



**More time at the Face.**

# Primary Mine Fan Solutions

FanMon - Fan Monitoring System



**Maestro**  
mine ventilation



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## FanMon – Fan Monitoring System



**Improve Fan Life and Performance**



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## Mine Primary or Booster fans



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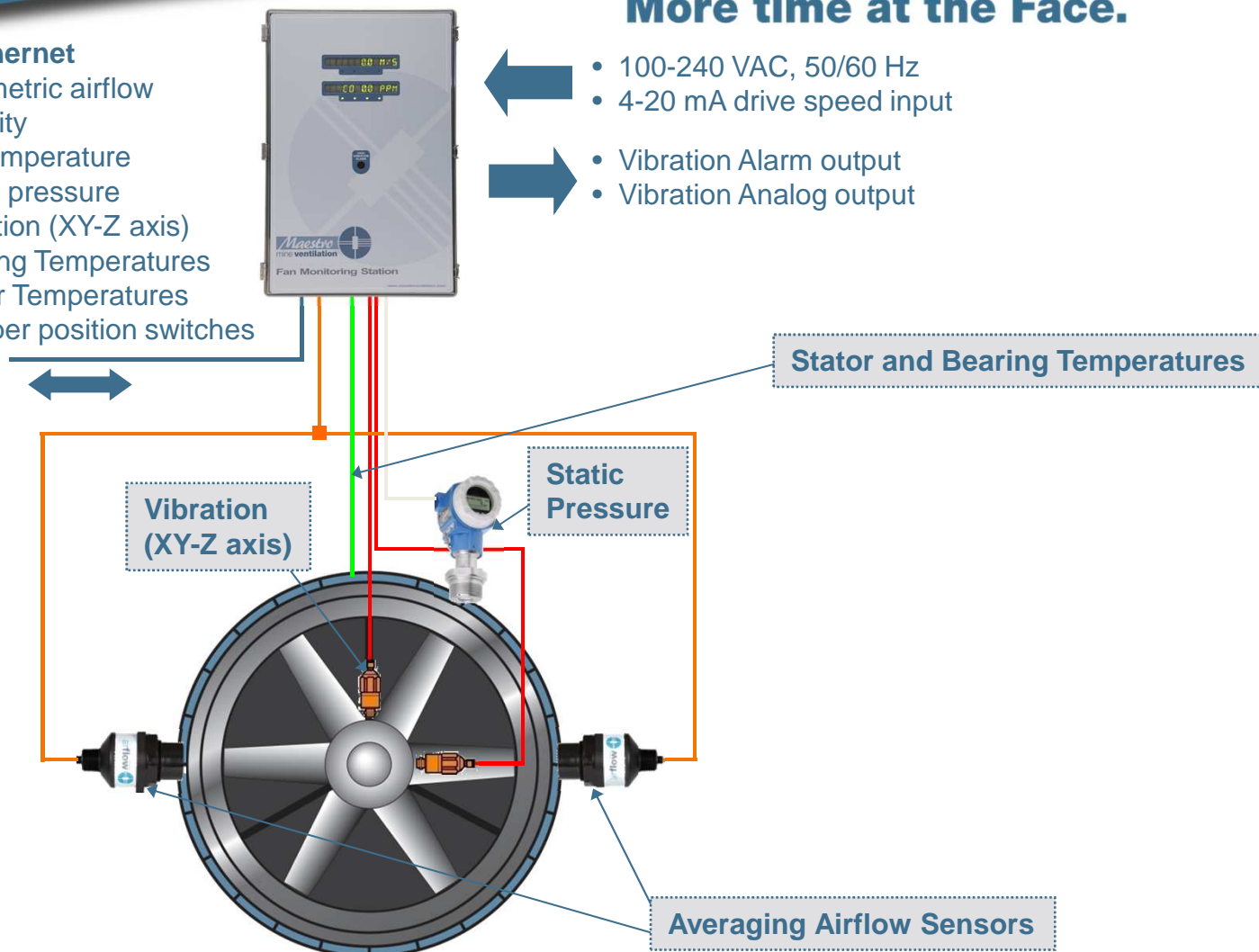
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### Ethernet

- Volumetric airflow
- Velocity
- Air Temperature
- Static pressure
- Vibration (XY-Z axis)
- Bearing Temperatures
- Stator Temperatures
- Damper position switches

