EUROTHERM® FLEXIBLE SOLUTIONS

# EPower™

CONTROLLER


PLM
Predictive Load Management

FLEXIBILITY
EFFICIENCY
PEACE OF MIND

*THE FUTURE OF POWER CONTROL*

invensys®
EUROTHERM®

# EPower™ Controller – extraordinary power control

The EPower Controller is the latest product in the Eurotherm range of power controllers. It 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. Let us look after your power control for you with EPower Controllers and give you the peace of mind that you have the best for your process – even as it changes.

Eurotherm has a significant R&D capability and a policy of continuous development, improvement and innovation. Investing in EPower Controllers will keep options and new developments within your reach as you can upgrade to meet your changing requirements at any point.

- ***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*

## Revolutionary modularity and configurability to meet your needs...

- Easy ordering, configuration and maintenance through modular design
- If your requirements change EPower Controller can be easily adapted to your needs
- Minimum spares holding – many options configurable through a common driver module e.g. firing mode, load, phases, control etc.
- Up to four power modules provide single and multi-phase control
- Software configurable options to bring you flexibility:

| Control Type | Firing Modes | Load Type | Load Configuration | Feedback |
|---|---|---|---|---|
| Single phase | Phase angle | Standard Resistive | Single phase | $V^2$ |
| 2 x single phase | Half cycle | Complex Resistive | Star | $I^2$ |
| 3 x single phase | Burst firing | Inductive e.g. Transformer | Delta | True power |
| 4 x single phase | Fix modulation period | Short Wave Infrared | Star with neutral | RMS load voltage |
| Two phase | Logic mode | | Open Delta | RMS load current |
| 2 x two phase | | | | Open loop |
| True three phase | | | | |

You no longer need to be restricted to the options that you order – EPower Controller provides you with configurable options and modular hardware to give you the flexibility to match your process now and in the future. Combine this with an instrument that provides easy configuration via the integral display and full graphical configuration via iTools PC configuration tool as standard – you have a power controller that makes life that bit easier.

## The options that you need...

A single driver module can support up to four power modules – and hence four independent control loops. Power modules are available in current ratings covering a range from 100A to 400A. The driver module itself supports option boards to give you additional flexibility in your solution:

- **Communications** – RS485 Modbus RTU, Profibus, DeviceNet® and Modbus TCP network protocols
- **Predictive Load Management (PLM)*** – A powerful feature to effectively manage your power requirements across multiple machines to save on your energy costs

Predictive Load Management

- **Flexible I/O** – The driver module supports standard I/O and up to three additional I/O boards with analogue inputs, analogue outputs, digital I/O and relay outputs.

* patent pending

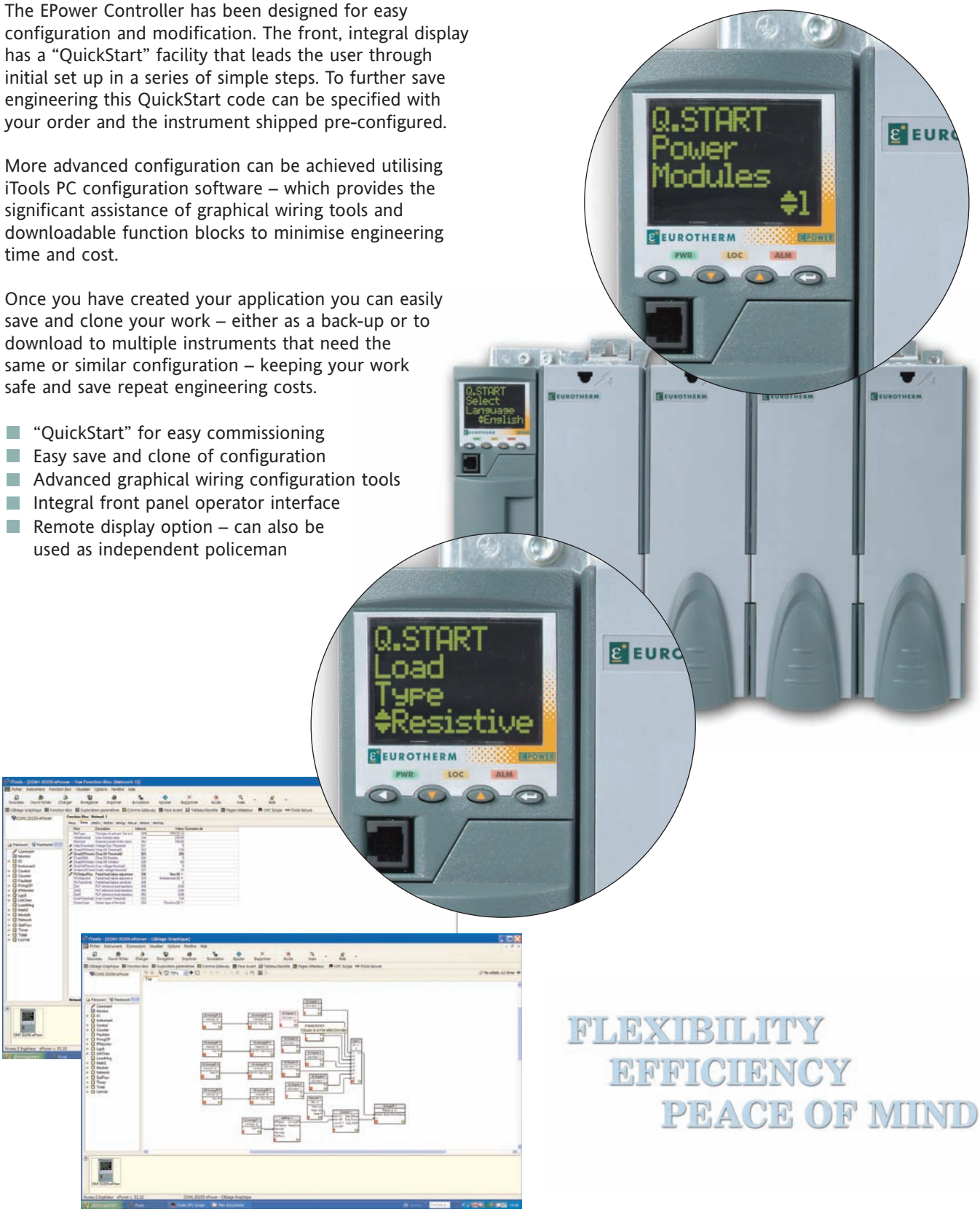
# Easy configuration to save you engineering costs ...

