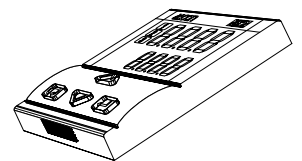
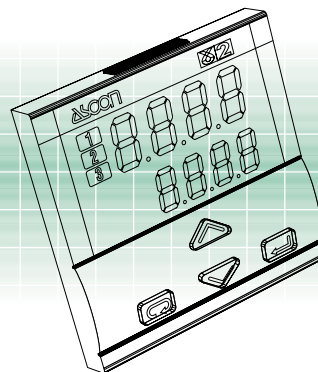
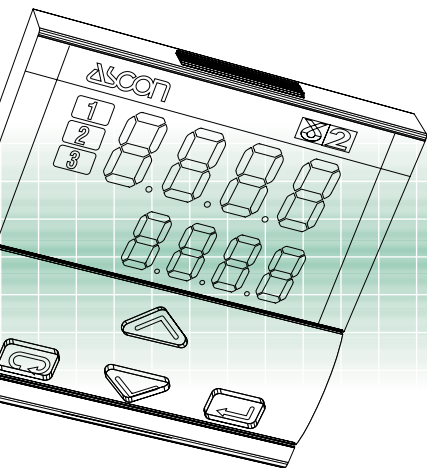


Temperature controller 1/16 DIN - 48 x 48 mm gamma**due**® series M4 line

Flexible, easy and comprehensive

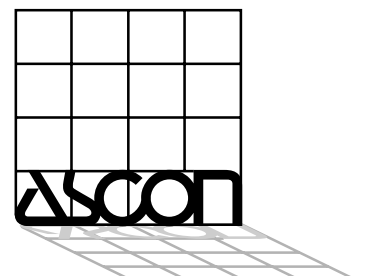
This 48x48 size controller of the gamma**due**® series, is suitable for a wide range of applications. It performs Heat/Cool control and provides on auxiliary current transformer input. Easy configuration and simple operating method are merged with the typical characteristics

of more complex devices like: autotune, IP65 front panel protection, serial communications, analogue control output, Auto/Man, custom linearisation, transmitter power supply, Start-up and Timer special functions.



E

ISO 9001 Certified



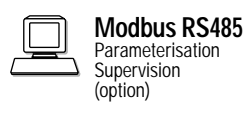
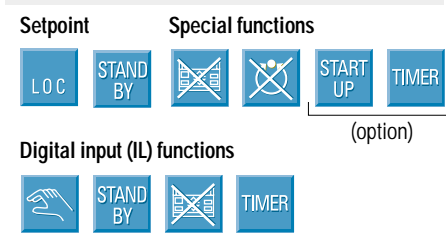
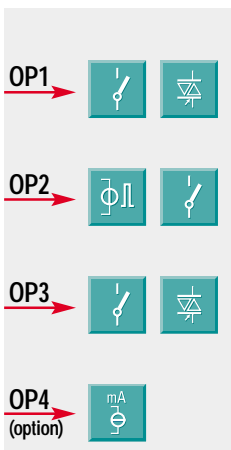
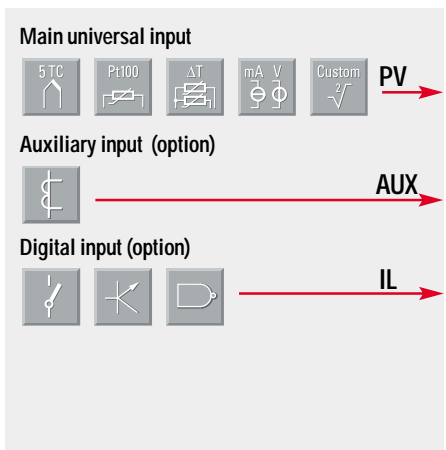
ASCON spa

20021 Bollate - (Milano) Italy - Via Falzarego, 9/11 - Tel. +39 02 333 371 - Fax +39 02 350 4243
<http://www.ascon.it> e-mail info@ascon.it

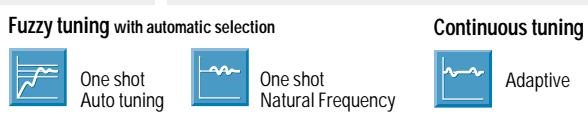


| Your needs | Our solutions |
|---|---|
| Heaters failure | Heater break alarm with current transformer |
| Both heating and cooling functions | Heat/Cool double action |
| Easy replacement and quick start-up | Configuration by simple to use codes |
| Correct tuning for any condition | Automatic selection between two different tuning methods |
| Alarm signalling | Absolute, band and deviation alarms, Latching/Blocking |
| Interfacing with other devices | Serial communications at 9600 baud Modbus/Jbus protocol, analogue retransmission output |
| Quick learning | Every model has the same operating method |
| Ergonomic compatibility with other devices | Two colours: beige or darkgrey front panels |
| Environmental protection | IP65 front panel protection (indoor, dust and water protection) |
| Easy to use | Ergonomic keypad, clear and comprehensive display |
| Noise immunity | Electromagnetic compatibility |
| Universal input signals, linear as well as non-linear | Configurable input (TC, RTD, mA, Volt and ΔT , infrared sensor, "custom" linearisation) |
| Costs reduction | Built-in Timer and Start-up functions |
| Reliability and safety | CE compatibility, ASCON is ISO 9001 certified, 3 years warranty |
| Technical support | Technical application assistance from ASCON sales and after sales service |

