

MET-Therm

Temperature Programmers



MET-Therm
Controls



Committed to Technology



Regulating Heat Treatment Processes



MET-Therm ensures Precise Heating Control for Quality Products

SINGLE CHANNEL TEMPERATURE PROCESS CONTROL

For Heat Treatment/Sintering in air or vacuum in the temperature range of 25°C to 1750°C, where the temperature profile is defined in segments, following ramp and supplemented by dwell with varied permissible maximum % of power for each segment, the MET-Therm Temperature Programmer is diversely available to fulfill the demand for single channel heating/cooling processes. For more than one channel, multiple programmers may be employed in MASTER/SLAVE mode in large heating chamber with multiple zones of identical temperatures. Robust, flexible and user-friendly, the Programmer meets Heat Treatment Process Industry Standards both in hardware and software. Reaching critical ramp profile SP in defined permissible maximum % of power for each segment is the hallmark of the Programmer.

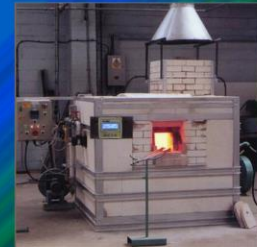
SALIENT FEATURES

The MET-Therm CI-Y01 microprocessor based 8-segment Temperature Programmer covers a wide range of temperature regulation cycles in process control. The versatility of the Programmer exists in providing multiple features in a single channel/loop Programmer instead of opting different features modules. The ramp is taken either in °C/min or °C/hour. Therefore, the SV is incremented accordingly to reach SP. The novelty of the Programmer amongst the others is the provision of permissible maximum % of PID-power defined by the operator for each of the 8 segments. Besides, MET-Therm may be configured in MASTER/SLAVE or STAND ALONE mode. The Salient Features of the Programmer include:

- Input: Thermocouple-K,R,S & J
- Internal/External CJC
- Output: SSR/TRIAC, Analog (0-20mA/0-10V), Chart Recorder (0-20mA/0-10V)
- Profile: 8 x (SET POINT°C, RAMP (°C/min & °C/hour), DWELL(min), PWR%) to 120°C.
- Alarm: Activated at Deviation Band with Relay Output
- Retransmission Mode: MASTER/SLAVE & STAND-ALONE
- Digital RUN/HOLD: Active Low Input
- PC/PLC Interface: LabVIEW/PLC (SV/PV Recording)
- Communication: Serial RS232, Baud Rate-9600
- Configuration: Password Protected
- Program Storage: 5
- Conforms to IEC Standard: EN 61010 Installation Category II, Pollution Degree 2, IP: 65

STANDARD CASING

A 1/4 -DIN (Deutsche Institut für Normung), German standard industrial size; 92mm x 92mm Panel Cut-out is required. Insert the Programmer through front panel cut-out. Tighten the mounting clamps in the slots below/top of the Programmer. These clamps are located at the rear to ensure that the 4 ends are firmly seated in the slots. Once seated, tighten the screw firmly with a screw driver from the rear of mounting panel. Avoid over tightening to avert casing breakage. The Programmer constitutes Microprocessor based Motherboard, Power Supply Board, Front Push Button Board, LCD Display Board and Rear Interface Board. The Programmer outer casing is Polycarbonate material. It is high-impact heat resistant, light weight, low water absorbance, fire retardant high dielectric strength (100kV/cm to 300kV/cm). Service temperature is -50°C.



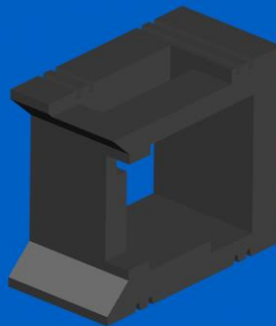
MET-Therm mounted near Rugged Heating Environment



