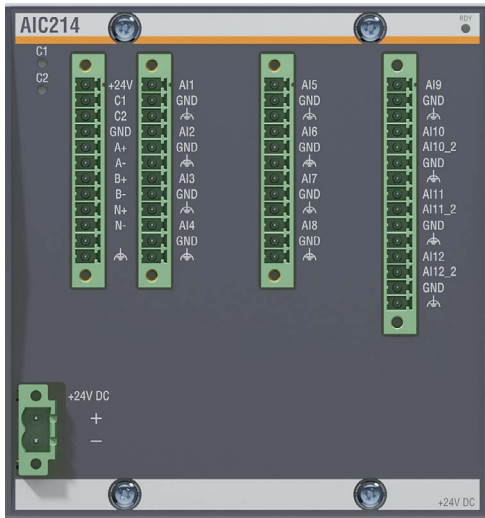


Condition Monitoring



AIC214 Vibration Sensor Input Module

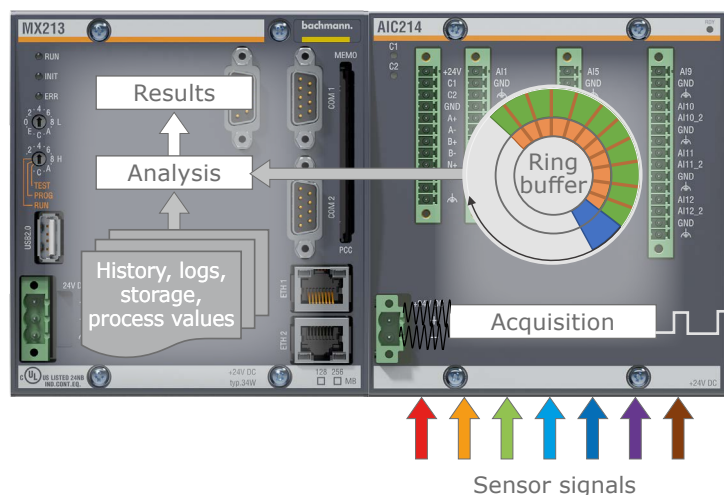
The AIC214 module offers a vibration monitoring solution that can be fully integrated with the control system. The AIC214 can provide up to 12 channels of ICP®/IEPE enabled vibration inputs for high resolution, simultaneous monitoring. Up to 3 of these channels may be utilised as general analog input modules for voltages between ± 10 V. Two counter channels are available 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 three 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.

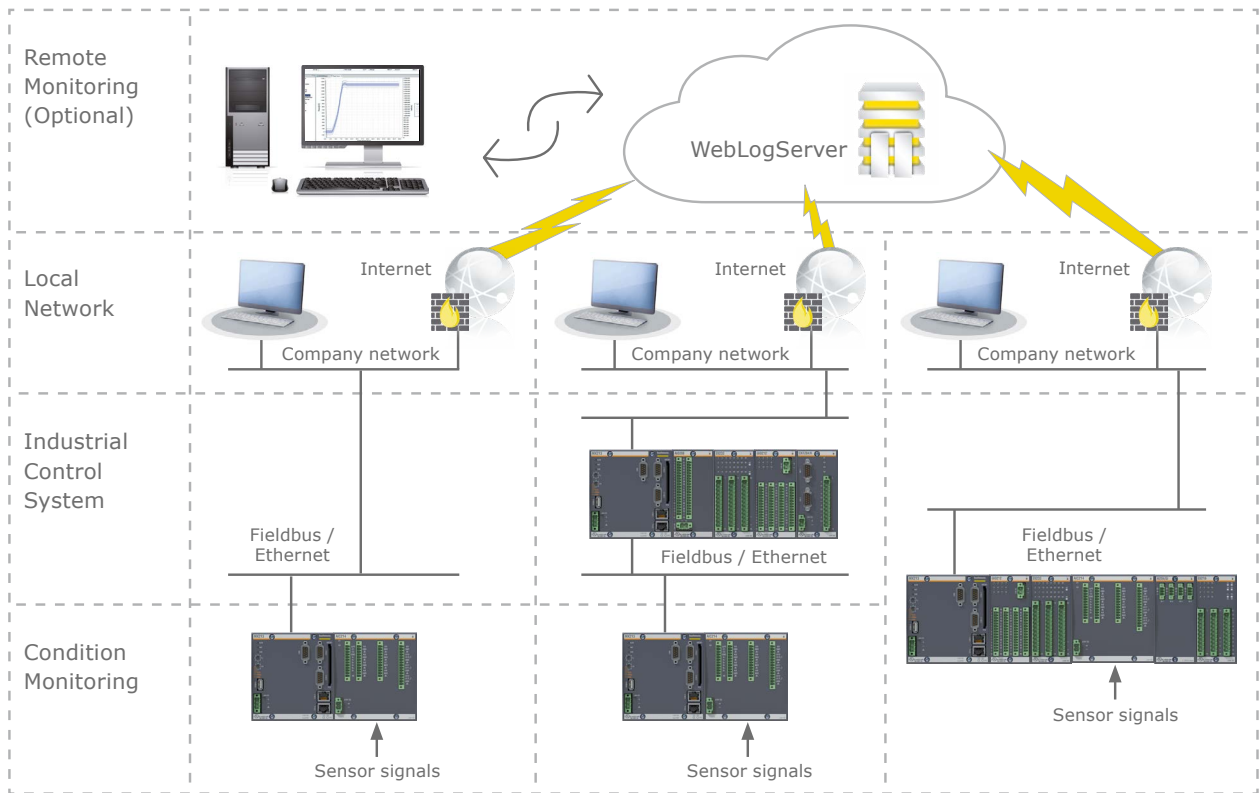
Integration with the M1 system means that values are available from any signal in the control system, or via field bus (e.g. Modbus; Profinet). Similarly, vibration values are available as variables within the cycles of the controller programs. The system is expandable simply by adding modules, either for further vibration channels or other input types.

