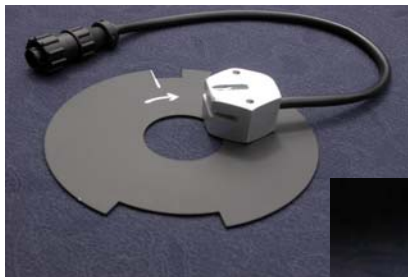


Engine Management Systems



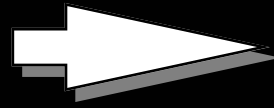
Overview:

The POLESTAR Systems manufactures a range of low cost yet highly sophisticated engine management systems, ranging from the basic 2D ignition-only system up to the full 3D Turbo Fuel Injection System.

Although developed for the Mini A-Series engine the systems can be used on virtually any engine. The systems features include,

- Sequential twin-point fuel injection specifically designed for the A-Series engine (requires cam sensor)
- Optional single point mode (multi-injector)
- 2D or 3D Ignition only distributor-less versions also available
- Direct crankshaft trigger for greater accuracy
- Accurate control of ignition timing and fuelling
- Timing/Fuelling adjusted with 8 load sites at every 500 rpm from 0-10000rpm
- Integral 'smooth-cut' rev limiter included as standard
- Optional 'Boost Retard' feature with integral MAP sensor for Turbo engines
- Optional knock sensor with automatic retard on knock detection
- Race proven - Used by Sarah Munns and Lee McNair and other front running Mini Miglias

POLESTAR Systems



Details:

Originally developed and tested in conjunction with Bryan Slark of Slark Race Engineering and Jon Lee of LynxAE using their dyno facilities.

Fuel Injection (New)

The POLESTAR fuel injection system has been specifically designed for the A-Series engine. It can be used in either single point or multipoint sequential mode (requiring a cam sensor). It will operate with turbo/supercharged and normally aspirated engines. When running in sequential mode injector timing is carefully controlled to ensure correct mixture balance between the cylinders sharing an inlet port.

The system consists of a management ECU, a magnetically operated crankshaft sensor and a timing disk which attaches to the crankshaft pulley of an A-Series engine. (it can be modified to fit many other types of engine). Various other sensors are required depending on the system type. These are typically a throttle position



sensor, MAP sensor, water temperature sensor and inlet air temperature sensor.

All POLESTAR ECUs provide a standard rev counter output, and the fuel injection ECUs can control the engine cooling fan and fuel pump.



Ignition Only

In addition to our fuel injection systems we also supply ignition only systems. The basic two dimensional ignition only system provides a simple mapped ignition for carburettor based engines. The engine's advance curve can be tailored to the engine with ignition points at every 500 rpm up to 10000rpm. This system has been used successfully for several years by Mini Miglia and other race formulas.

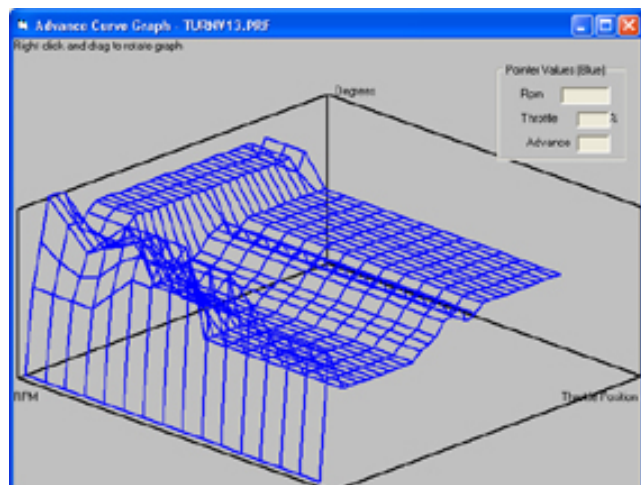
By adding a throttle position sensor or using an optional integral MAP sensor the system can operate in 3D mode. The ignition timing can then be set based on both RPM and throttle position/manifold pressure. This allows an engine to produce more power and run more efficiently with part throttle openings.

A typical 3D ignition curve is shown below

Boost Retard

On turbo engines it is often ideal to be able to apply a controlled amount of ignition retard as the boost pressure increases. This is important to prevent dangerous detonation which can quickly melt pistons and destroy an engine.

The POLESTAR Turbo Management System employs an integral manifold absolute pressure sensor (MAP) which constantly measures the turbo boost pressure (0-1.5bar, or 0-22psi) boost). The system can then be configured with between 0 and 5 degrees of ignition retard per PSI of boost pressure. This value can be configured in 0.25



POLESTAR Systems



degree increments for super accurate engine timing under boost conditions. The calculated retard value is subtracted from the base advance figure in the engine map. This gives safe smooth delivery of power from a turbo engine.

This functionality is available in both our fuel injection and ignition only ECUs.

Knock Control

If ignition timing is over advanced or if too much boost pressure is applied in a turbo engine then detonation or 'knock' can occur. This can prove disastrous to an engine, causing serious damage.

All POLESTAR systems can be supplied with an integral knock sensor to detect any detonation. This consists of a detector which is tightly bolted to the engine block. The ECU then 'listens' to this sensor just after it has fired the ignition. The detector can 'hear' the high frequency noise generated by detonation.

If knock is detected the ECU will automatically

begin retarding the ignition timing (and adding extra fuel in the case of a fuel injection ECU). It continues to do this until no more knocking occurs. This way the engine can continue to run safely.

Mapping Software

All systems can be supplied with a connecting cable and mapping software. This software will run on Windows 98/NT/2000/XP. It is simple to use and allows 'Live mapping' of all engine parameters with the engine running.

For more information please contact POLESTAR directly at the address below, or at www.polestarsystems.com or through

Slark Race Engineering,
174 London Road, Amsebury,
Wiltshire, SP4 7EL
Tel: 01980-624477.

Harris Motorsport,
Nine Yews,
Nr Cranborne,
Dorset,
Tel: 01725-517999

LynxAE
Unit 1, Rose Lane
Forest Rd., Hanslope
Milton Keynes MK19 7DE
Tel / Fax : 01908 510000

Options

POLESTAR Management System **£449.00**

Ignition only system including an ECU, timing disk, magnetic sensor and loom

POLESTAR Turbo Management System **£512.00**

Ignition only system including an ECU, timing disk, magnetic sensor, loom and integral MAP (manifold absolute pressure) sensor with 'boost retard' feature.

POLESTAR Turbo Management System with Knock Control **£583.00**

This includes everything in the above system but also with an integral knock sensor which automatically retards the ignition on knock detection

POLESTAR Fuel Injection System **£511.00**

ECU, timing disk, magnetic sensor, cam sensor if required and loom. Requires throttle position sensor and temperature sensors

POLESTAR Turbo Fuel Injection System **£529.00**

ECU, timing disk, magnetic sensor, loom and integral MAP (manifold absolute pressure) sensor with 'boost retard' feature. Requires throttle position sensor and temperature sensors.

POLESTAR Turbo Fuel Injection System with Knock Control **£594.00**

This includes everything in the above system but also with an integral knock sensor which automatically retards the ignition and increases fuelling on knock detection

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