mRC-KIT – mini Recirculating Chiller Kit
compact water cooling system for OEMs

- up to 900 W cooling capacity
  \((T_{\text{WATER}} +25 \, ^\circ\text{C}, T_{\text{AMBIENT}} +25 \, ^\circ\text{C})\)
- high cooling capacity in compact format
- single/twin versions available
- temperature stability \(\leq \pm 0.2 \, \text{K}\)
- flow rate 1 lpm to 5.5 lpm @ 2 bar to 0.2 bar
- double pump rotary compressor
AMS Technologies is a leading solution provider and distributor of high-tech, leading-edge components, systems and equipment, with more than 35 years of experience to date and currently serving more than 2000 European customers.

We are the specialists in both componentry and complete solutions for Optical Technology, Thermal Management and Power Technology fields, with access to and long standing relationships with the most advanced manufacturers in each of those fields. Drawing extensively on our experience in each of these differing technologies, and coupling this with our broad system-level competence, we are able to offer seamless and comprehensive solutions incorporating complementary aspects from all three key technology fields.

With an appropriate technical education, an element of entrepreneurial spirit and many years of design and consultancy expertise, our sales engineers can rapidly comprehend system requirements and provide you the customer with a solution that goes way beyond a simple understanding of our product datasheets. We take active involvement in the design cycle, defining and re-defining your specifications, and leading in many cases to highly specific, customized products and solutions. Helping you to effectively outsource your production line, we can even provide you with the necessary leading turnkey contract manufacturing services in our key competency fields.

AMS Technologies has been delivering solutions into a variety of high-tech markets, including renewable energies, medical, defence & aerospace, research & scientific and various other industrial segments. Our customer base consists of Europe’s largest leading technology corporations, a network of universities and research institutes as well as the most promising start-ups.

Our commitment: Identifying the best solution for your project enabling you to become your customers’ first choice!

Your AMS Technologies team

mRC-KIT – mini Recirculating Chiller Kit

mRC-KIT is a “mini Recirculating Chiller” development kit for creating particularly compact compressor-based water cooling systems. Both mRC-KIT versions feature vapor compression circuits and closed, pressurized recirculating water circuits. On the refrigeration side, miniature rotary compressors as well as customized condensers and evaporators are utilized to reduce size.

The compressor’s BLDC motor is speed controlled by an inverter, eliminating annoying switching noise of hot gas bypass known from ON/OFF compressors. Throughout its speed range, the compressor twin pump design offers low vibration and low noise. Compact centrifugal on the water circuit side are also contributing to the compact size. Since the water circuit is pressurized, the mRC-KIT manages with very small tanks – without the risk of cavitation in the smoothly operating centrifugal pumps. Overpressure on the cooling system also prevents the ingress of bacteria and oxygen and thus extends the maintenance intervals.

While mRC-KIT-400 features full chiller power and up to 400 W cooling capacity in a shoe box form factor; mRC-KIT-900-TWIN provides two independent water cooling systems in a 19-inch rackmount insert, which can provide a combined maximum cooling capacity of 900 W – either with each circuit cooling two heat loads independently of each other or with both circuits coupled in series, if only one circuit is needed.

key features

- recirculating water chilling kit
- ideal for water cooling tasks up to 900 W
- one (mRC-KIT-400) or two (mRC-KIT-900-TWIN) cooling circuits
- compact size
- easy to be integrated in customer application
- PID parameters and fan speed adjustable
- smooth, low-noise operation
- valved and non-valved water connections available

your customized mRC-KIT

For customer requirements that cannot be covered by mRC-KIT-400 or mRC-KIT-900-TWIN, our thermal management specialists at AMS Technologies are happy to develop a completely tailor-made solution and offer all services from development and proof-of-concept all the way to series production.
**mRC-KIT-400**

- **condenser**
- **compressor**
- **control board**
- **liquid coolant in**
- **filter**

**mRC-KIT-400 – process & instrumentation diagram**

- **liquid coolant out**

**mRC-KIT-400 – specifications**

- **power supply consumption**: < 300 W (max. 12 A @ 24 VDC)
- **cooling capacity (approx.)**: 250 W (Twist = +25°C, Twarm = +40°C) to 400 W (+25°C/+25°C)
- **temperature range**: +/- 1 K (over-/undershoot at 250 W heat load ON/OFF), +/- 0.05 K (continuous operation)
- **hydraulic parameters**: pressure drop 2 bar @ 4 lpm (optionally 1 bar @ 4 lpm)

**mRC-KIT-400 – unit main parameters**

- **weight**: 13 kg
- **dimensions (W×H×D)**: 350 mm × 220 mm × 209 mm, main body without filter
- **electrical connection**: 24 VDC
- **noise level**: 48 dB (A) (50% duty cycle), 60 dB (A) (100% duty cycle)
- **control**: local panel (optional), RS232
- **Interlock I/O alarms**: temperature, flow, liquid level, pressure

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**mRC-KIT-900-TWIN**

- **control board 1**
- **tank 1**
- **liquid coolant in 1**
- **liquid coolant out 1**
- **control board 2**
- **tank 2**
- **liquid coolant in 2**
- **liquid coolant out 2**

