

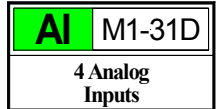


25 South Street
Hopkinton, MA 01748
Phone: 508.435.9595
Fax: 508.435.2373
www.ctc-control.com

Data Sheet

M1-31D Analog Input Module

Four ±100 mVDC/Thermocouple Analog Inputs



Data Sheet: M1-31D Analog Input Module

Description

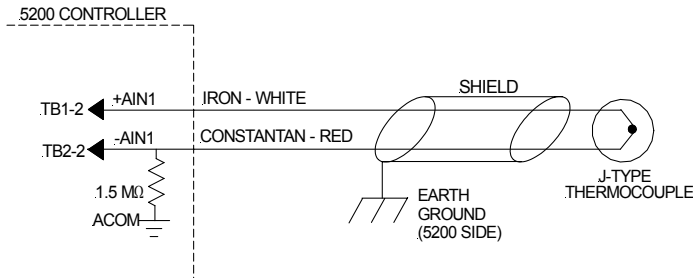
- ▶ Four 13-bit, ±100 mVDC analog inputs
- ▶ Four differential-ended inputs for use with both grounded or ungrounded tip TC
- ▶ Thermocouple linearization algorithms: E, K, J, R, S, T
- ▶ Analog input circuitry is electrically isolated from CPU and communications electronics via optical isolators and DC-to-DC converters
- ▶ On-board input averaging, 64 samples per digital input

M1-31D Specifications

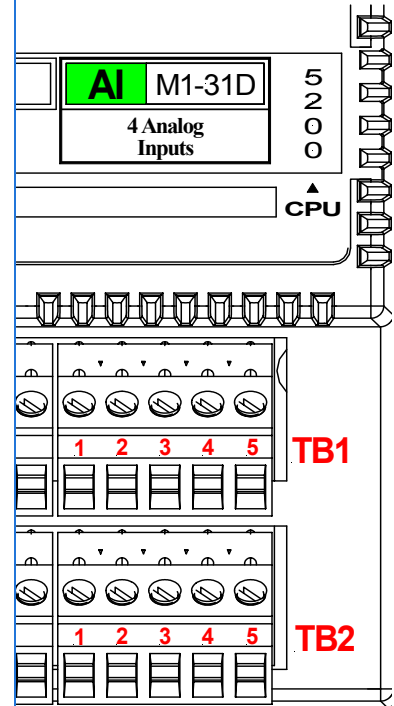
Parameter	Value	Description
General		
Number of inputs	4	Three differential-ended inputs and one single-ended input
Connection type	Screw terminal	Screw terminal spring clamp accepts #14-22 AWG wire. Terminated connector may also be unplugged.
Input type	±100 mVDC	
Linearization Algorithms (Channel configurable)	E, K, J, R, S, T	Thermocouple Linearization Algorithms For additional TC algorithms, please contact Control Technology Corp.
Resolution	13-bit 0.1°	Straight Voltage Measurements: 1 in 8192 counts; 24.4 µV/LSB Temperature Measurements
Engineering units (User configurable)	±10,000 ±100,000 C, F, K	Integer numbers used by the Model 5200 to represent the input value 10000 = +100.00 mVDC (Default) 100000 = +100.000 mVDC (±99,999,999 = over/under range) 250 = 25.0 °C (±99,999,999 = over/under range)
Isolation rating	500 VDC	Isolation voltage between any input and other sensitive 5200 circuitry
Input protection	±15 VDC	Absolute continuous input voltage
Input impedance:		
+Ain to -Ain	10 ¹² Ω	The impedance between the positive and negative inputs
+Ain to ACOM	10 ¹² Ω	The impedance between the input and analog ground
-Ain to ACOM	1.5MΩ	The impedance between the positive input and analog common
+5 VDC supply current	0.2 mA	Current requirements from the 5200's +5 VDC power supply
Performance		
Full scale calibration error Ta=25°C Ta=Full range	±2 LSB; ±1° ±4 LSB; ±2°	The error between the measured input voltage and a true +10.000000 VDC Temperature specifications are for J, T, and E thermocouples only.
Offset calibration error Ta=25°C Ta=Full range	±1 LSB; ±1° ±2 LSB; ±2°	The error between the measured input voltage and a true 0.000000 VDC Temperature specifications are for J, T, and E thermocouples only.
Integral linearity error Ta=25°C Ta=Full range	±3 LSB; ±2° ±6 LSB; ±4°	The maximum error in the measured input voltage across the entire input range Temperature specifications are for J, T, and E thermocouples only.
Digital input filter size	64 samples	The number of samples used in an input's average calculation
Filter sample rate	400 µSec	The rate at which all analog input channels are sampled
Environmental		
Temperature	Operating Storage	0 to 50°C -25 to 85°C
		Refer to the 5200 Controller Data Sheet Guide for proper mounting instructions.

Application Information

Typical Application



Module Identification



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 (10%)	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	+AIN #3
TB1-5	+AIN #4
TB2-1	VS_RTN
TB2-2	-AIN #1
TB2-3	-AIN #2
TB2-4	-AIN #3
TB2-5	-AIN #4

Notes



- Shield grounds must be terminated on the 5200-controller side of the cable.
- For register and programming information, refer to the Model 5200 Applications Guide.
- For other thermocouple types, please contact Control Technology Corp.
- VS refers to the voltage supply of the controller.
- For new designs, CTC recommends using module M1-33D instead of this module.

The information in this document is subject to change without notice. Any software described in this document is provided under license agreement and may be used or copied only in accordance with the terms of the license agreement.

The information, drawings, and illustrations contained herein are the property of Control Technology Corporation. No part of this manual may be reproduced or distributed by any means, electronic or mechanical, for any purpose other than the purchaser's personal use, without the express written consent of Control Technology Corporation.