The EPower Controller has been designed for easy configuration and modification. The front, integral display has a “QuickStart” facility that leads the user through initial set up in a series of simple steps. To further save engineering this QuickStart code can be specified with your order and the instrument shipped pre-configured.

More advanced configuration can be achieved utilising iTools PC configuration software – which provides the significant assistance of graphical wiring tools and downloadable function blocks to minimise engineering time and cost.

Once you have created your application you can easily save and clone your work – either as a back-up or to download to multiple instruments that need the same or similar configuration – keeping your work safe and save repeat engineering costs.

- “QuickStart” for easy commissioning
- Easy save and clone of configuration
- Advanced graphical wiring configuration tools
- Integral front panel operator interface
- Remote display option – can also be used as independent policeman

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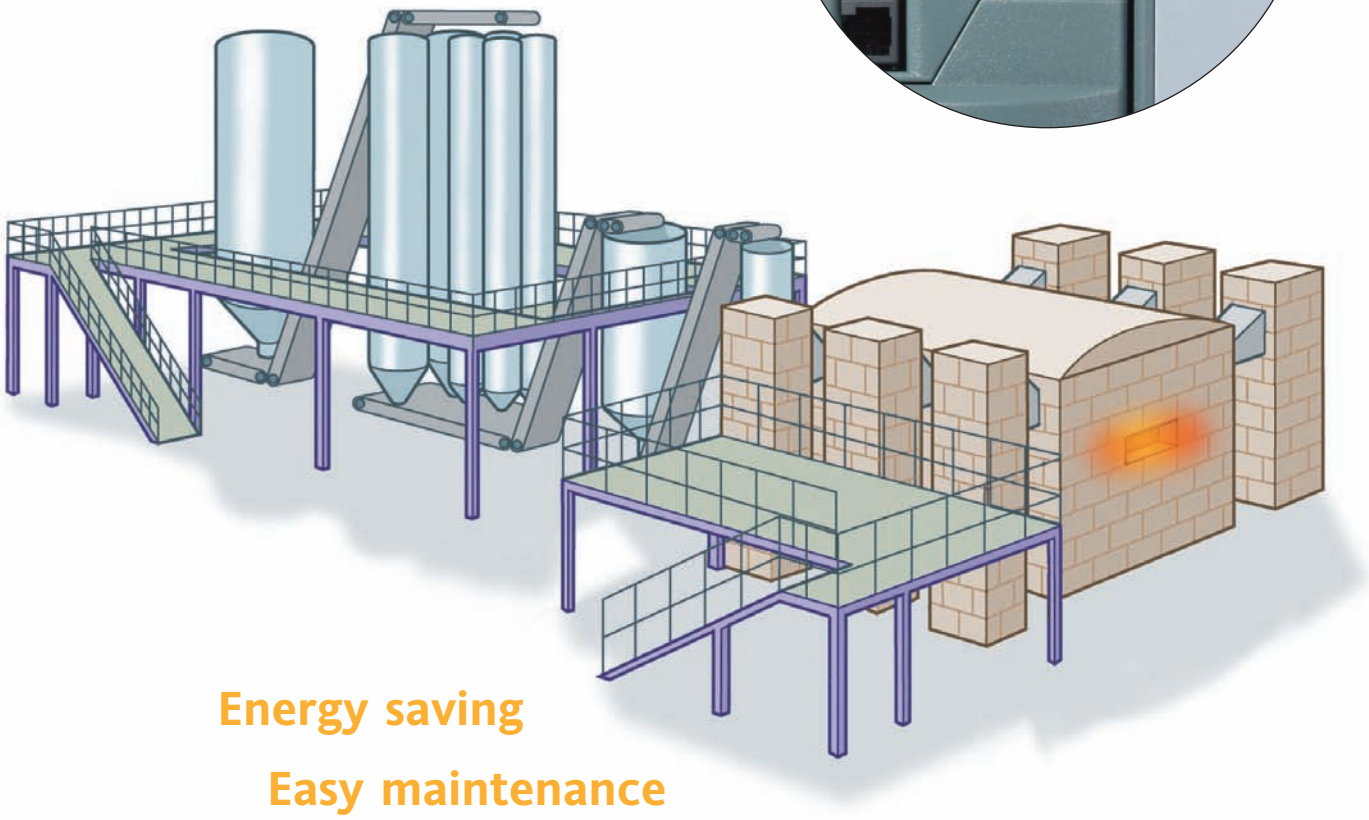
# Efficiency through advanced technologies...

