



DIESEL HIGH PRESSURE PUMP TEST KIT

MODEL NO: **VS216**

Thank you for purchasing a Sealey product. Manufactured to a high standard, this product will, if used according to these instructions, and properly maintained, give you years of trouble free performance.

IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY. NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS & CAUTIONS. USE THE PRODUCT CORRECTLY AND WITH CARE FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY. KEEP THESE INSTRUCTIONS SAFE FOR FUTURE USE.



Refer to instructions



Wear eye protection



Wear heavy duty protective gloves

WARNING!

- Ensure that Health and Safety, local authority and general workshop practice regulations are strictly adhered to.
- Diesel high pressure fuel systems can produce pressures over 1,000bar(14,500psi). Contact with a jet of high pressure fuel **WILL** penetrate skin resulting in serious injury. If fuel enters the blood stream it can cause heart failure resulting in death.

1. SAFETY

- × **DO NOT** Crack fuel lines under pressure or to bleed air from system.
- × **DO NOT** Check for leaks with hands or by leaning over engine.
- ✓ **ALWAYS** wear suitable safety eye protection, overalls and heavy duty protective gloves or gauntlets.
- × **DO NOT** wear jewellery. Tie back long hair.
- ✓ **ALWAYS** check for leaks from a distance visually and/or by using a long piece of card or wood to wipe against the pipe or component being checked.
- ✓ **ALWAYS** wait at least 20 minutes for the fuel system to naturally de-pressurise with the vehicles engine switched off before loosening/disconnecting pipework.
- ✓ **ALWAYS** loosen pipework with a cloth wrapped around the fitting/nut to reduce the likelihood of spray if system is unexpectedly pressurised.
- ✓ **ALWAYS** read manufacturers information for the fuel system being worked on before commencing work on the fuel system.
- × **DO NOT** use tools if damaged.
- ✓ Maintain tools to ensure that they are in an adequate condition for safe use and optimum performance.
- ✓ Ensure that a vehicle that has been raised by a jack is adequately supported. Use axle stands.
- × **DO NOT** leave tools in or near the engine. Return tools to suitable storage after use. Account for all tools, parts and components being used.
- ✓ When not in use, store in a safe dry and childproof place.
- ✓ Keep children and unauthorised persons away from the work area.
- ✓ With high pressure common rail systems, cleanliness is very important. Check before connecting any pipes or hoses that they are perfectly clean.
- ✓ Make sure vehicle has sufficient fuel before testing.

2. INTRODUCTION

Essential tool for accurately measuring the high pressure fuel circuit of diesel common rail systems. Features 2,000bar gauge, pressure relief valve and high pressure flexible hoses. The kit also includes a set of dummy pump regulator and injector pipe blanks. Kit allows for a variety of tests to be conducted;

- Engine cranking/running pressure test
- Maximum pump pressure test
- Pump pressure regulator test
- Injector leakage test

The VS216 comes with three main components parts which make up the complete kit, enabling a variety of test to be carried out.

- Gauge and hose assembly VS216A (Fig.3)
- Dummy pump regulators VS216B (Fig.4)
- Injector pipe blanks VS216C (Fig.5)

3. SPECIFICATION

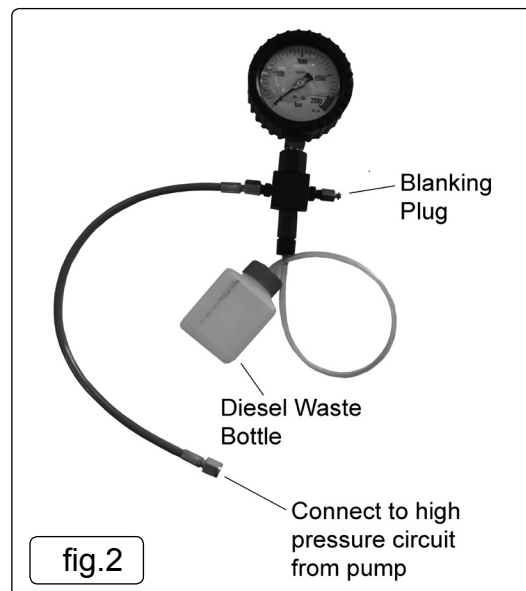
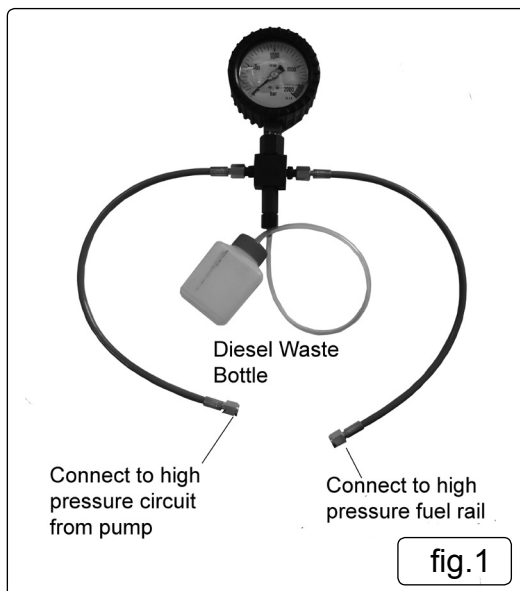
Model No.....VS216
 Gauge Pressure range.....0-2000bar
 Safety valve opening pressure.....1,300bar
 Hose Length.....500mm(x4)
 Hose Fittings.....M12x1.5(x2), M14x1.5(x2)
 Hose fitting adaptors.....M12x1.25(x2), M14x1.25(x2)
 Injector pipe blanks.....M12x1.5(x6), M14x1.5(x6)

