

# Prevent Engine Damage from Dust Ingress

## A new condition monitoring tool

Undetected air-induction leaks can lead to rapid engine failure, machine down-time and loss of production. The DustGuard™ System uses smart sensing technology, cloud-based monitoring and intelligent engineering to provide real-time protection against engine damage from contaminated combustion air.

## Clean air is critical

Engines require a clean source of air for combustion and reliable operation. The failure of engine air induction systems can allow unfiltered air to enter the combustion chamber causing loss of performance, engine wear and severe engine damage due to the abrasive nature of particles commonly found in dust. Dust ingress is often caused by damage to air ductwork, broken induction air hoses, broken or loose hose clamps or failure of air filtration media.



## DustGuard™ bridges the gap between PM inspections

Induction system leaks are typically discovered during routine preventative maintenance services through oil analysis or visual inspections. Typical PM intervals can lead to extended engine operation with induction system leaks during which extensive wear and damage can accumulate. The DustGuard™ System bridges the gap between PM inspections and alerts operators and maintenance personnel of induction system leaks so that repairs can be made before damage occurs.

## Cloud-based data & remote alerts

The DustGuard™ System includes access to a cloud-based data dashboard where machine assets can be tracked and monitored on a real-time and historical basis. To ensure optimal engine protection, the DustGuard™ System will automatically send alerts to designated maintenance and engineering personnel in the event an unsafe condition is detected.

## Communications flexibility

The DustGuard™ System is compatible with CAN bus, Modbus TCP, RS485, Modbus RTU, 4G cellular and satellite communication protocols.

## No data subscription required

The DustGuard™ System does not require a data subscription. Unlimited access to cloud-based data and remote alerts is included in the purchase price.



Optional AFM Sensors

## (Optional) Air Filter Management

The DustGuard™ System is now available with real-time monitoring of engine air filters. The DustGuard Air Filter Management (AFM) option allows for continuous monitoring of up to four (4) engine air filters allowing for protection against clogging and high suction pressures. Severe operating environments can lead to the rapid accumulation of dust particles in air filter media resulting in high levels of air restriction to the engine.

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## Engine Protection

Operation with excessive air filter restriction decreases engine efficiency and increases combustion, coolant and oil temperatures. Extended operation with high suction pressures can lead to premature engine wear and damage as high combustion temperatures can overwhelm engine cooling systems and cause piston, liner and exhaust valve damage. In addition, excessive restriction can result in suction pressures that exceed the structural limits of air filter media. Extended operation in this condition can lead to failure of the air filter media and rapid ingestion of dust particles into the engine.

## Reduce PM Costs

For high horsepower engines operating in severe dust environments, air filters can represent a significant PM cost. The DustGuard™ AFM option allows maintenance personnel to optimize air filter replacement based on condition instead of an hour meter. Replacing air filters that still have significant operating life increases maintenance costs and reduces sustainability. In addition, modern air filters increase in efficiency as they get dirty - premature replacement exposes engines to more abrasive particles as new air filters take time to reach peak efficiency.

## Cloud-based data & remote alerts

The AFM option utilizes the same online environment as the DustGuard™ System. AFM data is available via the DustGuard™ online dashboard and alarms / alerts are automatically sent to maintenance personnel via email.

### DustGuard Particle Sensor Housing

- Remote dust monitoring
- 300x300x120 mm enclosure size
- 320x260 mm mounting points (to be mounted on shock mounts)
- Weight: 2kg
- IP 66 sheet steel enclosure, powder coated, with breathing valve
- 4 JIC 7/16" air inputs
- 1 JIC 7/16" exhaust output
- 4 Binder 7 pin connections for Power, Siren, Pressure attachment (optional), , CAN J1939 (connectors provided with the unit).
- 1 Ethernet port for Modbus TCP or local network connection
- 4 SMA (F) connection for Cellular, GPS and Satellite communications
- USB Port

### Electronic Control Unit (ECU)

- 5 Programmable solenoid valves w/ thresholds
- Variable sampling rates (30 seconds to 1 hour)
- Local/Online user interface
- Onboard data storage
- 12V to 24V input power, 2 Amps
- Communications:
  - CAN j1939
  - Modbus TCP
  - RS485
  - 3 Dry contacts (Ok, Warning, Danger signals)
  - Cellular (2G/3G) communication (optional)
  - Satellite communication / GPS (optional)

### ECU Environmental Ratings

- Operating temperatures: -10°C to +60°C
- Storage temperature: -40°C to +70°C
- Performs best at 10°C to 40°C
- Built in anti-vibration and shock resistance

### Sensors

- Particle Sensor
  - High accuracy laser scattering measurement
  - Lifetime up to 8 years [Note 1]
  - Contamination resistant technology
  - Particle Mass concentration
    - PM 1.0, 2.5, 4, 10
    - Particle concentrations
      - PM 0.5, 1.0, 2.5, 4, 10
- Pressure sensor
  - 0-100 PSI pressure rating
  - Operating temperature: -40°C to +105°C

- Temperature sensor
  - Onboard Temperature sensor

### Strobe Light / Horn:

- 12/24 VDC (power supplied by PSM)
- Audible output 87-99 dBA at 3 meters
- 60-80 flashes per minute
- 1.75 joule flash / 50 ECP
- -35C to 66C
- NEMA 3R enclosure
- UL Listed

