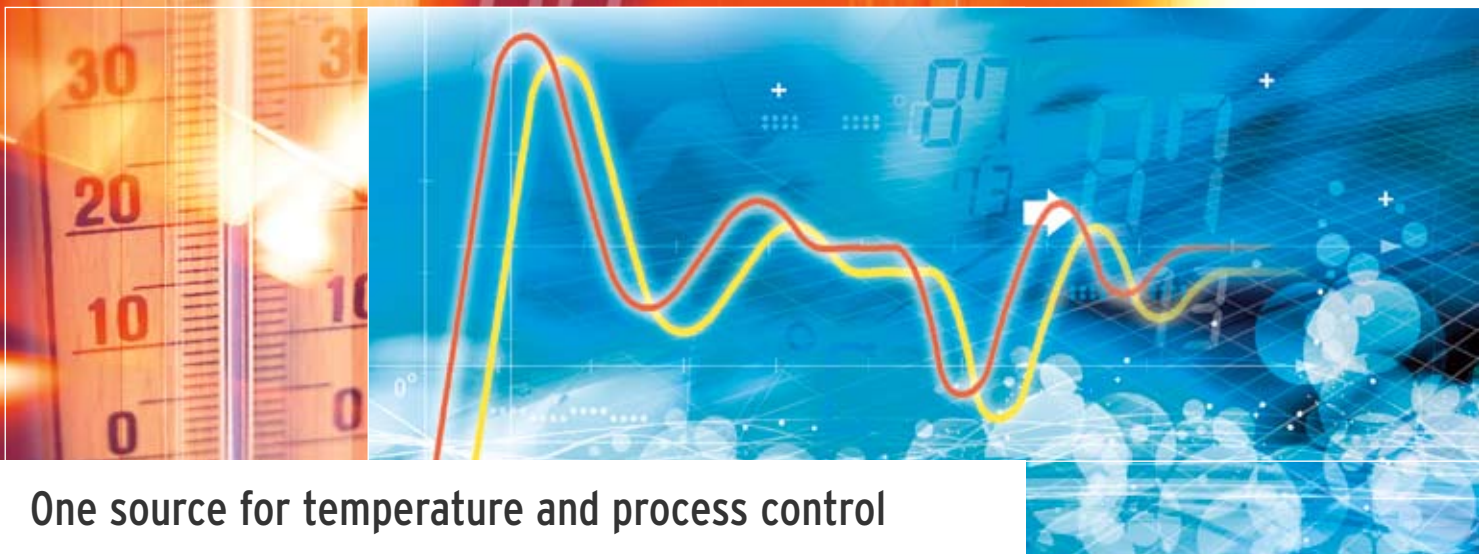


# Regulation solutions



One source for temperature and process control

- Basic temperature control
- General purpose temperature control
- Advanced temperature and process control
- Multi-Loop temperature control
- PLC based temperature and process control

Advanced Industrial Automation

**OMRON**

## World wide leading in temperature control technology



Worldwide, every 30 s an Omron temperature controller is sold. 24hrs/day, 7 days/week...

The world's number one in instrumentation for temperature control with a global network guaranteeing that we are close you our customers.



2

## OMRON MAKES ADVANCED TECHNOLOGY SIMPLE!

Analogue parameters such as temperature, pressure and humidity may be simple concepts but regulating them in today's complex industrial processes, which are subject to the constant demand for ever greater process optimization, can be anything but simple. Here's where Omron can help you.

As a world-renowned specialist in temperature-control and other analogue-parameter-control instrumentation, we are currently the only company to offer a complete range of controllers – from those providing basic regulation, to advanced high-speed, high-resolution multi-loop regulators, right through to fully integrated instruments offering PLC-based loop control. All with the

emphasis on simplicity. Simplicity in installation, simplicity in setting up and simplicity in operation.

Don't, however, let this apparent simplicity fool you. With Omron, simplicity is only skin deep. Within their compact, rugged housings, Omron controllers pack some of the world's most advanced technology. Like high-visibility colour-change displays based on the latest negative transmissive LCD technology, and our unique 2-PID control that takes PID (Proportional, Integral, Derivative) control to the next level to provide outstanding disturbance response and stability. And like our award-winning GTC (Gradient Temperature Control) that precisely controls 2-dimensional temperature profiles.



#### COLOUR CHANGE DISPLAY

Leading display technology, providing the user with clear and intuitive information. These Liquid Crystal Displays have a wide viewing angle and are much easier to read from a distance and in all lighting conditions.

Omron controllers also offer a broad choice of communication and networking options to provide exceptional versatility in both regulation and monitoring. While dedicated Windows-based software with a highly intuitive user interface ensures that installation, configuring and commissioning are as easy as they can possibly be.

