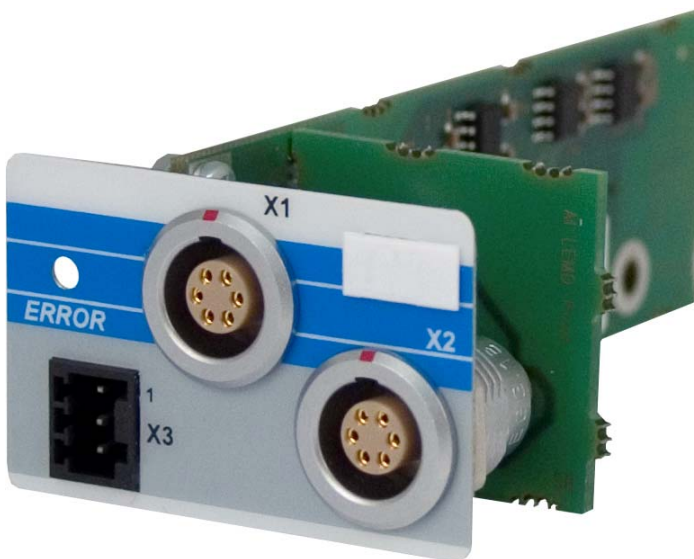


AI Insertable Module

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 are not calibratable.

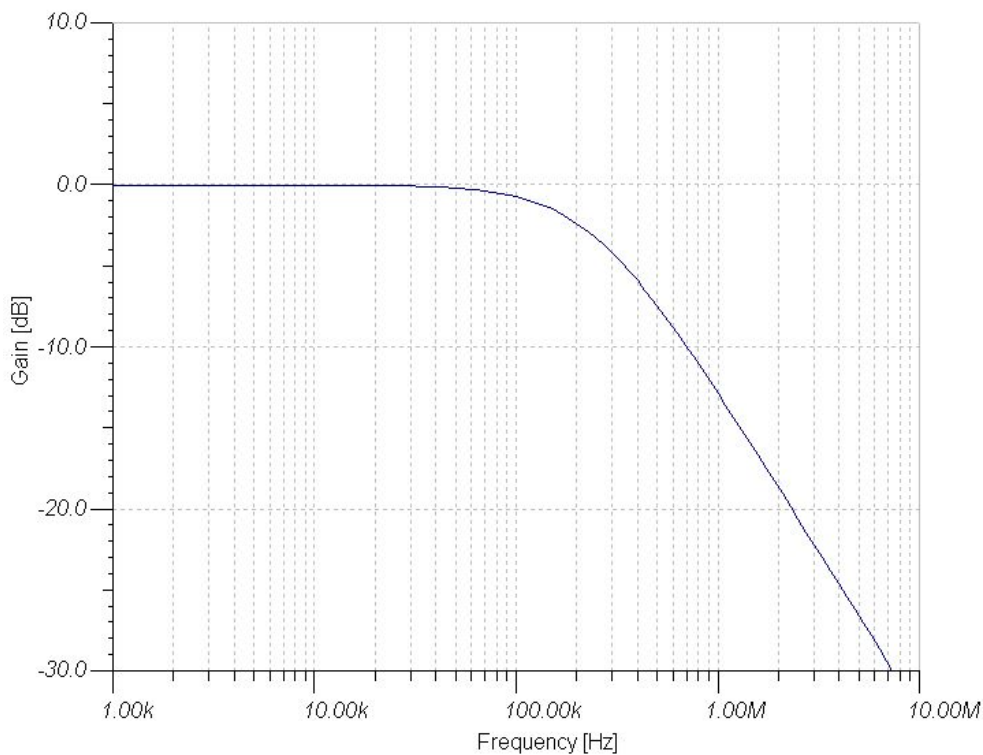
Technical Data

The following entries are valid in conjunction with the base module.

