Emerson EPRO Series Service Manual

A6210

1. Description

Emerson A6210 Thrust Position,

3. Product Information

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

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 RS-232

Handle Easily remove card and provide plate

for module and sensor identification

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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
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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
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Environmental, General
Module IP 00, DIN 40050
Front Plate IP 21, DIN 40050
Climate DIN 40040 class KTF

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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

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