

Process Controller Setpoint programmer

1/16 DIN - 48 x 48 mm

Platinum™ Series M5000 Line



Advanced features, customizable and process adaptable

The most sophisticated 48x48mm size controller of the Platinum™ series offers high speed data acquisition and signal management, efficient information transfer to the supervisor, and the ability to adapt itself to changing process conditions.

Standard features include: Autotune software, dedicated auto/man key, three outputs, one or two digital inputs, IP65 front panel protection, and auxiliary power supply.

Options include: serial communications, analog control or retransmission output, remote setpoint input, feedback potentiometer input, current transformer input, logic output, one 16 segment setpoint program, and two front bezel colors.

Some options are mutually exclusive.



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Platinum™ S E R I E S

athenacontrols.com

the right solution to your needs



Your needs	Our solutions
High speed data acquisition and signal management	Sampling time: 100ms Measure update time: 50 ms
Use of different actuators	Analog output, heat/cool, valve control output with potentiometer position feedback
Process with time variable characteristic	Initial and automatic calculation of the right control parameters
Alarm signalling and diagnostic	4 alarms addressable to one or more outputs, latching/blocking, absolute or deviation thresholds, loop break alarm, heater break alarm by current transformer input
Interfacing with other devices	Serial communications at 19200 baud Modbus/Jbus protocol, analog retransmission output & Remote Setpoints
Temperature profile	1 program with 16 segments, 2 stored Setpoints
Safe and reproducible configuration and parameter settings	Memory chip for data transfer & storing, configuration & parameterisation software
Quick learning	Platinum™ Series has the same operating method
Ergonomic compatibility with other devices	Two colors: beige or dark grey 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)
Reliability and safety	CE compatibility, 3 years warranty
Technical support	Technical application assistance from ATHENA sales & after sales service

Resources Operating mode

Main universal input

6 TC Pt100 ΔT mA V Custom PV

Auxiliary input (option)

POT. REM mA REM V AUX

Two digital inputs

D1 D2

Memory Chip
Data Copy/Data Store (option)

OP1 OP2 OP3 OP4 (option)

Setpoint

LOC 2 MEM REM 1x16s

Digital inputs (D1, D2) functions

MEM REM RUN HOLD PV SP STORE

Modbus RS485
Parameterisation Supervision (option)

Tuning

One shot Auto tuning Adaptive

	Control	Alarms	Retransmission
			PV/SP
1 Single output	OP1	OP2 OP3	OP4
2 Single output	OP4	OP1 OP2 OP3	
3 Heat/Cool	OP1 OP2	OP3	OP4
4 Heat/Cool	OP1 OP4	OP2 OP3	
5 Heat/Cool	OP4 OP2	OP1	OP3
6 Valve	OP1 OP2	OP3 OP4	

