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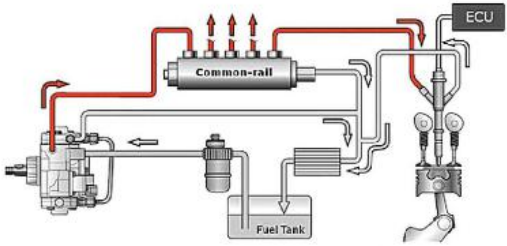
Introduction

With the increasing market share of common rail diesel vehicles, fuel system problems are becoming more common.

There is a need to accurately determine whether these are related to the low pressure circuit, or the high pressure circuit. As well as whether they are hydraulic / electrical related.

This digital tester is specially designed to test the high-pressure circuit, being able to measure pressures up to 2,000 bar (29,400 psi). This tester is suitable for use with the latest Bosch / Denso / Delphi common rail systems.



High pressure side of common rail system

For optimal diagnosis, use in conjunction with a scan tool to view real time pressure data alongside live engine data.

- Measure actual common rail pressure while the engine is running, and compare with the ECU value, to test the high pressure sensor; and

- Test the high pressure pump during start up, by connecting the sensor directly to the high pressure pump outlet, and then starting the engine.

This tester has an integrated wireless Bluetooth module which allows test results to be displayed in real-time on a PC, as well as for test results to be printed wirelessly.

1. One-Year Limited Warranty

Subject to the conditions of this limited warranty, Shenzhen Foxwell Technology Co., Ltd ("FOXWELL") warrants its customer that this product is free of defects in material and workmanship at the time of its original purchase for a subsequent period of one (1) year. In the event this product fails to operate under normal use, during the warranty period, due to defects in materials and workmanship, FOXWELL will, at its sole option, either repair or replace the product in accordance with the terms and conditions stipulated herein. Terms and Conditions

1. If FOXWELL repairs or replaces the product, the repaired or replaced product shall be warranted for the remaining time of the original warranty period. No charge will be made to the customer for replacement parts or labor charges incurred by FOXWELL in repairing or replacing the defective parts.
2. The customer shall have no coverage or benefits under this limited warranty if any of the following conditions are applicable: a) The product has been subjected to abnormal use, abnormal conditions, improper storage, exposure to moisture or dampness, unauthorized modifications, unauthorized repair, misuse, neglect, abuse, accident, alteration, improper installation, or other acts which are not the fault of FOXWELL, including damage caused by shipping.

   b) The Product has been damaged from external causes such as collision with an object, or from fire, flooding, sand, dirt, windstorm, lightning, earthquake or damage from exposure to weather conditions, an Act of God, or battery leakage, theft, blown fuse, improper use of any electrical source, or the product was used in combination or connection with other product, attachments, supplies or consumables not manufactured or distributed by FOXWELL.
3. The customer shall bear the cost of shipping the product to FOXWELL.And

FOXWELL shall bear the cost of shipping the product back to the customer after the completion of service under this limited warranty.

4. FOXWELL does not warrant uninterrupted or error-free operation of the product. If a problem develops during the limited warranty period, the consumer shall take the following step-by-step procedure:
5. The customer shall return the product to the place of purchase for repair or replacement processing,

a) contact your local FOXWELL distributor or visit our website www.foxwelltech.com to get further information.

b) The customer shall include a return address, daytime phone number and/or fax number, complete description of the problem and original invoice specifying date of purchase and serial number.

c) The customer will be billed for any parts or labor charges not covered by this limited warranty.

d) FOXWELL will repair the Product under the limited warranty within 30 days after receipt of the product. If FOXWELL cannot perform repairs covered under this limited warranty within 30 days, or after a reasonable number of attempts to repair the same defect, FOXWELL at its option, will provide a replacement product or refund the purchase price of the product less a reasonable amount for usage.

e) If the product is returned during the limited warranty period, but the problem with the product is not covered under the terms and conditions of this limited warranty, the customer will be notified and given an estimate of the charges the customer must pay to have the product repaired, with all shipping charges billed to the customer. If the estimate is refused, the product will be returned freight collect. If the product is returned after the expiration of the limited warranty period, FOXWELL' normal service policies shall apply and the customer will be responsible for all shipping charges.

