

Analog input module

AI

M3-33C

AI

M3-33D

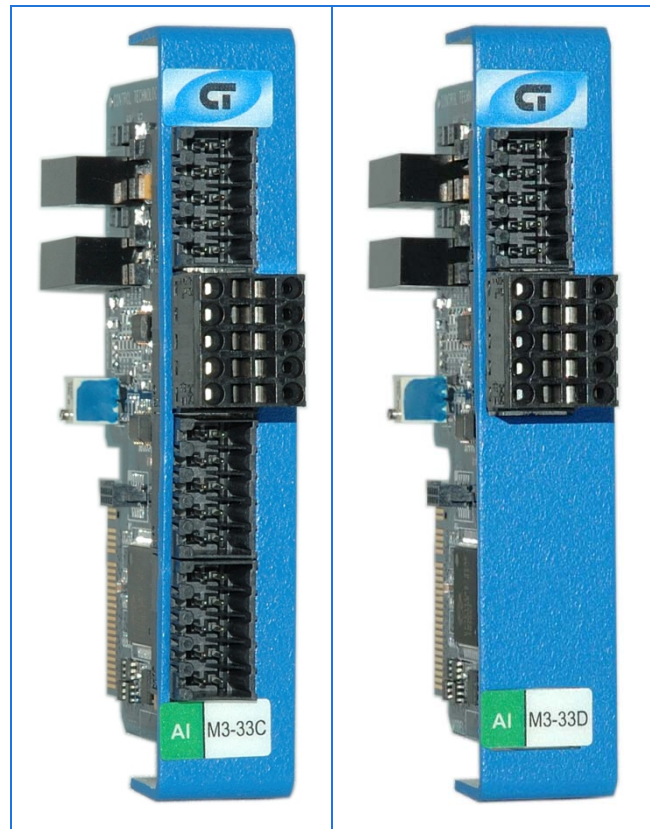
M3-33C: 8 thermocouple inputs / ± 100 mVDC

M3-33D: 4 thermocouple inputs / ± 100 mVDC

- ▶ Thermocouple type individually selectable by channel
- ▶ Eight 16-bit ± 100 mVDC analog inputs, differential-ended inputs for use with both grounded or ungrounded tip thermocouples (M3-33C)
- ▶ Four 16-bit ± 100 mVDC analog inputs, differential-ended inputs for use with both grounded or ungrounded tip thermocouples (M3-33D)
- ▶ Optically and electrically isolated
 - Each module has an electrically isolated analog ground
 - Each channel is optically isolated
- ▶ Thermocouple linearization algorithms E, K, J, R, S, T
- ▶ Each channel has individually configurable digital filtering

General specifications

Inputs per module:	
M3-33C	8
M3-33D	4
Input type	Thermocouple (E, K, J, R, S, T) / ± 100 mVDC
Connection	Removable terminal block
Connection type	Tension clamp
Terminal block part number	069-621010
Terminal wire size (UL 1059)	18 - 22 AWG
Test point	All connections
Module size	1 rack slot (0.75"/19 mm)
Bus power required (5 VDC)	0.26 mA
Isolation rating	500 VDC
Operating temperature	
Horizontal installation	0 - 50°C
Vertical installation	0 - 45°C
Storage temperature	-25 - 85°C
Humidity	5 - 95% non-condensing



Actual size

Minimum hardware revision	0, A
Minimum firmware revision	1.02
Minimum operating system revision	5.00.90
Documentation number: 950-533303-002	

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Performance specifications

Parameter	Value
Input range	Thermocouple (E, K, J, R, S, T) / ± 100 mVDC
Input resolution	16-bit
Input resistance	
+Ain to -Ain	$10^{12} \Omega$
+Ain to ACOM	$10^{12} \Omega$
-Ain 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}	$0.013\% \pm 1^\circ\text{C}$
Linearity error (full range) ^{1,2}	$0.037\% \pm 2^\circ\text{C}$
Digital input filter size (settable)	1 – 255 samples
Update rate (all channels):	
M3-33C	1250 Hz
M3-33D	1250 Hz

