KnockLink©

By Link ElectroSystems Ltd

Hardware Description

The KnockLink© is a visual display module which takes the output of a knock sensor (piezo microphone) and displays the signal on the LED scale. This scale is used to display abnormal, high frequency *noise* as caused by detonation. The Knock sensor is usually a piezo-electric microphone which generates an output signal when large amplitude vibrations are present. This signal is filtered and amplified by the display unit and presented as a bar graph showing the noise level.

Installation

Most modern engines will already have a knock sensor fitted as standard, but any type of knock sensor may be fitted as required. The sensor is normally screwed into a boss on the engine block although some manufactures fit the sensor in the inlet manifold (especially Ford). In either case ,the sensor must be in such a position that block vibrations are coupled to the sensor. Avoid regions of extreme temperature such as exhaust manifolds, turbochargers etc. Choose a suitable mounting point but don't mount the KnockLink© until calibration is complete. The calibration adjustment is on the rear of the KnockLink©, next to the VHT tape. Connect the three cables as follows:

Red		+12 volts
Black		Chassis Earth (ground)
Brown/Black	Knock Sensor	

Note: The second black wire is for two terminal knock sensors. If the application's sensor is a single wire sensor remove the black lead at the heat shrink. For two terminal sensors one terminal is an earth. Terminate the black lead to this terminal. The earth terminal can be determined by checking for continuity between the body of the knock sensor and the terminal.

Calibration and Testing

Connect all wires as above. Locate the sensitivity trimmer on the rear of the unit and turn fully clockwise, maximum sensitivity. Switch on the power supply, all LED's should be extinguished. Using a spanner or similar, tap the engine block adjacent to the sensor and observe the KnockLink©. One or more LED's should briefly flash, then extinguish. The number of LED's that flash are dependent on the sensitivity of the sensor.

Note: Hitting the sensor directly will damage it.

Drive the vehicle and run the engine at approximately 75% maximum power while observing the LED's. Adjust the sensitivity control until the first or second green LED's just light at high power. The green LED's are showing the normal background noise that all engines produce. If detonation occurs the LED's will all light, the top one being very obvious.

Operation

Assuming the engine is operating correctly, the LED's will show only background noise which will rise in proportion to engine power output. Any abrupt rise in signal level at any time is an indication that detonation is occurring. The immediate remedy is to close the throttle. Severe detonation will destroy any engine in seconds.

Knocking is the self detonation of the unburnt fuel in the combustion chamber toward the end of combustion. The flame burns abound ten times faster than normal causing huge pressures.

Possible cures for knocking are; cooler intake air; increased intake humidity; reduce load; increase rpm; enriches or lean engine from lambda stoichiometric; improve spark; increase octane level of fuel; reduce total ignition advance etc.

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