

# AI16e

## ABB Ability™ Symphony® Plus Hardware Selector



The AI16e Universal Analog Input module processes up to sixteen (16) high level, CH-2-CH isolated, analog input field signals. Each channel is independently configurable for high level (4 to 20 mA or 1 to +5 VDC), RTD, mV and TC analog input signal ranges.

FC 221 (I/O Device Definition) sets AI module operating parameters and each input channel is configured using FC 222 (Analog Input CH) to set individual input channel parameters such as engineering units, High/Low alarm limits, etc.

Each input channel has a dedicated A/D converter that provides 24 bit resolution with polarity. The AI16e module will update all 16 input channels in 100 msec.

In current mode, the AI16e module provides short circuit protection by limiting current to a maximum of 96 mA. The AI16e module will also detect an open circuit in less than 400 msec.

### Features and benefits

- Sixteen (16) independently configurable Analog Input channels supporting:
- Hi Lvl: 4 to 20 mADC, 0/1... +5 VDC, or -10/0...+10 VDC
- TC types: E, J, K, R, S, T, B, L, N (14 & 28 AWG), U, Chinese TC types: E & S
- mV Ranges: 0 to 100 mV or -100 to +100 mV
- RTDs: 100  $\Omega$  Platinum U.S. Lab & Industry Std., 100  $\Omega$  Platinum European Std., 120  $\Omega$  Nickel, Chinese 53  $\Omega$  Copper, 10  $\Omega$  Copper
- A/D resolution is 24-Bit
- A/D update of all 16 Channels in 100 msec
- Accuracy from is  $\pm 0.03\%$  to  $\pm 0.1$  of Full Scale Range (FSR)
- In HN800 operating mode, AI16e supports optional module redundancy

General info	
Article number	7PAA001446R1 (AI16e)
Type	Universal Analog Input
Signal specification	Hi Lvl: 4...20 mA, 0/1...+5 VDC, -10/0...+10 VDCmV: -100/0...+100mV Thermocouple: Type B, E, J, K, L, N(14 or 28 AWG), R, S, T, U or Chinese E, S RTD: 100 Ω Platinum U.S. & Euro Std, 120 Ω Nickel, Chinese 53 Ω Copper, and 10 Ω Copper
Life cycle status	ACTIVE
Number of channels	16
Signal type	Universal AI: High Level, mV, TC, and RTD
HART	No
SOE	No
Redundancy	Yes
Form factor	Compact (127 mm)
Mounting	EMB01S-UAI
MTBF (per MIL-HDBK-217-FN2)	PR: B = 185,127 Hours @ 30 °C 137,772 Hours @ 40 °C 52,055 Hours @ 70 °C (Hours)
MTTR (Hours)	AI16e MTTR = 1 hour

Detailed data	
Module power requirements	360 mA (typical) @ 24 VDC ± 10%
Module power connection	POWER TB on EMC-_B0x, cHBX01L or VBX01T
Field IO power	20 mA per CH @ 24 VDC ± 10%
Overvoltage category	Category I for power, inputs or outputs. Tested according to EN 61010-1
Max field cable length	600 meters (1968 feet)
Number of Channels	16 independently configurable channels
Signal ranges and types	Analog Inputs: High Level: 4...20 mA, 0/1...+5 VDC, -10/0...+10 VDCmV: -100/0...+100mV Thermocouple: Type B, E, J, K, L, N(14 or 28 AWG), R, S, T, U or Chinese E, S RTD: 100 Ω Platinum U.S. Lab & Industry Std., 100 Ω European Std, 120 Ω Nickel, Chinese 53 Ω Copper, and 10 Ω Copper
TC Cold Junction Compensation	± 0.5°C Reference Accuracy
Input Impedance	Current: 10 MΩ minimum (mV & TC), 250 Ω (4 to 20 mA) Voltage: 100 kΩ minimum (V, mA)
Output load	0 to 750 Ω Current mode, minimum 22kΩ voltage mode
A/D Conversion	1 dedicated A/D converter for each channel
A/D Resolution	24-Bits with Polarity
A/D Update rate	100 msec for all 16 channels
Accuracy, FSR	Current Mode: ± 16 μA (± 0.1% of FSR, where FSR = 16 mA) Voltage Mode: ± 8 mV (0 ± 0.04% of FSR, FSR = 20 VDC) RTD: ± 0.25 Ω (0 ± 0.05% of FSR, FSR = 500 Ω) mV: ± 0.06 mV (0 ± 0.03% of FSR, FSR = 200 mV)
Temp effect on accuracy	±0.003% of FSR per °C maximum, from 0 to 70°C
Field signal to Logic isolation	Galvanically isolated, 1500 V up to 1 minute
Channel isolation	Individual CH-2-CH isolated, 1500 V up to 1 minute
Open circuit detection time	400 msec, when in current mode
Short circuit protection	Max 96 mA (in current mode only)
Normal mode noise rejection	-80 dB minimum
Common mode noise rejection	-120 dB minimum

