Section 4. Analog Input Module (13 bits)

4-1. Description

The Ovation Analog Input Module with associated Personality Module provides signal conditioning and analog-to-digital conversion for eight individually-isolated analog inputs. Field inputs are surge protected and routed by the appropriate Personality Module and then sent to the Electronics Module for conversion.

The Analog Input Module (13 bits) is applicable for CE Mark Certified Systems.

Note

See **Section 3. I/O Modules** for environmental, installation, wiring, and fuse information.

4-2. Module Groups

4-2.1. Electronics Modules

There are six groups of Electronics modules for the Analog Input Module:

- 1C31113G01 provides voltage input range of ± 20 mV.
- 1C31113G02 provides voltage input range of ± 50 mV.
- 1C31113G03 provides voltage input range of ± 100 mV.
- 1C31113G04 provides voltage input range of ± 1 V.
- 1C31113G05 provides voltage input range of ± 5 V.
- 1C31113G06 provides voltage input range of ± 10 V.

4-2.2. Personality Modules

- 1C31116G01 provides voltage analog inputs.
- 1C31116G02 provides field-powered current analog inputs.
- 1C31116G03 provides locally powered current analog inputs.
- 1C31116G04 provides voltage analog inputs with a temperature sensor for cold junction thermocouple compensation.

Table 4-1. Analog Input Subsystem (13 Bit)

Range	Channels	Electronic Module	Personality Module
± **20mV**	8	1C31113G01	1C31116G01
± **50mV**	8	1C31113G02	1C31116G01
± **100mV**	8	1C31113G03	1C31116G01
± **20mV Compensated (Thermocouple)**	8 [1]	1C31113G01	1C31116G04
± **50mV Compensated (Thermocouple)**	8 [1]	1C31113G02	1C31116G04
± **100 mV Compensated (Thermocouple)**	8 [1]	1C31113G03	1C31116G04
± **1 VDC**	8	1C31113G04	1C31116G01
± **5 VDC**	8	1C31113G05	1C31116G01
± **10 VDC**	8	1C31113G06	1C31116G01
0-20 mA Field powered (4-20 mA Field powered can also be selected in the I/O Builder; card will be configured appropriately)	8	1C31113G05	1C31116G02
0-20 mA Locally powered (4-20 mA Locally powered can also be selected in the I/O Builder; card will be configured appropriately)	8	1C31113G05	1C31116G03

1 A ninth logical channel (does not connect to a device) is provided when using the Analog Input module with temperature sensor. This ninth point is needed for the CJ Compensation field of the Point Builder Instrumentation Tab when defining the eight other thermocouple points for the AI module (refer to U3-1041, NT-0060 or WIN60 for additional information).

All Configurations are CE Mark Certified.

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4-3. External Power Supplies

Note

Module power specifications (main and auxiliary) refer to the actual power drawn by the module from the 24VDC main power supply and from the auxiliary power supply (if required) and **NOT** from the AC or DC Mains.

If the Analog Input module uses the 1C31116G03 Personality module (configured with locally powered current analog inputs), the required voltage source may be obtained from the internal auxiliary power supply (backplane) or it may be obtained from an external power supply.

If an external power supply is used, see Appendix D for the steps to be undertaken before connecting the external power supply to the Analog Input module base unit terminal block. The Analog Input module auxiliary supply voltage level (24 VDC or 48 VDC) depends on the external transmitter devices being interfaced to the Analog Input module's analog inputs.

4-4. Specifications

Electronics Module (1C31113)
Personality Module (1C31116)

Table 4-2. Analog Input Module Specifications

Description	Value
Number of channels	8
Input range [1]	±20 mv ±50 mv ±100 mv 4 - 20 mA [2] ±1 V ±5 V ±10 V
Resolution	13 bits (including polarity)
Guaranteed accuracy (@25°C)	Accuracy over -25% to 100% range of full scale input level: ±0.10% of upper range value ±10µV ±1/2LSB @99.7% confidence. Accuracy over -100% to -25% range of full scale input level: ±0.15% of upper range value ±10µV ±1/2LSB @99.7% confidence.
Temperature coefficient	±0.24% of the upper range value ±24µV over 0 to 60°C.

