# Precision at the Heart of Your Process

# Eurotherm.®

Simplify the integration of fast-acting control while easing cybersecurity worries

## Eurotherm EPC2000 Programmable Controllers

eurotherm.com/epc2000

Life Is On | Schneider Electric

Whatever your process, the EPC2000 controller delivers outstanding performance precisely where it is needed. Easily providing required stability, accuracy and repeatability, together with an internationally recognized cybersecurity certification.

# Efficient, Consistent Results in an Easy-to-Deploy Format

The EPC2000 DIN rail mounting controller delivers fast-acting precision control with easy-to-integrate Ethernet communications. This offers high-performance enhanced Eurotherm PID control, either as part of a stand-alone machine or as a control loop in a multi-zone application.

## Can Help Improve Quality, Reduce Scrap and Increase Profits

- Fast-acting enhanced Eurotherm PID control reaches operating temperature quickly, minimizing overshoot, helping to increase plant utilization
- Precise repeatable control can help improve quality and reduce waste
- Independent single-loop controllers maintain zone conditions, independent of supervisory system or PLC operation

## Easy to Deploy

- Compact DIN rail mounting format
- Distributed, Ethernet-based controllers
- Install close to the point-of-use, reducing cabling runs and wiring costs

## Reduce Equipment and Maintenance Costs

- Easy-to-install, commission and replace
- Robust battery-free design for reliability in demanding environments and highly regulated industrial processes
- Adapt easily to changing needs and machine integration functions with flexible software and user function block wiring
- Instant function upgrades available online, only pay for what you need
- Extended standard product warranty and free online support

## World Class Certification

- Cybersecurity certification to Achilles® CRT Level 1
- Wide range of international standards
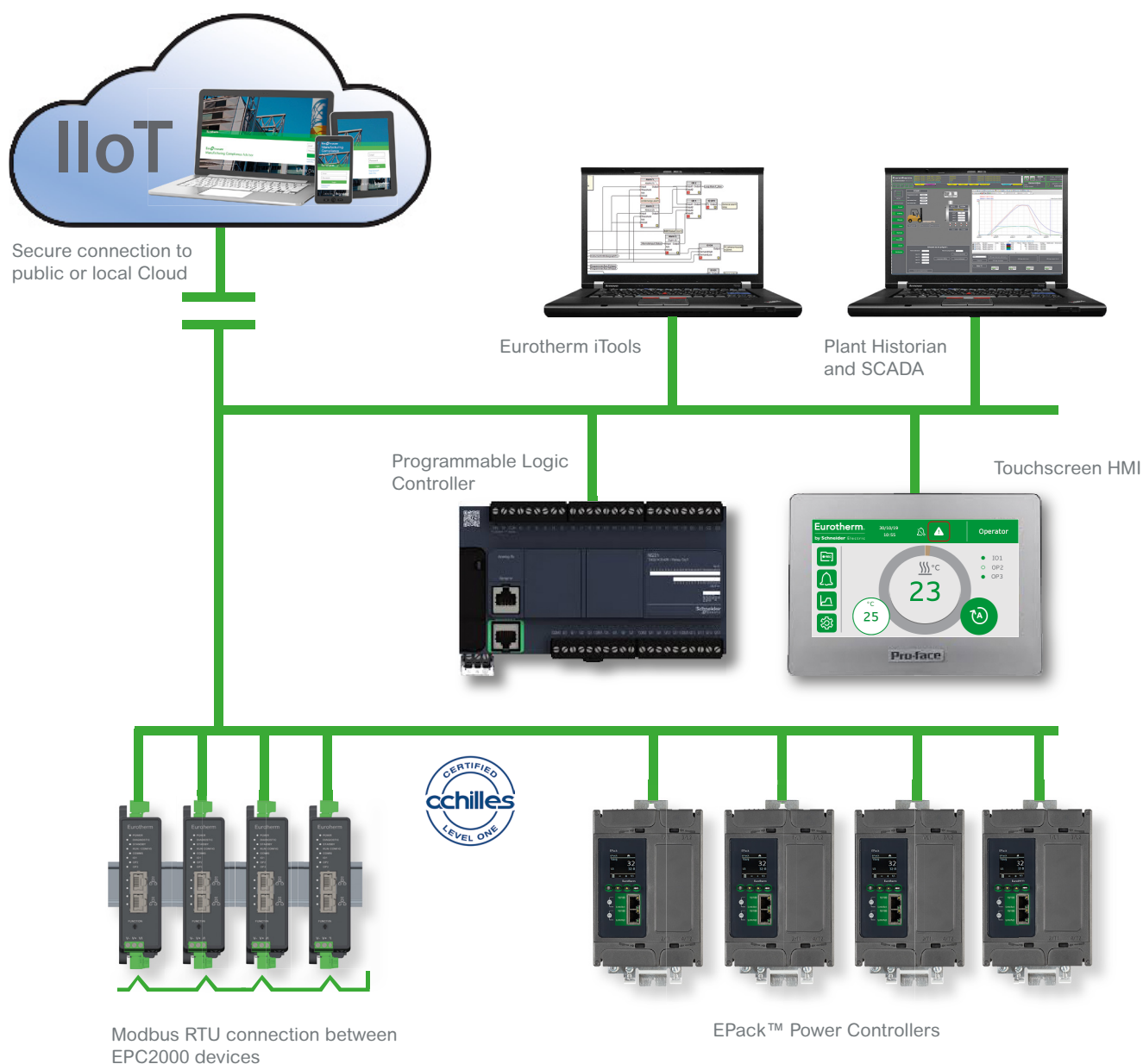- Suitable for use in demanding automotive and aerospace applications

# Networked Applications

## Fast and Flexible Ethernet Communications

Reduce your system integration and wiring costs using fast 100BASE-T Ethernet device interconnection.

