SKADEC
COOLING-HEATING

PRODUCT BROCHURE

Refrigeration
Air conditioning
Water chillers

SKADEC GMBH – YOUR SYSTEM SUPPLIER FOR HIGH-QUALITY, EFFICIANT WATER CHILLERS AND HEAT PUMPS

"There's a way to do it better."

Based on this quote from Thomas A. Edison, the aim of Skadec GmbH is to make good things even better. For this reason, we have been developing and researching innovative refrigerating machines at our headquarters in Hohenlohekreis in southern Germany for five years. A special appeal for us is the use of future-proof, low-GWP refrigerant such as the natural and environmentally friendly refrigerant propane (R290).
Together with our exclusive international mechanical engineering and trade partners, we have been working for years on the development of trend-setting products in the field of refrigeration technology. We are particularly proud of our proprietary controller software.
By using freely programmable controllers, our development team – consisting of technicians, master craftsmen and engineers in the fields of refrigeration, control engineering and software development – was able to develop novel control strategies.
The focus of the design of these algorithms is particularly on the combination of ease of use, maximum availability and system efficiency.
Furthermore, our refrigeration systems are characterised by the high Skadec quality standard, mainly components from well-known German manufacturers. This ensures ready availability of spare parts and that the required quality standards are maintained.

Skadec GmbH is a newly founded independent company of the Kratschmayer Group.

CE Declaration of Conformity and Certification

All appliances offered are supplied with a CE Declaration of Conformity.

Production is certified according to Module A2, B, C2 and D of the Machine Directive 2014/68 EU and to ISO 9001.

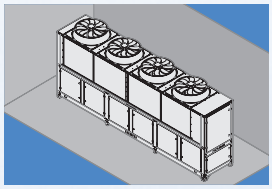
Standards and Guidelines:

- DIN EN 378
- Pressure Equipment Directive
- Low Voltage Directive
- Machine Directive
- Electromagnetic Compatibility

CE

Kratschmayer Group

OVERVIEW



INTELLIGENT MACHINE CONTROL

As control systems we use freely programmable controllers. They are ideally suited for incorporating our many years of experience in refrigeration and air-conditioning technology into our specially developed control algorithms. In the design of our control programs, the main focus of our in-house programming department is on user-friendliness, high availability as well as the efficiency of the systems.

Visualisation – Everything at a glance

The schematic representation of the system shows all the important process data at a glance.

Detailed information about each actuator can be found on its information screen.

Malfunctions or irregularities are highlighted in colour directly on the respective system component and in full text in the alarm list. The intuitive display concept ensures easy user-machine interaction.

Control system

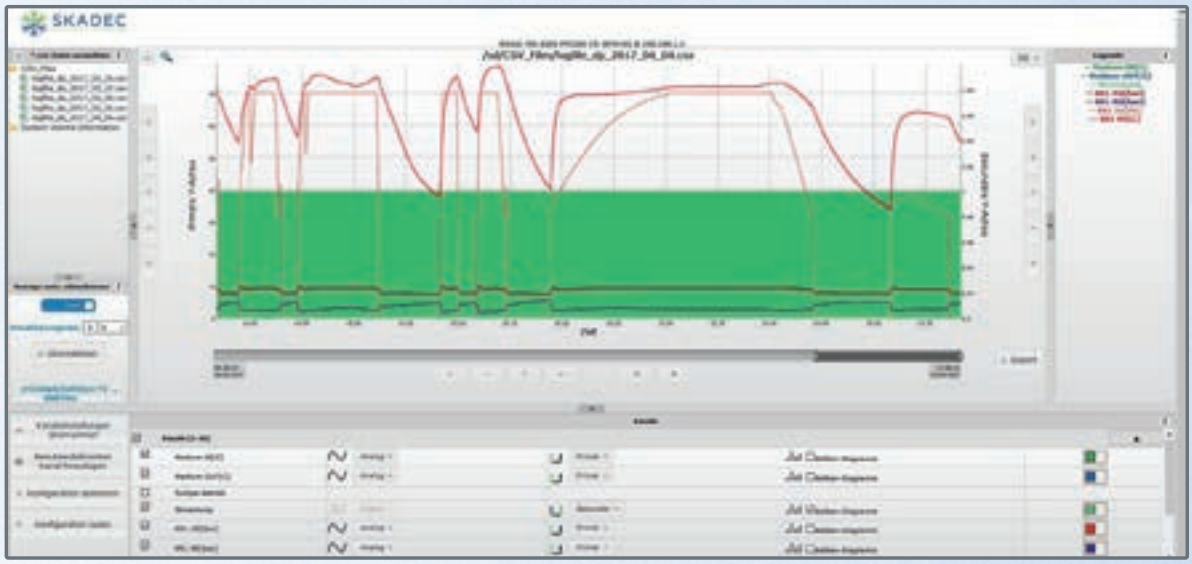
The heart of the machine control system is the control algorithm which ensures efficient and trouble-free operation of the system. Thanks to "condition monitoring", the constant monitoring and analysis of all components and process data, faults are detected as soon as they arise. As a result, for example, maintenance can be planned in advance. However, should there be any irregularities or malfunctions, the machine responds autonomously and provides the maximum possible power during emergency operation, despite any impairment.

