E+PLC

Precision PLC

Simplifying the process puzzle

invensys
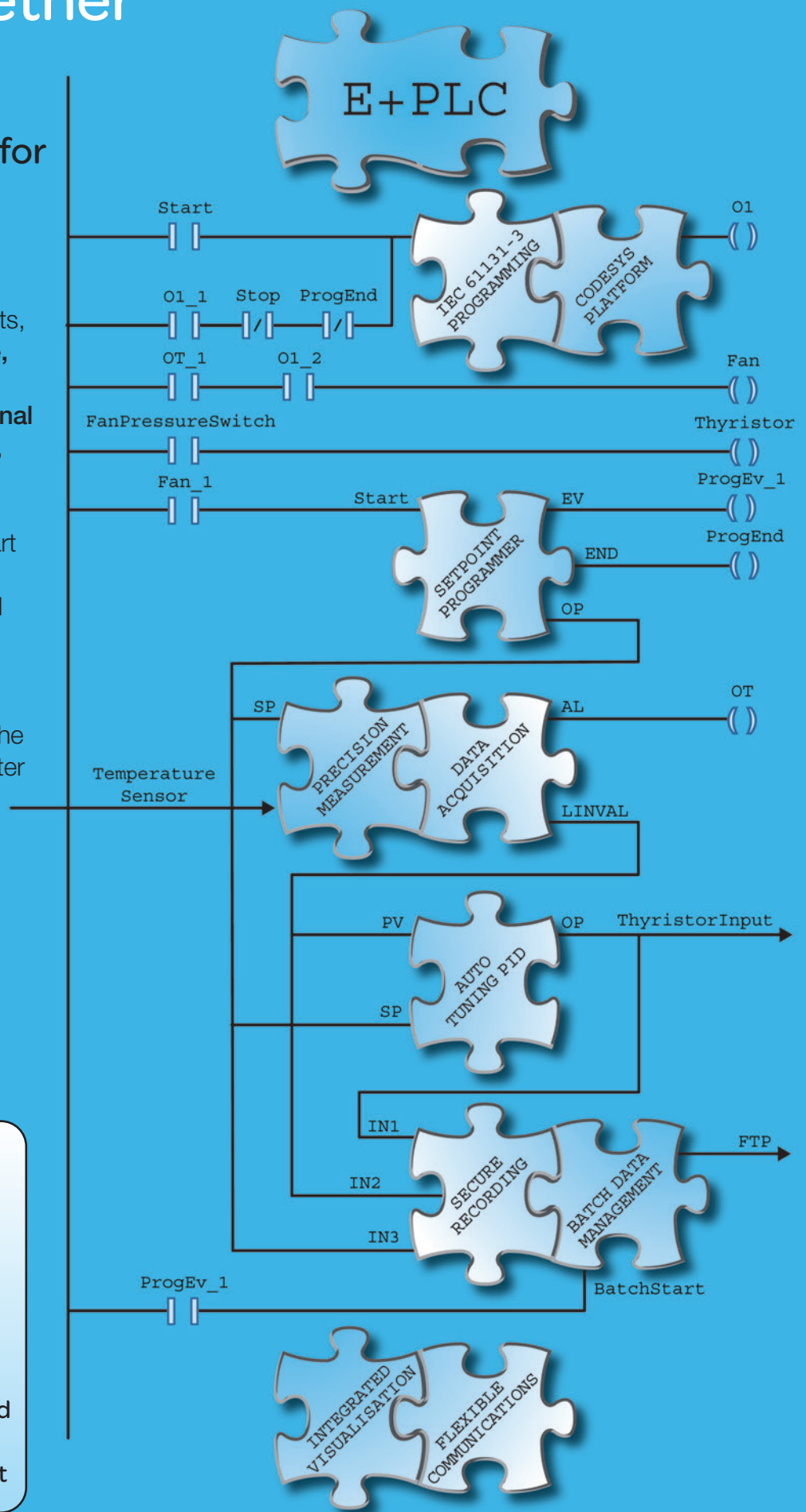Eurotherm

E+PLC – putting your process puzzle together

Better for your customers, better for your bottom line

When controlling a process, precision brings many benefits, It can **reduce energy usage, shorten processing times, minimise waste, improve final product quality** and, overall, **increase your profitability**.

The E+PLC contains the heart of Eurotherm expertise in measurement, recording and control, all in a flexible, PLC package.

Talk to us today about how the E+PLC can help you get better value from your process.

E+PLC
E= Eurotherm analogue control and secure recording neatly packaged in function blocks that the programmer can freely instantiate
+
PLC = a complete, standard IEC 61131-3 PLC programming environment

E+PLC

IEC 61131-3 PROGRAMMING
CODESYS PLATFORM
SETPOINT PROGRAMMER
PRECISION MEASUREMENT
DATA ACQUISITION
AUTO TUNING PID
SECURE RECORDING
BATCH DATA MANAGEMENT
INTEGRATED VISUALISATION
FLEXIBLE COMMUNICATIONS

Start
O1_1 Stop ProgEnd
OT_1 O1_2
FanPressureSwitch
Fan_1 Start EV
END
OP
SP AL
Temperature Sensor
LINVAL
PV OP ThyristorInput
SP
IN1
IN2
IN3
ProgEv_1
BatchStart

O1
Fan
Thyristor
ProgEv_1
ProgEnd
OT
FTP

An open PLC designed to offer control and recording... easily

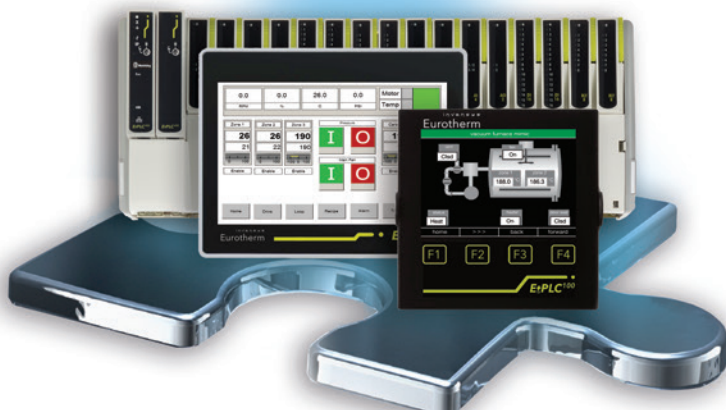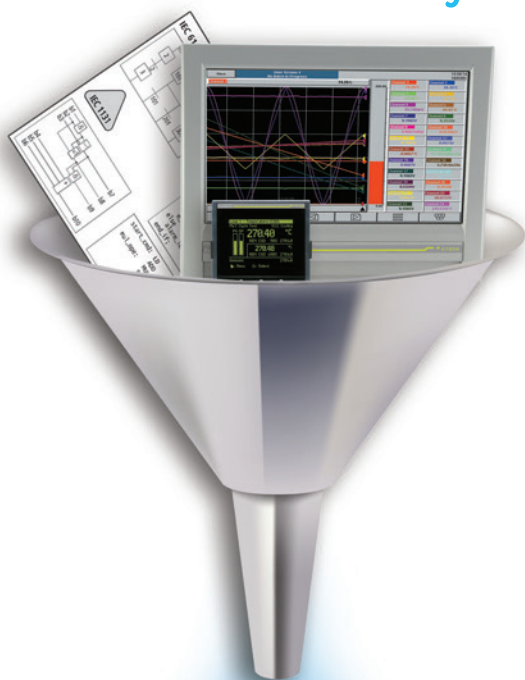## Reduced engineering, better performance

E+PLC is an open standards based PLC platform combined with decades of knowledge in precision PID control and secure recording packaged in function blocks for incredibly easy implementation.

