

AIC214 Vibration Sensor Input Module

The AIC214 module of the Bachmann automation system offers a vibration monitoring solution that can be fully integrated with the control system. The AIC214 can provide up to 12 channels of ICP®/IEPE enabled vibration inputs for high resolution, simultaneous monitoring. Up to 3 of these channels can be used as general analog inputs for ±10 V voltages. 2 counter channels are provided for speed inputs, or alternatively as a single differential encoder, giving speed, position, direction of rotation and phase within a single measurement.

Independent signal sampling and processing of each channel ensures that sampling at up to 51.2 kHz is maintained. The upgrade from the AIC212 gives a greater dynamic range and introduces variable gains to accommodate the low signal levels from slow-moving parts. Each channel contains a ring buffer so that continuous values for bandpass filtered overall vibration (as acceleration or velocity) are available, each configurable with up to 3 alarm levels. Rotational speed is also stored directly in this buffer, which is timestamped. Routine monitoring data is obtained by copying this buffer under defined operating conditions, and/or on an alarm firing.

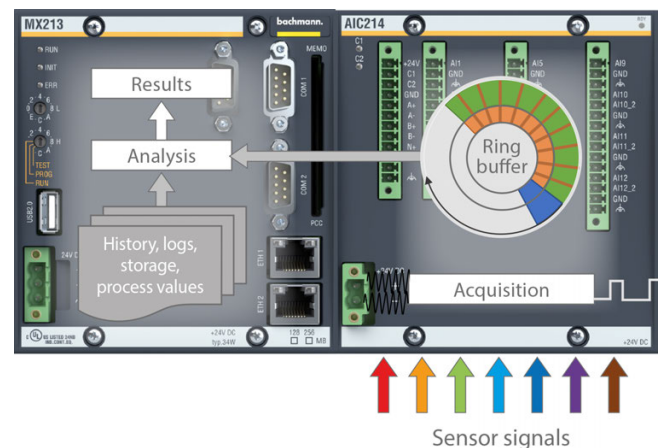
Integration with the M200 system means that values are available from any signal in the control system, or via field bus (e.g. Profibus; Modbus). Similarly, vibration values are available as variables within the cycles of the controller programs. The system is expandable simply by adding modules, either for further vibration channels or other input types.