Integration and communication

Thanks to the implementation of various bus interfaces, the systems can be easily integrated into existing processes. These interfaces include among others Industrial Ethernet, Profibus-DP, Modbus-RTU, Modbus-TCP/IP and CANopen.

Data logger / Data plotting

Recording and analysis of a wide range of process data is becoming increasingly important. For this purpose, our controller provides the user with a freely configurable data logger. The relevant data can be easily selected via process visualisation. The controller automatically saves the data as a *.csv file on an SD memory card. When required, the data can also be sent to a server. To be able to conveniently analyse the sometimes large amounts of data, the controller additionally includes a data plotter which converts the recorded data into meaningful line graphs. It is also possible to save the graphs as .jpg, .png or .csv files.



SKADEC REMOTE MAINTENANCE

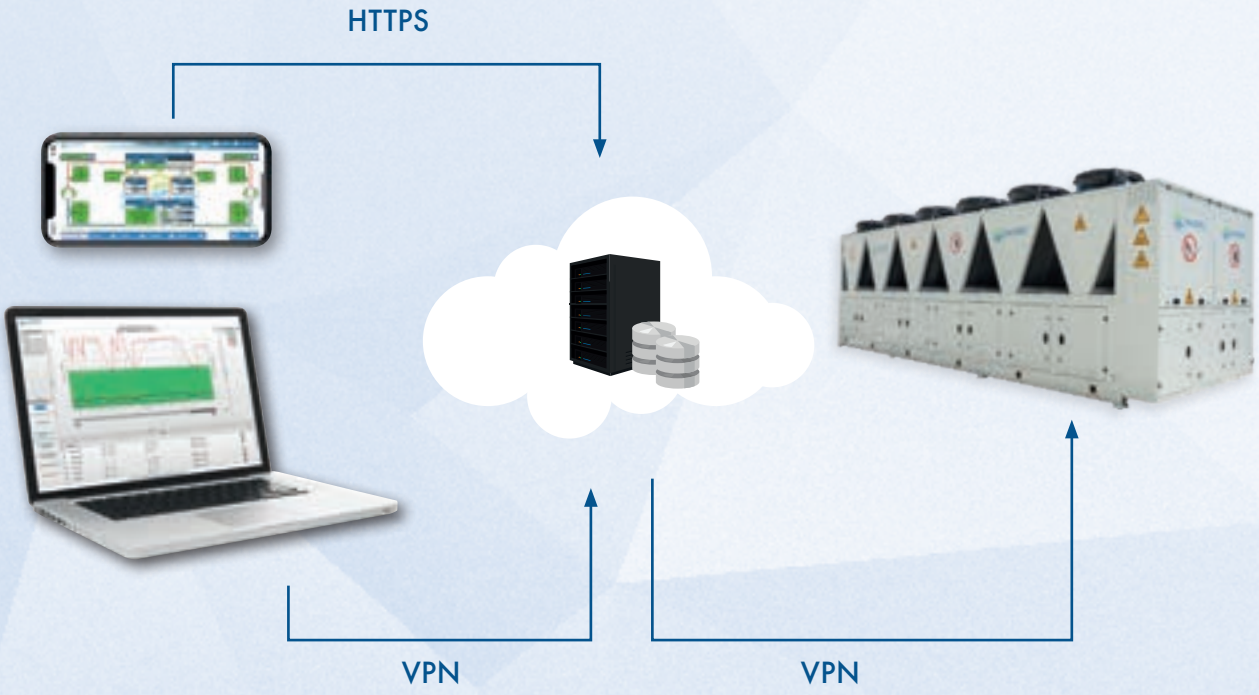
The powerful programmable logic controllers (PLC) of the PFC series with the in-house SKADEC chiller software are IP capable as standard and provided with a web server for process and data visualisation.

