Digital temperature and process controllers

E5_C/E5_D Series

- Feature-rich and high speed temperature controller
- Faster design, assembly and setup
- Compact body to free-up space in your panel

industrial.omron.eu/temperature_control
Next generation of controllers
the era of A.I.

Omron’s E5_C series substantially raised the bar for temperature control in the past five years thanks to its user-friendliness, high precision and highly reliable control. Now, the E5_D series - the next generation of controllers built on the successful E5_C platform - is designed to achieve optimal and automatic temperature control without human intervention. In fact, from now on all typical adjustments made in the field by experts are automated using Artificial Intelligence (A.I.).

With standard temperature controllers, not only do you need a long time to define initial start-up PID settings, but it is also really challenging to make the optimal adjustments without having many years of experience in this area. That’s why Omron developed the E5_D Series with “adaptive control technology”. This automatically detects changes in the process under control and adapts the PID accordingly. The result? Perfectly fine-tuned PID algorithm and ultra-stable temperature control.

Adaptive control

Changes in ambient or processing conditions can be both planned and unforeseen. In either case, a responsive tuning algorithm will manage these variations quickly. This precision Adaptive control algorithm finds the right PID settings and reacts fast to any fluctuations.

Causes of temperature variations on production lines

<table>
<thead>
<tr>
<th>Temperature Variations</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece changes</td>
<td>Materials, dimensions, etc.</td>
</tr>
<tr>
<td>Machine and infrastructure</td>
<td>Cooling water, gas, etc.</td>
</tr>
<tr>
<td>Environment changes</td>
<td>Outside air temperature, etc.</td>
</tr>
</tbody>
</table>

The E5_C and E5_D series by design have been developed for high-sampling speeds. They use a powerful algorithms to enhance control stability.

Moreover 2-PID innovation offers high precision advantages over standard controllers, providing greater security and safeguarding of product quality.

High-contrast

Control rooms are generally known to have subdued lighting conditions. This is a key factor on which the E5_D as actual E5_C outperforms. It’s large, high-contrast, white LCD display enables clear visibility. View settings comfortably from greater distances and wider viewing angles. Be assured of accurate readings thanks to our clear data display.
Perfect sealing temperature control for packaging machines

On a conventional sealing machine, temperature sensors can often be located too far away from the sealing surface of the heating bar. This causes a difference between the temperature of the sealing surface and the temperature that was actually being controlled. This temperature difference and resulting sealing failures increase as the packaging speed increases and also in correlation with thinner packaging materials or changing ambient temperature.

Thanks to the E5_D series, this issue is solved with the following approach:

• bringing sensor closer to the sealing surface - thanks to special temperature sensor models for faster detection
• adopting special algorithms (automatic filter adjustment function) built-in E5_D, specifically developed to suppress temperature variations. The result is a better sealing quality of the packages.

Locate temperature sensor in the right place
Omron is able to provide special sensors to be placed easier close to the sealing surface to acquire the correct measurement.

“Automatic filter adjustment function”
Suppress the instability on the temperature surface measurements

* Data measured by OMRON on a vertical flow packer.
Temperature variations in molding machines minimized by a new algorithm

On a water-cooled extrusion molding machine, increased speed leads to temperature variations due to various factors such as the materials compounding and cooling water. For human operators, that means repeatedly making valve adjustments to stabilize the quality. However, it is really difficult to achieve high-speed production while also maintaining the quality.

With the ES_D, the water-cooling output adjustment function suppresses the temperature variations to a minimum and raises the production capacity with the quality maintained.

Causes of temperature variations

Non-linear characteristic of water cooling
This kind of cooling method has a non-linear behavior that could create temperature variations.

Changes in water cooling system
If changes in the cooling water system occur, temperature variations could happen with conventional auto-tuning PID algorithms, as it is not possible to make adjustments in the setting during continuous operations.

1) Faster production speed and other changes (haul-off speed, production speed, etc.)

2) Temperature variation

3) Valve adjustment required

It is possible to suppress the temperature variations that occur due to the non-linear water cooling characteristics by selecting the right AT tuning algorithm on the ES_D controller setting menu.

It constantly detects changes in the temperature behavior and suppresses the temperature variation by automatically adjusting the proportional band (cooling).
Free-up space in your panel

Compact, space-saving body
With a depth of just 60 mm, the E5_C and E5_D are especially ideal for panels with limited space. And since E5_C has a push-in plus technology, wiring is performed from the back, enabling horizontal group mounting to achieve compact panel surfaces.

