A6210 Thrust Position, Differential Expansion, and Rod Position Monitor for AMS 6500 Machinery Health Monitor

A6210

The A6210 monitor operates in 3 distinct modes: thrust position, differential expansion, or rod position.

The Thrust Position mode accurately monitors thrust position and reliably provides machinery protection by comparing the measured axial shaft position against alarm set-points – driving alarms and relay outputs.

Shaft thrust monitoring is one of the most critical measurements on turbomachinery. Sudden and small axial movements should be detected in 40 msecs or less to minimize or avoid rotor to case contact. Redundant sensors and voting logic are recommended. Thrust bearing temperature measurement is highly recommended as a complement to thrust position monitoring.

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 that measures shaft position.

For extremely critical safety applications, the A6250 monitor provides triple-redundant thrust protection built on the SIL 3-rated overspeed system platform.

The A6210 monitor can also be configured for differential expansion measurements. As both the case and rotor grow due to changes in thermal conditions at turbine start-up, differential expansion delivers a measure of the relative difference between mounted displacement sensors on the case and the sensor target on the shaft. If the case and shaft grow at approximately the same rate, then the differential expansion remains close to the desired value of zero. The differential expansion measurement mode supports tandem/complementary or cone/ ramp modes.

Finally, the A6210 monitor can be configured for average rod drop mode – used to monitor rider band wear in reciprocating compressors. Over time, rider bands wear in horizontal reciprocating compressors due to the force of gravity acting on the horizontally-oriented piston in the compressor cylinder. If the rider band wears beyond spec, the piston can contact the cylinder wall and cause incremental machine damage and possible failure.

By mounting at least one displacement probe to measure the piston rod position, you will receive notification when the piston drops – an indication of rider band wear. You can then set shutdown protection thresholds for automatic trip. The average rod drop parameter can be factored to represent the actual rider band wear, or with no factor applied, rod drop will represent the actual movement of the piston rod.

The AMS 6500 includes easy integration to the DeltaV and Ovation process automation systems, including preconfigured DeltaV Graphic Dynamos and Ovation Graphic Macros to speed operator graphic development. AMS software 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 and API 618 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
Measuring Frequency Range	0 - 8 Hz (10 Hz, -3 dB)
Measuring Range	
Range	■ Continuously adjustable with the configuration software. ■ Also includes measuring range invert
Sensor Power Supply	■ Separate buffered sensor supply Galvanically separated from all system voltages and system supply voltage ■ Open and short circuit proof
Nominal Supply 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 ■ Measures average rod position
Configurable Parameters	■ Measuring range ■ Engineering units ■ Sensitivity ■ Alert and Danger
Rear Outputs Available	
Current Mode Outputs	0/4-20 mA output for each channel proportional to main value ■ 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 - 10 seconds
Rear Buffered Outputs	0 - 10 VDC output proportional to main value for each channel Open/short circuit proof
Frequency Range	>10 kΩ
Permissible Load	Raw buffered output signal, AC and DC Open/short circuit proof
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 - 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): ■ Power supply, sensor, cable, module checking, overload, internal temperature, system watchdog Green LED: ■ 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/s2, 55 - 150 Hz
Shock	■ IEC 68-2, part 29 ■ 98 m/s2 peak, 16 ms
EMC Resistance	EN50081-1 / EN50082-2
Power Consumption	Max. 6 W, 250 mA at 24 VDC
Configuration	Password protected

A6210 Dimensions:

PCB/EURO card format according to
DIN 41494, 100 x 160mm (3.937 x 6.300in)

Width: 30.0mm (1.181in) (6 TE)

Height: 128.4mm (5.055in) (3 HE)

Length: 160.0mm (6.300in)

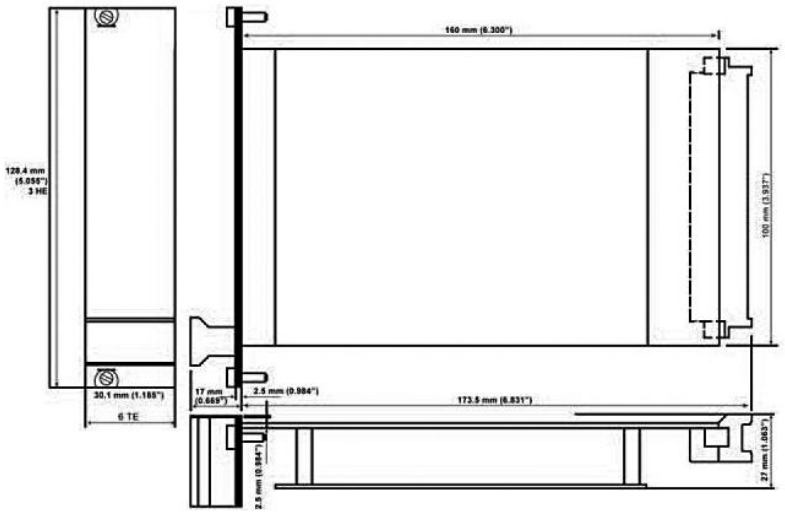
Net Weight: app 320g (0.705lbs)

Gross Weight: app 450g (0.992lbs)
includes standard packing

Packing Volume: app 2.5dm³ (0.08ft³)

Space
Requirements: 1 slot

14 modules fit into each 19" rack



Ordering Information

Model Number	Product Description
A6210	Dual-channel Thrust, Differential Expansion, and Rod Drop Monitor