Modular-Lab

Module Diversity

Solenoid Valve Module (SVM; Dimensions: 130 x 130 x 78 mm)

With 4 valves (3-way or 2-way) for liquid transport. Standard UNF connectors at front. Easy to access for mounting of "finger tight" fittings. Optional one valve (barbed fitting) at back for gas transport.

Valve: Bürkert 6604, max. 3 bar, dead volume 45 µl, body: PEEK, sealing: FFKM (Simritz)

Valve: SMC LVM155, max. 6 bar, dead volume 10 µl, body: PEEK, sealing: FFKM (Kalrez), certified for clean room use

Other valves upon request.

Stopcock Manifold Module (SMM; Dimensions: 130 x 130 x 78 mm)

Holder and adapter for quick mounting of stopcock manifold. Standard stopcock manifold with Luer connectors for medical applications (one way, sterile) is used. Stopcocks are driven by servo motors.

Single Stopcock Module (SSM; Dimensions: 130 x 130 x 78 mm)

Holders and adapters for quick mounting of 3 single stopcocks (driven by servo motors). Stopcocks of different material and size can be used on the same module. Adapters for disposable sterile, plastic, Luer stopcocks, Teflon PTFE valves with UNF threads and metal stopcocks are available.

Hamilton Single Stopcock Module (SSM; Dimensions: 130 x 130 x 78 mm)

Hamilton Single Stopcock Module is equipped with three valves. Liquid flow into the centre port of a valve can be directed to one of the three exit ports. Additionally the valve can be switched to a closed position blocking the flow completely. Standard connections for ¼-28 UNF makes the module fully compatible with other Modular-Lab modules.

Pinch Valve Module (PVM; Dimensions: 130 x 130 x 78 mm)

Module with 3 servo motor driven pinch valves for high pinching pressure (70 N/cm). Excellent for isolation type applications. Only tubing has liquid contact. Tubing diameter from 0.5 to 4 mm (with adapters). Various tubing material can be used.

Vial Holder Module (VHM; Dimensions: 130 x 130 x 78 mm)

Holds up to 3 vials or cartridges. Holders for different vials and cartridges are available. The holders can easily be adjusted in their position and fit with the respective handles of all modules coming with the Modular-Lab. Can be equipped with an internal activity detector.

Vial Holder Plate (VHP)

Holds up to 3 vials or cartridges. The holders can easily be adjusted in their position and fit with the respective handles of all modules coming with the Modular-Lab.

Multi Position Valve Module (MVM; Dimensions: 130 x 130 x 78 mm)

The 7-port 6 position rotary valve is driven by a servo motor into 6 different positions and has no dead volume. From the seventh position liquids can be distributed to 6 ports or liquids from 6 different locations can be collected into one reservoir via the seventh position. Optional solenoid valve at the front to close the system when switch is rotating.

Flex Module

Module can easily be stacked underneath, between or on top of other modules to provide more space. It enables to turn other modules by 90° and it can also be used for vial storage on top of the system.

Single Syringe Module (SYM; Dimensions: 130 x 130 x 234 mm)

A single syringe with a volume of 1, 2, 5, 10 or 20 mL can be fixed via holder and is operated by a linear transfer axis. Customer specific syringes can be adapted on request.

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Peltier Reactor Module (PRM; Dimensions: 130 x 230 x 156 mm)

Heating and cooling with 8 double thermoelectric Peltier elements from -40°C to +150°C (heat exchanger, no liquid nitrogen needed for cooling). Includes activity detector, camera, stirrer, thermo sensor inside the reactor block. Additional temperature and pressure measurement inside reaction vial is possible. Can be equipped with a lift. Vials from 1 to 24 mL can be used with different adapter rings.

Connection by needles via septum of vial or with standard UNF fittings via reaction vial head.

Heater Reactor Module (HRM; Dimensions: 130 x 220 x 78 mm)

Heating with heating-foil from room temperature to 220°C. Lead-shielding of activity detector and electronics is included. Additional external thermo sensor, stirrer and pressure sensor is available. Vials from 1 to 24 mL can be used with different adapter rings. Connection by needles via septum of vial or with standard UNF fittings via reaction vial head.

