4.4.4. Low Level Analog (Temperature) Input LLAI

Function

The Low Level Analog Input (LLAI) Module accepts up to 16 channels of temperature inputs from RTD & TC.

Notable Features

- TC and RTD operation
- Remote Cold Junction compensation capability
- 1 Second PV scanning with OTD protection
- Configurable OTD protection (See below)
- Temperature points can be added in 16 point increments

Temperature Support

The Temperature variable is collected from all points at a 1 second rate. The 1 second update includes a configurable check for Open Thermocouple Detection (OTD) (see below) before propagation of the temperature variable. All TC inputs include integral Cold Junction Compensation (CJC).

Sampling and Open Sensor Detect

The TC/RTD IOM supports a configuration parameter for Open Sensor Detect before PV delivery. With the OTD configuration active, the PV is sampled and held while an OTD cycle is performed within the same measurement window. If the OTD is negative, the PV is propagated up through the system. If the OTD is positive, the PV is set to NAN and the input channel soft failure is set. In this way, no inappropriate control action occurs for PV values that are invalid due to an open thermocouple. PV sampling/reporting incurs no added delays from OTD processing.

Detailed Specification- Low Level Analog Input – RTD & TC (8C-PAIMA1)

Parameter	Specification
Input / Output Module	8C-PAIMA1- Low Level Analog (Temperature) Input, Coated
IOTA Modules	8C-TAIMA1 | Non-Redundant, Coated | 9”
Input Type	Thermocouple and / or RTD
Voltage Rating	24 VDC
Module current rating	120m A
Input Channels	16 fully-isolated channel-to-channel, channel-to-IOL, and channel-to-power supply common in 16 channel increments
Input scan rate	1 second fixed by IOM, (up to 16 channels/sec max.)
Channel bandwidth	0 to 4.7 Hz (-3 dB)
Nominal input range (TC only)	-20 to +100 millivolts
Maximum normal mode continuous input non-damaging (any thermocouple type configured)	-10 to +10 volts (TC) -1 to +2 Volts @ 100 milliamps (RTD)
Gain error (-20 to +100 millivolt range)	0.050% full scale max

Parameter		Specification	
Temperature stability	TC, millivolt inputs	+/-20 ppm per deg C max	
	RTD inputs	+/-20 ppm per deg C max	
Long term drift		500 ppm	
Input impedance		1 megohm at dc (TC only)	
CMV with respect to Power System common, dc to 60 Hz		Channel to Shield :+/-250 VDC or VAC RMS Channel to Channel: +/-33 VDC or VAC RMS	
CMRR, 50 or 60 Hz (with 1000 ohms source impedance max.)		120 dB min	
Voltage, channel-to-channel, dc to 60 Hz		+/-33 VDC or VAC RMS	
Voltage, channel-to-shield, dc to 60 Hz		+/-250 VDC or VAC RMS	
Crosstalk, dc to 60 Hz		80 dB (120 dB at 50 and 60 Hz)	
NMRR at 50/ 60 Hz		60 dB min	
Line frequency integration		Fixed selection of 50 Hz or 60 Hz	
RTD sensor excitation current		1 milliamp	
Cold Junction Compensation Range		-20 to +60 deg C (± 0.5 deg C typical)	
TC Linearization Accuracy [1]		± 0.05 Ω / deg C	
Open Thermocouple Detection		Each conversion qualified, ≤ 1000 Ω = guaranteed no-trip ≥ 1500 Ω guaranteed trip.	
RTD Max Lead Resistance		15 Ω	
Surge protection (sensor terminals)		EN 61000-4-5 (for Industrial locations, 1kV line to line, 2kV line to gnd.)	
Surge protection (power/serial link with cable adapter option)		EN 61000-4-5 (for Industrial locations, 1kV line to line, 2kV line to gnd.)	
Supported RTD types		Pt: 100 ohm DIN 4376	-180 to +800 deg C
		Pt: 100 ohm JIS C-1604	-180 to +650 deg C
		Pt: 1000 ohm	-40 to +260 deg C
		Ni: 120 ohm ED #7	-45 to +315 deg C
		Cu: 10 ohm SEER	20 to +250 deg C
		Cu: 50 ohm SEER	-50 to +150 deg C
Supported Thermocouple types		ANSI specification J	-200 to +1200 deg C
		ANSI specification K	-100 to +1370 deg C
		ANSI specification E	-200 to +1000 deg C

Parameter	Specification	
	ANSI specification T	-230 to +400 deg C
	ANSI specification B	+100 to +1820 deg C
	ANSI specification S	0 to +1700 deg C
	ANSI specification R	0 to +1700 deg C
	ANSI specification N	-13 to +1300 deg C
Supported millivolt types	-20 to +100 millivolts	
Note 1 – Linearization polynomials are 4th order and based on NIST Monograph 175, ITS90 and JIS C-1602-1995		