Item	Item no.
AIC214	00028808-00
AIC214 CC	00028811-00*

* on request



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As an M1 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. The use of M1 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 51.2 kHz
- 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 M1 plant management system or as an autonomous CMS
- Up to four AIC214 modules can operate in one system simultaneously
- Any signals from other modules or calculated variables can be used to trigger data storage via the M1
- Analyses can be designed to individual requirements
- Broad range of implementation tools (C, C++) on the real-time operating system VxWorks®
- Synergy by using fieldbus and service communication
- Local storage in CPU module memory card

Condition Monitoring

AIC214

Analog Inputs		
	IEPE	±10 V
Channels	AI1 – AI12	AI10 – AI12
Input voltage	IEPE standard (0 to 24 V)	±10 V
A-D conversion; dynamic range	24 bit; ≥ 96 dB	
Ring buffer	512 MB -> 67 million samples	
Measurement range	AC-coupled ±6 V	±10 V
Input impedance	10 kΩ	> 1 MΩ
Current source for IEPE channels	< 5 mA / channel	-
Sample rate / Bandwidth	51.2 kHz / 0.1 Hz bis 21.8 kHz (-3 dB) 25.6 kHz / 0.1 Hz bis 11.1 kHz (-3 dB) 12.8 kHz / 0.1 Hz bis 5.53 kHz (-3 dB) 6.4 kHz / 0.1 Hz bis 2.76 kHz (-3 dB) 3.2 kHz / 0.1 Hz bis 1.38 kHz (-3 dB) 1.6 kHz / 0.1 Hz bis 690 Hz (-3 dB) 0.8 kHz / 0.1 Hz bis 345 Hz (-3 dB) 0.4 kHz / 0.1 Hz bis 173 Hz (-3 dB) 0.2 kHz / 0.1 Hz bis 86 Hz (-3 dB) 0.1 kHz / 0.1 Hz bis 43 Hz (-3 dB)	
Full scale error at +25 °C	±0.1 %	
Error detection	IEPE: Bias voltage outside expected range; open channel (cable breakage)	
Over voltage protection	-15 to +36 V	

Incremental Counter and Encoder Inputs

Incremental Counter and Encoder Inputs		
Interface	Optional: Either 2 counter inputs or one encoder	
	24 V Initiator/Proximity switch	Incremental encoder
Number of channels	2	1
Input signal	CNT1, CNT2	A-, A+, B-, B+, N-, N+
Analysis	On rising edge	1,2,4-fold edge evaluation or pulse direction mode
Count direction	Switchable via digital input or software	A/B sequence or pulse direction
Indicator	Yes, green LED per channel	No
Count frequency	5 kHz	100 kHz ≤ 400 kHz at 4-fold edge evaluation
Minimum pulse duration	≥ 100 μs	-
Filter frequency	On/Off and adjustable 287 Hz up to 73 kHz	-
Fault recognition	Spikes	Phase loss
Measurement resolution	32 bit	
Signal level	HTL (24 V) with 10 mA sink	

Condition Monitoring

AIC214		
Power Supply	External	Internal
Reverse polarity protection	Yes	-
Input voltage	Power supply 24 V (18 to 34 V)	Via backplane BS2xx
Current consumption	210 mA (at +24 VDC) incl. Σ current consumption of sensors (4.1 mA per sensor)	280 mA
Ambient conditions		
Operating temperature	-30 to +60 °C	
Rel. humidity operation	5 to 95 % without condensation	
Storage temperature	-40 to +85 °C	
Rel. humidity storage	5 to 95 % with condensation	
Approvals / Certificates		
General	CE, UL/cUL, CCC	
Maritime	DNV/GL, LR, ABS, BV	

Order codes AIC214		
Item	Item no.	Description
AIC214	00028808-00	Analog measuring module for Condition Monitoring; 9x Input IEPE; 3x Input IEPE /±10V; 24bit; 0.1%; >96dB dynamic range; 20µs sample time; 1x INC HTL; 400kHz; A,A/B/N; 512MB measured data ring buffer; real-time continuous output of values
AIC214 CC	00028811-00*	Like AIC214; ColdClimate (✱)
Accessories		
KZ-AIC214 B+C	00031066-00	Terminal set Phoenix cage clamp (1x KZ 51/02; 3x KZ 35/12; 1x KZ 35/15) with labelling strips and coding elements

*on request