IVARO Tube Handler XS

Innovative automation for tube processing

The IVARO Tube Handler XS is a sample processing system for small laboratory vessels, such as screw cap micro tubes and cryo tubes. Its unique design and variability enable diverse manual operations to be automated simply and safely.

The IVARO Tube Handler XS is the ideal tool for labeling, scanning, sorting, weighing and pipetting a large number of sample tubes in the lab. By eliminating manual processing steps, the system reduces the workload for laboratory staff and also ensures a greater degree of analysis reliability. Samples are uniquely identified by barcode and processing steps, increasing transparency and traceability during sample processing.

The patented concept of two robotic arms working in parallel, numerous module options, and a compact and functional design allow for fast, reproducible, and safe processing of samples, even in complex applications. Powerful database-linked control software supports the user with an extensive range of standard functions. With so many custom adaptations, this system is easily integrated into existing laboratory workflows.
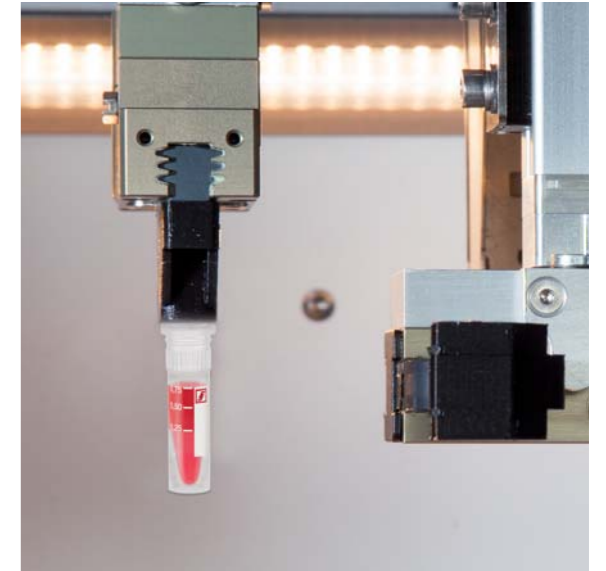
Individual customization

The IVARO Tube Handler XS has a flexible deck setup that, combined with finished module and rack supports, allows it to be individually adapted to suit specific customer needs for different applications and rack formats. It features numerous modules for equipping the system to meet customer requirements for a wide range of uses.

Sample preparation in scientific laboratories

The integrated labeler assigns a unique barcode to the micro tubes. Samples are either added externally or via the pipetting module. One or more solutions can be added by the dispensing module.

Sample handling for biobanks and compound libraries

Sample tubes can be recorded and sorted using the integrated barcode reader or the bottom barcode reader module. New tubes can be labeled with the labeler. The additional four-digit or five-digit weighing module records initial weights and monitors changes in weight during storage. Samples can be aliquoted and reformatted using the pipetting module.

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The right modules and solutions for your applications

- Sample identification and cherry picking with rack resorting
- Labeling of tubes and vials
- Reformatting (vial-to-vial, vial-to-plate)
- Sample preparation
- Aliquoting of samples (vial-to-vial, vial-to-plate)
- Initial weight determination and sample monitoring
- Capping and decapping of individual samples and complete racks for further processing, e.g. on a pipetting robot

Available modules

- Label printer with thermotransfer printing, 600 dpi, and applicator
- Cap hopper
- Pipetting module (1000 µl, liquid level detection)
- Weighing module
- Dispenser (different options, can also be combined)
  - Syringe pump
  - Peristaltic pump
  - Gear pump
  - Positive displacement system
- Bottom barcode scanner module for reading 2D codes on the bottom of tubes
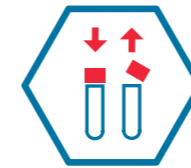
Custom solutions

In addition to our wide range of standard solutions, we welcome custom requests. Our engineers are ready to help you navigate uncharted territory and develop and implement the software adaptations and modules you may need. Let us know your questions and requirements.