Resources **Operating mode**



| | Control * | Alarms |
|-----------------|-----------|---------|
| 1 Single action | OP1 | OP2 OP3 |
| 2 Single action | OP2 | OP1 OP3 |
| 3 Double action | OP1 OP3 | OP2 |
| 4 Double action | OP1 OP2 | OP3 |
| 5 Double action | OP2 OP3 | OP1 |



* Each control output can be replaced by the OP4 analogue output

Technical data

| Features at env. 25°C | Description | | | |
|--|--|---|--|--|
| Total configurability | From keypad or serial communications, the user selects: type of input - associated functions and corresponding outputs - type of control algorithm - type of output and safe conditions - alarm types and functionality - control parameter values | | | |
| PV input (for signal ranges see table 1) | Common characteristics | A/D converter with 50.000 points Update measurement time : 0.2 sec Sampling time : 0.5 sec Input shift : + 60 digits Input filter : 1...30 sec (OFF= 0) | | |
| | Accuracy | 0.25% ± 1 digit (T/C and RTD) 0.1% ± 1 digit (mA and mV) | Between 100 and 240V ~ error is minimal | |
| | Resistance thermometer (for ΔT: R1+R2 must be <320Ω) | Pt100Ω at 0°C (IEC 751) °C /°F selectable | 2 or 3 wire connection | Line: 20Ω max (3 wire) Thermal drift 0.35°C/10°C env. T. <0.35°C/10Ω line resist. |
| | Thermocouple | L, J, T, K, S (IEC 584) °C /°F selectable | Internal cold junction compensation | Line: 150Ω max Thermal drift <2μV/°C env. T. <5μV/10Ω line resist. |
| | DC input (current) | 0/4...20mA with 2.5Ω ext. Shunt Rj > 10MΩ | Engineering units, floating decimal point, Low Range -999...9999 High Range -999...9999 100 digits minimum | Input drift: <0.1% / 20°C env. T. |
| | DC input (voltage) | 0/10...50mV, Rj > 10MΩ | | |
| Auxiliary input | CT current transformer | 50 or 100mA input hardware selectable | Current visualization 10...200 A with 1A resolution and Heater break alarm | |
| Digital input (option) | The closure of the external contact produces any of the following actions: | | Auto/Man mode change, Stand-by Setpoint activation, keypad lock, Timer start | |
| Operating modes | 1 double action PID loop or ON/OFF with 1 or 2 alarms | | | |
| Control mode | Algorithm | P.I.D. with overshoot control or ON/OFF | | |
| | Proport. band (P) | 0.5...999.9% | | |
| | Integral time (I) | 0.1...100.0 min | | |
| | Derivative time (D) | 0.01...10.00 min | | |
| | Error band | 0.1...10.0 digit | | |
| | Cycle time | 1...200 sec. | | |
| | Dead band | -10.0...10.0 | | |
| | Relative cool gain | 0.1...10.0 | | |
| | Cool cycle time | 1...200 sec. | | |
| | Overshoot control | 0.01...1.00 | | |
| High limit | 100.0...10.0% (heat) -100.0...-10.0% (cool) | | | |
| Hysteresis | 0.1...10.0% | | | |
| OP1 output | SPST relay N.O., 2A/250V~ for resistive load Triac, 1A/250V~ for resistive load | | | |
| OP2 output | SSR drive not isolated: 5V~, ± 10%, 30mA max SPST relay N.O., 2A/250V~ for resistive load | | | |
| OP3 output | SPST Relay N.O., 2A/250V~ for resistive load Triac, 1A/250V~ for resistive load | | | |
| OP4 (option) analogue control output | Galvanically isolated: 500V~/1min Resolution: 12bit (0.025%) Accuracy: 0.1% | | In current 0/4...20mA 750Ω/15V max | |
| AL2-AL3 alarms | Hysteresis 0.1 ... 10.0% of range | | | |
| | Action | Active high | Action type | Deviation threshold ± range |
| | | Active low | | Band threshold 0...range |
| | Special functions | | Sensor break, Heater break, Loop break, Latching/Blocking | |
| Setpoint | Local and stand-by selectable by digital input or serial communications | | | |
| | Up and down ramps | | 0.1...999.9 digit/min (OFF = 0) | |
| | Low limit | from low range to high limit | | |
| One-shot Fuzzy-Tuning | Depending on the process condition, the controller applies the best method | | Step response | |
| | | | Natural frequency | |
| Auto/Man Station | Standard with bumpless function, by keypad, digital input or serial communications | | | |