- Standard CODESYS platform
- No learning curve - standard IEC 61131-3 programming
- The best in PID control and secure recording packaged for quick, easy implementation

E+PLC

A complete, integrated PLC solution that is simply easier to engineer and gives better process performance.

Why compromise?

Precision measurement...

enabling better process performance

- Precise, repeatable results
- Enables precise control and accurate recording
- Optimises energy usage

Precision control...

increasing efficiency, reducing costs, improving quality

- Simple function block instantiation, capturing 50 years of control experience
- Optimises processing time
- Optimises energy usage
- Reduces application engineering and commissioning costs
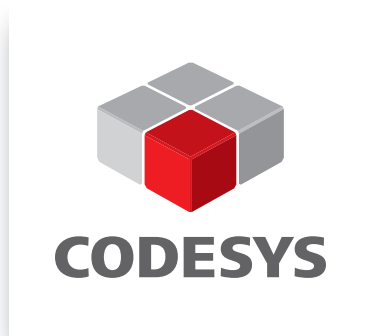
Secure recording...

at point of measurement for complete peace of mind

- Total data integrity and security
- Tamper resistant files
- Highly efficient data management strategies
- Helps ensure compliance with regulatory and quality standards

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Everything you would expect from a PLC

The benefits of a CODESYS platform inside

E+PLC uses CODESYS, a leading platform which provides a familiar programming environment and reduces engineering costs. Complete solutions are built in one integrated development environment, which reduces the time and cost of implementing a system. Using this single tool users have the flexibility to develop sophisticated PLC strategies and corresponding HMI functionality with seamless integration between the two. Advanced Eurotherm algorithms can be readily selected in the form of easily applied function blocks. The resulting E+PLC solution gives the perfect combination of a standard, open platform and focussed application-specific capability.

CODESYS® is a trademark of 3S-Smart Software Solutions GmbH.
www.codesys.com

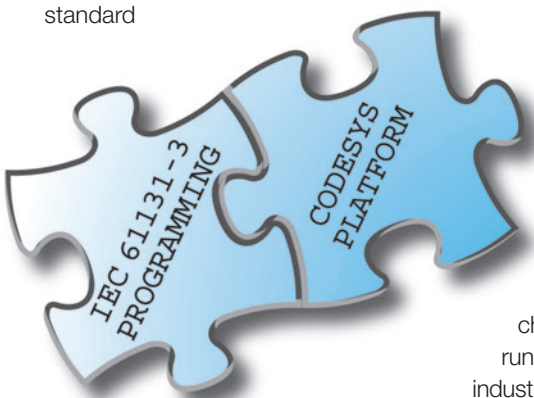## Enhanced visualisation for custom views of the process

For ease of use and faster setup, fully integrated CODESYS Visualisation offers a modular facility to create enhanced views of the plant. The visualisation editor provides ready-made graphical elements supported by a range of commands. Modern visualisation masks with defined styles can be quickly created and the resulting elements organized in libraries and repositories for future use.

- Concurrent design of visualisation speeds up application programming of graphic elements

- Built in graphical elements for faster setup

- Easy creation of styles for custom look and feel

- Modern masks for enhanced views of simulation, operation and monitoring of the plant

Keeping up with the latest technology

CODESYS is well supported by a specialist team, responsible for constant maintenance and development. The open platform also creates a knowledge sharing culture resulting in a large network of skilled engineers familiar with the CODESYS development environment.

- Dedicated teams providing continuous maintenance and development of new technologies

- Developed through years of specialist industry knowledge

- Involved in committees that contribute to the international IEC 61131-3 standard
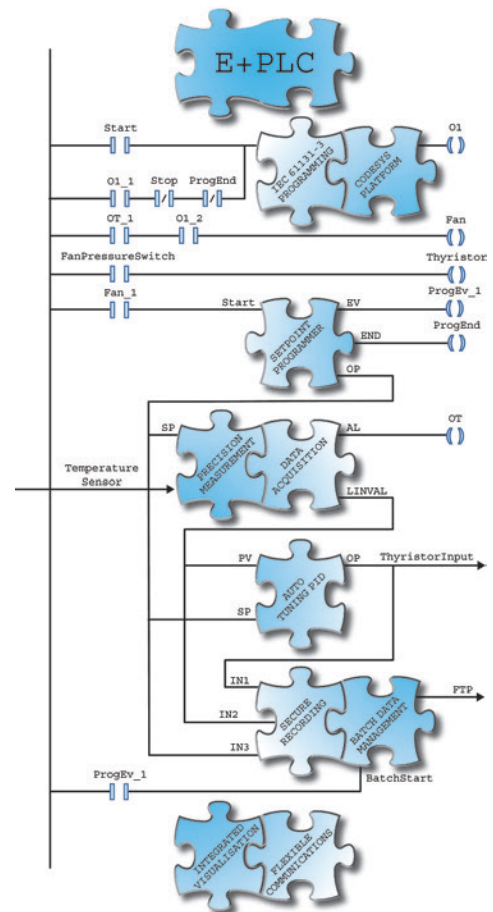
Flexible programming on an open PLC Platform

CODESYS is an open PLC programming platform based on the IEC 61131-3 standard. It is a well-respected solution designed for efficiency and ease of use. Fully portable to and from other products and applications and providing total programming flexibility, it gives an enhanced user experience to the Eurotherm E+PLC range.

