

## Mini 1.3i Technical Info & Tips

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## 1. Troubleshooting the MAP Sensor

SPi models only — MPi models utilize a sensor which is mounted directly in the manifold rather than in the ECU. This eliminates the need for the often troublesome vacuum lines.

What is the MAP sensor? MAP is an acronym for "manifold absolute pressure". The MAP sensor measures the vacuum levels in the inlet manifold (engine load), and the data is used by the ECU to make fuelling adjustments. On SPi models, the sensor is located within the ECU housing, and connected to the manifold via a series of vacuum tubes and a vapor trap.

A blocked or leaking MAP sensor vacuum line can cause the engine management system to do all sorts of crazy things: common symptoms can include poor idling, stalling, and very rich running (which results in sooty spark plugs and exhaust).

This problem is more common than you might imagine, and if you are experiencing running problems on your SPi, this is often the best place to start.

The vacuum lines run from a fitting at the back of the inlet manifold to the vapor trap, and from there to the ECU. It's important to check each of these connections, and the vacuum lines and vapor trap for cracks, holes, or blockage. For easiest access, remove the air cleaner assembly.

The vapor trap can be popped out of its holder for inspection. Air should flow freely through the trap and you can check this by blowing air into the white inlet connector.

Inspect the vacuum line and connectors carefully. The vacuum line is strong but not very flexible, so it's easy to kink and crack. If you find a line or connector is compromised, replace it. The factory vacuum line includes some excess, so it is possible to do some minor trimming if there are cracks or breaks in the line at either end.

When you reassemble everything, be sure to route everything correctly! The vacuum line runs from the manifold to the trap inlet (white connector), and then from the trap outlet (green connector) to the ECU.

Applicable part numbers:

- vapor trap: NPC10001 or JZV1222
- ECU vacuum line: MLH10026
- manifold vacuum line: MLH10022
- vacuum elbow connectors: NNZ10001



*Vapor trap*



*Map sensor*

## 2. Factory Alarm / Immobilizer

### A. Rover Mini Factory Alarm / Immobilizer



The factory-fitted alarm / immobilizer unit is the Lucas 5AS, sometimes branded TRW. This unit is also used on the Rover 25/45/45/100/200/400/600/800 in addition to the Mini. Unfortunately, many of the features of the 5AS aren't used on the Mini.

The 5AS can flash the indicator lamps when the alarm is enabled. Late MPi models are wired this way.

The 5AS can control power locks (i.e. lock/unlock with the use of the fob) by connecting a control wire to the appropriate pin on the 5AS. This wire can be obtained with most Mini power lock kits.

The 5AS can "blip" the horn when turning the alarm on and off, although this feature is for some reason enabled on very few Minis.

The 5AS can accept EKA (electronic key access) codes, which allow the immobilizer to be disabled in the event the fobs are lost or damaged. This is accomplished via switches in the exterior door locks, and of course both the switches and wiring are absent on the Mini. In theory, these could be added, though...

Early alarm units are Lucas 3AS, which use a one-button fob. Like the 5AS, these are usually quite reliable, but unfortunately the one-button fobs they use are less so, and have in the past been difficult to replace.

### B. Key Fobs



The original fobs were Lucas 3TXA, and current replacements are Lucas 17TN. These fobs also work with the Lucas 10AS alarm, which is used in Land Rover Discovery and Defender models.

There is NO generic replacement for these fobs. You must use the real thing, or a dedicated substitute (see the "news" at the bottom of the page).

You CANNOT program them yourself at home! Replacement fobs can only be programmed by taking your Mini to a Rover (not Land Rover) dealer, or by removing and shipping the alarm unit to a UK company specializing in this type of work.

Up to two fobs can be programmed per car.

### **C. Repair and Fob Programming**

Replacement 5AS units can be obtained from [BBA Reman](#). Be aware that if you replace your 5AS, you will have to have your fobs and alarm re-programmed to work together. If you have an MPi, your 5AS and the engine management ECU are "keyed" to one another, making replacement extremely difficult for those located in countries lacking a Rover dealer network.

Replacement fobs and programming are available from [Mobiletuning](#). If you want an original-style fob, you will need to remove your 5AS unit from the car, and ship it to Mobiletuning in the UK, along with any fobs. Mobiletuning can also provide replacements for the one-button 3AS fobs, OR reprogram your 3AS to no longer arm itself automatically. Of course, with the alarm unit removed from the car, it will not run until it is re-installed!

NEWS! Mobiletuning now offers a fob which can be programmed without removing your 5AS unit from the car. They instead supply a special new fob, and a "dongle" which attaches to the diagnostic socket of your Mini. The dongle "programs in" the new fob to your alarm unit. Email them about the ROV2 fob via their website using the above link! This is a more expensive option, but is an attractive alternative for those in places other than the UK who can't have their Mini out of service.

### 3. Consumables and Parts Substitutions

#### A. Consumables

Part Name	Rover/Unipart Part Number	Part Substitution
Oil Filter (SPi)	GFE166	K&N HP1002 Fram PH966B AC Delco 93156323 Beck/Arnley 0418988 Purolator L10028
Oil Filter (MPi)	GFE280	Fram PH4952 WIX 51312
Fuel Filter (SPi)	GFE7119 or GFE7059	Fram G3727 Wix 33481
Fuel Filter (MPi)		
Air Filter (all injection models)	GFE1143	No generic paper element filters are available in North America. For about the price of two genuine Unipart filters, one can purchase a K&N E-9172 reusable filter.
Wiper Blades / Refills	GWB341	Bosch VW [classic] Beetle 10" wiper blades and refills are an exact replacement.