Sample identification, reformatting, and cherry picking

The IVARO Tube Handler XS features an arm with a mounted barcode scanner (1D, 2D) for removing tubes from any rack arrangement. The arm rotates even as it transports the tube to the target position in order to read the barcode on the sample tube. After samples are identified, new rack arrangements can be determined or the actual processing of the sample can begin.

Capping and decapping

The unique double arm design of the IVARO Tube Handler XS allows it to unscrew tube caps (decapping) even during tube movement. After the screw cap is opened, a sensor checks the vial to ensure that there is no septum or lid on the tube. Later, the IVARO Tube Handler XS can screw the cap back on the vessel (capping). Caps can be discarded completely or stored temporarily.

Dispensing liquids

The IVARO Tube Handler XS optionally features one or more dispensing channels for liquids, which can be dispensed by a peristaltic, piston or gear pump or using positive air pressure, depending on your application. Typical dilution or solution techniques involving volumes from 0.1 µl to several milliliters – as is required in the chemical analysis of HPLC measurements, for example – can be performed safely and quickly.

Pipetting

An optional pipetting module is available for transferring liquids from tube to tube (vial-to-vial), tube to microplate (vial-to-MTP) or microplate to tube (MTP-to-vial). Thanks to the disposable tips in different sizes with and without filters and the excellent pipetting technology with liquid level detection (cLLD and pLLD) and qualitative pipetting monitoring (QPM), this module produces excellent pipetting results, both during aliquoting and serial dilution as well as during other sample reformatting and preparation operations.
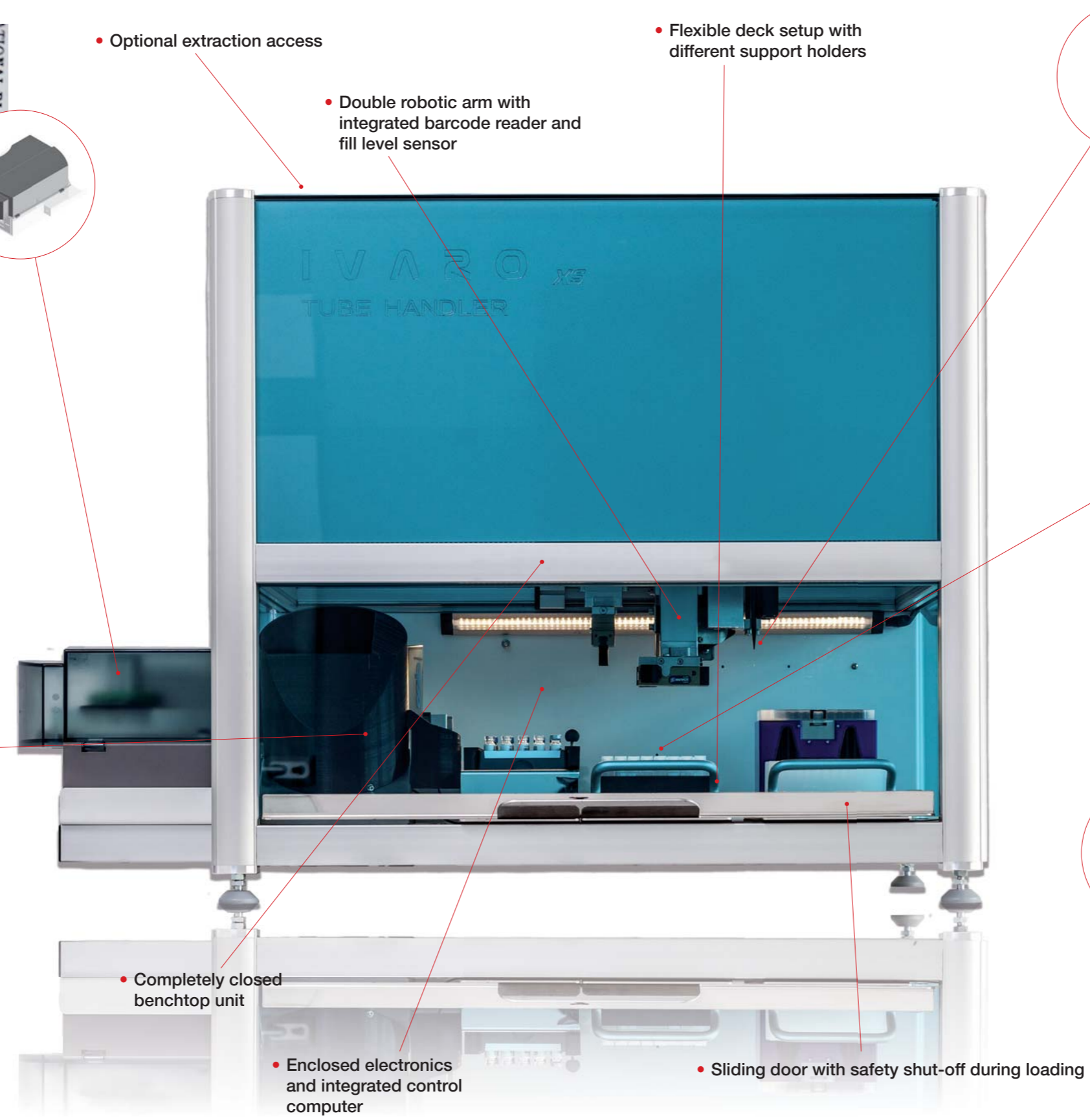
Weighing

