WEST Control Solutions

Complete control

PMA: The full spectrum of automatic control technology

WEST Control Solutions – Consolidated expertise

PMA: More than 80 years of process control engineering experience

Four internationally successful companies – PMA, WEST, CAL and Partlow – have combined their expertise under the "WEST Control Solutions" banner. As a premium brand, PMA Prozeß- und Maschinen- Automation GmbH represents more than 80 years of instrumentation and process control engineering experience. The core competence of the company is industrial process control engineering.

As a competent partner, WEST Control Solutions offers individual hardware and software solutions which are perfectly matched to each process and application area – from simple and powerful to flexible and multi-functional configurations. The offering also includes customer-specific controller solutions along with engineering support for special processes or the complete automation of plants and machinery.

Modern software tools and a full range of controllers designed for an extremely wide variety of tasks set new standards in application flexibility and guarantee an optimum price/performance ratio. This product strategy makes WEST Control Solutions one of the market leaders for digital temperature controllers.

Flexibility – Our strength, your benefit

Whether they are used to position the slot dies of flat film extruders or to monitor the quality of drying processes in a clean-room production facility: the range of tasks performed by control systems is as broad as the range of applications in which they are used. In order to provide a solution for every situation, WEST Control Solutions continuously adapts the formats and functions of its controllers to meet new requirements. The innovation leader's product portfolio extends from classic devices for control panel installation to controller models for DIN rail mounting.

What makes the products and services of WEST Control Solutions so valuable for customers all over the world is the company's complete solutions approach to problems and its skilful application of the technology to meet the specific needs. Integrated functions save money here. This makes it possible to quickly create ratio controllers, outside temperature-controlled boiler control systems or oxygen-optimised burner control systems, for example. Additional function keys and digital inputs and outputs permit logic operations without the need to use and program a PLC (e.g. the launch of start-up, stand-by or short-term warm-up operations, temperature/time curve settings with multiple segments, etc). The integrated monitoring functions for actual values (sensor fault, tolerance bands) and manipulated variables (heating current and servo valves, DAC function) reduce installation costs. Using interconnected control loops such as automatic multi-variable, cascade and limiter control systems, even complex processes can enjoy optimum control with reliable control response to all disturbance variables. And in order to facilitate work with all formats, WEST Control Solutions offers standardised software solutions. The engineering tools enhance efficiency during configuration and parameterisation.

Specifications

Cost objectives

Product life cycle management

On-time delivery

Your requirements are our benchmark

Save your resources and take advantage of our development expertise: We define not only your specifications and priorities in advance, but also your cost objectives. Moreover, we provide complete product life cycle management.

And you can rely on our on-time delivery: even with large volumes and tight schedules, we guarantee short turnaround times – and that keeps costs down.

Consolidated diversity

BluePort® and BlueControl® open up new controller perspectives

Interface and software tool make universal controllers into versatile specialists
The distinguishing feature of the BluePort® controller family from PMA is the interface connection on the front for direct access to a PC or a laptop. The BlueControl® software tool makes it possible to completely configure these universal controllers. In this way, the universal device becomes an application-specific specialist. BluePort® controllers are available in all standard housing formats.

Set controller parameters in a matter of seconds
The BluePort® interface on the front of the device and BlueControl® software can be used to carry out the desired operations quickly and easily. The PC software has been designed to facilitate the configuration, parameterisation and operation (commissioning) of the controllers. In so doing, all settings are archived and, if necessary, printed out.

Certain versions also include a powerful data acquisition module with trend graphics. In the simulation mode, the practical suitability of the selected function can even be tested in advance on the PC and commissioning can be monitored with a trend curve display.

BluePort® controllers at a glance


KS 40-1


KS 50-1


KS 90-1 KS 92-1


TB 40-1


DIGITAL 280-1

Controllers
KS 40-1: The KS 40-1 compact controller is suitable for all thermal control operations which are handled by switching controllers – 2-point, 3-point or 3-point stepping characteristics. Three relay outputs are available for this purpose and the analog universal output makes the device into a continuous controller.

KS 50-1: Designed for use in plastics processing machinery, the KS-50-1 can be adapted to every task: from high-speed hot runners to slow mould temperature control with special functions. Extra inputs and outputs make it possible to start special functions, for example, or to monitor temperature profiles without additional PLCs. Moreover, the Modbus interface can be used to quickly integrate the KS-50-1 controller family into networks.