Thanks to the use of HTML5, the visualisation can be operated and displayed with all popular end devices such as smartphones, tablets and PCs using HTML5-capable web browsers (Microsoft Edge, Firefox, Apple Safari, etc.).

To access the machine control outside the intranet, a secured connection can be used via a VPN router, permitting remote monitoring, remote maintenance, troubleshooting, alarm reporting as well as long-term process analysis and process optimisation. The router is conform to ISO27002, IEC62443-2-4, NIST Cyber Security Framework 1.0, BSI TR-02102-1 & TR-02102-2 (German Federal Office for Security in Information Technology).

Communication

The VPN router can be connected to the Internet via Ethernet (Standard RJ-45), WLAN or the mobile network.



CUSTOM BUILD CHILLERS AND HEAT PUMPS SPECIAL SOLUTIONS

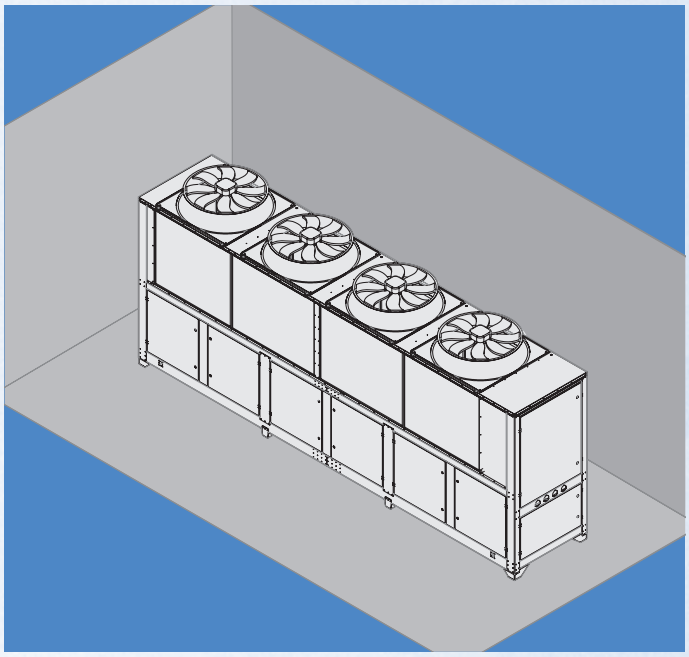
Our flexible organisation enables us to respond individually to custom requirements with special equipment outside the usual catalogue solutions. Machines can be designed to meet high or low ambient temperatures, limited space or strict noise regulations. When it comes to product design, special focus may be placed on system efficiency, redundancy or cost criteria, depending on the requests.

An individual, tailor-made system designed for a specific application guarantees the best possible solution for the customer and also makes undesirable, inefficient compromises unnecessary.

Special systems

- Individual programming
- High demands regarding noise emission
- Limited space
- Highly efficient systems
- Flexible machine configuration
- Container solutions where required
- High/low ambient temperatures

We have already produced a large number of special systems tailored specifically to our customers' requirements. Our customers benefit greatly from the fact that all programs for our machines are developed in-house. All control strategies are designed by our engineers, master craftsmen and technicians. Our claim is nothing less than the optimal performance of the control system.



Practical example of a special solution for limited width.

In-house machine test bench for testing and continuous development of the machines. Newly developed control concepts can be tested comprehensively by us.

WATER CHILLERS

Water chillers for indoor and outdoor installation, with or without free cooling, can be individually adapted to customer requirements and produced in large and small performance categories. Skadec water chillers and heat pumps are characterised by their greater innovation, efficiency and individuality.

Applications for water chillers, optionally with free cooling:
- Air conditioning
- Process cooling
- Food industry

Selection of options available:
- Free cooling
- Heat recovery
- Hydraulic module
- EC fans
- Remote maintenance

Air-cooled water chillers

Air-cooled water chillers are compact machines that can be easily and quickly installed outdoors. Optionally available in a low-noise version, with EC fans, hydraulic module or variable speed compressors and other accessories. Configuration of several refrigeration circuits together results in increased system redundancy.

Air-cooled propane (R290) water chillers

We have developed a particularly sustainable system concept for our customers in cooperation with a partner company. The result of this collaboration is a proprietary range of propane water chillers. The water chillers work very efficiently with the natural refrigerant R290 propane and therefore even today are already on the technical level of tomorrow. Propane water chillers with a GWP of 3 will also be exempt from any stricter refrigerant regulations in the future.

