Greenhouse Automation.

Small or big solutions –
State-of-the-art and cost-effective.

KRIWAN

Flexibility and Quality.

Superior technology and cost-effectiveness of KRIWAN system solutions will ensure your economic success. With over 20 years of experience and the reputation of being the greenhouse automation specialist, we offer tailored solutions for your individual control requirements – in top-quality and cost-saving design.

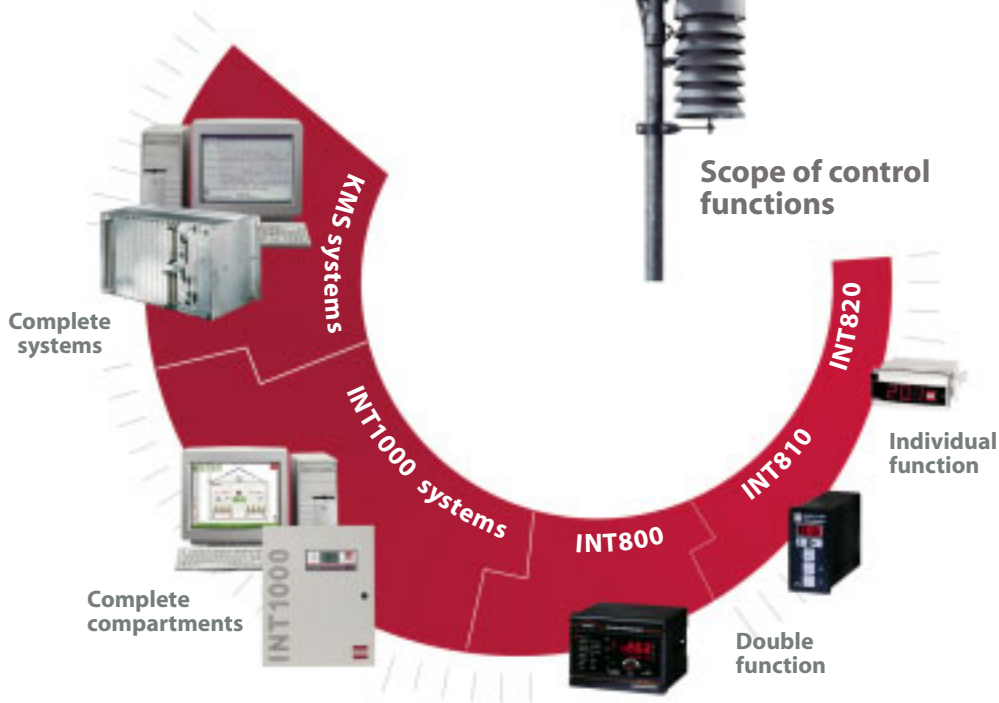
We offer instrumentation and control equipment for individual functions as well as complex control tasks for commercial horticulture, botanical gardens and research institutes on both national and international level.

Due to application-oriented planning, easy installation on site, trouble-free commissioning and maintenance without specialists, we can guarantee investment security for every type of operation and installation.

KRIWAN solutions can process a flexible number of control parameters. They allow for optimized culture keeping, using customized control technology, modern control strategies and protection programs. Increased energy efficiency and a more economic use of chemicals are benefits that contribute to a quicker amortization of the system investments.

Highest manufacturing standards and continuous development efforts safeguard reliability and long-term usability of all of our products. Our KRIWAN test center verifies compliance of all our products with the relevant standards. Prior to delivery, each product is subjected to a test of all individual functions. Products leaving KRIWAN work.

Superior performance features and the proverbial quality of KRIWAN system solutions let you forget about complex technology and allow you to focus on the essentials.



Flexibility
· optimal adaptation
· quick availability

Quality
· routine-tested components
· superior performance features
· robust, long-lasting technology

Efficiency
· quick amortization
· efficient use of energy
· optimum price-value ratio
· improved sales opportunities due to increased quality

INT820 – The digital standalone controller for greenhouses.

The INT820 controller series delivers impressive benefits. Its ease of use makes it ideal even for beginners. The controllers offer simple functions such as ventilation, shading and heating for smaller greenhouses.
Continuous sensor monitoring and emergency programs in case of error (sensor failure) ensure a high degree of reliability!

Each of the standalone controllers in the INT820 series offers specific functions as a simple, tailored system with standalone functionality for original equipment customers. In a modern design, with digital display, three variants are available.

- → INT820 H for heating control
- → INT820 L for ventilation control
- → INT820 S for shading control

Features of all controllers

- → Simple 2-button operation
- → Only one operating set value required
- → Display of set and actual values
- → Additional LED status indicators

Special features of the individual controllers

Heating

- → External input for day/night change-over
- → Emergency mode in event of sensor defect

Ventilation

- → Protective function in response to wind speed and rain
- → Emergency mode in event of sensor defect

Shading

- → Shading and thermal screen mode
- → Thermal screen opend in clocked mode
- → Protective function for indoor temperature

The compact solution INT 800/810.