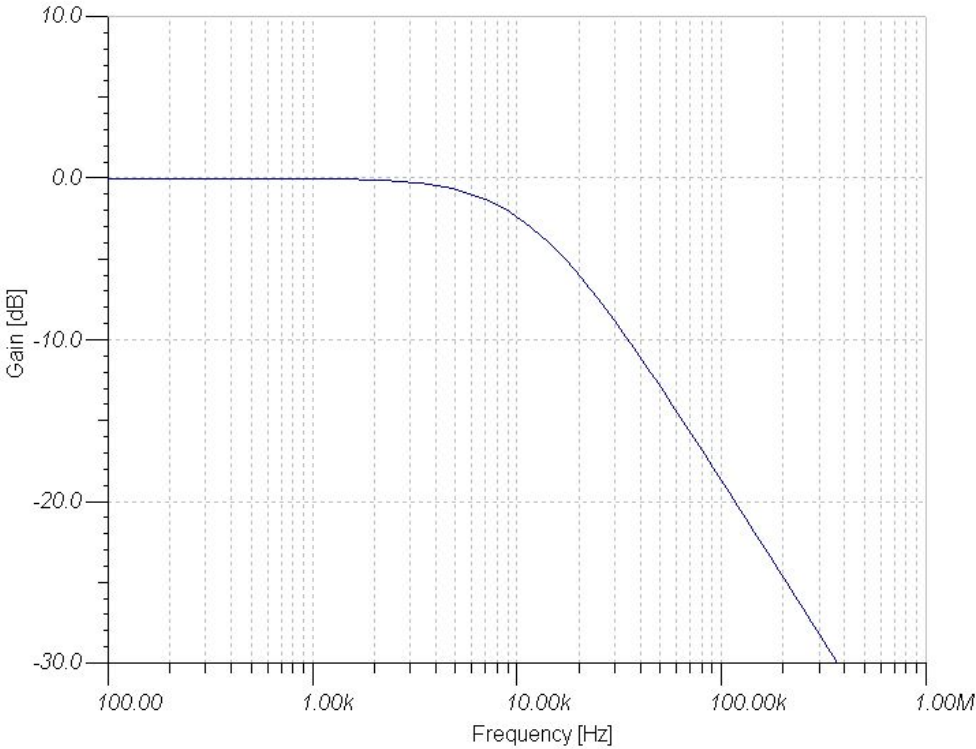
Analog channel specifications

Number of channels	2
Measurement range [Volt]	$\pm 10 \text{ V}$
Measurement range [Digit]	- 100.000 ... + 100.000 in 0.1 mV increments An open input returns 999.999 (sensor break detection)
Resolution [Volt]	333.3 μV / LSB
Resolution [Bit]	16
Sensor break detection	10 M Ω between AI- and -15 V 10 M Ω between AI+ und +15 V
Conversion time per channel	$\leq 25 \text{ }\mu\text{s}$
Common mode range	$\pm 12 \text{ V}$
Input resistance	$> 1 \text{ M}\Omega$
Analog channel accuracy from end value 0 °C ... 60 °C	Typically $\pm 0.0205\%$
Status display	ERROR (red) (located on the base)
Converter	18-bit Serial SAR
Galvanic isolation	500 V DC

Input Filter Characteristics



Typical common mode frequency response



Typical differential mode frequency response

Analog channel accuracy

Integral nonlinearity error	Typically $\pm 0.006\%$	Maximum $\pm 0.01V$
Noise voltage	Typically $\pm 0.01\%$ $\triangleq 300\mu V$ rms	Maximum $\pm 0.015\%$ $\triangleq 450\mu V$ rms
Temperature drift 0°C ... 60°C	Typically $\pm 0.002\%$	Maximum $\pm 0.01\%$
Cross talk from previous channel -10 to 10V	Typically $\pm 0.0025\%$	Maximum $\pm 0.0035\%$
Total error	Typically $\pm 0.0205\%$	Maximum $\pm 0.0385\%$
Long-term drift 1000h	Typically $\pm 0.006\%$	

Reference output

Rated voltage 25°C	+10.000 V	
Initial accuracy 25°C	Typically $\pm 0.01\%$	Maximum $\pm 0.05\%$
Temperature drift 0°C ... 60°C	Typically $\pm 0.01\%$	Maximum $\pm 0.03\%$
Total error 0°C ... 60°C	Typically $\pm 0.02\%$	Maximum $\pm 0.08\%$
Additional error with load 0 ... 1mA 0 ... 10mA	Typically $\pm 0.001\%$ Typically $\pm 0.015\%$	
Long-term drift 1000h	Typically $\pm 0.005\%$	
Maximum load (per channel)	10mA short-circuit proof	

Supply voltage

0 ... 60°C

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

Guidelines for using the Supply Voltage Outputs

When using sensors, the following switching sequence is recommended:
Activate the sensors sequentially with an offset of 100 ms.

Diagnostic connector

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

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 %, uncondensed	
EMV stability	According to EN 61000-6-2:2001 (industrial area)	
Shock resistance	EN 60068-2-27	150 m/s ²
Protection Type	EN 60529	IP 00

