MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ABB

AI830A 3BSE040662R1

RTD ANALOG INPUT MODULE

Used with the applicable S800 I/O configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

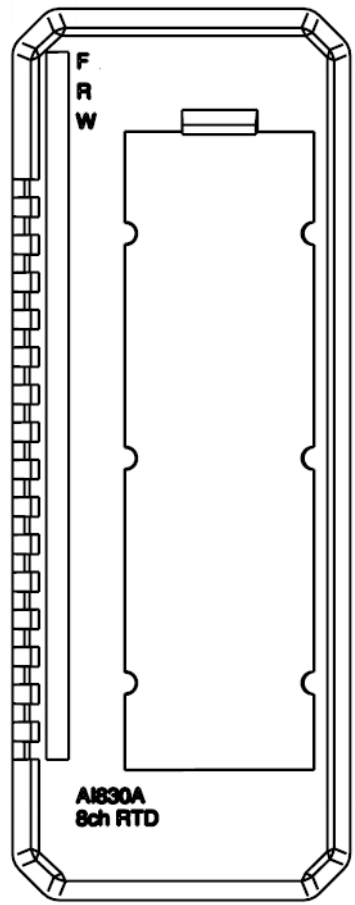
Selected official manufacturer pages follow this cover.

Source: ABB S800 I/O Modules and Termination Units 3BSE020924-600 A; model-specific specification sections.

AI830/AI830A RTD Input Module

Features

- 8 channels for RTD (Pt100, Cu10, Ni100 and Ni120 and resistor) inputs.
- 3-wire connection to RTDs.
- 14 Bit resolution.
- Inputs are monitored for open-circuit, short-circuit and has a input grounded sensor.



Description

The AI830/AI830A RTD Input Module has 8 channels for measurement of temperature with resistive elements (RTDs). With 3-wire connections. All the RTDs must be isolated from ground.

The AI830/AI830A can be used with Pt100, Cu10, Ni100, Ni120 or resistive sensors. Linearization and conversion of the temperature to Centigrade or Fahrenheit is performed on the module. Every channel can be individually configured.

The MainsFreq parameter is used to set mains frequency filter cycle time. This will give a notch filter at the frequency specified (50 Hz or 60 Hz).

Four different types of MTUs can be used. The TU830 Extended MTU and the TU810 (or TU814) Compact MTU enables three wire connection to the devices without additional terminals. The TU812 Compact MTU has a D-Sub 25 pin (male) connector for connection to the process.

Shielded field cables are required for process connections.

Technical Data

Table 20. AI830/AI830A RTD Input Module Specifications at 25°C

Feature	AI830/AI830A RTD Input Module
Number of channels	8
Type of input	3-wire RTD: Pt100, Cu10, Ni100, Ni120 and resistive potentiometer
Measurement range	See Table 21
Maximum field cable resistance	55 Ω for AI830 up to PR:F 500 Ω for AI830A and AI830 from PR:G
Error dependent of the field cable resistance R_{err} =Error in ohm R =Wire resistance ΔR =Difference in % between resistance in field cables, see Figure 34.	R_{err} = R x (0.005 + ΔR/100) $T_{err°C}$ = R_{err} / (R0 x TCR) $T_{err°F}$ = $T_{err°C}$ x 1.8
CMRR, 50 Hz, 60 Hz	>120 dB(1)
NMRR, 50 Hz, 60 Hz	>60 dB
Error (IEC 51-1)(2)(3)	See Table 21
Resolution	See Table 21
Temperature drift	See Table 21
Update cycle time	150 ms + n x 95 ms (4)
Current consumption 24 V (Modulebus)	50 mA
Current consumption 5 V (Modulebus)	70 mA
Power dissipation	1.6 W
Supervision	Open-circuit, short-circuit(5), reference channel, internal power supply

Table 20. AI830/AI830A RTD Input Module Specifications at 25°C (Continued)

Feature	AI830/AI830A RTD Input Module
Isolation	Groupwise isolated from ground
Mounting termination units	TU810, TU812, TU814 or TU830
MTU keying code	AF
Rated insulation voltage	50 V
Dielectric test voltage	500 V a.c.

(1) At 10 Ω load, e.g. Cu 10. CMMR is >80 dB at <400 Ω load and >110 dB at 100 Ω.
(2) Without error dependent of the field cable resistance
(3) Activated and not correctly connected channels can have negative influence on the accuracy of other channels.
(4) n=Number of active channels
(5) For Cu10, not short circuit.