R290
ENVIRONMENTALLY FRIENDLY

Fluid-cooled water chillers

Liquid-cooled water chillers for commercial and industrial applications. Optional soundproof housing available.
Due to better fluid heat transfer compared to the air-cooled type, higher ESEER values can be achieved.

Condenserless water chillers

Cooling solutions in compact design, especially suitable for confined spaces in small machine rooms. The ideal solution for environments where a low noise level has the highest priority. Condenserless water chillers also permit operation in winter without glycol or additional heating. A separate condenser is installed outdoors.

Air-cooled heat pumps

Air-to-water heat pumps are available in various performance classes. Heat pumps are designed according to the requirements of relevant ambient temperatures and the required heating and cooling capacity. Configuration of several refrigeration circuits together results in increased system redundancy. Operation with a natural refrigerant is possible.

Air-cooled propane (R290) heat pumps

Propane (R290) heat pumps are available in a wide performance range from 30 kW to 350 kW. Equipped with a PLC controller, it is operated via a 7" touch screen. The housing is optimised for the specific heating case, thus ensuring that no thawing water freezes on the housing during defrosting.

R290
ENVIRONMENTALLY FRIENDLY

DRY COOLERS

Powerful W- and V-shaped dry coolers for medium to high performance in refrigeration and air conditioning applications. The AC or EC fans used are from a German manufacturer. Dry coolers are available with different noise levels, a choice of control system or control cabinet.

CONDENSING UNITS

Condensing units, mainly for outdoor installation, in different housing designs and a wide range of performance. Individual refrigeration and control engineering configuration of the condensing units is also possible. All the components of the condensing units are from well-known manufacturers.

NK: Normal cooling
TK: Deep cooling

Polar S

Smallest series of condensing units for commercial applications. Polar S condensing units are equipped with scroll or digital scroll compressors and designed for applications in the NK or TK range. Special features include a short delivery times, ease of installation and low noise levels (NK: 3-11 kW, TK: 3-6 kW).

Polar M

Condensing units designed for small and medium-sized commercial refrigeration and air conditioning applications. Polar M condensing units for NK and TK applications can be equipped with reciprocating compressors, variable-speed reciprocating compressors, scroll or digital scroll compressors. Special features include high energy efficiency, low noise levels and easy installation. Optional configuration with EC fans and further options available on request.

Polar Open

Classic condensing units without housing, in a simple and reliable design for small, medium and large commercial and industrial applications. Equipped with reciprocating or scroll compressors. Features include a large performance range and extensive options (NK: 15-75 kW, TK: 4-30 kW).

Polar Gold

Polar Gold condensing units for medium or large commercial and industrial refrigeration and air conditioning applications. The condensing units can be equipped with reciprocating compressors, variable speed reciprocating compressors and scroll or digital scroll compressors. Several compressors can be connected in parallel or several refrigeration circuits can be implemented in one housing.
Special features include design flexibility and a variety of available options such as EC fans, closed compressor housing or heat recovery.

Polar Silber

Polar Silver condensing units for medium commercial and industrial refrigeration applications. The condensing units can be equipped with reciprocating compressors, variable speed reciprocating compressors, scroll or digital scroll compressors. Several compressors can be connected in parallel. The main feature is the lateral air intake and the vertical air outlet, allowing installation close to a building.
The units can be configured optionally with EC fans, heat recovery and other options.

Polar Chrom

Polar Chrome condensing units for small and medium sized commercial and industrial refrigeration applications. The condensing units can be equipped with reciprocating compressors, variable-speed reciprocating compressors, scroll or digital scroll compressors. Several compressors can be connected in parallel. Rear air intake and vertical air outlet allow easy servicing from the front of the unit.

COMPRESSOR RACKS

Extensive range of compressor racks in various designs and a wide performance range, with different frame and housing versions suitable for indoor and outdoor installation. Frames and housings are made of high quality, galvanised steel with powder coating. The reciprocating and screw compressors are made by Bitzer or GEA Bock; the scroll compressors by Copeland Scroll.

Standard Compressor racks

Possible configuration of compressor racks with scroll, digital scroll, reciprocating, variable speed reciprocating and screw compressors. Suitable for commercial or industrial standard cooling, freezing and air conditioning. Specially adapted to the customer's requirements, the compound compressor sets can be installed on a variety of frames and housings.