- 100-240 VAC, 50/60 Hz
- 4-20 mA drive speed input

- Vibration Alarm output
- Vibration Analog output



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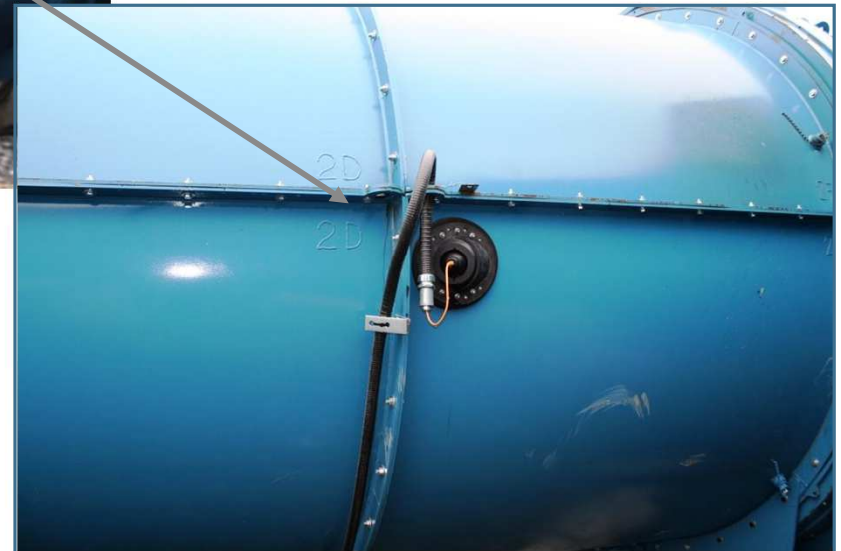
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## Airflow measurement



### Airflow sensors

- Two required (one of each side of duct)
- Ultrasonic transit time principle
- Averages flow profile across measurement path
- Not affected but dirt, dust, mist or oil
- Moisture resistant
- Immune to electrical noise from VFD fan motor drives

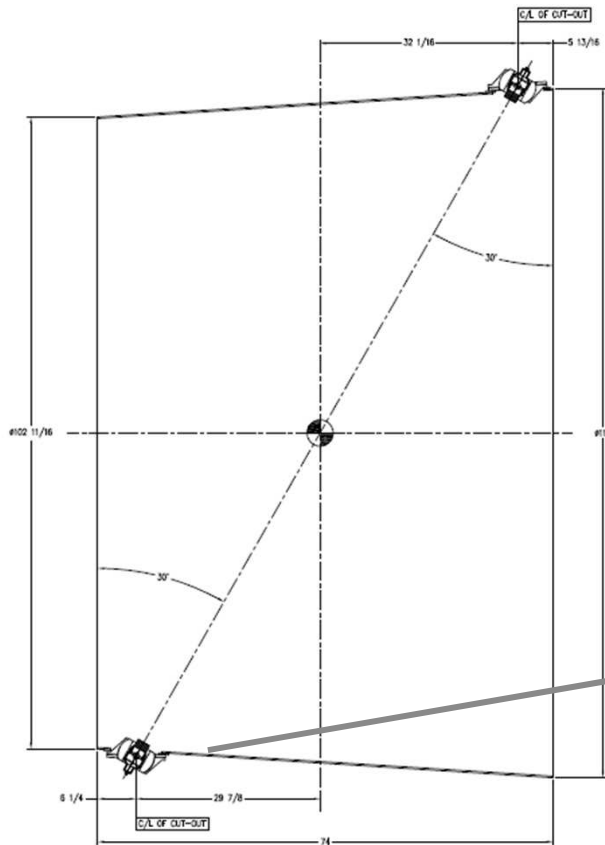


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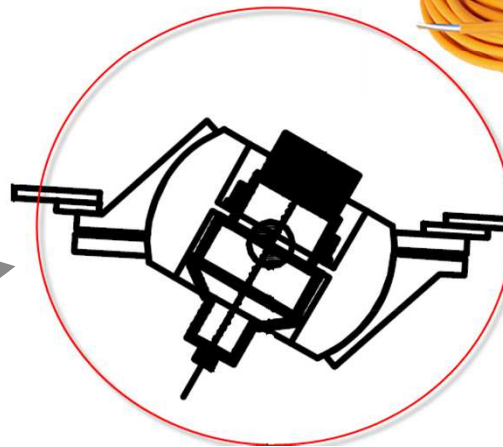
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## Airflow Measurement