KS 90-1 / KS 92-1
The industrial and process controllers of the KS 9x-1 family take over automatic control functions in all industrial sectors, precisely and economically. They offer the choice of simple ON/OFF control, PID control or stepping motor control. A second analog input can be used to measure heating current or to connect lambda sensors directly to the device. The optional third input serves as a universal input to perform a wide range of additional functions, such as temperature-dependent setpoint correction, derivative-action control, etc. In the program controller variant (KS 9x-1 programmer), both controllers offer extensive programmer functions.

Temperature limiter
TB 40-1 : The TB 40-1 temperature limiter has been type tested to DIN standards, can be used for heating and refrigeration processes, and is suitable for all thermocouple types and resistance-type sensors.

Indicator
DIGITAL 280-1: The convenient DIGITAL 280-1 universal indicator with its exceptionally large display rounds out the BluePort® controller portfolio.

All down the line

rail line modular DIN rail mounting system

rail line provides a comprehensive product range for decentralised automation. The KS 45 universal controller, the Uniflex CI 45 and SG 45 transmitters, the TB 45 temperature limiter combine with the RL field bus couplers for Profibus, CAN, Modbus TCP, Modbus RTU and Ethernet IP, the wireless module and the RL 400 I/O module to form a flexible system with distributed intelligence. Separate compact modules, plug-in screw terminals or spring-clamp connectors, space-saving rail mounted installation and universal system components save time and money during engineering development and in operation. The integrated BluePort® front interface and the BlueControl® software tool can be used to implement tailor-made solutions. The desired functions are easily selected, compiled and reproducibly archived by means of a PC.

Benefits
- Range of intelligent devices for decentralized automation
- Cost-saving ‚top hat' rail mounting technology
- Compact design
- Comprehensive stand-alone functionality
- Field bus coupler for Profibus, CAN, Modbus TCP, Modbus RTU, and Ethernet IP

The rail line system at a glance


RL 400 I/O-system KS 45 TB 45 UNIFLEX CI 45

Communication
Field bus coupler: Simple field bus integration of universal transmitters, universal controllers, temperature limiters and standard I/Os

Radio module: Central coupling module for wireless data transmission

I/O module
RL 400 I/O system: Digital and analog inputs and outputs
- Pt 100 in 2 or 4-wire connection
- Thermocouples
- mA/V
- Relay
- Potential-free digital inputs
- NPN/PNP inputs

Controller
KS 45: Flexible universal controller with integral self-tuning

Temperature limiter
TB 45: Reliable temperature limiter, monitor and limit signaller

Transmitters
UNIFLEX CI 45: Programmable universal transmitter with display

UNIFLEX SG 45: Special-purpose transmitter for strain gauge input (e.g. load cells and melt pressure sensors)

