Emerson EPRO Series Service Manual

A6410

1. Description

Emerson A6410 Valve and Case

3. Product Information

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Emerson A6410 Valve and Case
Expansion Monitor for
AMS 6500 Machinery
Health Monitor
The Valve and Case Expansion Monitor is designed for high reliability for the plant's most critical rotating machinery. This 1-slot monitor is used together with other AMS 6500 monitors to build a complete API 670 machinery protection monitor. Applications include steam, gas, compressors and hydro turbomachinery.
The main functionality of the Valve and Case Expansion Monitor is to accurately monitor valve position and case expansion and reliably protect machinery by comparing parameters against alarm setpoints, driving alarms and relays.
Valve position is a measurement of the main steam inlet valve stem position normally displayed in percent open. The valve position measurement provides the operator with an indication of the current load on the turbine.
Case expansion monitoring usually consists of two inductive displacement sensor (or LVDT's) mounted in the axial direction, parallel to the shaft, and on each side of the turbine case. Unlike the eddy current sensor which is a non-contact sensor, the inductive sensor is a contact sensor.
Case expansion monitoring is important at start-up, so both sides of the turbine case can be monitored for proper expansion rates. Because the turbine is allowed to slide on rails as it expands, if both sides are not free to expand, the turbine "crabs" (the case bends), leading to the rotor colliding with the case.
Channel 1 can measure static values, such as case expansion, and can also be used for dynamic quantities, such as displacement, angles, forces, torsions or other physical quantities measured by inductive transducers. Channel 2 is left for static measurements and relative displacements (relative to channel 1).
The AMS 6500 Machinery Health Monitor is an integral part of PlantWeb® and AMS software. PlantWeb provides operations integrated machinery health combined with the Ovation® and DeltaV™ process control system. AMS software provides maintenance personnel advanced predictive and performance diagnostic tools to confidently and accurately determine machine malfunctions early.
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Transducer Inputs
Number of Inputs Two, independent, differential inputs
Type of Inputs Inductive, half bridge or full bridge
and differential transformers
Emerson Sensor Inputs Part number: PR 9350/xx
and K20315/xx
Isolation Galvanically separated
from power supply
Input Impedance 200 kΩ
Input Voltage Range 3.6 VDC
(protected against over voltage)
Measuring Frequency Range 0 - 100 Hz (-3 dB)
Two-channel, 3U size, 1-slot plugin module decreases cabinet space requirements in half from traditional
four-channel 6U size cards
 API 670 compliant,
hot swappable module
 Password protected user configuration
 Self-checking facilities include
monitoring hardware, power input,
hardware temperature, sensor
and cable
 Front and rear buffered
and proportional outputs,
0/4-20 mA output, 0 - 10 V output
 Use with inductive displacement
sensor 9350
Measuring Range

Range Continuously adjustable with
configuration software. One or both
outputs may be inverted
Carrier Frequency 4.75 kHz
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 4 V rms
Permissible Load 120-600 Ω
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 ±12 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 for
dual-channel measurement,
expansion measurement.
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 Open/short
circuit proof.
Permissible Load <500 Ω
Accuracy ±1% of full scale
Settling Time Configurable, 0 - 10 seconds
Rear Buffered Outputs Raw buffered output signal, 0 - 12 V
peak to peak Open/short circuit proof
Frequency Range 0 - 100 Hz (-3 dB)
Permissible Load >100 kΩ
DC Voltage Outputs 0 - 10 VDC output proportional to
main value 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,

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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

November 2017

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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)

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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

A6410 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

A6410 Dual-channel Valve and

Case Expansion Monitor