The INT810 and 800 series controllers feature multiple basic control functions, both as individual and as double function in one housing – perfect for control tasks in small greenhouses.

When controlling only one climate function, the INT810 controller offers a low-cost solution, trouble-free installation and ease of operation with only three buttons.

The INT800 series is the adequate choice for economic and safe operation of two control loops. The INT800 compact controller allows convenient operation with two buttons and one turning knob.

Both series control accurately and do not require any repeaters. They monitor the sensors for interruptions and short circuits and perform self-tests. Modular expansion is possible, if more control functions are required. Simply connect more controller to your weather station.

INT810 HR
Heating controller for one heating section

INT810 LR
Ventilation controller for one ventilation section incl. storm and rain protection

INT810 SR
Shading controller for one shading section and/or energy screen

INT800 HD
Heating controller for two heating sections, cascade control

INT800 HL
Combined controller for a heating and a ventilation circuit incl. dehumidification function

INT800 LD
Ventilation controller for two separate ventilation sections incl. storm and rain protection and energy-saving function

INT800 SD
Shading controller for 2 separate shading sections (inside), energy screen, outside shading and exposure circuits

INT 1000 – Benefits without restrictions.

For maximum cost-effectiveness for your greenhouse, KRIWAN offers a high-performance system with proven sensors and a networked visualization based on the new decentralized controller generation – the INT1000 system.

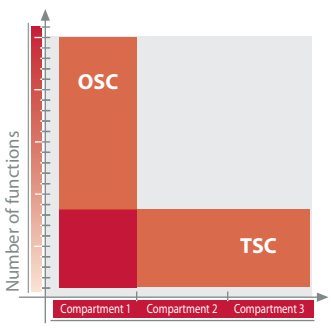
The INT1000 system naturally offers superior performance features combined with highest manufacturing quality. Designed maintenance-free and for long-term use, decentralized controllers for boiler and individual compartments ensure maximum flexibility when designing, expanding and converting greenhouses. Previous investments can be utilized and are thus not wasted.

Optimized use of energy through automation, shortest cable routes and optimized dialog functions between sensor and controller increase the cost-effectiveness over the entire life cycle. Display and operation is possible at every node of the system. At each controller, all networked INT1000 controllers of the greenhouse can be displayed and operated. Alarm messages are represented on all displays and can be acknowledged from each controller. The use of internet technology for the visualization of the system ensures optimum use of all communication media – at your office, at home or mobile.

The INT1000 system is delivered wired and equipped with all the software necessary. Individual functionalities can be activated during commissioning and any time later. Tedious parameterization is no longer required and saves both on risk and costs.

OSC/TSC

(One-section/three-section controllers)



→ The system is expandable

The system is suitable for small and large configurations (1-127 compartments and 1-5 boilers). The INT1000 system can be expanded compartment by compartment and enables the gardener to start with a low-cost version.

→ Optimization of common applications

OSC controllers feature all functions required for the production before their delivery. TSC controllers are particularly designed for commercial gardening and building centers but are also suited for controlling additional rooms, interconnecting buildings, break rooms and foil greenhouses with reduced control requirements. The functions can be activated on site according to the requirements without additional charges.

→ Energy efficiency

OSC and TSC controllers provide all the important control strategies (cool morning, DIFF, total temperature and air humidity control) in order to produce high-quality plants and reduce the energy expenditure. Due to the communication between com-partment and boiler control, the central heating system can accurately be controlled as needed.

→ Time control

Stores need different temperatures depending on the time of day. TSC controllers offer an accurately adapted control concept, that controls the room temperature according to the weekday. Furthermore, the flow temperature of the heating circuits can be controlled depending on the weather conditions, e.g. for the temperature control in break rooms.

Functional overview

OSC (One section):		**TSC (Three sections):**
Heating	Ventilator	Heating
Ventilation	Irrigation	Ventilation
Shading	Pest control	Shading
Lighting	CO_2-content	Lighting
Humidity		(Humidity)

GMS/CHC

(Visualization/ boiler control)

GMS

➔ Flexible access

The user has the choice: operation directly via the controller or centrally via PC visualization. Internet technologies are integrated and open up new opportunities.

➔ Data logging and evaluations

Database with automatic archiving, various evaluation ranges, convenient zooming options, signals to be displayed can be selected, various storage and loading functions.

➔ Representation of the selected time window

Various values, from one day to one year, can be individually compiled.

➔ Culture-relevant data

Saving and loading culture-relevant parameters can be done online - reloaded parameters will immediately activated.