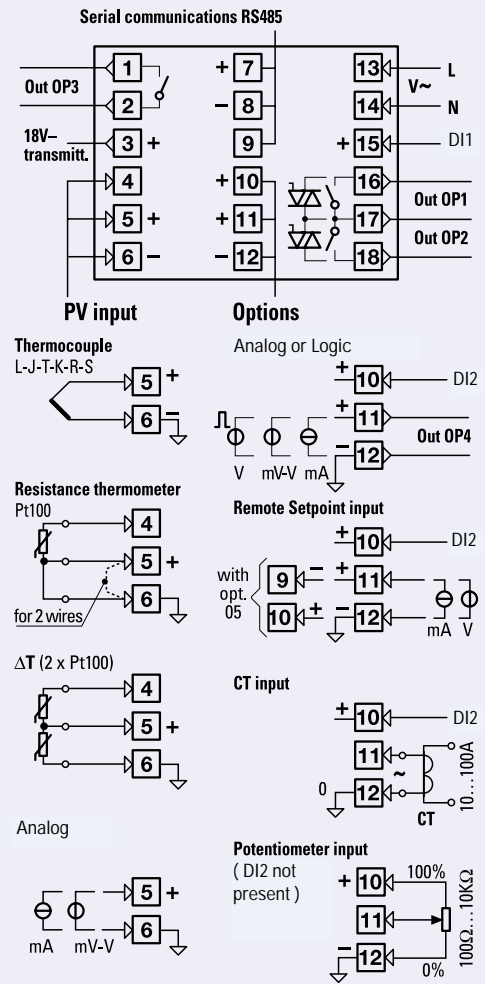
Technical data

Features at env. 25°C		Description		Input type	Scale range	
Total configurability	The choices are: input type, operating mode, type of control, safety strategies, alarm strategies			RTD Pt100Ω at 0°C	-200...600 °C	
	1 loop with Heat/Cool output				-328...1112 °F	
Operating modes	1 loop as the latter with the addition of the Setpoint programmer			RTD 2xPt100Ω at 0°C for ΔT	-99.9...300.0 °C	
	1 loop with Heat/Cool output				-99.9...572.0 °F	
Control mode	Algorithm	PID with overshoot control or On-Off		T/C type L Fe-Const. T/C type J Fe-Cu 45% Ni T/C type T Cu - CuNi T/C type K Cromel Alumel T/C type R Pt13%Rh-Pt T/C type S Pt10%Rh-Pt 0/4...20 mA, 0...50 mV 0/1...5 V, 0...10 V	-50.0...50.0 °C	
		PID with valve algorithm, for controlling motorised valves			-58.0...122.0 °F	
	Proport. band (P)	0.1...999.9%			0...600 °C	
	Integral time (I)	1...9999 sec.	User enabled/disabled		PID control	32...1112 °F
	Derivative time (D)	0.1...999.9 sec.				0...600 °C
	Manual reset	0...100% output	User enabl./disabled		P and PD control	32...1112 °F
	Cycle time	0.2...30.0 sec.			Time prop. control	-200...400 °C
	Hysteresis	0.1...5.0%			On-Off control	-328...752 °F
	Dead band	0.0...5.0%			Heat-Cool control	0...1200 °C
	Cool Proport. band	0.1...999.9%				32...2192 °F
	Cool Integral time	1...9999 sec.	User enabled/disabled			0...1600 °C
	Cool Der. time	0.1...999.9 sec.				32...2912 °F
	Cool cycle time	0.2...30.0 sec.			Motorised valves	0...1600 °C
	Motor travel time	15...600 sec.				32...2912 °F
	Motor minim. step	0.1...5.0%				Configurable engineering units mA, mV, V, bar, psi, Rh, ph
	Feedback potent.	100Ω...10KΩ				
PV input (for signal ranges see table 1)	Common characteristics	A/D converter with resolution of 160.000 points Update measurement time: 50 ms Sampling time (max. update time of the output adjustable): 0.1...10.0 sec. configurable - Input shift : 60...+ 60 digit Input filter with enable/disable: 0.1...999.9 sec.			Table 1 : PV input	
		Accuracy	0.25% ± 1 digits for temperature sensors 0.1% ± 1 digits (for mA and mV)	Between 100...240V~ the error is minimal		
	Resistance thermometer (for ΔT: R1+R2 must be <320Ω)	Pt100Ω a 0°C (IEC 751) °C/°F selectable	2 or 3 wires or 2 Pt100 for ΔT	Max. wire res.: 20Ω (3 wires) 0.35°C/10°C Env. t. <0.35°C/10Ω Wire res.		
	Thermocouple	L,J,T,K,R,S (IEC 584) °C/°F selectable	Internal cold junction compensation	Max. wire res: 150Ω Sensitivity <2μV/°C Env. t. <5μV/10Ω Wire res.		
	DC input (current)	0/4...20mA Rj = 30Ω	Engineering units Decimal point conf. with or without √	Input drift: <0.1% / 20°C Env. temperature		
	DC input (voltage)	0...50 mV Rj = 10MΩ 1-5/0-5/0-10V Rj = 10KΩ	Initial Sc.: -999...9999 Full Sc.: -999...9999 (minim. range 100 digits)			
Auxiliary inputs (options)	Remote Setpoint Not isolated accuracy 0.1%	Current 0/4...20mA Rj = 30Ω	Bias in engineering units and ± range			
		Voltage 1-5/0-5/0-10V Rj = 300KΩ	Ratio from -9.99...+99.99 Local + Remote Setpoint			
	CT current transformer	max span 50 or 100 mA hdw selectable	Display from 10 to 200 A resolution of 1A with alarm threshold (Heater break alarm)			
	Potentiometer	100Ω...10KΩ supply. 300mV	Position feedback measurement			
Digital inputs	2 logic	The closure of the external contact produces any of the following actions	Auto/Man mode change, Local/Remote Setpoint mode change, Stored Setpoints activation, keypad lock, measure hold and slopes inhibit. Start, stop, hold of a program (only with Setpoint programmer)			
Control output (analog)	Single or double channel, direct or reverse action					
	Minimum limit	0...100.0% (OP1 heat)				
	Maximum limit	0...100.0% (OP1 heat), -100.0...0% (OP2 cool)				