Many applications in the world of analysis or substance libraries call for initial weight determinations. The IVARO Tube Handler XS provides support here through the fully automated weighing of empty tubes and initial samples. Depending on the application, this system can be optionally equipped with a four-digit or five-digit balance or weighing cell (up to 0.01 mg).

Labeling

The label printer affixes tubes with a barcode for subsequent identification of the sample. The information on the label can only be transmitted immediately before labeling and can contain a timestamp, for example, or even the previously determined weight of the sample. The label is easy to customize and can include plain text, 1D and 2D codes, and logos. Different label sizes and materials are available, including materials that are solvent-resistant and temperature-resistant to -196°C.

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• Optional extraction access

• Double robotic arm with integrated barcode reader and fill level sensor

• Flexible deck setup with different support holders

Label printer

Solvent-resistant labeling of labware (tubes and vials) and cryo labels resistant to -196°C possible. Prints logos and text, barcode (1D/2D), measurement results, timestamp, and more. For use with new vials in the lab.
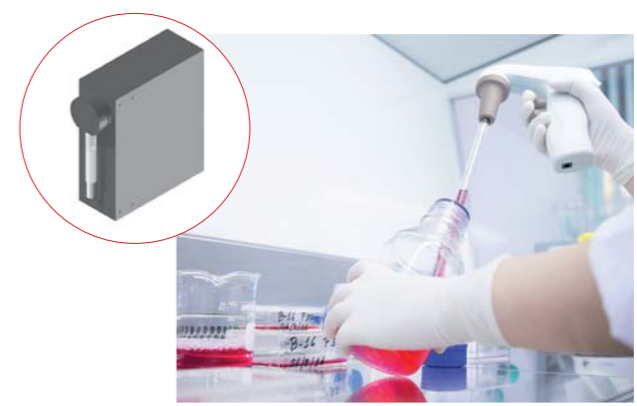
Pipetting module

Transfer of liquids up to 1,000 µl for sample preparation and aliquoting.

Weigh cell

For determination of initial and final weight; four-digit or five-digit balance with and without draft shield. Suitable for applications such as initial weight determination, product filling, documentation and QC.

Cap hopper

Preparation of screw caps for further processing, sample preparation, and aliquot capping.