### Airflow sensor bracket

- Welding free design
- Simple cut out pattern
- Thick self sealing bracket gasket
- Articulating ball joint for sensor alignment
- Airflow sensor threads into ball joint



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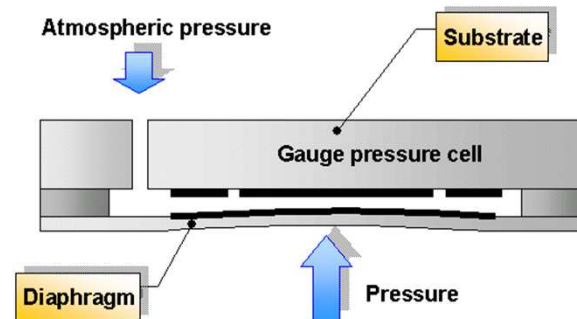
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## Static pressure measurement



### Static pressure transmitter

- 1-½" MNPT threaded process connection
- No impulse lines to plug or freeze
- Installed directly on fan inlet or outlet duct work/elbow
- Hart smart, 4-20 mA output signal
- LCD display
- 40" W.C. range (field scalable from -40 to +40" W.C.)



### Rugged Ceramic Sensor

- 99.9% ceramic ( $\text{Al}_2\text{O}_3$ ) sensor
- Excellent in corrosive or abrasive environments
- No fluid fill = no temperature influence
- Long term stability
- High over-load resistance

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## Temperature measurement



### **Temperature monitoring**

- Fan air temperature in duct
- Stator windings
- Fan impellor or motor bearings
- 6 or 12 channel options
- PT 100 ohm RTD's



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## Backdraft damper position measurement



### **Damper monitoring**

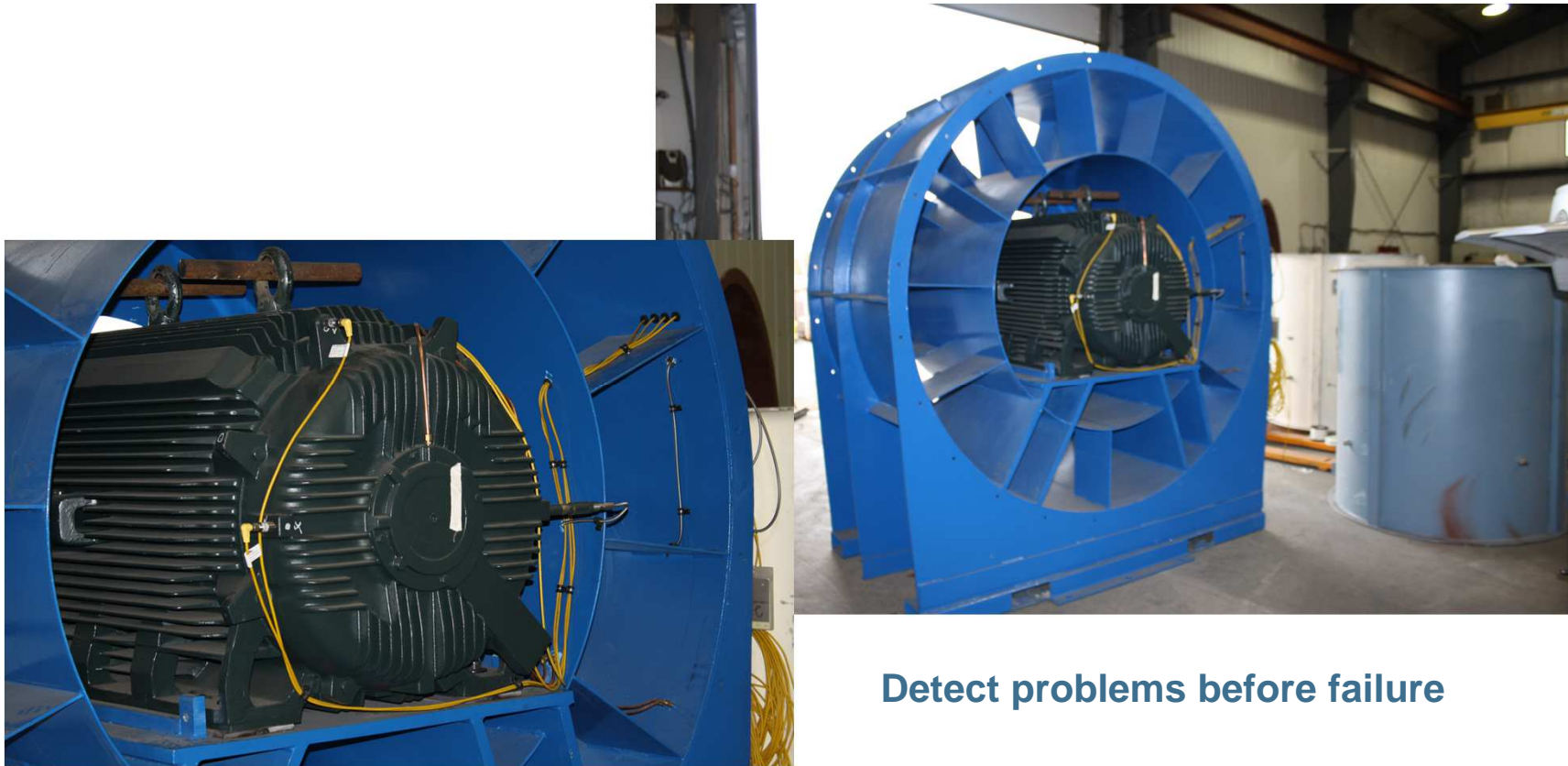
- Monitors for fan recirculation
- Monitors the damper closed or open position
- Accepts two damper position switch input signals
- Optionally accepts analog position indicator

