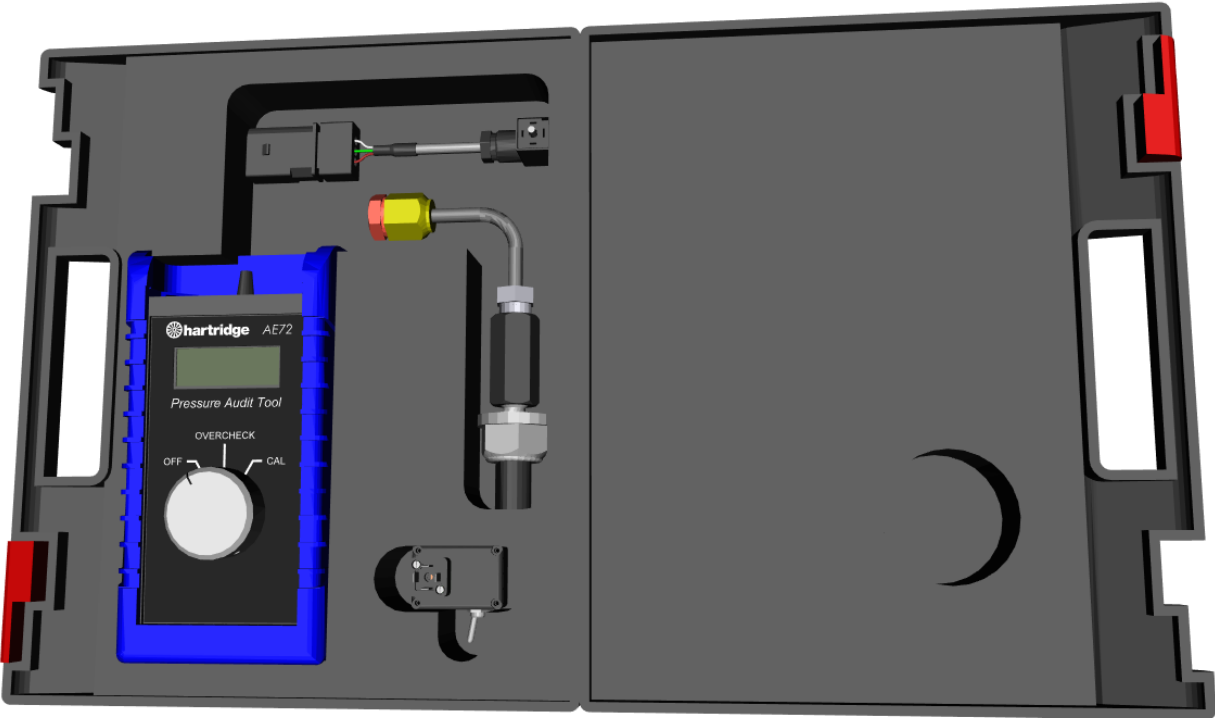




HM1023

(AE72) Pressure Audit Kit

Operating and Servicing Manual



HM1023 (AE72) Pressure Audit Kit

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Foreword

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Safety Information

Warnings, Cautions and Notes

The precautionary notes in this publication, indicated by the words WARNING, CAUTION, or NOTE provide information about potential hazards to personnel or equipment. Ignoring these notes may lead to serious injury to personnel and/or damage to equipment. These notes appear as follows:

WARNING! INDICATES THAT A SITUATION MAY BE HAZARDOUS TO PERSONNEL. INSTRUCTIONS ARE PROVIDED FOR AVOIDING PERSONAL INJURY.

CAUTION! Indicates that conditions exist that could result in damage to equipment. Instructions are provided to prevent equipment damage.

NOTE *Indicates additional information for clarification where there may be confusion.*

Operational & General Warnings



Do not open the guard on the host machine while the system is running. Wait for the machine to stop before opening the guard.

Do not attempt to remove covers of the machine while the system is running. Wait for the test bench to stop, the pressures to decay to zero before opening and to be isolated from the services.

WARNING! HIGH PRESSURE FLUID SPRAYS CAN CAUSE SERIOUS INJURY OR DEATH.



COMMON RAIL SYSTEMS OPERATE AT EXTREMELY HIGH PRESSURES.

DO NOT ATTEMPT TO BYPASS THE PRESSURE DUMP VALVE OR THE SAFETY INTERLOCK.



Ensure good levels of lighting for safe, efficient equipment operation.



High Voltage!

Do not work on electrical equipment while voltage is supplied.