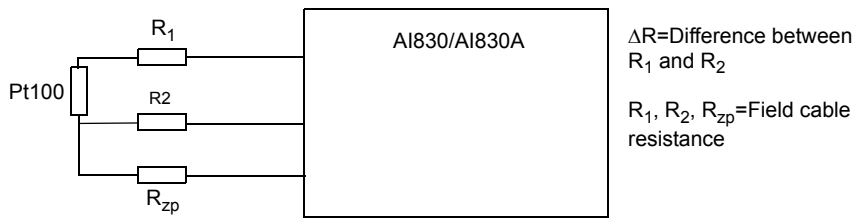


Figure 34. Error dependency of the field cable resistance

Table 21. AI830/AI830A Signal Range

Temperature Range	Sensor Type	Max Error		Resolution		MaxTemp Drift
		50 Hz	60 Hz	50 Hz	60 Hz	
-80...80°C	Pt100(1)	0.10°C	0.11°C	0.025°C	0.030°C	0.0017°C/°C
-112...176°F	Pt100(1)	0.18°F	0.20°F	0.046°F	0.055°F	0.003°F/°F
-200...250°C	Pt100(1)	0.15°C	0.16°C	0.026°C	0.031°C	0.0028°C/°C
-328...482°F	Pt100(1)	0.27°F	0.29°F	0.046°F	0.055°F	0.0050°F/°F
-200...850°C	Pt100(1)	0.31°C	0.34°C	0.056°C	0.067°C	0.007°C/°C
-328...1562°F	Pt100(1)	0.57°F	0.61°F	0.10°F	0.12°F	0.013°F/°F
-60...180°C	Ni100(2)	0.10°C	0.12°C	0.031°C	0.037°C	0.0021°C/°C
-76...356°F	Ni100(2)	0.19°F	0.21°F	0.056°F	0.067°F	0.0038°F/°F
-80...260°C	Ni120(3)	0.27°C	0.29°C	0.022°C	0.026°C	0.0029°C/°C
-112...500°F	Ni120(3)	0.49°F	0.51°F	0.039°F	0.046°F	0.0053°F/°F
-100...260°C	Cu10(4)	1.0°C	1.2°C	0.26°C	0.31°C	0.024°C/°C
-148...500°F	Cu10(4)	1.8°F	2.2°F	0.46°F	0.56°F	0.0043°F/°F
0...400 Ω	Resistor	0.083 Ω	0.091 Ω	0.020 Ω	0.024 Ω	0.0020 Ω/°C
-200...880°C(5)	Pt100	0.29°C	0.32°C	0.056°C	0.067°C	0.007°C/°C
-328...1616°F(5)	Pt100	0.53°F	0.58°F	0.10°F	0.12°F	0.013°F/°F
-200...880°C(6)	Pt100	0.30°C	0.32°C	0.055°C	0.066°C	0.007°C/°C
-328...1616°F(6)	Pt100	0.53°F	0.58°F	0.10°F	0.12°F	0.012°F/°F
-80...80°C(7)	Pt100	0.10°C	0.11°C	0.025°C	0.030°C	0.0017°C/°C
-112...176°F(7)	Pt100	0.18°F	0.19°F	0.046°F	0.055°F	0.003°F/°F
-200...250°C(7)	Pt100	0.14°C	0.15°C	0.025°C	0.031°C	0.0027°C/°C
-328...428°F(7)	Pt100	0.25°F	0.28°F	0.046°F	0.055°F	0.005°F/°F

Table 21. AI830/AI830A Signal Range (Continued)

Temperature Range	Sensor Type	Max Error		Resolution		MaxTemp Drift
		50 Hz	60 Hz	50 Hz	60 Hz	
-200...850°C(7)	Pt100	0.30°C	0.33°C	0.056°C	0.067°C	0.007°C/°C
-328...1562°F(7)	Pt100	0.54°F	0.59°F	0.10°F	0.12°F	0.013°F/°F
-200...649°C(8)	Pt100	0.25°C	0.27°C	0.053°C	0.064°C	0.0052°C/°C
-328...1200°F(8)	Pt100	0.45°F	0.49°F	0.096°F	0.12°F	0.0094°F/°F

(1) According to IEC 751, IPTS-68, TCR = 0.00385
(2) According to DIN 43760, TCR = 0.00617
(3) According to MIL-T-24388C, TCR = 0. 00672
R_o = 120 Ω (MINCO)
(4) According to TCR = 0.00427, R25 = 10 Ω (MINCO)
(5) According to US Industrial Std, TCR = 0.00391. Only supported by AI830A.
(6) According to US Lab Std IPTS-68, TRC = 0.00392. Only supported by AI830A.
(7) According to IEC 751, ITS-90 (JIS C 1604-1997), TRC = 0.00385. Only supported by AI830A.
(8) According to JIS C 1604:1981. Only supported by AI830A.