CHC

➔ Individual boiler control

Each individual boiler temperature is controlled depending on its permissible limits. Individual boilers can thus be run within its optimum operating range.

➔ Two-fuel burner

Switch-over two-fuel burner, depending on the power-supply company.

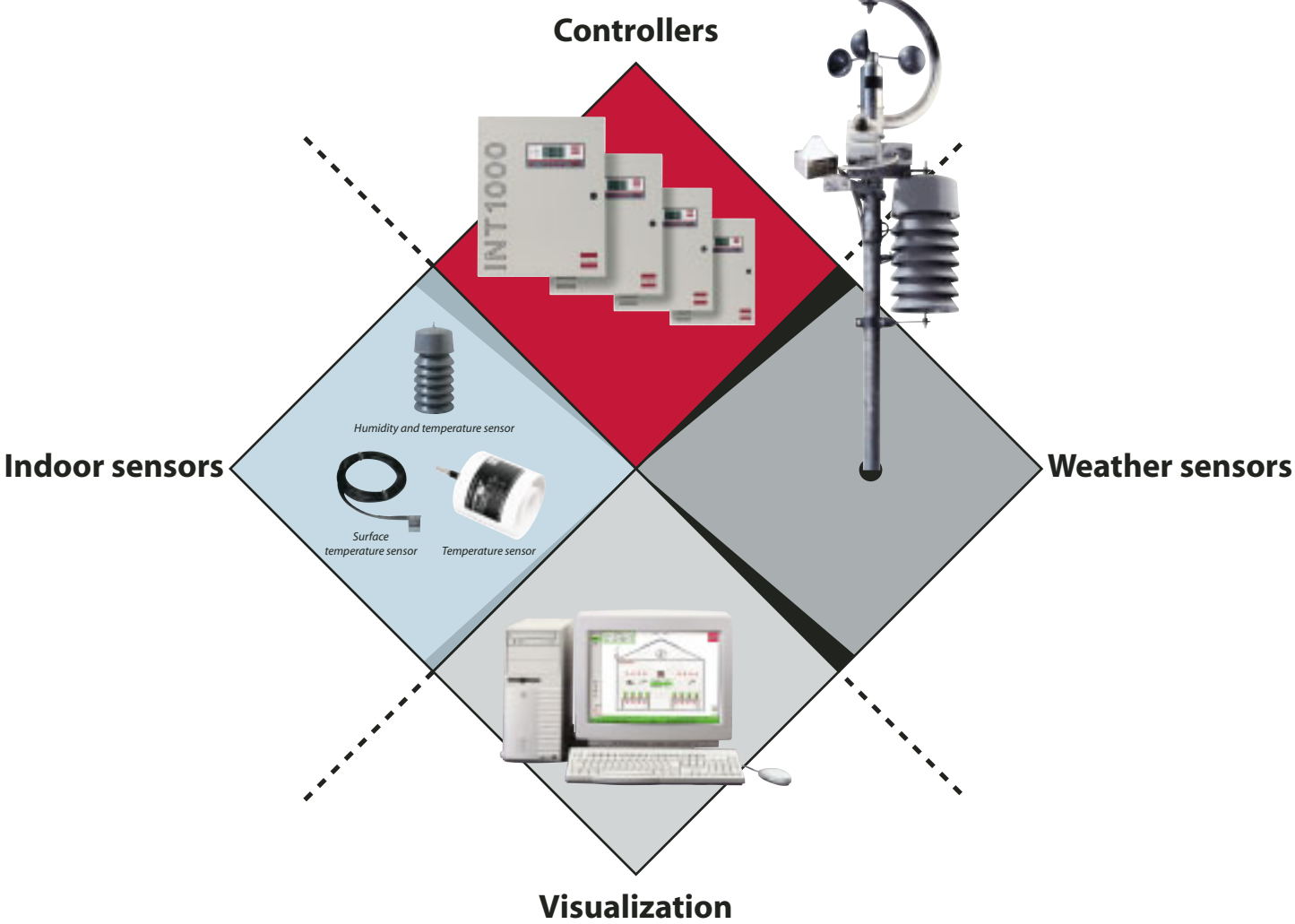
➔ Demand-dependent boiler selection

Heat-demand dependent switch-in of individual boilers or boiler stages. The sequence can be freely selected (digital switch-in principle); weather and sun intensity controlled temperature control.

➔ Prioritization

In case of overload, low priority compartments reduce their heating energy demand. Cultures are thus protected from temperatures that are too low. Prioritization can be extended to include ring pipelines.


FLEXIBILITY
EFFICIENCY
QUALITY


Controllers
INT1000
Indoor sensors
Humidity and temperature sensor
Surface temperature sensor
Temperature sensor
Weather sensors
Visualization

INT800 KMS
The climate management system.

