

Eurotherm® flexible solutions

2604 and 2704 controllers



With Unique Levels of Control
and Flexibility

eurotherm.co.uk/2704

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Eurotherm.
by Schneider Electric

Unique levels of flexibility

Uncompromising design and a willingness to listen to their customers has allowed Eurotherm to tailor the 2604 and 2704 multi-loop controllers to provide a highly adapted solution to meet the needs of many different applications.

Unique levels of functionality are key to their unmatched versatility — features that Eurotherm has identified as essential requirements in a number of application areas, including furnaces, test chambers and autoclaves. The 2604 and 2704 controllers combine Eurotherm's proven PID control with functionality previously only found in PLCs. These controllers not only provide unsurpassed capabilities in highly compact units, but also offer the potential to reduce total hardware system costs by replacing several discrete pieces of control equipment.

Setpoint programmer

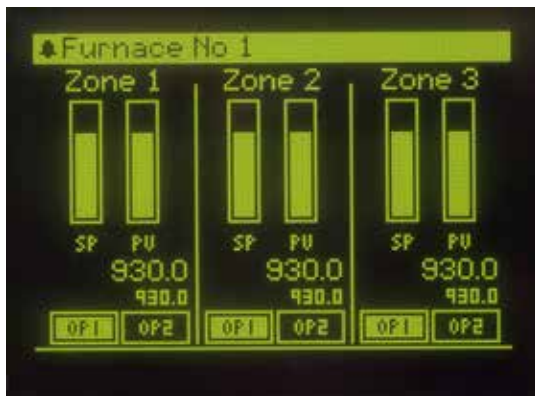
Multi-loop controller

Maths and logic functions

Precision measurements

Expandable I/O option

Open communications

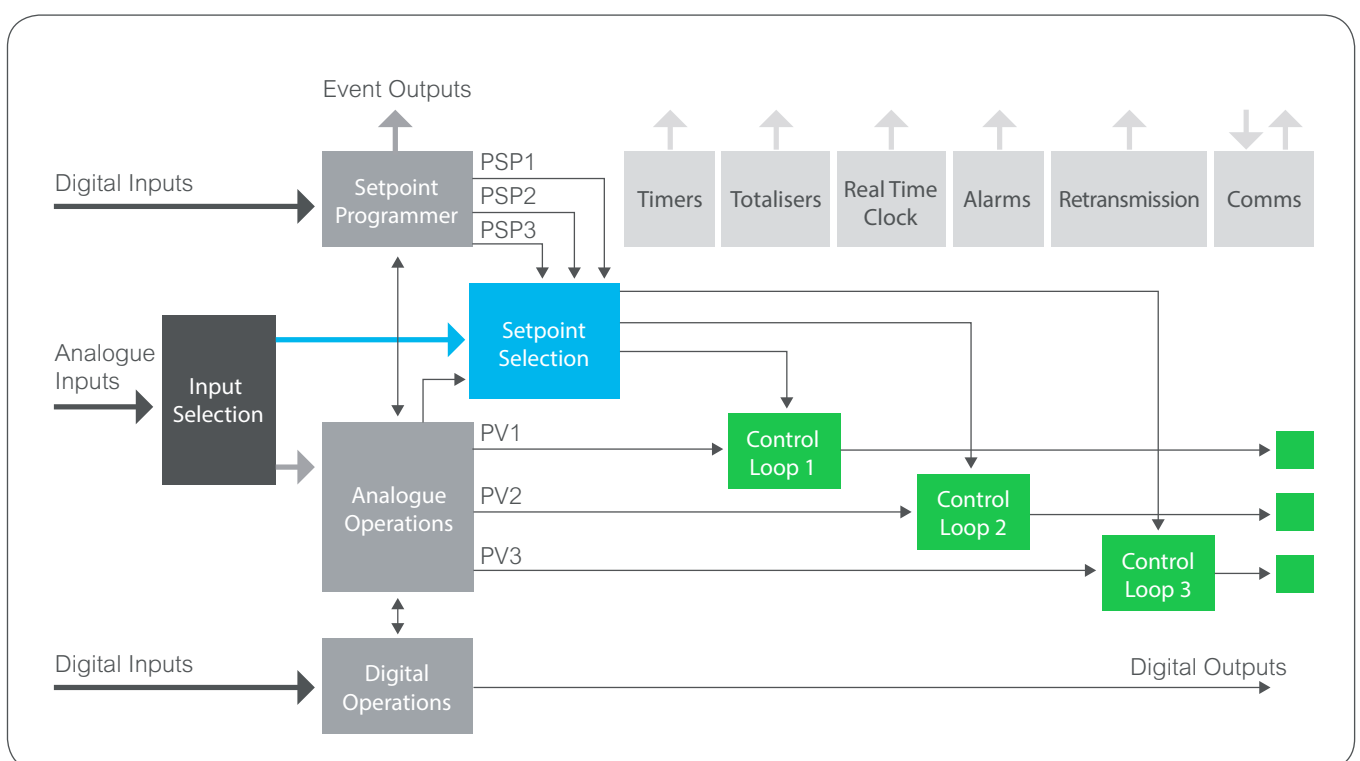


| Features | 2704 | 2604 |
|------------------|--|---|
| Control | 3 Loops, Cascade, Override, Ratio | 3 Loops, Cascade, Override, Ratio |
| SP Programs | 60 Synchronous, 20 Asynchronous | 50 Synchronous |
| Maths + Logic | 32 Analogue, 32 Logic, 50 User Values | 24 Analogue, 32 Logic, 12 User Values |
| Timer Functions | 4 Timers, 4 Totalisers, Real Time Clock | 4 Timers, 4 Totalisers, Real Time Clock |
| Communications | Modbus RTU, Profibus DP, DeviceNet®, Ethernet/Modbus TCP | Modbus RTU, Profibus DP, DeviceNet® |
| IO Expander | 20 Digital Inputs, 20 Digital Outputs | 20 Digital Inputs, 20 Digital Outputs |
| Master Modbus | 100 Parameters, Broadcast Mode | 25 Parameters, Broadcast Mode |
| Melt Pressure | Available | Available |
| Humidity | Available | Available |
| Carbon Potential | Available | Available |
| Vacuum | Available | Not Available |
| Boiler TDS | Available | Not Available |



Controlled variables

- Temperature
- Pressure
- Flow
- Level
- Relative humidity
- Dewpoint
- Carbon potential
- Oxygen concentration
- Total dissolved solids
- Melt pressure
- pH



Optimised control performance