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

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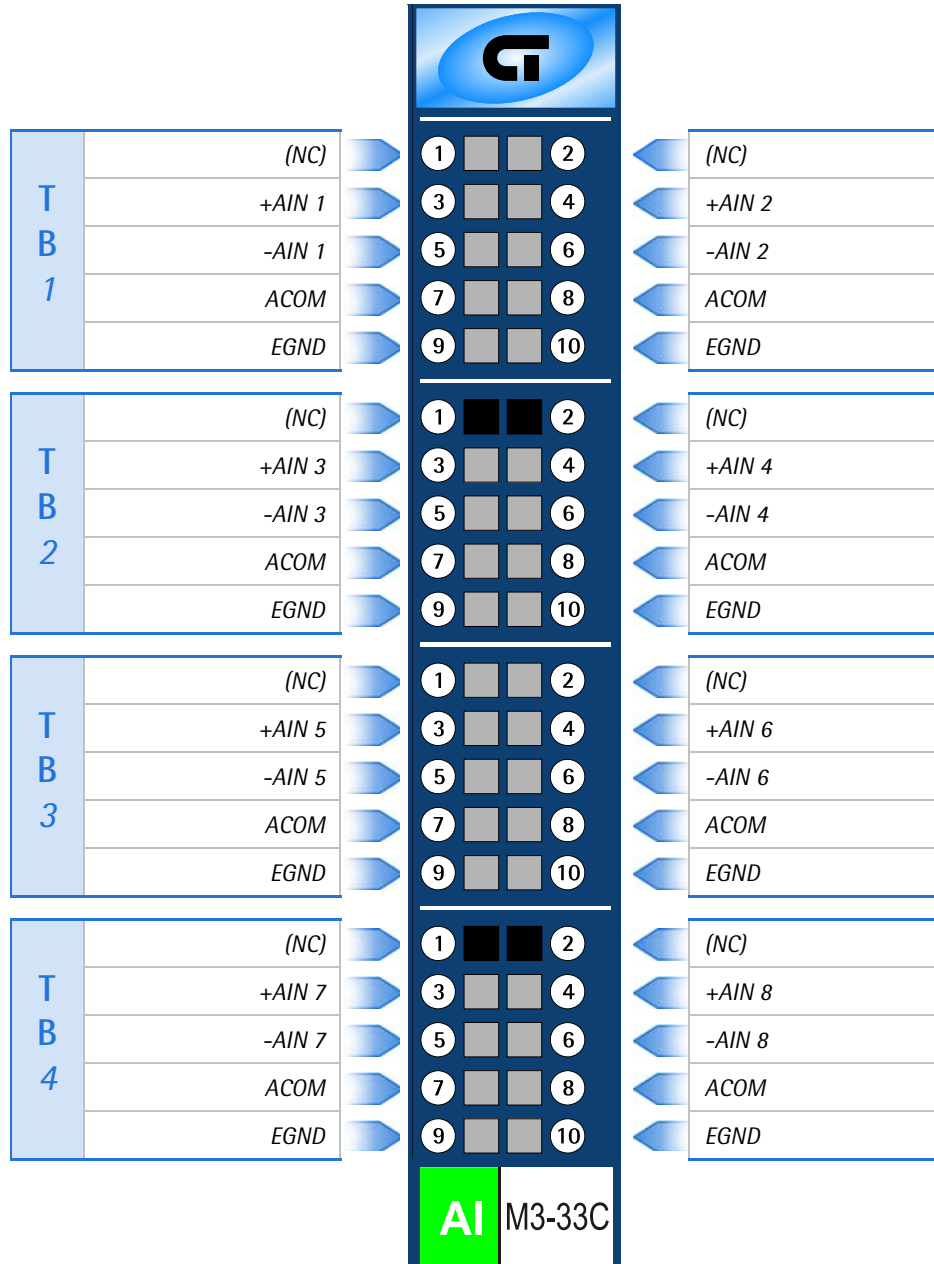
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M3-33D

M3-33C: 8 thermocouple inputs / ± 100 mVDC

M3-33D: 4 thermocouple inputs / ± 100 mVDC

Terminal block connections



Notes

1. TB3 and TB4 not available on M3-33D.
2. TB2 and TB4 contain factory-tuned cold junction compensation devices. These TBs must remain in their factory-shipped locations.

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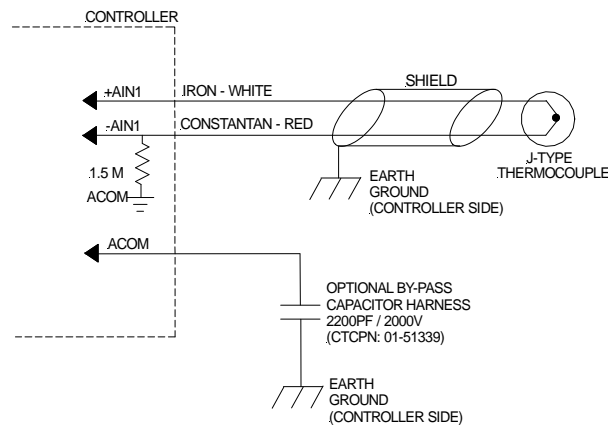
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M3-33C

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M3-33D

Application Information



Thermocouple Specifications

TYPE	+ AIN		- AIN		RANGE (°C)	
E	PURPLE	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 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.
- Insertion and/or removal of I/O modules should be done with all power removed. Failure to do so may lead to damaged electronics and/or incorrect I/O states.
- Incorrect I/O connections may lead to damaged electronics and/or incorrect I/O states.
- For register and programming information, refer to the appropriate controller Applications Guide.
- For other thermocouple types, please contact Control Technology Corp.
- The information and illustrations contained herein are the property of Control Technology Corporation and are subject to change without notice. Data based on $V_S = 24 \text{ VDC}$ @ 25°C unless otherwise noted. For additional information and/or updates, visit www.ctc-control.com. Copyright © 2007-2013 Control Technology Corporation. All Rights Reserved.