Control functions:

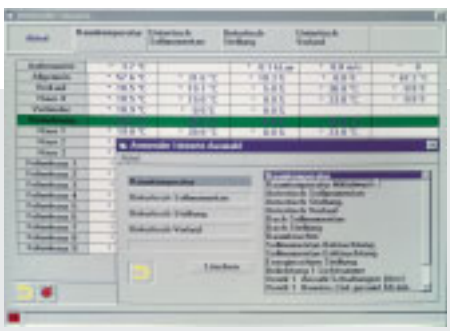
- Heating
- Ventilation
- Shading
- Exposure
- Ventilation
- CO_2
- Cooling
- Irrigation
- Fertilization
- Boiler control
- Circular irrigation layout
- Full climate control

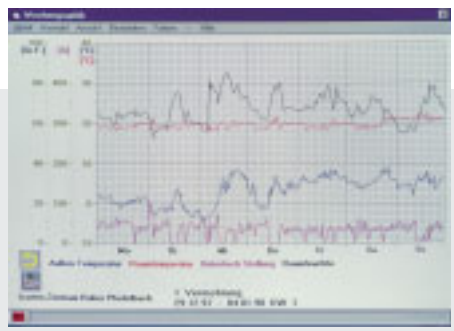
INT800 KMS – The modular climate management system to control climate, irrigation and fertilization in greenhouses. INT800 KMS is used in commercial horticulture, botanical gardens and research centers.

The climate management and greenhouse automation system consists of 64 controllers with 15 slots each for relay boards as well as analog and digital input and output boards for heating, ventilation, shading, illumination, CO_2, cooling and irrigation functions, fertilization, boiler control, ring pipelines and full climate control.

The system controllers are connected via a modern network (LON bus) and can be operated by either connecting a monitor and keyboard locally or via the KMS supervisory console centrally.

Due to the modular design, the system can be adapted to individual control functions, no matter if its new or a modularly expanded system. The investment costs are thus determined by the actual scope of control functions.





Sensors – for indoor and outdoor use.

KRIWAN sensors are developed and manufactured for optimum applicability. Proven components and materials, as well as tests in tough environments safeguard reliable use and long service life even under the most adverse conditions.

Perfected features, such as the light-triggered reset delay prevent damage on the ventilation flaps during unsettled weather conditions. Ventilation for humidity and temperature sensors prevents deviating air humidity and thus incorrect measurements.

Fiber-optics for the weather station ensure that lightning-induced overvoltages are not transferred to the downstream unit.

Solutions from the comprehensive KRIWAN product program cover the entire range of weather station, interfaces and all relevant indoor sensors.

Vane anemometer

Light sensor

Surface temperature sensor

Temperature sensor

Humidity and temperature sensor

Yesterday, Today and Tomorrow.

With over 150 employees, KRIWAN in Forchtenberg near Heilbronn is a well-known player on the greenhouse automation market.

Since 1974 we successfully tailor sophisticated greenhouse automation to our customer's requirements.

The list of KRIWAN reference customers ranges from Europe to the U.S.A. all the way to China and documents many years of mutually successful partnerships.

In close collaboration with our customers, we implement solutions that suit not only today's but also tomorrow's needs. Research and development with renowned institutes combined with a highly qualified staff is KRIWAN's recipe for success.

KRIWAN Test Center

The KRIWAN Test Center offers services in the fields of electromagnetic compatibility and environmental simulation as well as consulting and support for product development projects. The KRIWAN Test Center is specialized in analyzing and finding the reasons for malfunction under real environmental conditions.

1968 Foundation of the company

1974 Analogue controller for greenhouse technology

1981 Microprocessor-controlled greenhouse controller

1984 Modular greenhouse control

1986 Multifunction controllers for greenhouses

1987 Compact individual controller for greenhouses

1990 Combined controller for heating/ventilation and Tensio sensor

1991 Weather station with serial interface

1992 Modular INT800 KMS with supervisory console

1993 Expansion of KMS functions – irrigation/fertilizing

1994 Boiler control analogue controller

1996 Wind-speed sensor with standardized signal

1997 Founding of the KRIWAN Testzentrum GmbH & Co. KG
Integrating KMS/LON in the scope of functions

1998 KMS/control of fertilizer mixer

1999 KMS/boiler control automatic oil/coal boiler

2000 Start KRIWAN France
KMS/boiler control of several boilers

2001 Founding of KRIWAN Industrie-Elektronik Austria GmbH

2002 Wind-direction sensor with standardized signal

2003 Greenhouse automation system INT1000

2004 INT1000 TSC
Climate computer for three sections

2005 INT820
Digital standalone controller for heating, ventilation or shading

2006 INT1000 OSC with CO_2
Climate computer for one section

TI 600.00002.2

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