

Temperature controllers 1/16 DIN - 48 x 48 mm gamma2[®] series M1-M3 lines

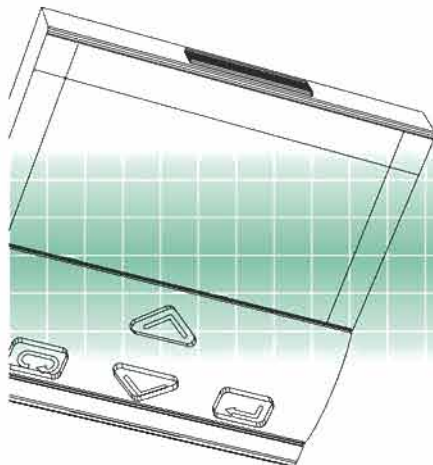
Flexible, easy and comprehensive

These two 48x48 size controllers of the gamma2[®] series are suitable for a wide range of applications.

The M1 can be used as a simple controller while the M3 performs Heat/Cool control and provides on auxiliary current transformer input.

Easy configuration and a simple operating method are merged with the characteristics typical of more complex devices such as:

- Autotune
- IP65 front panel protection
- Serial communications
- Analog retransmission output
- Custom linearization
- Transmitter power supply
- Start-up timer
- Special functions



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S E R I E S

the right solution to your needs



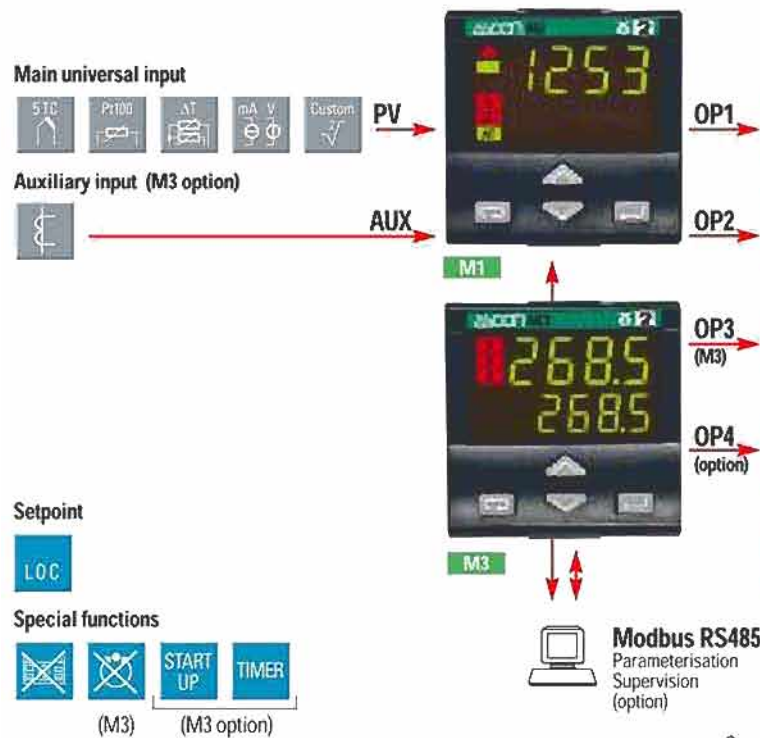
Your needs

- Heaters failure
- Both heating and cooling functions
- Easy replacement and quick start-up
- Correct tuning for any condition
- Alarm signalling
- Interfacing with other devices
- Quick learning
- Ergonomic compatibility with other devices
- Environmental protection
- Easy to use
- Noise immunity
- Universal input signals, linear as well as non-linear
- Costs reduction
- Reliability and safety
- Technical support

Our solutions

- Heater break alarm with current transformer
- Heat/Cool double action
- Configuration by simple to use codes
- Automatic selection between two different tuning methods
- Absolute, band and deviation alarms, Latching/Blocking
- Serial communications at 9600 baud Modbus/Jbus protocol, analogue retransmission output
- Every model has the same operating method
- Two colours: beige or darkgrey front panels
- IP65 front panel protection (indoor, dust and water protection)
- Ergonomic keypad, clear and comprehensive display
- Electromagnetic compatibility
- Configurable input (TC, RTD, mA, Volt and ΔT, infrared sensor, "custom" linearisation)
- Built-in Timer and Start-up functions
- CE compatibility, ASCON is ISO 9001 certified, 3 years warranty
- Technical application assistance from ASCON sales and after sales service