Diagnostics	
Front plate LED's	R (Run), F (Fault), P (Primary), and B (Backup) + 8 Diagnostic & Status LEDs
Local availability	R (Run), F (Fault), P (Primary), and B (Backup) + 8 Diagnostic & Status LEDs
Remote availability	HN800 device diagnostics via SPE

<b>Environment and certification</b>	
Temperature, Operating	-40 to +70 °C Tested according to IEC/EN 60068-2-1, IEC/EN 60068-2-2
Temperature, Storage	-40 to +85 °C Tested according to MIL-STD-810G
Relative humidity	20% to 95% @ 40°C non-condensing. Tested according to IEC/EN 60068-2-78, IEC/EN 61298-3
Vibration (operational sinusoidal)	5 to 60 Hz 0.137 mm (0.0054 in.), 60 to 150 Hz 1.0 G. Tested according to IEC/EN 60068-2-6
Vibration (transportation)	10 to 500 Hz. Tested according to MIL-STD-810G
Shock (storage)	15 G, 11 msec. Tested according to IEC/EN 60068-2-27
Drop	100 mm. Tested according to IEC/EN 60068-2-31
Protection class	IP20 according to EN 60529
Altitude (operational)	Sea level to 3,048 meters (10,000 ft.) Tested according to MIL-STD-810G
Altitude (storage)	Sea level to 12,192 meters (40,000 ft.) Tested according to MIL-STD-810G
Air quality	Standard = ISA S71.04 G1, ISA S71.04 G3 compliant versions SPCxxxA also available
ESD immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-2, Severity level 3
Surge immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-5, Severity level 3
Electrical fast transient immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-4, Severity level 3
Radiated RFI immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-3, Severity level 3
Conducted Immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-6, Severity level 3
Magnetic field immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-8, Severity level 4
Radiated emission	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-6, Severity level 3
Conducted emission	Tested according to IEC/EN 61000-6-4, CISPR 11 + A1, CISPR 16-1-1, Group 1, Class A, ISM equipment
Voltage dips and interruption immunity	Tested according to IEC/EN 61000-6-2, IEC/EN 61000-4-11
CSA non-hazardous locations	Certified for use as process control equipment in an ordinary (non-hazardous) location
CSA hazardous, nonincendive locations	Class I, Division 2, Groups A, B, C, D
CE Mark	CE Mark EMC directive 2004/108/EC & Low Voltage Directive 2006/95/EC
RoHS compliance	RoHS Directive 2015/863
WEEE compliance	DIRECTIVE/2012/19/EU

<b>Compatibility</b>	
Use with MTU	EMB01S-UAI, HBS01e-UAI, VBS01e-UAI
Module keying code for base	slot #1 = 6, slot #2 = 18

<b>Dimensions</b>	
Width	27 mm
Depth	127 mm
Height	127 mm
Weight	204 g

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