

# Temperature Input Modules

## F2-04THM 4-Channel Thermocouple In \$529.00

### General Specifications

|                                      |                                                                                    |
|--------------------------------------|------------------------------------------------------------------------------------|
| <b>Number of Channels</b>            | 4, differential                                                                    |
| <b>Common Mode Range</b>             | ±5VDC                                                                              |
| <b>Common Mode Rejection</b>         | 90dB min. @ DC, 150dB min. @ 50/60 Hz.                                             |
| <b>Input Impedance</b>               | 1 MΩ                                                                               |
| <b>Absolute Maximum Ratings</b>      | Fault-protected inputs to ±50 VDC                                                  |
| <b>Accuracy vs. Temperature</b>      | ±5 ppm/°C maximum full scale calibration (including maximum offset change)         |
| <b>PLC Update Rate</b>               | 4 channels per scan max.<br>D2-262 CPU                                             |
| <b>Digital Input Points Required</b> | 32 (X) input points (16 binary data bits,<br>2 channel ID bits, 4 diagnostic bits) |
| <b>External Power Supply</b>         | 60mA maximum, 18 to 26.4 VDC                                                       |
| <b>Base Power Required 5VDC</b>      | 110mA                                                                              |
| <b>Operating Temperature</b>         | 32° to 140°F (0° to 60°C)                                                          |
| <b>Storage Temperature</b>           | -4° to 158°F (-20° to 70°C)                                                        |
| <b>Relative Humidity</b>             | 5 to 95% (non-condensing)                                                          |
| <b>Environmental Air</b>             | No corrosive gases permitted                                                       |
| <b>Vibration</b>                     | MIL STD 810C 514.2                                                                 |
| <b>Shock</b>                         | MIL STD 810C 516.2                                                                 |
| <b>Noise Immunity</b>                | NEMA ICS3-304                                                                      |
| <b>Terminal Type (included)</b>      | Non-removable                                                                      |

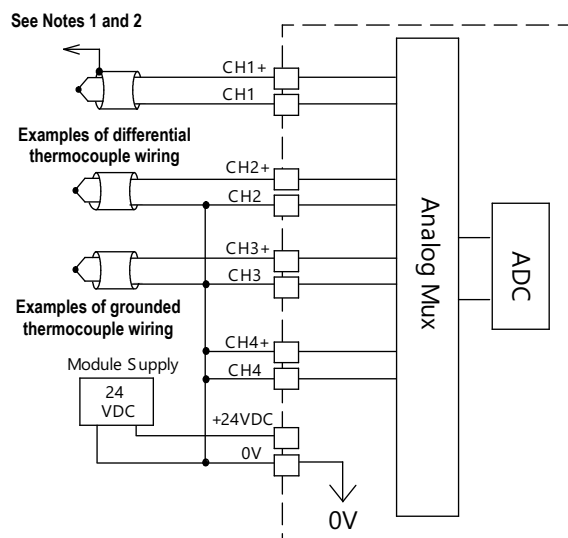
### Thermocouple Specifications

|                                                             |                                          |                |
|-------------------------------------------------------------|------------------------------------------|----------------|
| <b>Input Ranges</b>                                         | Type J -190 to 760°C                     | -310 to 1400°F |
|                                                             | Type E -210 to 1000°C                    | -346 to 1832°F |
|                                                             | Type K -150 to 1372°C                    | -238 to 2502°F |
|                                                             | Type R 65 to 1768°C                      | 149 to 3214°F  |
|                                                             | Type S 65 to 1768°C                      | 149 to 3214°F  |
|                                                             | Type T -230 to 400°C                     | -382 to 752°F  |
|                                                             | Type B 529 to 1820°C                     | 984 to 3308°F  |
|                                                             | Type N -70 to 1300°C                     | -94 to 2372°F  |
|                                                             | Type C 65 to 2320°C                      | 149 to 4208°F  |
| <b>Display Resolution</b>                                   | ±0.1°C or ±0.1°F                         |                |
| <b>Cold Junction Compensation</b>                           | Automatic                                |                |
| <b>Conversion Time</b>                                      | 100ms per channel                        |                |
| <b>Warm-Up Time</b>                                         | 30 minutes typically ± 1°C repeatability |                |
| <b>Linearity Error (End to End)</b>                         | ±.05°C maximum, ±.01°C typical           |                |
| <b>Maximum Inaccuracy</b>                                   | ±3°C (excluding thermocouple error)      |                |
| <b>Voltage Input Specifications</b>                         |                                          |                |
| <b>Voltage Ranges</b>                                       | 0-5V, ±5V, 0-156.25 mV, ±156.25 mVDC     |                |
| <b>Resolution</b>                                           | 16-bit (1 in 65535)                      |                |
| <b>Full Scale Calibration Error (Offset Error Included)</b> | ±13 counts typical ±33 maximum           |                |
| <b>Offset Calibration Error</b>                             | ±1 count maximum, @ 0V input             |                |
| <b>Linearity Error (End to End)</b>                         | ±1 count maximum                         |                |
| <b>Maximum Inaccuracy</b>                                   | ±.02% @ 25°C (77°F)                      |                |

