

Analog input module

AI

M1-33D

2 thermocouple inputs / ± 100 mVDC

- ▶ Two 16-bit ± 100 mVDC analog inputs
- ▶ Optically and electrically isolated
 - Each channel has an electrically isolated analog ground
 - Each channel is individually optically isolated
- ▶ Two differential-ended inputs for use with both grounded or ungrounded tip thermocouples
- ▶ Thermocouple linearization algorithms: E, K, J, R, S, T
- ▶ Each channel has individually configurable digital filtering

General specifications

| | |
|--------------------|--|
| Inputs per module | 2 differential-ended |
| Input type | Thermocouple (E, K, J, R, S, T) / ± 100 mVDC |
| Connector | Removable |
| Connection type | Screw terminal |
| Terminal wire size | 14 – 22 AWG |
| Test point | All connections |
| Module size | 1 controller bay |

| | |
|--------------------------------------|------------------------|
| Bus power required (5 VDC) | 0.26 mA |
| Isolation rating | 500 VDC |
| Operating temperature | |
| Horizontal installation ¹ | 0 – 50°C |
| Vertical installation ¹ | 0 – 45°C |
| Storage temperature | -25 – 85°C |
| Humidity | 5 – 95% non-condensing |
| 5100 equivalent part number | I |

1. Refer to the applicable controller datasheet for proper mounting instructions.

Performance specifications

| Parameter | Value |
|--|--|
| Input range | Thermocouple (E, K, J, R, S, T) / ± 100 mVDC |
| Input resolution | 16-bit |
| Input resistance | |
| + <i>Ain</i> to – <i>Ain</i> | $10^{12} \Omega$ |
| + <i>Ain</i> to ACOM | $10^{12} \Omega$ |
| – <i>Ain</i> to ACOM | $1.5 \text{ M}\Omega$ |
| Max input voltage | ± 40 VDC |
| Full range calibration error ^{1,2} | 0.013% $\pm 1^\circ\text{C}$ |
| Offset calibration error at 0 V ^{1,2} | 0.013% $\pm 1^\circ\text{C}$ |

| Parameter | Value |
|---|------------------------------|
| Linearity error (full range) ^{1,2} | 0.037% $\pm 2^\circ\text{C}$ |
| Digital input filter size (settable) | 1 – 255 samples |
| Digital input filter rate | 5 msec |

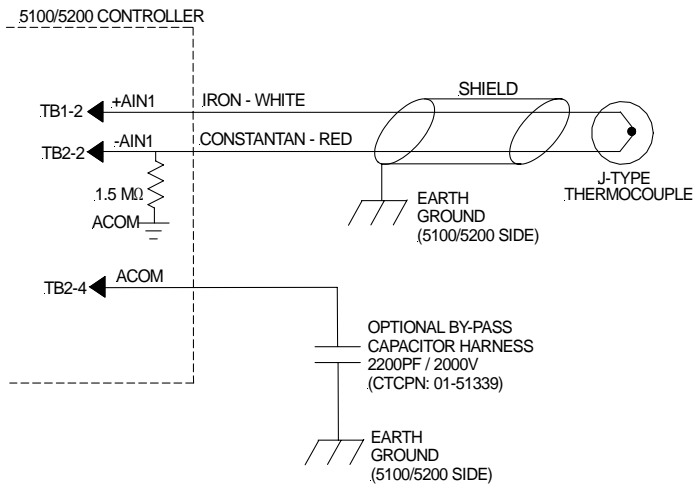
1. Errors are at 25°C.
2. Errors are double across full ambient temperature range of 0 – 50°C.

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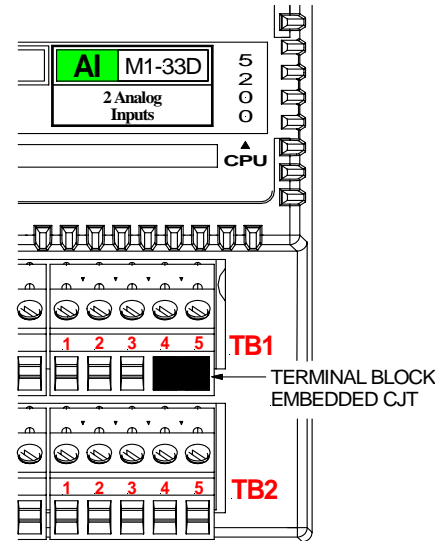
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Typical Application



Connections



Thermocouple Specifications

| TYPE | + AIN | | - AIN | | RANGE (°C) | |
|------|--------|-----------------------------------|-------|------------|------------|------|
| E | WHITE | CHROMEL | RED | CONSTANTAN | -250 | 980 |
| J | WHITE | IRON | RED | CONSTANTAN | -190 | 1180 |
| K | YELLOW | CHROMEL | RED | ALUMEL | -200 | 1360 |
| R | BLACK | PLATINUM RHODIUM ^(13%) | RED | PLATINUM | -40 | 1740 |
| S | BLACK | PLATINUM RHODIUM ^(10%) | RED | PLATINUM | -40 | 1750 |
| T | BLUE | COPPER | RED | CONSTANTAN | -180 | 390 |

I/O Terminations

| | |
|-------|---------------------|
| TB1-1 | VS_OUT |
| TB1-2 | +Ain #1 |
| TB1-3 | +Ain #2 |
| TB1-4 | Internal CJT device |
| TB1-5 | Internal CJT device |
| TB2-1 | VS_RTN |
| TB2-2 | -Ain #1 |
| TB2-3 | -Ain #2 |
| TB2-4 | ACOM |
| TB2-5 | N/C |

| | 5100 | 5200 |
|-----------------------------------|---------|------|
| Minimum hardware revision | A | A |
| Minimum firmware revision | 1.01 | 1.01 |
| Minimum operating system revision | 4.04.12 | 5.06 |
| Document number: 950-513308-0003 | | |

Notes

- Shield grounds must be terminated on the controller side of the cable.
- For register and programming information, refer to the appropriate controller Applications Guide.
- The information and illustrations contained herein are the property of Control Technology Corporation and are subject to change without notice. Data based on VS = 24VDC @ 25°C unless otherwise noted. For additional information and/or updates visit www.ctc-control.com.
- For other thermocouple types, please contact Control Technology Corp.
- VS refers to the voltage supply of the controller. CJT refers to cold junction thermistor.