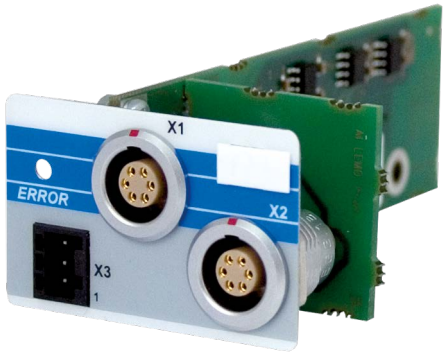
# AI Insertable Module
# MSR 221




This analog input module is used to record voltages in the range of ±10 V. The module has two channels, each with a short-circuit proof reference voltage of 10 V. In addition, each channel has a 24 V supply voltage.

On the diagnostic connector, the processed input signals can be measured. The signal in the diagnostic connectors can only be used for diagnostic purposes and cannot be calibrated.

## Analog Channel Specifications

| | |
|---|---|
| Number of channels | 2 |
| Measurement range [Volt] | ±10 V |
| Measurement range [Digit] | -100.000 ... +100.000 in 0.1 mV increments<br>an open input returns 999.999 (sensor break detection) |
| Resolution [Volt] | 333.3 µV/LSB |
| Resolution [bits] | 16 |
| Sensor break detection | 10 MΩ between AI- and −15 V<br>10 MΩ between AI+ and +15 V |
| Conversion time per channel | ≤ 25 µs |
| Common mode range | ±12 V |
| Input resistance | > 1 MΩ |
| Analog channel accuracy from end value 0 °C ... 60 °C | typically ±0.0205 % |
| Status display | ERROR (red) (located on the base) |
| Converter | 18-bit serial SAR |
| Galvanic isolation | 500 V DC |

## Analog Channel Accuracy

| | | |
|---|---|---|
| Integral non-linearity error | typically ±0.006 % | maximum ±0.01 % |
| Noise voltage | typically ±0.01 %<br>≙300 µV rms | maximum ±0.015 %<br>≙450 µV rms |
| Temperature drift<br>0 ... +60 °C | typically ±0.002 % | maximum ±0.01 % |
| Cross talk from previous channel<br>−10 ... +10 V | typically ±0.0025 % | maximum ±0.0035 % |
| Total error | typically ±0.0205 % | maximum ±0.0385 % |
| Long-term drift 1000 h | typically ±0.006 % | |

## Reference Output

| | | |
|---|---|---|
| Rated voltage 25 °C | +10,000 V | |
| Initial accuracy 25 °C | typically ±0.01 % | maximum ±0.05 % |
| Temperature drift<br>0 ... +60 °C | typically ±0.01 % | maximum ±0.03 % |
| Total error 0 ... +60 °C | typically ±0.02 % | maximum ±0.08 % |
| Additional error with load<br>0 ... 1 mA<br>0 ... 10 mA | typically ±0.001 %<br>typically ±0.015 % | |
| Long-term drift 1000 h | typically ±0.005 % | |
| Maximum load (per channel) | 10 mA<br>short-circuit proof | |

## Supply Voltage 0 ... +60 °C

| | |
|---|---|
| Output voltage | +23.343 V ... 24.330 V ... 25.127 V |
| Output current/channel | maximum 100 mA<br>short-circuit proof |
| Total current/base module | maximum 800 mA |
| Galvanic isolation | 500 V DC |

## Diagnostic Connector

| | |
|---|---|
| Voltage range | ±5 V |
| Load capacity | 10 mA |
| Short-circuit proof | yes |

## Article Number and Miscellaneous

| | |
|---|---|
| Article number | 18-001-221 |
| Hardware version | 2.x |

## Environmental Conditions

| | | | |
|---|---|---|---|
| | Storage temperature | -30 ... +85 °C | |
| | Operating temperature | 0 ... +60 °C | |
| | Humidity | 0-95 %, non-condensing | |
| | EMC stability | in accordance with EN 61000-6-2:2001 (industrial area) | |
| | Shock resistance | EN 60068-2-27 | 150 m/s² |
| | Protection type | EN 60529 | IP00 |

# Notes