Standard Cat 5 RJ45 cables allow a spacing of 100m (328 ft) between devices without loss of performance. The EPC2000 controller uses an integrated switch to remove the need for separate switches or routers.

Easily collect key application data for use in analytics and Industry 4.0 applications.

IIoT

Secure connection to public or local Cloud

Eurotherm iTools

Plant Historian and SCADA

Programmable Logic Controller

Touchscreen HMI

Modbus RTU connection between EPC2000 devices

EPack™ Power Controllers
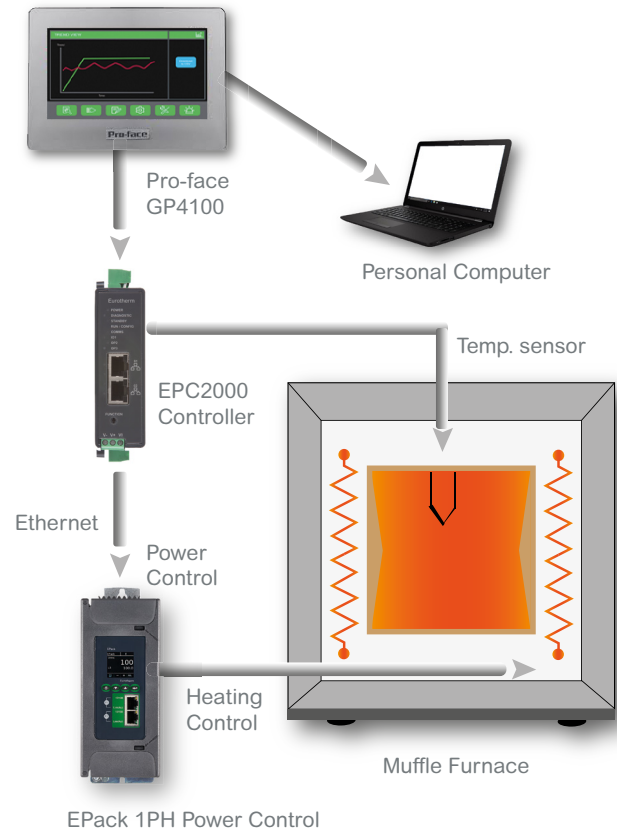
# Real World Applications

## Muffle Furnace With Touchscreen HMI

A muffle furnace separates the workpiece from the heat source by means of a "muffle", a removable and sometimes adjustable component used to aid temperature uniformity.

The furnaces may be used for the heat treatment of small components and laboratory testing of materials, and many other applications where uniformity and accuracy of temperature control is required.

In this example, the Eurotherm EPC2000 device provides high accuracy temperature control, using the Eurotherm EPack™ SCR Power controller to manage the non-linear heating characteristics of certain loads. A Pro-face GP4100 touchscreen is used as the primary operator interface.

This provides a high-performance furnace control system with fast responding enhanced Eurotherm PID control with minimal overshoot. The touchscreen panel is easy to use and customize. The furnace can be connected using Ethernet communication or via a WiFi router to data loggers or personal computers.

Pro-face GP4100

Personal Computer

Temp. sensor

EPC2000 Controller

Ethernet

Power Control

Heating Control

Muffle Furnace

EPack 1PH Power Control

## Baking Oven With Distributed Zones

Commercial biscuit or baking ovens are often arranged in long tunnels, through which the product being processed travels on a conveyor. They are usually gas-fired and made up of separate zones. Typically a PLC and drive system is used to control the conveyor.

Accurate temperature control in each zone is essential to reduce wastage, normally attributed to under or over baking. Ovens may be many meters in length, and running cabling the length of the machine can be expensive.

Using EPC2000 devices distributed along the machine allows each controller to be placed near to the point of use, reducing cable runs and maintaining operating temperature even if the PLC is offline.

