

Shaft Relative Vibration Monitor Specifications

The Shaft Relative Vibration Monitor is designed for extremely high reliability for the plant's most critical rotating machinery. This 1-slot monitor is used together with other CSI 6500 monitors to build a complete API 670 machinery protection monitor. Applications include steam, gas, compressors and hydro turbo machinery.

The main functionality of the Shaft Relative Vibration monitoring module is to accurately monitor shaft relative vibration and reliably protect machinery by comparing vibration parameters against alarm setpoints, driving alarms and relays.

Shaft relative vibration monitoring consists of a displacement sensor either mounted through the bearing case, or mounted internally on the bearing housing, with the rotating shaft being the target.

The displacement sensor is a non-contact sensor measuring shaft position and movement. Since the displacement sensor is mounted to the bearing, the monitored parameter is said to be shaft relative vibration, that is, shaft vibration relative to the bearing case.

Shaft relative vibration is an important measurement on all sleeve bearing machines for predictive and protection monitoring. Shaft relative vibration should be selected when the machine case is massive as compared with the rotor, and the bearing case is not expected to vibrate between zero and production-state machine speeds. Shaft absolute is sometimes selected when the bearing case and rotor mass are more closely equal, where it is more likely that the bearing case will vibrate and impact shaft relative readings.

The CSI 6500 is an integral part of PlantWeb® and AMS™ Suite. PlantWeb provides operations-integrated machinery health combined with the Ovation® and DeltaV™ process control system. AMS Suite provides maintenance personnel advanced predictive and performance diagnostic tools to confidently and accurately determine machine malfunctions early.



- Two-channel, 3U size, 1-slot plug-in module decreases cabinet space requirements in half from traditional four-channel 6U size cards
- API 670 compliant, hot swappable module
- Remote selectable limit multiply and trip bypass
- Front and rear buffered and proportional outputs, 0/4-20 mA output, 0-10 V output
- Self-checking facilities include monitoring hardware, power input, hardware temperature, sensor and cable
- Use with displacement sensors 6422, 6423, 6424 and 6425 and driver CON 011/91, 021/91,041/91

Transducer Inputs

| | |
|-----------------------|--|
| Number of inputs | Two, independent or combined monitoring modes |
| Type of inputs | Eddy current, differential |
| Emerson sensor inputs | Part number: 6422, 6423, 6424, 6425 |
| Isolation | Galvanically separated from power supply |
| Input resistance | >100 kΩ |
| Input voltage range | 0 to -22 VDC |
| Input frequency range | Lower cutoff 1 or 5 Hz Upper cutoff 50-2000 Hz adjustable |

Measuring Range

| | |
|---------------------|---|
| Range | Continuously adjustable with the configuration software |
| Smallest range | 0-400 mV |
| Largest range | 0-8000 mV |
| Sensor power supply | Separate buffered sensor supply Galvanically separated from all system voltages and system supply voltages Open and short circuit proof |
| Nominal voltage | -26.7 V |
| Available current | Nominal 20 mA, maximum 35 mA |

Front Panel Outputs

| | |
|-------------------------------|--|
| Green LED's | Two LED's, indicates channel OK separately for each channel |
| Red LED's | Two LED's, indicates alert and danger separately for each channel |
| Front panel buffered outputs | Two, identical to transducer sensor inputs ±10 V, >100 kΩ load, freq. range 0.1-5 kHz (-3 dB) 0-16 kHz-3 dB ±20% |
| Mini DIN configuration socket | Module interface connection for configuration and parameter and status monitoring RS-232 |
| Handle | Easily remove card and provide plate for module and sensor identification |

Analysis

| | |
|---------------------|--|
| Measurement modes | Hot configurable Zero to peak Peak to peak Independent dual-channel or combined dual-channel modes Smax (combined) (DIN 45670A) Smax peak to peak (combined) (DIN 45670B, VDI 2059) Smax 0 to peak (combined) (VDI 2059) True S peak to peak Y. X (independent) (API 670) |
| Analysis parameters | ½x, 1 to 10x and phase angle of same Available via ModBus TCP/IP output |