Resources



Operating mode

	Control	Alarms	Retransmission
			PV/SP
0	Indication only	OP1 OP2	OP4
1	Single action	OP1	OP2 OP3 OP4 (M3)
2	Single action	OP2	OP1 OP3 OP4 (M3)
3	Double action	OP1 OP3	OP2 OP4
4	Double action	OP1 OP2	OP3 OP4
5	Double action	OP2 OP3	OP1 OP4

Fuzzy tuning with automatic selection

- One shot Auto tuning
- One shot Natural Frequency

* Mode 0 for M1 only
 Modes 3, 4 and 5 for M3 only

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)
	Resistance thermometer (for ΔT: R1+R2 must be <320Ω)	Pt100Ω at 0°C (IEC 751) °C/°F selectable 2 or 3 wire connection
	Thermocouple	L, J, T, K, S (IEC 584) °C/°F selectable Internal cold junction compensation Line: 20Ω max (3 wire) Thermal drift 0.1°C/10°C env. T. <0.1°C/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 Input drift: <0.1% / 20°C env. T.
	DC input (voltage)	0/10 - 50mV, Rj > 10MΩ High Range -999 - 9999 100 digits minimum
	Auxiliary input	CT current transformer (M3 only) 50 or 100mA input hardware selectable Current visualization 10 200 A with 1A resolution and Heater break alarm
Operating modes	M1 : 1 single action PID loop or ON/OFF with 1 alarm M3 : 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 (M3 only)	0.1 - 0.10 digit
	Cycle time	1 - 200 sec.
	Dead band	-10.0 - 10.0
	Relative cool gain	0.1 - 10.0
Control mode	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%
	ON/OFF algorithm	
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 (M3 only)	SPST relay N.O., 2A/250V~ for resistive load Triac, 1A/250V~ for resistive load	
AL1 alarm (indicator with 2 alarms)	Hysteresis 0.1 - 10.0% of range	
	Active high	Absolute threshold, whole range
AL2 alarm	Hysteresis 0.1 - 10.0% of range	
	Action	Sensor break, Heater break, Loop break, Latching/Blocking
AL3 alarm (M3 only)	Active high	Deviation threshold ± range
	Active low	Band threshold 0 - range
	Special function	Absolute threshold, whole range
Setpoint	Up and down ramps	0.1 - 999.9 digit/min (OFF = 0)
	Low limit	from low range to high limit
	High limit	from low limit to high range
OP4 (option) PV or SP retransm. output	Galvanically isolated: 500V~/1min Resolution: 12bit (0.025%) Accuracy: 0.1%	
One-shot	Depending on the process condition.	
Fuzzy-Tuning	the controller applies the best method	

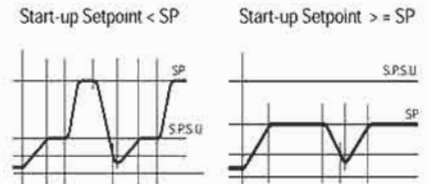
Input type	Scale range
RTD	-99.9 - 300.0 °C
Pt100Ω@0°C	-99.9 - 572.0 °F
	-200 - 600 °C
	-328 - 1112 °F
T/C type L	0 - 600 °C
Fe-Const.	32 - 1112 °F
T/C type J	0 - 600 °C
Fe-Cu 45% Ni	32 - 1112 °F
T/C type T	-200 - 400 °C
Cu - CuNi	-328 - 752 °F
T/C type K	0 - 1200 °C
Cromel Alumel	32 - 2192 °F
T/C type 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

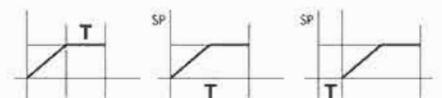
Special functions

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.

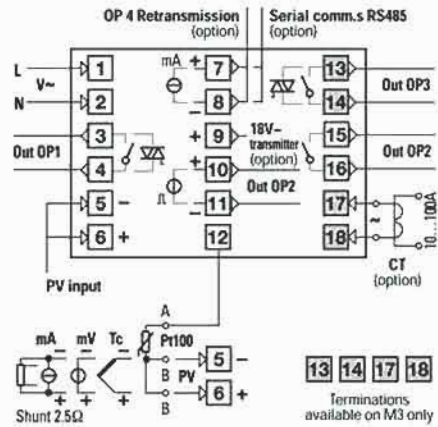
Moreover there are:

- **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.

