

that knock can be distinguished more easily. The exact knock frequency is different for each engine type. To accommodate for this, a knock frequency selection switch has been included to tailor the KnockBlock to the engine it is being use on.

There are three knock frequencies that may be selected using the slide switch on the front of the KnockBlock.

Frequency	Switch Position
6.0 kHz	Left
7.5 kHz	Centre
9.0 kHz	Right

The default position is 7.5kHz. Finding the optimal position for a given engine may require some experimentation.

Note: The frequency selection switch only affects the output of the display.

The filtering of the signal from the headphone connector is NOT adjustable.

### Sensitivity Adjustment

A higher sensitivity will result in larger noise level readings on the display. The sensitivity adjustment also acts as a volume control when using headphones. Turn the trimmer to its fully clockwise to position 10 (maximum sensitivity). Turn the key on to the ON position. Using a spanner or similar, tap the engine block adjacent to the sensor. If headphones are being used then the noise should be clearly heard. If a KnockLink display is being used then the output should jump in accordance with the taps.

Note: Hitting the sensor directly may damage it.

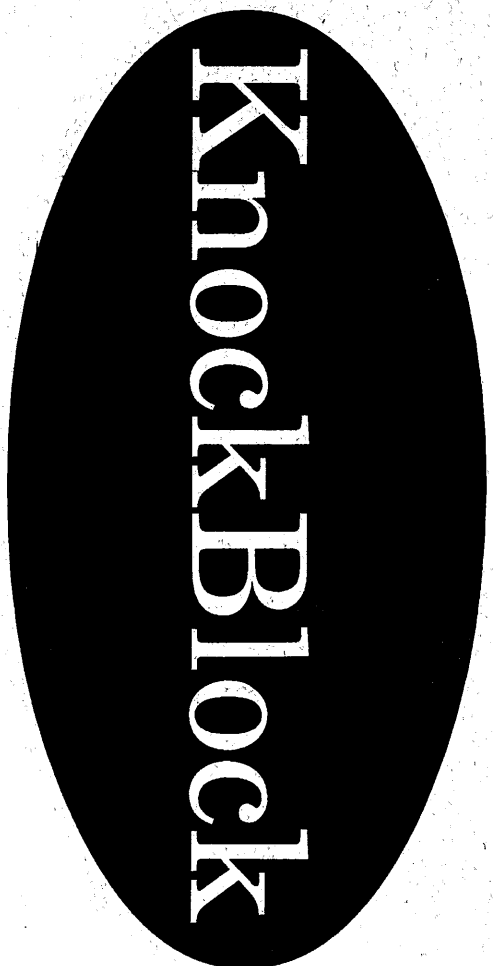
The sensitivity should then be reduced if background engine noise if causing the display to rise to full scale at high engine speeds.

### Display Operation

Assuming the engine is operating correctly, the display will show only background noise. It is not abnormal for this to rise in proportion to engine speed. An abrupt rise in signal level is an indication that detonation is occurring. The immediate remedy is to close the throttle.

When detonation occurs, the flame front burns around ten times faster than under normal conditions causing hugely destructive pressures. Severe detonation can destroy any engine.

Possible cures for knocking are: retarding ignition timing, lowering intake air temperature, reducing air/fuel ratio (enrich mixture), increasing fuel octane level, reducing engine coolant temperature, increasing intake air humidity, reducing load, increasing rpm, improving spark, etc.



### Link ElectroSystems Ltd. Limited Warranties Statement

Effective April 5, 1992 5 p.m.

All products manufactured or distributed by Link ElectroSystems Ltd. are subject to the following, and only the following. LIMITED EXPRESS WARRANTIES, and no others:

For a period of one (1) year from and after the date of purchase of a new Link ElectroSystems Ltd. product, Link ElectroSystems Ltd. warrants and guarantees only to the original purchaser - user that such a product shall be free from defects of materials and workmanship in the manufacturing process. A product claimed to be defective must be returned to the place of purchase. Link ElectroSystems Ltd., at its sole option, shall replace the defective product with a comparable new product or repair the defective product. This expressive warranty shall be inapplicable to any product not properly installed and properly used by the purchaser - user or to any product damaged or impaired by external forces. This is the extent of warranties available on this product. Link ElectroSystems Ltd. shall have no liability whatsoever for consequential damages following from the use of any defective product or by reason of the failure of any product. Link ElectroSystems Ltd. specifically disclaims and disavows all other warranties, express or implied including, without limitation, all warranties of fitness for a particular purpose (except for those which apply to product or part thereof that is used or bought for use primarily for personal, family, or household purposes), warranties of description, warranties of merchantability, trade usage or warranties of trade usage.