Types of frame and housing:
AU – welded frame, curved profile. Advantages: compact and lightweight; 2-storey design possible
AB – screwed frame with housing. Advantages: compact and weatherproof housing
AS – welded frame, standard profile. Advantages: solid construction
AR – screwed frame. Advantages: housing can be retrofitted

AU

AB

AS

AR

Satellite arrangement

Arrangement of the compressors usually on two storeys. Up to four different suction pressure levels with a high pressure level. Configuration with scroll or reciprocating compressor.

NATURAL REFRIGERANT

Subcritical CO_2 cascade

The best known and most efficient cascade system in supermarket refrigeration technology for deep and normal refrigeration. Designed for climates with high and medium ambient temperatures. The natural refrigerant R744 is used for deep-freezing and R134a for normal cooling.

Transcritical CO_2

In transcritical CO_2 systems only the natural refrigerant CO_2 with GWP = 1 is used. The technology of transcritical CO_2 systems is fundamentally different from conventional refrigeration systems.
Transcritical CO_2 composite compressor sets with a GWP of 1 will also be exempted from any stricter refrigerant regulations in the future.

PRESSURE VESSELS

Our own expertise, experience and constant cooperation with experts in the industry enable us to meet customers' requirements and expectations within the shortest possible time and with the best possible result. Pressure vessels can be produced on request as a one-off or in mass production. As part of the joint develop-ment process, drawings and data sheets are created according to the specifications and sent to the customer for approval. Then production starts. Each product meets the requirements of the Directive of the European Parliament and the Pressure Equipment Directive 2014/68/EU and is supplied with a Declaration of Conformity.

Specification on request:

Position:	vertical / horizontal
Max. pressure permitted:	up to 45 bar
Temperature range:	–50 to +120 °C
Connections:	on request
PED category:	I-II-III-IV
Suitable for:	Ammonia, CFC-HCFC-HFC and CO_2

BUFFER TANKS AND HEAT RECOVERY SYSTEMS

Systems for energy storage and heat recovery are standard in modern refrigeration, air conditioning, ventilation and heating systems. Buffer tanks and heat recovery systems:

- Increase thermal inertia
- Reduce the number of cycle times, thus extending system life and ensuring reliable operation
- Use the excess heat from refrigeration systems
- Maximise efficiency

Product groups:
- Series CS: Buffer tank for cooling/ventilation systems
- Series HS: Buffer tank for heating systems
- Series HR: Buffer tank for heat recovery
- Series DS: Hot water tank and water heating
- Series CT: Combination tanks for heat storage and exchange, preheating sanitary water

Materials:
- Available in steel or stainless steel design
- Wide range of internal heat exchangers made of carbon steel, stainless steel, copper and/or tinplated copper, suitable for different applications
- Insulation made of 50/100 mm thick soft foam polyurethane or 20/40 mm thick closed-cell elastomer
- Foam insulation as standard with removable PVC coverg

Available sizes:
- Volumes from 100 to 30,000 l








ICE BANKS

Ice banks are the most cost-effective solutions for processes with power peaks. Cold energy can be stored due to the phase transition of water into ice when charging, e.g. at a discounted night tariff or at low ambient temperature. Refrigeration systems can be designed so that only the base load must be covered by normal cooling. Peak loads are covered by discharging the accumulator, thus appropriate the system design results in huge cost savings.

Applications:
- Food production
- Winemaking and breweries
- Milk and dairy products
- Chemical and pharmaceutical industry
- Air conditioning and district cooling

Available sizes:
- Storage capacities of 30 kWh to 2,000 kWh

Available designs:
- Direct expansion evaporator
- Glycol system
- Flooded system for ammonia

Materials used:
- Heat exchanger and container made of stainless steel
- Hard polyurethane foam insulation

Ice storage systems are individually planned and manufactured to customer requirements.

REFERENCES

Cooling capacity from 3 to 260 kW

Conventional refrigerants

223 kW, R410A, heat pump

939 kW, R134a, with dry cooler

250 kW, R410A

410 kW, R410A, heat pump

910 kW, R410A, with dry cooler

200 kW, R410A, with dry cooler

REFERENCES

Cooling capacity from 3 to 260 kW

Natural refrigerants

1070 kW, R290

79 kW, R290, water chiller and 158 kW, R290, heat pump

64 kW, R290

2x103 kW, R290

65 kW, R290

283 kW, R290

407 kW, R290

Skadec GmbH

Hohebuch 13
D-74638 Waldenburg

Tel +49 (0)7942/94 79 570
Fax +49 (0)7942/94 79 572

info@skadec.de
www.skadec.de