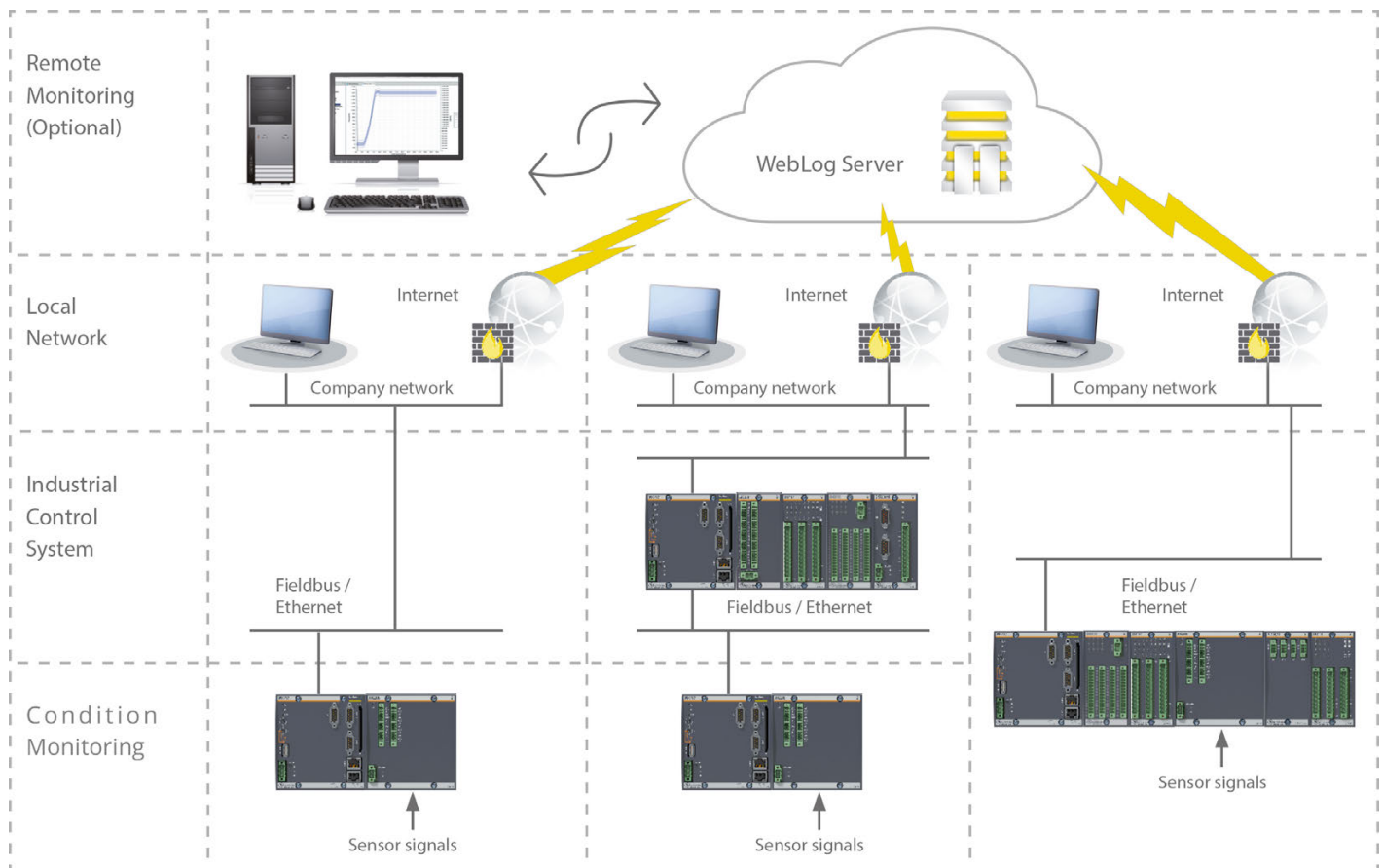
As an M200 standard module, the AIC214 can be implemented either as a “stand-alone” condition monitoring system or incorporated into the various remote or distributed configurations possible with the Bachmann automation system.



Part type designation	Part number
AIC214	00028808-00
AIC214 CC	00028811-00 ¹⁾

¹⁾ On request





The use of M200 CPUs allows this CMS to benefit from pre-existing communication and service interfaces, which reduces the start-up and maintenance costs.

The AIC214 system concept allows a free design of the condition monitoring software to the requirements of a specific application.

12 analog inputs with IEPE interface for piezo vibration sensors:

- Channels 10-12 can be used as an analog input of $\pm 10\text{ V}$
- Analog inputs individually configurable for sensitivity
- 24 bit A-D Resolution with a dynamic range $\geq 96\text{ dB}$
- Adjustable sampling rate up to 51.2kHz
- Adjustable analog and digital filtering
- Full evaluation of frequency band RMS amplitudes as acceleration and velocity values available on channels 1-8, e.g. as per ISO 10816-21
- High-speed ring buffer directly on the module
- Configurable threshold levels can be used to generate alarm signals
- Events due to alarm triggering send interrupts to the processor with a $1\ \mu\text{s}$ response

2 counter channels:

- Position detection (incremental encoder input)
- Rotary encoder signal sampled synchronously
- Suitable for embedding in M200 plant management system or as an autonomous CMS
- Up to 4 AIC214 modules can be used in sync per M200 system
- Any signals from other modules or calculated variables can be used to trigger data storage via the M200 controller
- Analyses can be designed to individual requirements
- Broad range of implementation tools (C, C++) on the realtime operating system VxWorks®
- Synergy by using fieldbus and service communication
- Local storage in CPU Module Memory Card

