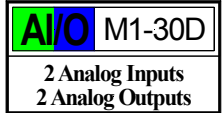




25 South Street
 Hopkinton, MA 01748
 Phone: 508.435.9595
 Fax: 508.435.2373
www.ctc-control.com

Data Sheet
M1-30D Analog Combo I/O Module
 Two $\pm 100\text{mVDC}$ /Thermocouple Analog Inputs
 Two $\pm 10\text{V}$ Analog Outputs



Data Sheet: M1-30D Analog Combo I/O Module

Description

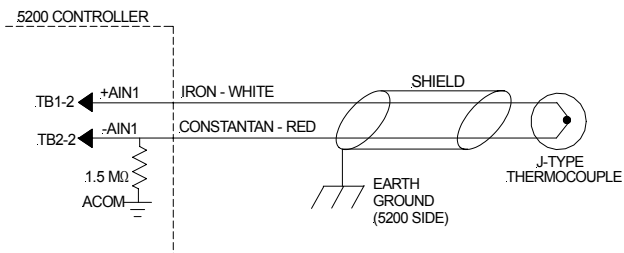
- ▶ Two 13-bit, $\pm 100\text{ mVDC}$ bipolar, differential-ended (grounded and ungrounded tip TC), analog inputs
- ▶ Two 12-bit, $\pm 10\text{ VDC}$ bipolar, single-ended, analog outputs
- ▶ Thermocouple linearization algorithms: E, K, J, R, S, T
- ▶ Analog input circuitry is electrically isolated
- ▶ On-board input averaging, 64 samples per analog input

M1-30D Specifications

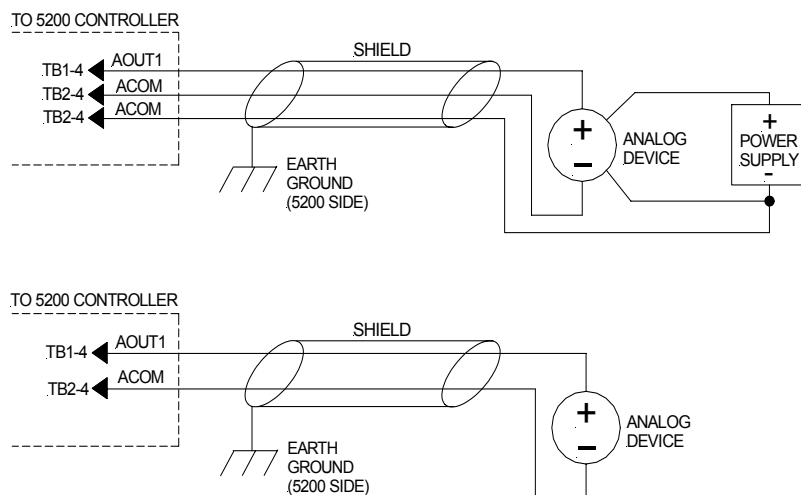
Parameter	Value	Description
General		
Number of inputs	2	Two differential-ended analog inputs at $\pm 100\text{ mVDC}$
Number of outputs	2	Two single-ended analog outputs at $\pm 10\text{ VDC}$
Connection type	Screw terminal	Screw terminal spring clamp accepts #14-22 AWG wire. Terminated connector may also be unplugged.
Linearization algorithms (Channel configurable)	E, K, J, R, S, T	Thermocouple Linearization Algorithms For additional TC algorithms, please contact Control Technology Corp.
Resolution		
Inputs	13-bit	Analog inputs: 1 in 8192 counts; 24.4 $\mu\text{V/LSB}$
Outputs	12-bit	Analog outputs: 1 in 4096 counts; 4.88 mV/LSB
Engineering units (Channel configurable)	$\pm 10,000$ $\pm 100,000$ C, F, K	Integer numbers used by the Model 5200 to represent the input value. 10000 = +100.00 mVDC (Default) 100000 = +100.000 mVDC ($\pm 99,999,999$ = over/under range) 250 = 25.0 $^{\circ}\text{C}$ ($\pm 99,999,999$ = over/under range)
Signal type		
Inputs	Diff.-ended	The input reading is the voltage difference between +AINx and -AINx.
Outputs	Single-ended	Both output voltages are in reference to analog common (ACOM).
Common mode voltage	$\pm 15\text{ VDC}$	The maximum input voltage in reference to analog common (ACOM)
Isolation rating	500 VDC	Isolation voltage between any I/O and other sensitive 5200 circuitry
Input protection	$\pm 40\text{ VDC}$	Absolute maximum input voltage
Input impedance		
+Ain to -Ain	$10^{12}\ \Omega$	The impedance between the positive and negative inputs
+/-Ain to ACOM	$10^{12}\ \Omega$	The impedance between the either input and analog common (ACOM)
Maximum output current	$\pm 5\text{ mA}$	The maximum current that any given analog output can continuously sink or source
+5 VDC supply current	0.2 mA	Current requirements from the 5200's +5 VDC power supply
Performance		
Full scale calibration error Ta=25 $^{\circ}\text{C}$ Ta=Full range	$\pm 2\text{ LSB}; \pm 1^{\circ}$ $\pm 4\text{ LSB}; \pm 2^{\circ}$	The error between the input/output voltage and a true +10.000000 VDC Temperature specifications are for J, T, and E thermocouples only.
Offset calibration error Ta=25 $^{\circ}\text{C}$ Ta=Full range	$\pm 2\text{ LSB}; \pm 1^{\circ}$ $\pm 4\text{ LSB}; \pm 2^{\circ}$	The error between the input/output voltage and a true 0.000000 VDC Temperature specifications are for J, T, and E thermocouples only.
Integral linearity error Ta=25 $^{\circ}\text{C}$ Ta=Full range	$\pm 3\text{ LSB}; \pm 2^{\circ}$ $\pm 6\text{ LSB}; \pm 4^{\circ}$	The maximum error in the input/output 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 both analog input channels are sampled
Output slew rate	$\pm 10\text{ V}/\mu\text{Sec}$	The maximum slope of an output signal change
Environmental		
Temperature		
Operating	0 to 50 $^{\circ}\text{C}$	Refer to the Model 5200 Controller Data Sheet for proper mounting instructions.
Storage	-25 to 85 $^{\circ}\text{C}$	