Safety glasses conforming to standard BS EN 166:1996 must be worn when using this equipment for the following reasons:

The host machine is capable of producing high pressures which can cause severe eye injury in the event of a malfunction.

The host machine uses fluid which may be harmful to the eyes.



Gloves conforming to standard BS EN 407:1994 must be worn when handling parts after testing which may be hot.



Safety footwear must be worn in the test area at all times. Injury to the feet may be sustained in the event that equipment under test is dropped (during loading or unloading).



Accidents can occur to unauthorised personnel during testing. Untrained person(s) must not be present in the test area when the equipment is operating. Only qualified personnel are to use this equipment.



This equipment contains electrostatic sensitive devices. Observe the necessary precautions for handling electrostatic discharge sensitive devices. Do not touch printed circuit boards and associated electronic connections and components.



There must be no naked flames. Smoking in the vicinity of the equipment is strictly forbidden. Potentially flammable vapours are present in the test stand and ignition is possible although unlikely.



Severe injury can be caused by slipping on spilt oils or fluids. All spillage of fluids in the test area must be dealt with immediately.



Arc welding equipment must not be operated within 5 metres of the host machine. The electrical supply to welding equipment must be provided from a remote isolating transformer. Arc welding can disturb the electronics.



Ensure that the servicing requirements and intervals as set out in the Maintenance section are adhered to. Operate and service this equipment only if competent to do so..



Use fluid of the correct specification only. Obtain the manufacturers Health & Safety Data Sheets and follow the advice given therein. Prolonged and repeated contact with oil products, ingestion or excessive and prolonged inhalation of oil mists can be detrimental to health. Use an appropriate barrier cream.



Do not adjust the dump valve air pressure regulator on the host machine, this is pre-set and locked off prior to leaving Hartridge. If this is adjusted after leaving Hartridge by unauthorised personnel, it will invalidate the warranty and may cause serious injury.



All injector electrical connectors not in use should be stowed away to prevent any damage to connectors.

1. Introduction

The HM1023 Pressure Audit Kit is designed to provide a means of checking the accuracy and condition of Common Rail pressure transducers on Hartridge Sabre injector Tester, CRi-PC test stands and AVM2-PC test benches fitted with the HB378 Common Rail Base Kit, HF1130 All Makes Common Rail Pump Test Kit and the HK900 All Makes Common Rail Injector Test Kit.

1.1 Kit Overview

Refer to Figure 1.1. The kit consists of -

- A281G200 - Pressure audit test box (1)
- A281A200 - Test box transducer assembly (2)
- A281A210 - Pressure audit test box case (3)
- A281A202 – PTD simulator assembly (4)
- A281P201 – Cable adaptor assembly (5)