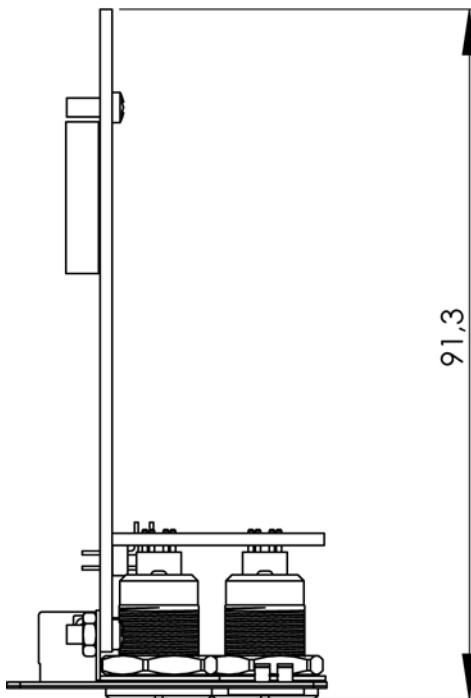
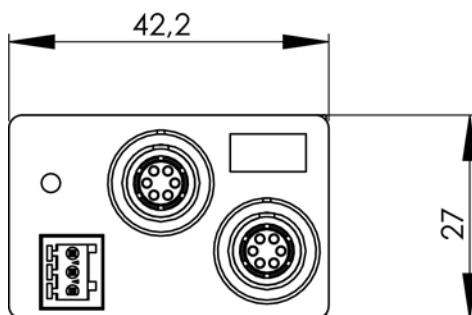
CAUTION:

To ensure the accuracy of the card over a long period of time, annual calibration is necessary to compensate for component aging. This can be in the form of a factory setting or calibration.

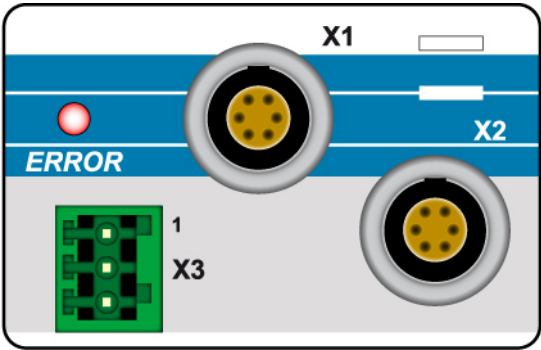
If the aging of the card does not have a significant influence on the application, the annual calibration does not have to be performed. However, Sigmatek then no longer guarantees the specified accuracy.

Also, a minimum warm-up phase of 10 minutes is to be expected!

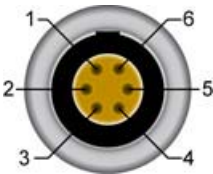
Mechanical Dimensions



Connector Layout

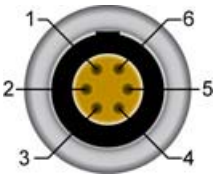


X1: AI 1
Lemo 6-pin (EGG.1B.306.CLN)



Pin	Function
1	Analog input 1+
2	Analog input 1-
3	+10 V-reference
4	AGND
5	+24 V power supply
6	GND

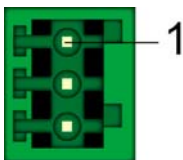
X2: AI 2
Lemo 6-pin (EGG.1B.306.CLN)



Pin	Function
1	Analog input 2+
2	Analog input 2-
3	+10 V-reference
4	AGND
5	+24 V power supply
6	GND

X3: Diagnostic

Phoenix 3-pin (MC0,5/3-G-2,5THT)



Pin	Function
1	Analog input 1
2	Analog input 2
3	AGND

Applicable connectors

X1 - X2: LEMO FGG.1B.306.CLADxx

X3: PHOENIX FK-MC 0,5/3-ST-2,5

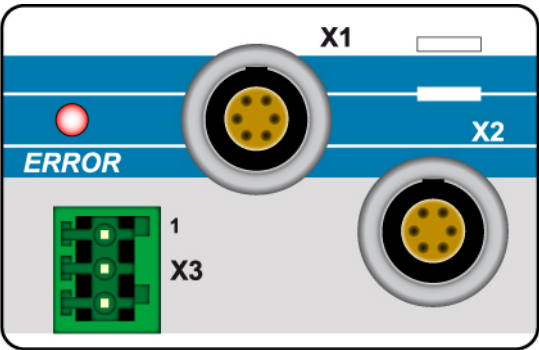
Applicable connection marker



Weidmüller MultiFit MF 10/5 MC CABUR

Order number: 1854510000

Status display



LED number	LED color	Definition
1	RED	Over current or short in the 24 V voltage supply

Wiring Guidelines

The signals recorded by the analog modules are very small, as compared to the digital signals. To ensure error-free operation, a careful wiring method must be followed:

- The 0 V connection of the supply voltage must be connected with the 0 V assembly point over the shortest route possible.
- The lines connected to the inputs of the analog signals must be as short as possible and parallel wiring to digital signal lines must be avoided.
- The signal lines should be 2, 3 or 4-pin shielded wires.
- If the analog ground of the sensor and AI module are not connected, the noise voltage increases significantly.

