The 2604 is a highly accurate and stable process controller available in a single, dual or triple loop format. Features include setpoint programming and comprehensive selection of maths and logic functions.

It has a dual 5-digit display of process value and setpoint with an LCD panel for display of alarm messages, programmer and loop status information. User defined messages in the LCD panel simplify operation. The 2604 is a highly configurable product offering many features previously found only in programmable logic controllers. This allows systems to be implemented integrating the process control and logic functions of a machine, therefore simplifying system complexity and reducing the total system costs.

Configuration is achievable either via the front panel or using Eurotherm’s iTools configuration software.
Control functions
- 3 Control loops
- PID, VP or ON/OFF
- Cascade, ratio or override
- Gain scheduling
- Configurable control strategies

Eurotherm’s advanced control algorithm gives stable straight-line control. Automatic tuning simplifies the commissioning procedure by performing a one shot tune to calculate the optimum PID values. To further optimise control especially in programmer applications, gain scheduling can be used to transfer control between up to six sets of PID values.

IO Hardware
- 0.25uV PV input resolution
- Fixed and modular IO
- 250Vac isolation
- Expandable IO
- Easily upgraded

The 2604 incorporates a self correcting input circuit (INSTANT ACCURACY) to maximise accuracy and performance during initial warm up and changes in ambient temperature.

One universal and one high level analogue inputs, along with 10 digital IO are included as standard. Additionally, a further 5 IO modules may be fitted providing very flexible input/output combinations. The series 2000IO expander unit can provide a additional 20 digital inputs and 20 digital outputs.

Setpoint programmer
- 50 Programs
- 3 Profiled setpoints/program
- 500 Segments
- 16 Event outputs

Ideal for applications such as atmosphere or vacuum furnaces, and environmental chambers. The 2604 user interface offers the user an extremely easy method of editing, selecting and running programs.

Dual temperature/carbon programmer
**Toolkit functions**
- Mathematical calculations
- Combinational logic
- Real time clock
- Timer functions

Operators include:
Add, Subtract, Log, Exp, SQRT, AND, OR
Max, Min, Select and many more

Toolkit blocks allows the user to create custom solutions by internally wiring analogue and digital operations together in flexible ways. 24 analogue and 32 digital operations are available. Other functions are available including timers, totalisers and a real time clock.

**I/O Expander**
- 20 Logic inputs
- 20 Relay outputs

The 2000IO expander can increase the digital IO providing the option for greater remote operation of the programmer and expands the 2604 logic capability.

**Slave communications**
- Modbus™ RTU
- Profinet® DP
- DeviceNet®
- EI-Bisync

The 2604 supports two slave communication ports. Its modular build provides the user with a selection of communication protocols allowing easy integration into both PLC and PC supervisory systems.

When using Profinet DP a GSD file has to be created, containing the information relating to the instruments parameters, that a Profinet master needs in order to communicate with its slave device. The GSD file for a 2604 is created using Eurotherm’s GSD file editor.

**Master communications**
- Modbus protocol
- 25 read/write parameters
- Expands available hardware
- Interfaces to most Modbus slaves

Master Modbus communications significantly increases the applications open to 2604. In its simplest form it can be used to retransmit a setpoint to a number of slave controllers in a multi-zone furnace.
% Relative humidity
- %RH or Dewpoint Measurement
- Pressure compensation
- Boost heat/cool
- Compressor timer
- Cooling bypass output

Ideal for use in applications where it is necessary to simulate the environmental conditions of temperature, humidity, altitude or light. The setpoint programmer is used to generate synchronised profiles of up to three variables. Other options allow configuration of signals to turn on a compressor, operate a bypass or operate further stages of heating and cooling.

Carbon potential
- %CP, O₂ or Dewpoint measurement
- CO correction
- Probe burn off and sooting alarm
- Sooting alarm

Ideal for use in gas carburising furnaces where Zirconia probes are used to measure Carbon Potential. A three loop controller can be used to control furnace temperature, carbon potential and quench. The setpoint programmer is used in batch applications to generate synchronised temperature and carbon profiles.

Melt pressure
- 350Ω Strain gauge input
- Transducer excitation
- Pressure alarms
- Screen blockage alarm
- Simple user calibration with shunt

Suitable for precision pressure control in the plastic extrusion industries. Additionally a second pressure transducer can be used to provide a differential pressure alarm when the screen starts to block. Various machine start up strategies can be used to ensure a smooth transition from auto to manual mode.
TECHNICAL SPECIFICATION

General

Environmental performance
Temperature limits
Operation: 0 to 50°C
Storage: -10 to 70°C
Humidity limits
Operation: 5 to 95% RH non condensing
Storage: 5 to 95% RH non condensing
Panel sealing: IP65, Nema 4X
Vibration: 2g peak, 10 to 150Hz
Altitude: <2000 metres
Atmospheres: Not suitable for use in explosive or corrosive atmosphere

Electromagnetic compatibility (EMC)
Emissions and immunity
BS EN61326
Suitable for domestic, commercial and light industrial as well as heavy industrial. (Domestic/light (Class B) emissions. Industrial (Class A) environmental immunity emissions.
With Ethernet module fitted product only suitable for Class A emissions.