Push-in plus technology enables side-by-side mounting
Because push-in plus technology allows you to wire straight into the back of the terminals, it is no longer necessary to plan the sequence of products in the panel. This allows side-by-side mounting, making your panel cleaner and more space efficient.

Faster design, assembly and setup

Fast wiring via push-in plus technology
Just insert the wires – no tools required. Do all your wiring in less than half the time needed with screw type terminals.

Temperature sensors
Our push-in plus technology assures contact reliability even with a very small signal such as Pt100 and Thermocouple

No retightening required
Retightening screws is often necessary for screw terminals, but with push-in plus, there is no (re) tightening.

Easy to insert
Our push-in plus technology is as easy as inserting to an earphone jack – reducing your work load and improving wiring quality at the same time.

Held firmly in place
Even though less insertion force is required than other temperature controllers with push-in technology, the wires are held firmly in place – thanks to the advanced mechanism design and manufacturing technology.

Push-in plus technology

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Screw terminal technology

IEC standard Push-in plus technology Screw technology
20 N 125 N* 112 N*
* Data from our own research

Step 1: Wire RS-485 communications
Step 2: Set the communications addresses and communications types in the Temperature Controllers
Step 3: Set the same communications settings in PLC

Just 3 steps - no PLC communications program
In addition to communications with PLCs, you can share target temperatures and copy parameter settings with other E5_C series controllers.

Intuitive software - quick setup and operation
Our CX-Thermo software gives you the fastest possible parameter setting, instant device adjustment and simpler maintenance. And you don’t even need to connect a power supply to the controller – the USB bus to your laptop takes care of that. Also, if you need to log your temperature curves on an external PC, the CX-Thermo software tracks your data in an organised and understandable way.
Family E5_C/D

“We are family”

Temperature controller + Solid State Relay + Temperature Sensor in one

Good regulation results don’t necessarily need to be expensive. To achieve the best results in the regulation process we’d recommend you to purchase the complete package from Omron. All parts of the control loop harmonise and assure stable conditions for many years.

We offer you a wide range of Solid State Relays with different driving currents and zero/ non-zero crossing functions. Add to that multiple simple temperature sensors of various shapes and temperature ranges, allowing you to get all the relevant parts at once for a quick machine setup.

Special tube lengths and cable confectioning can also be provided without needing to order large quantities.

<table>
<thead>
<tr>
<th>Model name</th>
<th>DIN size</th>
<th>Dimensions</th>
<th>ON-/In-Panel</th>
<th>Terminal type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESGC</td>
<td>1/32 DIN</td>
<td>(24 x 48 x 90) mm</td>
<td>On-Panel</td>
<td>screwless and screw</td>
</tr>
<tr>
<td>ESCC/CD</td>
<td>1/16 DIN</td>
<td>(48 x 48 x 60) mm</td>
<td>On-Panel</td>
<td>push-in plus* and screw</td>
</tr>
<tr>
<td>ESEC/D</td>
<td>1/8 DIN</td>
<td>(48 x 96 x 60) mm</td>
<td>On-Panel</td>
<td>push-in plus* and screw</td>
</tr>
<tr>
<td>ESAC</td>
<td>¼ DIN</td>
<td>(96 x 96 x 60) mm</td>
<td>On-Panel</td>
<td>screw</td>
</tr>
<tr>
<td>ESCC-U</td>
<td>1/16 DIN</td>
<td>(48 x 48 x 60) mm</td>
<td>On-Panel</td>
<td>screw</td>
</tr>
<tr>
<td>ESDC</td>
<td>22.5 mm DIN rail</td>
<td>(22.5 x 96 x 85) mm</td>
<td>In-Panel</td>
<td>screw</td>
</tr>
<tr>
<td>ESCC-T</td>
<td>1/16 DIN</td>
<td>(48 x 48 x 60) mm</td>
<td>On-Panel</td>
<td>screw</td>
</tr>
<tr>
<td>ESEC-T</td>
<td>1/8 DIN</td>
<td>(48 x 96 x 60) mm</td>
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<td>(96 x 96 x 60) mm</td>
<td>On-Panel</td>
<td>screw</td>
</tr>
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(*) E5_D push-in plus models planned during 2017
Would you like to know more?

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