AE4 Controller
A 4 Port
Programmable
Temperature / RH / Controller with 8 Temp Inputs and 4 Relay Outputs
Features:

- 8 Temperature Sensor Inputs (10k NTC Type) (-30F - 284F)
- 4 Relay Outputs (3 pin, Form C) (30VDC / 120/240 VAC, 6 amps)
- Provides 4 ports of programmable temperature control
- Supports Differential Temperature Control (Heat or Cool), Thermostat Control (Heat or Cool), Outdoor Reset, Time of Day Timer and Cyclic Timer Control on each of 4 output ports.
- Relative Humidity Sensor Input with Humidistat control modes
- Large Backlit 4 line display for easy menu driven configuration and status
- Real Time Clock and Logging Capability built in for performance monitoring
- 12VDC Power Input, diode protected, DIN Rail mounting clips included
Applications:

1. Supports up to 4 differential temperature control loops for applications like solar hot water and air heating, root cellar and attic differential cooling, equalization, etc.

2. Supports up to 4 thermostat controls for heating and cooling calls, greenhouse fan and vent controls, and temperature alarming for refrigeration and motor over heating, etc.

3. Supports up to 4 time of day timers with dual on/off times for applications like watering, lighting control, greenhouse controls, etc.

4. Support cyclic timer applications for hot water circulation, greenhouse misting and watering, etc.

5. Supports outdoor reset control for wood stove boiler control

6. Supports humidistat control with optional humidity sensor: greenhouses
The AE4 Solar Temperature Controller is a 4 port programmable temperature controller with logging. The controller has 8 temperature sensor inputs and 4 high current Form C Relay Outputs to provide maximum flexibility in switching both AC and DC load devices upto 6 Amps. The controller uses I2VDC for powering onboard circuitry, and has DIN rail clips to make mounting the controller simple. All inputs and outputs use screw terminals.

The controller has a large backlit 4x20 character display to make programming intuitive with easy to read menus selections. A simple knob is used to adjust settings and enter new values. The display also provides a full set of status menus to make monitoring the controllers operations and input and output easy.

In addition to temperature control, the AE4 is equipped with a real time clock to support timestamping logging data as well as time of day timer control options.
AE4 has (4) 10A Relays.

Each group of 3 pins from left to right: N.O, COM, N.C. Relay is Form C

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Temperature Sensor Inputs

T1 T2 T3 T4 T5 T6 T7 T8

Each pair of Temp sensors (T1/T2, T3/T4, etc.) share a common GND pin. For T1/T2 pinout from left to right is: T1, T1/T2, T2. The middle pin has one pin from both sensors. AE2 has only T1-T4 inputs.
More Pinouts:

Power Input:
GND       +12VDC

Humidity Sensor
Input: Connect Pins with cable same as picture for right to left (optional add-on)
More Pinouts:

The LCD Display cable and correct pinout orientation is shown to right. LCD can be panel mounted off board if desired with cable provided.

A single rotary encoder is used to change settings, and enter new values. Simply push to select, twist to adjust.

The AE4 controller comes with 2 DIN Rail clips and a piece of DIN Rail as shown for mounting.
Status Menu Examples:

Each control application has its own status menu that shows the current inputs and output state of the control rule and output relay state.

The logging status provides current log and state and a status menu for cycling thru each log record. The logging period can be set in the program section.
More Status Menus:

There are also individual status menus for 24 hr temperature data which provides high and low temps, and 24 hr relay data that provides relay cycle counts over 24 hours, and device info with SW revision, and controller total run time hour meter.
Program Device Menus: Control Apps

The Control Apps selection under program device menu configures how the controller will control each relay output. First select which relay, then select the control mode you want for it, (thermostat, differential heating, etc) the controller will request the rest of the configuration for that control application.
Program Device Menus: System Time

By selecting System Time in the main config menus selection, the controller will prompt you to enter your current time of day hours and minutes, and the day, month and year for the real time clock. The RTC has a coin cell which will allow the controller to keep accurate time during power interruptions.
Program Device Menus: Logging and System Units

In logging setup, you can select the logging period and start and stop logging. Starting logging erases logs. A SMART Cable connector can be used to extract logs.

You can set either F or C for temp units to display and log.
Logging Data from SMART Cable output

Log Dump: 10/29 18: 1
###,HH:MM:SS,R1R2R3R4,T1 ,T2 ,T3 ,T4 ,T5 ,T6 ,T7 ,T8,RH
1,10:31: 1,0,0,0,0, 70, 71,-30, 73,-30,-30,-30,-30,34
2,10:34: 1,0,0,0,0, 70, 70,-30, 73,-30,-30,-30,-30,33
3,10:37: 1,0,0,0,0, 72, 70,-30, 74,-30,-30,-30,-30,34
4,10:40: 1,0,0,0,0, 73, 70,-30, 73,-30,-30,-30,-30,34
5,10:43: 1,0,0,0,0, 74, 70,-30, 73,-30,-30,-30,-30,34
6,10:46: 1,0,0,0,0, 74, 70,-30, 73,-30,-30,-30,-30,35
7,10:49: 1,0,0,0,0, 75, 71,-30, 73,-30,-30,-30,-30,35
8,10:52: 1,0,0,0,0, 76, 70,-30, 73,-30,-30,-30,-30,35
9,10:55: 1,0,0,0,0, 76, 71,-30, 73,-30,-30,-30,-30,34
10,10:58: 1,0,0,0,0, 77, 71,-30, 73,-30,-30,-30,-30,33
11,11: 1: 1,0,0,0,0, 77, 71,-30, 73,-30,-30,-30,-30,34
12,11: 4: 1,0,0,0,0, 78, 71,-30, 73,-30,-30,-30,-30,34
13,11: 7: 1,0,0,0,0, 78, 72,-30, 74,-30,-30,-30,-30,34
14,11:10: 1,0,0,0,0, 79, 72,-30, 73,-30,-30,-30,-30,33
15,11:13: 1,0,0,0,0, 79, 72,-30, 73,-30,-30,-30,-30,33

The controller will collect upto 500 log records which can be retrieved from the controller with a SMART Cable adapter connected to JP2. This is a serial interface that runs at 9600 bps, 8, n, 1. You can use a free program like teraterm to collect the log which is configured in .csv for use in programs like Excel where you can plot the sensors over time to look at the operation of your system. Smart Cable can be purchased from Digikey.com - pn: 768-1028-ND
Specifications:

- Power Input: +12VDC nominal (range 11.0 - 14.5VDC), 0.25 amp max
- 8 Temperature Inputs: 10K NTC Thermistor, -30F - 284F range, sensor extendable to 50ft with twisted pair.
- 4 Type C Relay Outputs (3 Pins, NC, COMMON, NO contacts), 30VDC max, 120/240 VAC max, 6 amps
- DHT11 compatible RH Humidity Sensor Input - 10-95% RH
- Logging: 500 records, timestamped, 1-999 seconds per tick, configurable, .csv output available on SMART CABLE connector for access to computer
- Size: 5” wide x 4.25” tall x 1.5” high, DIN Rail Mounting Clips for mounting
- 4x20 backlit HMI LCD display with Rotary Encoder with pushbutton function
- Operating Temperature: 0 - 70C