# INSPECTA FFT ®
Acoustic Tube Leak Detection System

Inspecta FFT audio spectrum analysers are field proven systems developed to detect steam tube leaks in power station boilers. More than 110 systems have been installed and are currently monitoring boilers, gasifiers and oxygen plants in various countries. These systems are computer-based and provide continuous monitoring, analysis and displays of the sounds in a boiler by means of Fast Fourier Transform techniques. Field sensors are situated at intervals around the boiler, and continually monitor the sound signature in the combustion chamber and on the heat exchange surfaces. Audio signals are converted from these primary sensors into isolated low impedance signals for electrical noise immune transmission to the remote system multiplexer. A variation in the normal sound frequency and amplitude is used to detect steam leaks. Inspecta systems run a continuous expert analysis of every field sensor. The monitor displays are digitally averaged, so as provide a true display of the signals, free from any spurious sounds not associated with the steam leak detection functions of the systems.
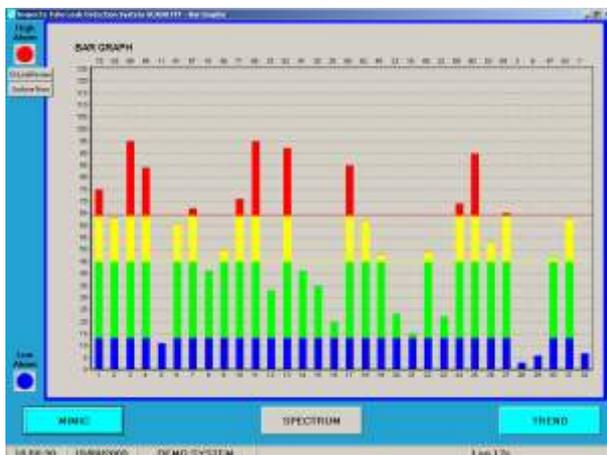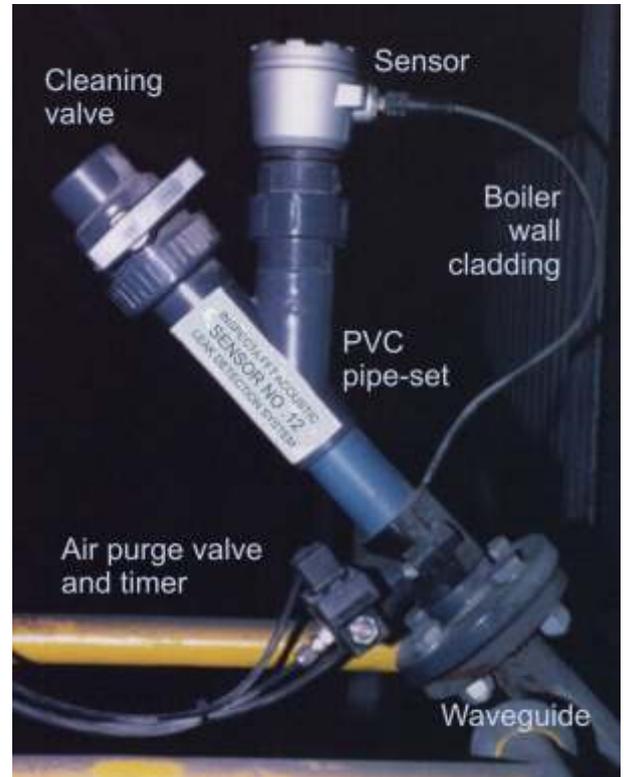
Bar graph mode has provision to display up to 32 processed sensor alarm signals simultaneously on the monitor. The vertical coordinate is the present alarm level and the horizontal is the sensor number. Under tube leak conditions, the graph climbs from the normal Green zone, to Yellow for caution, and to Red to show a critical situation has been reached. Fault Conditions and Low Sensor Levels are displayed in Blue.


