

Microprocessor Based Temperature Controller

MODEL 810



- ☐ Microprocessor based 3-term control.
- ☐ Optional self-tuning
- ☐ Customized fluorescent display of setpoint and measured value complete with 9 segment deviation indication.
- ☐ Integral plug-in mounting sleeve.
- ☐ Plug-in circuit board construction.
- ☐ Optional auto/manual with bumpless transfer
- ☐ Wide range of inputs and outputs.
- ☐ Non-volatile memory (no battery back-up required).
- ☐ XXXXXXXXXX
- ☐ Made in USA.

The Model 810 Controller is a microprocessor based three term controller, featuring digital display of the setpoint and measured value. As standard, each 810 incorporates a 9 segment bargraph display of deviation from setpoint and LED indication of output. A full 4 digit display is standard.

Up and Down pushbuttons are incorporated in the 810 for not only setpoint changes but also for control parameter changes, such as proportional band, integral, derivative, alarm, etc. An internal slide switch is incorporated as standard to provide security for the control parameters selected.

An optional self-tuning feature automatically determines the PID tuning parameters. This is accomplished during the start-up of the process, upon demand, and even while the process is running.

Each 810 is available with up to two independently adjustable alarm functions. Options such as auto/manual bumpless transfer and remote set point input make the Model 810 extremely versatile.

Specifications

SETPOINT

Digital display with raise and lower pushbuttons.

SETPOINT RESOLUTION

1 degree or one least significant digit.

INPUT SIGNAL

Thermocouple, RTD, Volts, mV, or mA; minimum span 5mV.

THERMOCOUPLE BREAK PROTECTION

Standard, display blanks and the deviation bargraph indicates direction.

DEVIATION INDICATION

Vertical 9 segment bargraph display; $\pm 0.5\%$ to 5% of span.

PROPORTIONAL BAND

Adjustable in steps from 0.5% to 100% .

INTEGRAL (RESET)

Adjustable in steps from 15 to 1800 seconds with integral OFF.

DERIVATIVE (RATE)

Adjustable in steps from 5 to 600 seconds with derivative OFF.

CYCLE TIME

Adjustable 0.3, 1, 5, 10, 20, 40 and 80 seconds.

CALIBRATION ACCURACY

Typically $\pm 0.25\%$ of span.

OPERATING LIMIT

Ambient Temperature: $0-50^{\circ}\text{C}$ ($32-122^{\circ}\text{F}$)

Line Voltage: $100/210\text{VAC} \pm 10\%$

$120/240\text{VAC} \pm 10\%$

Line Frequency: 48-62Hz

Common Mode Rejection: 300VAC RMS maximum with respect to ground

Series Mode Rejection: Greater than 1000:1 (60db) giving no observable effect for up to 50mV RMS

STABILITY

Line Voltage: Typically better than 0.2% of span within operating limits.

Temperature: Typically better than 30 to 1 rejection of ambient.

POWER CONSUMPTION

10VA Maximum.

DISPLAY SIZE

0.500 inch high, 7 segment fluorescent display.

MAXIMUM THERMOCOUPLE RESISTANCE

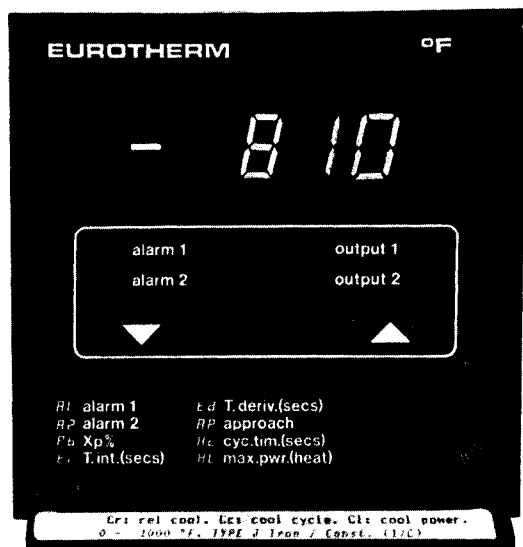
100 ohms (loop resistance).

