



# Systematic multiloop control

Flexible & modular: the KS vario multiloop controller system



# Modular, intelligent, open

The modular KS vario multiloop controller system has been developed specifically for temperature treatment processes, whereby the basic version consists of a controller module and a field bus coupler. These two components already provide a fully operational control unit with 4, 6 or 8 loops. Simply by adding the required number of individual I/O modules, the system is expandable up to 30 control loops with minimum extra cost. Hereby, no more I/O modules are required than those needed for the actual number of inputs & outputs. Moreover, the KS vario can also be expanded with standard I/Os, which are then made available to the superordinate system (PLC/SCADA).

The individual modules of a KS vario system are simply plugged together without the need for tools – all interconnections are made automatically, and power is supplied via the bus coupler. The field bus coupler with integral power supply represents the heart of the system, and links the multiloop controller to all established field bus systems. Apart from ProfiNet and innovative Ethernet topologies, the coupler also supports classical field buses such as Profibus-DP, CANopen, DeviceNet, and Modbus.

## Application areas

- Extruder automation
- Hot runners
- Mold heating
- Textile machines
- Packaging machines
- Semiconductor production
- Furnaces
- Driers
- Climatic chambers
- Heat treatment
- Burner & boiler control
- Medical technology
- Sterilizers



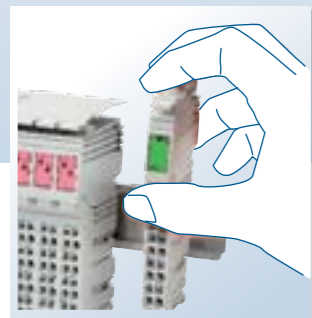
# KS vario: The system components

COUPLERS	INPUT MODULES	OUTPUT MODULES	I/O MODULES
 <p><b>KS VARIO BK PN</b>                      • ProfiNet bus coupler                      • 2nd Ethernet port                      • ProfiNet real-time</p>	 <p><b>VARIO DI 16/24</b>                      • Digital input module                      • 16 inputs: 24 VDC</p>	 <p><b>VARIO DO 16/24</b>                      • Digital output module                      • 16 outputs: 24 VDC, 500 mA</p>	 <p><b>VARIO RTD 6 - DO 6</b>                      • Combined I/O module                      • 6 inputs for resistive sensors                      • 6 outputs: 24 VDC, 70 mA                      • 1 heating current input</p>
 <p><b>KS VARIO BK IP</b>                      • Ethernet IP bus coupler                      • 10/100 Base T                      • IP protocol/Rockwell</p>	 <p><b>VARIO DI 8/24</b>                      • Digital input module                      • 8 inputs: 24 VDC</p>	 <p><b>VARIO DO 8/24</b>                      • Digital output module                      • 8 outputs: 24 VDC, 500 mA</p>	 <p><b>VARIO UTH 8 - DO 8</b>                      • Combined I/O module                      • 8 inputs for thermocouples                      • 8 outputs: 24 VDC, 70 mA                      • 1 heating current input</p>
 <p><b>KS VARIO BK ETH</b>                      • Ethernet TCP/IP bus coupler                      • 10/100 Base T                      • Modbus TCP, DDI, Boot P</p>	 <p><b>VARIO DI 4/24</b>                      • Digital input module                      • 4 inputs: 24 VDC</p>	 <p><b>VARIO DO 4/24</b>                      • Digital output module                      • 4 outputs: 24 VDC, 500 mA</p>	 <p><b>VARIO UTH 4 - DO 8</b>                      • Combined I/O module                      • 4 inputs for thermocouples                      • 8 outputs: 24 VDC, 70 mA                      • 1 heating current input</p>
 <p><b>KS VARIO BK DP/V1</b>                      • Profibus DP/V1bus coupler                      • Up to 12 Mbits/s                      • DP/V1 Class 1 and 2</p>	 <p><b>VARIO DI 2/24</b>                      • Digital input module                      • 2 inputs: 24 VDC</p>	 <p><b>VARIO DO 2/24</b>                      • Digital output module                      • 2 outputs: 24 VDC, 500 mA</p>	
 <p><b>KS VARIO BK CAN</b>                      • CANopen bus coupler                      • Up to 1 Mbit/s                      • Up to 32 PDOs</p>	 <p><b>VARIO AI 8/SF</b>                      • Analog input module                      • 8 input, 0...20 mA, 4...20 mA, ±20 mA, 4...40 mA, ±40 mA, 0...5 V, ±5 V, 0...10 V, ±10 V, 0...25 V, ±25 V, 0...50 V</p>	 <p><b>VARIO DO 4/230</b>                      • Relay output module                      • 4 Changeover contacts, gold-plated                      • 5...253 VAC, 3 A</p>	<p><b>GENERAL-PURPOSE MODULES</b></p>  <p><b>VARIO RM BK</b>                      • Coupler module for remote I/Os                      • For all I/O modules</p>
 <p><b>KS VARIO BK DN</b>                      • DeviceNet bus coupler                      • Up to 500 kbits/s                      • Polling, change of state</p>	 <p><b>VARIO AI 2/SF</b>                      • Analog input module                      • 2 input, 0...20 mA, 4...20 mA, ±20 mA, 0...10 V, ±10 V</p>	 <p><b>VARIO DO 1/230</b>                      • Relay output module                      • 1 Changeover contact, gold-plated                      • 5...253 VAC, 3 A</p>	 <p><b>VARIO RM TX</b>                      • Branch module for remote bus                      • Max. bus length: 400 m</p>
 <p><b>KS VARIO BK MOD</b>                      • Modbus bus coupler                      • Modbus RTU</p>	 <p><b>VARIO RTD 2</b>                      • Analog input module                      • 2 inputs for resistive sensors                      • Pt 100/Pt 1000</p>	 <p><b>VARIO AO 2/U/BP</b>                      • Analog output module                      • 2 outputs: 0...10 V, ±10 V</p>	 <p><b>VARIO CO 2/U</b>                      • Supply module for sensors                      • 2 outputs: 10 V constant                      • 2 x 40 mA (or 1 x 80 mA)</p>
	 <p><b>VARIO UTH 2</b>                      • Analog input module                      • 2 inputs for thermocouples</p>	 <p><b>VARIO AO 1/SF</b>                      • Analog output module                      • 1 output: 0...20 mA, 4...20 mA, 0...10 V</p>	 <p><b>VARIO PWR IN/24</b>                      • Power supply module                      • Segmentation</p>