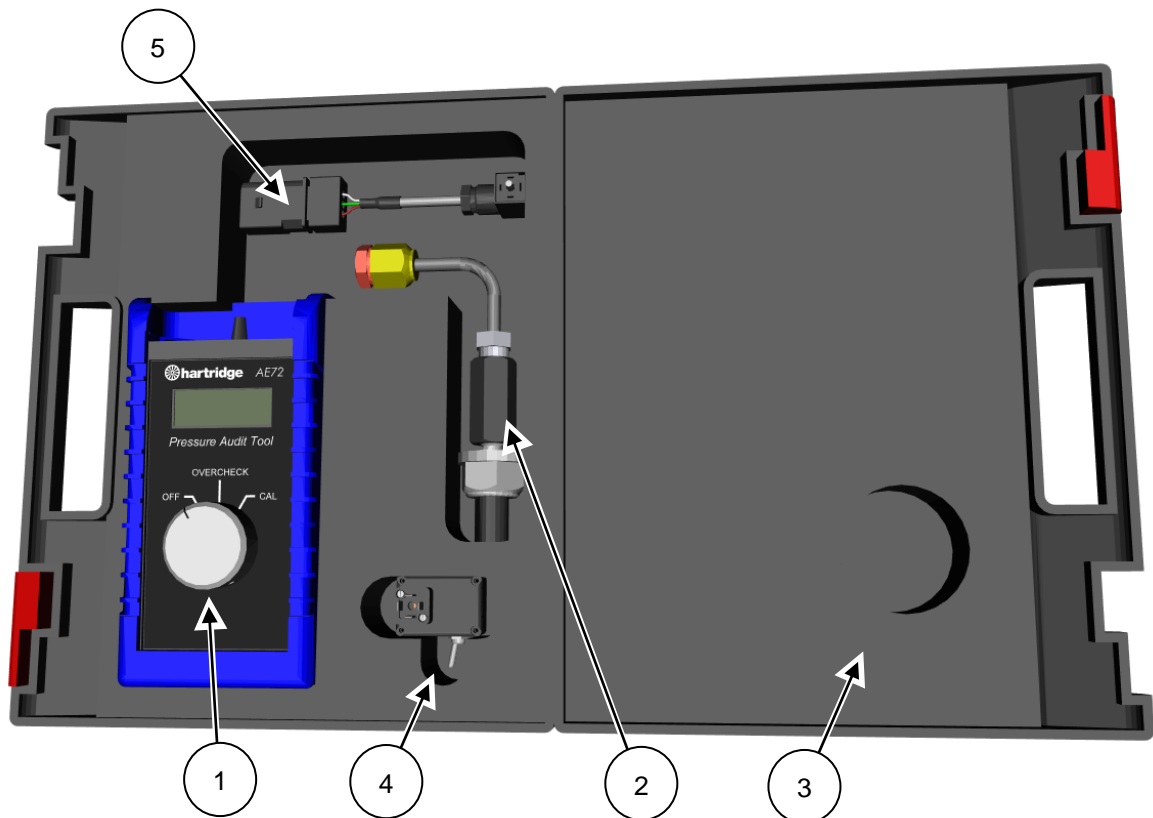


Figure 1.1 Kit Overview

1.2 Specification & Site Requirements

The kit requires a host machine, either a Sabre CRi Master/Expert, CRi-PC or an AVM2-PC (fitted with HB378 Common Rail Base Kit, HF1130 All Makes Common Rail Pump Test Kit and HK900 All Makes Common Rail Injector Test Kit).

The AE72 Audit Test Box is powered by a 9V PP3 battery.

Display resolution is ± 1 bar.

Accuracy is within ± 6 bar of nominal pressure.

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2. Preparation & fitting

2.1 Preparing the test box

1. Connect the battery in the back of the AE72 Audit Test Box. Switch the AE72 Audit Test Box to 'CAL' mode
2. Check that the display shows a value of 5000 ± 2
3. If the value is too low, fit a new 9V battery in the rear of the AE72 Audit Test Box
4. If the value is still out of tolerance the AE72 Audit Test Box must be returned to Hartridge Ltd for recalibration.

2.2 Connections

Refer to Figure 2.1.

1. Switch off the host machine.

For Sabre Master / Expert

2. Connect the AE72 Audit Test Box Transducer Assembly to the high pressure port (1).
3. The transducer cable can enter the guarded area from the bottom of the guard door. Ensure the hydraulic connection are tightened to a maximum torque of 35Nm.

For CRi-PC / AVM2-PC

2. Ensure there is one free outlet port on the common rail (2)
3. Connect the AE72 Audit Test Box Transducer Assembly to the free rail port (3).
The transducer cable can enter the guarded area from the bottom of the guard door on CRi-PC or from beneath the guard on AVM2-PC.
Ensure hydraulic connections are tightened to a maximum torque of 35Nm.
4. Switch on the AE72 Audit Test Box and select 'Overcheck' mode.
Check the display shows 0000 ± 2 .
If the displayed value is out of tolerance the AE72 Audit Test Box must be returned to Hartridge Ltd for recalibration.
5. Do not leave the AE72 Audit Test Box switched ON without using it for extended periods as the battery has a finite life. A weak battery will affect the accuracy of any readings on the display.