The controllers at a glance

Model	DIGITAL 280-1	KS 40-1 KS 41-1 KS 42-1	KS 40-1 burner	KS 50-1 KS 50-1 TCont	TB 40-1	KS 45	TB 45	KS 90-1 KS 90-1 prog.	KS 92-1 KS 92-1 prog.	KS 94	KS 98-1	KS 800	KS 816	KS vario modulares Regelsystem	KS 108
Description	Digital indicator	Industrial controller	Burner controller	Industrial cont-roller/Tempera-ture controller for tempering units and hot runners	Temperature limiter/monitor	Industrial controller	Temperature limiter/monitor	Industrial and pro-cess controller/ Program controller	Industrial and pro-cess controller/ Program controller	Industrial and pro-cess controller	Multi-function unit	Multi-tempera-ture controller	Multi-transmitter Multi-tempera-ture controller	Modular control system	Compact automation unit
Dimensions (mm) (WxHxD)	96 x 48 x 118	48 x 96 x 118 96 x 48 x 118 96 x 96 x 118	48 x 96 x 118	48 x 96 x 118	48 x 96 x 118	22,5 x 99 x 118	22,5 x 99 x 118	48 x 96 x 118	96 x 96 x 118	96 x 96 x 160	96 x 96 x 160	1024 x 170 x 85	1024 x 170 x 85	139 x 120 x 71 (Regler und Bus-koppler)	194 x 172 x 50
Connectors	Screw terminals	Pins or screw terminals	Pins or screw terminals	Pins or screw terminals	Pins or screw terminals	Screw terminals or spring-loaded terminals	Screw terminals or spring-loaded terminals	Pins or screw terminals	Pins or screw terminals	Pins or screw terminals	Screw terminals	Plug-in terminal blocks	Plug-in terminal blocks	Plug-in spring-clamp connectors	Plug-in screw terminals or spring-loaded terminals
Number of control loops/ process inputs	1/1	1/2	1/2	1/3	–/1	1/2	–/2	1/3	1/3	1/3 ... 5	3 ... 26/3 ... 85	8/9	16	4...30/4...34	> 20
Scan time of the universal input	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	100 ms	200 ms	200 ms	625 ms	1 sec	≥ 100 ms	> 20 ms
Customer-specific linearisation	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	Engineering Tool BlueControl®	Engineering Tool BlueControl®	–	–	–	Modular I/O system RL400
Transmitter power supply	●	●	●	●	–	●	●	●	●	●	●	–	–	–	Modular I/O system RL400
Extra input for heating current monitoring	–	● or ●	–	● or ●	–	● or ● 2nd universal input	–	–	–	–	–	●	–	up to 4 summing current inputs	Modular I/O system vario IO
Extra input for external setpoint	–		● also for Pt 100/Poti		–		–	●	●	●	●	–	–	–	Modular I/O system RL400
Ratio input/ Three-component input	– / –	– / –	– / –	– / –	– / –	– / –	– / –	● / –	● / –	● / ●	● / ● Mathematical functions	–	–	–	● Function library
Potentiometer input position feedback	–	–	–	–	–	–	–	●	●	●	●	●	–	●	●
Measured value output	Universal output	Universal output	–	Universal output	–	Universal output	Universal output	Universal output	Universal output	●	●	20 mA outputs	–	max. 60 Universal outputs	Modular I/O systems RL400, vario IO
Control outputs	Relay, logic, continuous	Relay, logic, continuous	Relay	Relay, logic, conti-nuous, optocoupler	–	Relay, logic, conti-nuous, optocoupler	2	Relay, logic, conti-nuous, optocoupler	Relay, logic, conti-nuous, optocoupler	Relay, logic, continuous	Relay, logic, continuous	Logic, continuous	–	max. 60 Relay, logic, continuous	Modular I/O systems RL400, vario IO
Stepping motor controller	–	●	●	●	–	●	–	●	●	●	●	●	●	●	●
Manual-Automatic key/ Function key	– / –	● / –	● / ●	● / ●	Alarm/Reset	Function/ Function	Alarm reset	● / ●	● / ●	● / –	configurable	Via digital inputs	–	Via digital inputs	●
Alarm outputs/ Alarm functions	max. 3, Memory	max. 3, Memory	max. 3, Memory	max. 3, Memory	Temperature limiter	max. 3, Memory	Temperature limiter, 2 pre-alarms	max. 4	max. 4	max. 4	2 ... 362/ configurable	3	–	max. 60, Memory	Modular I/O systems RL400, vario IO
Number of programmer segments	–	4	4	10	–	4	–	Ramp 16 x 16	Ramp 16 x 16	3 x 16	> 1000	2 per zone	2 per zone	2 per zone	> 5000
Number of control inputs	max. 3	max. 3	2	max. 3	1	1	1	max. 3	max. 3	max. 12	2 ... 362	max. 4	–	max. 320 digital inputs	Modular I/O systems RL400, vario IO
Front interface/ Engineering tool	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	BlueControl®	ET 94	ET 98plus BlueControl®	BlueControl®	BlueControl®	RS232 port for BlueControl®	USB / –

● as standard

All in one

For tailor-made solutions: KS 98-1

With its compact design and freely configurable functionality, KS 98-1 makes it possible to create flexible solutions for complex process control tasks. And its high-resolution LCD display (160 x 80 pixels) sets new standards. Individual plain text lines can be displayed with the current function states. Choose to visualise setpoint and actual values or manipulated variables either in bar graphs or trend curves.

An extensive function library is available to support the engineering of individual solutions, from analog signal conditioning to digital signal operations and cascade control systems to complex meshed control loops. The KS 98-1 is equipped with a large number of analog and digital inputs and outputs as standard. This multi-function controller is also able to handle additional tasks with any trouble, such as direct connection of lambda sensors or field bus connection.

Convenient engineering tools with simulation, integrated self-optimisation and PID optimisation processes make the KS 98-1 particularly user-friendly. The connection to commonly used field buses such as Profibus DP makes it possible to implement concepts which are logically and physically distributed but have on-site operation and indication.

A new form of automation

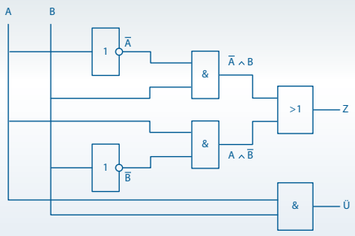
KS 108: Engineering made easy

The KS 108 automation concept combines proven control engineering with programming according to IEC 61131 3. As a compact basis for tailor-made solutions, KS 108 unites open-loop and closed-loop control, visualisation and operation functions with a wide variety of field bus interfaces.