EPower Controllers have measurement accuracy, functionality and innovation that will deliver you extraordinary power control to help your process, environment and budget.

- Measurement accuracy (better than 1%) to help save energy
- Load management for better distribution of energy and to minimise peak energy usage costs
- Reduce energy bills and other costs with a selection of advanced firing modes to best suit your load type:
  - Minimise electrical disturbance
  - Increase lifetime of heater elements


## Improve power factor



## Energy saving

## Easy maintenance

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# Predictive Load Management
## – the best innovation for energy management

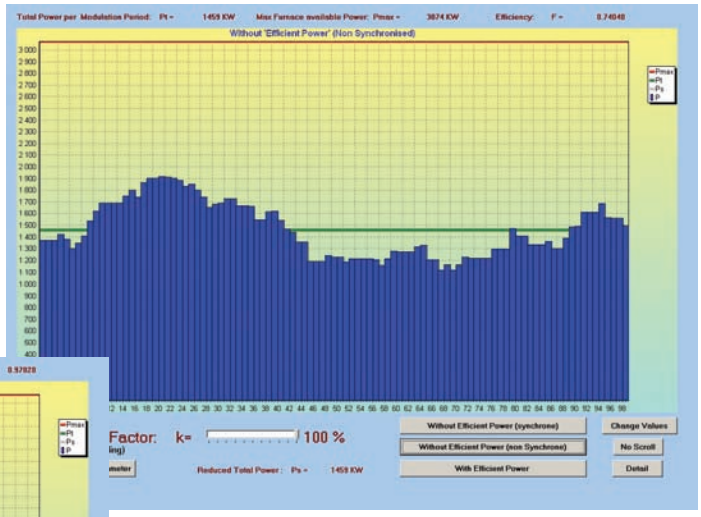
You can reduce your energy costs across your plant by utilising the Predictive Load Management (patent pending) functionality within the EPower Controller. This new feature provides a better distribution of energy across different loads in your installation, by managing the priority and, if necessary, load shedding,

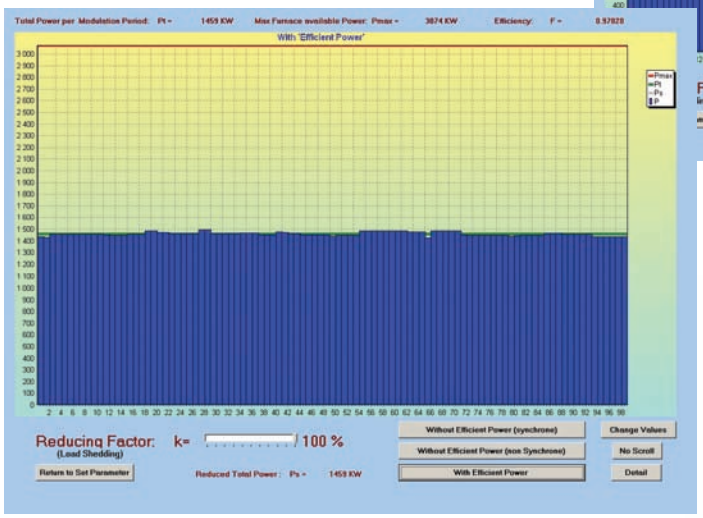
The EPower Controller prevents overshoot of the nominal power. This will keep you within the limits of your electrical contract for your installation and prevent increases in energy tariffs imposed by your supplier. Unlike other software offering this type of feature, Predictive Load Management from Eurotherm anticipates your energy usage rather than just reacting when you have already exceeded your tariff peak.