### Link ElectroSystems Ltd. Licence Agreement

The programme in this system is licensed not sold. Link ElectroSystems Ltd. grants you a license for the programme only in the country where you acquired the programme. You obtain no rights other than those granted under this license. Under this license you may use the programme on only one machine at any one time. If you transfer the Programme you must transfer a copy of this license and all other documentation. Your license is then terminated. You may terminate your license at any time. Link ElectroSystems Ltd. may terminate your license if you fail to comply with the terms and conditions of this license. In either event you must destroy your copies of the programme.

By Link ElectroSystems Ltd.

## System Description

The KnockBlock is a tool to be used for the detection of engine knock (also known as detonation or pinking). The system takes a signal from an engine mounted knock sensor, processes this signal and then produces an output that can be used by various devices.

A knock sensor is not supplied with this product, as most modern engines will already have a knock sensor fitted as standard. However, engines that do not have a factory fitted knock sensor must have one retrofitted.

The KnockBlock has two dedicated outputs. One output may be used to drive a display device such as the KnockLink Digital (not included). The second output is via a headphone connector. By plugging a set of headphones (not included) into this, the noise picked up by the knock sensor may be monitored directly.

## Sensor Installation

The knock sensor is normally screwed into a boss, which is centralized on the side of the engine block. Alternatively, some manufacturers fit the sensor in the inlet manifold (especially Ford). In either case, the sensor must be positioned so that block vibrations are coupled to the sensor. Avoid regions of extreme temperature such as exhaust manifolds or turbochargers.

## Mounting

The KnockBlock should be mounted in a clean and dry position. Typical positioning is under the dash. However, it is important that the adjustments on the KnockBlock remain accessible.

## Wiring

The KnockBlock has a 8-pin connector and wiring harness. Each wire has the following function:

**Power In (Red wire/Pin 2)** - This wire should be connected to a switched 12V supply, which will supply power when the key is turned to the ON position.

**Ground In (Black wire/Pin 1)** - This wire should be connected to any convenient ground point. This point must be clean and free from paint or grease.

**Power Out (Red wire/Pin 3)** - This wire provides power for the display (KnockLink Digital or similar).

**Ground Out (Black wire/Pin 5)** - This wire provides a ground for the display.

**Knock Out (Blue wire/Pin 4)** - This wire carries a 0-5V analogue signal from the KnockBlock to the display. The output voltage should be at a low level under normal conditions and increase significantly during knock.

There is also a 3.5mm headphone connector on the side of the KnockBlock. By connecting headphones to the KnockBlock, the listener will hear the signal

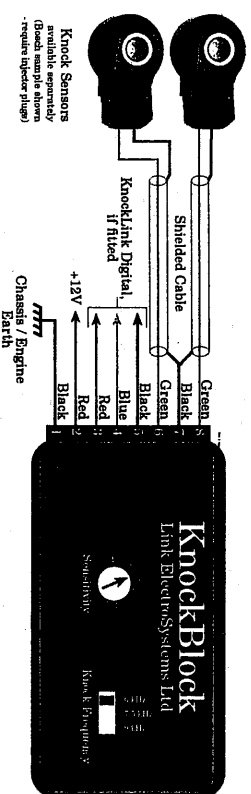
coming from the knock sensor. This proves to be a very successful method of monitoring engine knock provided the listener has sufficient experience to know what to listen for.

Knock 1 & Knock 2 (2 grey shielded cables with green core/Pins 6 & 8) - These two cables are the inputs from the knock sensor/s. Inline engines usually use a single sensor while engines with a V configuration usually have two sensors. If a single sensor is used, only one of the two cables must be connected.

Note:

1. The green wire in the middle of the cable is the signal wire and should be connected to the knock sensor. If the knock sensor has two terminals, then the second terminal is a ground and should be connected to the braided shield. Checking for continuity between the body of the sensor and ground can usually identify which of the two terminals are ground. If there is no continuity between the body and either terminal, then the polarity is not important. For single terminal sensors the shield may be left unconnected.
2. The shielded cable/s from the knock sensor/s must be routed well clear of HT leads, coils and other ignition components. The output signal of the knock sensor can be easily interfered with by the ignition system (hence a shielded cable is used).
3. The KnockBlock Digital must use a stand-alone sensor and not be shared in conjunction with any other device. Therefore, if the factory or Link ECU is connected to the knock sensor, then it must be disconnected or a second sensor must be used. This is because the KnockBlock modifies the knock signal and this may interfere with existing systems using the sensor.

The wiring information above is summarised in the following diagram.



## Calibration

To calibrate the KnockBlock there is a sensitivity adjustment trimmer and frequency selection switch on the front of the KnockBlock.

## Frequency Selection

Each engine produces a large amount of noise at a particular frequency when engine knock occurs. The KnockBlock removes noise at other frequencies so