All good reasons for choosing Omron. The world's number one in instrumentation for analogue control. With a complete product portfolio meeting all your needs. And with a global network guaranteeing reliable delivery and reliable, personal service anywhere in the world.

- 4 ▶ One source for temperature and process control  
Product portfolio and positioning
- 6 ▶ Basic temperature control  
K8AB-TH & E5C2 – temperature monitoring and control
- 8 ▶ Basic temperature control  
E5CSV – perfect temperature control in a few simple steps
- 10 ▶ General purpose temperature control  
E5\_N – designed to exceed your expectation
- 12 ▶ Advanced temperature and process control  
E5\_K – performance meets flexibility
- 14 ▶ Advanced temperature and process control  
E5\_R – High performance and multi-loop
- 16 ▶ Multi-loop temperature control  
E5ZN – Space saving modular integration solution
- 18 ▶ PLC based temperature and process control  
CJ/CS PLC integrated control
- 20 ▶ Smart Platform  
One software, one connection, one minute
- 22 ▶ Software and auxiliaries  
Programming and SCADA software, networking, SSRs and Sensors

Fully integrated



CJ1W-TC



E5ZN



E5\_N



E5CSV

Stand alone



K8AB-TH



E5C2

Basic

General Purpose

4

## One source for temperature and process control

### Basic solutions

Where simple, discrete temperature regulation and monitoring are required, our K8AB-TH, E5C2 or E5CSV controllers offer the best solution. The units offer basic control functionality: temperature alarm, simple ON/OFF control or single-loop PID control.

#### Typical applications:

- Protection of your heating application
- ON/OFF boiler heating control
- Frying and baking
- Sealing and other packing applications

### General Purpose solutions

For the majority of control applications, you'll find the ideal solution in our E5\_N controller series. Available in 4 panel mount DIN sizes and an in-panel model, the E5ZN, these instruments offer reliable regulation even the in most challenging industrial environments.

#### Typical applications:

- Packing applications
- Plastic forming and moulding
- Laboratory and ceramic ovens
- Reflow furnaces



E5\_K



E5\_R



PLC loop

- PLC based
- Multi loop
- Single loop

Advanced

Hybrid

Throughout all industrial processes, the precise regulation of analogue quantities such as temperature, pressure, humidity and flow rate forms a key link in the chain - whether for safety, quality or efficiency reasons. Our solutions fall into 4 categories: Basic, General Purpose, Advanced and Hybrid.

**Advanced solutions**

For demanding applications that require flexibility in inputs and outputs, programmable control and networking capabilities, you can choose from our range of advanced single-loop and multi-loop solutions. These include the single-loop E5\_K series and the single- & multi-loop E5\_R series.

**Typical applications:**

- Heat-treatment ovens
- Processing food and beverages
- Autoclaves and sterilizers
- Automotive and semiconductor

**Hybrid solutions**

Since sequence-based systems must regularly provide some degree of analogue loop control as well, it is often desirable to integrate the analogue loop in the PLC. To meet this need, we've combined our know-how both in discrete analogue control and PLC-based control to produce a range of hybrid solutions.

**Typical applications:**

- Packaging machinery
- Plastic machinery
- Wine-making plants
- Climate chambers

# K8AB-TH & E5C2 - TEMPERATURE MONITORING AND CONTROL

## Easy installation, intuitive operation



The K8AB-TH and E5C2 provide the perfect solution for basic applications including alarm monitoring and simple ON/OFF control.

### **K8AB-TH – protect your heating application**

The K8AB-TH is a temperature monitoring relay that embodies both temperature-alarm functionality and ON/OFF temperature control. The unit is designed specifically for monitoring abnormal temperatures to prevent excessive temperature increases and to protect equipment. It comes in a slim space-saving housing with a width of just 22.5 mm suitable for DIN-rail mounting. With functions set by means of a DIP switch, and the alarm threshold set directly by rotary switches on the front, the K8AB-TH is also exceptionally easy to configure. The unit features

multiple inputs with support for both thermocouples and PT100 sensors. For the alarm output, a change-over relay is provided and, in contrast to many other, comparable, monitoring relays, the K8AB-TH also embodies an output latch function with (front button) latch reset, SV protection and the choice of fail-safe/non-fail-safe relay operation.

### **E5C2 – it can't get easier**

The E5C2 family of compact temperature controllers embodies ON/OFF control and proportional-derivative (PD) control with a manual reset adjustment function. The family offers a choice of type J or K thermocouple, PT100 and thermistor inputs, and relay or voltage (pulse) outputs. The E5C2 allows for DIN-rail and front-panel mounting – just choose one of the available 8-pin plug-in sockets.