• Completely closed benchtop unit

• Enclosed electronics and integrated control computer

• Sliding door with safety shut-off during loading

Liquid dispenser

Different pumps available for any application (peristaltic, syringe and gear pumps, positive pressure systems) and for creating mixture solutions and product filling.
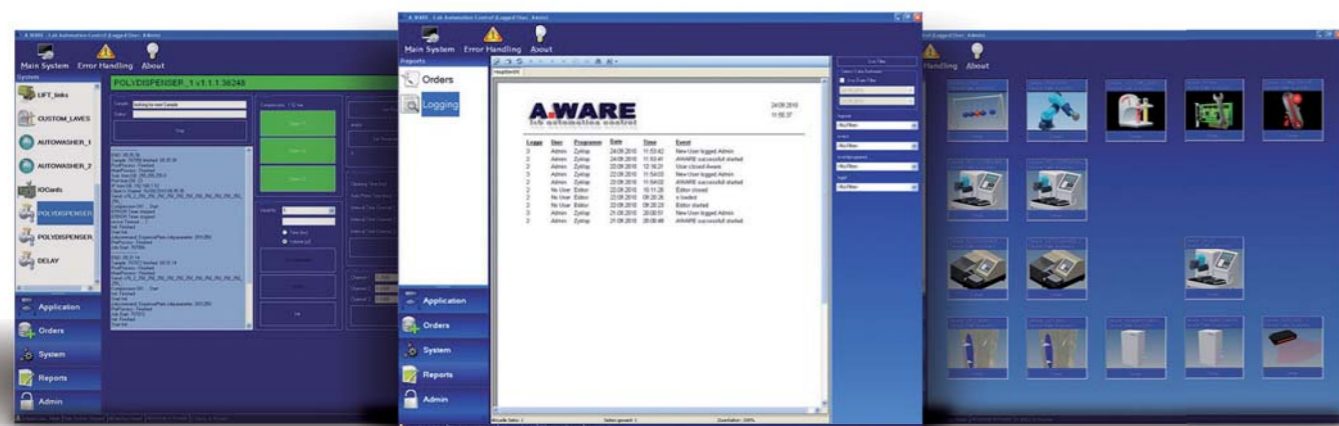
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A.WARE lab automation control software – an innovative control concept ensures that equipment works exactly as needed

The modern, database-linked A.WARE lab automation control software not only controls the IVARO Tube Handler XS but also provides an intuitive user interface with simple touchscreen and setup.

A.WARE lab automation control software supports different data formats (XML, CSV) for smooth data import and export and seamless integration into existing systems. With countless options for individual customization to suit your requirements, such as application-related reports, selected device drivers and customized interfaces, this automation solution is a welcome addition to the lab that is intuitive and simple to use.

The concept of a 'continuous workflow' ensures maximum availability and utilization of the equipment, enabling A.WARE lab automation control software to process different workflows for different samples all at the same time. The system also allows for racks to be unloaded and new racks to be loaded while other racks are still being processed. The safety conditions prevent system errors, while self-check functions ensure maximum performance of the IVARO Tube Handler XS. A.WARE lab automation control software can also be used to control other instruments and even multiple IVARO Tube Handler XS units so the same inventory of samples can be processed.

Secure user management, comprehensive logging and database-linked data storage mean that A.WARE lab automation control software meets the requirements of regulation FDA CFR 21 Part 11.
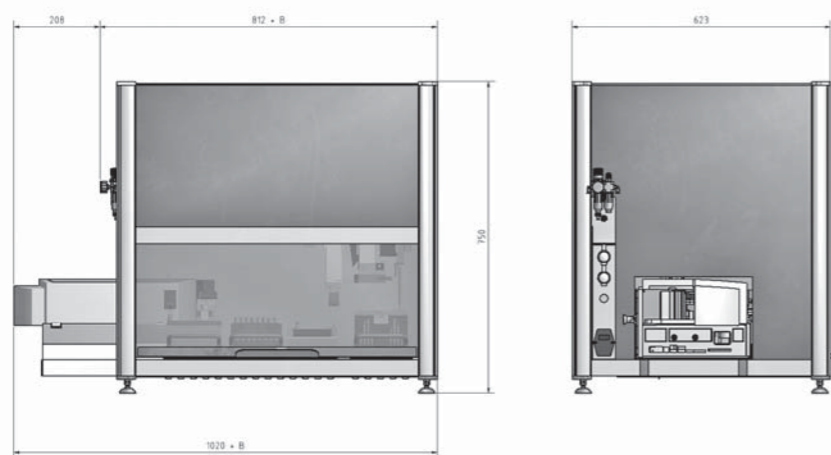
A solution, not just a product

The IVARO Tube Handler XS is more than just a piece of equipment – it provides a comprehensive solution. Sarstedt is your partner when it comes to designing automation solutions and creating applications. We provide helpful documentation for installation and operation qualification (IQ/OQ), and we also offer user training and routine product servicing, so your new equipment can even be used in regulated environments such as GLP or GMP.

