

Power Input

100 - 130 VAC, 50/60 Hz, 5VA
200 - 240 VAC, 50/60 Hz, 5VA

Signal Input

Thermocouple: Type J or K
RTD: 3-wire Pt100 DIN or JIS
Sampling Rate: 3 samples per second
Accuracy: ±2% of span
Cold Junction Compensation: ±0.1°C / 1°C
Common Mode Rejection Ratio (CMRR): 120 dB
Normal Mode Rejection Ratio (NMRR): 60 dB
Sensor Break Protection: Upscale

Output 1

Relay Rating: 5 Amp, 240 VAC
SSR drive: Pulsed DC, 20 V at 20 mA maximum
Current Loop: 4 - 20 mA, 0 - 20 mA, maximum load: 500Ω
Voltage: 0 - 10 VDC, minimum load 500 KΩ

Control

Proportional Band: 2.2% of span
ON-OFF Hysteresis: 1% of span
Cycle time: 20 seconds for relay output, 1 second for pulsed voltage output, 0.02 second for linear current or voltage output
Control Action: Reverse Action

Approval Standards

Safety Standard: EN61326
Protective Class: Front panel: IP 30
Housing and Terminals: IP 20

Adjustment

Setpoint: Single turn wirewound potentiometer
Setpoint Resolution: 0.2% of span
Accuracy of Setpoint: ±2% of span
Repeatability of Setpoint: ±0.1% of span

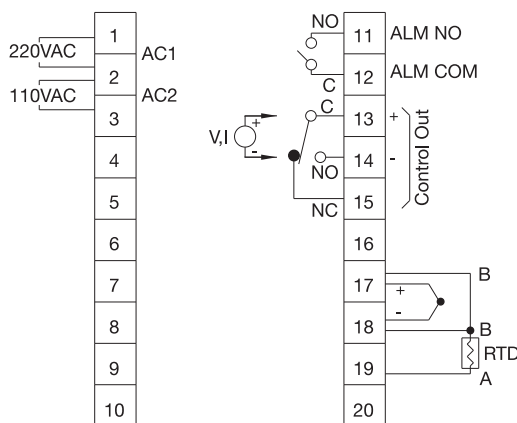
Display

Deviation meter: ±10% of scale (TEC-402)
Non-Indicating (TEC-401)

Environmental and Physical

Operating Temperature: 32 to 122°F (0 to 50°C)
Humidity: 0 to 90% RH, non-condensing
Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute
Vibration: 10 - 55 Hz, amplitude 1 mm
Shock: 200 m/s² (20g)
Dimensions: 3-3/4 × 3-3/4 × 2-9/16" (96 × 96 × 65 mm) H×W×D
Depth behind panel: 2" (53 mm)
Panel Cutout: 3-5/8" × 3-5/8" (92 × 92 mm) H×W
Weight: 0.79 lb. (360 grams)

Rear Terminal Connections



(For TEC-401 Pins 11 and 12 are not used)

With Deviation Meter TEC-402 Stock and Common Part Numbers (Proportional mode)

Part Number	Signal Input	Range	Output	Alarm
TEC57201	J tc	50-850°F	relay	none
TEC57202	J tc	50-550°F	relay	none
TEC57203	K tc	50-850°F	relay	none
TEC57204	K tc	50-550°F	relay	relay
TEC57205	RTD	50-550°F	relay	none
TEC57206	J tc	0-300°C	relay	none
TEC57207	J tc	0-600°C	relay	none
TEC57208	K tc	0-300°C	relay	none
TEC57209	K tc	0-600°C	relay	none

Non-Indicating TEC-401 Stock and Common Part Numbers (Proportional mode)

Part Number	Signal Input	Range	Output
TEC57101	J tc	50-850°F	relay
TEC57102	J tc	50-550°F	relay
TEC57103	K tc	50-850°F	relay
TEC57104	K tc	50-550°F	relay
TEC57105	RTD	50-550°F	relay
TEC57106	J tc	0-300°C	relay
TEC57107	J tc	0-600°C	relay
TEC57108	K tc	0-300°C	relay
TEC57109	K tc	0-600°C	relay

TBC-41 Board PID Control

Continued from previous page...

Power

90-250 VAC, 47-63 Hz, 12VA, 5W max.
11-26 VAC / VDC, SELV, Limited Energy, 12VA, 5W max.

Input

Resolution: 18 bits
Sampling Rate: 5 samples/second
Max. Rating: -2 VDC min, 12 VDC max.
(1 minute for mA input)
Temperature Effect: $\pm 1.5\text{uV}/^\circ\text{C}$ for all inputs except mA
 $\pm 3.0\text{uV}/^\circ\text{C}$ for mA input

Sensor Lead Resistance Effect:

T/C: 0.2uV/ohm
3-wire RTD: 2.6°C/ohm of resistance difference of two leads
2-wire RTD: 2.6°C/ohm of resistance sum of two leads

Burn-out Current: 200 mA

Common Mode Rejection Ratio (CMRR): 120dB

Normal Mode Rejection Ratio (NMRR): 55dB

Sensor Break Detection:

Sensor open for TC, RTD and mV inputs
Sensor short for RTD input
Below 1 mA for 4-20 mA input
Below 0.25V for 1-5 V input
Unavailable for other inputs

Sensor Break Responding Time:

Within 4 seconds for TC, RTD and mV inputs
0.1 second for 4-20 mA and 1-5 V inputs

