

## DATASHEET

# VibSys® A01

Vibration monitoring system & cloud gateway

## VibSys A01

### Redefining vibration monitoring

VibSys A01 is a compact vibration monitoring system and cloud gateway that delivers reliable machine health insights for any rotating machine. It makes vibration data accessible and actionable through an open ecosystem, enabling predictive maintenance strategies and seamless integration into modern data systems.

A01 is the first release. It provides dependable hardware, consistent data, and a defined core feature set with a seamless Istec Sphere cloud platform connection. This allows early users to start now and expand capability through updates.

Additional firmware features will be released over time. These updates extend onboard data processing and automation capabilities, without requiring hardware replacement. These items are highlighted as 'future'.



## VIBRATION MONITORING FOR A WIDE RANGE OF APPLICATIONS

- Vibration monitoring on rotating equipment.
- Continuous acquisition, verified data, and advanced local signal processing for local alarms.
- Raw and processed data can be transferred onto the Istec Sphere cloud platform for further processing.
- Eliminating the need for inefficient and costly manual vibration measurement rounds.

Typical applications include:

- Balance of Plant (BoP)
- Pumps, compressors and fans

*Future:*

- Gas, steam & hydro turbines
- Wind turbines
- Gearboxes
- Marine applications

## KEY FEATURES

- Designed for 2-wire IEPE vibration sensors
- 4-channel system
- Up to 32 pre-defined extractions per channel
- Wide range of connectivity for analysis platform and IoT networks
- Digital and analog I/O for local interfacing
- Modbus TCP connectivity

## CYBER SECURITY

VibSys can be deployed as a stand-alone monitoring system, integrated into plant networks, or connected to cloud-based applications. Communications between devices, software platforms, and external systems are protected using HTTPS/TLS encryption. This flexible architecture allows organizations to align connectivity and cybersecurity measures with their own operational and security requirements.

### KEY CYBER SECURITY FEATURES

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- HTTPS/TLS encrypted communications
- Stand-alone operation possible without network connectivity
- Plant network integration via industrial communication interfaces (e.g. Modbus TCP)
- Deployment within segregated OT networks
- Cloud-connected deployment options
- Flexible integration into existing OT and IT environments

*More details are available in the document 'VibSys Cyber Security Overview' (pending).*

## SYSTEM OVERVIEW

### Interfaces

|               |                                                     |
|---------------|-----------------------------------------------------|
| Sensor input  | 4 × IEPE vibration                                  |
| Analog input  | 2 × current or voltage input                        |
| Digital input | 1 × speed and 1 × status <i>(future: 2 × speed)</i> |
| Relay output  | 2 × SPST                                            |
| Analog output | 4 × current output                                  |

## INPUT

### Sensor input

|                           |                                                                                                                                                        |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor type               | 2-wire IEPE accelerometers directly<br>2-wire externally powered sensor, signal offset required<br>Other sensor types through Signal Bridge / Isolator |
| Constant current supply   | 4.5 mA                                                                                                                                                 |
| Sensitivity               | 100 mV/g                                                                                                                                               |
| Input voltage range       | 0 – 24 V <sub>DC</sub>                                                                                                                                 |
| Bandwidth                 | 0.2 Hz – 20 kHz                                                                                                                                        |
| Input impedance           | 100 kΩ                                                                                                                                                 |
| Resolution A/D conversion | 24-bit                                                                                                                                                 |
| SNR A/D conversion        | 105 dB                                                                                                                                                 |
| CMRR                      | ≥ 80 dB                                                                                                                                                |
| Amplitude accuracy        | ≤ 1 % of FSD                                                                                                                                           |

### Analog input

|            |                                                                                                       |
|------------|-------------------------------------------------------------------------------------------------------|
| Range      | 4 – 20 mA or 0 – 30 V (passive, externally powered)                                                   |
| Resolution | 24-bit                                                                                                |
| Function   | User-configurable range to receive process parameters to trend and trigger the vibration measurements |

### Digital input

|                 |                                                                               |
|-----------------|-------------------------------------------------------------------------------|
| Frequency range | 0 Hz – 10 kHz                                                                 |
| Input range     | 0 – 30 V, max. 15 mA                                                          |
| Trigger level   | 'High' ≥ 4 V                                                                  |
| Impedance       | > 2 kΩ                                                                        |
| Function        | DI1: Speed input                      DI2: Digital switch to reset the device |

## OUTPUT

### Relay

|                            |                                                                                                                                 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Number                     | 2 × relay output, SPST (1 × COM 1 × NO)                                                                                         |
| Maximum switching capacity | 30 V <sub>DC</sub> / 2 A                      (resistive load)<br>30 V <sub>DC</sub> / 100 mA                  (inductive load) |
| Function                   | User-configurable relays for single channel alarms or voted outputs                                                             |

### Analog output

|            |                                                          |
|------------|----------------------------------------------------------|
| Number     | 4 × analog output                                        |
| Type       | 4 – 20 mA current loop (active, device-powered)          |
| Resolution | 16-bit (0 – 24 mA)                                       |
| Accuracy   | 0.1 %                                                    |
| Function   | User-configurable range to transmit current output value |

