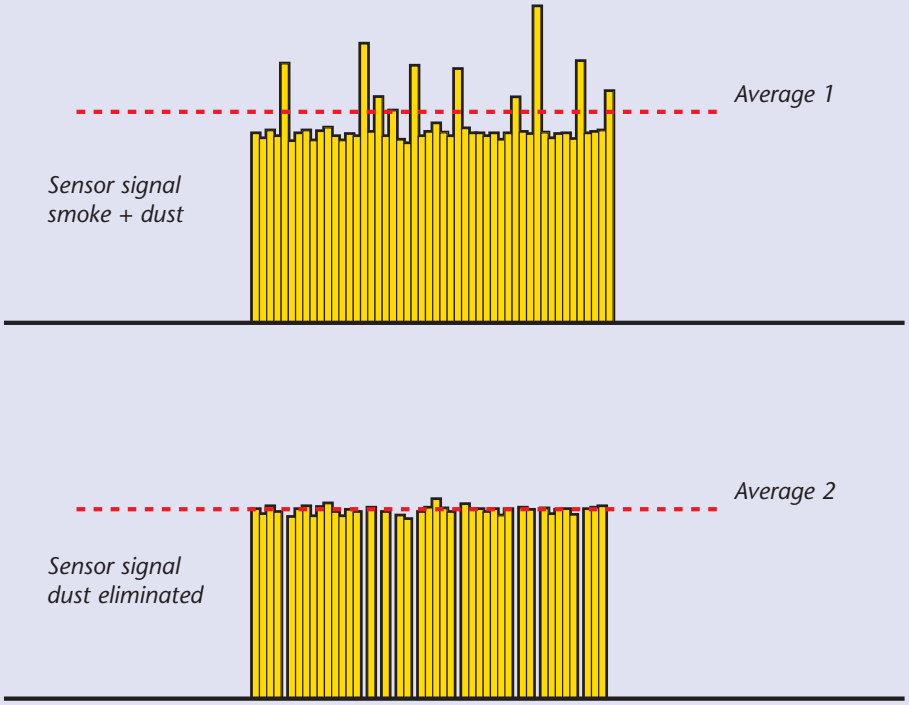
Laser Dust Discrimination (LDD-3D³™)



The AirSense Technology Ltd Stratos-HSSD (series 2) and Stratos-Micra series of aspirating smoke detectors use a new and updated dust discrimination algorithm known as LDD-3D³™.

The system works on the principle that the laser sensor signal will show a steady output (caused by the homogeneous distribution of smoke particles throughout the moving air sample), with 'spikes' caused by any dust particles intermittently passing through the point of laser focus on the moving airstream. Any dust present will cause these 'spikes' to be superimposed on the smoke reading signal. LDD-3D³™ works on the principle that if these spikes can be eliminated from the underlying detector signal, then the steady output which remains would represent the underlying smoke density present. The result is greatly enhanced dust rejection by these detection products.

The algorithm works as follows:

- The laser is pulsed at a frequency of approximately twice per second, with a pulse duration of approximately 15 milliseconds. During each 15ms pulse, a total of 50 readings of 'light scatter' signal are taken and temporarily stored in RAM.
- The average signal (arithmetic mean) of the 50 readings is calculated. All readings above the average are removed.
- A second average (arithmetic mean) is calculated using all the remaining readings (those below or equal to the previously calculated average).
- The second average is considered to be the detector output for this cycle. It is passed to a selectable moving average arithmetic routine to reduce slower variations in chamber output.
- The result of the moving average is compared to the alarm thresholds to establish if a fire condition exists and passed to ClassiFire® to be added to the histogram.

This cycle is repeated twice per second.

The calculation of the moving average in stage 4 can be omitted. This is set by the "LDD enable" tick box in the function settings of the detector. Omitting this stage will make the detector faster-responding but more prone to alarms caused by dust.

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