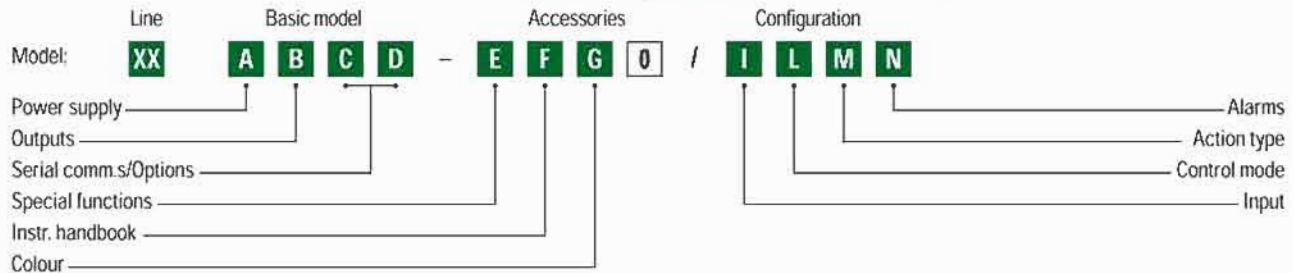
Technical data

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.	+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 (user enabled/disabled): 0%, 100% (M1) 0 - 100% (-100 - 100% for Heat/Cool mode) (M3).
	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 and parameters
	Power supply	100-240V~ (-15% +10%) 50/60Hz or 24V~(-25% +12%), 50/60Hz and 24V~ (-15% +25%). Power consumption 1.6W max
General characteristics	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
	Protection	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



Line	Options	M1	M3	C	D
Controller-Indicator 48x48x120					
Heat/Cool Controller 48x48x120					
Power supply					
100-240V~ (-15% +10%)					
24V~ (-25% +12%) or 24V~ (-15% +25%)					
OP1 (OP3) output					
Relay		✓			
Relay-Relay			✓		
Relay-Triac			✓		
Triac			✓		
Triac-Relay			✓		
Triac-Triac			✓		
Serial comm.s	Options	M1	M3	C	D
None		✓	✓	0	0
Current Transformer input (CT)		✓	✓	0	3
Not fitted	Transmitter	✓	✓	0	6
	power supply + 18V	✓	✓	0	7
	+ CT	✓	✓	0	8
	+ Re-trans. + CT	✓	✓	0	9
RS 485	None	✓	✓	5	0
Modbus/Jbus protocol	Transmitter power supply + CT	✓	✓	5	6
		✓	✓	5	8
Special functions		M1	M3	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		M1 M3 L	
P.I.D.	control OP1 / alarm AL2 on OP2	✓ ✓	0
	control OP2 / alarm AL2 on OP1	✓ ✓	1
On - Off	control OP1 / alarm AL2 on OP2	✓ ✓	2
	control OP2 / alarm AL2 on OP1	✓ ✓	3
Indicator with 2 alarms	alarm AL1 on OP1 / alarm AL2 on OP2	✓ ✓	4
	alarm AL1 on OP2 / alarm AL2 on OP1	✓ ✓	5
Heat / Cool action	control OP1-OP3 / alarm AL2 on OP2	✓	6
	control OP1-OP2 / alarm AL2 on OP3	✓	7
	control OP2-OP3 / alarm AL2 on OP1	✓	8
Single control action type	Heat/Cool (M3) Safety (M1)	M1 M3 M	
Reverse (M1: AL1 active low)	Linear cool 0%	✓ ✓	0
Direct (M1: AL1 active high)	On-Off cool 0%	✓ ✓	1
Reverse (AL1 active low)	100%	✓ ✓	2
Direct (AL1 active high)	100%	✓ ✓	3
AL2 type and function		M1 M3 N	
Disabled		✓ ✓	0
Sensor break/Loop break (M3) alarm		✓ ✓	1
Absolute	active high	✓ ✓	2
	active low	✓ ✓	3
Deviation	active high	✓ ✓	4
	active low	✓ ✓	5
Band	active out	✓ ✓	6
	active in	✓ ✓	7
Heater break by CT (if present)	active during ON output state	✓ ✓	8
	active during OFF output state	✓ ✓	9

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

Model: M1 3000-0000 or M3 3100-0000