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## Vibration measurement



**Detect problems before failure**

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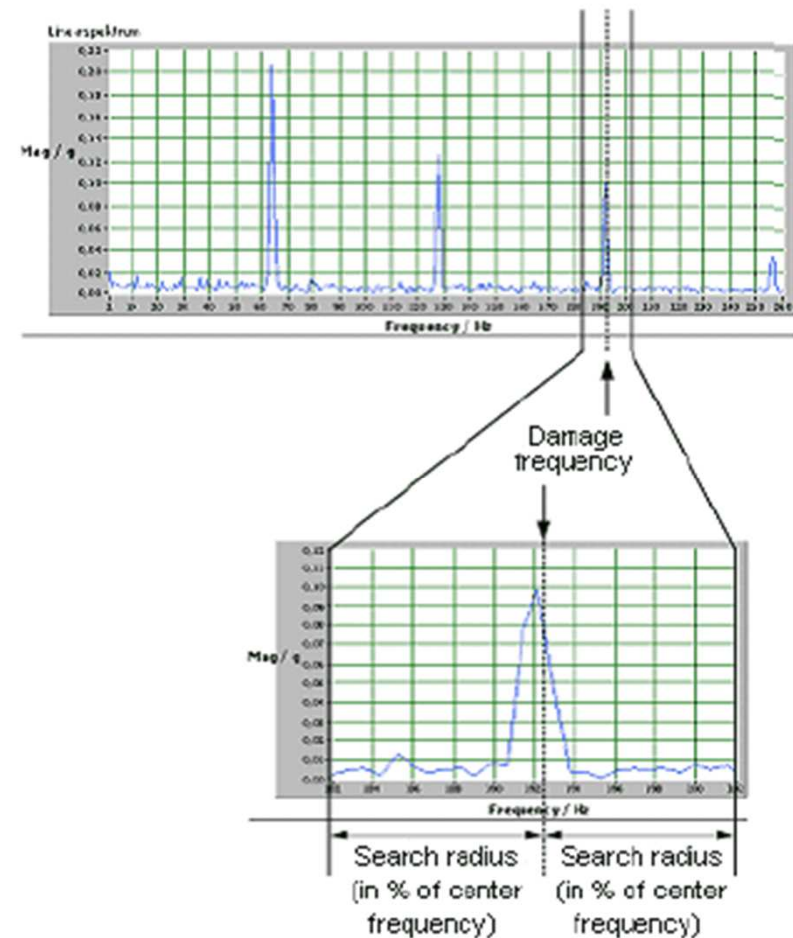


