

# DM4130

## THERMOCOUPLE INPUT FIELD RANGEABLE ISOLATED TRANSMITTER



The *DM4130* provides an isolated output voltage or current proportional to the temperature as measured with a thermocouple. Any thermocouple may be used, and thermocouple types J, K, R, S, T, E and N can be linearized.

A microprocessor controls the input settings, the cold junction temperature compensation, and performs a table look-up for linearization.

The output is fully isolated from input, line power, and ground. The unit is useful in eliminating ground loops and isolating from common mode voltages. The *DM4130* utilizes a microprocessor controlled single slope integrating converter with automatic compensation for offsets and drift. The microprocessor develops a digital signal with a duty cycle proportional to the input signal amplitude. This signal is coupled through an isolating pulse transformer to the output circuitry, where the duty cycle data is converted to a proportional output signal level.

The module includes filtering and conditioning to reduce susceptibility to transients and noisy environments.

Input and output ranges are fully user-settable. With handy gold plated jumper connections, the user selects and sets - the thermocouple type, linearized or non-linearized output, up-scale/down-scale burnout indication, voltage/current output, output range, and normal/reverse acting output. Input span and zero adjustments provide full range adjustability. All adjustments, settings, and input and output

connections are easily accessed from under a pull off/push on cover panel. A write-on label is supplied on the front panel for the user's convenience.

The DIN Rail package snaps onto the rail and is easily removed from the front side by using a screwdriver to release the spring loaded snap.

### OPTIONS

(User specified)

**AC Power** 24, 115 or 230 VAC

**DC Power** 12 or 24 VDC

**U** All circuit boards conformal coated for protection against moisture.

### INSTALLATION

*DM4130* mounts on standard DIN Rail. Install it by hooking the top of the module's latch onto the top of the rail, then use a downward rotating motion to snap the module onto the rail. To remove the module, insert a screwdriver into the slot on the spring loaded snap which is located on the lower backside of the unit. Apply a downward pressure on the release and rotate the module up and off of the rail.

1. Remove the front panel by spanning the top and bottom edges between the thumb and index finger. Use a rocking motion to pull the front panel away from the module.
2. Input, Output and Power connections are shown on the terminal block labels.

**CAUTION: BEFORE PROCEEDING, REMOVE ALL POWER TO THE WIRES AND MODULE TO AVOID THE DANGER OF SHOCK AND/OR DAMAGE TO THE UNIT.**

To access input and output terminals, the connecting wires are inserted into the top of the top terminal block, and into the bottom of the bottom terminal block. Recommended wire sizes are 22-14 AWG Cu, with a strip length of 0.25 inches.

3. Replace the front panel by inserting the pins into the slotted holes located on the bezel and pushing it into position.
4. The front panel label provides space for the user to make application notes.

### CALIBRATION

The *DM4130* is factory calibrated to the input and output noted on the side label.

The *DM4130* allows the user to calibrate the module to operate as required for a specific application.

Field adjustments can be made by using the following recommended procedure.

**CAUTION: BE SURE ALL RANGE SELECT JUMPERS ARE SET TO THEIR PROPER POSITIONS BEFORE APPLYING INPUT OR POWER.**

1. Remove the front panel and disconnect the power.
2. Using the label on the side of the module (Figure 1) as a guide, position the jumper blocks for the desired operation of the following functions:

**thermocouple types-** all three jumpers must be positioned as indicated on Figure 1 to select a thermocouple type linearization or non-linearization

**up-scale or down-scale burn out indication-** if an open is sensed in the thermocouple wiring the module constantly outputs full scale for up-scale or minimum level for down-scale

**output range -** Select the voltage or current range to obtain the desired output.

**output mode -** Select either voltage or current, this selection must be made in conjunction with the output range selection.

**normal or reverse acting output -** Select normal for the output to increase as the input increases, select reverse for the output to decrease with increasing input.

3. Connect thermocouple simulator or equivalent voltage source to the input; and meters to the input and output terminals. Observe the RUN indicator illumination when power is applied. Apply power to the module.

4. Set the input to represent the zero level, the lowest value of the input span.
5. Depress and hold the MODE switch button until the ZERO indicator is illuminated, approximately one second. This indicates the module is in the ZERO adjustment mode.
6. Observe the output monitor. Use the UP/DOWN switch to raise or lower the output to the desired zero level. The output will start at the last set value. Each depression of UP/DOWN switch will change the output by 1/8000 of the output span. When the UP/DOWN switch is depressed for longer than a second the output will change by 1/800 of the output span per second. When the UP/DOWN switch is depressed for longer than 10 seconds the output will change by 1/80 of the output span per second. Any time the switch is released the cycle will restart from the point of release.
7. Set the input voltage to represent the upper limit of the SPAN (highest value of the selected output span).
8. Depress and hold the MODE switch button until the SPAN indicator is illuminated, approximately one second. This indicates the module is in the SPAN adjustment mode.
9. Observe the output monitor. Use the UP/DOWN switch to raise or lower the output to the desired span level. Reference step 6.
10. The MODE switch may be depressed for one second each time to flip back and forth between the ZERO and SPAN adjustment modes.
11. Depressing the SET switch until the RUN indicator illuminates will cause the last adjusted values of ZERO and SPAN to be set into memory establishing the operating conditions.
12. Depressing the MODE switch for more than 10 seconds from either the ZERO or SPAN adjustment mode will cause the RUN indicator to illuminate, but no changes will be made to the previously set ZERO and SPAN values.
13. If the module is left in either the ZERO or SPAN adjustment mode, after 3 minutes the module will automatically switch to the RUN mode and no changes will be made to the previously set ZERO and SPAN values.