IEC 61131-3 programming languages supported:

- Continuous Function Chart (CFC)
- Function Block Diagram (FBD)
- Instruction List (IL)
- Ladder Logic Diagram (LD)
- Sequential Function Chart (SFC)
- Structured Text (ST)

Easy engineering

- Comprehensive built in libraries and function blocks

- Custom, 3rd Party library support

- Unique Eurotherm function blocks for precision PID, autotune, setpoint programming, batch recording and archiving

- Faster commissioning

- Complete OEM security: Application programs are protected and cannot be reverse engineered

With over two million licenses sold worldwide, Codesys is the software of choice for efficient day to day running and future scalability of industrial automation applications.
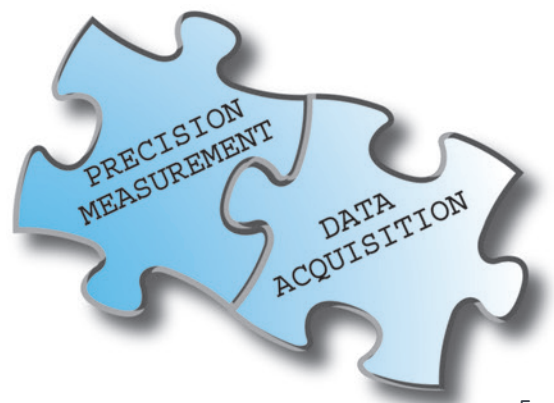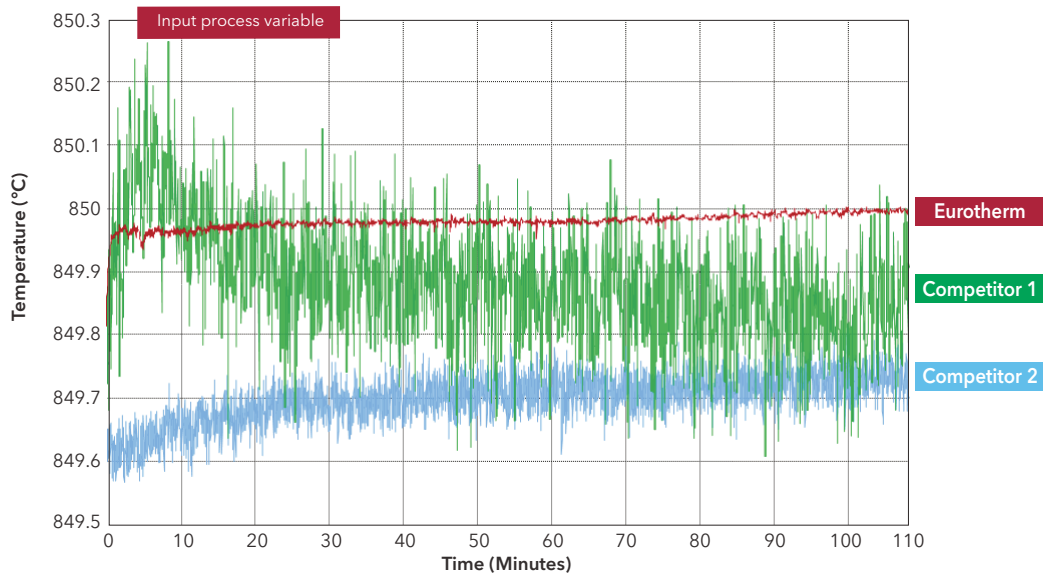
4

Precise, repeatable results

Precision measurement in a PLC

E+PLC offers precise measurement of process variables to give accurate, repeatable results which translate into optimised energy usage. Its precision is based on the fundamental requirement that to control accurately, you need to measure precisely.

- High stability, high repeatability measurements to 0.1% of span precision

- High level of input noise rejection

- Exceptionally fast acting cold junction temperature compensation for thermocouples

- Accurate linearization for industry standard thermocouples, resistance thermometers and many other sensors

- Tighter process tolerances to handle the most demanding production operations

- Low input noise prevents control oscillations, allowing precise control to setpoint within tolerance

- Flawless operation for regulated processes, for example AMS2750E, CQI-9

Accuracy comparison to competitor products

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Auto-tuning PID control in a PLC

50 years of experience in improving process performance

Unique Eurotherm auto-tuning PID algorithms are contained within E+PLC in the form of easily parameterised function blocks. They provide precision control which is designed to improve process performance, produce higher quality results, reduce processing time, and lower costs. An effective auto-tune algorithm reduces commissioning and loop setup time. The control gets to the required setpoint quickly, with minimal overshoot and tighter tolerances, resulting in:

- Reduced processing time
- Reduced energy usage
- Simply better, stable control performance with tighter tolerances
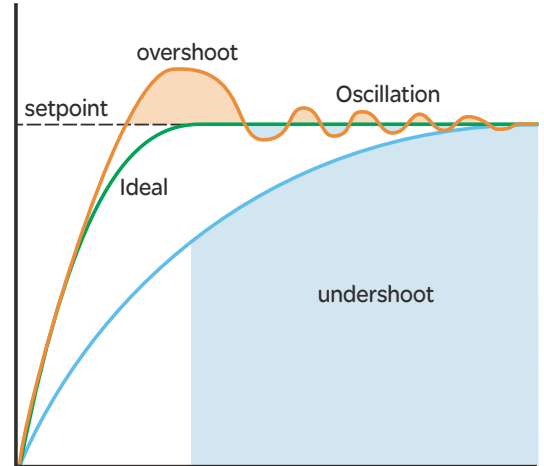- Reliable, repeatable, high quality results

Eurotherm control algorithms protect product quality by eliminating overshoot and providing tighter tolerances to the required setpoint. The resulting finer, repeatable control makes processes more predictable and aids with compliance to both regulatory and quality standards. The improvements in process performance gained also reduce wasted energy and processing times, thus maximising overall equipment efficiency (OEE).