Protect yourself from unexpected operating costs and minimize orders with a maintenance and service agreement, which will also minimize system downtime.

Orders can also be generated without software operation using an index service or corresponding variables, sensors and switches. Users can create and even edit processes themselves using the easy graphic editor. There are a number of options for handling errors via both the process control in the editor and in the controls, where steps can be repeated or skipped, or orders can be deleted.

A.WARE lab automation control software is therefore just as innovative and powerful as the IVARO Tube Handler XS and provides an optimal basis for managing any application safely and reliably.

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Dimensions

Height	750 mm
Depth	623 mm
Width of IVARO 20* basic unit	812 mm
+ W for IVARO 25	150 mm
+ W for IVARO 30	300 mm
+ W for IVARO 35	450 mm
+ W for IVARO 40	600 mm
+ label printer (optional)**	208 mm

Unit configuration

Vertical arm, infinite rotation	1
Horizontal arm, infinite rotation	1
Barcode scanner for tubes – 2D, 3D	1
Fill level sensor, ultrasound	1
Depth sensor for detecting rack usage	1
PC system (integrated)	1

Throughput***

Read barcode, open screw cap, dispense, close and reset	approx. 25 s/sample approx. 140 samples/h
Read barcode, weigh, label	approx. 20 s/sample approx. 180 samples/h

*   This number indicates how many grid points are available in the deck. For example, an MTP rack has five grid points.
     The right five grid points cannot be reached by the vertical arm and are available to the pipetting module.
     The left five grid points cannot be reached by the pipetting module.
**   The label printer has five grid points from the left.
*** Values may vary depending on the tubes and required accuracy.

1. Basic system

Consists of one self-supporting housing, duplex lifter unit (DLU) and FlexDeck with grid points. The number indicates how many grid points are available in the deck*. For example, an MTP rack has five grid points.

IVARO-XS 20 – 20 grid points for racks and modules (standard)	IVXS20
IVARO-XS 25 – 25 grid points for racks and modules	IVXS25
IVARO-XS 30 – 30 grid points for racks and modules	IVXS30
IVARO-XS 35 – 35 grid points for racks and modules	IVXS35
IVARO-XS 40 – 40 grid points for racks and modules	IVXS40
IVARO-XS 45 – 45 grid points for racks and modules	IVXS45

2. Add-on options for DLU

Pipetting module	-PM
Crimper for 11 mm caps	-CR

3. Modules (deck setup)

Label printer (five grid points from the left)	-LM
Bottom barcode scanner	-BB
Weigh cell – four digits (three grid points)	-WZ
Cap hopper crimp caps 11 mm (five grid points from the left)	-LS
Shaker for SBS format	-SH
Shaker for individual tubes	-MI
Dispenser	-DI

4. FlexDeck holders and rack supports

FlexDeck holder for rack supports with a width of four grid points	FDS4
FlexDeck holder for rack supports with a width of five grid points	FDS5
FlexDeck holder for 50-well HPLC and GC racks with four grid points	FD50
Rack support for 2×81-well (9×9) racks – requires FlexDeck holder FDS5	RT81
Rack support for 3×SBS (horizontal) – requires FlexDeck holder FDS5	RT3S
Rack support for 2×SBS (vertical) – requires FlexDeck holder FDS4	RT2S

This is only a selection of the available holders and rack supports. The range is constantly growing. Please do not hesitate to ask for the right holder for your labware.

5. Software and support

A.Ware – lab automation control software	AW
IQ/OQ – adapted IQ and OQ templates for the selected system	IOQ
Application support	
Maintenance and service agreements	

*   Please note: the right five grid points cannot be reached by the vertical arm and are available to the pipetting module. The left five grid points cannot be reached by the pipetting module.

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