DATA RETENTION

Minimum 10 years with instrument unpowered.

WEIGHT

2.42 lbs.



The Display

The digital display is a customized fluorescent indicator panel comprising a nine segment error bar display and 4, seven segment, indicators giving accurate digital indication of process variables. The measured value or setpoint can be viewed during normal operation. Single depression of either the up or down, ▲ ▼, button causes the setpoint to be displayed. A flashing dot at the top left of the display confirms that a parameter value other than the measured value is being displayed and a timing feature returns the display to measured value five seconds after the last change.

The nine segment bars provide error indications of measured value with respect to the setpoint. In the event of a thermocouple break the numeric display goes blank when the maximum/minimum scale range is reached and the error bars indicate an up or down break.

Operator Controls

Each 810 controller is provided with the ability to vary control parameters in discrete steps as listed below. The parameters are accessed via the scroll pushbutton located behind the fascia door and varied by the use of the up/down pushbutton. To assist in start-up each 810 is precommissioned to nominal values and the internal scroll disable slide switch is placed in the secure position.

CONTROL PARAMETERS

Prop Band: 0.50, 0.75, 1.00, 1.50, 2, 3, 4, 6*, 8, 12, 16, 25, 35, 50, 100%.
 Integral (secs): Off, 15, 30, 45, 60, 90, 120, 150, 200, 300, 400*, 600, 900, 1200, 1800.
 Derivative (secs): Off, 5, 10, 15, 20, 30, 40, 60*, 90, 150, 200, 300, 400, 600.
 Approach (rel. Pb): 0.25, 0.50, 0.75, 1.00*, 1.25, 1.50, 2.00, 2.50, 3.00.
 Cycle Time (secs): 0.3, 1, 5, 10, 20, 40, 80.

**Standard precommissioned value unless self-tuning option is added.*

SELF-TUNING

During start-up the Model 810 with optional self-tuning will determine the appropriate PID tuning parameters. After selection, these values can be viewed and even changed via the scroll and up/down pushbuttons. Upon demand the 810 can be retuned and even while the process is running, adjustments are constantly made to optimize control parameters.

Table 1
OUTPUT CODES

HEAT CHANNEL	DESCRIPTION	APPLICATION
SCT	Slow Cycle Triac 1A, 240VAC Zero Crossing Fired	Time proportional contactors
ZCP	Zero Crossing SCR trigger pulses	Eurotherm, SCR power packs and open stacks—Resistive loads
PAP	Phase Angle SCR trigger pulses	Eurotherm SCR power packs and open stacks—Inductive and temperature sensitive loads
R2	Slow Cycle Relay 2A, 240V RMS (10 ⁶ operations)	Time Proportional Contactors
LGC	DC Logic Output to drive solid state contactors. (Unisolated 10VDC minimum at 20mA.)	Solid State Contactors
0-5V 1-5V 0-10V	Isolated 0-5, 1-5, or 0-10VDC analog output (20mA maximum)	Eurotherm SCR Assemblies, Drivers or External Analog Devices
0-10mA 0-20mA 4-20mA	Isolated 0-10, 0-20, or 4-20mA analog output (10VDC maximum)	SCR Assemblies, Saturable Reactors, etc.
COOL CHANNEL	DESCRIPTION	APPLICATION
TL	Slow Cycle Triac with non-linear characteristics 1A, 240VAC (10 sec. cycle time)	Fan (air) Cooling Applications
TNL	Slow Cycle Triac with non-linear characteristics 1A, 240VAC (10 sec. cycle time)	Solenoid Valves (water) Cooling Applications
TOO	On-Off Triac Cooling 1A, 240VAC	Air Cooling Applications

