costs and minimises ordering effort. At the same time, system downtime is reduced to a minimum. Software updates that are otherwise subject to a fee are included with a maintenance contract, as is free application support for questions and problems relating to the application.
TECHNICAL SPECIFICATION

IVARO MODULES

LABEL PRINTER
- Print resolution: 600 dpi
- Print speed: up to 150 mm/s
- Print width: up to 54.1 mm
- Elements: Text, bar code, 2D Code, images

CAP FEEDER
- Loading capacity: 500 pcs.
- Separation speed: 10 caps/min
- Cap type: Caps for SARSTEDT screw cap micro tubes

PIPETTING UNIT
- Pipetting range: 1 μl - 1000 μl
- Pipetting modes: Individual pipetting and aliquoting
- Process monitoring: Qualitative Pipette Monitoring (QPM)
- Liquid Level Detection (LLD): LLD, print / LLD capacitive
- Pipetting specification:
  
<table>
<thead>
<tr>
<th>Volume</th>
<th>Precision (%)</th>
<th>Accuracy (μl)</th>
</tr>
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<tbody>
<tr>
<td>10 μl</td>
<td>5 %</td>
<td>+/- 5</td>
</tr>
<tr>
<td>100 μl</td>
<td>2 %</td>
<td>+/- 5</td>
</tr>
<tr>
<td>1000 μl</td>
<td>1 %</td>
<td>+/- 5</td>
</tr>
</tbody>
</table>

Sample
- Pipette tip type: HAMILTON verification solution
- Verified by: 12 Measuring points per volume and pipetting module

DISPENSING PUMPS
- Peristaltic Pump
  - Volume range: 40 μl ...
  - Precision (CV): 5 μl ...
- Syringe Pump
  - Volume depending on time
  - Hosing exchange required: required
- Chemical resistance:
  - Suitable for viscous liquids: +
  - Investment costs:
  - Operating costs:
  - Accuracy:
  - Speed:

WEIGHING CELL
- Weighing range: 220 g
- Readability: 0.1 mg
- Reproducibility (standard deviation):
- Depending on ambient conditions and unit setup

** The values indicated are based on the following settings:

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IVARO BASIC UNIT

DIMENSIONS

<table>
<thead>
<tr>
<th></th>
<th>Unit size 1</th>
<th>Unit size 2</th>
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<tbody>
<tr>
<td>Height</td>
<td>750 mm</td>
<td>870 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>523 mm</td>
<td>516 mm</td>
</tr>
<tr>
<td>Width</td>
<td>600 - 2000 mm*</td>
<td>600 - 2000 mm*</td>
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HARDWARE
- Vertical gripper arm, continuous rotation
- Horizontal gripper arm: optional
- Filling level sensor, ultrasound: optional
- Depth sensor for the detection of the rack load: 1x yes
- PC system (integral): yes
- Integration of pipetting unit: yes

SOFTWARE
- A.Ware - lab automation control software

DOCUMENTATION
- IQ/OQ - IQ and CQ templates tailored to the selected system (optional)

** With the printer module, the unit width increases by 257 mm.

HARDWARE
- Monolifter: 1x yes
- Duplexlifter Variant A: 1x yes
- Duplexlifter Variant B: 2x yes

SOFTWARE
- A.Ware - lab automation control software
- IQ/OQ - IQ and CQ templates tailored to the selected system (optional)

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