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## Vibration measurement

### On line condition based monitoring

- Up to 84 different frequencies can be monitored by a maximum of 24 objects
- Bearings (Inner, Outer race way, rolling elements)
- Fan imbalance
- LED display and analog output signal for highest vibration level
- Alarm light and relay output for early warning or high level alarm
- Ethernet TCP/IP communication to network for data acquisition and analysis



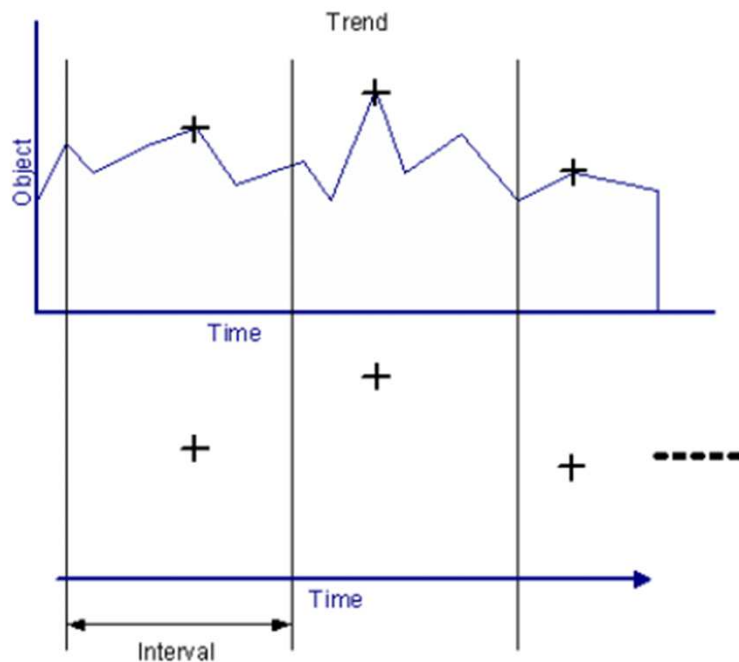
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## Vibration measurement



### Trending

- Internal memory for trending history of defined elements
- Recording of up to 30,000 values
- Date and time stamped
- Battery back-up
- Peak acceleration (mg)
- Weighted acceleration (RMS mg)
- Average velocity (RMS mm/s)
- Distance (mm)

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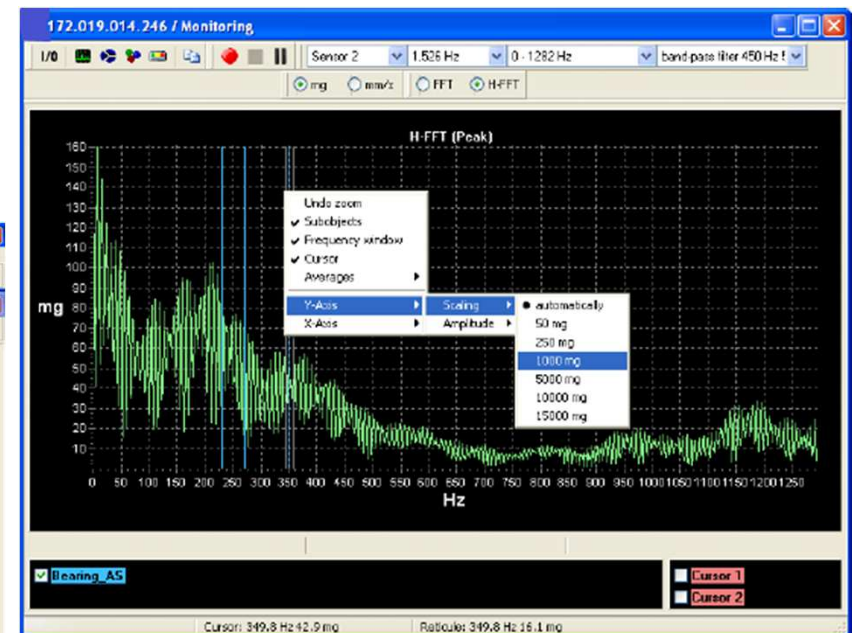
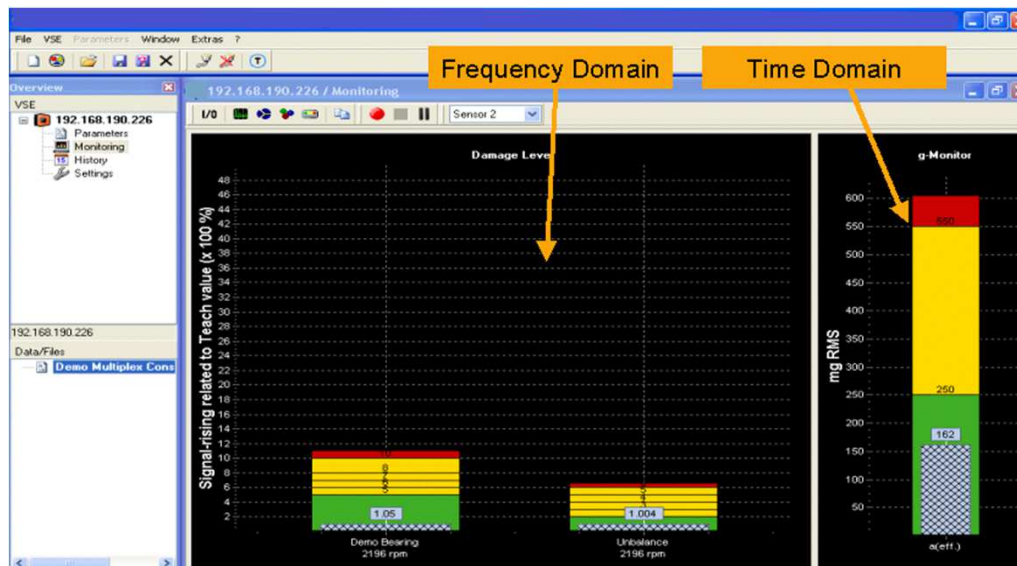