## SPECIFICATIONS

### INPUT

Span Adjustment  
 Minimum  
 (5 mV input minimum)  
 Maximum  
 100% of T/C range  
 Offset Adjustment  
 0% to 90% of T/C range

### LINEARIZATION

+ 0.25°C of NIST tables  
 full range of J, K, R, S, T, E, N

### COLD JUNCTION COMPENSATION

± 0.25°C accuracy

### IMPEDANCE

1 megohm

### UPDATE PERIOD

4/sec

### OUTPUT

Voltage	Current (mA)
0/.25	0/1
0/1	0/4
1/5	4/20
0/5	0/20
0/10	
-5/5	
-10/10	

### OUTPUT LOGIC

Normal or Reverse Acting

### DRIVE CAPABILITY

Voltage 5 mA  
 Current >24 V Compliance

### ACCURACY

±0.1% of span

### OUTPUT RIPPLE

<0.1% of full scale  
 (peak-to-peak)

### OPERATING TEMPERATURE

14 to 140 °F (-10 to 60 °C)

### TEMPERATURE STABILITY

±(0.01% of span)/°C

### ISOLATION

Resistance  
 >500 megohms

Voltage Rating  
 >1000 VAC rms sine wave

### COMMON MODE REJECTION

>120 dB, DC to 60 Hz

### POWER

Wattage  
 2.5 W maximum  
 (Standard)  
 115 VAC ±10%, 50/60 Hz  
 230 VAC ±10%, 50/60 Hz  
 (Optional)  
 24 VAC ±10%, 50/60 Hz  
 24 VDC (21 to 32 VDC)

**CAUTION: THE DIN/RAIL SHOULD BE EARTH GROUNDED (GREEN WIRE) TO ENSURE SAFEST OPERATION AND TO PROVIDE OPTIMUM PERFORMANCE.**

## MOUNTING

The module mounts on a standard H-35 DIN rail. A spring latch holds it in place. The module is demounted by using a screw driver to release the latch. The latch is accessible at the bottom of the module.

## WARRANTY

The **DIN/MOD** Series of products carry a limited permanent warranty. In the event of a failure due to defective material or workmanship, the unit will be repaired or replaced at no charge. Relays are not covered by the warranty.

## CASE DIMENSIONS INCHES [mm]

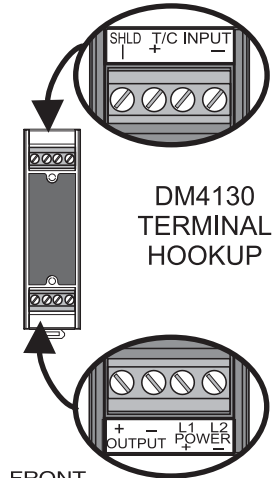
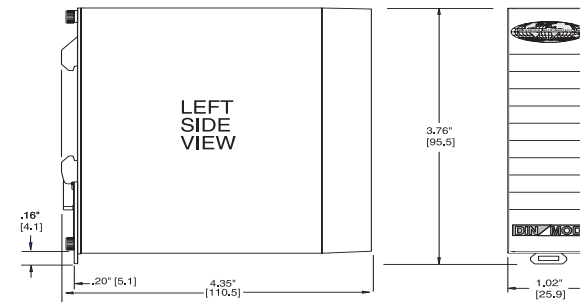
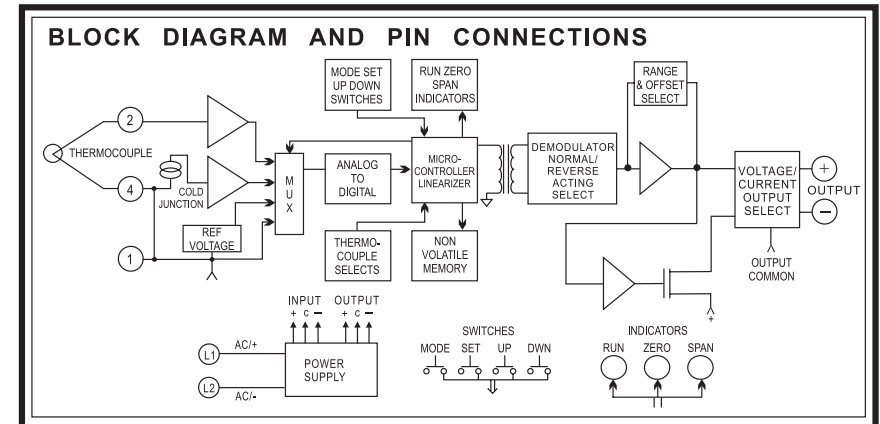
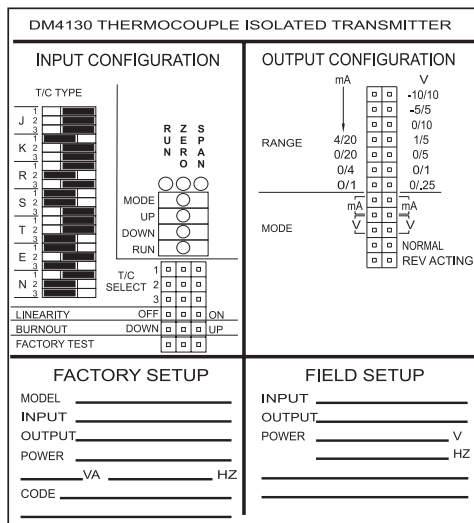


FIGURE 1



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