Control Technology Corporation

Data Sheet
5100-K Analog Combo I/O Module
Two ±100mVDC / Thermocouple Analog Inputs
Two ±10V Analog Outputs

AI/O ±100m/10V | K
2 Analog Inputs
2 Analog Outputs

Description

▶ Two 13-bit, ±100 mVDC bipolar, differential-ended (grounded tip TC), analog inputs
▶ Two 12-bit, ±10 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 digital input

5100-A Specifications

Parameter	Value	Description
General		
Number of inputs	2	Two differential-ended analog inputs at ±100 mVDC
Number of outputs	2	Two single-ended analog outputs at ±10 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 Outputs	13-bit 12-bit	Analog inputs: 1 in 8192 counts; 24.4 uV/LSB. Analog outputs: 1 in 4096 counts; 4.88 mV/LSB
Engineering units (Channel Configurable)	±10,000 ±100,000 C, F, K	Integer numbers used by the Model 5100 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)
Signal type Inputs Outputs	Diff.-ended Single-ended	The input reading is the voltage difference between +AINx and –AINx. Both output voltages are in reference to analog common (ACOM)
Common mode voltage	±15 VDC	The maximum input voltage in reference to analog common (ACOM).
Isolation rating	500 VDC	Isolation voltage between any IO and other sensitive 5100 circuitry.
Input protection	±40 VDC	Absolute maximum input voltage
Input impedance: +Ain to –Ain +/-Ain to ACOM	10^{12} Ω 10^{12} Ω	The impedance between the positive and negative inputs. The impedance between the either input and analog common (ACOM)..
Maximum output current	±5 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 5100's +5 VDC power supply.
Model type	5130	Identifier for the hardware and software type
Performance		
Full scale calibration error Ta=25°C Ta=Full range	±2 LSB; ±1° ±4 LSB; ±2°	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°C Ta=Full range	±2 LSB; ±1° ±4 LSB; ±2°	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°C Ta=Full range	±3 LSB; ±2° ±6 LSB; ±4°	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	±10 V/µSec	The maximum slope of an output signal change.
Environmental		
Temperature Operating Storage	0 to 50 °C -25 to 85 °C	Refer to the Model 5100 Controller Data Sheet for proper mounting instructions.

Doc. No. 950-513002-0003.doc
Minimum Hardware Revision: E
Minimum Module Firmware Revision: 1.07
Minimum 5100 Operating System Revision: 4.04.12

Data Sheet: 5100-K Analog Combo I/O Module

AI/O ±100m/10V K
2 Analog Inputs
2 Analog Outputs

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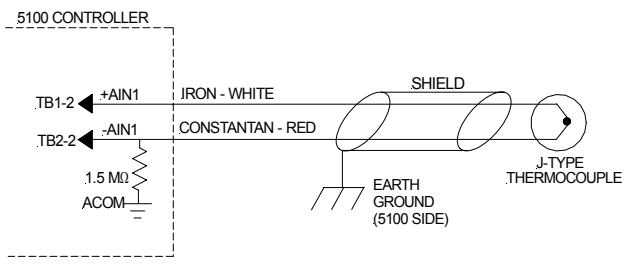**CT Control Technology Corporation**

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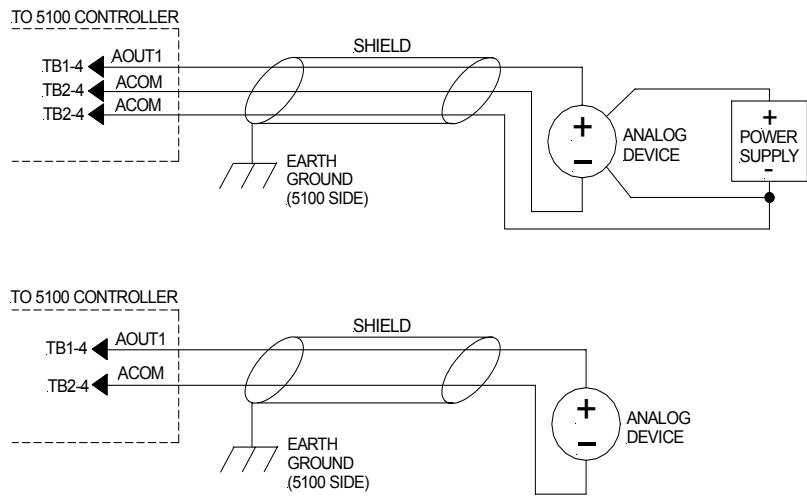Fax: 508.435.2373
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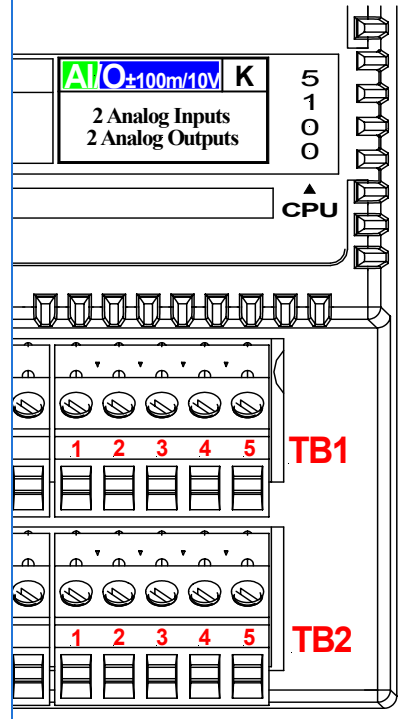**Data Sheet: 5100-K Analog Combo I/O Module**

Application Information

Typical Analog Input Application

Typical Analog Output 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 [(13%)] RHODIUM	RED	PLATNUM	–40	1740
S	BLACK	PLATINUM [(10%)] RHODIUM	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	Aout #1
TB1–5	Aout #2
TB2–1	+VS_RTN
TB2–2	–Ain #1
TB2–3	–Ain #2
TB2–4	ACOM
TB2–5	ACOM

Notes

1. Shield grounds must be terminated on the 5100-controller side of the cable.
2. 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.
3. For register and programming information, refer to the Model 5100 Applications Guide.
4. For other thermocouple types, please contact Control Technology Corp.
5. VS refers to the voltage supply of the 5100 controller.
6. For new designs, CTC recommends using module 5100-I instead of this module.

Doc. No. 950-513002-0003.doc
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