Product Specifications

VC-6000 Monitoring System
Monitoring Module – SM-610-108
8x Vibration Channels, 8x DC Outputs, 8x 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-610-108.

Applications

The SM-610 series of VC-6000 Monitoring Modules are designed to provide protective monitoring of various types of industrial machines. The SM-610-108 is specifically designed for monitoring casing and/or shaft vibration of a machine with up to four 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

- 8x vibration signals – up to 4x dual-point measurements

Outputs

- Up to 8x analogue DC outputs
- 8x relays (4x Alert, 4x Danger) – 1-out-of-2 voting logic for single-point measurements

Measurements

- Up to 8x bandpass (ISO 7919 or ISO 10816)
- Up to 4x S_{max} or Max(X-Y)
- 8x DC static shaft position

Input Channel Configuration Combinations

No. of Inputs [1]	Monitoring Module – SM-610-108 8x Vibration Channels, 8x DC Outputs, 8x Relays																					
	Channel Types																		Additional Measurements			Relay's
	Dual-point Vibr.[2] (ISO)	DC-out	Single-point Vibr[2] (ISO)	DC-out	Axial Pos.	DC-out	Speed	DC-out	Rod Drop	DC-out	Rel. Exp.	DC-out	Eccentricity	DC-out	DC Input (Process, Absolute Exp)	DC-out	Bin. in	Vector[3]	BP	Tracking BP	
8	8	4	-	-																		
8	6	3	2	2																		
8	4	2	4	4																		2x 1oo2 for each Dual-point
8	2	1	6	6																		
8	-	-	8	8																		
	[1] The number of input signals is the sum total of the channels shown in yellow. [2] Dual-point measurements can alternatively be set up as single-point measurements.																					

[1] The number of input signals is the sum total of the channels shown in yellow.

[2] Dual-point measurements can alternatively be set up as single-point measurements.
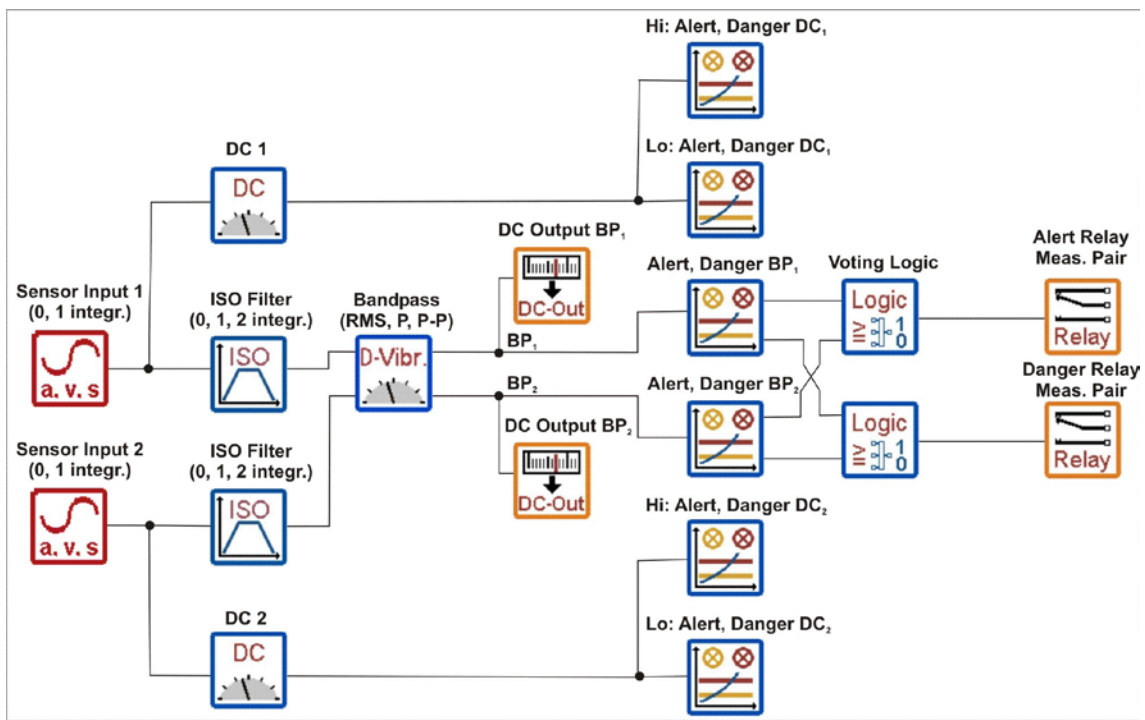
Signal Flow Diagrams