Each EPC2000 controller may be daisy chained to the next with a fast Ethernet link to the PLC using standard industrial protocols.
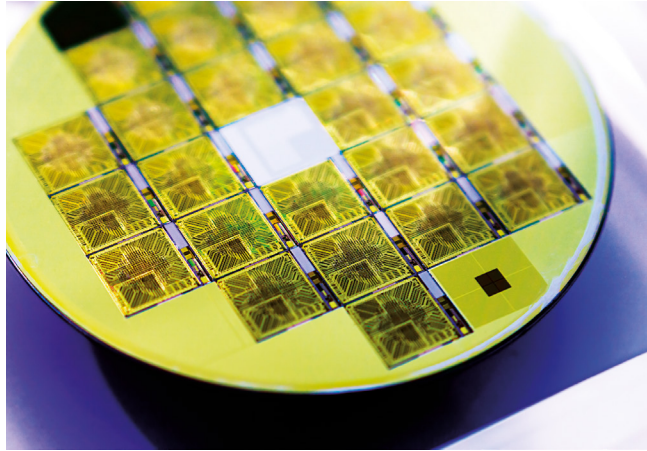
# Real World Applications

## Semiconductor Etch Processes

The etching process is used to remove surface layers from a wafer during semiconductor fabrication. It is a critically important part of the manufacturing process and each wafer will undergo multiple etching steps.

Successful etching relies upon forming a high-uniformity cavity in the surface using a combination of chemistry and precise control of temperature. As die sizes shrink, the performance of the temperature control system becomes increasingly important for yield. Wafers have a limited tolerance to temperature fluctuations during the full fabrication cycle, and it is important in each process step to minimize temperature variation.

The EPC2000 controller is a highly versatile and cost effective solution offering high-stability precision measurement and control with Ethernet connectivity.



The enhanced Eurotherm PID algorithm is particularly well suited to critical process steps, with rapid mitigation of disturbances caused by chemical introduction and associated pressure and temperature fluctuations, minimizing overshoot.

## Post Weld Heat Treatment (PWHT) of Pipes

Post weld heat treatment is a method of reducing residual stresses in welded joints. Joints are wrapped in ceramic pad heating elements and heated according to a specific ramp/soak sequence and often applied across multiple heating zones simultaneously.

EPC2000 controllers provide a cost-effective method of clustering multiple single loops in a compact console built into a portable trolley.

One unit is configured as a master programmer, broadcasting a setpoint to several slave units. Each slave uses a deviation alarm relay to close a digital input on the master unit if it has not yet approached setpoint, to provide a holdback or "guaranteed soak" function in each zone.

Using the recipe function on the EPC2000 instrument, units can be easily reconfigured



with a digital input, permitting a console to be subdivided into switchable sets running different profiles at the same time for separate operations.

Connectivity can be provided via Ethernet or via a WiFi access point for logging of the treatment operation.

# EPC2000 Programmable Controller Key Features

| General | |
|---|---|
| Format | Compact DIN rail mounting units, no display, 24V ac/dc PSU connection. Operating range 0ºC to 55ºC (32ºF to 131ºF). |
| Size | Approx (H)131mm (5.17in) x (D)107mm (4.22in) x (W)33mm (1.28in) |
| IP Rating | IP20 |
| PV Accuracy and Control Cycle Time | Single 0.1% Full scale precision input with exceptional thermal stability, 50ms sample time. Control Cycle time 50ms process inputs, 62.5ms thermocouples, 100ms resistance thermometer. Automatic cycle time selection with optimized mains cycle rejection. |
| Outputs | SSR drive logic output or 0-20mA DC linear output (SCR drive or valve), plus 1 Form A and 1 Form C relay. |
| Logic Inputs | 2 contact closure logic inputs for interlocks and events. |
| Alarms | Six freely configurable alarms with manual, automatic, non-latching and event types plus alarm delay function and blocking. Alarms may be inhibited in standby. Other process and sensor break alarms available. |

| Network Integration | |
|---|---|
| Ethernet Communications | 100BASE-T with plug and play "Bonjour" connection. Maximum separation 100m with CAT 5 cable. IIoT and Industry 4.0 ready. |
| Ethernet Connection Type | RJ45 with integral switch permitting daisy chain connection. |
| Ethernet Protocols | Modbus/TCP Slave, EtherNet/IP Server, Modbus TCP Master (up to 3 slaves). |
| Cybersecurity Certification | Achilles CRT Level 1. |
| Serial Communications | EIA485-Modbus RTU Slave, Broadcast Master. Up to 32 slaves on a single network segment, may be increased with repeaters. Serial communications are independent of Ethernet and may be run concurrently. |
| HMI Connection | Via Ethernet or Serial Communications. Eurotherm recommends HMI solutions from Pro-face by Schneider Electric. |
| Comms Selection | Simple configuration of basic Ethernet communications via a recessed button on the instrument front. Select from fixed IP address and plug and play operation. |
| Programming Software | Eurotherm iTools |

| Control and Specialist Functions | |
|---|---|
| Control Algorithm | Eurotherm Enhanced PID with Fourier autotune, offering fast disturbance response and overshoot minimization. 2 PID sets with gain scheduling. |
| Standard Applications | Basic Heat and Heat/Cool applications available pre-wired via order code or parameter selection. |
| User Wiring | User Function Block Wiring of standard maths and special function blocks, to permit I/O pre and post processing and interlock logic. |
| Function Blocks | Linearization, Maths, Logic, Multiplexing, 32 bit totalizers, Counter/Timer, LIN16 and Zirconia. |
| Setpoint Ramp Programmer | Maximum 20 program sequences of 8 segments. Options for 1x8, 1x24, 10x24, with textual program and segment names. |

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