***Using EPower Controllers with Predictive Load Management could well be one of the best value decisions you could make for your plant!***

PLM
Predictive Load Management

**Power consumed without "Predictive Load Management"**




**Power consumed with "Predictive Load Management"**

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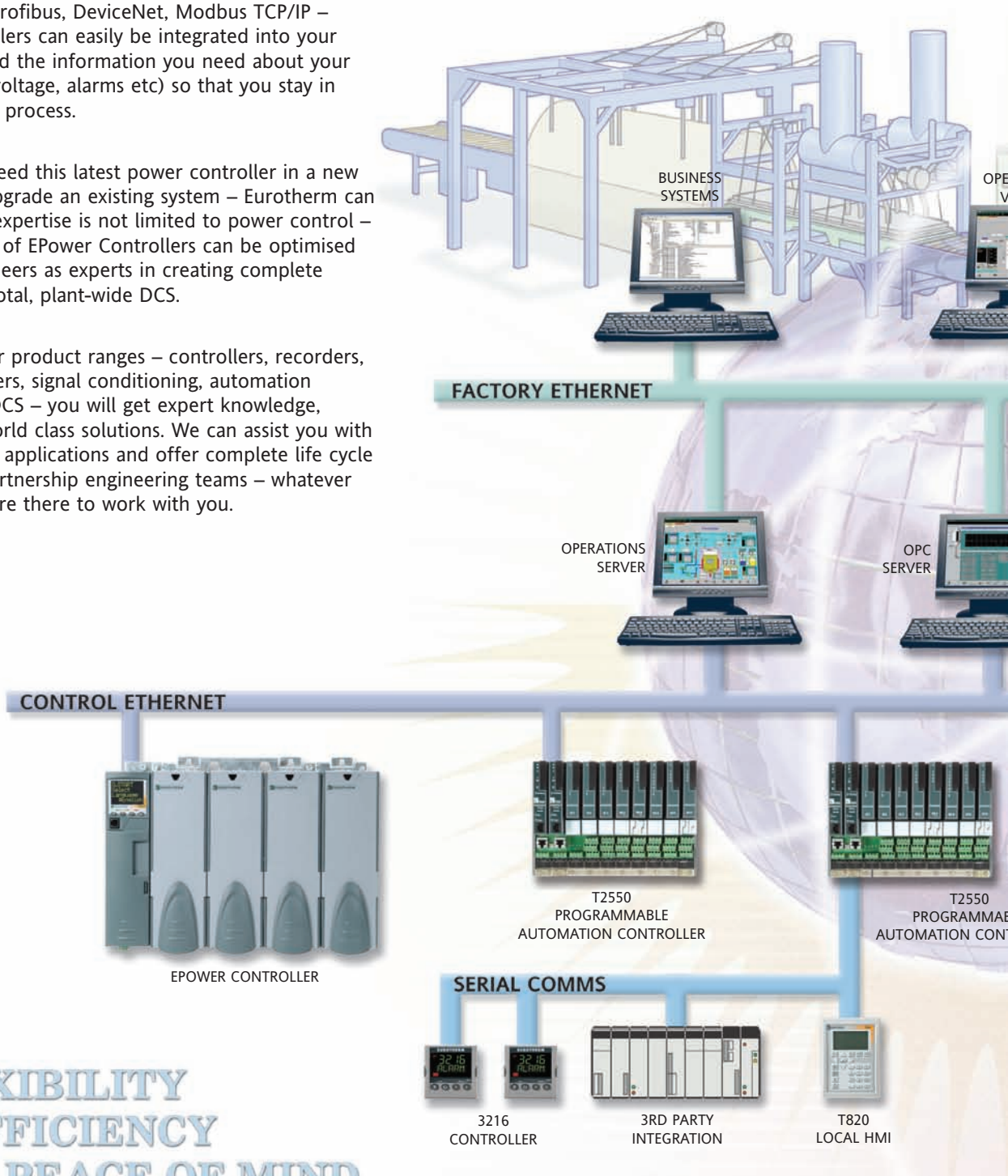
# A product to integrate into a complete solution

EPower Controllers have not only been designed to be world-class power controllers that you can rely on, they have been designed to integrate perfectly into a wider control system.

Whatever your system communication preferences are – Modbus RTU, Profibus, DeviceNet, Modbus TCP/IP – EPower Controllers can easily be integrated into your system and send the information you need about your load (current, voltage, alarms etc) so that you stay in control of your process.