The 2604 and 2704 controllers are highly versatile products capable of operating a number of control strategies.

Eurotherm's control algorithm is based on more than 50 years of temperature and process control market leadership. A comprehensive range of modular I/O capability and functionality, including remote I/O, is available making them ideal for a wide range of applications.

Process measurement resolution to better than 0.25µV delivers unprecedented performance in applications demanding high accuracy and stability, such as semiconductor, materials testing and research. The three control loops can be totally independent or interactive, allowing difficult control solutions to be satisfied. Standard options allow classic control strategies such as Cascade, Ratio or Override to be implemented without the need for complex user configuration.

Multiple sets of tuning parameters can be used to optimise control performance over a wide range of process conditions. The real time trending facility in the 2704 controller provides the user with a graphical view of how the process is performing.

Dedicated application blocks have been created to allow easy implementation in a variety of key markets including atmosphere and vacuum heat treating, climatic control chambers and packaged boilers.

Measurement resolution <0.25µV

3 control loops

Cascade, ratio, and override control options

Modular I/O options

Specific application blocks

Multiple PID sets

PV/SP trending

The setpoint programmer features are unmatched in a product of this size, allowing control loop setpoints to follow predetermined series of ramp and dwell segments. Coupled with its excellent user interface, the 2704 controller is ideal for applications such as heat treatment furnaces and environmental chambers where more than one process value needs to be profiled. Programmes can be created using the operator interface or via a user friendly software tool.



Setpoint programmer

- 60 stored programs
- 600 segments capacity
- 3 profiled setpoints/program
- 16 digital event outputs
- Synchronous or asynchronous timebase
- Digital input functions

Custom solutions

The 2604 and 2704 controllers provide a range of application blocks offering the ability to create custom solutions creating highly cost effective machine controllers, able to satisfy control applications which to date have not been possible in the 1/4 DIN format.