## Status LED indicators

|                |                                        |
|----------------|----------------------------------------|
| LED indicators | 4 × sensor status & 4 × channel status |
|----------------|----------------------------------------|

## POWER

### DC Input

|                   |                                                          |
|-------------------|----------------------------------------------------------|
| DC input voltage  | 24 V <sub>DC</sub> (18 – 31.2 V <sub>DC</sub> ) @ 400 mA |
| Power consumption | ≤ 10 W                                                   |

### PoE input

|                |                                          |
|----------------|------------------------------------------|
| PoE IEEE 802.3 | Up to 3 units daisy-chained per PoE port |
|----------------|------------------------------------------|

## CONNECTIVITY

### Communication

|                   |                                                                                              |
|-------------------|----------------------------------------------------------------------------------------------|
| Ethernet hardware | Dual RJ45 port, ethernet switch functionality                                                |
| Module connection | Non PoE: 16 units daisy-chained per ethernet port<br>PoE: 3 units daisy-chained per PoE port |

### Cloud connection

|                                |               |
|--------------------------------|---------------|
| Istec Sphere analysis platform | <i>future</i> |
|--------------------------------|---------------|

### Protocols

|                |               |
|----------------|---------------|
| HTTPS          |               |
| Modbus TCP     |               |
| <i>MQTT</i>    | <i>future</i> |
| <i>CAN-bus</i> | <i>future</i> |

### Data transmission interval

|                               |                   |
|-------------------------------|-------------------|
| Static extraction values      | Minimum 5 minutes |
| Dynamic waveform and spectrum | Minimum 1 hour    |

## SYSTEM FEATURES

### Housing

|                    |                                                                          |
|--------------------|--------------------------------------------------------------------------|
| Material           | Polyamide (PA 66 GF 30)                                                  |
| Connectors         | Push-in type terminals                                                   |
| Dimensions         | 45 x 127 x 114 mm (1.78 x 5.00 x 4.49")                                  |
| Mounting           | DIN rail ("top hat", 35 mm)                                              |
| Ingress protection | IP20 according to IEC 60529. Indoor use or use in a protective enclosure |

### Weight

|  |                   |
|--|-------------------|
|  | ± 245 g (8,64 oz) |
|--|-------------------|

### Environmental conditions

|                              |                                   |
|------------------------------|-----------------------------------|
| Operating temperature        | -20 to 60 °C (-4 to 140 °F)       |
| Storage temperature          | -40 to 85 °C (-40 to 185 °F)      |
| Operating & storage humidity | < 95%; condensation to be avoided |

### Conformal coating

|  |     |
|--|-----|
|  | Yes |
|--|-----|

### Other

|  |                                              |
|--|----------------------------------------------|
|  | Overvoltage category II / Pollution degree 2 |
|--|----------------------------------------------|

## PROCESSING

|                              |                                                                                                                                    |               |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Measurement resolution       | Waveform: up to 65,536 points (16-bit)<br>Spectrum: 32768 lines of resolution<br><i>Spectrum: configurable lines of resolution</i> | <i>future</i> |
| Sampling rate                | 48 kHz                                                                                                                             |               |
| FFT window                   | Hanning; Rectangular                                                                                                               |               |
| Averaging (frequency domain) | <i>Overlap and averaging</i>                                                                                                       | <i>future</i> |
| Extracted data               | Up to 32 processed outputs per channel                                                                                             |               |
| Integration                  | Acceleration to velocity                                                                                                           |               |
| Signal level metrics         | True RMS, Scaled RMS, scaled peak<br><i>True peak, True peak-peak, Scaled peak-peak, Crest factor</i>                              | <i>future</i> |

## WAVEFORM AND SPECTRUM

| Name                  | Processing                        | TWF / FFT    | HP1       | LP1         |
|-----------------------|-----------------------------------|--------------|-----------|-------------|
| TWF_A                 | ADC                               |              | 0         | Fmax        |
| <i>TWF_V (future)</i> | <i>ADC + filter + integration</i> |              | <i>10</i> | <i>Fmax</i> |
| FFT_A                 | Fast Fourier Transform            | TWF_raw      | 0         | Fmax        |
| <i>FFT_V (future)</i> | <i>Fast Fourier Transform</i>     | <i>FFT_A</i> | <i>10</i> | <i>Fmax</i> |