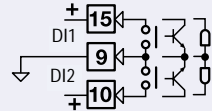
Technical data

Features at env. 25°C	Description			
Control output	Max. slope	0.01...99.99%/sec. up and down		
	Safety value	-100...+100%. User enabled/disabled		
	Time proportioning	Relay	SPST NO, 2A/250V~ resistive loads	
		Triac	1A/250V~ resistive loads	
	Analog OP4 (optional)	Logic OP4 (Option-Control Only)	0...22V~, 20mA max (for static switches)	Galvanic isolation 500V~/1min. 12 bit (0.025%)
		Current	0/4...20mA max 750Ω/10V max	12 bit (0.025%)
	Analog OP4 (optional)	Voltage	0...1/5/10V	Accur. 0.1%
			500Ω / 20mA max	Short circuit protection
	Motorised valve (3 states) Open - Stop - Close	Double action		
		SPST Relay N.O., 2A/250V~ resistive load		
Alarms	SPST NO, 2A/250V~ resistive load - hysteresis 0.1...5.0% symmetrical			
	Action	Active high	Action type	Deviation threshold ± range
		Active low		Band threshold 0...range
				Absolute threshold Whole range
	Special functions	Heater Break detection		
		Loop Break Alarm		
		Activation inhibit (blocking)		
		Acknowledge (latching)		
	Related to the program (optional) (OP3)			
	Analog output OP4 (optional)	Galvanic isolation 500V~/1min. Resolution: 12 bit (0.025%) Accuracy: 0.1% Short circuit protected	Current 0/4...20mA 750Ω/10V max	Control or Retransmission of PV or SP
		Voltage 1-5/0-5/0-10V 500Ω/20mA max		
Setpoint	Ramp up and down, with slope in digit/sec., digit/minute or digit/hour between 0.0...10.0% of the range High and low limits	Local plus 2 stored Setpoints		
		Only Remote		
		Local and Remote		
		Local with trim		
		Remote with trim		
Time programmable (optional)				
SetPoint Program*	1 program, 16 segments (1 initial and 1 end)			
	From 1 to 9999 cycles or continuous cycling (OFF)			
Time values in seconds, minutes and hours				
Start, stop, hold, etc. activated from the keypad, digital input and serial comm.s				
Tuning	One shot tune-step response method for calculating the PID terms parameters			
	Adaptive tune self-learnig, not intrusive, analysis of the process response to disturbances and continuous calculation of the PID parameters (not available with the Setpoint Programmer option)			
Auto/Manual station	Integrated in the controller, bumpless			
Serial comm.s (optional)	Operated from keypad, digital inputs and serial communications			
Auxil. supply	RS 485 isolated, Modbus/Jbus 1200, 2400, 4800, 9600, 19200 bit/sec., 2 wires			
Operational safety	Measure input	18V~ + 20% 30mA max for transmitters (2 3 4 wires)		
	Control output	Safety value:-100...+100%, (user enabled/disabled)		
	Parameters	Parameters and configuration data are stored in a non volatile memory for an unlimited time. They are organised in functionally homogeneous groups, as: visible and changeable, visible and not changeable, not visible		
	Access protection	Password to access the configuration data and the parameter protection menu		
	Power supply	100-240V~ (-15% +10%) 50/60Hz or 24V~(-25% +12%), 50/60Hz and 24V~ (-15% +25%). Power consumption 3W max		
General characteristics	Safety	Compliance EN61010-1 (IEC 1010-1), inst. class 2 (2500V), poll. class II		
	Electromagnetic compatibility	Compliance to the CE standards for industrial system and equipment		
	Protection	IP65 front panel		
	Dimensions	EN60529 (IEC 529)		
	Approvals	1/16 DIN - 48 x 48, depth 150 mm, weight 230 gr apx. cULus		