#### B. Parts

The parts listed in the following table are applicable to both SPi and MPi models, except where indicated.

Part Name	Rover Part Number	OEM Part Number	Part Substitution
Lambda Sensor	MHK10004		A generic sensor with the correct number of wires can be fitted by splicing the original Rover wiring and connector on to the new replacement sensor. The OEM Rover sensor is also used on the Rover Metro/45/200/400/600/800 & MGZS.
Coolant Temperature Sensor	ADU7161	Lucas 73246A	No generic equivalent is known. The OEM sensor is also used on the Rover Metro/45/200/400/600/800 & MGZS/MGF/MGTF.
Inlet Air Temperature Sensor	NNK10001	Elmwood Sensors ES110-1	No generic equivalent is known. The OEM sensor is also used on the Rover Metro/45/200/400/600/800 & MGZR/MGZS/MGF/MGTF.
Vapor Trap (MAP Sensor Vacuum System)	JZV1222 or NPC10001		No generic equivalent is known. The OEM part is also used on the Rover Metro/200/400.
Crank Sensor	ADU7340		No generic equivalent is known. The OEM part is also used on the Rover Metro/200/400.
Relay	YWB10012	Siemens V23134-B52-X127	This series of Siemens relay (V23134) appears to be very common in the automotive world, and is also produced under license by Tyco. I will need to do some additional research in order to find the specific part numbers which are appropriate substitutions. Land Rover uses a relay YWB10012L (Range Rover, Defender and Freelander). As far as I know, it's exactly the same as YWB10012. Maybe the "L" is for "Land Rover"? The OEM part is also used on the Rover Metro/75/200/400 & MGZS/MGZT/MGF/MGTF.
Turn Signal / Hazard Flasher	DRC8626	Lucas 35093A	The OEM part is also used on the Land Rover Freelander.

Fuel Injector	not available separately	Bosch	
Fuel Pump Inertia Switch	WQT10001	First Inertia Switch	No generic equivalent is known. The OEM part is also used on the Rover Metro/200/400/800.
Fuel Pump (SPi)	WFX10045	SiemensVDO X10-736-002-008	No specific equivalents known at this time, although it is rumored that because these were pulled from the GM Delphi parts bin, replacements can be sourced at your local NAPA... It is possible to purchase the OEM part from SiemensVDO (Europe), but the cost is not significantly less than purchasing directly from Rover.
Fuel Pump (MPi)	WFX100810	SiemensVDO X10-736-002-009	No specific equivalents known at this time, although it is rumored that because these were pulled from the GM Delphi parts bin, replacements can be sourced at your local NAPA... It is possible to purchase the OEM part from SiemensVDO (Europe), but the cost is not significantly less than purchasing directly from Rover.

## 4. Engine Management & Diagnostic Tools

A few members of the MiniMania message board and I have done quite a bit of research in an effort to tackle the mystery of the Mini's engine management system. In the US, it's somewhat challenging, since we do not have a Rover dealer network.

Rover used a system called MEMS (Modular Engine Management System), basically across the entire range of passenger vehicles. The implementation varies, of course, from one vehicle to another. It is a completely proprietary system, and because of this, there are very few aftermarket devices which can interface with it, and all of them are expensive, as they are geared primarily toward professional users rather than hobbyists.

Rover's proprietary diagnostic/control device is called the Testbook, which is basically a fancy Hewlett-Packard PC with some special expansion cards and cables which allow it to interface with MEMS. It's a complete, turnkey sort of device which has a touch screen and rolls around in a heavy-duty case. Who has the Testbook in the US? Land Rover dealers do, but the catch is that they only have the software and cabling for Land Rover models — not the Mini or any other Rover passenger car. The Testbook is so expensive (about \$15,000) that only the most successful non-dealer shops could afford such a thing — and I am not aware of any non Land Rover shops who have one, although I'm sure some exist, somewhere.

One notch down from the "real" Testbook is a system called Rovacom, which comes in two "flavors", the regular Rovacom system, which is a rugged, dedicated pc-based system which mimics both the physical and functional characteristics of the Testbook. It also is very expensive, again geared towards large shops which do a substantial amount of work on Land Rover vehicles. There is also a much less expensive version known as Rovacom Lite, which includes only the basic hardware interface, and in this incarnation, the user provides a PC or laptop on which to run the software. Software modules and cables can be purchased a la carte from Rovacom. The system is primarily targeted at shops which repair Land Rovers, but they recently added support for some non-Land Rover applications: Rover MEMS 1.6/1.9, and the Lucas 5AS alarm ECU. This covers engine diagnostics/ECU control for injection Minis from roughly 1991-1996 (1997-on MPi models/MEMS 2J is not currently supported), and alarm/immobilizer control for Minis from roughly 1993-on. The Rovacom system is unique in that it comes closest to duplicating the functionality of the Testbook. One can perform some very advanced functions which go well beyond basic monitoring. A Rovacom Lite system with these two software modules and the appropriate cables would cost approximately \$1300, which is still very expensive, but within the reach of very serious hobbyists. <http://www.blackbox-solutions.com>

The balance of diagnostic devices are freestanding, hand-held devices which typically perform very basic functions such as reading and clearing error codes, and real-time monitoring of engine management. Currently known units which support Rover MEMS and the Mini are manufactured by both Krypton and Sykes-Pickavant. Cost of the units, Rover ROM modules and cables is roughly \$800-\$1000. Haynes



Garage Equipment apparently also manufactured a similar unit, but Haynes has apparently since sold off this division of the company and I am unaware of any current information on their product.

A user of our message board claims to have some equipment of the Testbook/Rovacom level, but thus far has not been forthcoming with any specifics, and I would currently consider it anecdotal information at best.