MET-Therm can withstand Industrial Environmental Vibrations and Minor Shocks



Plastic Casing



PCB Rubber Packing



Sliding Cards View

LCD

Back Connector PCB

Button PCB



Mother Board

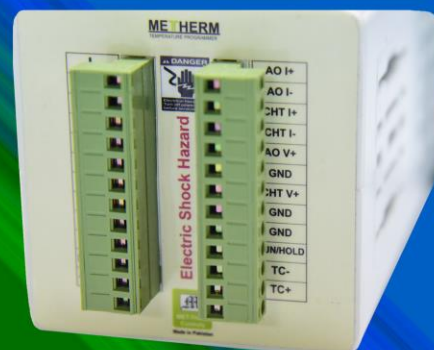
Power Supply



Front Casing



Back View



RETRANSMISSION MODE/PLC INTERFACE

In retransmission mode, the same Programmer may be used in either MASTER or SLAVE mode. Besides, it may be STAND-ALONE mode depending on the configuration. If used as MASTER, then another 10 maximum SLAVES may be connected, taking ramp SV from the MASTER. The communication mode is RS232 between MASTER & SLAVE. In MASTER & STAND-ALONE mode, the respective zero to defined maximum % of power of each segment is delivered to the load. But the SLAVE Programmer drives the load with only zero to defined maximum % of power set in each SLAVE's first segment throughout the cycle. Besides the first segment(SP1) of each SLAVE should have a non-zero default value. The data is sent/received in 6-byte string/with 8928 baud rate, 1-start/1-stop bit, 8-data bit, and parity/flow control none in the order below:

6(End Code)	5	4	3	2	1(Start Code)
0xFF	PV(MSB)	PV(LSB)	SV(MSB)	SV(LSB)	0x7E

MSB: Most Significant Byte LSB: Least Significant Byte

Industrial PLCs may also be interfaced to MET-Therm serially on RS232 protocol in Master mode. Configuring the Stated Start & End Code Bytes in PLC Registers, SV/PV real-time data can be acquired in 6-byte Packet. The Baud rate is set at 8930 in PLC communication registers.

PROGRAM STORAGE CAPACITY

MET-Therm offers 5 programs to be permanently saved in the built-in EEPROM memory at power off. Programs saved, constitute 8 x (SP/RAMP/DWELL/%POWER) with Controlling Parameters saved at Password.



MET-Therm Programmers are designed for different Thermocouples K, R, S, and J



Actutators and Thermocouples interfaced with MET-Therm

ACTUATORS & THERMOCOUPLES

The Programmer is made to drive both Analog and Digital Actuators. SSR or TRIAC drivers may be activated as sink (digital zero) by the Programmer. Besides, single or three phase-regulators may be run by standard analog signals of 0 to 10V. Thus, the Programmer comprises 2-analog and 1-digital outputs available for the 3 actuators of a single channel process loop. Chart Recorder (0-20mA/0-10V) may also be interfaced. The Programmer supports K, R, S and J-type Thermocouples.

PROGRAMMER CUM CONTROLLER

The Programmer if placed in HOLD state, will take the current Set Value as the target Set Point and run the process indefinitely in the defined current segment, zero to maximum % of power.

The dwell time will not be taken into account. Thus, the Programmer may become a fixed Set Point temperature controller. This application is for all MASTER/SLAVE/STAND-ALONE modes.



MET-Therm Programmers used in the MASTER/SLAVE configuration in Carbolite High Temperature Furnace with 3 zones (1 MASTER/2 SLAVES)



MET-Therm installed in Industrial Process Control Instrumentation



The 1/4 DIN standard size allows MET-Therm to be installed in Panel Cut-out 92mm x 92mm

DIGITAL RUN/HOLD

The digital RUN/HOLD hard-wired option enables the Programmer to be run remotely by an active low input signal pulse stayed momentarily either from a plant PLC or any other actuating devices. The retrigger would hold the cycle at the current SV. The temperature regulation will continue at the current locked SV (SP) indefinitely, unless exit. The low input signal is drawn from the Programmer own GND signal and resending it via an external relay N/O contact to the RUN/HOLD input. The external relay once energized (closed contact) for 3 sec initiates RUN of the Programmer. The repeated action initiates HOLD of the Programmer. Thus, RUN/HOLD happens in tandem as decided by the plant external controller (PLC).

