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MultiTherm™ 2000

MODULAR TEMPERATURE CONTROLLER

The MultiTherm™ 2000 provides a modular architecture (based on the MKS Automation Platform) for temperature control that can be easily configured for single zone or multi-zone temperature control applications. The MultiTherm 2000 can be used as a stand-alone temperature controller or it can be easily integrated with a PLC or control system, with support for standard fieldbus and control networks, such as EtherCAT or Modbus TCP/IP.

The MultiTherm 2000 boasts precision sensor input channels, accepting RTD's, all thermocouple types, as well as voltage and current inputs. Highly configurable, fast acting PID makes the MultiTherm ideal for dynamic control applications where tight temperature stability is required. The unit is also capable of providing superior performance for tight coordination across multiple zones. The MultiTherm 2000 features supervisory control options such as model based temperature control, cascading loops and PID gain scheduling. MultiTherm includes user friendly diagnostic features such as front panel LED indicators for individual channels and heater health monitoring that help minimize system down time. The MultiTherm 2000 can be configured with many different types of modules, all available from MKS, including Temperature input, Current input, PWM output, Voltage output, Current Transformer and (CT) inputs. Each module is available in a compact, DIN rail mounted enclosure.

Features & Benefits

- Modular architecture for improved flexibility, serviceability, and scalability
- Capable of standalone control or seamless integration with a PLC or control network for simple or advanced programmability
- Ease of integration with a wide variety of heaters, drivers and sensors
- Supports standard fieldbuses and control networks such as EtherCAT and Modbus TCP/IP
- Incorporate Current Transformer (CT) inputs for heater diagnostics
- Functions as a standalone controller, with interface options for Labview
- Off-the-shelf availability for faster time to market
- Advanced control capabilities and programmability via:
  - Support for Model Based Control (MBC) or standard PID control
  - Advanced autotuning algorithm for specific application requirements
  - Cascading loops for applications requiring extremely fast recovery from disturbances
  - PID gain scheduling for strict process requirements over a broad range of temperatures.
  - Option for full programmability via IEC 61131-3 programming environment

Modularity & Scalability

The MultiTherm 2000 can be customized to meet the requirements of almost any application, ranging from standalone single zone temperature control all the way up to multi-zone (48+) applications while also supporting additional supervisory functions. Also, due to its modular architecture, the control system can be easily scaled up or down as temperature control requirements change.

The MultiTherm 2000 can be customized with various modules based on each application's requirements. Below is a list of some of the MKS modules compatible with the MultiTherm 2000:

- Standard Temperature Input Module – supports 8 RTD or Thermocouple (all TC and RTD types) inputs
- Standard PWM Output module – supports 12 PWM outputs to external Solid State Relays (SSRs)
- Analog Input/Output Module – supports 8 analog inputs and 4 analog outputs, supporting. 0-5V, 0-10V, -10 to +10V, 4-20mA and 0-20mA
- Digital Input/Output Module – supports 12 digital inputs and outputs (0-24V)
- Power module or power extender when additional power requirements are needed

Connectivity & Communication

The MultiTherm 2000 can be utilized as a standalone temperature controller with direct programmability features or it can be easily interfaced to an existing control system utilizing standard fieldbus connectivity.

The MultiTherm temperature control family currently supports interfacing to a control system or a PC using Modbus TCP/IP or EtherCAT connectivity. While the Modbus TCP/IP interface provides a standard, commonly used control network, which can work for most general temperature control applications, the MultiTherm's EtherCAT connectivity is ideal for processes requiring precise repeatability.



MultiTherm™ 2000 Modular Architecture —

The MultiTherm 2000 can be customized to meet any temperature control application

Specifications

Connectivity	TCP/IP, Modbus TCP EtherCAT Slave supporting PDO and Mailbox (CoE and FoE)
Temperature Range	0 to 850°C depending on type of sensor used
Input Channels per Temperature (Input Module)	8 sensor input channels supporting RTDs and Thermocouples RTDs (PT100, PT1000, 3-wire) T/Cs (J, K, T, E, R calibrated)
Input Accuracy	±0.8°C typical TCs excludes sensor accuracy ±0.1°C typical RTDs excludes sensor accuracy
Sensor Acquisition Time	10 - 625 ms (configurable)
Temperature Resolution	0.01°C
Input Repeatability	Better than 0.1°C depending on sensor type and temperature range
Factory Calibration	12 Months typical - dependant on sensor type, temperature range and required accuracy
Control Methods	Control via EtherCAT Master PID with auto-tuning Control via Modbus Master PID with auto-tuning Open loop manual control of outputs Model Based Control (optional)
Software	EtherCAT Configurators (i.e. TwinCAT, KPA Studio) (Configurators not included)
Environmental	0 to +50°C operating temperature 0 - 85% RH, no condensation
Mounting	DIN rail and wall mount options
Dimensions (H x D x W)	85 x 124 x 35 mm (4.9 x 3.3 x 1.4 inches)
Certifications/Standards	RoHS, CE

DIO Module

PWM Outputs	12 channels @ 24V active high
Output Resolution	0.01% Full Scale power

AIO Module

Sampling Rate for AI	6.25 kHz (160µSec, for all 8 channels)
Isolation	1.5 kV rms
ADC Native Resolution	16-bits
Number of AI channels per AIO Module	8 differential
Input & Output Range	
Voltage	0-5V, 0-10V, ±5V, ±10V
Current	0-20 mA, 4-20 mA (Factory configurable between voltage and current)
Input Voltage Measurement Range	-10 V to +9.9997 V
Minimum Common Mode Voltage Range	±8 V
Minimum Input CMRR	50 dB, 0-1 kHz
Minimum Input Impedance	10 mega-ohms
Anti-Alias HW Filtering	200 Hz ±20%, 6 dB/octave minimum
Protection	ESD to IEC 61000-4-2 ±4 kV contact, short to 24 V, +15 V, or -15 V
DAC Native Resolution	16-bits
Number of Channels	4, differential/single ended
Output Voltage Range	-10 V to 9.9997 V
Output Accuracy at 25°C Ambient	±1.2 mV measured at I/O connector with 2 kilo-ohms load
Output Accuracy Temp Drift (20°C – 35°C)	0.02% of output value
Maximum Output Current	5mA, into a 2 kilo-ohms, 10 nF load

Ordering Information

AS11860G-01	Temperature input module
AS11870G-01	CPU module
AS11893G-01	PWM module (Source)
AS11894G-10	PWM module (Sink)
CN02215	PWM/AIO connector (spare)
AS11880G-01	AIO module
AS11840G-01	Power module

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