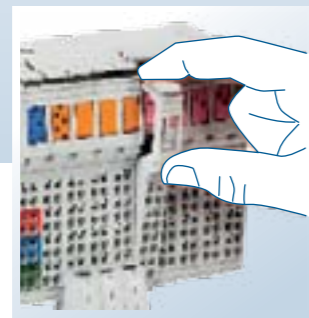


Status LEDs

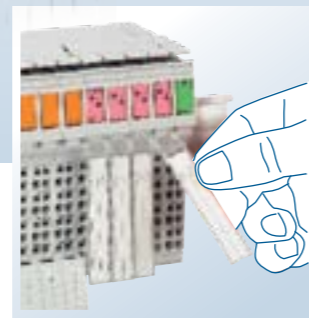
Bus couplers link the multi-loop controller to established field bus systems



Additional I/O modules are simply clipped into the system



Plug-in connections for fast module replacement



Signal ID marking and individual inscriptions



Galvanic isolation

## Performance features in detail

### Comprehensive communication options

Bus couplers connect the I/O systems to all established field bus systems: ProfiNet, Ethernet IP, Ethernet TCP/IP, Profibus, CANopen, DeviceNet, Modbus.

### Demand-oriented expansion

Simply by plugging additional I/O modules into the system, a finely graduated expansion up to 30 control loops is possible.

### Automatic inter-connections

The necessary modules of a KS vario system are simply plugged together without the need for tools. All peripheral and data signals, as well as the supply voltages are connected automatically. The external 24 VDC system supply must only be connected to the bus coupler at one point.

### Fast module replacement

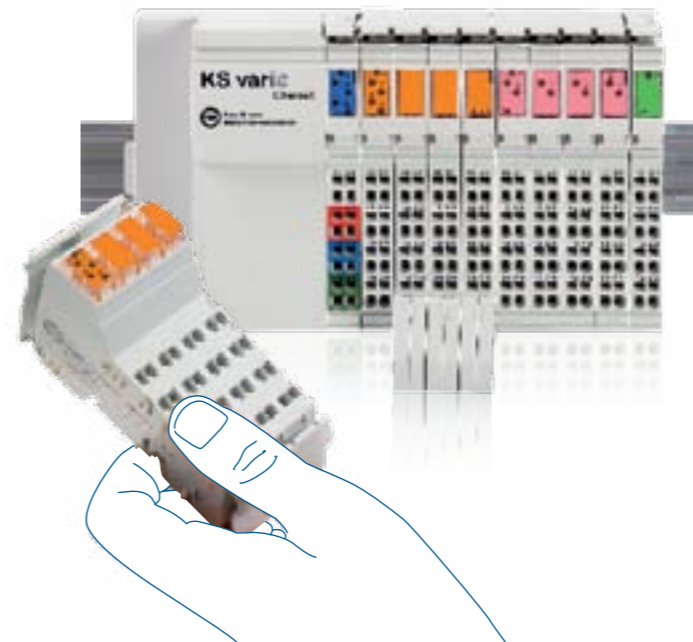
Thanks to the plug-in spring clamp connectors for the I/O wiring, quick and simple module replacement is ensured.

### Galvanic isolation

Each segment is energized by means of special isolated power supply terminals, which automatically isolates them from the adjacent segments.

### Clear identification

KS vario modules can be fitted with ‚Zack‘ numbering markers to identify every terminal. It is also possible to label each channel in plain text.



## The system at a glance

### Control functions

All conventional control modes including master/slave and valve motor control are selectable per channel. Two self-tuning options are available for determining the best control parameters: during start-up or at setpoint. Individual sampling rates starting at 100 ms are adjustable for each channel.

### Controller modules

- 4, 6 or 8 analog inputs
- Thermocouples or resistive sensors
- Up to 8 outputs, 24 VDC, 70 mA
- Integrated heating current monitor
- Expandable up to 30 control zones

### Additional functions

Several special functions such as controlled start-up for plastics processing machines are standard features of the basic version. Comprehensive heating current monitoring functions with correction for mains voltage variations (per phase), and the direct connection of strain gauge pressure sensors are just two of many other features.

### BlueControl® Engineering Tool

BlueControl® is a powerful engineering tool for controller and system configuration. It combines clear operating functions with visualization and monitoring. Moreover, the tool provides a simulation of the entire control loop with selectable process responses.

WEST Control Solutions your global partner for temperature and process control



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