USER-FRIENDLY INTERFACE

The Programmer is interfaced with the operator on 10 screens using 4x 20 LCD. The operator is eased with finding maximum process parameters and variables on 7 scrolling screens.

Thus, the need of repeatedly pressing the button to reach the required parameter at a different screens is effectively nullified in the Programmer. The flexible

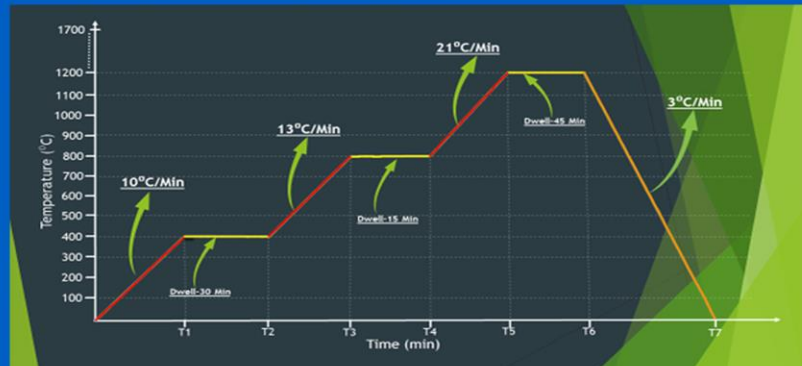
cursor adjustment further harnesses the user interface. All process parameters are thus permanently stored.

The 4 x 20 LCD display facilitates the operator to draw maximum process status on single screen



TEMPERATURE PROFILE

The real-time temperature profile precisely regulated by MET-Therm Temperature Programmer is the hallmark of process control.



MET-Therm heating/cooling temperature profiles incorporating 8-stage SP/Ramp/Dwell

EQUIPMENT RATING

The equipment has different input, output and communication ratings that are as followed

Supply Voltage	220V-240V AC-LINE Neutral. 50Hz
Power Consumption	10-Watt
Relay Output	Max. Voltage: 250V AC Max. current: 1 A
Fuse	100mA
Logic Output	+12V (from the system) & sink with 600mA(max) (SSR or external TRIAC-driver)
DC Analog Output	0-10V/ 0-20mA (Thyristor Regulator)
Chart Recorder	0-10V/ 0-20mA
Input	Thermocouples K, R, S & J
Digital Communication with PC /PLC	RS232 (MASTER Mode Only)
Calibration Error	$\pm 1^{\circ}\text{C}$
Retransmission (MASTER/SLAVE) Interface	MASTER/SLAVE RS232, 8928 Baud Rate PLC/PC
Weight	1.60 kg
Packing Dimension	(L X W X H) 303 X 142 X 150 mm

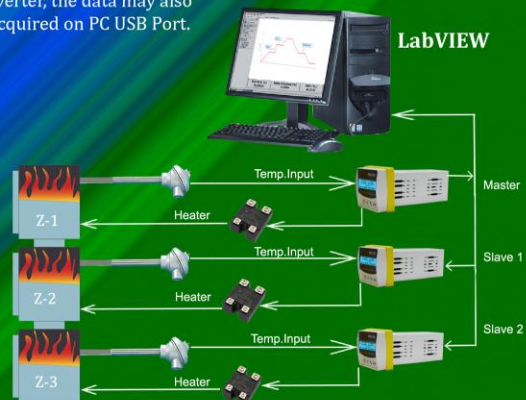
A Product of



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LabVIEW BASED LPC INTERFACE

In MASTER mode, the RS232 signal from the Programmer may also be sent to the PC Serial Port. A LabVIEW Program is developed to acquire & display the real time trend of SV/PV. Besides, storing the variables in a data file during the entire Heat Treatment cycles. Thus, the VI file is the Virtual Recorder of the Programmer. Using RS232 to USB Port Converter, the data may also be acquired on PC USB Port.



MET-Therm interfacing Actuators, Thermocouples & LabVIEW in MASTER/SLAVE mode

Made in Pakistan