Spectrum mode displays the full audio spectrum with the sound level indicated in dB for each octave, for the selected sensor on the vertical coordinate. The horizontal coordinate displays the frequency of the sound between 313 Hz and 10 kHz. The monitor shows what the sound signature looks like, whilst the computer analyses the spectrum to generate the alarm bar displayed on the right hand side of the monitor.
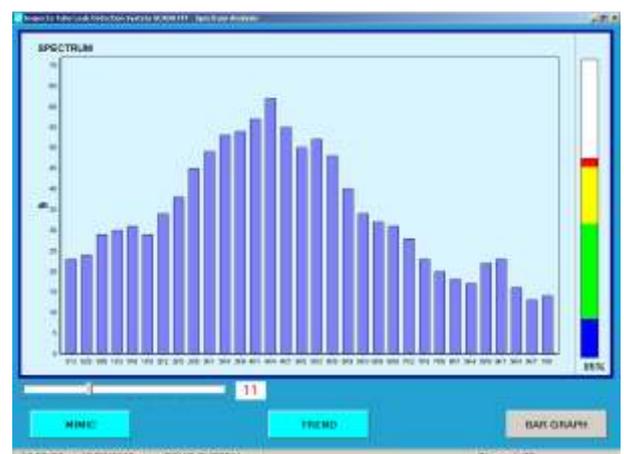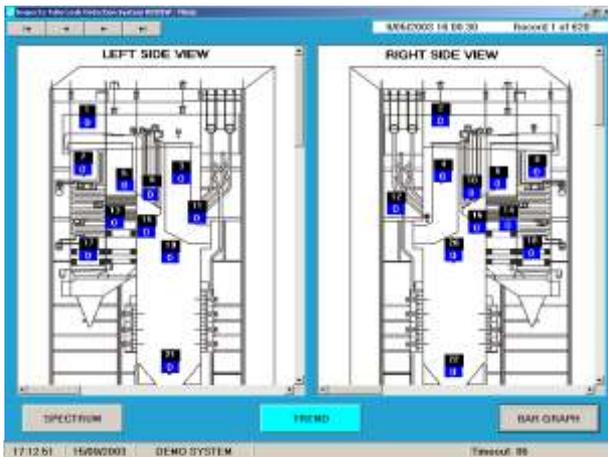
Mimic shows the boiler plant layout giving the position of each sensor. The vertical coordinate is the Boiler Level height in metres, and the horizontal is a pictorial display of the boiler layout. The sensor numbered points change colour on the monitor to indicate alarm conditions.

Trend mode displays the historical level over a period of time for each sensor, each being individually selected by the operator, as required. The trend will indicate the rate at which a steam leak has developed and is, or is not, progressively growing.
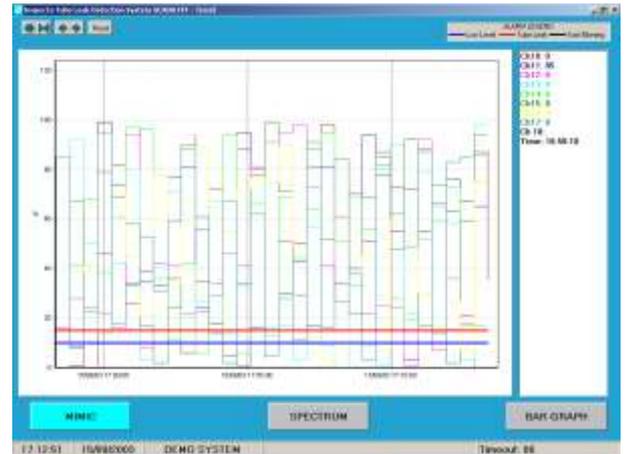
Typical block diagram
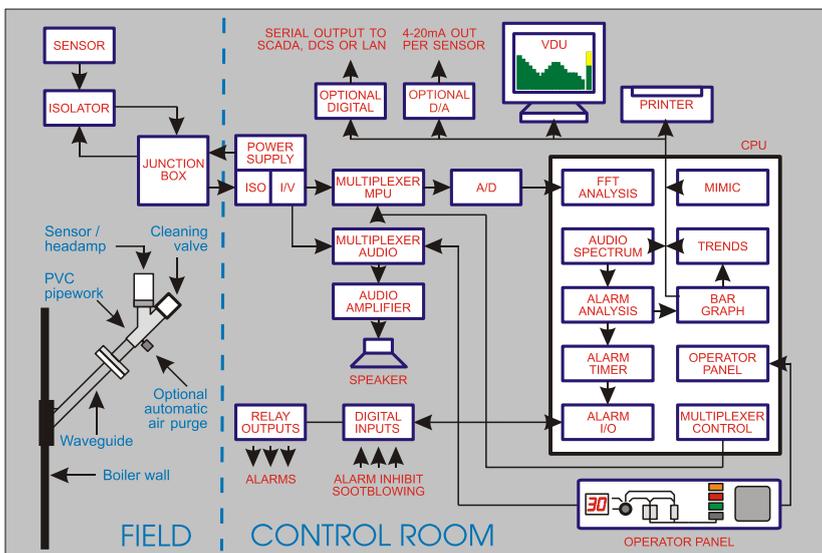
Audio allows operators to listen to the sound inside the boiler at any sensor point by selecting the required channel. The audio sound is heard through the speaker built into the multiplexer operator panel.

Field sensor

Multiplexer