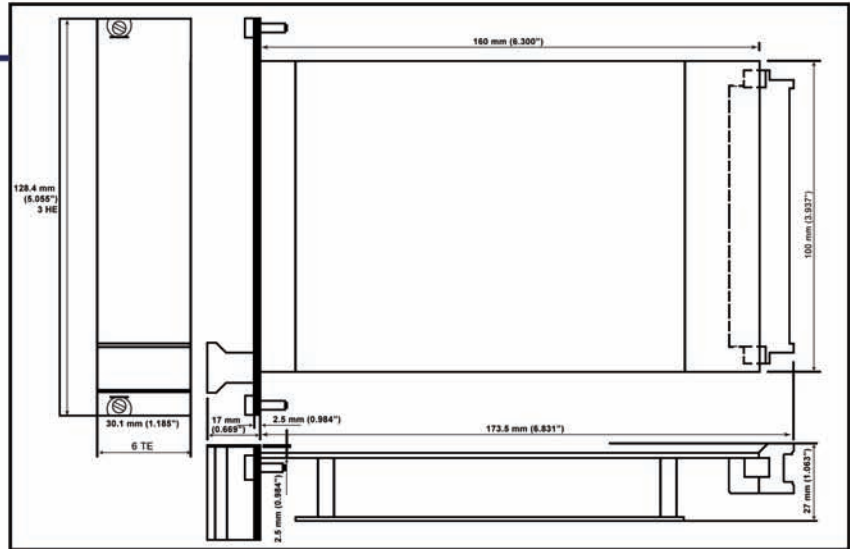
| Rear Outputs Available | |
|-------------------------------|---|
| Current mode outputs | 0/4-20 mA output for each channel proportional to main value <ul style="list-style-type: none"> ■ For example, both outputs are identical combined for Smax (combined mode) ■ For example, both outputs are independent for Y and X (independent mode) Open/short circuit proof |
| Permissible load | <500 Ω |
| Accuracy | ±1% of full scale |
| Settling time | configurable, 0 to 10 seconds |
| Voltage mode outputs | 0-10 VDC output proportional to main value for each channel <ul style="list-style-type: none"> ■ For example, both outputs are identical combined for Smax (combined mode) ■ For example, both outputs are independent for Y and X (independent mode) Open/short circuit proof |
| Permissible load | >10 kΩ |
| Rear buffered outputs | Raw buffered output signal, AC and DC Open/short circuit proof |
| Frequency range | 0.1-16 kHz (-3 dB) 0-16 kHz -3 dB ±20% |
| Permissible load | >10 kΩ |
| DC voltage outputs | 0-10 VDC output proportional to the shaft position (gap) Open/short circuit proof |
| Accuracy | ±1% of range |
| Permissible load | >10 kΩ |

| Alarm Setpoints Alarm Time Delays | |
|-----------------------------------|---|
| Alert | Selectable normally open, normally closed 0-5 second delay per channel 0-36 second delay with A6740 relay card Selectable to be blocked on channel not OK Adjustable range 5 to 100% of full scale value Resolution 1% of full scale value Alarm hysteresis on decreasing signal value, 0 to 20% of full scale value |
| Danger | Selectable normally open, normally closed 0-5 second delay per channel 0-36 second delay with A6740 relay card Selectable to be blocked on channel not OK Adjustable range 5 to 100% of full scale value Resolution 1% of full scale value Alarm hysteresis on decreasing signal value, 0 to 20% of full scale value |
| OK | Self checking (normally closed): <ul style="list-style-type: none"> ■ power supply, sensor, cable, module checking, overload, internal temperature, system watchdog Green LED: <ul style="list-style-type: none"> ■ off when not OK ■ during delay time, LED flashes ■ reason for not OK can be read from communication bus |
| Limit multiply | Remote, relay input, 1.00-4.99 factor |
| Trip bypass | Remote, relay input |

| Environmental, General | |
|------------------------|---|
| Module | IP 00, DIN 40050 |
| Front plate | IP 21, DIN 40050 |
| Climate | DIN 40040 class KTF |
| Operating temperature | 0°-65° C (32°-149° F) |
| Storage temperature | -30°-85° C (-22°-185° F) |
| Relative humidity | 5-95%, non condensing |
| Vibration | IEC 68-2, part 6 0.15 mm, 10-55 Hz 19.6 mm/s ² , 55-150 Hz |
| Shock | IEC 68-2, part 29 98 m/s ² peak, 16 ms |
| EMC resistance | EN50081-1 / EN50082-2 |
| Power consumption | Max. 6 W, 250 mA at 24 VDC |
| Configuration | Password protected |

Dimensions:

PCB/EURO card format according to
DIN 41494, 100 x 160 mm (3.937 x 6.300 in)
Width: 30.0mm (1.181 in) (6 TE)
Height: 128.4 mm (5.055 in) (3 HE)
Length: 160.0 mm (6.300 in)
Net weight: app 320 g (0.705 lbs)
Gross weight: app 450 g (0.992 lbs)
includes standard packing
Packing volume: app 2.5 dm³ (0.08 ft³)
Space requirements: 1 slot
14 modules fit into each 19" rack



Ordering Information

| Model Number | Product Description |
|--------------|---|
| A6110 | Dual-channel Shaft Relative Vibration Monitor |

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Online Machinery Health Management powers PlantWeb through condition monitoring of mechanical equipment to improve availability and performance.