AIC214

Analog inputs	IEPE	±10 V
Channels	AI1 – AI12	AI10 – AI12
Input voltage	IEPE standard (0 V to 24 V)	±10 V
A-D conversion; dynamic range	24 bit; ≥ 96 dB	
Ring buffer	512MB → 67 million samples	
Measuring range	AC-coupled ±6 V	±10 V
Input impedance	10 kΩ	> 1 MΩ
Current source for IEPE inputs	< 5 mA/channel	–
Sample rate / bandwidth	51.2 kHz / 0.1 Hz to 21.8 kHz (-3 dB) 25.6 kHz / 0.1 Hz to 11.1 kHz (-3 dB) 12.8 kHz / 0.1 Hz to 5.53 kHz (-3 dB) 6.4 kHz / 0.1 Hz to 2.76 kHz (-3 dB) 3.2 kHz / 0.1 Hz to 1.38 kHz (-3 dB) 1.6 kHz / 0.1 Hz to 690 Hz (-3 dB) 0.8 kHz / 0.1 Hz to 345 Hz (-3 dB) 0.4 kHz / 0.1 Hz to 173 Hz (-3 dB) 0.2 kHz / 0.1 Hz to 86 Hz (-3 dB) 0.1 kHz / 0.1 Hz to 43 Hz (-3 dB)	
Full scale error at +25 °C	±0.1 %	
Error detection	IEPE: Bias voltage outside expected range; open channel (cable break)	
Overvoltage protection	-15 V to +36 V	
Incremental encoder input / counter inputs		
Interface	Optional: Either 2 counter inputs or one encoder	
	24 V initiator / proximity switch	Incremental Encoder
Number of channels	2	1
Input signals	CNT1, CNT2	A-, A+, B-, B+, N-, N+
Evaluation	For positive edge at the counter input	1- / 2- / 4-fold edge evaluation or pulse direction mode
Count direction	Switchable via digital input or software	A/B sequence or pulse direction
Indication	Yes, green LED per channel	No
Count frequency	5 kHz	100 kHz ≤ 400 kHz at quadruple evaluation
Minimum pulse duration	≥ 100 μs	–
Filter frequency	On/Off and adjustable 287 Hz to 73 kHz	–
Error detection	Noise pulse	Phase error
Measurement resolution	32 bit	
Input level	HTL (24 V) / 10 mA sink	
Supply	External	Internal
Reverse polarity protection	Yes	–
Input voltage	Power supply 24 V (18 V to 34 V)	Via BS2xx backplane
Current consumption	210 mA (at +24 V DC) incl. ∑ current consumption of sensors (4.1 mA per sensor)	280 mA

Environmental conditions	
Operating temperature	-30 °C to +60 °C
Relative humidity, operation	5 % to 95 % noncondensing
Storage temperature	-40 °C to +85 °C
Relative humidity, storage	5 % to 95 % with condensation
Approvals/Certificates	
General	CE, UKCA, cULus
Maritime	ABS, BV, DNV, KR, LR, NK, RINA

Order data

Part type designation	Part number	Description
AIC214	00028808-00	Analog measuring module for Condition Monitoring; 9x Input IEPE; 3x Input IEPE $\pm 10V$; 24 bit; 0.1 %; >96 dB dynamic range; 20 μs sampling time; 1x INC HTL; 400 kHz; A,A/B/N; 512 MB measured data ring buffer; real time continuous output of values
AIC214 CC	00028811-00 ¹⁾	Same as AIC214; ColdClimate ❄

¹⁾ On request

Accessories

Part type designation	Part number	Description
KZ-AIC214 B+C	00031066-00	Terminal set Phoenix cage clamp (1x KZ 51/02; 3x KZ 35/12; 1x KZ 35/15) with labeling strips + keying elements