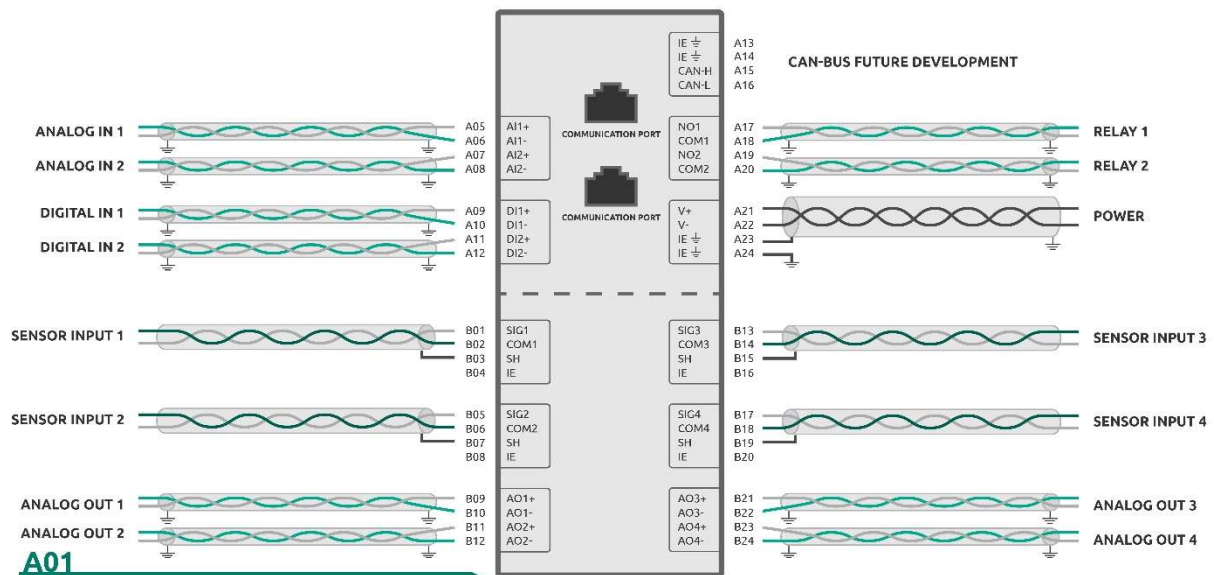
## EXTRACTIONS

| Name              | Processing                  | TWF / FFT | HP1          | LP1   | Detection |
|-------------------|-----------------------------|-----------|--------------|-------|-----------|
| Overall           | Time domain                 | TWF_V     | 3            | 1000  | True RMS  |
| Band_2_1k_A_RMS   | Frequency domain extraction | FFT_A     | 2            | 1000  | RMS       |
| Band_10_1k_A_RMS  | Frequency domain extraction | FFT_A     | 10           | 1000  | RMS       |
| Band_10_5k_A_RMS  | Frequency domain extraction | FFT_A     | 10           | 5000  | RMS       |
| Band_10_10k_A_RMS | Frequency domain extraction | FFT_A     | 10           | 10000 | RMS       |
| Band_2k_10k_A_RMS | Frequency domain extraction | FFT_A     | 2000         | 10000 | RMS       |
| Band_2_1k_A_Pk    | Frequency domain extraction | FFT_A     | 2            | 1000  | Peak      |
| Band_10_1k_A_Pk   | Frequency domain extraction | FFT_A     | 10           | 1000  | Peak      |
| Band_10_5k_A_Pk   | Frequency domain extraction | FFT_A     | 10           | 5000  | Peak      |
| Band_10_10k_A_Pk  | Frequency domain extraction | FFT_A     | 10           | 10000 | Peak      |
| Band_2k_10k_A_Pk  | Frequency domain extraction | FFT_A     | 2000         | 10000 | Peak      |
| Band_2_1k_V_RMS   | Frequency domain extraction | FFT_V     | 2            | 1000  | RMS       |
| Band_10_1k_V_RMS  | Frequency domain extraction | FFT_V     | 10           | 1000  | RMS       |
| Band_10_5k_V_RMS  | Frequency domain extraction | FFT_V     | 10           | 5000  | RMS       |
| Band_10_10k_V_RMS | Frequency domain extraction | FFT_V     | 10           | 10000 | RMS       |
| Band_2_1k_V_Pk    | Frequency domain extraction | FFT_V     | 2            | 1000  | Peak      |
| Band_10_1k_V_Pk   | Frequency domain extraction | FFT_V     | 10           | 1000  | Peak      |
| Band_10_5k_V_Pk   | Frequency domain extraction | FFT_V     | 10           | 5000  | Peak      |
| Band_10_10k_V_Pk  | Frequency domain extraction | FFT_V     | 10           | 10000 | Peak      |
| 1xHarmonic_V      | Frequency domain extraction | FFT_V     | 0.9nX        | 1.1nX | Peak      |
| 2xHarmonic_V      | Frequency domain extraction | FFT_V     | 1.9nX        | 2.1nX | Peak      |
| 3xHarmonic_V      | Frequency domain extraction | FFT_V     | 2.9nX        | 3.1nX | Peak      |
| Not_1xHarmonic_V  | Frequency domain extraction | FFT_V     | 0.9nX        | 1.1nX | Peak      |
| SumHarmonics      | Frequency domain extraction | FFT_V     | 1X + 2X + 3X |       |           |

## DIMENSIONS AND MOUNTING



## WIRING DIAGRAM



## APPROVALS

### International standards

Electromagnetic compatibility

Environmental / RoHS

### Marine type approval

CE

EN IEC 61000

EN IEC 63000 (RoHS 3)

*DNV type approved product*

*future*

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