## K8AB-TH benefits

- Easy to setup, field-configurable dip switch for multi-input and unit selection
- Only 4 application-specific models, high- and low-temperature range, 24 V or 100-240 V
- Slim, compact (22.5 mm wide) space-saving design, DIN-rail and panel mounting
- Change-over type output relay, with or without latching and front button reset
- Self protection against power or unit failure thanks to selectable relay fail-safe mode
- LED alarm indicator for alarm and SV-protection status



## E5C2 benefits

- Reduced engineering time and costs
- Easy to operate with large analogue setting dial
- Flexible to use, one unit for panel or DIN-rail mounting
- Choice of ON/OFF or PD control models
- Easy to see output operation with LED indicator
- Setting accuracy better than  $\pm 2\%$  at full scale

### ▶ ON/OFF

Hot water supply provided by a boiler can be simply controlled with an E5C2. The water temperature is set by the big and easy to operate dial on the front of the controller.

### ▲ Protect your heating application

If a temperature sensor is damaged or the SSR is short circuited in a furnace, the controller has no means of stopping rises in temperature. An internal alarm can help, but there is still some risk if the controller fails. This risk is eliminated by the built-in redundancy of the K8AB-TH alarm unit which can automatically switch off the power to the furnace.

### ◀ Prevent overheating in cabinets

Temperature rises due to heat dissipation from SSRs within a cabinet can be too high for efficient operation. Simple ON/OFF control with the K8AB-TH can protect against overheating without the necessity and expense of running the fans continuously.



# E5CSV – BASIC TEMPERATURE CONTROLLER

Ready, set, go!



8

The E5CSV temperature controller series is the enhanced successor to our E5CS series – the most widely sold temperature-controller that has established itself throughout the world as the ideal choice for simple, cost-effective temperature control.

### Keeping the best...

The new series shares many of the outstanding features that made its predecessor such a success – including easy setting up using DIP and rotary switches, a large 7-segment LED display and choice of ON/OFF or PID control with Self-Tuning. What's more, it still provides an indication of output and alarm status and direction of deviation from set point.

### Enhancing the rest...

Building on the success of the previous E5CS, however, the new E5CSV series offers much more. Like an Auto-Tune function and the fact that as standard you can now select multiple input types (thermocouple/RTD). A new 3.5 digit display also means that E5CSV can show a larger range, now extending up to 1999 °C. The series also meets new RoHS requirements and complies with the stringent IP66 standard. What's more, depth has been reduced to a mere 78 mm.

The E5CSV series: perfect temperature control in 4 simple steps.



**E5CSV benefits**

- Easy setting-up using DIP and rotary switches
- Meets broad range of basic temperature-control requirements with only 4 models
- No expert knowledge needed to optimise performance because of Self- and Auto-Tuning functions
- Reduced chance of malfunction thanks to set-value protection
- End-user friendly since the menu only has 3 parameters
- Excellent legibility with a large (13.5 mm) single-line, 3.5 digit, 7 segment LED display
- Clear status overview thanks to PV-SV deviation indicator, output and alarm indicator
- Easy connection to a broad range of temperature-sensor types



▲ **Intuitive operator guidance**

Clear indication that the correct temperature has been reached thanks to the deviation indicator.

▼ **Usage in harsh environment**

The flat front makes the use of the E5CSV hygienic and it's easy and safe to clean thanks to its IP66 rating.

▶ **Speed-up your line**

Excellent control, especially in this disturbancesensitive application.



220VAC		24VAC/DC	
Relay output	Voltage (puls) output	Relay output	Voltage (puls) output

**1. Select**  
4 models only

Ready...



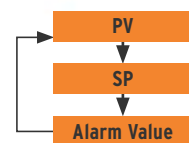
**2. Set up**  
Function, input and alarm type are easy set by dip and rotary switches

Set...



**3. Mount**

...Go!



**4. Adjust**  
Only 3 parameters

# E5\_N - GENERAL PURPOSE TEMPERATURE CONTROLLERS

Designed to exceed expectations



The E5\_N single-loop series is the ideal choice for the majority of general analogue control applications. The instruments are exceptionally easy to use and to configure for optimum control. Not surprising then that they are currently the most popular controllers in the world.

To meet the challenges of operating in an industrial environment, all products in the E5\_N series feature a large high intensity back-lit Liquid Crystal Display with a wide viewing angle. This makes the display much easier to read from a distance and in all lighting conditions. What's more, the sharp **11-segment digits** make parameter text much easier to understand.