HPLC Module (HPLC; Dimensions: 130 x 130 x 314 mm)

The HPLC module is designed to clean the reaction product of a PET-tracer synthesis by semi-preparative HPLC. Integrated parts of the module are an HPLC-column, an injection valve, a sample loop, a fluid detector and an activity detector. Additional components are HPLC-pump and the UV-detector from Knauer, which are not integrated in the module itself.

Vial Dispensing Module (VDM; Dimensions: 130 x 130 x 234 mm)

The Vial Dispensing Module is equipped with a lift for needles and a manually moveable vial holder. The vial holder can be made of acryl or tungsten shielding and is adjusted to customer specific vials. Two needles are placed in the automated lift – one for transporting the liquid and the other for venting. To assure that the liquid is wholly removed from the vial, the vial holder remains in a slant position during the withdrawal process.

Carbon-11 Trapping Module (CTM; Dimensions: 130 x 130 x 234 mm)

Trapping of $[^{11}C]CO_2$ is achieved by a molecular sieve (60-80 mesh) at room temperature. The column for heating is supplied by VICI with following attributes: 1/4"x5cm and 1/16" tube fitting. Compressed air influx through 4mm tubing and 2/2 way valve. Gas distribution is performed by a valve manifold with two types of connectors: 1/16" tube fitting to waste, reactor and column; 1/8" tube fitting for $[^{11}C]CO_2$ and Helium gas. The gases are distributed by 3/2 way valves. The Helium flow is especially controlled by an integrated Helium flow controller ranging from 0 to 150 ml/min (max. pressure: 3 bar).

Detector Shielding Module (DSM; Dimensions: 130 x 130 x 234 mm)

The Detector Shielding Module (DSM) provides additional shielding for the external activity detector, i.e. when using the HPLC module.

Tube Oven Module (TOM; Dimensions: 130 x 130 x 314 mm)

The Tube Oven Module (TOM) is a used for continuous flow reactions of gases on hot surfaces. The TOM can be operated up to 900°C. The TOM contains an internal temperature measurement and a heating spiral for reaching and maintaining the set temperatures. It can be installed on a special bottom plate for vertical or horizontal set-up. The horizontal TOM is available with an integrated double tube. When using pulverized filling material the TOM should be positioned vertically.

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Cooled Carbon Trapping Module (CCTM; Dimensions: 130 x 130 x 156 mm)

The Cooled Carbon Trapping Module (CCTM) is used for reversible adsorption of radioactive gases (e.g. $[^{11}C]CO_2$ delivered from a cyclotron). It is directly connected to target and gas supply. $[^{11}C]CO_2$ from a cyclotron is trapped inside a copper U-tube filled with carbosphere™ for adsorbing gases. The trapping performance can be improved by cooling the U-tube (min. -10°C). The U-tube is equipped with Swagelok™ connectors (made of stainless steel and Teflon) that can be easily connected to Teflon, FEP or PEEK tubing material.

Flow Controller Module – 2 valves (FCM; Dimensions: 130 x 130 x 78 mm)

The flow controller module is used to control a flow of a certain gas in a limited range. The mass flow controller is directly coupled to one of the internal 3/2 way valves to switch between the controlled gas flow (i.e. helium) and another not controlled gas (i.e. carbon dioxide). The typical operational range of the integrated mass flow controller is from 0 to 150 ml/min for helium. A maximum external pressure of 3 bar can be applied to the FCM.

Flow Controller Module – 3 valves (FCM; Dimensions: 130 x 130 x 78 mm)

This Flow Controller Module (FCM) can be selected with one of three mass flow controller (150 ml/min He, 500 ml/min $He/Ar/N_2$ or 500 ml/min H_2:He, 10:90). The flow can be reliably controlled between maximum flow and 10% of maximum flow. The flow controller and the three 3/2 way valves (SMC LVM 155) have all standard UNF connectors at the front for easy access of "finger tight" fittings. The FCM shows optimal performance up to 3 bar.

For more detailed information on each module please see individual module fact sheets.

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