Superior control with reduced engineering

E+PLC uses a single, integrated programming environment to optimise engineering efficiency. High performance PID control capability is made readily available within this environment in the form of pre-engineered function blocks. Users need to simply parameterise the blocks and can instantiate them as many times as required for an application.
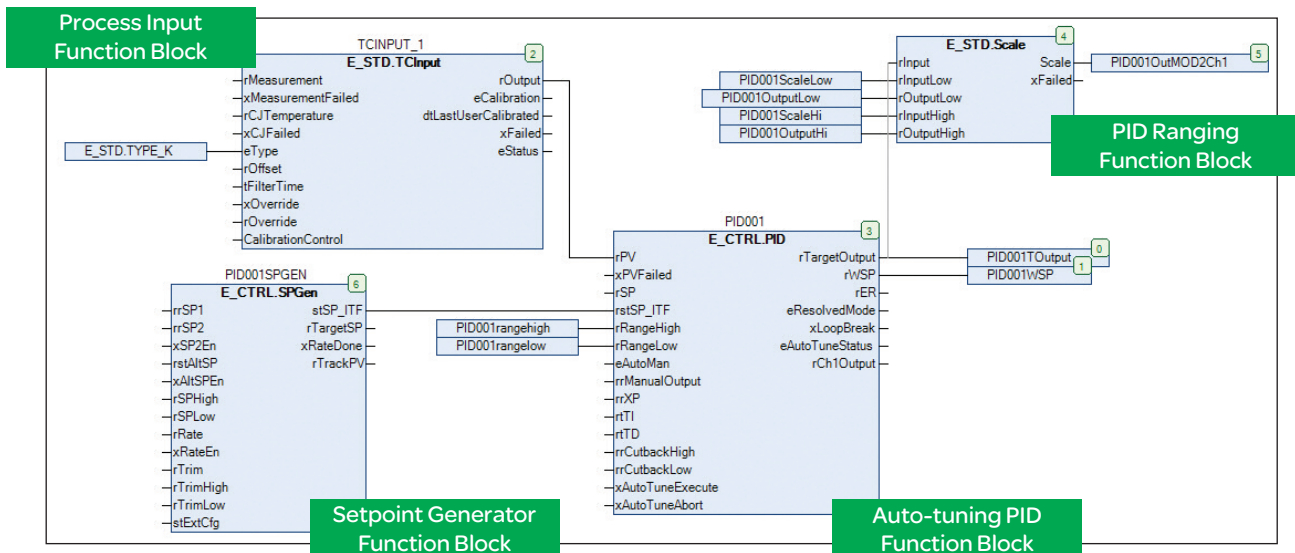
Over Operating Temperature results in:

- Wasted energy
- Over-heated workpiece
- Possible scrap

Under Operating Temperature results in:

- Wasted time
- Wasted energy
- Slower throughput
- Possible non-comformance and re-work

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Secure recording in a PLC

Robust compliance with regulatory and quality standards

The E+PLC product range delivers the complete peace of mind associated with total data integrity and security. It keeps vital process records safe using highly efficient data management strategies which extend all the way to automated offsite storage and analysis of historical process data using the innovative EOS (Eurotherm Online Services) Director.

- Total security, complete peace of mind
  — Tamper resistant records are created with continual recording to internal Flash memory at point of measurement
  — Power fail safe strategy with validated files to be certain data is never lost
  — Based on decades of experience and over 20 years of backward compatible file format
  — Complete traceability
  — Robust to network failure

- More efficient data management
  — Integrated recording functionality readily available on E+PLC platform
  — Flexible, easily configurable recording and archiving strategies to suit plant requirements
  — Easily search and recreate historical records

Smart Data Management
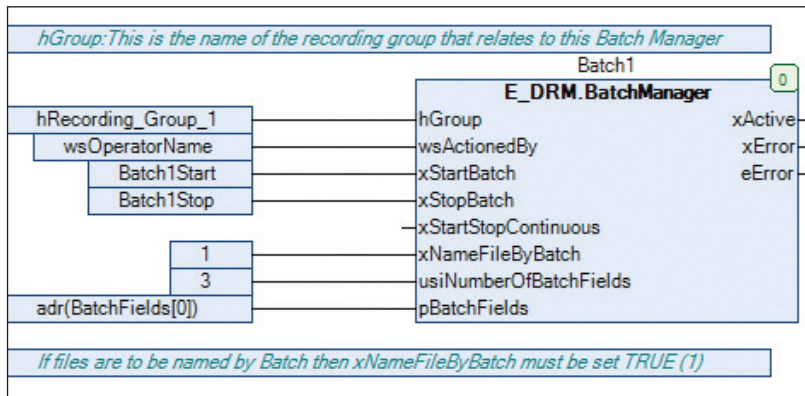
Self-healing, validated archiving strategy: E+PLC stores data locally and archives to local media and/or over the network to a server. If there is a network failure, data is automatically pushed to the server when it has recovered, resulting in a self-healing, validated and totally robust archive.

Eurotherm Online Services: Supporting E+PLC are EOS Director and EOS Advisor, the latest products in efficient data and accreditation management designed to further improve operational efficiency. They give added assurance that process records are kept safe for as long as they are needed and that productivity is maximised through efficient management of accreditation status.
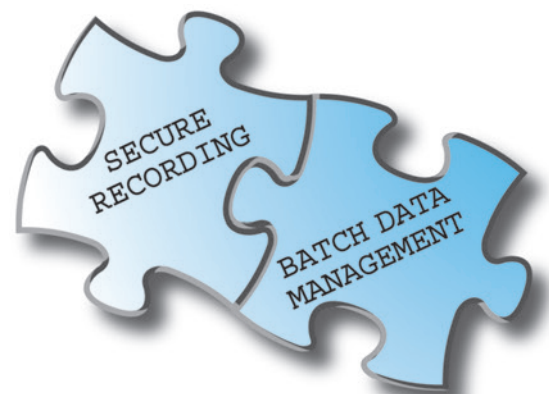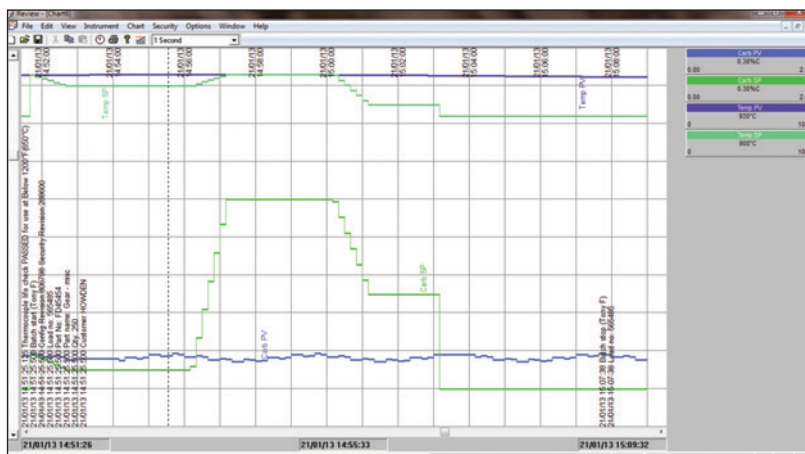
Find out more about Eurotherm Online Services at **www.eurotherm.co.uk/eos**

Batch data management in a PLC

E+PLC provides readily available batch recording that captures all process and metadata associated with a batch in easily searched, secure records. This ensures high integrity traceability of the process history for compliance with both regulatory and quality standards.

