



# Product Specifications

## VC-6000 Monitoring System Monitoring Module – SM-610-115 10x Vibration Channels, 10x Relays

The VC-6000 Monitoring System hardware is used for both stand-alone safety monitoring and condition monitoring using the Compass 6000 monitoring software modules and database. The VC-6000 offers various standard monitoring modules, power supply modules and communication modules. These Product Specifications describe the SM-610-115.

### Applications

The SM-610 series of VC-6000 Monitoring Modules are designed to provide protective monitoring of various types of industrial machines. The SM-610-115 is specifically designed for monitoring AC/DC vibration of a machine train with up to five rolling-element and/or journal bearing supports.

### General Description

The features and functions common to all SM-610 Monitoring Modules are briefly listed below. Please refer to the VC-6000 Product Specifications (BPS 0044) for more information.

- Interfacing with the CI-6xx Communication Modules
- High speed digital signal processor
- Relay outputs (logic controlled)
- OK-relay status indication
- Extensive local LED indication
- Flash memory for storing settings and local logbook
- High speed reaction time - 10ms
- Alarm limits with programmable hysteresis and response delay time
- Global trip multiply and override
- Extensive self-monitoring functions
- System bus interface to other modules
- Buffered vibration outputs



### Inputs

- 10x vibration signals – up to 5x dual-point measurement
- 6x binary input signals

### Outputs

- 10x relays (5x Alert, 5x Danger) – 1-out-of-2 voting logic

### Measurements

- Up to 10x bandpass (ISO 7919 or ISO 10816)
- Up to 5x  $S_{max}$  or Max(X-Y)



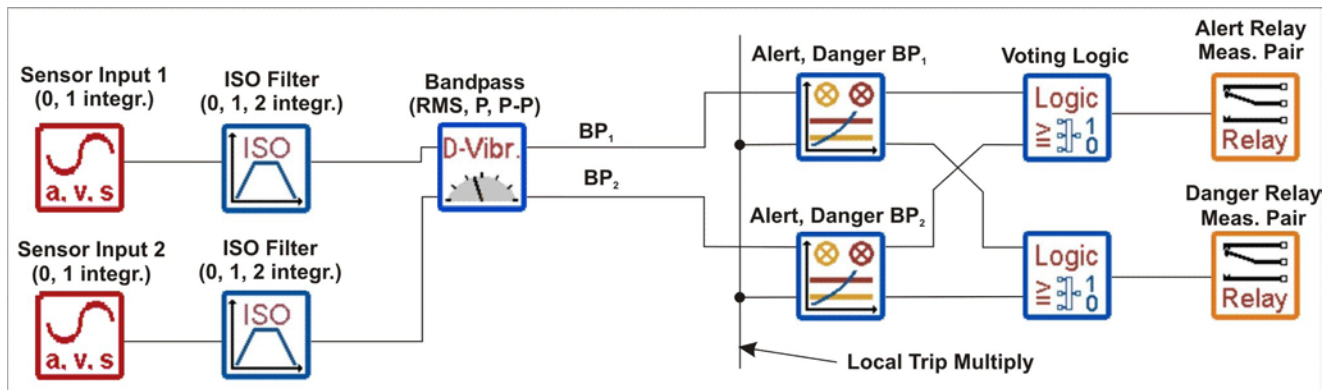


Figure 2. Two single-point AC/DC vibration inputs can alternatively be set up from a dual-point measurement (up to 10 channels). Separate 1-out-of-2 voting logic for Alert and Danger relay control.

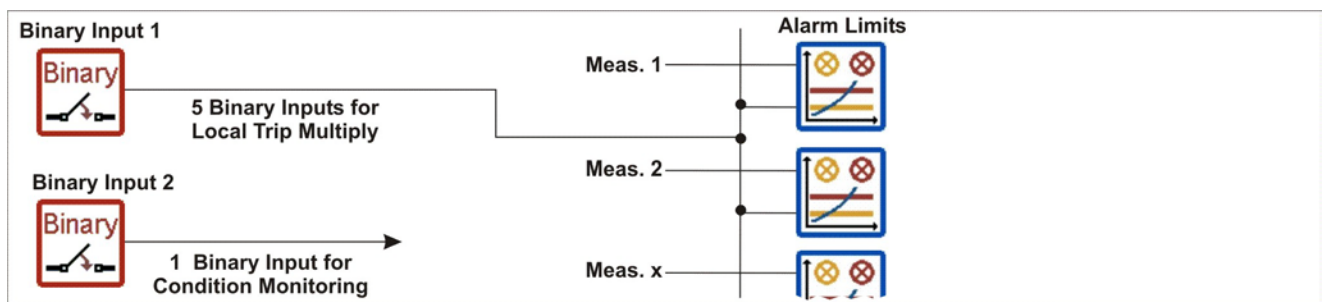


Figure 3. Binary input (6 channels – 5x for local trip multiply of all measurement alarm limits, 1x for condition monitoring purposes).

## Technical Specifications

The specifications given below are specific for the SM-610-115 Monitoring Module. See the VC-6000 Product Specifications for features and functions common to all SM-610 Monitoring modules.