Electrical safety
BS EN61010
INSTALLATION CATEGORY II
POLLUTION DEGREE 2
The rate impulse voltage for equipment on nominal 230V mains is 2500V.
POLLUTION DEGREE 2
Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected

Physical
Panel mounting: 1/4 DIN
Dimensions and weight: 96W x 96H x 150D mm, 600g
Panel cut-out dimensions: 92W x 92Hmm

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

Approvals
CE, cUL listed (file E57766), Gost
Suitable for use in Nadcap and AMS2750D applications under System Accuracy Test calibration conditions

Standard I/O
Precision PV input
Accuracy: ±0.1%
Ranges: mV, mA, volts or RTD (PT100)
Thermocouple types: J, K, I, N, R, S, B, PI, C, plus others
Cold junction: Ext 0°C, 45°C or 50°C

Analogue input
Allocation: 1 fitted
Accuracy: ± 0.1%
Ranges: -10V to 10V or 0 to 20mA

Digital I/O
Types: 1 digital input
7 Bi-directional input/outputs
1 Changeover relay

Modules
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 10Vdc

Dual Analogue outputs
Allocation: Slot 1, 4 or 5
Range: 4-20mA or 24Vdc 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: Software selectable. 5 or 10Vdc
Bridge resistance: 300Ω to 15Kohms

Potentiometer input
Potentiometer resistance 33Ω to 15kohms

Precision PV input (Module)
Allocation: Slot 3 or 6
Accuracy: ±0.1%
Ranges: mV, mA, volts or RTD (PT100)
Thermocouple types: J, K, T, N, R, S, B, PI, C, plus others
Cold junction: Ext 0°C, 45°C or 50°C

Dual (Probe) input
Allocation: Slot 3 or 6
Accuracy: ±0.1%
Ranges: mV, mA, volts or RTD (PT100)
Thermocouple types: J, K, T, N, R, S, B, PI, 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, N, R, S, B, PI, C, plus others
Cold junction: Ext 0°C, 45°C or 50°C

Setpoint Programmer
No profiles: 1, 2 or 3 profiles
No. of programs: 50 programs max.
No. of segments: 500 time to target segments (max.) or 400 ramp rate segments (max.)
Event outputs: Up to 16

I/O Expander
10 I/O version: 4 Changeover and 6 normally open relay contacts
20 I/O version: 4 Changeover and 16 normally open contacts
20 Logic inputs

Advanced Functions
Application blocks: 32 digital operations
24 analogue operations
12 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 the week and time
Customisable screens: 8 user screens
User switches: 8, toggle and momentary function

Slave communications
Allocation: Slot H or J (DeviceNet/Profibus slot H only)
Types: Proibus DP RS485
Modbus RTU RS485 (2 wire)
RS485 (5 wire) or RS232
DeviceNet
EI-BiSync (subset of parameters)

Master communications
Allocation: Slot J
Types: Modbus RTU RS485 (2 wire), RS485 (4 wire) or RS232
Parameters: 25 read/write
**Example ordering code**

2604 - VH - 323 - XX - RR - PV - D4 - TP - PV - XX - A2 - XX - ENG - U1 - IT

This code describes a 3 loop controller with capability to store 20 three profile programs.

Supply voltage is 85-264Vac.

Modular hardware: 2 x PV input, 1 x Dual relay, 1 x DC control, 1 x Triple logic output, EIA-232 Comms. 16 analogue and 16 digital operations, tTools supplied with controller

**Configuration coding (optional)**
**Hardware notes:**

1. Basic Controller/Programmer includes 8 digital registers, 4 timers and 4 totalisers.
2. Toolkit 1 includes 16 analogue, 16 digital, pattern generator, digital programmer, analogue switch and 4 user values.
3. Toolkit 2 includes Toolkit 1 plus extra 8 analogue, 16 digital operations and 8 user values.
4. Dual analogue input suitable for Carbon Probes. (Inputs not isolated from each other)
5. EI-Bisync includes only a subset of parameters.
6. The HR module has 1 high resolution DC output and 1 24Vdc power supply.

**General notes:**

1. Loop 1 PV defaults to main PV input on microboard. Loop 2 and 3 PV inputs must be fitted in I/O slots 3 or 6 or be assigned to the analogue input.
2. Alarm configuration refers to loop alarms only. One selection is allowed per loop. Additional alarms are available for the user to configure.
3. Thermocouple and RTD inputs assume sensor min and max values with no decimal point.
4. Linear inputs are ranged 0-100%, no decimal point.
5. Temperature units will be °C unless ordered by USA where °F will be used.
6. Remote setpoints assume loop min & max ranges.
7. VP1, VP2, VP3 and VP4 are not available with override function.
8. For Cascade and Override inputs only.
9. HR module should be used in feedback mode, please refer to TIBC160.

---

### Comms J

<table>
<thead>
<tr>
<th>Slot 1</th>
<th>Slot 2</th>
<th>Slot 3</th>
<th>Slot 4</th>
<th>Slot 5</th>
<th>Slot 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>None fitted</td>
<td>232 Modbus</td>
<td>2W 485 Modbus</td>
<td>4W 485 Modbus</td>
<td>232 Bisync (5)</td>
<td>2W 485 Bisync (5)</td>
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### Comms H

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<thead>
<tr>
<th>Slot Function</th>
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</tr>
</thead>
<tbody>
<tr>
<td>None fitted</td>
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</tr>
<tr>
<td>232 Modbus</td>
<td>PV Loop 2</td>
</tr>
<tr>
<td>2W 485 Modbus</td>
<td>PV Loop 3</td>
</tr>
<tr>
<td>4W 485 Modbus</td>
<td>SP Loop 1</td>
</tr>
<tr>
<td>232 Master</td>
<td>SP Loop 2</td>
</tr>
<tr>
<td>2W 485 Master</td>
<td>SP Loop 3</td>
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<tr>
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### Toolkit Functions

<table>
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<tr>
<th>Toolkit</th>
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<tr>
<td>Standard</td>
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### Technical Support

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<tbody>
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### Hardware notes:

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</table>
Dimensional details

Rear terminal connections

Isolation

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Part No. HA026669 Issue 8
2604 Specification Sheet
Printed in England 11.06