Dummy Regulators.....Bosh CP1
Bosh CP3
Delphi DFP1/DFP3
Denso HP1/HP2
Denso HP3
Siemens DCP1
Siemens DCP2

4. OPERATION

4.1. Engine cranking/running pressure test

- 4.1.1. Connect gauge in series, to the vehicles high pressure circuit. This will allow the engine to operate as normal giving the actual fuel pressure reading.
- 4.1.2. **Parts of kit required – VS216A**
 - 4.1.2.1. Locate high pressure pipe from pump to the fuel rail. If access is difficult, locate the pipes from fuel rail to injector.
 - 4.1.2.2. With fuel system de-pressurised, disconnect accessible high pressure pipe and connect gauge with either M12 or M14 hoses. Make sure all hose fittings are tight before proceeding. (Fig 1)
 - 4.1.2.3. Connect diesel waste bottle with tube to bottom of gauge. The bottle will collect the waste fuel when the pressure relief valve has activated. (Fig 1)
 - 4.1.2.4. Crank/start engine. It may take a few seconds for the engine to start due to air in the system. With engine cranking and at idle the reading should be around 300bar.
 - 4.1.2.5. A non-starting vehicle should still have a reading of 300bar.
 - 4.1.2.6. With engine running, visually check there are no fuel leaks before proceeding. If a fuel leak is found, switch off engine and allow system to de-pressurise before checking fittings are tight/sealing correctly. Once done, start engine and check for leaks again.
 - 4.1.2.7. Increase engine speed making sure the fuel pressure increases accordingly.
 - 4.1.2.8. The most important parameter is that 300bar is achieved with the engine at idle or under engine cranking conditions. If this pressure is correct, we can deduce that the low-pressure circuit is working properly and the high pressure pump is supplying the minimum pressure needed to start the engine.
 - 4.1.2.9. In the event that the pressure is correct but the engine does not start, the problem is not likely to be the pump and could be an electrical/injectors/mechanical fault.
- 4.1.3. **If the pressure does not reach the required pressure, follow the below steps.**
 - 4.1.3.1. Test the pressure at the inlet of the high pressure pump with a low pressure tester (not supplied).
 - 4.1.3.2. If the pressure at the high pressure pump inlet is correct, check the maximum pressure of the pump and carry out Injector leakage test as below.