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Table 4-2. Analog Input Module Specifications (Cont'd)

Description	Value
Input impedance: [3] Groups G01 through G05 Group G06 (± 10V input only)	 10 MΩ 2 MΩ
Sampling rate	10 times per second
Offset and gain temperature drift compensation	Automatic
Diagnostics	Internal module operating faults. Out of range detection. Open thermocouple detection for thermocouple inputs. Open loop/blown fuse detection for current inputs.
Dielectric isolation: Channel to channel Channel to logic	 1000 V AC/DC 1000 V AC/DC
Normal mode rejection	60 dB at 50 Hz ± 1/2% or 60 Hz ± 1/2% 30 dB (typical) at 50 Hz ± 5% or 60 Hz ± 5%
Common mode rejection	120 dB at DC, power line frequency and its harmonics ± 1/2% tracking. 100 dB (typical) for nominal line frequency ± 5% and harmonics.
Module power	Main: 2.5 W typical; 3.38 W maximum Aux: When used (1C31116G03) Aux power supply voltage = 24 V DC 3.84 W typical (8 inputs @ 20mA each)
Operating temperature range	0 to 60°C (32°F to 140°F)
Storage temperature range	-40°C to 85°C (-40°F to 185°F)
Humidity (non-condensing)	0 to 95%

1 Ranges are available via separate modules.
2 Current inputs when using Personality module 1C31116G02 or 1C31116G03 with ± 5V electronics module. The input range 0 to 20 mA is also available, but if selected, blown fuse detection will be disabled. If you select 0 to 20 mA, the software adds a suffix "A" to the Personality module identification. This "A" is not displayed, it is only used by the database to differentiate between 0 to 20 mA and 4 to 20 mA, in order to generate correct coefficients.
3 Only for modules used with voltage input Personality modules (1C1116G01 and 1C1116G04).

4-5. Analog Input Terminal Block Wiring Information

Each Personality module has a simplified wiring diagram label on its side, which appears above the terminal block. This diagram indicates how the wiring from the field is to be connected to the terminal block in the base unit.

The diagrams for the analog input Personality modules are illustrated in Figure 4-1. The following table lists and defines the abbreviations used in those diagrams.

Abbreviation	Definition
A1 - A8 +	Analog Input positive terminal connection
A1 - A8 -	Analog Input negative terminal connection
	Earth ground terminals
P1 - P8 +	Positive terminal connection for current loop power
PS+, PS-	Auxiliary power supply terminals
RSV	Reserved terminal. No connections allowed on these terminals.
SH1 - SH8	Shield terminal connection (for non-CE Mark certified systems)

As is standard for analog signals, shielded twisted-pair wire should be used for the field interface. For the analog input, the (-) and shield should be tied together and to earth ground, either locally at the cabinet or at the field device. Figure 4-2 and Figure 4-3 show how the various Personality modules require these connections or how the options are implemented.

Figure 4-4 illustrates the jumper settings for the Personality module.

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Notes

1. Do **not** use unmarked terminal block locations.
2. Shield terminals (SH) are **not** connected in CE Mark systems.

Voltage Input: (1C31116G01)
Thermocouple Input: (1C31116G04)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	A1 +	SH1	A2 +	SH2	A3 +	SH3	A4 +	SH4	A5 +	SH5	A6 +	SH6	A7 +	SH7	A8 +	SH8	PS +	PS -
B	RSV	A1 -	RSV	A2 -	RSV	A3 -	RSV	A4 -	RSV	A5 -	RSV	A6 -	RSV	A7 -	RSV	A8 -	PS +	
C																	⏚	⏚

Note: Internal jumpers are in this personality module for locally grounding the shield and (-) connections to earth ground.

Field Powered Current Loop: (1C31116G02)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	A1 +	SH1	A2 +	SH2	A3 +	SH3	A4 +	SH4	A5 +	SH5	A6 +	SH6	A7 +	SH7	A8 +	SH8	PS +	PS -
B	RSV	A1 -	RSV	A2 -	RSV	A3 -	RSV	A4 -	RSV	A5 -	RSV	A6 -	RSV	A7 -	RSV	A8 -	PS +	
C																	⏚	⏚

Locally Powered Current Loop: (1C31116G03)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	P1 +	SH1	P2 +	SH2	P3 +	SH3	P4 +	SH4	P5 +	SH5	P6 +	SH6	P7 +	SH7	P8 +	SH8	PS +	PS -
B	A1 +	RSV	A2 +	RSV	A3 +	RSV	A4 +	RSV	A5 +	RSV	A6 +	RSV	A7 +	RSV	A8 +	RSV	PS +	
C																	⏚	⏚