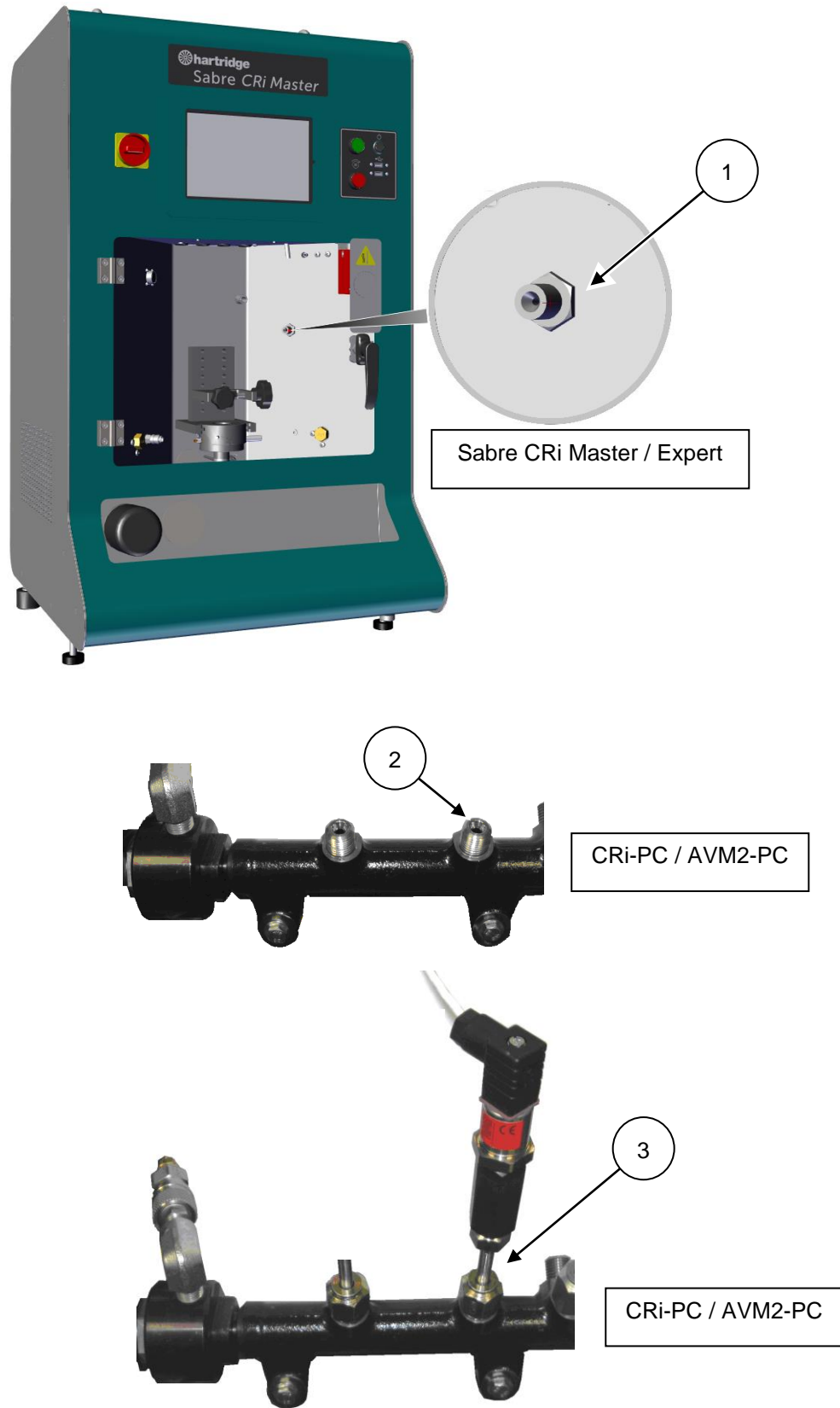


Figure 2.1 Connections

3. System Description

The AE72 Audit Test Box provides a 5 Volt supply to a high pressure transducer. The voltage is derived from the 9V battery. The transducer provides a ratiometric output voltage (between 10 – 90% of supply voltage), the output voltage is proportional to the applied pressure, where 0.5V is equivalent to zero bar and 4.5V is equivalent to 2800 bar.

The AE72 Audit Test Box is calibrated to convert the transducer output voltage into a displayed pressure. The AE72 Audit Test Box has two modes:-

- **CAL**
Provides a reading of the 5V supply voltage to the transducer. The pressure reading is dependent on an accurate supply voltage. It is important to periodically check the 'CAL' value is within tolerance to ensure accurate readings.
- **Overcheck**
Provides a reading of the applied pressure. With the paired transducer connected, but no pressure applied, the reading should be zero.

The Pressure Transducer (PTD) Simulator provides a means of checking the calibration of the host machine. A switch connects a simulated 0 bar or Maximum 2800 bar signal into the system. The PTD Simulator connects to the AE72 Audit Test Box via the adaptor cable A281P201, provided in the kit.

4. Operation

4.1 General

The following sections describe typical procedures for the use of the AE72 Pressure Audit Kit. In all cases the correct audit process for the host machine must be followed. Certificates of Compliance must be completed to confirm the host machine is within tolerance.

4.2 Warm Up and Leak Check



WARNING! HIGH PRESSURE FLUID SPRAYS CAN CAUSE SERIOUS INJURY OR DEATH.