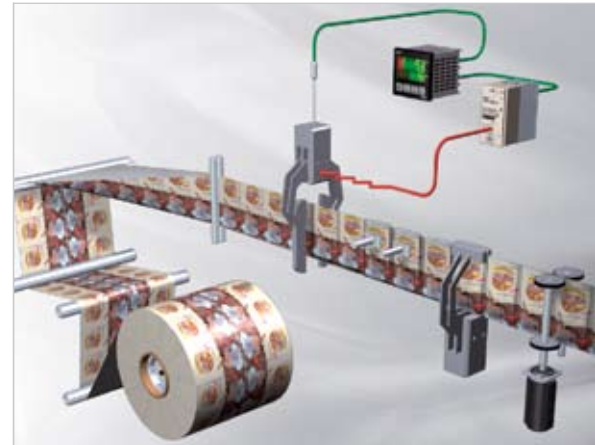
The series also features a 3-colour-change PV display, providing operators with easy recognition of process status.

Installation, set-up and operation couldn't be easier with the front panel keys and the clear and structured menu. A customisable menu-setting facility allows the instrument to display only the parameters of interest and hide the others to reduce possible operator confusion. The instruments can also be set-up using a PC with our Windows-based configuration and tuning software CX-Thermo. Moreover, our ThermoMini cloning software (available free) enables you to program the same parameters into multiple units.



	M	Q	V	W	Z	R
7 Segment	7	9	u	4	3	r
11 Segment Omron E5_N	M	Q	V	W	Z	R

- Excellent visibility – in all lighting conditions – thanks to high-intensity Liquid Crystal Display with wide viewing angle
- Easy status recognition with 3-colour-change PV display
- Clear diagnostics and extended process and heater alarm strategies
- Optimum control with Omron's unique 2-PID system
- Easy set-up and operation through the front keys or with intuitive, Windows-based software tool
- Optimum application security thanks to password protection and customisable menus
- Wide range of application-specific features and options available



- ▲ **Faster input sampling and control period**  
This gives faster, more precise heater control in rapidly changing, disturbance-sensitive applications.

**PV colour change**

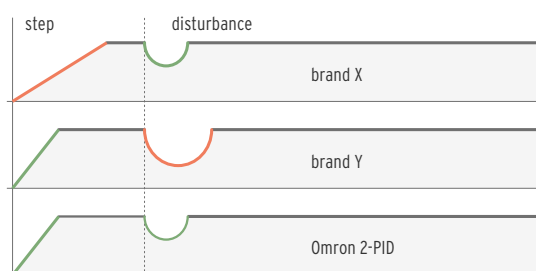
This provides crystal-clear process status, even from a distance and without the need for interpreting the values. When one of the heaters is not at set-point the PV can change colour to alert any member of staff (detecting a bad sealing at an early stage, for example).



- ◀ **Loop break alarm and sensor break alarm (with forced MV option)**  
In plastics production the tool used to make the product is changed quite often. Frequent reconnecting of the sensor or heater can result in a wire break (a broken thermocouple, for example). These alarms quickly detect such problems in the process.



- ▼ **2-PID control combines stability with fast reaction speed**  
A highly innovative Omron development, 2-PID control is an important advance on standard PID (Proportional, Integral, Derivative) control. 2-PID control uses a powerful algorithm that enables the instrument to be tuned for optimum disturbance response without any compromise on the speed of reaction to changes in set point. And the best part is that the user doesn't have to take any special action since the built-in 2-PID control does all the work. All our instruments with 2-PID control are factory preset with a default setting, suitable to give fast responses with minimal overshoot for most analogue control applications. What this means for you of course is faster start-up production times and much more stable control during production leading to better quality products.



- ▲ **Basic (2-step) programmer**  
In many thermal processes (food, brick, pottery etc.) a small element of timing is required. This feature enables you to ramp up to a set-point and set the dwell time period. At the end of this time, the process stops or continues with an indication alarm to alert the operator. With this feature, a fixed minimum or maximum curing/baking time is assured in a smooth, controlled way.

# E5\_K - ADVANCED TEMPERATURE AND PROCESS CONTROLLERS

## Performance meets flexibility



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Offering sophisticated programmable control and communication, with flexible, modular expansion capabilities, the E5\_K series meets the most demanding requirements of today's advanced industrial automation systems.

Available in 1/4, 1/8 and 1/16 DIN, the series features a universal input configurable for temperature and process signals. Inputs are available for industrial thermocouples, resistance thermometers and linear signals. Moreover, a broad range of replaceable modules is available for optimum (field-configurable) flexibility. Optional modules are available supporting serial communications for data-exchange, programming or commissioning. The 1/8 DIN controller (E5EK) also offers

a version with a DeviceNet interface, while both the E5EK and E5AK types are capable of connecting to a Profibus network via Omron's Intelligent Gateway (PRT1-SCU11).

Standard control functions are supported by two levels of auto-tune, plus the option to continuously recalculate control parameters. In addition, a heater protection option is available with current monitoring and heater burn-out alarm.