### Air sample control valves

- 1/8 inch port size
- 1.7mm orifice size
- 0-114 PSI pressure rating
- 215 PSI proof pressure
- operating temperature: -20C to +70C
- aluminum alloy valve body
- 12VDC (power supplied by PSM)
- IP65 protection
- Class B temperature protection
- .05 second activation time

### Air sample flex hose

- Vinyl nitrile inner tube (RMA Class A)
- 1-braid fiber reinforced
- Vinyl nitrile cover
- -40C to 100C
- 300 PSI operating pressure
- 1200 PSI burst pressure

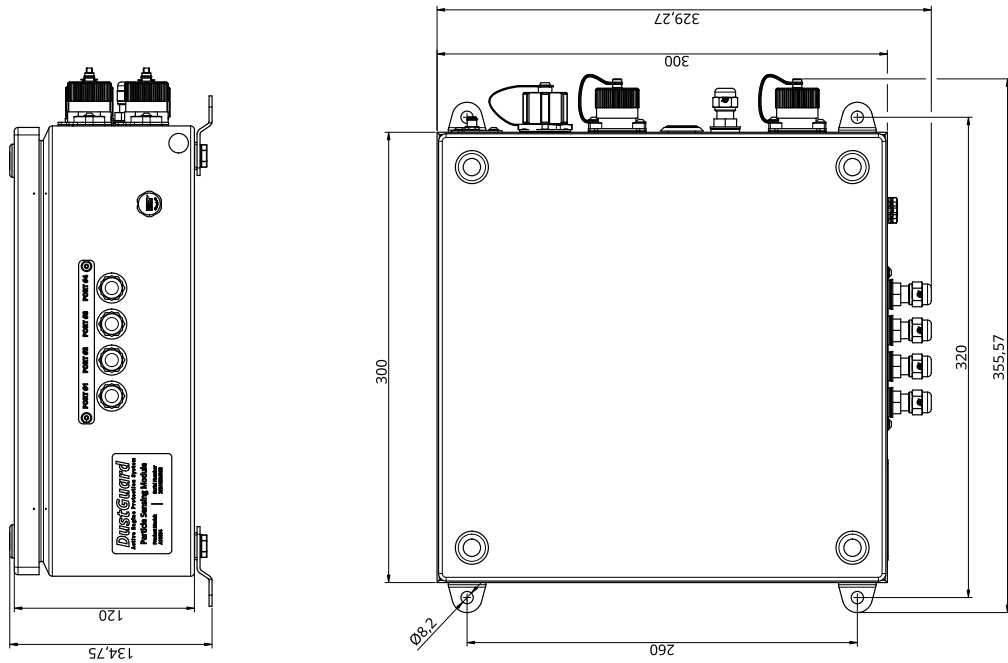
### AFM pressure sensor (Optional)

- 10-30 VDC
- 15-0 PSIA pressure range
- Operating temperature: -40C to +105C

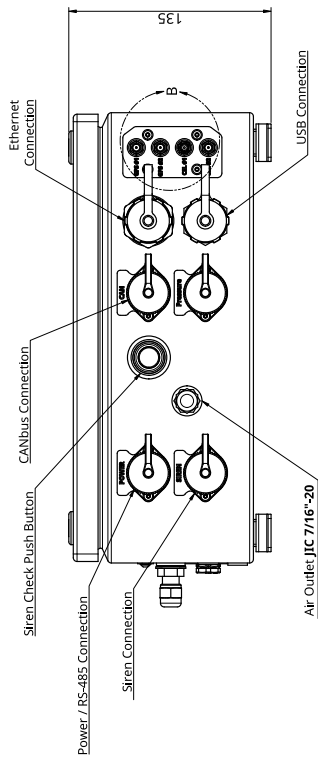
[Note 1] Lifetime is based on the mean-time-to-failure calculations. Lifetime may vary on different operating conditions.

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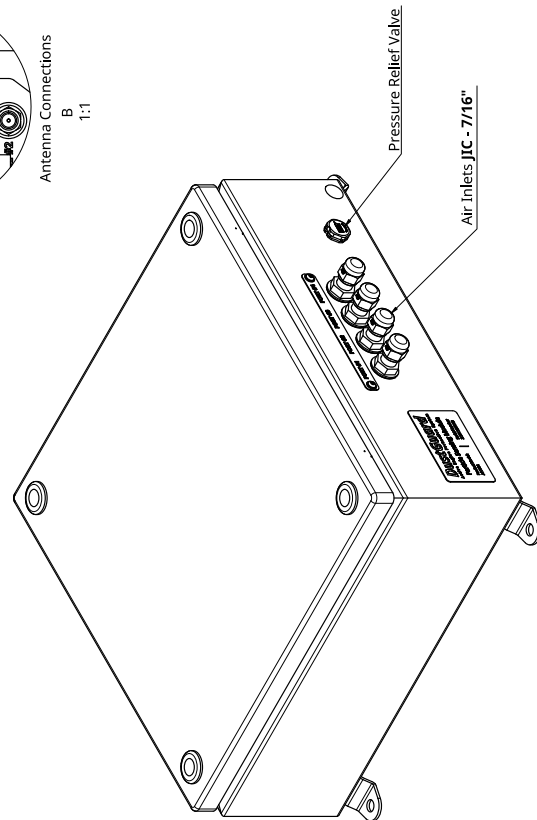
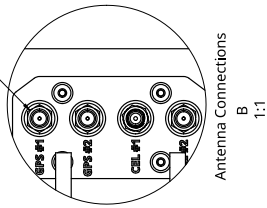
Front View



Right View



Coaxial Connections



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