COMMON RAIL SYSTEMS OPERATE AT EXTREMELY HIGH PRESSURES.

ENSURE THAT ALL PANELS ARE FITTED TO THE HOST MACHINE.

1. Set up the host machine to run a test, using injectors capable of high pressures.
2. If a 4 line CRi-PC is used, ensure that unused injector positions are populated with injectors but do not connect the injector control cable to the unused injectors.
3. On any host machine, ensure that unused connectors are stowed away to prevent damage to them.
4. Start the host machine in Manual Mode, to allow control of rail pressure and injector parameters.
5. Set the rail pressure to 400 bar and check for leaks around the pressure transducer connections. If a leak is present, stop the machine, ensure the rail pressure has been relieved, switch off the machine and fix the leak.
6. When there are no visible leaks, run the host machine at approximately 1000 bar. Run for several minutes to allow the system to purge air and the temperature to stabilise. Recheck for leaks.

4.3 Pressure Audit (Refer to the Hartridge audit process document for the host machine)



Stop the machine drive before attempting any adjustments. Ensure the rail pressure has dissipated before attempting to remove pressure transducers.



High Voltage!

Only qualified personnel are to attempt adjustments while power is applied to the machine. Observe all safety precautions including, but not limited to - erecting signs warning of the electrical hazard; placing barriers/chains around the hazardous area; ensuring that metal items (such as jewellery) are removed before accessing the hazardous area.

1. Switch on the AE72 Audit Test Box.
2. Set into 'CAL' mode and check the displayed value is 5000 ± 2 .
3. Set into 'Overcheck' mode.
4. Follow the audit procedure as described in the machine audit document.
This generally involves –
 - Checking host machine calibration with the PTD Simulator
 - Adjusting machine calibration if necessary
 - Adjusting the rail pressure on the host machine to the test pressures specified on the audit Certificate of Compliance.
 - Confirming that AE72 readings at each point are within tolerance

4.4 Failed Audits

If the results are out of tolerance, the host machine transducer may be faulty or the host machine pressure calibration may need adjustment. Always check that the AE72 'CAL' value is within specification before rejecting a transducer or adjusting machine calibration, if the 'CAL' value is incorrect the pressure audit results are invalid.

4.5 End of Test



Stop the machine and switch off. Ensure the rail pressure has dissipated before attempting to remove pressure transducers.

1. Switch OFF the AE72 Audit Test Box. Remove the AE72 pressure transducer from the machine.
2. Reconfigure the Host Machine for normal testing.
Ensure hydraulic connections are tightened to a maximum torque of 35Nm.
3. Start the Host Machine in Manual Mode.
Increase the rail pressure and check for leaks.

5. Maintenance

5.1 *Regular Maintenance*

Each Use

1. Switch on the Audit Test Box and set into 'CAL' mode with a pressure transducer connected. Ensure the reading is 5.000 ± 2 .
If the reading is out of tolerance, change the 9V battery in the rear of the Test Box.

Note -

- Lithium batteries should generally give a longer life.
 - Consider carrying a spare battery.
 - Consider using rechargeable batteries (NiMH), ensure that the battery charger is compatible with the type of rechargeable battery used. Also be aware that rechargeable batteries self discharge even when not in use (20-25% per month).
 - Dispose of batteries with care, many types are toxic.
Use collection and recycling facilities where they exist.
2. Inspect sealing faces before fitting equipment to a machine.

Annually

The AE72 Audit Test Box and transducer must be re-calibrated as a pair against a master reference held at Hartridge Ltd., and a calibration certificate issued. The PTD Simulator accuracy should also be checked annually. Contact Hartridge Ltd customer support for further details.

5.2 *General Cleanliness*

The kit should be kept clean. Contamination on the sealing faces or threads can cause leaks, degrade seals and enter the fuel systems of host machines, causing blockages and potential damage to equipment.

1. Ensure that all threads and pressure ports are sealed when not in use with dust caps.
2. The display window of the Audit Test Box may be wiped clean with a damp, non abrasive cloth.
3. Keep the contacts of the PTD Simulator connector and the cable adaptor assembly clean to avoid poor connection and inaccurate readings.

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6. Spares

Please quote the serial number of the unit when enquiring about spares.