### AC/DC Vibration Sensor Inputs

Input voltage range ..... -21.5 to -1V

#### Input frequency range:

Accelerometer/velocity sensor ..... 0.6Hz to 20kHz  
 Displacement sensor ..... DC to 20kHz

#### Input impedance:

Accelerometer ..... >800kΩ  
 Velocity sensor ..... 50kΩ  
 Displacement sensor ..... >800kΩ

#### Gain:

Accelerometer:  
 No integration ..... 1 to 80 (±0.75%)  
 Analogue integration ..... 1 to 80 (±2.75%)

Velocity sensor ..... 1 to 80 (±0.75%)  
 Displacement sensor ..... 1 (±0.75%)

#### Sensitivity:

Accelerometer ..... adjustable (typ. 100 or 10mV/g)  
 Velocity sensor . adjustable (typically 100mV/mm/s)  
 Displacement sensor ..... adjustable (typ. 8mV/μm)

#### Common mode rejection:

DC to 30kHz ..... typically 90dB  
 30kHz to 100kHz ..... typically 85dB

#### Maximum accelerometer input signal (100mV/g):

No integration ..... 1.25 to 80g peak  
 Analogue integration ..... 12.5 to 150mm/s peak

#### Sensor power:

Sensor supply ..... -24VDC ±2%  
 Maximum current ..... 30mA

**Binary Inputs**

Input impedance .....3.3kΩ  
 Response time ..... 5ms  
 Minimum current load .....5mA  
 Maximum contact voltage .....±50V

*Signal status LOW:*

Nominal input voltage ..... 0V  
 Input voltage range .....-50 to 6.6V  
 Maximum input current .....2mA

*Signal status HIGH:*

Nominal input voltage .....24V  
 Input voltage range .....16.5 to 50V  
 Maximum input current .....5mA

**Buffered Outputs**

Minimum output load .....100kΩ  
 Output gain .....1 (±2%)  
 Cross-talk..... typically -90dB (up to 50kHz)  
 Inherent noise (1Hz to 50kHz) .....typically 10mV RMS  
 Output impedance ..... <100Ω  
 Frequency range..... DC to 50kHz (phase shift <5%)  
 Output offset .....≤ ±13mV

**Relay Outputs**

Nominal working voltage.....24V  
 Maximum current ..... 100mA

**Measurements**

Meas. Name	Frequency Range	Measuring Time	Detection	Alarm Limits	Measuring Range	Units <sup>1</sup>	Accuracy (25°C, 80Hz, 0-Peak)
Bandpass (ISO 10816)	HP: 1 to 10Hz (-1dB) LP: 1kHz (-1dB) 18dB/Octave (ISO 2954)	Adjustable 100ms to 100s in steps of 100ms	RMS, Peak, Peak-peak	1x Alert, 1x Danger	80g	g	±(0.08g + 0.75% of measured value)
					150mm/s (1 integration <sup>2</sup> )	mm/s	±(0.6mm/s + 2.75% of measured value)
					100mm/s	mm/s	±(0.1mm/s + 0.75% of measured value)
Bandpass (ISO 7919)	HP: 1 to 10Hz (-1dB) LP: 1kHz (-1dB) 18dB/Octave (ISO 2954)	Adjustable 100ms to 100s in steps of 100ms	RMS, Peak, Peak-peak	1x Alert, 1x Danger	2000µm	µm	±(10.0µm + 1.0% of measured value)
S <sub>max</sub>	HP: 1 to 10Hz (-1dB) LP: 1kHz (-1dB) 18dB/Octave (ISO 2954)	Adjustable 100ms to 100s in steps of 100ms	Peak	1x Alert, 1x Danger	2000µm	µm	±(10.0µm + 1.0% of measured value)
X-Y <sub>max</sub>	HP: 1 to 10Hz (-1dB) LP: 1kHz (-1dB) 18dB/Octave (ISO 2954)	Adjustable 100ms to 100s in steps of 100ms	RMS, Peak, Peak-peak	1x Alert, 1x Danger	80g	g	±(0.08g + 0.75% of measured value)
					150mm/s (1 integration <sup>3</sup> )	mm/s	±(0.6mm/s + 2.75% of measured value)
					100mm/s	mm/s	±(0.1mm/s + 0.75% of measured value)
					2000µm	µm	±(10.0µm + 1.0% of measured value)

<sup>1</sup> Metric and imperial units can be used; Metric units are shown only as an example.

<sup>2</sup> One analogue integration is possible. An additional digital integration can be done but this will result in less accuracy.

<sup>3</sup> One analogue integration is possible.

*Brüel & Kjær Vibro reserves the right to change specifications without notice*

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**Brüel & Kjær Vibro A/S**  
2850 Nærum – Denmark  
Tel.: +45 7741 2500  
Fax: +45 4580 2937  
E-mail: [info@bkvibro.com](mailto:info@bkvibro.com)

**Brüel & Kjær Vibro GmbH**  
64293 Darmstadt – Germany  
Tel.: +49 (0) 6151 428 1100  
Fax: +49 (0) 6151 428 1200  
E-mail: [info@bkvibro.de](mailto:info@bkvibro.de)