Panel Meters

MODEL IMT - INTELLIGENT THERMOCOUPLE METER

- **USER PROGRAMMABLE T/C TYPE** *(T, E, J, K, R, S, B, N or mV SCALE)*

- **SELECTABLE °F OR °C WITH 0.1 OR 1 DEGREE DISPLAY RESOLUTION**

- **FULL 6-DIGIT, HIGH VISIBILITY, 0.56"** *(14.2 mm)* **HIGH, RED LED DISPLAY**

- **PROGRAMMABLE TEMPERATURE OFFSET** *(optional)*

- **TIME - TEMPERATURE INTEGRATOR AND PEAK/VALLEY MEMORY** *(optional)*

CE						
EMC COMPLIANT	NEMA 4 / IP65	PARAMETER LOCKOUT	FRONT PANEL PROGRAMMABLE	ALARMS	ANALOG OUTPUT	COMMUNICATIONS CAPABILITY

Product Features

The Apollo Intelligent Thermocouple Meter (IMT) accepts inputs from standard thermocouples and precisely linearizes them. A full 6-digit display accommodates a wide range of temperature inputs and holds large totalization values. Digital circuitry virtually eliminates errors due to drift. The unit automatically compensates for cold junction, NBS linearity and the meter's zero and span.

The indicator features a readout choice of either Fahrenheit or Celsius with 0.1 or 1 degree of resolution. English Style display prompts and front panel buttons aid the operator through set-up and operation. With a few simple steps the unit can be engaged as a millivolt meter by programming "mV" for thermocouple type (enter 8 in "Pro 1"). This mode is useful in monitoring and displaying the actual voltage produced at the thermocouple probe junction as an aid in troubleshooting for a faulty thermocouple probe. A front panel lock-out menu protects set-up data and operation modes from unauthorized modification. Programmable digital filtering enhances the stability of the reading. Programmable remote input "E1-CON" pin can be utilized to control a variety of functions, such as totalizing, alarm control, peak/valley readings, display hold, or temperature offset operations. All set-up data is stored in non-volatile E^2PROM.

The indicator has several built-in diagnostic functions to alert operators of any malfunction. Extensive testing of noise interference mechanisms and full burn-in makes the indicator extremely reliable in industrial environments. The die-cast front bezel meets NEMA 4/IP65 requirements for washdown applications.

OPTIONS

An optional integrator/totalizer can be used to totalize or integrate temperatures up to a maximum display value of 999,999. It features independent scaling, decimal point, and a low temperature cut-out to suit a wide variety of temperature integration/totalization applications. Programmable remote input "E2-CON" pin is included with this option and can be utilized to control a variety of functions, such as integrating/totalizing, alarm control, peak/valley readings, display hold or temperature offset operations, simultaneously with "E1-CON" pin. Peak/valley (max/min) reading memory and programmable temperature offset functions are included with this option and they are easily recalled and controlled by either the front panel or a remote input. All readings are retained at power-down.

Optional dual relays with parallel solid state outputs are fully programmable to operate in a wide variety of modes to suit many control or alarm applications.

Optional 20 mA loop, bidirectional serial communications provides computer and printer interfacing to extend the capabilities of the indicator. More than one unit can be connected in the loop with other RLC products which have serial communications capabilities.
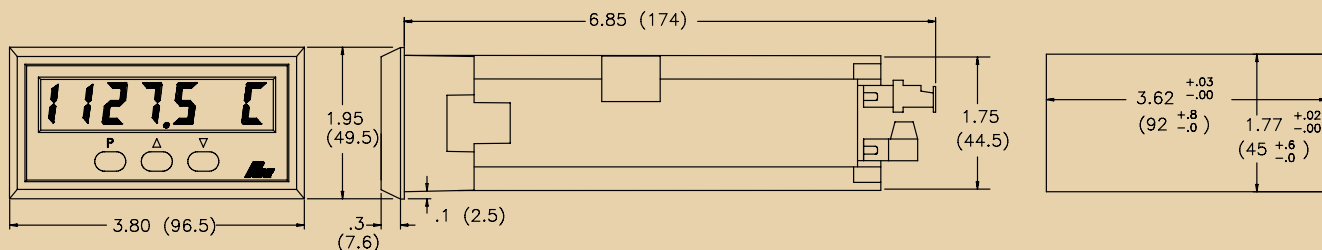
An optional 4 to 20 mA or 0 to 10 VDC re-transmitted analog output can be scaled by the user to interface with a host of recorders, indicators and controllers.

DIMENSIONS "In inches (mm)"

6.85 (174)
1.95 (49.5)
.3 (7.6)
.1 (2.5)
1.75 (44.5)
3.80 (96.5)
3.62 $^{+.03}_{-.00}$ (92 $^{+.8}_{-.0}$)
1.77 $^{+.02}_{-.00}$ (45 $^{+.6}_{-.0}$)

General Specifications

1. **DISPLAY**: 4-digit with F/C indication, 0.56" *(14.2 mm)* high LED, minus sign displayed for negative temperatures. 6-digits for integrator/ totalizer, "Flashing" display for totalizer overflow. "OLOLOL" displayed for input display out of positive range. "ULULUL" displayed for input display out of negative range.
2. **POWER REQUIREMENTS**:
   A.C. Power: Switch Selectable 115/230 VAC, ±10%, 50/60 Hz, 14 VA
3. **CONTROLS**: Three front panel push buttons for modifying alarm values and indicator set-up. Two external inputs for disabling the front panel and controlling programmable functions.
4. **INTEGRATOR/TOTALIZER**: Front panel button for input/total display select. External integrator/totalizer reset/enable. Programmable time-base, scale factor (0.001-999.999) and low-temp cutout. Response Time = 0.2 sec. max.
5. **ENVIRONMENTAL CONDITIONS**:
   Operating Temperature Range: 0 to 50°C
   Storage Temperature Range: -40 to 80°C
   Operation and Storage Humidity: 85% max (non-condensing) from 0 to 50°C
   Span Drift: 40 ppm/°C