Flexible user pages in the 2704 controller provide the user with the option of defining how the process is viewed, therefore simplifying plant operation.

Two communication ports are available. The modular build provides the user with a selection of slave communication protocols allowing easy integration into both PLC and PC supervisory systems.

Master Modbus communications significantly increases the applications open to the 2604 and 2704 controllers by increasing its I/O flexibility. In particular, integration with the Eurotherm Mini8™ controller allows systems of greater complexity to be controlled.

Communications

- Modbus RTU
- Profibus DP
- DeviceNet®
- Ethernet/Modbus TCP
- EI-Bisync
- Master Modbus

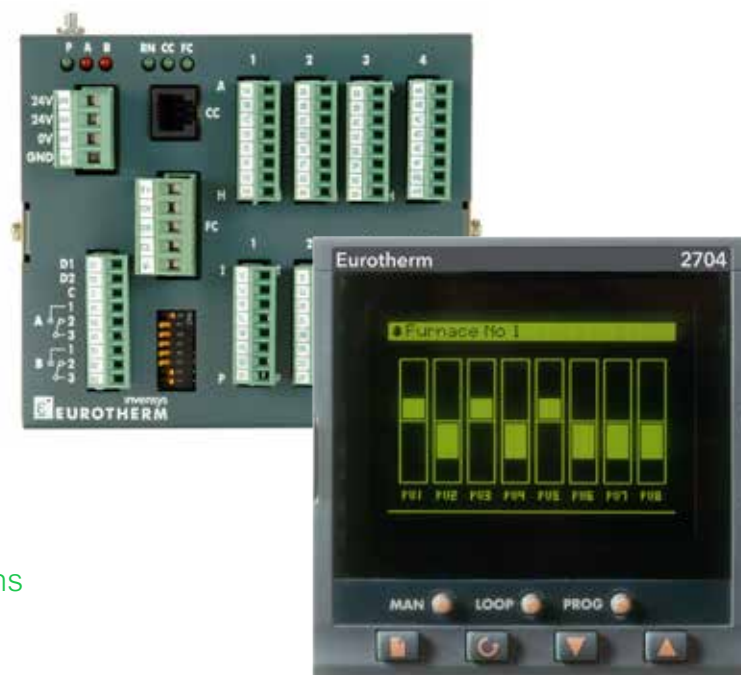
Transducer scaling

Real Time clock

Timer functions

Combinational logic

Mathematical calculations



Configuration tools

- Configuration
- Cloning
- Data logging
- Process monitoring
- OPC connectivity

iTools is a complete configuration and monitoring package for the series 2000 controllers. It allows users to create configurations in a friendly, easy to use environment. In addition, a Setpoint programmer editor and real time trend plots of process values are provided.

iTools employs an OPC server which uses Modbus to communicate with the controllers. The server connects to the controllers via serial communications, Ethernet or a telephone modem. The OPC server may also be used by third party "client" software such as Wonderware™ and LabVIEW.

Technical specifications

Quoted at 0 to 50°C unless otherwise stated

| CONTROL OPTIONS | |
|-----------------|---|
| No. of loops | 1, 2 or 3 loops |
| Options | Cascade, Ratio or Override |
| Modes | PID, ON/OFF or Valve Position |
| Applications | Carbon Potential, Humidity, Vacuum and Boiler TDS |

| STANDARD I/O | |
|-----------------------------|--|
| Precision PV Input Accuracy | ±0.1% |
| Ranges | mV, mA, volts or RTD (PT100) |
| Thermocouple types | J, K, L, N, R, S, B, PII, C, plus others |
| Cold junction | Ext 0°C, 45°C or 50°C |

| | | |
|----------------|----------|--|
| Analogue Input | Accuracy | ±0.1% |
| | Ranges | -10V to 10V or 0 to 20mA |
| Digital I/O | Types | 2 digital inputs, 7 Bi-directional input/outputs, 1 Changeover relay |