No previous programming experience is necessary: to create an individual solution for multi-variable control systems, cascades and limiter controllers, the user merely links together the pre-tested, off-the-shelf functions from the function library.

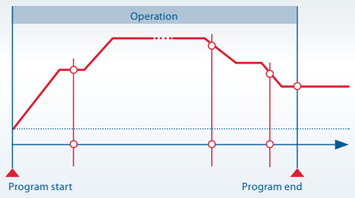
The robust, flat metal enclosure is equipped with a choice of 5.7" TFT, 10" TFT or CSTN touch panel. Numerous field bus interfaces are directly accessible at the back of the unit, and a USB port on the front accepts flash drives. The controllers are parameterised with the BlueDesign and BlueEdit software tools. Decentralised digital and analog I/O can be handled not only via the proven vario IO systems but also using the RL 400: a rail-mounted modular system which can be expanded without a restrictive back panel.

Tailor-made application solutions



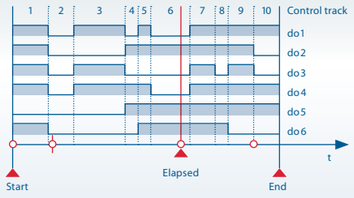
Logic operations

- Personnel access controls (cleanroom)
- Safety interlocks (heating equipment)
- Condition-based functional control systems



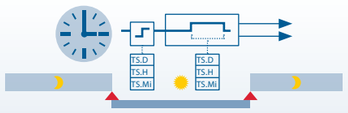
Analog programmer

- Hardening furnaces
- Heat treatment
- Freezers
- Diurnal curves (water treatment plant/ water and energy supply)
- Breweries/distilleries



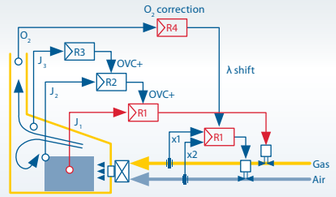
Digital programmer

- Furnace control system
- Sequential control systems (washing machine)
- PLC functions
- Soft start circuitry



Timer

- Weekly timer (greenhouse: temperature/ light)
- Weekly timer (building automation)
- Timing cycle in production control
- Night-time reduction (heating)
- Timing elements for ON/OFF switching processes (production)

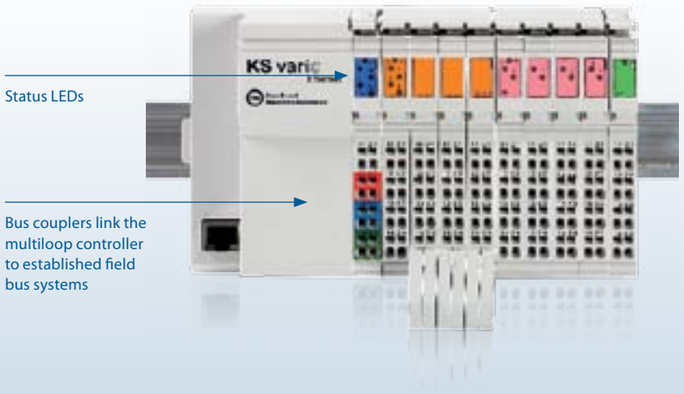


Complex control schemes

- Chemical reactors
- Thermal energy supply
- Melt control
- Boiler control
- Cleanroom HVAC
- Melt furnaces in foundries
- Plastic processing units

Formulas

- Relative/absolute humidity (HVAC control)
- O_2 sensors, CO control (exhaust gas)
- CP control (hardening operation)
- Steam calculations (boiler application)




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

Intelligent modular multi-channel control

The KS vario multi-controller system

The KS vario multi-controller system was specifically developed for temperature control. In its basic configuration it comprises a controller module and a field bus coupler. Together these two components already constitute a valuable 4, 6 or 8-channel controller. By adding any number of I/O modules, the system can be expanded up to 30 control loops very economically and in precise increments. The number of I/O module used need not exceed the actual number of inputs or outputs required. Up to 60 analog outputs, 34 analog inputs and 320 digital inputs or outputs per bus coupler can be processed in the maximum configuration. The individual modules of a KS vario system are simply attached to one another without having to use tools: this automatically interconnects them and supplies them with power via the bus coupler. The field bus coupler with integrated power supply is the heart of the system and links the multi-controllers with established field bus systems. Along with Profinet and innovative Ethernet topologies, classical field buses such as Profibus DP, CANopen, DeviceNet and Modbus are also supported.


