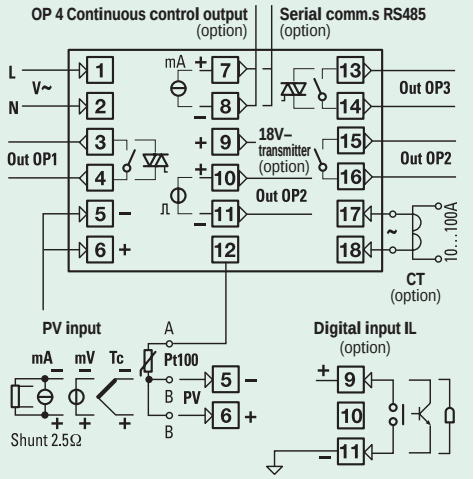
Technical data

Features at env. 25°C	Description	
Ser. com.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: 0…100%. (-100...100% for Heat/Cool mode) (user enabled/disabled).
	Parameters	A non volatile memory stores for unlimited time all the parameter values
	Password	A password protects the access to the instrument configuration
General characteristics	Power supply	100-240V~ (-15% +10%) 50/60Hz or 24V~(-25% +12%), 50/60Hz and 24V– (-15% +25%). Power consumption 1.6W 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
	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

Model: M4 A B C D – E F G 0 / I L M N

- Line: M4
- Basic model: A
- Power supply: A
- Outputs: B
- Serial comm.s/Options: C D
- Special functions: E
- Instr. handbook: F
- Colour: G
- Accessories: 0
- Configuration: I L M N
- Input: I
- Control mode: L
- Action type: M
- Alarms: N

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		0	6
		+ Continuous control output	0	7
		+ CT	0	8
		+ Cont. control output+ CT	0	9
RS 485 Modbus/Jbus protocol	None		5	0
	Transmitter power supply		5	6
		+ CT	5	8
Digital input	None		9	0
	CT		9	3
	Continuous control output		9	7
	Continuous 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
TR Pt100 IEC751	-99.9…300.0	°C	-99.9…572.0	°F	0
TR 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 Cromel -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	0
	control OP2 / alarm AL2 on OP1	1
On - Off	control OP1 / alarm AL2 on OP2	2
	control OP2 / alarm AL2 on OP1	3
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 double control action	M
Reverse	Linear cool	0
Direct	On-Off cool	1

AL2 type and function		N
Disabled		0
Sensor break		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: M4 3100-0000

Technical data

Features at env. 25°C	Description			
Total configurability	From keyboard or serial communications, the user selects: type of input - associated functions and corresponding outputs - type of control algorithm - type of output and safe conditions - alarms type and functionallity - control parameters 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 0.1°C/10°C env. T. <0.1°C/10Ωline resist.
	Thermocouple	L,J,T,K,S (IEC 548) °C /°F selectable	Internal cold junction compensation	Line: 150Ω max Thermal drift <2µV/°C env. T. <0.5µV/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...100 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, Stored Setpoint activation, keypad lock, Timer launch	
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%		P.I.D. algorithm
	Integral time (I)	0.1…100.0 min	OFF = 0	
	Derivative time (D)	0.01…10.00 min		
	Cycle time	1…200 sec.		
	Dead band	-10.0...10.0		For Heat/Cool mode
	Relative cool gain	0.1…10.0		
	Cool cycle time	1…200 sec.		
	Overshoot control	0.01…1.00		P.I.D. algorithm
	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	Logic 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) continuous 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
				Absolute threshold, whole range
		Special functions	Sensor break, Heater break	
Setpoint	Local and stand-by selectable by keypad, 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	
	High limit		from low limit to high range	
One-shot Fuzzy-Tuning	Depending 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			

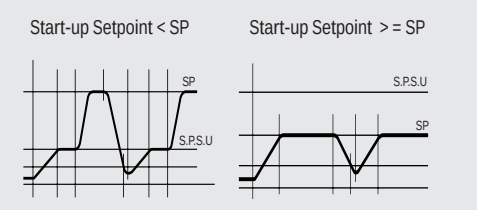
Input type	Scale range	
RTD Pt100Ω a 0°C	-99.9…300.0	°C
	-99.9…572.0	°F
	-200…600	°C
	-328…1112	°F
T/C type L Fe-Const.	0…600	°C
	32…1112	°F
T/C type J Fe-Cu 45% Ni	0…600	°C
	32…1112	°F
T/C type T Cu - CuNi	-200…400	°C
	-328…752	°F
T/C type K Cromel Alumel	0…1200	°C
	32…2192	°F
T/C type S Pt10%Rh-Pt	0…1600	°C
	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

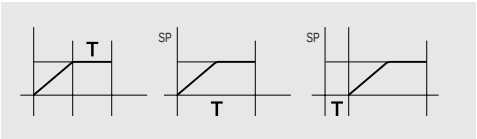
Special functions

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

- Start-up



- Timer



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

Moreover there are:

- **Keypad lock/unlock** function, to avoid wrong 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.