Whether you need this latest power controller in a new system or to upgrade an existing system – Eurotherm can help you. Our expertise is not limited to power control – the full benefit of EPower Controllers can be optimised using our engineers as experts in creating complete solutions and total, plant-wide DCS.

Throughout our product ranges – controllers, recorders, power controllers, signal conditioning, automation solutions and DCS – you will get expert knowledge, support and world class solutions. We can assist you with small and large applications and offer complete life cycle support and partnership engineering teams – whatever you need, we are there to work with you.

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RATIONS
VIEWER

ACTIVE
FACTORY

EYCON™ 10
VISUAL
SUPERVISOR

EYCON 20
VISUAL
SUPERVISOR

BLE
TROLLER

EPOWER CONTROLLER

6180A
PAPERLESS GRAPHIC RECORDER

32h8e
EPOWER CONTROLLER
REMOTE DISPLAY

T820
LOCAL HMI

3RD PARTY
INTEGRATION

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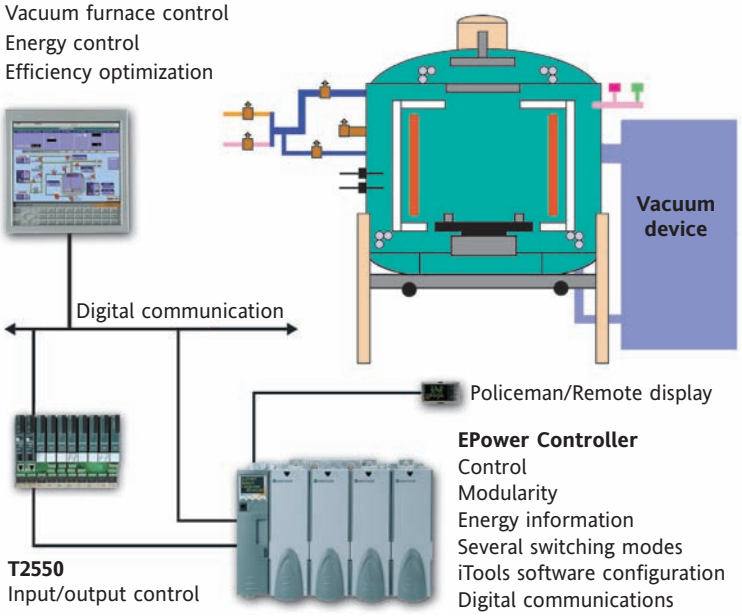
# Real-world applications

## VACUUM FURNACE IN HEAT TREATMENT

- Heater element control
- Power repartition in heating elements providing energy saving
- Alarm strategy
- Digital communication allowing supervisory control
- Use Predictive Load Management across multiple furnaces to reduce energy costs

PLM
Predictive Load Management




## COMPOSITE MATERIAL

In composite material production polymerisation is made in an autoclave at very high temperature. EPower Controller controls heating by providing:

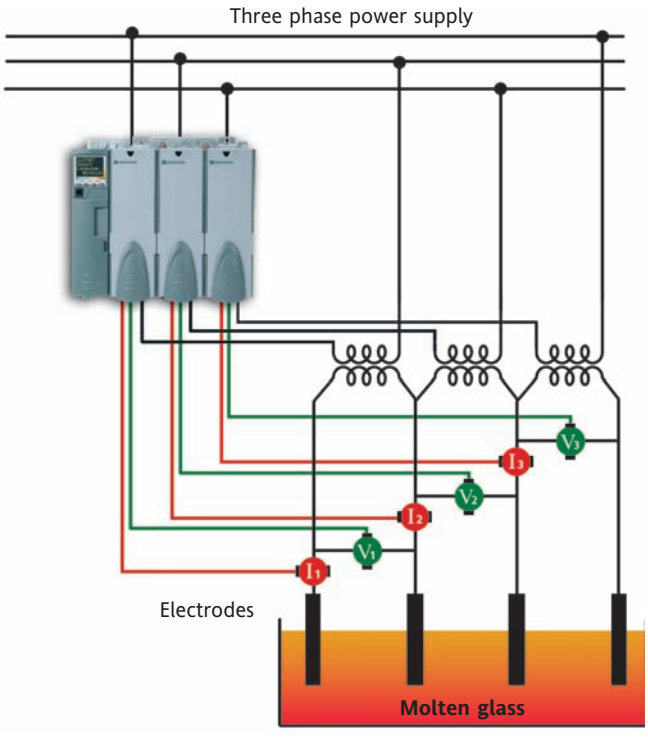
- Detection of total and/or partial load failure
- Optimization of the distribution of heating control in the different areas providing real cost savings
- Standard communications for process control and monitoring on HMI
- Down time reduction due to the modular design

## BOOSTING POWER CONTROL AND MONITORING IN GLASS INDUSTRY

Molten glass is a conductor of electricity. Passing high currents through the glass produces direct heating in the resistance presented by the glass, named boosting. This heating is beneficial as it heats the'colder' bottom glass in the furnace. This heated bottom glass rises towards the top and has a stirring effect which helps with melting, heat transfer and temperature homogenisation. Boosting is often used to meet periodic fluctuations in production demand or to support the pull rate of a furnace at the end of its operating life. Boosting may also help to reduce NOx emissions.

