

Thrust Position and Differential Expansion Monitor Specifications

The Thrust Position and Differential Expansion (D.E.) Monitor is designed for 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 turbomachinery.

The main functionality of the Thrust Position and D.E. monitoring module is to accurately monitor thrust position and reliably provide machinery protection by comparing the actual measured position against alarm setpoints, driving alarms and relays. The 6210 can also be configured for a differential expansion measurement. For super-critical safety applications, consider the A6250 triple redundant thrust monitor built on the SIL 3-rated overspeed system platform.

Shaft thrust monitoring consists of one to three displacement sensors mounted in the axial direction, parallel to the shaft at the shaft-end or thrust collar. The displacement sensor is a non-contact sensor measuring shaft position.

Shaft thrust monitoring, second only to overspeed, is one of the most critical measurements on turbo machinery. Sudden axial movements should be detected in 40 msec or less to avoid or minimize rotor to case contact. Redundant sensors are recommended. Temperature of the thrust bearing is highly recommended as a complement to thrust position monitoring.

The CSI 6500 Machinery Health Monitor 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
- 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, simplifies and cable
- Built-in software linearization easing sensor adjustment after installation
- Use with displacement sensor 6422, 6423, 6424 and 6425 and driver CON xxx

Transducer Inputs	
Number of inputs	Two, independent
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	0-8 Hz (10 Hz, -3 dB)

Measuring Range	
Range	Continuously adjustable with the configuration software
Sensor power supply	Separate buffered sensor supply Galvanically separated from all system voltages and system supply voltage Open and short circuit proof
Nominal voltage	-26.7 VDC
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	Four LED's, indicates alert and danger separately for each channel
Front panel buffered outputs	Two, identical to transducer sensor inputs -1 to -24 V, >100 kΩ load
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 Axial shaft movement Axial shaft position Measures cone, ramp and collar differential expansion Measures radial shaft position and bend Measures tandem configurations Measures conical disc with temperature compensation or radial displacement compensation
Configurable parameters	Measuring range Engineering units Sensitivity Alert and Danger
CSI 4500 interface	4 channel connector designed for CSI 4500 plug & play

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 for combined mode Tandem/Cone and assigned to the relevant channel for the modes Dual Channel or Min/Max ■ For example, 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 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 Hz-16 kHz (-3 dB)
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

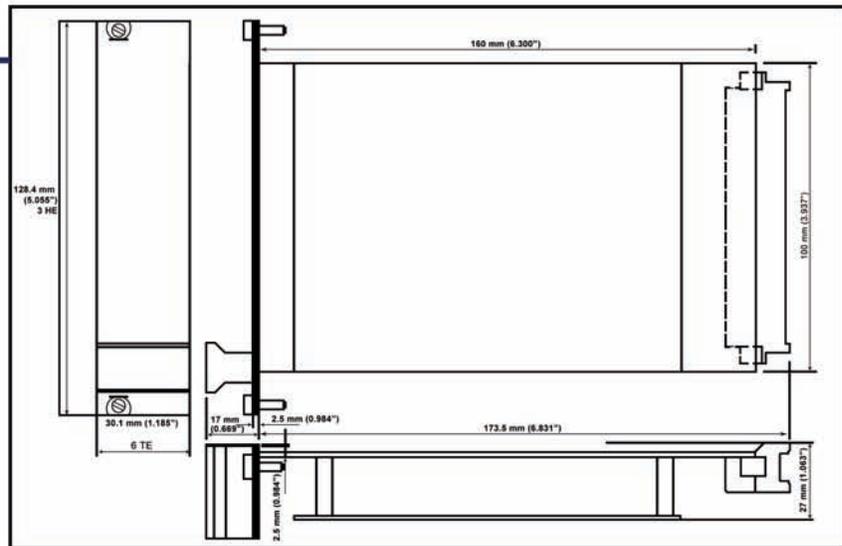
Alarm Setpoints Alarm Time Delays

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 5-100% 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 5-100% of full scale value Resolution 1% of full scale value Alarm hysteresis on decreasing signal value, 0-20% 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
A6210	Dual-channel Thrust and Differential Expansion Monitor

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