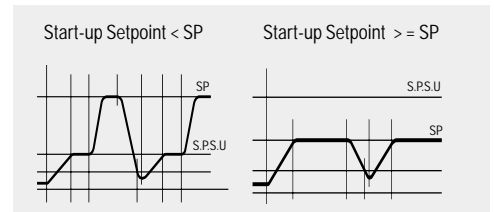
| Input type | Scale range |
|-----------------|--------------------------------|
| RTD | -99.9...300.0 °C |
| | -99.9...572.0 °F |
| Pt100Ω a 0°C | -200...600 °C |
| | -328...1112 °F |
| T/C type L | 0...600 °C |
| Fe-Const. | 32...1112 °F |
| T/C type J | 0...600 °C |
| Fe-Cu 45% Ni | 32...1112 °F |
| T/C type T | -200...400 °C |
| Cu - CuNi | -328...752 °F |
| T/C type K | 0...1200 °C |
| Cromel Alumel | 32...2192 °F |
| T/C type S | 0...1600 °C |
| Pt10%Rh-Pt | 32...2912 °F |
| 0/4...20 mA | Configurable engineering units |
| 0/10...50 mV | mA, mV, V, bar, psi, Rh, ph |
| mV Custom scale | On request |

Table 1: PV input

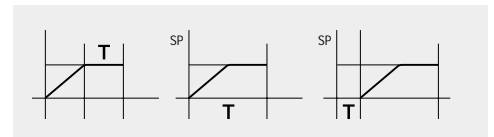
Special functions

To improve the instrument performance and to reduce the wiring and installation costs, two special functions are available:

- Start-up



- Timer



The use of these functions avoids additional device installation (e.g. external timer), therefore allowing a significant costs reduction.

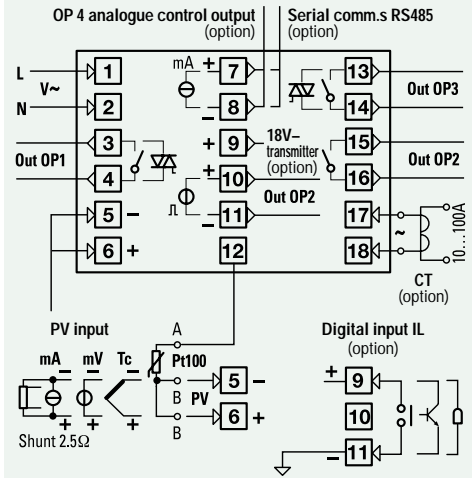
Moreover there are:

- **Keypad lock/unlock** function, to avoid incorrect operator actions
- **Outputs lock/unlock** function, at any moment it is possible to stop the control action, but not the process variable display, without switching-off the power supply.