- Complete batch traceability
- Assured data integrity and security
- Efficient handling of batch data with easy search facility
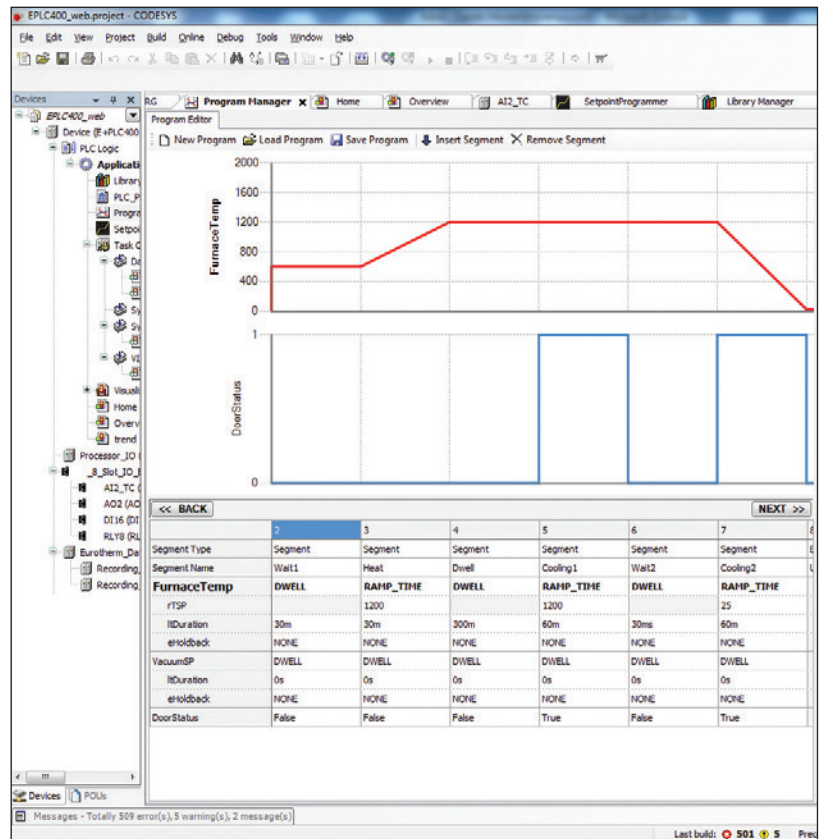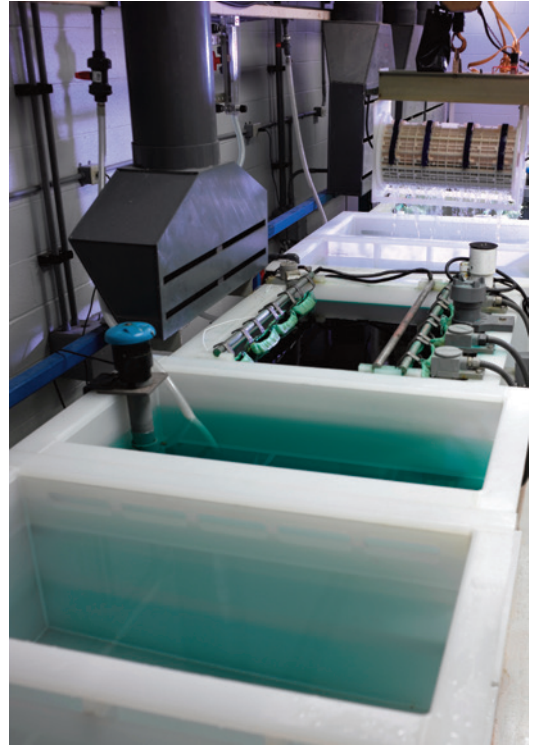- Suitable for use in ISA-S88 batch systems

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Easy setpoint programming in a PLC

Saves programming time and gives guaranteed operation

E+PLC has incredibly easy to use yet flexible setpoint programming capability. Straightforward configuration saves programming time and the instrument performance gives guaranteed operation which helps to lower processing costs.

- Efficient engineering
  - Multiple segments and parameters can be quickly configured using a simple spreadsheet style format
  - Simple parameterisation saves programming time
  - Total flexibility with unlimited segment
  - Unlimited analogue setpoints and digital events per segment

- Improved process efficiency, reduced cost, high quality results
  - Precise performance against required thermal profile
  - Minimal setpoint overshoot
  - Rapid control response
  - Guaranteed thermal soak times

- Increased operational efficiency
  - Multiple program recipes
  - Running programs can be edited
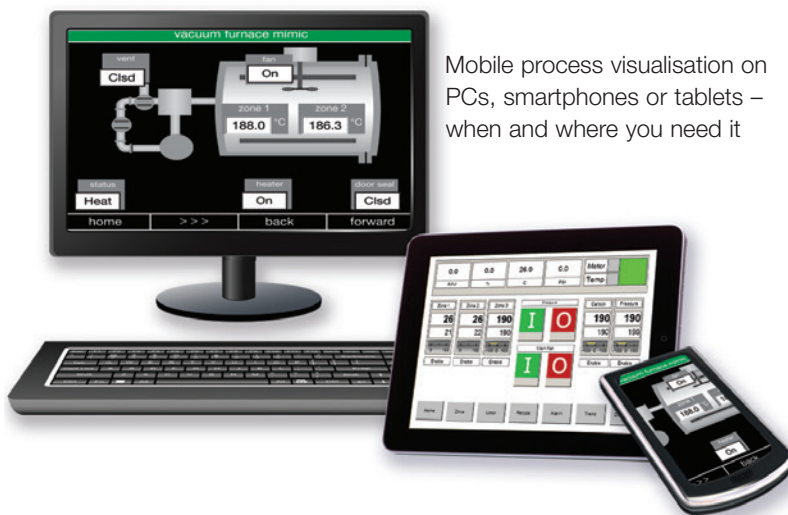 - Inbuilt power fail recovery routines.

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A PLC with integrated visualisation

Creating views onto a process could not be simpler

An E+PLC provides embedded visualisation which enables dynamic debugging of application programs together with concurrent development of the final process visualisation. Contained within a single programming environment, process displays are easily created for use where and when you need them.

- Efficient engineering with a single programming environment and automatic tag recognition
- Dynamic program diagnostics
- Extensive, configurable graphics libraries
- Access anywhere using any web browser on any platform
- Integrated local HMI on E+PLC[100]
- Connect up to two E+HMI[150] operator panels to E+PLC[400]

Mobile process visualisation on PCs, smartphones or tablets – when and where you need it

Advanced, versatile process visualisation ... easily engineered

E+HMI[150] Operator Panels - a completely integrated process interface

With a choice of 7" and 13" models available, they offer a highly effective, permanent operator interface onto the process at a suitable location. They are elegantly designed and offer a rich and easy visualisation solution through which processes can be monitored and controlled.