Refer to Figure 6.1

6.1 Consumables

Reference	Part Number	Description	Qty
1	9842551	Internal fuse, 100mA, quick blow, 20 x 5	1
2	Source locally	Battery, 9V PP3	1
3	9832054	Sealing plug	1

6.2 General Spares

Reference	Part Number	Description	Qty
4	A281P201	Adaptor Cable Assembly	1
5	A155A117	Test Box Pipe Assembly	1
6	A155A116	HP Interface	1
7	A281P200	Cable Assembly	1
8	A281A202	PTD Simulator Assembly	1

Note: The transducer (9) is not a spares item as the AE72 Audit Test Box and transducer must be calibrated as a pair, and a calibration certificate issued by Hartridge Ltd.

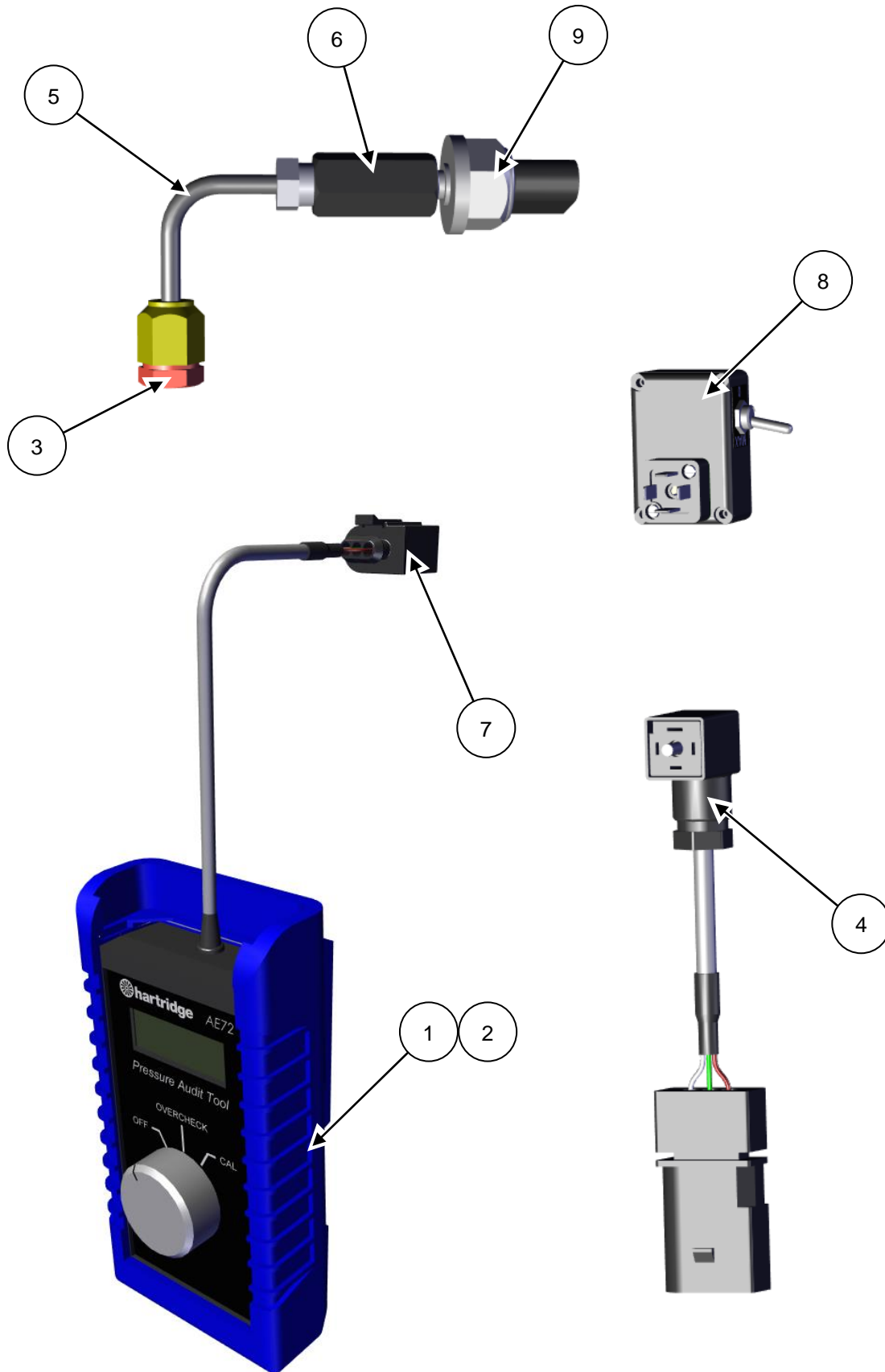


Figure 6.1 Spares



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