



Product Specifications

VC-6000 Monitoring System

Monitoring Module – SM-610-139

4x Rod Drop, 4x Speed 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. This Product Specification describes the SM-610-139.

Applications

The SM-610 series of VC-6000 Monitoring Modules are designed to provide protective monitoring of various types of industrial machines. The SM-610-139 is specifically designed for monitoring rider ring wear of up to four cylinders of a reciprocating compressor.

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

- 4x rod drop sensor signals
- 4x speed/phase reference signals

Outputs

- 8x analogue DC outputs
- 8x relays (4x Alert, 4x Danger) – 1-out-of-4 voting logic

Measurements

- DC – 4x cyclic, 4x static shaft position
- 4x RPM

Input Channel Configuration Combinations

Monitoring Module – SM-610-139																					
4x Rod Drop, 4x Speed Channels, 8x DC Outputs, 8x Relays																					
No. of Inputs ¹	Channel Types															Additional Measurements		Relay's			
	Dual-point Vibr. ² (ISO)	DC-out	Single-point Vibr. (ISO)	DC-out	Axial Pos.	DC-out	Speed	DC-out	Rod Drop	DC-out ²	Rel. Exp.	DC-out	Eccentricity	DC-out	DC Input (Process, Absolute Exp)	DC-out	Bin. in		Vector ³	BP	Tracking BP
8						4		4	8												2x 1oo4 for each rod drop (CYDC & DC)
¹ The number of input signals is the sum total of the channels shown in yellow . ² 2x DC-out per Rod-Drop Channel: 1x CYDC and one 1x DC.																					

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

Signal Flow Diagrams

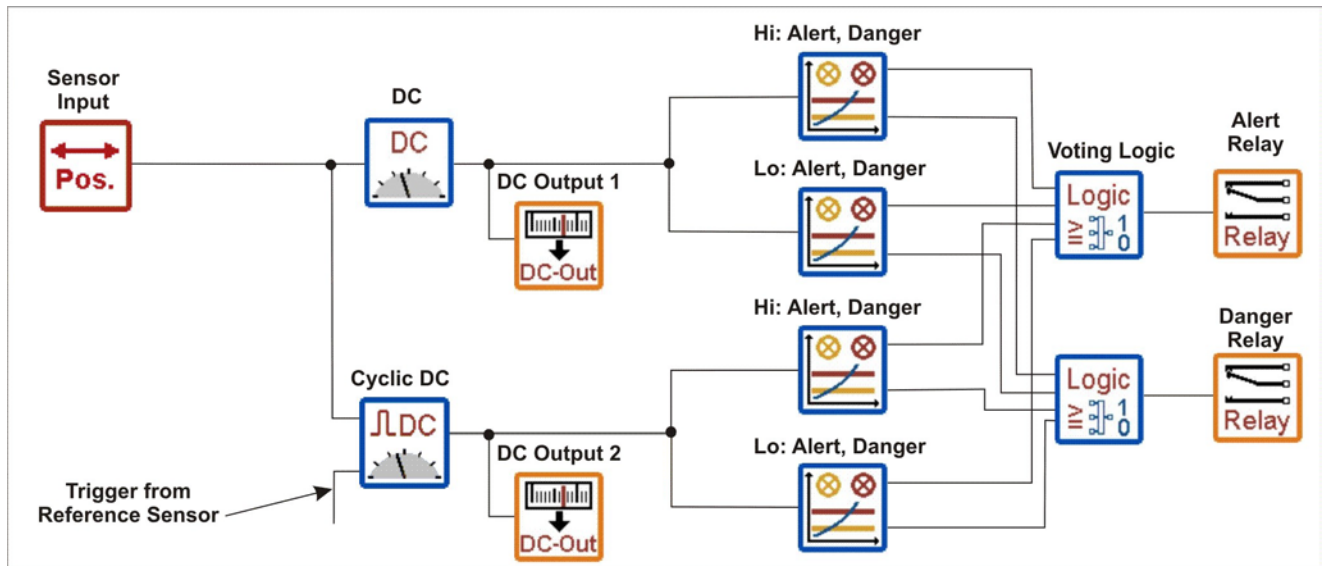


Figure 1. Rod drop input (4 channels). Separate 1-out-of-4 voting logic is used for Alert and Danger relay control.

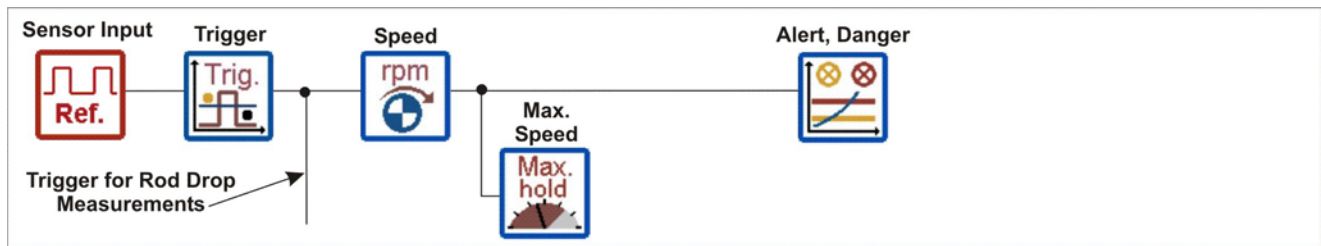


Figure 2. Speed/phase reference sensor input (4 channels).

Technical Specifications

The specifications given below are specific for the SM-610-139 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:

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

Common mode rejection:

DC to 30kHztypically 90dB
 30kHz to 100kHztypically 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

Speed/Phase Reference Sensor Inputs

Input voltage range.....-21.5 to -1V
 Input frequency range.....DC to 20kHz
 Input impedance>800kΩ
 Gain 1 (±0.75%)

Common mode rejection:

DC to 10kHz typically 90dB
 10kHz to 100kHz typically 85dB

Sensor power:

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

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

Analogue DC Outputs

Current output:

Current range 4 to 20mA or 0 to 20mA
 Maximum output load500Ω
 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, Peak)
DC (static shaft position)	-	Adjustable 10ms to 100s	-	2x Alert, 2x Danger	2mm	µm	±(2.0µm + 1.0% of measured value)
DC (cyclic)	-	Adjustable 10ms to 100s	-	2x Alert, 2x Danger	2mm	µm	±(2.0µm + 1.0% of measured value)
RPM (also Max. RPM)	Signal slope: +/- Trigger level ² (manual or automatic): -21.5 to -1V; adjustable in steps of 0.1V Hysteresis: 0 to 25; adjustable in steps of 0.1	Adjustable 10ms to 100s	RPM	1x Alert, 1x Danger	0.06 to > 1200000 RPM RPM multiplier and divider adjustable from 1 to 99999	RPM	Speed >10000rpm: ±0.01% of measured value Speed 100 to 10000 rpm: ±1 rpm Speed < 100 rpm: ±0.1 rpm (one pulse per revolution)

¹ User-defined units. Sensor input signal units indicated here

² Please refer to the sensor input for the allowed input signal.

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

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