Table 2
INPUT AND
SCALE
RANGES

Thermocouple & RTD Ranges — °C or °F

TEMPERATURE RANGE	J	K	R	S	T	B	C	E	G1	G2	PL2	RTD 3 100 ohms PLATINUM
- 250 to + 250	°F	°F	—	—	X	—	—	°F	—	—	—	°F
- 125 to + 125	X	°C	—	—	°C	—	—	X	—	—	—	X
0-50.0	—	—	—	—	—	—	—	—	—	—	—	°C
0-100.0	°C	—	—	—	—	—	—	°C	—	—	—	°C
0-200	°C	°C	—	—	°C	—	—	°C	—	—	—	X
0-300	X	X	—	—	°C	—	—	X	—	—	X	X
0-400	X	X	—	—	°F	—	—	X	—	—	X	X
0-600	X	X	°C	°C	°F	—	—	X	°C	°C	X	X
0-800	X	X	°C	°C	—	—	—	X	°C	°C	X	X
0-1000	X	X	°C	°C	—	°C	°C	°F	X	X	X	X
0-1200	°F	X	X	X	—	°C	X	°F	X	X	X	°F
0-1600	°F	°F	X	X	—	°C	X	—	X	X	°F	°F
0-2000	—	°F	°F	°F	—	°F	X	—	X	X	°F	—
0-2400	—	—	°F	°F	—	°F	°F	—	°F	°F	—	—
0-3000	—	—	—	—	—	°F	°F	—	°F	°F	—	—
0-4000	—	—	—	—	—	—	°F	—	—	—	—	—

DC Analog Ranges

RANGE	MILLIVOLTS (mV)		MILLIAMPERES (mA)	VOLTS DC (VDC)
	WITHOUT CJC (N)	WITH CJC (T/C)		
0-5.00	X	X	—	X
0-10.00	X	X	—	X
0-20.00	X	X	X	—
0-30.00	X	X	—	—
0-39.99	X	X	—	—
0 ± 2.500	X	—	—	—
4-20	—	—	X	—
1-5	—	—	—	X

X — °C or °F
°C — °C Only
°F — °F Only

X — Available Ranges

Table 3
VOLTAGE
INPUT

DESIGNATION	DESCRIPTION
100V	100 Volts AC input
120V	120 Volts AC input
210V	210 Volts AC input
240V	240 Volts AC input
SPS*	87-250 Volts AC input

* Available with SCT, ZCP, PAP, and LGC only.

Table 4
REAR TERMINALS

DESIGNATION	DESCRIPTION
S	Standard screw type terminals on integral sleeve
X	Optional plug-in terminals on integral sleeve