In this application the EPower Controller is controlling the power injected by the electrodes in the molten glass while controlling the true power or the current (the power injected is self compensated by the glass temperature)

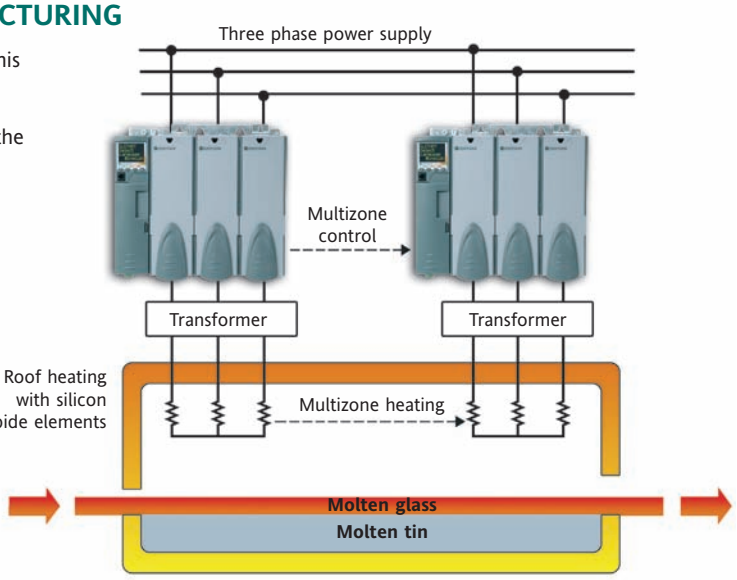
- Controlled convection currents to promote homogeneity
- Accurate true power or electrodes current control
- Digital communication allowing process parameters to be monitored by a supervisor: current, voltage, power and alarms



## TIN BATH FURNACE IN FLOAT MANUFACTURING

Melting is one of the first steps in the 'float' process'. At this stage glass is in liquid state in a molten furnace at around 1550°C. Roof heating is made by silicon carbide heaters. EPower Controller controllers provide all the solutions to the multizone control of this specific heater elements.

- Ageing compensation of the silicon carbide heaters with power control
- Power distribution control in the heater elements providing cost savings: suppression of inrush current for a better energy management and a minimum stress on the power transformers
- Digital communication with standard protocols for an efficient process monitoring
- Use Predictive Load Management across the glass plant to reduce energy costs




## SEMICONDUCTOR MANUFACTURING

Silicon was discovered in 1823 and is used in the manufacture of today's semiconductors. Semiconductors need a silicon of a very high purity and, therefore, the silicon is transformed by successive stages (crystal growing, epitaxy) that need very slow and accurate heating.

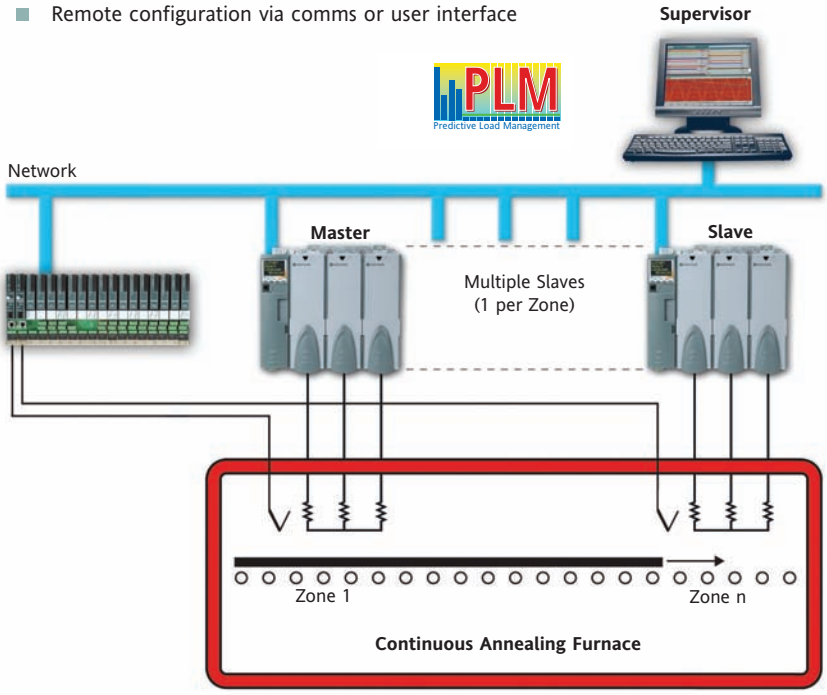
The EPower Controller will provide many solutions to this specific and expensive process:

- Precise and steady control of the heater elements
- Advanced and configurable strategy enables the EPower Controller to adapt to the load state
- Secure your process utilising a comprehensive alarm strategy and by transferring process information to a supervisor

## CONTINUOUS ANNEALING FURNACE

After casting and milling, metals are passed through an annealing furnace in order to increase ductility and reduce brittleness. In the case of a continuous metal sheet, this is a multi-zone furnace consuming several Megawatts of power. Each zone consists of one or multiple thermocouples feeding the process variable (PV) into a temperature controller, Programmable Automation Controller (T2550 PAC) or PLC. The control device then calculates the required power input to meet the process set point (SP), and sends this to the Power Controller via digital comms or via an analogue signal. The Power Controller then fires the element, either directly or via a transformer depending on the element specifications.

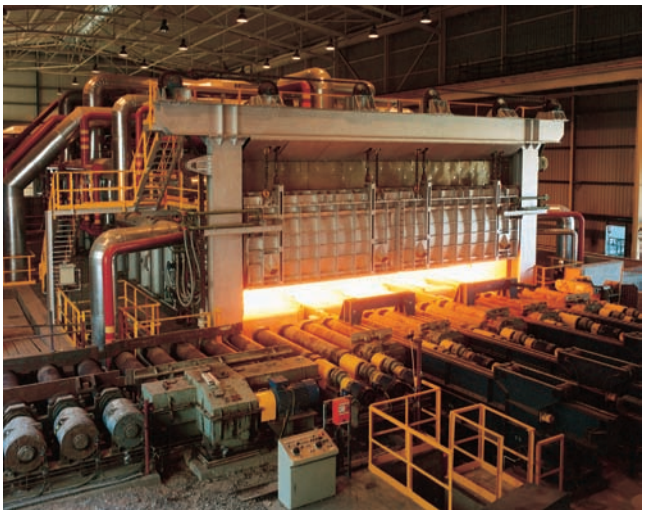
- Two-leg, true three phase control or 4 x single phase control available
- Load Sequencing - integral firing sequence control optimises instantaneous energy consumption across all zones
- Load Shedding - Predictive Load Management peak energy demand algorithm enables power smoothing to reduce peak demand
- Communication of PV, SP and process data
- Remote configuration via comms or user interface



# The EPower Controller –
## the best solution for your power control

With EPower Controllers you are not only buying one of the best power controllers in the world, you are supported by a global network of application and control specialists from Eurotherm. While we are a truly global company, we have not forgotten that you still need local support and understanding. Our team will bring you technical expertise along with in depth experience and understanding in numerous application areas – from glass furnaces, to semiconductor manufacture, to the heat treatment of metals and many more. The EPower Controller is one product for all your solution needs.

We can provide you with a range of services to suit your needs – from training to commissioning and maintenance contracts for your installation.



## Easy Maintenance

- Modular design for easy management of spare parts and quick mean time to repair (MTTR)
- Fast and easy configuration
- Easy wiring, installation and commissioning
- Remote Display option

FLEXIBILITY
EFFICIENCY
PEACE OF MIND

**With EPower Controllers, you will obtain an excellent return on your investment**

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# Selection guide and technical specifications