Figure 4-1. Terminal Block Connections for the Analog Input Personality Modules

4-6. Analog Input Field Connection Wiring Diagrams

Non-CE Mark Certified Systems

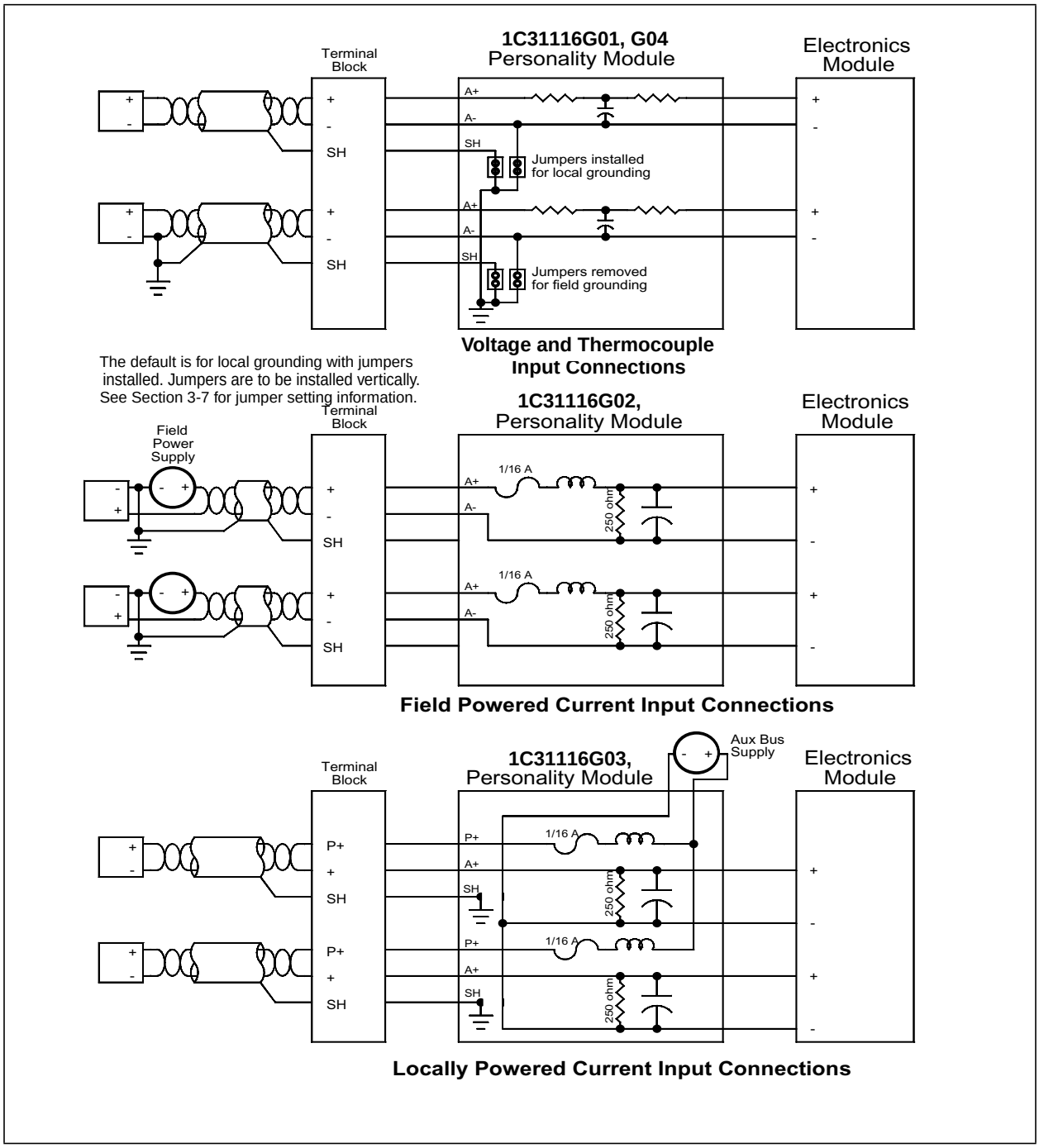


Figure 4-2. Field Connections for the Analog Input Personality Module (Non-CE Mark)

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