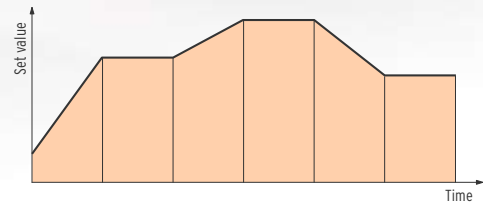
The range is completed by dedicated valve driver units for controlling motorised valves plus a 'set-value in time' profiling model.

## E5\_K Series benefits

- Flexible functionality thanks to the modular structure
- Easy connection to any sensor thanks to the field-configurable universal input
- Easy system integration thanks to a wide range of communication options
- Valve drive and SV profiling models available
- Units can be used in wash-down areas (front panel complies with IP66/NEMA4X)

### ▼ Modular structure

The base of the E5\_K contains the display, power supply and main input. The optional modules allows you to create flexible functionality.



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### ▲ Temperature profiling

In many advanced thermal processes (metals treatment, pottery etc.) "Time vs Set Value profiling" is required. This feature enables chaining of a number of 'ramp to set-point' and 'dwell time periods' together.

### ▼ Open network connectivity

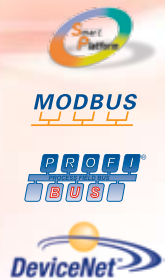
The E5EK DeviceNet model collects the paint process data to sent and is able to receive instructions from any DeviceNet master on the network.



 DeviceNet™

# E5\_R - ADVANCED AND MULTI-LOOP CONTROLLERS

Fast, accurate and customizable to application-specific needs



The E5\_R series combines high performance with advanced features that include multi-loop control of process parameters such as temperature, pressure and humidity. The series is characterized by high accuracy combined with exceptionally fast sampling and control update time.

The series comprises two types: 1/4 DIN (96 × 96 mm) E5AR in 1-, 2- and 4-loop models and the 1/8 DIN (48 × 96 mm) E5ER in 1- and 2-loop models. Various control modes can be selected, including heating/cooling control, valve control, cascade and ratio control. Moreover, it's possible to define your own application-specific control strategy, through a process called "customizing".

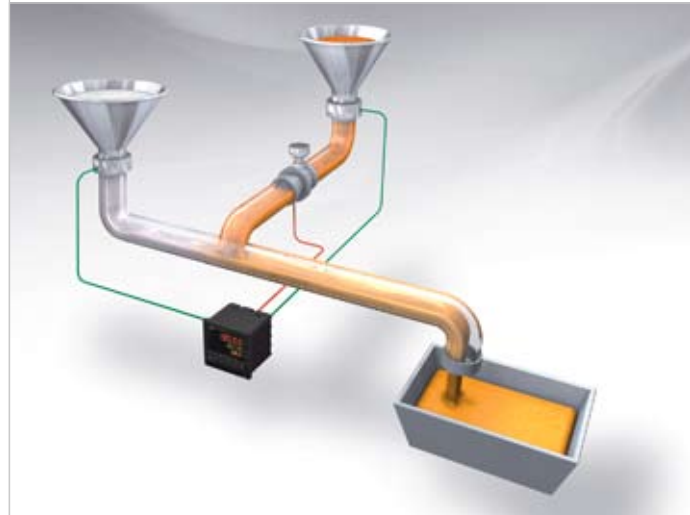
As with all Omron's analogue control instruments, configuring the E5\_R series is simple. Initial settings can be performed easily, either via the buttons on the front panel or via a PC with Omron's CX-Thermo software that allows full parameter setting, saving and cloning for repeatable configurations.

As well as the universal inputs and various control outputs, the instruments can easily be configured for external control using various I/Os. These include up to 6 event inputs, up to 2 transfer outputs plus auxiliary outputs for alarm signals. Serial communications enables sharing of data with a master through CompowayF or Modbus. DeviceNet models are also available as are models capable of connecting to a Profibus network via Omron's Intelligent Gateway [PRT1-SCU11].

- Easy and clear read-out thanks to bright Liquid Crystal Display
- High accuracy (0.01 °C with Pt100)
- Fast response – 50 ms input sampling and control update for all 4 loops
- Exceptional versatility – multi-loop control, cascade control, and valve control
- Easy configuring on a PC with CX-Thermo software
- Easy integration with DeviceNet, Profibus or Modbus

▼ **Mixing two flows: Ratio Control**

Used in applications where a secondary flow needs to be mixed in an exact ratio to the main flow, as in colouring paint, mixing yoghurt with jam and chloride with water.