**mRC-KIT-900-TWIN – process & instrumentation diagram**

**mRC-KIT-900-TWIN – specifications**

- **power supply consumption**: < 700 W (max. 29 A @ 24 VDC)
- **cooling capacity (approximately)**: 900 W (2 x 450 W, Twist = +25 °C, Twarm = +25 °C)
- **temperature range**: +/- 1 K (over-/undershoot at 250 W heat load ON/OFF), +/- 0.2 K (continuous operation)
- **hydraulic parameters**: pressure drop 1 bar to 0.2 bar @ 1 lpm to 5.5 lpm

**mRC-KIT-900-TWIN – unit main parameters**

- **weight**: 20 kg (Dry Weight: 19.9 kg)
- **dimensions (W×H×D)**: 440 mm × 220 mm × 350 mm, main body without flanges
- **electrical connection**: 24 VDC (230 V AC optional)
- **cabinet**: rack-mount, 19”, aluminium housing
- **control**: local panel (operating parameters readable via RS232)
- **alarms**: liquid level, tank pressure, coolant feed temperature, coolant flow rate, condenser pressure
Our miniature rotary compressors are the result of a breakthrough in compressor technology featuring low vibration and low noise operation. They can be utilized in many thermal management applications from compact recirculating chillers, cabinet coolers, direct cooling of electronic components, and white goods to mobile refrigeration. For smooth and easy temperature adjustment, these miniature rotary BLDC compressors with cooling capacities up to 2000 W are continuously speed-controllable via the frequency of a square wave signal. The inverter board is included, a test function board for easy evaluation is also available as an option.

Our cold plate technologies range from tubed cold plates and flat tube cold plates to performance-fin cold plates and liquid-cooled chasses. In a world of compact designs with increasing power densities, cold plates are satisfying demanding contact cooling requirements in applications as diverse as high-powered electronics, lasers, power drives, medical equipment, and military and aerospace. For high watt densities, when air-cooled heat sinks are inadequate, liquid-cooled cold plates are the ideal high-performance heat transfer solution.

AMS Technologies’ heat exchanger portfolio includes tubed heat exchangers (copper or stainless steel tubes expanded into copper or aluminum fin for good and cost effective heat removal), oil cooler flat tube heat exchangers (aluminum flat tube fluid channels vacuum brazed with aluminum fin for optimum cooling with poor heat transfer fluids such as oil and EGW) and liquid-to-liquid brazed plate heat exchangers (aluminum brazed construction for efficient maximum heat transfer in a compact and reliable package).

Accurate and fast temperature sensors are essential for precision temperature control. Amongst the different types of temperature sensors, thermistors provide very high sensitivity, small size and appropriate speed. AMS Technologies’ extensive range of NTC thermistor temperature sensor probes with base resistance values from 5 kΩ to 231.5 kΩ include various types from ultraminiature bare bead, epoxy coated and pipe versions to insulated, brass, brass reticulated stainless steel – threaded and unthreaded – to flange mount and plate models. Sizes range from 0.5 mm to 6.5 cm with Teflon coated lead lengths from 5 cm to 45 cm.

We want to accelerate your success, which is why AMS Technologies has invested in two design centers: in Krakow, Poland, and in the United Kingdom. Our goal is to augment your team’s key competencies by providing engineering services that are not core to you or where you may struggle with available resources to finish your projects.

From design services to prototype development to complete turnkey solutions, our collaborative approach has already helped many customer projects to move from concept to production.

- Design, prototyping and “proof of concept”
- Development of turnkey solutions to the customer’s order
- Design-in, systems integration, realization of entire design projects
- Development of customized specification sheets
- Effective project management of any product development
- Interdisciplinary system-level integrated design
- Appropriate subcontractor selection and production support
- Simulations and modeling of system-level designs
- Installation, training and servicing

A haemostasis analyzing instrument performs various tests to measure blood coagulation. In one area of the instrument the blood samples are kept at a constant temperature of +37°C. Right next to the blood samples the reagents need to be conserved at constant +15°C. The cooling of the reagents is done by forced air flow. For a redesign of the cooling system in their STA-R® haemostasis analyzer, French pharmaceutical laboratory STA-GO turned to AMS Technologies. After careful empirical investigation and determination of the cooling capacity, AMS Technologies developed a customized cooling unit with a powerful 24 VDC mini compressor with linear speed control, small evaporator and condenser heat exchangers, fans and other components of a refrigeration cycle and successfully placed all these components inside the given restricted space. During the development the AMS Technologies experts also optimized air flow rate and duct to achieve uniform temperatures across the reagents.

In order to avoid condensation in plastic containers filled with reagents and mounted on a carousel, the customer had asked AMS Technologies to find a solution that would create the same temperature profile of +4°C to +8°C bottom to top in every container’s reagent. With the help of computational fluid dynamic computations, the AMS Technologies experts showed that simply cooling the bottom disc of the carousel would not work, as insufficient thermal contact between plastic containers and cooled surface prevents effective cooling and does not allow to create the desired temperature profile. Instead AMS Technologies developed an air conditioning system based on two peltier cooling units and fans, distributing the air flow evenly to all containers. And designed the thermal insulation such that a perfectly defined temperature profile was achieved.

Associated products

Compressors

Cold Plates

Heat Exchangers

Temperature Sensors

Custom Cooling Unit for Biomedical Reagents

directed air flow for precise temperature profile

From technology components to turnkey solutions

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enabling your ideas.
Optical, Power and Thermal Management Technologies

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