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## Vibration measurement

### Remote diagnostics

- Detailed analysis of measurement data using Fast Fourier Transform (FFT) mode (harmonic signals -- unbalance, resonance alignment)
- H-FFT (high frequency peak shaped signals -- rolling element bearings)



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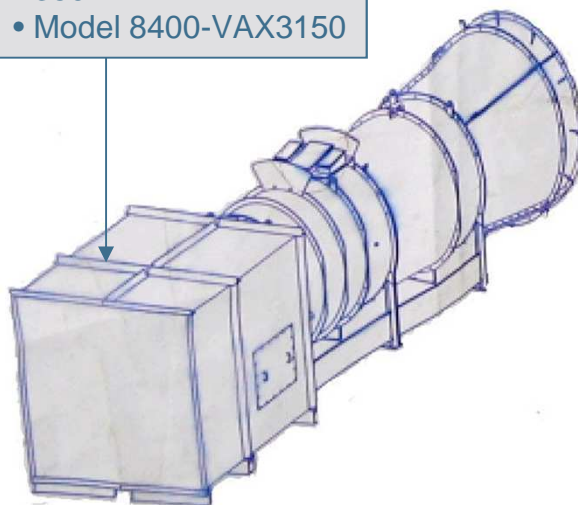


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## KGHM International Ltd. – Levack Mine – Booster Fan

- Ethernet based system
- Feeds OPC Server
- Four (4) vibration sensors
- Three (3) on back bearing, X-Y-Z
- One on front fan blade bearing
- One (1) 4-20 mA VFD speed input

- Alpha Jetstream
- 350 HP
- Model 8400-VAX3150



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## KGHM International Ltd. – Levack Mine – Booster Fan



**FAN DYNAMICS LTD.**

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EMAIL: [fanodynamics@golden.net](mailto:fanodynamics@golden.net)

August, 27, 2010

Dear Sir or Madam,

Fan Dynamics Ltd. has been providing professional services to several large international fan manufacturers since 1983. Our fan services range from vibration analysis, laser alignment, air performance testing, speed & power testing, sound testing, on-site fan balancing and consulting services.

We have provided professional services to the following manufacturers.