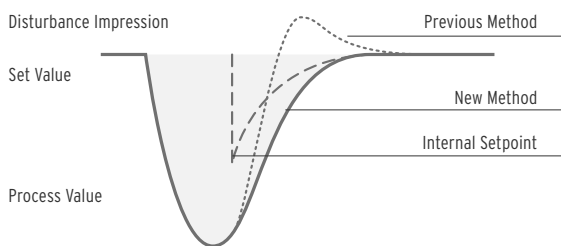
▲ **Controlling a processing vessel**

In a fermentor, tight control over all the parameters such as temperature, pH, level and/or pressure is essential for a good product.



▲ **Temperature and Pressure interaction in an autoclave**

Sterilizing products at high temperatures under pressure demands a fast and accurate controller like the E5\_R.



Advanced disturbance control technology provides outstanding suppression of overshoot.

◀ **Advanced disturbance control**

Many manufacturers claim their products offer overshoot reduction after a disturbance. Omron, however, has the technology to provide complete control of PV overshoot. In our E5CN model for example, when an external disturbance signal is generated by a sensor detecting a new product, the disturbance control can even reduce overshoot that can't be handled by the 2-PID system alone! And our E5R model has an even more advanced system called ADO (Adjustment of Disturbance Overshoot) that infers the disturbance automatically without the need for an additional sensor, and takes the appropriate action thanks to its rapid input sampling and output setting (50ms).

# E5ZN - MULTI-LOOP TEMPERATURE CONTROLLER

## Space saving modular integration solution



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With a width of just 22.5 mm, the E5ZN dual-loop controllers are among the slimmest of their kind in the world. In contrast to other in-panel control systems, which are based on a central strategy engine and separate I/Os, every E5ZN unit incorporates its own microprocessor. This guarantees exceptionally high loop integrity and system reliability.

The E5ZN is fast and easy to mount. It consists of a DIN-rail socket and a dual-loop plug-in unit, with voltage throughput and communications being distributed through a bus connector system inside the socket. The plug-in control unit simply snaps into and out of the socket, so it can be removed at any time for maintenance or replacement, without disturbing the wiring.

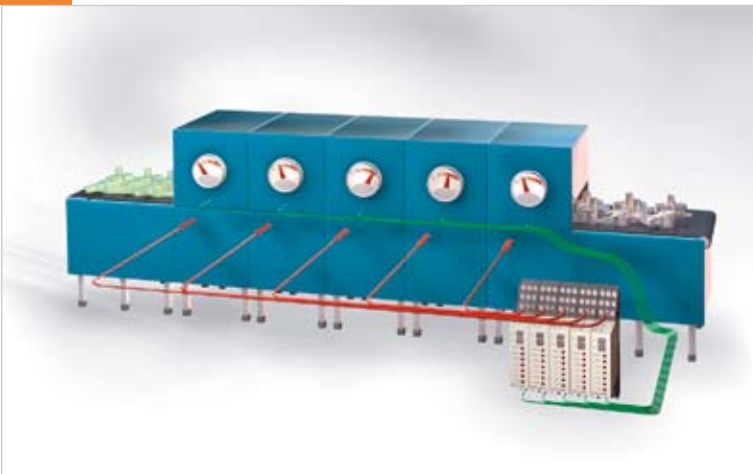
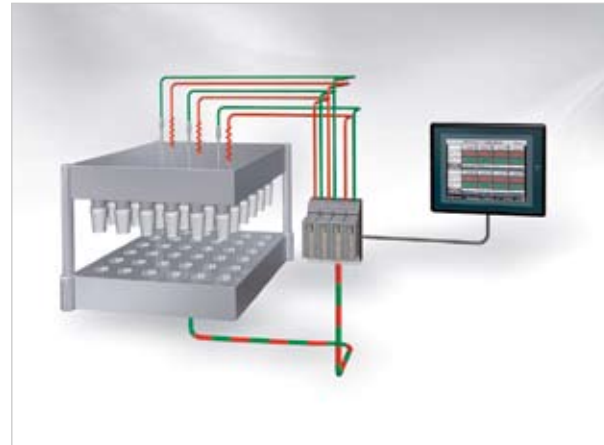
The units are ideal for a wide range of applications, from simple ON/OFF control, through to more complicated analogue control. They offer a wide choice of input signal types and various output types.

Each unit is controllable from the dedicated setting unit, directly from a PC/HMI or via a PLC. The E5ZN operates as a stand-alone unit but, making full use of its communications capabilities (serial or fieldbus), up to 16 two-loop controllers can be incorporated into a distributed control system.

Remote set-up and commissioning is easy using Omron's CX-Thermo support tool. Featuring a user-friendly interface, the package allows you to tune the E5ZN exactly to the system.