4.2. Maximum pump pressure test

- 4.2.1. There are high pressure pumps which disconnect the third piston when the pressure required is low, so they work only with the two pistons, whereby the engine power requirement is less. The third piston is activated by a solenoid when 600-700bar is reached.
- 4.2.2. Connect gauge to the vehicles high pressure circuit. This will not allow the engine to start and testing is done with engine cranking only. Pressure should rise to above 1050bar which shows the pump is working correctly.
- 4.2.3. **Parts of kit required – VS216A**
 - 4.2.3.1. Locate high pressure pipe from pump to the fuel rail. If access is difficult, locate the pipes from fuel rail to injector.
 - 4.2.3.2. With fuel system de-pressurised, disconnect accessible high pressure pipe and connect gauge with either M12 or M14 hose. Fit blanking plug to gauge outlet. Make sure hose fittings are tight before proceeding. (Fig 2)
 - 4.2.3.3. Connect diesel waste bottle with tube to bottom of gauge. The bottle will collect the waste fuel when the pressure relief valve has activated. (Fig 2)
 - 4.2.3.4. Crank engine. Pressure should quickly increase to above 1050bar. This indicates the pump is working correctly. If pressure reading is low it indicates the pump or pressure regulator is at fault. To identify which is faulty carry out a pump pressure regulator test.
Note – A problem with the pressure sensor (located on the fuel rail) can send the wrong information to the PCM and therefore give the wrong information to the pressure regulator causing it to open early resulting in a low pressure reading. This can be checked using an EOBD tool with live data and comparing the actual pressure from the gauge to the reading from the EOBD tool.
- 4.3. **Pump pressure regulator test**
 - 4.3.1. Essential test to determine if the fault is caused by a faulty pump or regulator when there is a low maximum pressure.
 - 4.3.2. **Parts of kit required – VS216A & VS216B**
 - 4.3.2.1. With fuel system de-pressurised, remove pressure regulator from pump.
 - 4.3.2.2. Select the required dummy regulator from the VS216B kit and fit to pump.
 - 4.3.2.3. Carry out 'Maximum pump pressure test refer to section 4.2. If the pressure now increases to above 1050bar it indicates the regulator is at fault. If pressure is still low the pump will be at fault.
Note – A problem with the pressure sensor (located on the fuel rail) can send the wrong information to the PCM and therefore give the wrong information to the pressure regulator causing it to open early resulting in a low pressure reading. This can be checked using an EOBD tool with live data and comparing the actual pressure from the gauge to the reading from the EOBD tool.

4.4. Injector leakage test

4.4.1. The VS216C is designed to be used together with VS216A.

4.4.2. This test should be carried out when the cranking pump pressure doesn't reach 300bar not allowing the vehicle to start. By blanking the injector pipes it will show if the loss of pressure is due to faulty injectors (sticking open).

4.4.3. Parts of kit required – VS216A & VS216C

4.4.3.1. With fuel system de-pressurised, disconnect high pressure pipes to the injectors and fit VS216C pipe blanks. (Fig 5)

4.4.3.2. Carry out 'Engine cranking/running pressure test 4.1 above.

4.4.3.3. If pressure has now increased it will show that at least one of the injectors was leaking.

4.4.3.4. To identify which injector is leaking, connect injector pipes individually and repeat test.

4.4.3.5. If pressure is still lower it may be a faulty with the pump or pressure regulator.

5. STORAGE

5.1. Keep the tools clean and dry.

5.2. Replace any damaged parts.

5.3. Do not drop or subject equipment to abnormal shock loadings.

5.4. Store in containers provided.

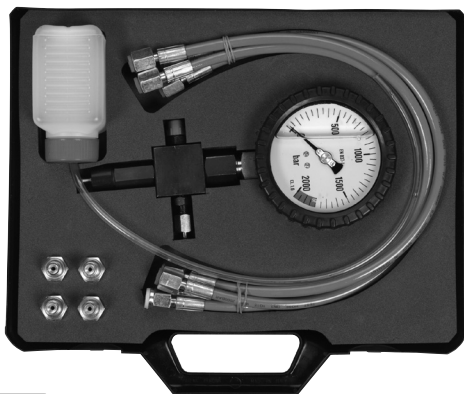


fig.3

Gauge and hose assembly VS216A



fig.4

Dummy pump regulators VS216B

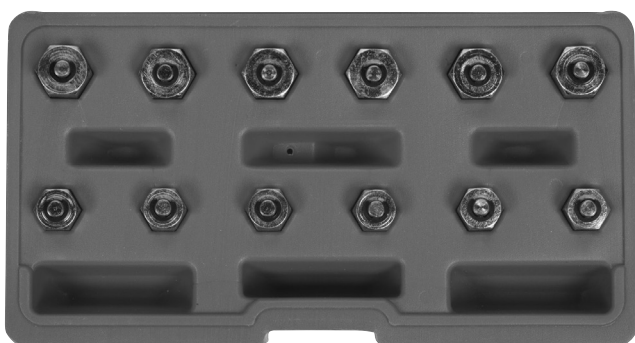


fig.5

Injector pipe blanks VS216C



A: Bosch CP1



B: Bosch CP3



C: Delphi DFP1/DFP3



D: Denso HP3



E: DENSO HP1/HP2



F: Siemens DCP2



G: Siemens DCP1



I: Siemens DCP1



H: Siemens Key

fig.6

Dummy pump regulators



ENVIRONMENT PROTECTION

Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment. When the product becomes completely unserviceable and requires disposal, drain any fluids (if applicable) into approved containers and dispose of the product and fluids according to local regulations.

Note: It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.

Important: No Liability is accepted for incorrect use of this product.

Warranty: Guarantee is 12 months from purchase date, proof of which is required for any claim.

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