- Powerful graphics capability with easy creation and automatic control strategy integration via the E+PLC programming environment
- TFT colour display
- Slim design with mounting depth less than 50mm
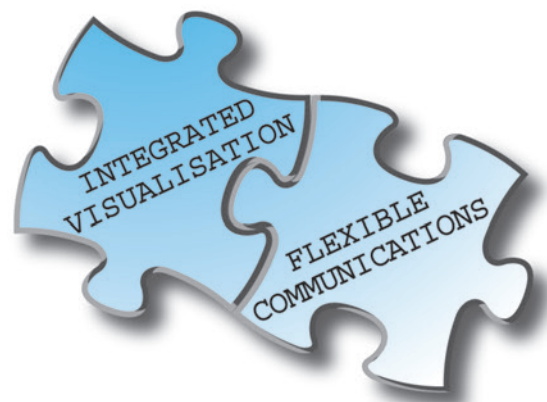- Two Ethernet ports with integrated switch

Flexible communications

Designed for easy integration

E+PLC products support a range of communications options to enable easy system integration and connection of slave instruments. Ethernet communications are also used for secure transfer of process data records via FTP to multiple specified servers and to the innovative EOS Director online data management facility.

- Straightforward integration into wider DCS/SCADA solutions
- Extend your solution by the easy connection of other Eurotherm products; including controllers, recorders, drives and power controllers

Please see individual product brochures for more detail on specific communications available per device

INTEGRATED VISUALISATION

FLEXIBLE COMMUNICATIONS

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The right solution for your application

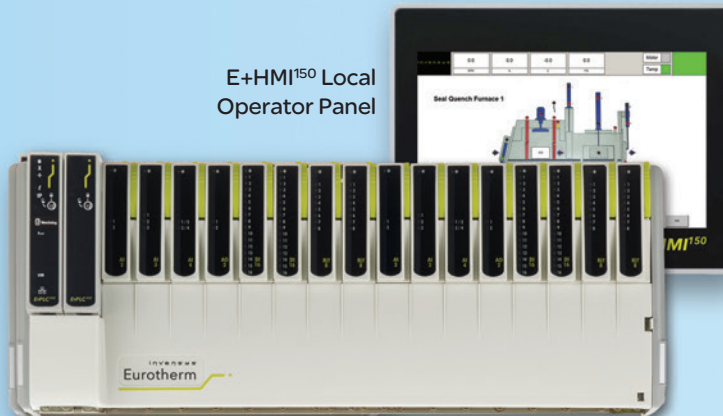## E+PLC^{100} – One small box, one complete solution

E+PLC^{100}

- A complete, compact PLC solution
- Precise control and secure recording fully integrated with your PLC application
- Minimises both your engineering and commissioning costs while maximising process performance
- Inbuilt extensive setpoint programmer function block
- Continuous or batch recording
- Visualisation browsable by smart devices

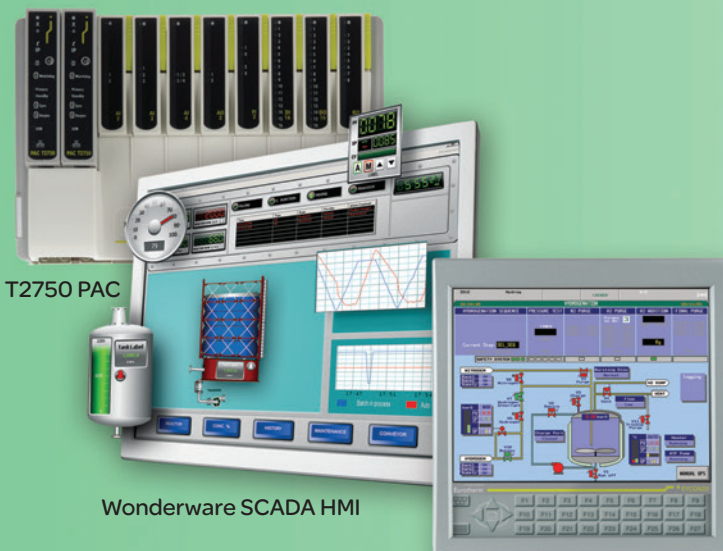## E+PLC^{400} – A versatile, precision PLC

E+HMI^{150} Local Operator Panel

E+PLC^{400}

- Modular solution with selection of base sizes to match application
- Precise control and secure recording fully integrated with your PLC application
- A scalable solution which minimises both your engineering and commissioning costs while maximising process performance
- Inbuilt extensive setpoint programmer function block
- Continuous or batch recording
- Visualisation browsable by smart devices

T2750 PAC – A plant-wide solution with plug in redundancy

T2750 PAC

Wonderware SCADA HMI

Eycon Visual Supervisor

- Complete distributed control and recording environment
- Easy system redundancy
- High availability solution
- Cost effective, high end solution
  - Continuous analogue, logic and sequential control
  - Complete ISA-S88 batch management
  - Secure data recording at point of measurement

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... whatever its size

Small scale single process up to 2 PID loop machine applications

E+PLC^{100} is a cleverly designed open PLC platform with integrated control and recording in a single, compact instrument. It offers full PLC functionality using CODESYS IEC 61131-3 programming. For its size, it has an impressive selection of precision I/O, making it ideal for smaller applications.

- Integrated HMI with intuitive 3.5" touchscreen display
- Integrated mobile/remote visualisation
- Provides four analogue inputs, two digital inputs, and up to two logic outputs, three relay outputs and three DC outputs
- Modbus TCP Master/Slave communications for easy integration into wider systems
- OPC DA connectivity
- Secure, point of measurement recording with inbuilt FTP of the secure files
- Intuitive operation, easily engineered

Medium scale multi-process multi-PID loop manufacturing lines

E+PLC^{400} is a complete, modular PLC solution which uses CODESYS IEC 61131-3 programming and is ideal for larger machines/processes. All functionality, including visualisation, is engineered through the E+PLC single programming environment, ensuring reduced engineering.

- Versatile range of precision analogue and digital I/O modules
- Integrated mobile/remote visualisation
- Connect up to two E+HMI^{150} operator panels as well as instant provision of remote/mobile visualisation
- Modbus TCP and Serial RTU Master/Slave and EtherCAT* communications for easy integration into wider systems
- OPC DA connectivity
- Secure, point of measurement recording with inbuilt FTP of the secure files

* please contact factory for availability

Large scale multi-process multi-PID loop plant solutions

For larger plants, the T2750 PAC (programmable automation controller) provides high performance control in a sophisticated, distributed solution. Control units with an I/O system form a complete distributed control and recording environment which offers total design flexibility in a high integrity solution.

- Can be easily integrated as part of a complete Wonderware SCADA HMI solution
- DCS style functionality
- Complete, plant-wide automation and control solution
- Modbus TCP, Modbus Serial Master/Slave, Profibus and LIN OPC communications
- Designed for use with FDA 21 CFR Part 11

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Simplified engineering ... with open connectivity to

EOS – Advisor

EOS Advisor is a unique, online solution for managing calibration and accreditation information and is the future for managing a plant's regulatory status. Calibration status of all your plant's equipment can be checked using a simple, intuitive web interface. Information such as calibration certificates can be quickly retrieved as and when required by authorised users. It enables you to easily maximise plant availability and ensure compliance with regulatory standards such as Nadcap, AMS2750E and CQI-9.