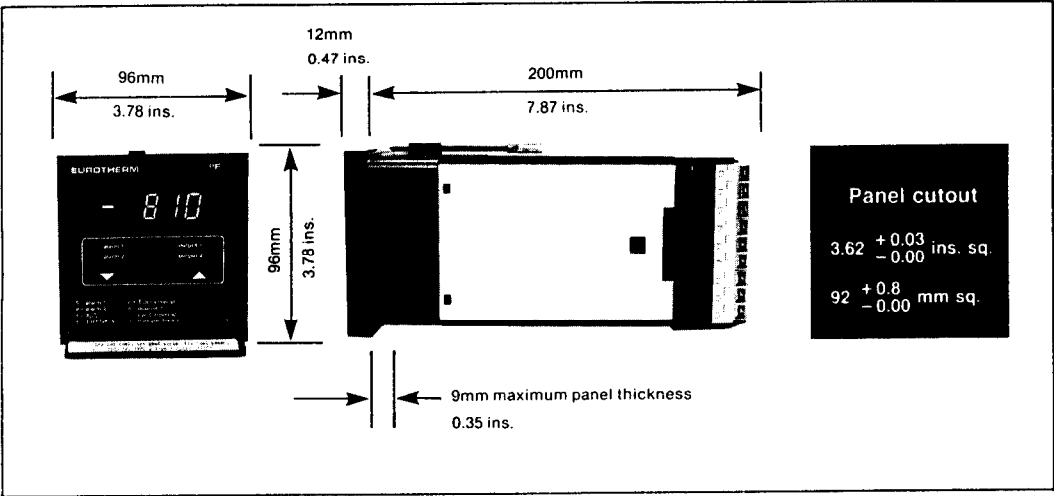
Table 5
OPTIONS

DESIGNATION	DESCRIPTION
RLS	Remote setpoint input, non-isolated (0-5VDC) with remote/local pushbutton on the instrument front panel.*
MVO	Retransmission output of measured value (0-10VDC unisolated and non-linearized)
DL	Deviation Limit Alarm — adjustable from 0-20% of span above and below setpoint — 1A, 240VAC, SPDT contacts
LL	Low Limit Alarm — adjustable from 0-20% of span below setpoint — 1A, 240VAC, SPDT contacts
HL	High Limit Alarm — adjustable from 0-20% of span above setpoint — 1A, 240VAC, SPDT contacts
FSH	Full Scale High Alarm — adjustable from 0-100% of span with alarm relay de-energized in high alarm condition — 1A, 240VAC, SPDT contacts
FSL	Full Scale Low Alarm — adjustable from 0-100% of span with alarm relay de-energized in low alarm condition — 1A, 240VAC, SPDT contacts
ST	Self-tuning feature which automatically determines the PID tuning parameters. (With the self-tuning option the options of RLS, LL, FSH, & FSL are not permitted and only one alarm, HL or DL, are permitted.)
AM	Auto/manual with bumpless transfer selected by front panel pushbutton. Manual allows the power output to be adjusted with raise and lower pushbuttons. Auto provides closed loop control of process variable.

Some options such as Auto/Manual, Remote Setpoint and Self-Tuning are mutually exclusive. Consult Eurotherm for availability.

* Instruments with auto/manual option select remote local from rear terminals.

Installation & Dimensional Details



Rear Terminal Block

1		10				28
2		11				29
3		12				30
4		13				31
5		14				32
6		15				33
7		16		25		34
8		17		26		35
9		18		27		36

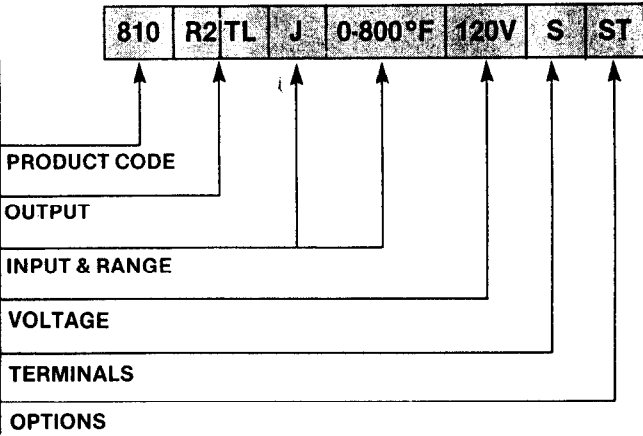
Rear Terminal Connections (Typical)

1 240VAC	10 —	19 —	28 Output 2 (Line)
2 120VAC	11 —	20 —	29 Output 2 (Load)
3 Neutral	12	21 —	30
4 Output 1 (Line)	13 —	22 —	31 Alarm 1 (Comm)
5	14	23 —	32 Alarm 1 (N/O)
6 Output 1 (Load)	15	24 —	33 Alarm 1 (N/C)
7	16	25 T/C(+)	34 Alarm 2 (Com)
8 —	17	26 —	35 Alarm 2 (N/O)
9 —	18 Instrument Ground	27 T/C(-)	36 Alarm (N/C)

Configuration shown is for Model 810/SCT/SCT (Dual Triac Outputs) with two alarm channels

Ordering Code

DESCRIPTION	CODE
Model	810
Outputs	See Table 1
Input & Range	See Table 2
Voltage	See Table 3
Terminals	See Table 4
Options	See Table 5



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