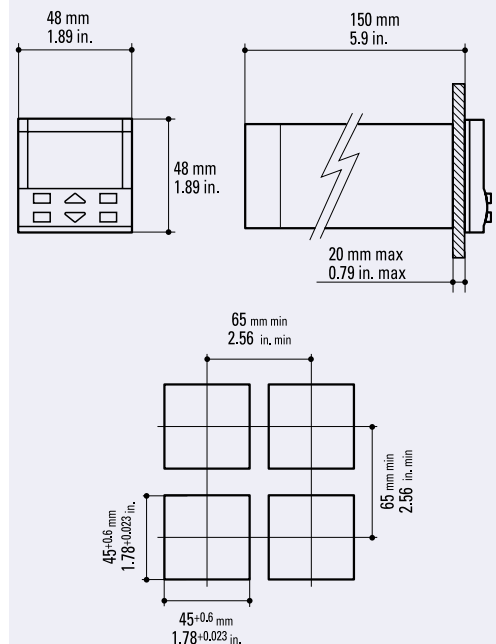
Electrical wirings



Digital inputs



Dimensions



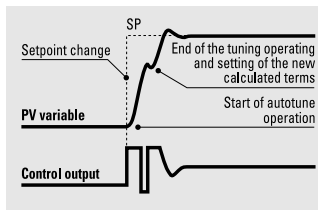
*Adaptive tuning not available with this option

Tuning

Two methods of tuning are available:

- **Auto-Tuning** "one shot"
- **Adaptive-Tuning*** continuous and self-teaching

The **Auto-Tuning*** method works best on the step response basis. When activated it modifies the output value and, in a short time, calculates the PID parameters. The new algorithm is operational immediately. The main advantages of this method are fast calculation and quick implementation.

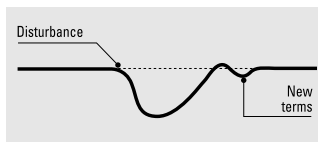


The ATHENA self teaching **Adaptive-Tuning*** waits for process change to recalculate the new PID parameters. The new PID calculation does not influence the control output, avoiding any disturbance. The PID optimisation is done only when necessary (e.g. Setpoint changes or process disturbances like load changes).

No action by the operator is required.

The operating mode of Adaptive-Tuning is safe and user friendly. It tests the process response after a disturbance, it memorises the intensity and frequency of the reaction, then the Adaptive-Tuning checks the new information with its statistical data base.

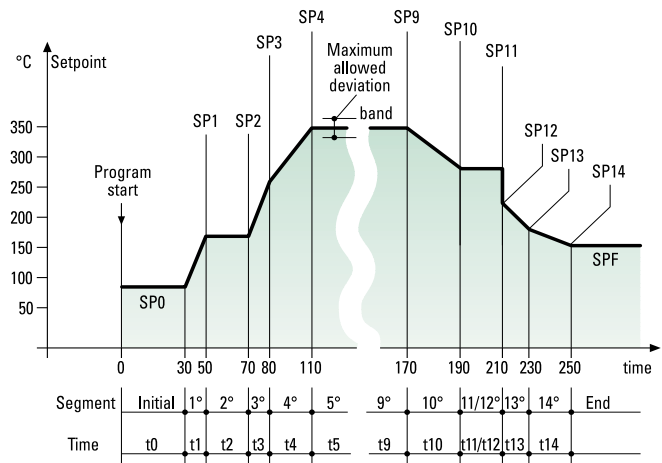
The correct PID algorithm is then ready to implement. This tuning is ideal for non-linear processes where the PID parameters must be adapted to changing conditions.



*Not available with Setpoint programmer option

Setpoint programmer

If the Adaptive-Tuning is not requested, the controller can be fitted with a Setpoint programmer option. A profile of up to 16 segments can be programmed. Number of cycles as well as the max. allowed deviation can be configured. The time base can be selected from seconds, minutes and hours. Run, Hold and Stop functions can be performed by means the front keypad or by external commands.



Integrity in data copy

Memory chip

The **memory chip** makes possible a fast and safe transfer of data related to the configuration and all parameters. With a simple operation, the information can be stored and copied to the **memory chip**. The procedure can be protected by a password.



