# B&R X20AI4222

## 01 Analog Input Module / system role

### Product function and operating context

B&R X20AI4222 brings four bipolar voltage measurements into the controller while allowing the input processing to suppress unwanted spikes and report out-of-range conditions.

The four differential inputs use a 13-bit converter including sign, with 400 µs conversion time for all inputs. Input impedance is 20 megohms within the signal range, and the maximum permissible input signal is ±30 V rather than an extended measurement range.

### Functional path

| Voltage sources | Differential input pairs | Conversion and filtering | X20 process values |
|---|---|---|---|

| | |
|---|---|
| Acquisition | Four ±10 V differential inputs |
| Conversion | 400 µs for all channels |
| Processing | Configurable filter and ramp limiting |

The analog front end includes a third-order low-pass filter with a 1 kHz cutoff. Configurable digital filtering and input ramp limiting act separately; ramp limiting precedes the digital filter and requires filtering to be enabled.

# X20AI4222

## 02 Technical operating envelope

| | |
|---|---|
| Inputs | 4 differential voltage channels |
| Measurement range | ±10 V |
| Converter resolution | 13 bits including sign |
| Conversion time | 400 µs for all inputs |
| Input impedance | 20 MΩ |
| Maximum input signal | ±30 V |

| | |
|---|---|
| Analog filter | Third-order low-pass, 1 kHz cutoff |
| Common-mode range | ±12 V |
| Channel-to-bus test voltage | 500 V RMS |
| Channel-to-channel isolation | None |
| Internal I/O consumption | 1.1 W |
| Bus consumption | 0.01 W |

X20AI4222 is the four-input ±10 V module. Conversion time, digital filtering and bus-cycle timing are distinct conditions.

### Operating interpretation

The 1 kHz analog low-pass cutoff and the selectable digital filter describe separate processing stages; neither should be treated as the application update rate.

### Configuration boundary

Retain the differential wiring, source common mode, bus module, terminal block and filter settings when replacing the four-input module.

### In what order does X20AI4222 apply ramp limiting and digital filtering?

Input ramp limiting acts first, followed by filtering. Ramp limiting is only available in conjunction with the filter.

# X20AI4222

## 03 System integration and applications

### Four-channel voltage acquisition

Collect bipolar process measurements in an X20 I/O station.

### Spike suppression

Use configured ramp limiting and filtering where the process permits the resulting response delay.

### Signed process signals

Convert positive and negative voltages with the correct controller scaling.

### Channel diagnostics

Distinguish disconnected or out-of-range inputs from normal conversion.

### System and supply context

B&R X20AI4222 operates within the following defined system context. Verify X20AI4222 and all four channel assignments.

### Application boundary

The applications below describe its technical role. Select associated hardware and configuration for the actual installation.

### Does the ±30 V limit of X20AI4222 extend its calibrated measurement range?

No. The measurement range is ±10 V. The maximum permissible signal must not be confused with the usable measuring range.

# X20AI4222

## 04 Engineering selection decisions

### Are the four inputs of X20AI4222 individually isolated?

No. The channels are isolated from the bus but not from each other; differential inputs do not imply independent galvanic isolation.

### What does the 400 µs conversion figure for X20AI4222 include?

It covers conversion of all four inputs. Digital filtering and communication timing can add further delay to the application value.

### What input impedance does X20AI4222 present in its measurement range?

The specified impedance is 20 megohms, which must be considered with the source and wiring arrangement.

### Can the digital input filter of X20AI4222 be used at every cycle time?

No. Its minimum cycle time must be greater than 500 µs; the filter is disabled at shorter cycle times.

| | |
|---|---|
| Check each input indication | Compare the input LEDs and software diagnostics with connected, open and out-of-range test conditions. Perform fault tests only in the approved process state. |
| Save the four-channel behavior | Retain the channel map, polarity, filter and ramp settings, diagnostics and measured response. Verify that the application receives the intended filtered signal before release. |

# X20AI4222

## 05 Configuration boundary and references

### Lifecycle and support

The current manufacturing and factory-support phase of X20AI4222 is unconfirmed. Apter Power availability is assessed separately from manufacturer lifecycle status.

### Replacement assessment

Retain the differential wiring, source common mode, bus module, terminal block and filter settings when replacing the four-input module.

### Document roles

Use the original manufacturer excerpt for its preserved technical tables and drawings. This product brief explains selection and system context. The separate installation guide covers preparation, connection, tests and handover; use it together with the applicable manufacturer instructions.

### Technical basis

B&R X20AI4222 Data Sheet, V1.30.

### Related product navigation

- B&R X20SC0842
- B&R X20CP1584

These are related references, not confirmed substitutes or an automatically approved assembly.

Product enquiries