

**Complete with RS-485 Interface &
Easy to Use, Intuitive Software**

Model TC-136

COOLING AND/OR HEATING

- ◆ BI-DIRECTIONAL CONTROL
- ◆ CONTROL TEMPERATURE -20°C - 100°C
- ◆ RESOLUTION $\pm 0.05^\circ\text{C}$
- ◆ CONTROL STABILITY $\pm 0.05^\circ\text{C}$

PROGRAMMABLE VIA RS-485 PORT

- ◆ PROPORTIONAL (P)
- ◆ INTEGRAL (I)
- ◆ DERIVATIVE (C)
- ◆ ON/OFF
- ◆ ADJUSTABLE HYSTERESIS

ALL SOLID STATE "H" BRIDGE CONTROL

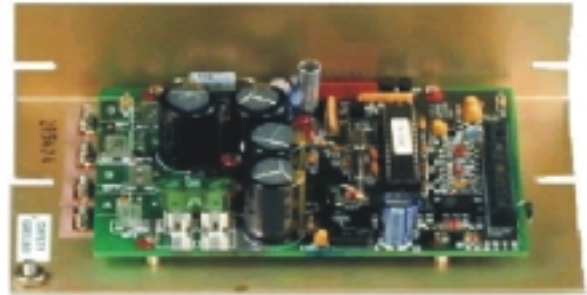
- ◆ SUPPLY VOLTAGE 12 TO 28 VOLTS DC.
- ◆ LOAD RATING 0.1 TO 25 AMPERE
- ◆ 1500 VAC ISOLATION
- ◆ UP TO 680 WATT CONTROL
- ◆ PULSE WIDTH MODULATION

OPERATING MODES

- ◆ STAND ALONE AFTER SET-UP
- ◆ REMOTE SET FROM POTENTIOMETER
- ◆ 4-20 mADC CURRENT LOOP
- ◆ 1.0 TO 5.0 VOLT ADJUSTABLE RANGE
- ◆ DIFFERENTIAL TEMPERATURE CONTROL

SOFTWARE

- ◆ INTUITIVE & EASY TO USE.
- ◆ CUSTOMIZE - COMMAND SET SUPPLIED
- ◆ RETAINS VALUES - NON-VOLATILE MEMORY



DESCRIPTION

HiTECH model TC-136 is a bi-directional control for use with independent **QualityTEC**[®] Thermoelectric Modules or in conjunction with auxiliary or supplemental resistive heaters for both cooling and heating applications.

The "H" bridge configuration of the solid state output device allows for bi-directional current flow in the **QualityTEC**[®] Thermoelectric Modules.

The **HiTECH model TC-136** controller has an RS485 communication port for direct interface with a compatible PC. The RS-485 interface has 1500 VAC isolation from all other electronic circuitry. The controller can be configured in a variety of operating modes, parameters can be field selected, and/or data acquisition can be performed, all by use of the communications interface. The unit will accept up to 32 addressable interfaces, over (up to) 4,000 feet of cable.

After set-up, the computer can be disconnected and the **HiTECH model TC-136** becomes a unique, stand alone controller. All settings are retained in non-volatile memory.

The intuitive, user friendly, communications software requires no prior programming experience. In addition, the command set is provided to enable programming of the software for use as an embedded control.

Mechanically, the printed circuit board is mounted to a metal bracket suitable for either horizontal or vertical orientation. Input and output connections are made via screw terminal strips, fast-on-terminals and a connector.

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TECHNICAL DESCRIPTION

HITECH model TC-136 is capable of operating from an input supply voltage of 12 through 28 VDC, compatible with **QualityTEC®** thermoelectric modules. The self-contained MOSFET output devices deliver load currents from 0.1 to 25.0 Amps. This unit will control a total power load up to 680 Watts and has a temperature resolution of 0.05°C. (Note: Consult appropriate installation instructions for power supply and heat sinking requirements for high current operation.)

The output signal to the thermoelectric module is Pulse Width Modulated and computer selectable for either 875 Hz. or 2700 Hz. operation. Pulse Width Modulation averages the amount of energy provided to the module and reduces the extreme temperature excursions that occur with a conventional on/off control. The controller tuning structure allows designation of a variety of control features. The computer set value provides for manual control of the output, either polarity, from 0% to 100% of load power. Proportional bandwidth (P) in degrees, integral reset (I) in repeats per minute, and the derivative rate (D) in minutes may be configured for P, PI, PD, or PID control. In addition, a dead band control (on/off) with an adjustable hysteresis may be selected. Differential temperature control is offered when two input sensing thermistors are chosen.

A control temperature range of -20°C. to +100°C is standard when using a **HITECH model TC-136** with a TEC-7 thermistor probe for the computer's primary set temperature. Additional external set temperature input types may be selected. They include a remote set temperature potentiometer, a 0 to 5 VDC signal and a 0 to 20 mADC current loop. These secondary inputs are used to define and "map" the secondary input to an adjustable temperature range. Differential set temperature control may also be selected from this configuration menu. All temperatures may be displayed in 'C' or 'F'.

Differential control is accomplished by selecting the primary set temperature with the second thermistor input and establishing the offset with the computer set temperature. The unit will control the differential between input 2 (reference temperature) and input 1 (actual system temperature).

Two types of control output modes may be selected. This determines the direction of the current flow through the **QualityTEC®** thermoelectric module during the heat cycle. This current flow may be from Wire Point WP1 (+) to Wire Point WP2 (-). Alternatively, this current flow may be reversed from WP2 (+) to WP1 (-) as selected in the configuration menu.

Several alarm types may be selected which provide a 5 VDC output rated for 25 mADC of current. They consist of no alarm function, tracking alarm, and fixed value alarm. Alarm set temperature values are entered in the setup menu. The computer controlled selection is evaluated for additional embedded input/output options. The alarm setup menu also provides for selection or an alarm latching condition. The alarm sensor may be either the control temperature sensor or a secondary thermistor sensor.

The various alarms have the ability to determine the status of the output power to the **QualityTEC®** thermoelectric module or auxiliary heater. Power may be maintained during an alarm condition or the main power may be shut down.

PERFORMANCE GUARANTEE

Since 1986, every product sold by **HITECH** has been guaranteed to perform in the application it originally was engineered and recommended for. Our company policy remains the same, every product sold comes with a **written performance guarantee**.

Should the equipment be unable to perform satisfactorily in your application and we are not able to correct the problem, we will accept the instrument in return and issue full credit. This performance guarantee is valid for 60 days. Thereafter, our standard limited two years factory warranty goes into effect.