EOS Advisor is a powerful tool designed for the process industry. It removes the need to store paper documentation, improves operational efficiencies and facilitates better workflow. It provides an easy overview of the accreditation status of multiple sites and details where production scheduling issues may arise. It enables you to optimise production scheduling, efficiently manage service events and maximise plant availability and productivity.

A better way to manage your plant regulatory status

EPower™ Controller

- Modular Design
- Software Configurable
- QuickStart Easy Setup
- Advanced Configuration using Graphical Wiring Editor
- Predictive Load Management providing advanced energy management
- Flexible Communications
- Suitable for 1, 2, or 3 phase systems

The EPower controller uses the newest technologies and innovations to manage your process and reduce your energy costs. On every level it brings you the flexibility you need to best meet your requirements now and in the future.

- Flexibility – advanced technologies in harmony with modularity and ease of use to deliver your power control needs
- Efficiency – world class power control with innovative features to minimise your energy costs with exceptional process performance
- Peace of mind – a power controller that will bring you return on investment and can be adapted in the future if your requirements change – one product for all solutions
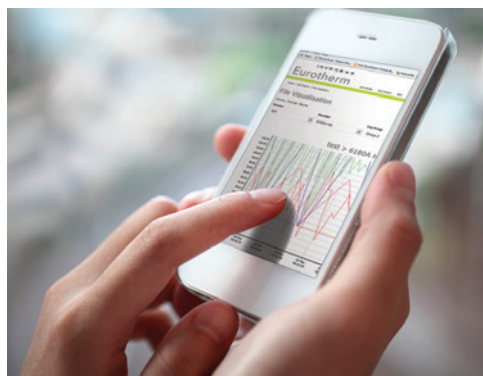
The future of power control

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other Eurotherm and CODESYS based products

EOS – Director

EOS Director is a lot more than secure, access anywhere file storage. It is specifically designed to provide a plant, batch and time centric view of your process data. Historical records can be searched, visualised and, if necessary, retrieved from this secure back-up facility faster than ever before. It provides effective management of data generated by recording devices, in particular the secure UHH files generated by Eurotherm products.

EOS Director provides both secure and efficient management of process data. It keeps data completely safe and contains intelligent, online tools which enable you to conveniently manage, search and analyse historical process records.

The modern way to maximise process data management efficiency

EPack™ Compact SCR Power Controller

The EPack power controller is a compact, fully featured instrument which combines a high level of functionality and configurability with simplicity of setup and operation. It supports advanced, configurable firing modes to closely match load characteristics and maximise process efficiency. These highly configurable units can be quickly adapted for current and future needs using software keys to enable additional functionality when needed.

- Exceptionally compact, efficient power controller designed to optimise energy usage
- Designed for single phase loads of currents from 1 to 63A and voltages from 100 to 500V
- Compact DIN rail and bulkhead mounting

The power to save is in your hands

Motor Drives

Eurotherm offers an extensive range of AC drives, soft starters and DC drives to suit a wide range of applications. Easy configuration, installation, and operation are featured throughout the ranges along with flexible programming and high accuracy performance.

AC Drives
A complete range of variable speed drives for AC induction motors. Models are available for everything from simple applications through to high accuracy, dynamic, complex system solutions. Units are designed for system integration with a number of fieldbus interface options available.

Soft Starters
A full range of micro-processor based Soft Starters which offer best starting performance in a cost effective solution. All models are rich with features including internal by-pass relay, fieldbus communications, intelligent pump control, optimised motor starting torque, electronic motor protection and remote HMI.

DC Drives
An impressive selection of analogue and digital DC drives for the control of DC shunt and DC permanent magnet motors. Digital models utilise fully programmable function blocks with soft wiring and offer an internal field controller.

A drive so clever its simple

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A lifetime of support

The innovative technology the E+PLC platform provides is supported throughout its lifecycle by highly professional teams of engineers who understand the challenges faced in modern industry. We will help you every step of the way, from selecting the right product for your application, through professional project management and engineering services, to comprehensive global technical service and support teams.

Working with Eurotherm, you will be able to access the decades of knowledge and experience we have in process control, recording and automation. Our experienced, professional engineers can help you get the most from your process. They can assist in programming, commissioning and helping to keep operations optimised throughout their lifetime. Our teams will ensure your control is correctly tuned, data secure, sensors correctly calibrated and system working efficiently.

- Comprehensive, highly professional global service network
- Deep understanding of control, recording and industrial applications
- Complete range of service level agreements to give you the peace of mind you require
- Support of an impressive research and development department containing leading domain experts

Complete peace of mind for efficiency and reliability throughout the lifetime of your system

Selection guide

	E+PLC		T2750 PAC
E+PLC and T2750 PAC			
FEATURES	**E+PLC^{100}**	**E+PLC^{400}**	**T2750 PAC**
Autotuning PID	✓	✓	✓
Setpoint Programmer	✓	✓	✓
Secure Recording	✓	✓	✓
Archiving Strategy	✓	✓	✓
Batch Management	✓	✓	✗
Processor Redundancy	✗	✗	✓
Peer-to-Peer Communication	✗	✗	✓
Programming Platform	CODESYS (open)	CODESYS (open)	LIN (proprietary)
Programming Languages	IEC61131-3 compliant CFC, FBD, IL, LD, SFC, ST	IEC61131-3 compliant CFC, FBD, IL, LD, SFC, ST	Based on IEC61131-3 FBD, SFC, ST
Product I/O Format	Fixed	Up to 16 x Modules	Up to 16 x Modules
Available I/O Dependant on build variant	AI(4), AO(3) DI(2), DO(2), RLY(3)	Modules: AI8*, AO2, DI6, DI16, DO16, RLY8, ZI*	Modules: AI8*, AO2, DI6, DI16, DO16, RLY8, FI2, ZI
I/O Expansion Method	Modbus	Modbus	Peer-to-Peer or Modbus
Communications Protocols	FTP Modbus TCP/IP (Master/Slave)	FTP Modbus TCP/IP (Master/Slave) Modbus Serial RTU (Master/Slave) EtherCAT*	FTP Modbus TCP/IP (Master/Slave) Modbus Serial RTU (Master/Slave) Profibus DP (Master/Slave)*
Suitable for AMS2750E Process	✓	✓	✓
Recording Duration (approx.) 1s Based on 4 chs at intervals of: 10s 20s 60s	12.97 days 129.7 days 259.45 days 2.13 years	50.5 days 1.38 years 2.77 years 8.3 years	14.83 days 148.26 days 296.52 days 2.43 years
Panel HMI (Protocol)	Built in (OPC DA)	E+HMI^{150} (OPC DA)	Eycon (LIN OPC)
Web Visualisaton	✓	✓	✗
Mounting	Panel	DIN	DIN

* Contact factory for availability

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Decades of application knowledge in a PLC

E+PLC contains decades of experience and understanding of industrial processes, how to control them well and meet regulatory requirements. Most PLCs have been developed from a sequential control platform. E+PLC is different. It has developed from a deep understanding of analogue control and secure recording and how these are applied across many industries.