Figure 1. Single-point AC/DC vibration inputs (up to 8 channels). Separate 1-out-of-2 voting logic is used for bandpass measurements for Alert and Danger relay control.
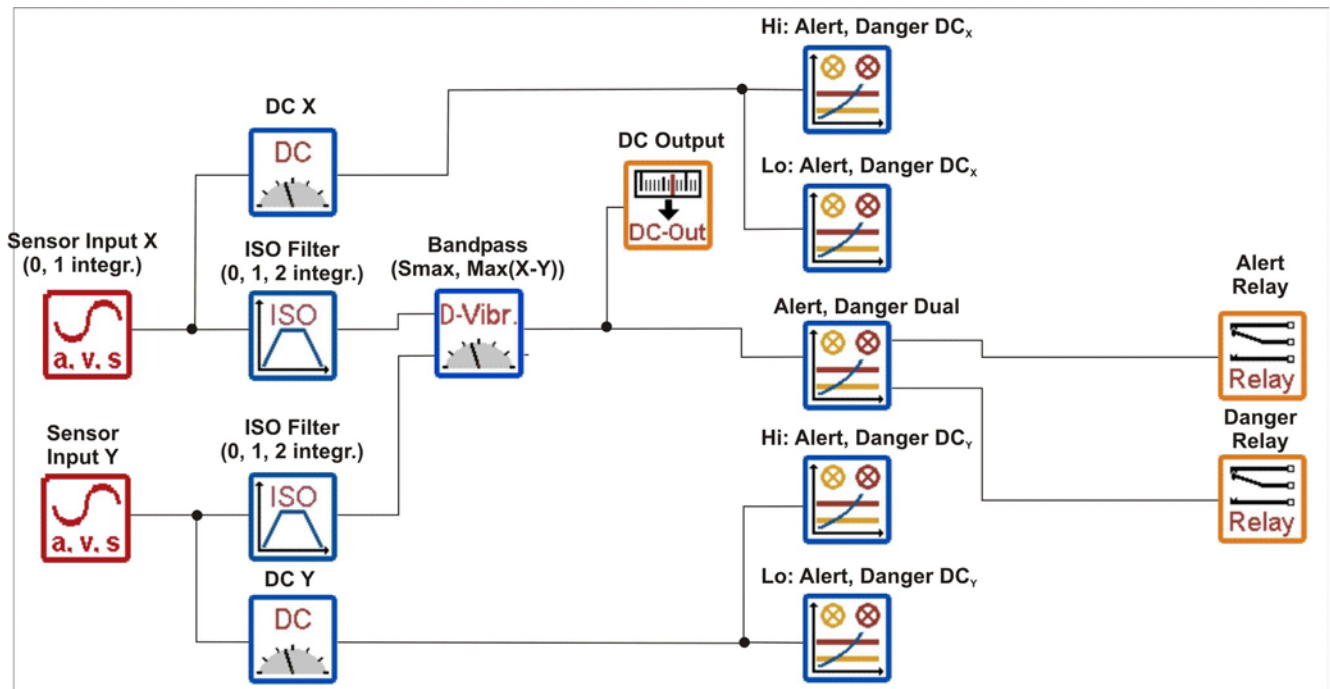
Figure 2. A dual-point AC/DC vibration input can alternatively be set up from two single-point AC/DC vibration inputs (Figure 1). There can be up to 8 channels – 4 pairs. 2 relays per measurement pair.

Technical Specifications

The specifications given below are specific for the SM-610-108 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 ($\pm$0.75%)
        Analogue integration.................1 to 80 ($\pm$2.75%)
    Velocity sensor ....1 to 80 ($\pm$0.75%)
    Displacement sensor ....1 ($\pm$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 $\pm$2%
    Maximum current..30mA

Buffered Outputs

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

Product Specifications - VC-6000 Monitoring Module – SM-610-108

Analogue DC Outputs

Current output:
    Current range.................... 4 to 20mA or 0 to 20mA
    Maximum output load 500Ω
    Accuracy .... <2.4% of measured value
    Offset ....<20μA

Voltage output:
    Voltage range .... 0 to 10V or 2 to 10V
    Minimum output load 1kΩ
    Accuracy .... <1.3% of measured value
    Offset ....<9.5mV

Relay Outputs

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

Measurements

Meas. Name	Frequency Range	Measuring Time	Detection	Alarm Limits	Measuring Range	Units[1]	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[2])	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_{max}	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)
$X-Y_{max}$	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[3])	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)
DC (static shaft position)	-	Adjustable 10ms to 100s	-	2x Alert, 2x Danger	2mm	μm	±(2.0μm + 1.0% of measured value)

[1] Metric and imperial units can be used; Metric units are shown only as an example.

[2] One analogue integration is possible. An additional digital integration can be done but this will result in less accuracy.

[3] One analogue integration is possible.

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

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