### CPU Firmware Required

| CPU      | Firmware Required          |
|----------|----------------------------|
| D2-250   | V1.06                      |
| D2-250-1 | All firmware versions work |
| D2-262   | Version 1.0 or later       |

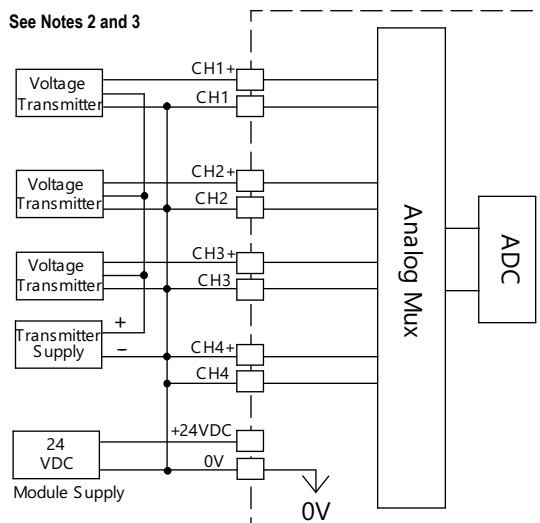
Thermocouple input wiring diagram



#### Notes:

- 1: Terminate shields at the respective signal source.
- 2: Connect unused channels to a common terminal (0V, CH4+, CH4).
- 3: When using 0-156 mV and 5V ranges, connect (-) or (0) volts terminal to 0V to ensure common mode range acceptance.
- 4: This module is not compatible with the ZIPLink wiring system.

Voltage input wiring diagram



# Analog Current Output Modules

## F2-02DA-1 2-Channel 4-20mA Analog Output \$282.00

This module requires a 24VDC user power supply for operation.

|                                                             |                                                                  |
|-------------------------------------------------------------|------------------------------------------------------------------|
| <b>Number of Channels</b>                                   | 2                                                                |
| <b>Output Ranges</b>                                        | 4 to 20 mA                                                       |
| <b>Resolution</b>                                           | 12-bit (1 in 4096)                                               |
| <b>Output Type</b>                                          | Single ended, one common                                         |
| <b>Digital Output Points Required</b>                       | 16 (Y) output points<br>(12 binary data bits, 2 channel ID bits) |
| <b>Maximum Loop Supply</b>                                  | 30VDC                                                            |
| <b>Peak Output Voltage</b>                                  | 40VDC<br>(clamped by transient voltage suppressor)               |
| <b>Load Impedance</b>                                       | Zero $\Omega$ minimum                                            |
| <b>Maximum Load/Power Supply</b>                            | 620 $\Omega$ /18V, 910 $\Omega$ /24V, 1200 $\Omega$ /30V         |
| <b>PLC Update Rate</b>                                      | 2 channels per scan maximum<br>(D2-262 CPU)                      |
| <b>Linearity Error (end to end)</b>                         | $\pm 1$ count ( $\pm 0.025\%$ of full scale) maximum             |
| <b>Conversion Settling Time</b>                             | 100 $\mu$ s maximum (full scale change)                          |
| <b>Full Scale Calibration Error (offset error included)</b> | $\pm 5$ counts max., 20mA @ 77°F (25°C)                          |
| <b>Offset Calibration Error</b>                             | $\pm 3$ counts max., 4mA @ 77°F (25°C)                           |