Sheldons Engineering  
Chicago Blower  
ASEA Brown Boveri (ABB)  
Alpha/Joy  
Novenco  
Canadian Blower  
Daltec  
Delhi Fan  
Airstream Fans  
Woods Air Movement  
Howden/Bufalo

We have worked with several different vibration monitoring packages during the past 25 years and we are extremely impressed with the Maestro FanVibe system. The Maestro system employs all the latest technology including x-y-z vibration measurement, analog or Ethernet based communications, complete vibration software and OPC software which allows direct integration into a higher level system.

I was involved in a start-up and vibration analysis of a 350 HP booster fan at Quadra FNX Mine which employed this system. Both the client and I were pleased at how simple and quick the installation went. We were also impressed with the amount of "real time" vibration monitoring and protection that is available with this system.

I would recommend this system to anyone that wants to raise the bar higher with "real time" vibration monitoring.

Yours sincerely,

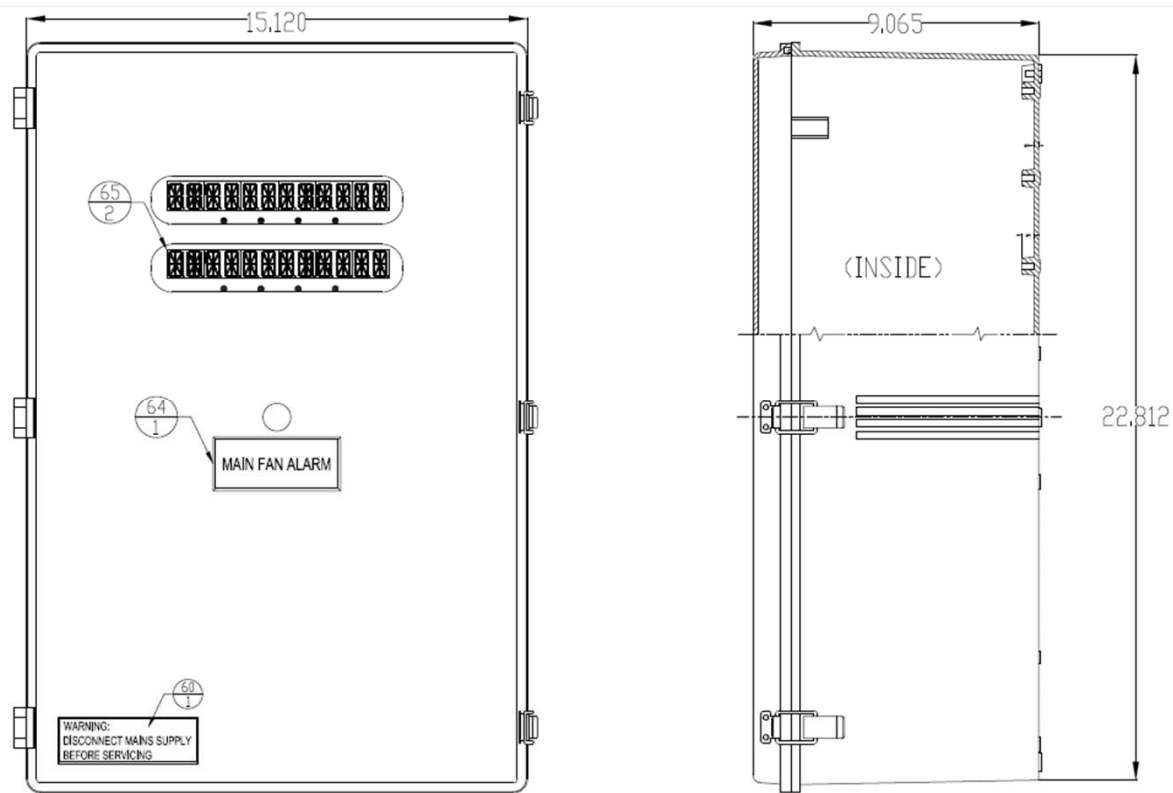
Peter Duley  
President

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**Complete compact solution**