## DRIVER MODULE

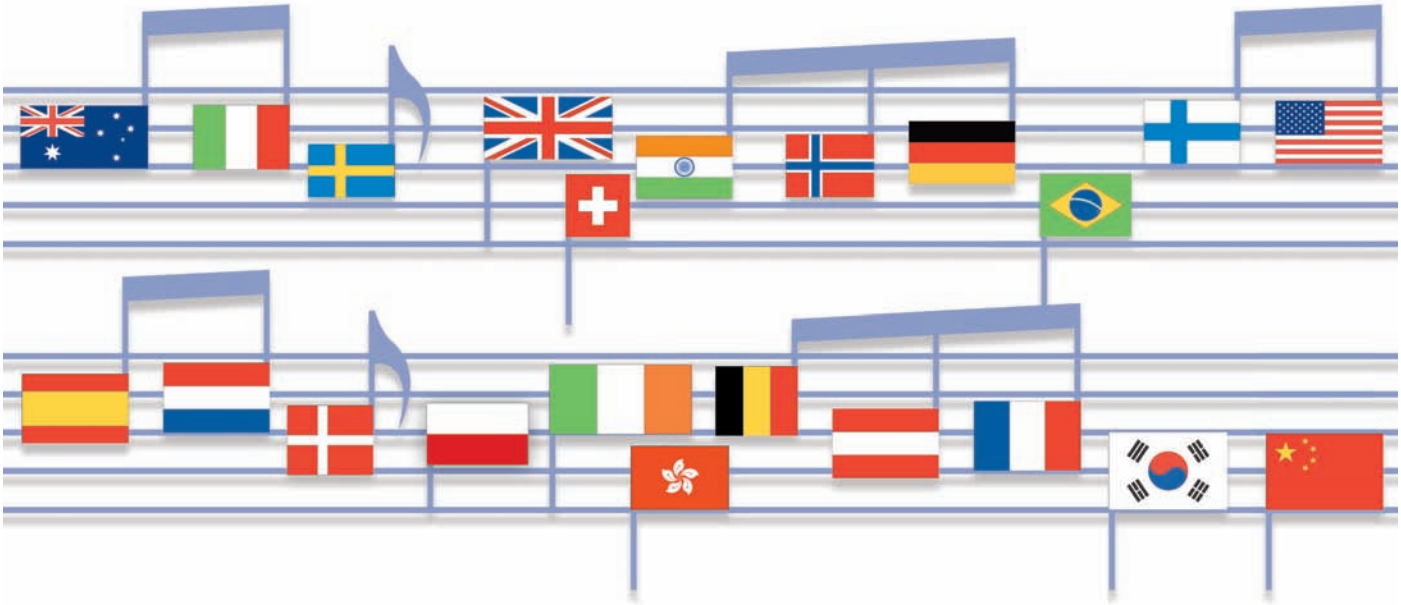
| | |
|---|---|
| **SUPPLY VOLTAGE** | 85 to 264V ac |
| **SUPPLY FREQUENCY** | 47 to 63Hz |
| **POWER CONSUMPTION** | 120W |
| **TEMPERATURE LIMITS** | 0 to 50°C operating, -10 to 70°C Storage |
| **DISPLAY** | 4 lines dot LCD matrix array |
| **COMMUNICATIONS** | Modbus RTU 2 wire EIA485<br>Modbus TCP/IP 10baseT Ethernet<br>Profibus DPv1<br>DeviceNet network protocol |
| **INPUTS AND OUTPUTS**<br>**Standard** | 2 Analogue inputs<br>1 Analogue output<br>2 Digital inputs<br>2 Relay outputs (1= Watchdog) |
| **Optional modules (max 3)** | Per module -<br>1 Analogue input<br>1 Analogue output<br>2 Digital inputs<br>1 Relay |
| **MEASUREMENT ACCURACY** | Better than 1% |
| **REMOTE PANEL** | Dedicated remote panel port<br>32h8e panel indicator |
| **QUICKSTART** | Configurable by order code or on start up via dedicated front panel HMI |
| **PREDICTIVE LOAD MANAGEMENT (PLM)** | Optional module connecting up to 63 instruments over dedicated communications (CAN based). Configurable PLM (patent Pending) optimises energy usage |
| **APPROVALS** | CE (EN 60947-4-3), UL 508A |

## POWER MODULES (UP TO 4)

| | |
|---|---|
| **VOLTAGE RANGES** | 100 to 600V ac, 100 to 690V ac |
| **CURRENT RANGES** | 100A, 160A, 250A, 400A, |
| **Nominal current range** | 16 to 400A |
| **FREQUENCY** | 47 to 63Hz |
| **POWER DISSIPATION** | 1.3 watts per Amp per Power module |
| **OPERATING TEMPERATURE** | Nominally 40°C,<br>Operation 0 to 50°C de-rating applied over 40°C |
| **COOLING FANS** | ≥160A |
| **FAN SUPPLY** | 115V or 230V |
| **FIRING MODES** | Phase angle<br>Half Cycle<br>Burst Firing<br>Fixed Modulation<br>Logic |
| **LOAD TYPES** | Standard Resistive<br>Complex Resistive<br>Inductive loads e.g. Transformer |
| **LOAD CONFIGURATION** | Single phase Ph/Ph or Ph/N<br>Two leg control 3 wire star or delta<br>Three phase control 3 or 4 wire star, 3 or 6 wire delta |
| **POWER MODULE COMBINATIONS** | 1, 2, 3 or 4 single phase (1, 2, 3 or 4 modules)<br>1, or 2 x two leg (2 or 4 modules)<br>1 x 3 phase (3 modules) |
| **FEEDBACK** | Internal voltage and current<br>Order option – External voltage and current |
| **FEEDBACK TYPES** | Open Loop<br>$V^2$<br>$I^2$<br>True Power<br>Vrms<br>Irms |
| **APPROVALS** | CE (EN 60947-4-3), UL 508A |

# **Eurotherm:** International sales and service

Understanding and providing local support is a key part of Eurotherm business. Complementing worldwide Eurotherm offices are a whole range of partners and a comprehensive technical support team, to ensure you get a service you will want to go back to.

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