Output 1 / Output 2

Relay Rating: 2A/240 VAC, life cycles 200,000 for resistive load

Pulsed Voltage: Source Voltage 5V
current limiting resistance 66Ω

Linear Output

Resolution: 15 bits
Output Regulation: 0.02% for full load change
Output Settling Time: 0.1 sec. (stable to 99.9%)
Isolation Breakdown Voltage: 1000 VAC
Temperature Effect: $\pm 0.01\%$ of SPAN / °C

Triac (SSR) Output

Rating: 1A / 240 VAC
Inrush Current: 20A for 1 cycle
Min. Load Current: 50 mA rms
Max. Off-state Leakage: 3 mA rms
Max. On-state Voltage: 1.5 V rms
Insulation Resistance: 1000 Mohms min. at 500 VDC
Dielectric Strength: 2500 VAC for 1 minute

Alarm

Alarm Relay: Form C Rating
2A/240VAC, life cycles 200,000 for resistive load
Alarm Functions: Dwell timer, Deviation High / Low Alarm
Deviation Band High / Low Alarm
PV High / Low Alarm
Alarm Mode: Normal, Latching, Hold, Latching / Hold
Dwell Timer: 0.1-4553.6 minutes

Data Communication

Interface: RS-232 (1 unit), RS-485 (up to 247 units)
Protocol: Modbus Protocol RTU mode
Address: 1-247
Baud Rate: 2.4~38.4 Kbits/sec
Data Bits: 7 or 8 bits
Parity Bit: None, Even or Odd
Stop Bit: 1 or 2 bits
Communication Buffer: 160 bytes

Analog Retransmission

Output Signal: 4-20 mA, 0-20 mA, 0-5V
1 - 5V, 0 - 10V
Resolution: 15 bits
Accuracy: $\pm 0.05\%$ of span $\pm 0.0025\%$ / °C
Load Resistance:
0 - 500 ohms (for current output)
10 K ohms minimum (for voltage output)
Output Regulation: 0.01% for full load change
Output Settling Time: 0.1 sec. (stable to 99.9%)
Isolation Breakdown Voltage: 1000 VAC min.
Integral Linearity Error: $\pm 0.005\%$ of span
Temperature Effect: $\pm 0.0025\%$ of span / °C
Saturation Low: 0 mA (or 0V)
Saturation High: 22.2 mA (or 5.55V, 11.1V min.)
Linear Output Range: 0-22.2mA (0-20mA or 4-20mA)
0-5.55V (0-5V, 1-5V)
0-11.1 V (0-10V)

User Interface

Dual 4-digit LED Displays
Keypad: 4 keys
Programming Port: For automatic setup, calibration and testing
Communication Port: Connection to PC for supervisory control

Control Mode

Output 1: Reverse (heating) or direct (cooling) action
Output 2: PID cooling control, cooling P band 50~300%
of PB, dead band -36.0~36.0% of PB
ON-OFF: 0.1-90.0 (°F) hysteresis control (P band = 0)
P or PD: 0-100.0% offset adjustment
PID: Fuzzy Logic modified
Proportional band 0.1~900.0°F
Integral time 0-3600 seconds
Derivative time 0-360.0 seconds
Cycle Time: 0.1-90.0 seconds
Manual Control: Heat (MV1) and Cool (MV2)
Auto-tuning: Cold start and warm start
Failure Mode: Auto-transfer to manual mode while
sensor break or A-D converter damage
Ramping Control: 0-900.0°F/minute or
0-900.0°F/hour ramp rate

Digital Filter

Function: First order
Time Constant: 0, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 60
seconds programmable

Environmental & Physical

Operating Temperature: -10°C to 50°C

Storage Temperature: -40°C to 60°C

Humidity: 0 to 90% RH (non-condensing)

Altitude: 2000m maximum

Pollution: Degree 2

Insulation Resistance: 20 Mohms min. (at 500 VDC)

Dielectric Strength: 2000 VAC, 50/60 Hz for 1 minute

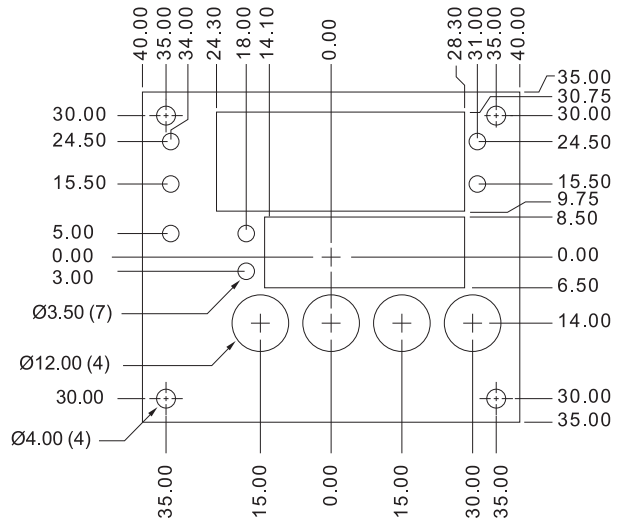
Vibration Resistance: 10-55 Hz, 10 m/s² for 2 hours

Shock Resistance: 200 m/s² (20 g)

Approval Standard

EMC: EN61326

Control Board Overlay Dimensions (mm)



Control PC Board Dimensions (mm)