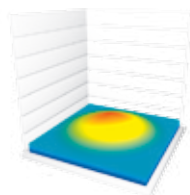


- Slim outline saves on valuable panel space
- Fast, easy DIN-rail mounting (replaceable control unit)
- Exceptionally high loop integrity and system reliability
- Ideal for a wide range of control applications
- Easy setting up and tailoring to system requirements
- Direct control through HMI, PC or via PLC

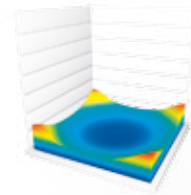


- ▲ **Multi-loop machine control with HMI**  
Control, overview and data-logging couldn't be better and easier with the E5ZN in combination with a direct connection to Omron HMIs.
- ◀ **The simple solution for multi-loop control**  
Fit-and-forget, compact and no compromise on control performance makes the E5ZN perfect for basic multi-loop control.

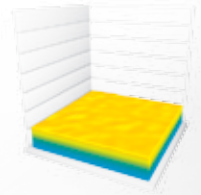
- ▶ **Precise control of 2-dimensional temperature profiles with GTC**  
GTC, Omron's new loop interacting PID control technology, ensures that a 2-dimensional temperature profile remains constant over a defined area, eliminating the damaging effect of hot spots on sheets of materials such as metal, glass, plastic or silicon wafers. GTC makes it possible to control the exact shape of the temperature profile at any position. With Omron's GTC you can choose either to:



Force fast heating from the inside



Force fast heating from the outside



Force temperature uniformity

- ▼ **Award winning unique temperature control technology - Gradient Temperature Control**

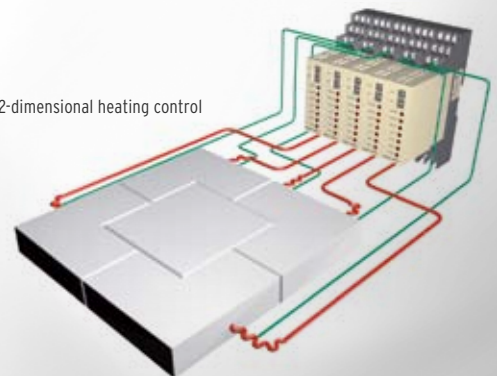
Without GTC



With GTC

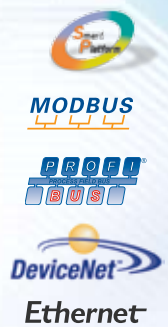


2-dimensional heating control



# CJ/CS PLC-BASED LOOP CONTROL

## PLC-integrated solutions for temperature and process control



Omron has combined its know-how both in discrete temperature control and sequence based PLC systems to produce a range of integrated control solutions from PID ladder instruction right up to high-end analogue loop control.

Besides the powerful PID ladder instruction with auto-tune for our PLCs for dedicated temperature control, you can choose Omron's CJ1W-TC series. Based on our successful E5\_N series, these temperature control cards for our CJ1 PLC provide PLC-integrated temperature control with no compromise on performance. And to simplify control-loop operation and reduce engineering time, Omron provides PLC Function Blocks to easily access all controller data in the TC card.

In addition, our innovative CJ1 hybrid CPU range integrates high-speed sequence and advanced analogue control in a single unit. Omron's CX-Process configuration tool uses Function Block programming to enable you to build your own control strategy. Clear commissioning windows help to adjust and tune the loops. Moreover, at the press of a button, you can automatically create controller faceplates for Omron's NS-series HMI.

Providing the same benefits and features, Omron's CS1 PLC series offers a similar solution as the CJ1 series, but for even bigger systems and, if required, with dual-redundant CPUs.

## Integrated loop benefits

- Always a good investment thanks to the modular and scalable concept
- Space saving thanks to compact size
- Broad range of options from PID PLC instruction right up to analogue loop strategy engines
- Effective PLC-integrated solutions for controlling any number of loops
- Easy engineering with Function Block programming
- HMI screens can be simply and automatically generated



### ▲ Central storage control

Control over temperature and humidity for multiple storage cabinets can be handled from one single PLC. Easy to scale-up or -down with a perfect overview using CX-supervisor.

### ▼ Total machine control

Specific features like compact build, accuracy, speed and control over disturbance, projects our know-how in packaging machinery.

### ▲ Dedicated temperature and process I/O

Analogue outputs for manual power control or multiple loop on inputs for alarming and data logging - all centrally handled from one CPU and with our extensive range of temperature and process I/O units.



# SMART PLATFORM

## One software platform for your complete machine



20

### Fast, easy automation – at the push of a button!

With the growing complexity of industrial systems, even experienced automation engineers admit that system integration is becoming ever more of a challenge. Projects can involve whole factories, use equipment and software from many vendors and occupy many man-years of effort.