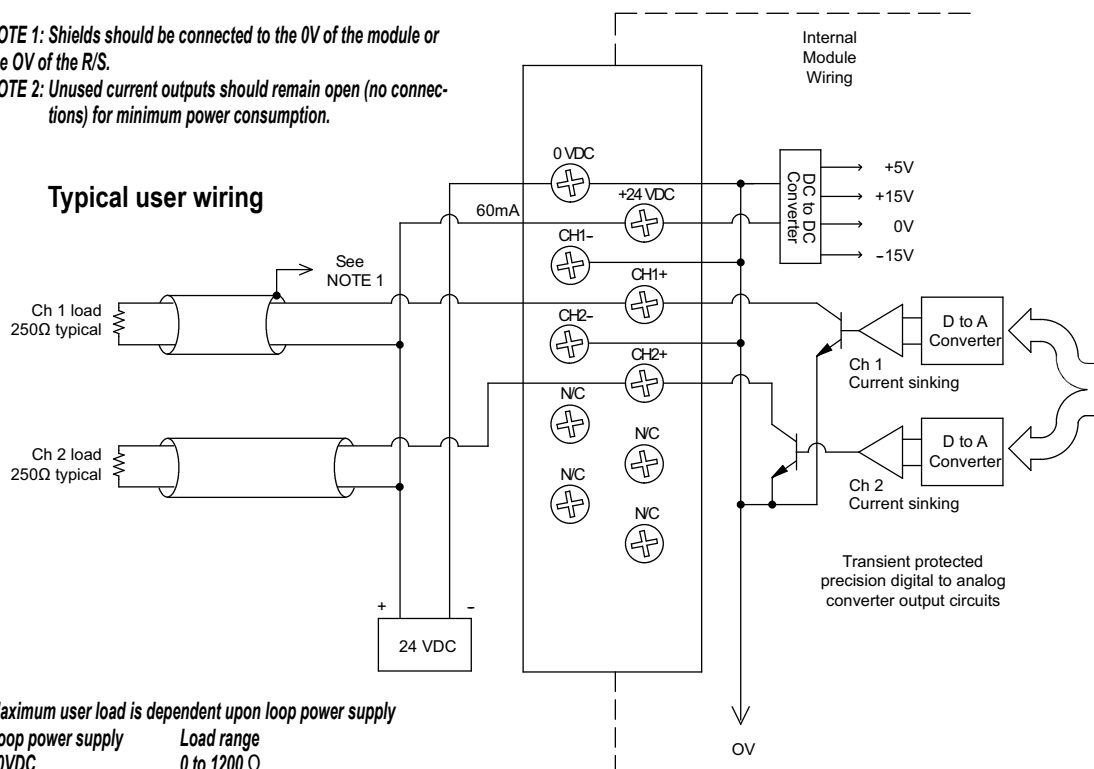
See Wiring Solutions for part numbers of ZIPLink cables and connection modules compatible with this I/O module.



|                                 |                                                                                             |
|---------------------------------|---------------------------------------------------------------------------------------------|
| <b>Accuracy vs. Temperature</b> | $\pm 50$ ppm/°C full scale calibration change (including maximum offset change of 2 counts) |
| <b>Maximum Inaccuracy</b>       | 0.1% @ 77°F (25°C)<br>0.3% @ 32° to 140°F (0° to 60°C)                                      |
| <b>Base Power Required 5VDC</b> | 40mA                                                                                        |
| <b>External Power Supply</b>    | 24VDC, 60mA.<br>(add 20mA for each current loop used)                                       |
| <b>Operating Temperature</b>    | 32° to 140°F (0° to 60°C)                                                                   |
| <b>Storage Temperature</b>      | -4 to 158°F (-20 to 70°C)                                                                   |
| <b>Relative Humidity</b>        | 5% to 95% (non-condensing)                                                                  |
| <b>Environmental Air</b>        | No corrosive gases permitted                                                                |
| <b>Vibration</b>                | MIL STD 810C 514.2                                                                          |
| <b>Shock</b>                    | MIL STD 810C 516.2                                                                          |
| <b>Noise Immunity</b>           | NEMA ICS3-304                                                                               |
| <b>Terminal Type (included)</b> | Removable; D2-8IOCON                                                                        |

**NOTE 1:** Shields should be connected to the 0V of the module or the 0V of the R/S.

**NOTE 2:** Unused current outputs should remain open (no connections) for minimum power consumption.



Maximum user load is dependent upon loop power supply

| Loop power supply | Load range         |
|-------------------|--------------------|
| 30VDC             | 0 to 1200 $\Omega$ |
| 24VDC             | 0 to 910 $\Omega$  |
| 18VDC             | 0 to 620 $\Omega$  |