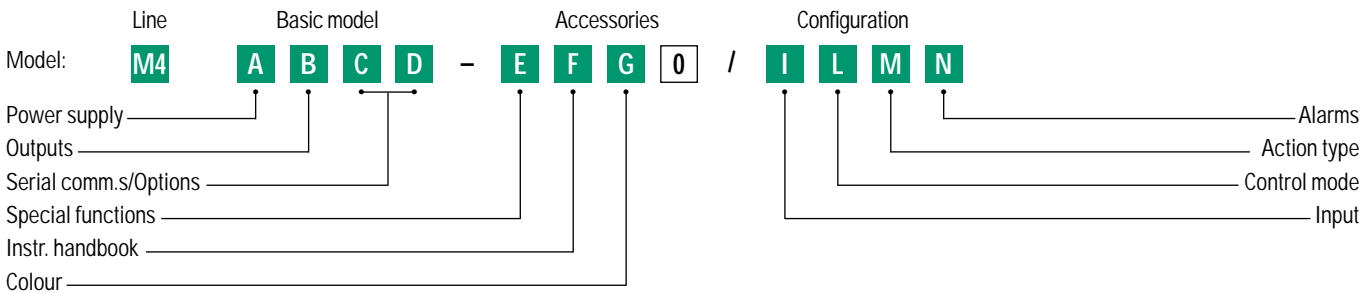
Technical data

| Features at env. 25°C | Description | |
|-------------------------|---|---|
| Ser. comm.s (opt.) | RS 485 isolated, Modbus/Jbus protocol 1200, 2400, 4800, 9600 bit/sec, two wires | |
| Aux. power sup. | (opt.) +18V- ±20%, 30mA max for external transmitter supply | |
| Operational safety | Measure input | Detection of out of range, short circuit or sensor break with automatic activation of the safety strategies and alerts on display |
| | Control output | Safety value: 0...100%. (-100...100% for Heat/Cool mode) (user enabled/disabled). |
| | Parameters | A non volatile memory stores for unlimited time all the parameter and configuration values |
| | Password | A password protects the access to the instrument configuration parameterisation |
| General characteristics | Power supply | 100-240V~ (-15% +10%) 50/60Hz or 24V~(-25% +12%), 50/60Hz and 24V- (-15% +25%). Power consumption 2.6 W max |
| | Safety | Compliance EN61010-1 (IEC 1010-1), installation class 2 (2500V), pollution class 2, class II instrument |
| | Electromagnetic compatibility | Compliance to the CE standards for industrial system and equipment |
| | UL and cUL Omologation | File E176452 |
| | Protection EN60529 (IEC 529) | IP65 front panel |
| | Overall dimensions | 1/16 DIN - 48 x 48, depth 120 mm, weight 130g appr. Panel cut-out: 45 ^{+0.6} x 45 ^{-0.6} mm |

Electrical wirings



Ordering codes



| Power supply | | A | | |
|--------------------------------------|--------------------------------|-------------------------------|---|---|
| 100-240V~ (-15% +10%) | | 3 | | |
| 24V~ (-25% +12%) or 24V- (-15% +25%) | | 5 | | |
| Output OP1-OP3 | | B | | |
| Relay-Relay | | 1 | | |
| Relay-Triac | | 2 | | |
| Triac-Relay | | 4 | | |
| Triac-Triac | | 5 | | |
| Serial comm.s/IL | Options | C | D | |
| Not fitted | None | 0 | 0 | |
| | Current Transformer input (CT) | 0 | 3 | |
| | Transmitter power supply + 18V | + Analogue control output | 0 | 7 |
| | | + CT | 0 | 8 |
| | | + Analogue control output+ CT | 0 | 9 |
| RS 485 | None | 5 | 0 | |
| Modbus/Jbus protocol | Transmitter power supply + CT | 5 | 6 | |
| | | 5 | 8 | |
| | None | 9 | 0 | |
| Digital input | CT | 9 | 3 | |
| | Analogue control output | 9 | 7 | |
| | Analogue control output + CT | 9 | 9 | |
| Special functions | | E | | |
| Not fitted | | 0 | | |
| Start-up + Timer | | 2 | | |
| Instruction handbook | | F | | |
| Italian-English (std) | | 0 | | |
| French-English | | 1 | | |
| German-English | | 2 | | |
| Spanish-English | | 3 | | |
| Front case colour | | G | | |
| Dark (std) | | 0 | | |
| Beige | | 1 | | |

| Input type | Range scale | I |
|-----------------------------|-----------------------------------|---|
| RTD Pt100 IEC751 | -99.9...300.0 °C -99.9...572.0 °F | 0 |
| RTD Pt100 IEC751 | -200...600 °C -328...1112 °F | 1 |
| TC L Fe-Const DIN43710 | 0...600 °C 32...1112 °F | 2 |
| TC J Fe-Cu45% Ni IEC584 | 0...600 °C 32...1112 °F | 3 |
| TC T Cu-CuNi | -200...400 °C -328...752 °F | 4 |
| TC K Chromel -Alumel IEC584 | 0...1200 °C 32...2192 °F | 5 |
| TC S Pt10%Rh-Pt IEC584 | 0...1600 °C 32...2912 °F | 6 |
| 0...50mV linear | Engineering units | 7 |
| 10...50mV linear | Engineering units | 8 |
| mV "Custom" scale | On request | 9 |

| Output configuration | L |
|----------------------|------------------------------------|
| P.I.D. | control OP1 / alarm AL2 on OP2 |
| | control OP2 / alarm AL2 on OP1 |
| On - Off | control OP1 / alarm AL2 on OP2 |
| | control OP2 / alarm AL2 on OP1 |
| Heat / Cool action | control OP1-OP3 / alarm AL2 on OP2 |
| | control OP1-OP2 / alarm AL2 on OP3 |
| | control OP2-OP3 / alarm AL2 on OP1 |

| Single control action type | Heat/Cool double control action | M |
|----------------------------|---------------------------------|---|
| Reverse | Linear cool | 0 |
| Direct | On-Off cool | 1 |

| AL2 type and function | N |
|---------------------------------|--------------------------------|
| Disabled | 0 |
| Sensor break/Loop break alarm | |
| Absolute | active high |
| | active low |
| Deviation | active high |
| | active low |
| Band | active out |
| | active in |
| Heater break by CT (if present) | active during ON output state |
| | active during OFF output state |

If not differently specified the controller will be supplied with standard version

Model: M4 3100-0000