

RAI02

ABB Ability™ Symphony® Plus Hardware Selector



The RAI02 Redundant Analog Input module processes up to 16 high-level, group isolated, analog input field signals. Each channel is independently configurable for either 4 to 20 mA or 1 to +5 VDC ranges. FC 221 (I/O Device Definition) sets AI module operating parameters and each input channel is configured using FC 222 (Analog Input Channel) to set individual input channel parameters such as engineering units, High/Low alarm limits, etc.

A/D resolution of each channel is configurable from 12 to 16 bits with polarity. The RAI02 module has one A/D converter for all 16 input channels. The module will update 16 input channels in 100 msec.

In current mode, the RAI02 module supports HART v5.4 instruments and provides short circuit protection by limiting current to a maximum of 96 mA. The RAI02 module will also detect an open circuit in less than 5 seconds.

Features and benefits

- 16 independently configurable channels supporting:
- 4 to 20 mADC or 1 to +5 VDC
- Up to 24 HART v5.4 secondary variables Total
- Max 4 sec vars per analog input CH
- Sec HART variables available to control logic
- 12 to 16-Bit (with polarity) A/D resolutionV
- A/D update of all 16 Channels in 100 msec
- Accuracy is $\pm 0.1\%$ of Full Scale Range where FSR = 25 mA or 6.25 VDC

| General info | |
|-----------------------------|-----------------------------------|
| Article number | 2VAA008427R1 (RAI02) |
| Type | Redundant Analog Input |
| Life cycle status | ACTIVE |
| Number of channels | 16 |
| Signal type | AI |
| HART | Yes |
| SOE | No |
| Redundancy | Yes |
| Form factor | Standard (190 mm) |
| Mounting | Horizontal Row or Vertical Column |
| MTBF (per MIL-HDBK-217-FN2) | PR A: 138,941 Hours |
| MTTR (Hours) | 1 Hours |

Detailed data

| | |
|-------------------------------------|--|
| Module power requirements | 24 VDC \pm 10%, 100 mA typical |
| Module power connection | POWER TB on cHBX01L or VBX01T |
| Field IO power | 24 VDC \pm 10%, 20 mA per CH |
| 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 AI channels |
| Signal ranges and types | Analog Inputs: 4...20 mA, or 1...+5 VDC with HART |
| No. of HART modems | 1 HART modem per module |
| Max no. of secondary HART variables | Up to 24 secondary variables Total, up to 4 variables per CH (HART v 5.4) |
| Secondary HART variable update rate | 2.5 seconds typical, 8.0 seconds max |
| Input Impedance | 250 Ω current mode (externally powered), \geq 250 k Ω voltage mode |
| Output load | 0 to 750 Ω Current mode, minimum 22k Ω voltage mode |
| A/D Conversion | 1 A/D converter per module |
| A/D Resolution | 16-Bits with Polarity |
| A/D Update rate | 100 msec for all 16 channels |
| Accuracy, FSR | \pm 0.01% FSR, FSR = 25 mA or 6.25 VDC |
| Temp effect on accuracy | Max \pm 0.003% per deg C |
| Field signal to Logic isolation | Galvanically isolated, 1500 V up to 1 minute |
| Channel isolation | 1x16 group isolated, 1500 V up to 1 minute |
| Short circuit protection | Max 96 mA per CH |
| Normal mode noise rejection | -70 dB minimum |
| Common mode noise rejection | -90 dB minimum |
| DC common mode rejection | -90 dB minimum |

Diagnostics

| | |
|---------------------|---|
| Front plate LED's | STATUS LEDs: R (Run) and F (Fault) + 1 thru 8 |
| Local availability | Mini USB connection on module front plate |
| Remote availability | HN800 device diagnostics via SPE |

| Environment and certification | |
|--|--|
| 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, IEC 529 |
| 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 | ISA S71.04 G1, ISA S71.04 G3 compliant versions SPCxxxA are 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 61000-6-4, CISPR 11 + A1, CISPR 16-1-1, Group 1, Class A, ISM equipment 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 |

| Compatibility | |
|-----------------------------|--|
| Use with MTU | HBR01-EPD, HBR01-FPH, VBR01-EPD, VBR01-FPH |
| Module keying code for base | slot #1 = 02, slot #2 = 15 |

| Dimensions | |
|-------------------|--------|
| Width | 27 mm |
| Depth | 106 mm |
| Height | 190 mm |
| Weight | 250 g |

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