

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.



A6410

- 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
- 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

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)

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 k Ω load.
Mini DIN Configuration Socket	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<ul style="list-style-type: none"> ■ 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	<p>Self checking (normally closed): Power supply, sensor, cable, module checking, overload, internal temperature, system watchdog</p> <p>Green LED:</p> <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	<ul style="list-style-type: none"> ■ IEC 68-2, part 6 ■ 0.15 mm, 10 - 55 Hz ■ 19.6 mm/s², 55 - 150 Hz
Shock	<ul style="list-style-type: none"> ■ 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)

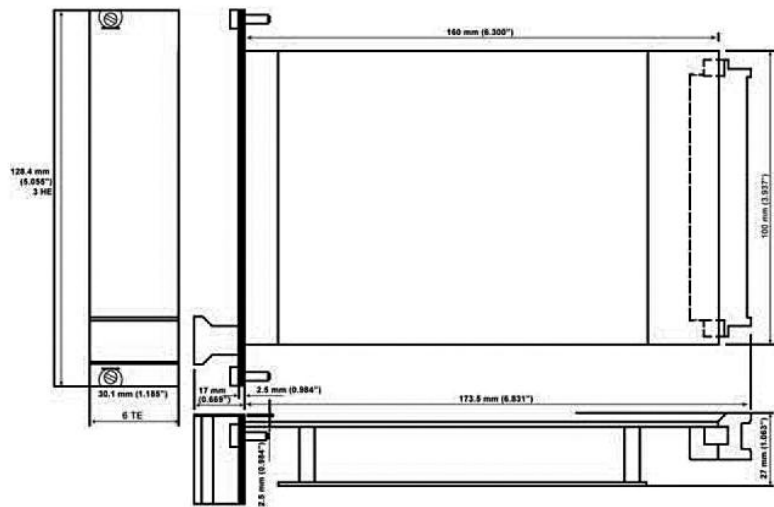
Gross Weight: app 450g (0.992lbs)
includes standard packing

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