Configuration software

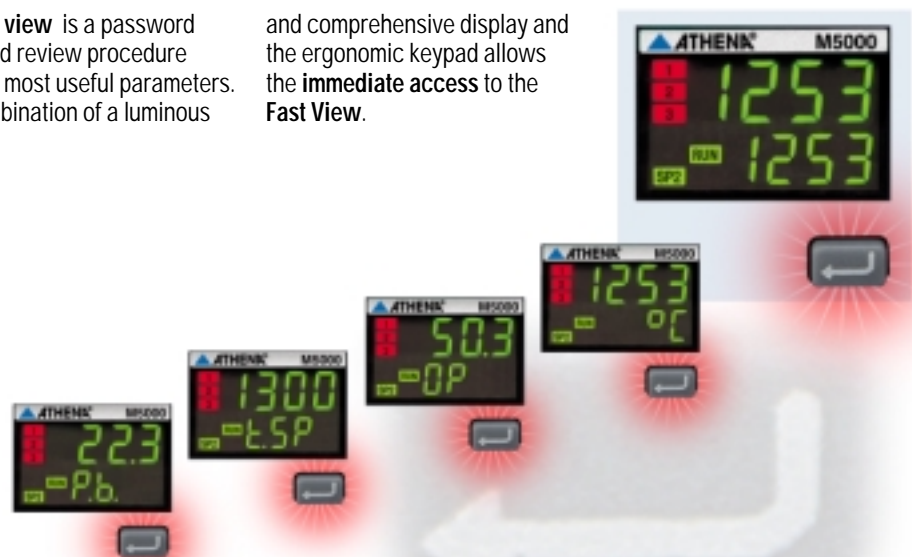
A software tool is available to improve both the configuration and the parameterization. All the data can be stored to file. It is also possible to down-load the linearisation of the "custom"

input by using the polynomial's coefficients.

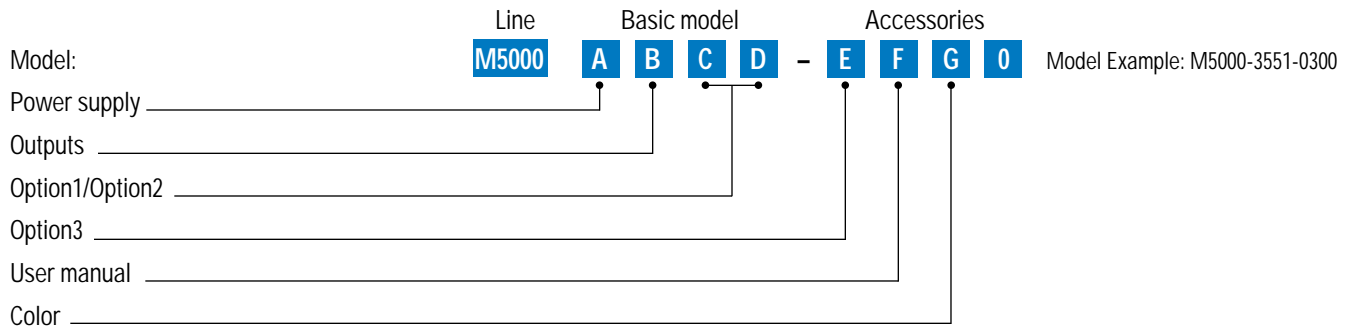
Fast view - fast parameter access

The **Fast view** is a password protected review procedure of the 10 most useful parameters. The combination of a luminous

and comprehensive display and the ergonomic keypad allows the **immediate access** to the **Fast View**.



Ordering codes



Power supply			A
100-240V- (-15% +10%)			3
24V- (-25% +12%) or 24V- (-15% +25%)			5
Output OP1	Output OP2	Output OP3	B
Relay	Relay	Relay	1
Relay	Triac	Relay	2
Triac	Relay	Relay	4
Triac	Triac	Relay	5
Option 1	Option 2		C D
None	None [2]		0 0
	Auxiliary input	Feedback potentiometer [2]	0 1
		Remote Setpoint [1]	0 2
		Current transformer	0 3
	Auxiliary output	Logic/Analog OP4 [3]	0 4
Logic/Analog OP4 + Remote Setpoint [1] [2] [3]		0 5	
RS 485 Modbus/Jbus protocol	None [2]		5 0
	Auxiliary input	Feedback potentiometer [2]	5 1
		Remote Setpoint [1]	5 2
		Current Transformer	5 3
	Logic/Analog auxiliary output		5 4
Option 3			E
None			0
Setpoint program - one program with 16 segments [4]			1
User manual			F
English-Spanish			3
Front Bezel color			G
Dark Grey (std)			0
Beige			1

[1] Not available with Setpoint programmer (E=1)

[2] Second digital input (DI2) not available

[3] OP4 (Output 4) can be software configured for logic output or analog output

Analog OP4 can be configured for control or retransmission output as 0-20mA or 4-20mA

Logic OP4 can be used for control output only at 22Vdc 20mA

The addition of OP4 option does not affect any of the other three outputs

[4] One setpoint program with up to 16 ramp/soak segments;

not available with 'CD' selections of 02, 05, or 52;

adaptive tuning not available