

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.

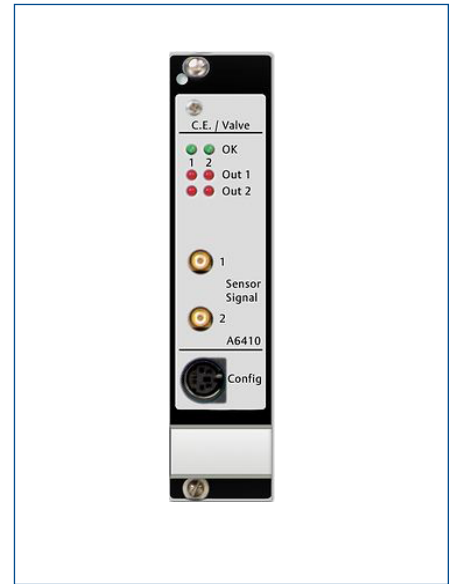
Valve position is a measurement of the main steam inlet valve stem position normally displayed in percent open. The valve position measurement provides the operator with an indication of the current load on the turbine.

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

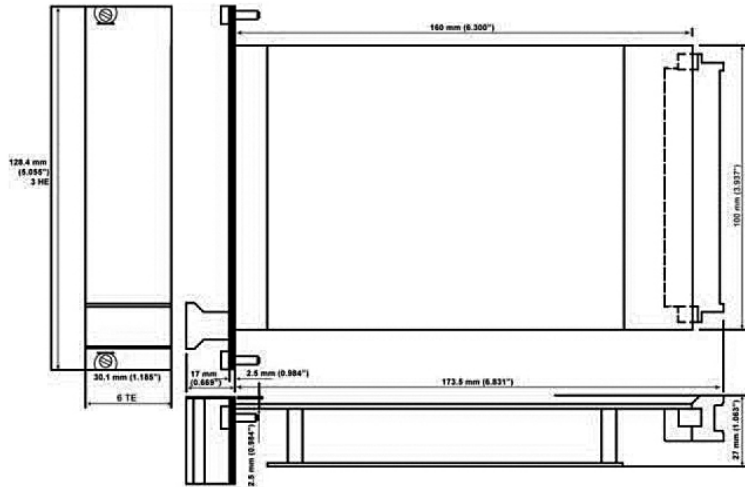
| Transducer Inputs | |
|-------------------------------|--|
| Number of inputs | Two, independent, differential inputs |
| Type of inputs | Inductive, half bridge or full bridge and differential transformers |
| Emerson sensor inputs | Part number: PR 9350/xx and K20315/xx |
| Isolation | Galvanically separated from power supply |
| Input impedance | 200 k Ω |
| 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 to 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 to 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 to 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):</p> <ul style="list-style-type: none"> ■ Power supply, sensor, cable, module checking, overload, internal temperature, system watchdog <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 to 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 |

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