Application Information

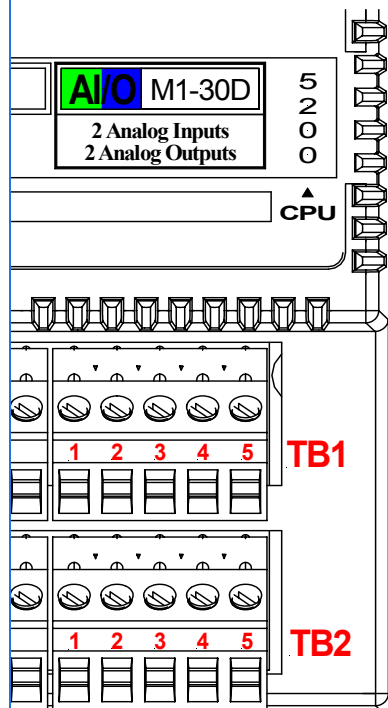
Typical Analog Input Application



Typical Analog Output Application



Module Identification



I/O Terminations

TB1-1	VS_OUT
TB1-2	+Ain #1
TB1-3	+Ain #2
TB1-4	Aout #1
TB1-5	Aout #2
TB2-1	+VS_RTN
TB2-2	-Ain #1
TB2-3	-Ain #2
TB2-4	ACOM
TB2-5	ACOM

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 (13%) RHODIUM	RED	PLATINUM	-40	1740
S	BLACK	PLATINUM (10%) RHODIUM	RED	PLATINUM	-40	1750
T	BLUE	COPPER	RED	CONSTANTAN	-180	390

Notes



- Shield grounds must be terminated on the 5200 controller side of the cable.
- When an analog device is powered via an external power source, it may be necessary to tie the ground of this power source to the module's analog common (ACOM) to limit common mode voltages.
- 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 5200 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.