Omron's answer to this challenge is Smart Platform – a new open concept that enables complete machine and plant automation from one single platform without having to worry about field buses, integration of various types of software and, above all, without being tied to one dominant supplier. With Smart Platform you need only one software package, 'CX-One', to program and configure your machine. And one connection is enough for all the devices in your system (to upload and download parameters, programs & comments, or to monitor operation and performance). Moreover, Smart Platform allows you to configure your system more efficiently. Enabling you to adapt or improve the performance and operation of your machine by 'one minute' configuration, drag & drop PLC programming or HMI screen auto-building.

Hence our Smart Platform motto – **JUST CREATE!**



### One software

CX-One allows you to control, visualise, position, detect and regulate from one automation suite.



### One connection

No matter what device, what fieldbus and what task you are performing. One connection is all you need to give you full access to your machine.



### One minute

Drag & drop, plug & work in minutes to control, visualise and maintain your machine.

## Smart Active Parts for configuring Omron's NS range of HMI products

Available in a library of the configuration software, Smart Active Parts (SAPs) are pre-programmed visualisation software modules with embedded communication code. Using SAPs, you can configure, commission, operate and maintain your complete machine from our NS terminals. This is possible because SAPs communicate directly with all devices and units connected to the NS terminals. This gives you the opportunity, for instance to read and write parameters of connected devices or to view alarms, all without having to program a single line of communication code. Just “drag and drop” an SAP on the screen in the configuration software and set the unit number of the connected device. This simple way of programming saves you a lot of development time, and at the same time allows you to include more advanced features that, for instance, reduce down-time or simplify machine set-up.



- Drastically reduced programming and development time
- No need to program communications
- Much easier troubleshooting and less need for testing

## Function Blocks for PLCs

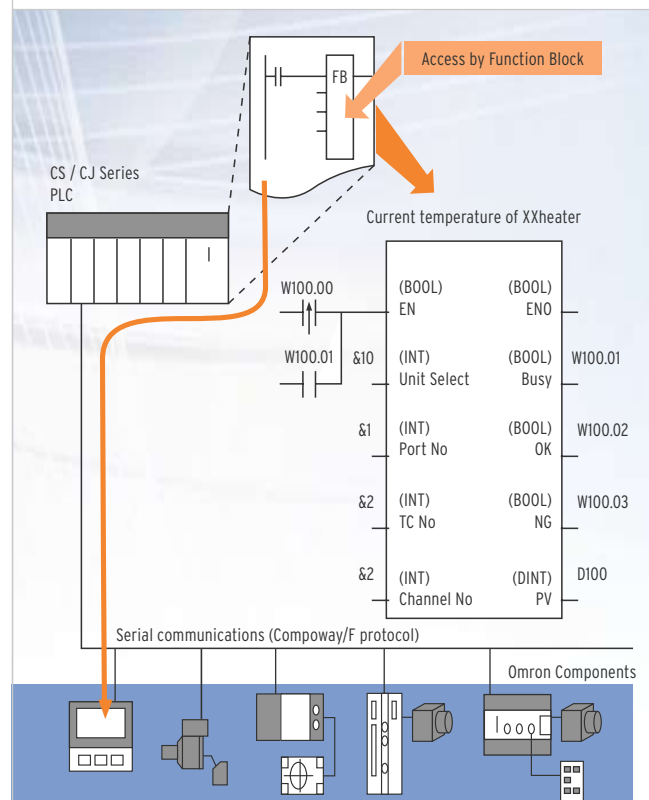
Function Blocks (FBs) are predefined and pre-tested programs (or functions) contained within a single program element that may be used in the ladder diagram.

A contact element is required to start the function, but inputs and outputs are editable through parameters used in the ladder arrangement. A function can be reused as the same element (same memory) or it can occur as a new element with its own memory assigned. FBs are intended to be used as an aid to simplify programs containing standard functionality for PLCs and Omron Factory Automation (FA) component functions. Using FBs, more time can be spent on bespoke programs for the external devices, rather than creating basic ladder diagrams since these are already available.

- Easy to use and understand
- Testing of program operation is unnecessary
- Extensibility in the future

### Example

Communication between temperature controller and PLC





**CX Thermo – CX Process**

Configuration software



**ThermoMini**

Parameter copy tool



**General purpose**



**Basic**

**TEMPERATURE &  
PROCESS CONTROL**



**PLC hybrid CPU**



**PLC integrated**



**QLP cable**



**IR sensors**



**SSR's**



**Power control**



**TC Views**

Mini SCADA



**CX Supervisor**

SCADA



**HMI/IPC**



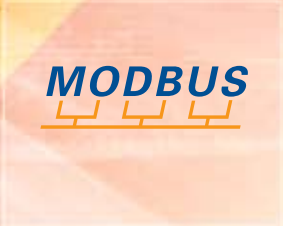
**Advanced**



**PLC**



**Multi loop**



**MODBUS**



**PROFIBUS**



**DeviceNet**



**Ethernet**

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