| MODULES - 5 PER INSTRUMENT | | |
|---------------------------------|--------------------------|--|
| Digital Outputs | Types | Single Relay, Dual Relay, Single Triac, Dual Triac, Single Logic and Triple Logic module |
| | Allocation | Slot 1, 3, 4, 5 or 6 (Max 3 Triacs per unit) |
| Digital Inputs | Types | Triple contact input, Triple logic input |
| | Allocation | Slot 1, 3, 4, 5 or 6 |
| Analogue Outputs | Types | DC Control or DC Retransmission (5 Max) |
| | Allocation | Slot 1, 3, 4, 5 or 6 |
| | Range | 0 to 20mA or 0 to 10V dc |
| Dual Analogue Outputs | Allocation | Slot 1, 4 or 5 |
| | Range | 4-20mA or 24V dc transmitter PSU |
| High Resolution Analogue Output | Allocation | Slot 1, 4 or 5 |
| | Range | 4-20mA and 24Vdc transmitter PSU |
| Transmitter PSU | Allocation | Slot 1, 3, 4, 5 or 6 |
| | Transmitter | 24Vdc @ 20mA |
| Transducer Supply | Bridge voltage | 5 or 10Vdc |
| | Bridge resistance | 300Ω to 15Kohms |
| Potentiometer Input | Potentiometer resistance | 330Ω to 150Kohms |
| Precision PV Input (Module) | Allocation | Slot 3 or 6 |
| | Accuracy | ±0.1% |
| | Ranges | mV, mA, volts or RTD (PT100) |
| | Thermocouple types | J, K, T, L, N, R, S, B, PII, C, plus others |
| | Cold junction | Ext 0°C, 45°C or 50°C |

| | | |
|------------------------------------|--------------------|---|
| 4-Wire RTD (Module) | Allocation | Slot 3 or 6 |
| | Accuracy | 0.01% |
| | Range | PT100 |
| Total Dissolved Solids (TDS) Input | Excitation | 0.4Vpp @ 1KHz |
| | Conductivity Range | 0 - 500mS |
| Dual Analogue Input | Allocation | Slot 3 or 6 |
| | Accuracy | ±0.1% |
| | Ranges | mV, mA, volts or RTD (PT100) |
| | Thermocouple types | J, K, T, L, N, R, S, B, PII, C, plus others |
| | Cold junction | Ext 0°C, 45°C or 50°C |
| Analogue Input (Module) | Allocation | Slot 1, 3, 4 or 6 |
| | Accuracy | ±0.2% |
| | Ranges | mV, mA, volts or RTD (PT100) |
| | Thermocouple types | J, K, T, L, N, R, S, B, PII, C, plus others |
| | Cold junction | Ext 0°C, 45°C, or 50°C |

| SETPOINT PROGRAMMER | |
|---------------------|---|
| No. of profiles | 1, 2 or 3 profiles |
| No. of programs | 60 programs Max. |
| No. of segments | 600 time to target segments (Max.) or 450 ramp rate segments (Max.) |
| Event outputs | Up to 16 |

| I/O EXPANDER | |
|----------------|--|
| 10 I/O Version | 4 Changeover and 6 normally open relay contacts, 10 Logic inputs |
| 20 I/O Version | 4 Changeover and 16 normally open contacts, 20 Logic inputs |

| ADVANCED FUNCTIONS | |
|----------------------|---|
| Application blocks | 32 digital operations, 32 analogue operations, 50 user values |
| Timers | 4 ON pulse, OFF delay, one shot and min-ON |
| Totalisers | 4, trigger level and reset input |
| Pattern generators | 16 patterns each with 16 bits |
| Real Time clock | Day of week and time |
| Customisable screens | 8 user screens |
| User switches | 8, toggle and momentary |

| SLAVE COMMUNICATIONS | |
|----------------------|---|
| Allocation | Slot H or J |
| Types | Modbus RS485 (2-wire), RS485 (4 wire) or RS232 EI-Bisyc (subset of parameters), Profibus (Slot H only), DeviceNet® (Slot H only), Ethernet Modbus/TCP (Slot H only) |

| MASTER COMMUNICATIONS | |
|-----------------------|--|
| Allocation | Slot J |
| Types | Modbus RS485 (2 wire), RS485 (4 wire) or RS232 |
| Parameters | 100 read/write |

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by **Schneider** Electric

Discover More About Eurotherm Controllers

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