Performance without compromise

- A single, integrated PLC solution with inbuilt superior control and secure recording

- Developed from a deep understanding of precise, analogue PID control and the applications in which it is required

- Designed to improve process performance, reduce energy and increase profitability

- Rich and versatile functionality to meet the most demanding of modern process needs

Heat Treatment and Special Processes

The E+PLC platform offers proven performance and efficiency, using algorithms that have been developed by Eurotherm through its close partnership with the Heat Treatment Industry. Its design is based on deep understanding of both process requirements and the regulations that govern this market sector. The precision measurement, stable control and secure recording functionality provided by E+PLC delivers accuracy and simplified regulatory compliance with reduced engineering costs for heat treatment processes.
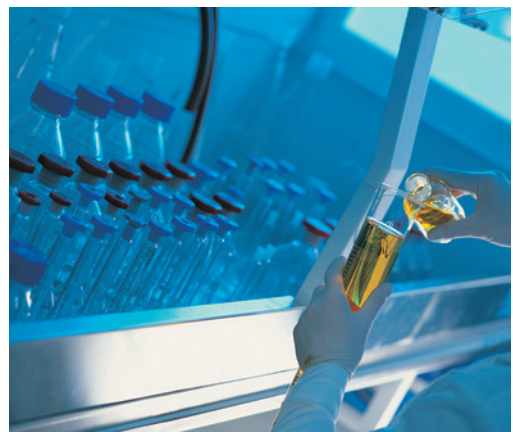
- Simplify compliance with regulations such as AMS2750E, Nadcap and CQI-9

- Improve process performance while reducing engineering costs

- The peace of mind of working with a product based on decades of experience and understanding of Heat Treatment and Special Processes
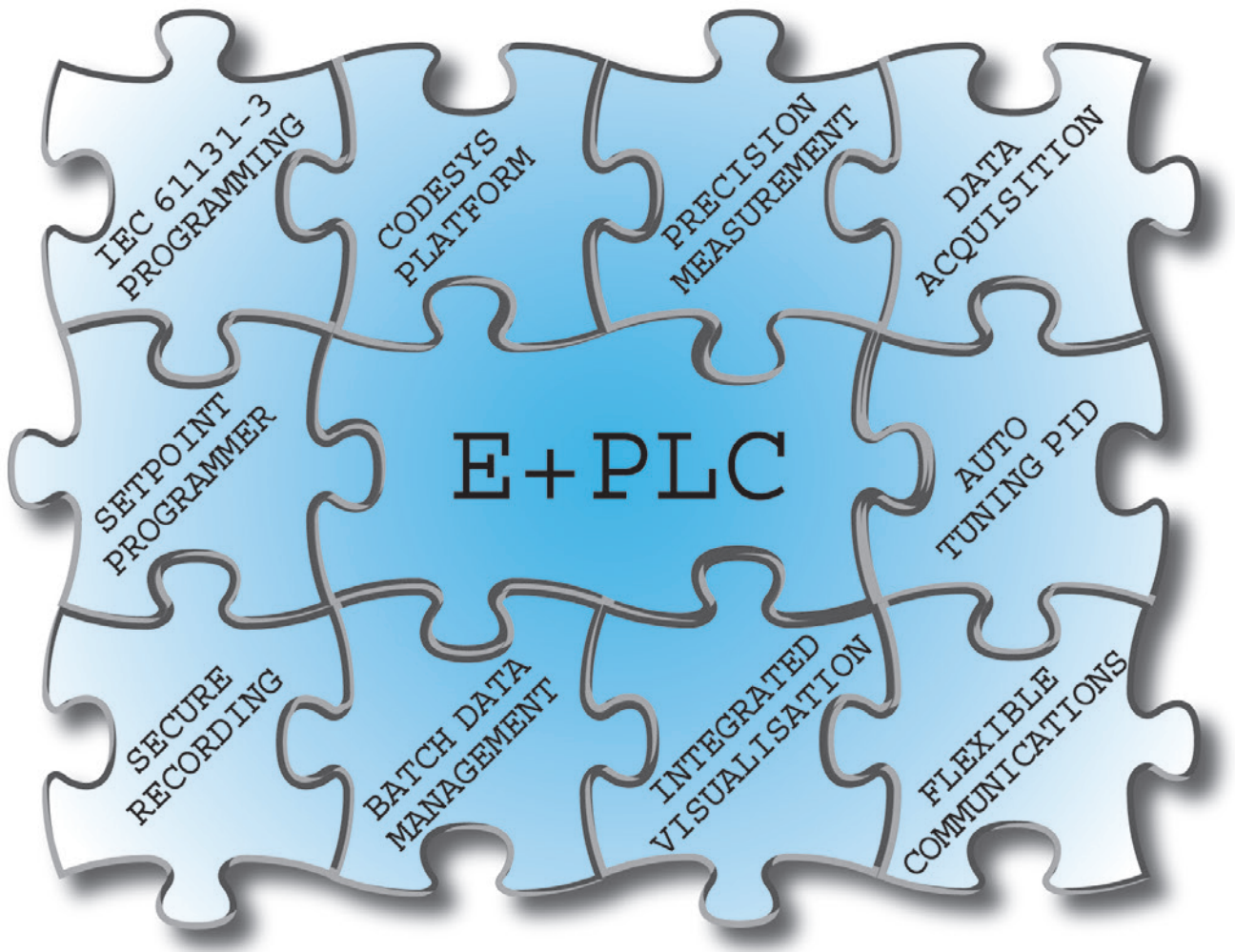
Life Sciences

E+PLC uses proven, pre-tested function blocks which not only reduce engineering times but also help facilitate system validation in Life Sciences applications. Advanced control performance and secure recording functionality make this product range ideal for critical applications. E+PLC offers a reliable, cost effective solution which can help improve plant efficiencies. It is supported by 50 years of experience in serving Pharmaceutical and Biotech industries, with teams which can help you get more from your processes and aid compliance with regulatory industries such as FDA and EMA (European Medicines Agency).

- Experienced teams to aid with regulatory compliance

- Re-usable function blocks to reduce engineering and validation times

- Stable, accurate control for the most demanding processes

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E+PLC – simplifying the process puzzle

Eurotherm: International Sales and Support

www.eurotherm.com

Contact Information

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Worthing, West Sussex, BN13 3PL

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