Block Diagram AI830/AI830A

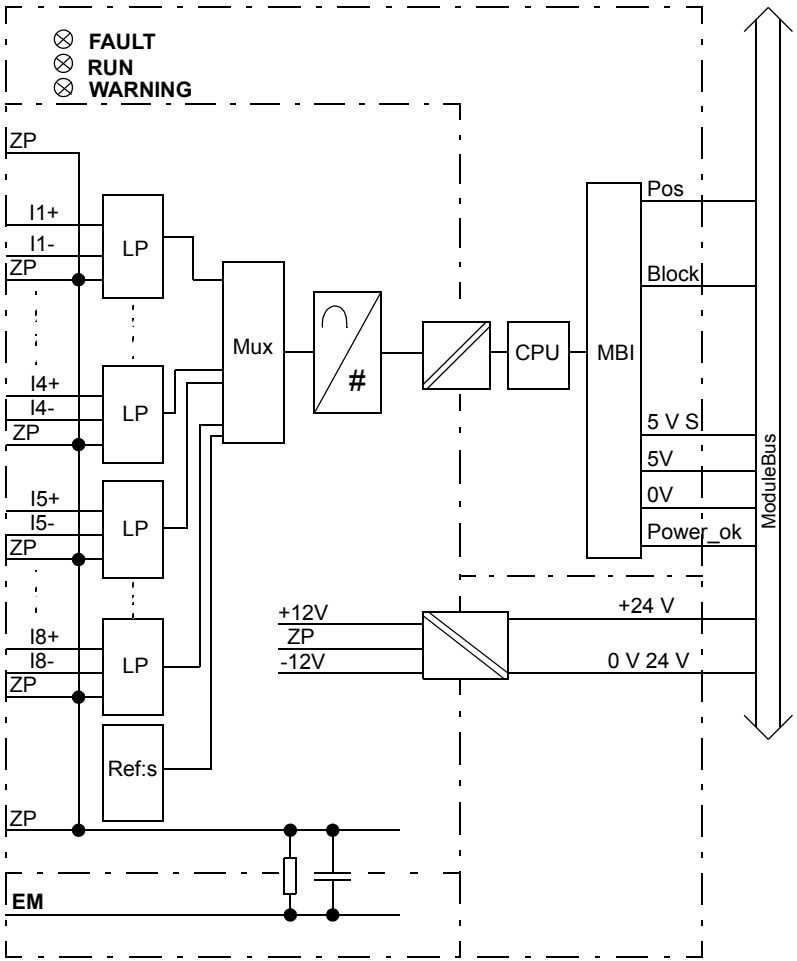


Figure 35. AI830/AI830A Block Diagram

Process Connections

Table 22. AI830/AI830A Process Connections

Process Connection	TU810 (or TU814) Terminal	TU812 D-Sub 25 male Connector (1)	TU830/TU833 Terminal
-	L1+ (2)	1, 14	L1+ (2)
-	L1-	2, 15	L1- (2)
-	-	-	B1, B2
Ch1, + Input	C1	3	C1
Ch1, - Input	B1	16	C2
Ch1, Return (ZP)	A1	-	A1, A2
-	-	-	B3, B4
Ch 2, + Input	C2	4	C3
Ch 2, - Input	B2	17	C4
Ch 2, Return (ZP)	A2	-	A3, A4
-	-	-	B5, B6
Ch 3, + Input	C3	5	C5
Ch 3, - Input	B3	18	C6
Ch 3, Return (ZP)	A3	-	A5, A6
-	-	-	B7, B8
Ch 4, + Input	C4	6	C7
Ch 4, - Input	B4	19	C8
Ch 4, Return (ZP)	A4	-	A7, A8
-	-	-	B9, B10
Ch 5, + Input	C5	7	C9

Table 22. AI830/AI830A Process Connections (Continued)

Process Connection	TU810 (or TU814) Terminal	TU812 D-Sub 25 male Connector (1)	TU830/TU833 Terminal
Ch 5, - Input	B5	20	C10
Ch 5, Return (ZP)	A5	-	A9, A10
-	-	-	B11, B12
Ch 6, + Input	C6	8	C11
Ch 6, - Input	B6	21	C12
Ch 6, Return (ZP)	A6	-	A11, A12
-	-	-	B13, B14
Ch 7, + Input	C7	9	C13
Ch 7, - Input	B7	22	C14
Ch 7, Return (ZP)	A7	-	A13, A14
-	-	-	B15, B16
Ch 8, + Input	C8	10	C15
Ch 8, - Input	B8	23	C16
Ch 8, Return (ZP)	A8	-	A15, A16
-	L2+ (2)	11, 24	L2+ (2)
-	L2-	12, 25	L2- (2)

(1) Pin 13 connected to connector body for EM.