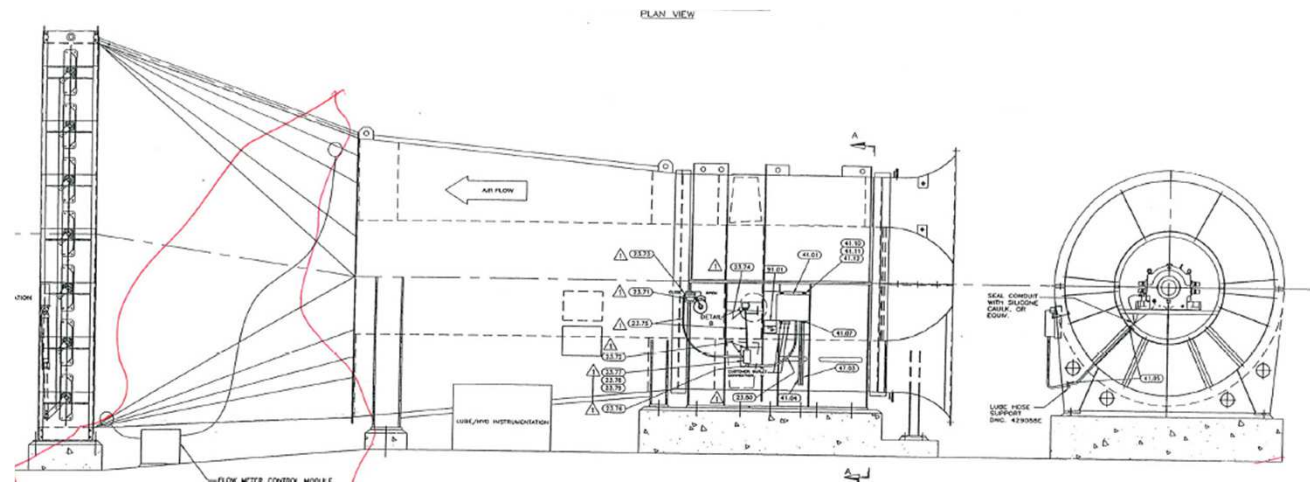
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### Xstrata Copper – Kidd Creek Mine – ON, Canada

- TLT-Babcock 4000 HP Booster Fan
- 6000L
- VFD Drive
- 500 m<sup>3</sup>/s
- 11' Evase



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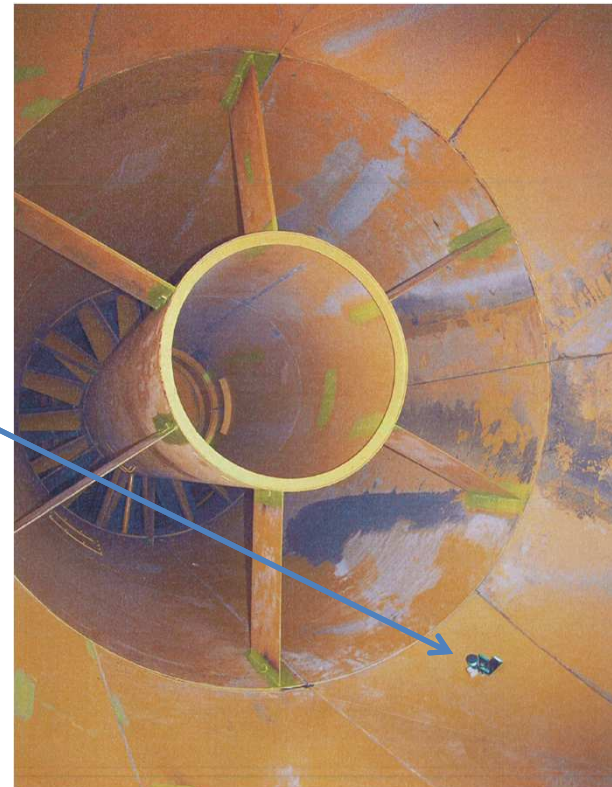




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## Xstrata Copper – Kidd Creek Mine – ON, Canada

- Existing ultrasonic unit
- Not working
- Signal is not readable



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## Xstrata Copper – Kidd Creek Mine – ON, Canada

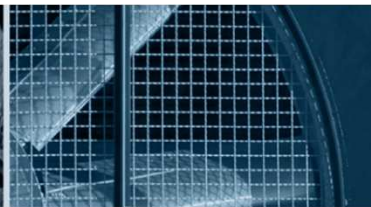
- New Maestro AirFlow ultrasonic unit
- Reliable
- Stable signal
- Not affected by EMF from VFD Drive
- Bruno Battocchio - “all of you have been exceptional and bent over backwards”



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mine ventilation



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Fan manufacturers agree...



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