The KS 800 multi-controller handles 8 zones simultaneously and can be configured as a signal device, 2-point controller, 3-point controller, cascade controller or stepping motor controller. In the 2-point and 3-point configurations, it can also be set up as a continuous and split-range controller. With functions such as “Setpoint Reduction” and “Heating/Cooling with Four Alarms”, it is particularly well-suited for temperature control in plastic processing machines, packaging machines and tempering equipment or for similar thermal processes. An extensive array of special functions and a precise and autonomous algorithm takes the load off of PLCs and IPCs. As an option, the field bus can be connected via CANopen, DeviceNet or Profibus DP. With the KS 816 version of the multi-controller, the control output signals are transmitted to the decentralised actuators via the bus. The 16-channel controller can also be used as a powerful universal transmitter.

Proven multi-talent

Eight-fold automatic temperature control with KS 800

The BlueControl® engineering tool

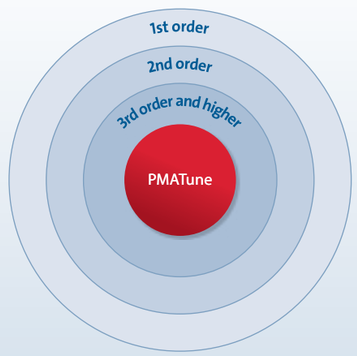
On-site commissioning and centralised remote configuration

BlueControl® makes it possible to define the parameters and signals of PMA controllers very easily by means of a PC. A set-up wizard guides users through the configuration process in just a few steps. Configuration and commissioning are particularly convenient via the BluePort® front interface on the field bus coupler. All of the parameters and signals defined are assigned to the controllers addressed in this way on a centralised basis. The software tool can be used to simulate universal processes with realistic conditions. The system even allows for controlled systems to be described using complex mathematical terms including forward feed of disturbance variables. Simulation with BlueControl® is an ideal tool for carrying out simple, risk-free tests before commissioning and for use during training courses. The integrated online help function includes an index and a search engine. Its summary pages display the menu path and all available functions, enabling both beginners and experts to make full use of the system’s wide range of optimisation capabilities.

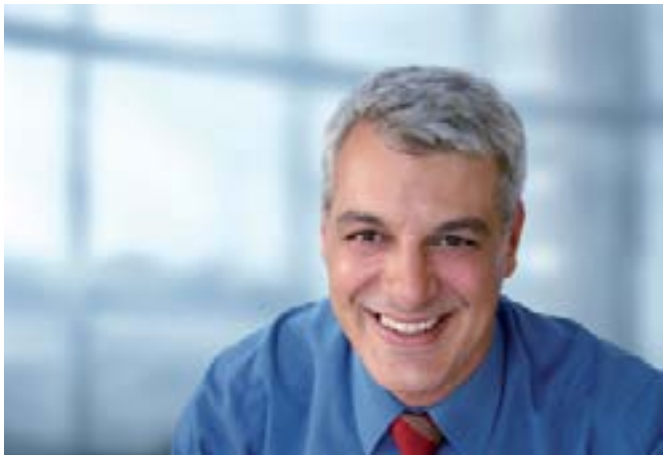
Stable automatic control of all controlled systems

Determination of control parameters with PMATune

The PMATune optimisation tool determines reliable controller parameters for higher order loops in the shortest possible time. The approach used places particular emphasis on robust and reliable control. The goal is to maintain the desired setpoint without overshoot or continuous oscillation and to rapidly and reliably correct for any errors arising from disturbances. The optimisation is launched after connecting a laptop to the interface port on the front of the controller. The user simply selects the bandwidth of the desired control dynamics – the software uses excitation pulses to determine the robust parameters. The new controller data are installed at the touch of a button. The functions of PMATune are already integrated into KS 98-1 and KS 108 easy. That means the optimal control parameters (proportional-action, derivative-action, integral-action time) can be determined even without an external laptop – in operation, during the soft-start process or at setpoint.



PMATune also helps to determine stable control parameters in difficult cases – for higher order controlled systems.

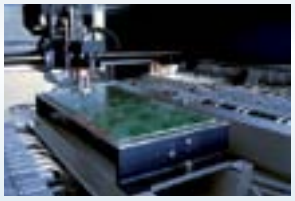


You can depend on us

The satisfaction of our customers is our number one priority. For this reason, WEST Control Solutions relies on a recognised quality management method in the sectors of production, development and sales. Furthermore, our ISO 9001 certification proves the adherence to international quality management standards. We are continuously working on optimising processes and increasing benefits for our customers. Profit from professional order processing, meticulous manufacturing, optimum quality control and the highest delivery reliability.

Order

Production



Quality control

Delivery on time

WEST Control Solutions your global partner for temperature and process control

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Brochures and datasheets are available for the complete range of West Control Solutions products, contact your local sales office for more information or visit our website at: www.west-cs.com

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