Zero Drift: 1 µV/°C
Altitude: Up to 2000 meters
6. **PEAK/VALLEY/SLOPE/OFFSET (Optional)**:
   Peak and Valley recording. Programmable temperature offset and slope.
7. **CERTIFICATIONS AND COMPLIANCES**:
   SAFETY
   EN 61010-1, IEC 1010-1
   ELECTROMAGNETIC COMPATIBILITY
   Immunity to EN 50082-2
   Emissions to EN 50081-2
8. **CONSTRUCTION**: Die-cast metal front bezel that meets NEMA 4/IP65 requirements for indoor use when properly installed. Installation Category II, Pollution Degree 2. Case body is black high impact plastic (panel gasket and mounting clips included).
9. **CONNECTION**: Fixed and removable terminal blocks.
10. **WEIGHT**: 1.2 lbs *(0.54 kg)*.

Input Specifications

1. **THERMOCOUPLE TYPES**: T, E, J, K, R, S, B, N or mV scale
2. **RESOLUTION**:
   1 degree for all types, or 0.1 degree for T, E, J, K, and N only.
3. **INPUT IMPEDANCE**: 20 MΩ, all types.
4. **LEAD RESISTANCE EFFECT**: 20 µV/350 Ω
   Max Input Voltage Protection: 70 VDC continuous.
5. **OPEN THERMOCOUPLE DETECTION**:
   Display: "OPEN"
   Setpoint Outputs: Disabled *(de-activated)*
   Serial Output: "OPEN" in data field.
   Analog Output: 20 mA or 10 VDC
6. **COLD JUNCTION COMPENSATION**: Automatic, 0.02 degree/degree. Disabled for linear mV scale.

7. **READING RATE**: 2.5 readings/second
8. **RESPONSE TIME**: 2 seconds to settle for step input (increases with programmable digital filtering).
9. **NORMAL MODE REJECTION**: 45 dB at 50/60 Hz (may be improved by programmable digital filtering).
10. **COMMON MODE REJECTION**: 120 dB, DC to 50/60 Hz
11. **E1-CON & E2-CON**: External remote inputs which allow activation of various functions. (Reset total, peak indicator mode, trigger mode, etc.)
    $V_{IL} = 0.8\ V_{MAX}$; $V_{IH} = 2.0\ V_{MIN}$. Response Time = 0.2 sec. max.

Output Specifications

1. **SERIAL COMMUNICATIONS (Optional)**:
   Type: Bi-directional 20 mA current loop, 20 mA source provided on transmit loop. *(Powers up to 7 units in a loop with internal current source.)*
   Baud Rate: programmable 300 to 2400
   Maximum address: 99 *(Actual number in a single loop is limited by serial hardware specifications.)*
   Data Format: 10 bit frame, Odd parity *(one start bit, 7 data bit, one odd parity bit, and one stop bit.)*
   Serial Hardware Specifications:
   SO - Output Transistor Rating: $V_{MAX} = 30$ VDC, $V_{SAT} = 1\ V_{MAX}$ at 20 mA.
   Note: This will allow up to 28 units max. in each loop.
   SI - Input Diode Rating: $V_F = 1.25\ V_{TYP}$; $1.5\ V_{MAX}$
   Note: The compliance voltage rating of the source must be greater than the sum of the voltage drops around the loop. (Typically, a 30 VDC powered source would be capable of operating between 18 and 22 units in a loop.)
2. **ALARMS (Optional)**:
   Solid State: Two, isolated sinking open collector NPN transistors acting in parallel with relays. $V_{SAT} = 1$ V @ 100 mA max. V_{max}: 30 VDC.

Relays:
   Type: Form C (2)
   Rating: 5 Amps @ 120/240 VAC or 28 VDC (resistive load), 1/8 hp @ 120 VAC *(inductive load)*.
   Relay Life Expectancy: 100,000 cycles at max. rating. *(As load level decreases, life expectancy increases.)*
3. **ANALOG OUTPUT (Optional)**:
   4 to 20 mA: Digital scaling and offsetting within 4 to 20 mA range.
   Accuracy: 0.1% of full scale
   Resolution: 12 bits
   Compliance Voltage: 10 VDC *(500 Ω max. loop impedance)*
   0 to 10 VDC: Digital scaling and offsetting within 0 to 10 VDC range.
   Accuracy: ±(0.1% of reading +35 mV)
   Resolution: 12 bits
   Min. Load Resistance: 10 KΩ *(1 mA max.)*

Ordering Information

MODEL NO.	DESCRIPTION	TOTALIZER/ PEAK/VALLEY/ SLOPE/OFFSET/ E2-CON	DUAL ALARM	SERIAL OUTPUT	ANALOG OUTPUT	PART NUMBERS FOR AVAILABLE SUPPLY VOLTAGES
						115/230 VAC
IMT	Intelligent Meter for Thermocouple Inputs	NO	NO	NO	NO	IMT00060
		NO	NO	NO	NO	IMT00062
		YES	NO	NO	NO	IMT02060
		YES	YES	YES	NO	IMT02061
		YES	NO	NO	NO	IMT02062
		YES	NO	NO	4 to 20 mA	IMT02063
		YES	YES	YES	4 to 20 mA	IMT02067
		YES	YES	YES	0 to 10 VDC	IMT02069