5. ANY IMPLIED WARRANTY OF MERCHANTABILITY, OR FITNESS

FOR A PARTICULAR PURPOSE OR USE, SHALL BE LIMITED TO THE DURATION OF THE FOREGOING LIMITED WRITTEN WARRANTY. OTHERWISE, THE FOREGOING LIMITED WARRANTY IS THE CONSUMER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. FOXWELL SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF ANTICIPATED BENEFITS OR PROFITS, LOSS OF SAVINGS OR REVENUE, LOSS OF DATA, PUNITIVE DAMAGES, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF ANY SUBSTITUTE EQUIPMENT OR FACILITIES, DOWNTIME, THE CLAIMS OF ANY THIRD PARTIES, INCLUDING CUSTOMERS, AND INJURY TO PROPERTY, RESULTING FROM THE PURCHASE OR USE OF THE PRODUCT OR ARISING FROM BREACH OF THE WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL OR EQUITABLE THEORY, EVEN IF FOXWELL KNEW OF THE LIKELIHOOD OF SUCH DAMAGES. FOXWELL SHALL NOT BE LIABLE FOR DELAY IN RENDERING SERVICE UNDER THE LIMITED WARRANTY, OR LOSS OF USE DURING THE PERIOD THAT THE PRODUCT IS BEING REPAIRED.

6. Some states do not allow limitation of how long an implied warranty lasts, so the one-year warranty limitation may not apply to you (the Consumer). Some states do not allow the exclusion or limitation of incidental and consequential damages, so certain of the above limitations or exclusions may not apply to you (the Consumer). This limited warranty gives the Consumer specific legal rights and the Consumer may also have other rights which vary from state to state.

2. Safety Information

For your safety, and to prevent damage to the equipment and vehicles, read this manual thoroughly before operating your tool. The safety messages presented below and throughout this user's manual are reminders to the operator to exercise extreme care when using this device. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or

equipment being tested. Read, understand and follow all safety messages and instructions in this manual.

2.1 Conventions Used

We provide safety messages to help prevent personal injury and equipment damage. Below are signal words we used to indicate the hazard level in a condition.

Signal Word	Hazard Level
⚠ DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury to the operator or to bystanders.
⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to the operator or to bystanders.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury to the operator or to by standers.

2.2 Important Safety Instructions

And always use your tool as described in the user's manual, and follow all safety messages.

⚠ WARNING Do not route the test cable in a manner that would interfere with driving controls.

⚠ WARNING Do not exceed voltage limits between inputs specified in this user's manual.

⚠ WARNING Always wear ANSI approved goggles to protect your eyes from propelled objects as well as hot or caustic liquids.

⚠ WARNING Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris produced by a malfunction engine can cause serious injury or death. Do not use the tool in areas where explosive vapor may collect, such as in below-ground pits, confined areas, or areas that are less than 18 inches (45 cm) above the floor.

⚠ WARNING Do not smoke, strike a match, or cause a spark near the vehicle while testing and keep all sparks, heated items and open flames away from the battery and fuel / fuel vapors as they are highly flammable.

⚠ WARNING Keep a dry chemical fire extinguisher suitable for gasoline, chemical and electrical fires in work area.

⚠ WARNING Always be aware of rotating parts that move at high speed when an engine is running and keep a safe distance from these parts as well as other potentially moving objects to avoid serious injury.

⚠ WARNING Do not touch engine components that get very hot when an engine is running to avoid severe burns.

⚠ WARNING Block drive wheels before testing with engine running. Put the transmission in park (for automatic transmission) or neutral (for manual transmission). And never leave a running engine unattended.

⚠ WARNING Do not wear jewelry or loose fitting clothing when working on engine.

⚠ CAUTION Make sure to turn off ignition before connecting or disconnecting the tool.

2.3 Using This Manual

We provide instructions for the usage of your tester in this manual. Below is a list of conventions we used in the manual.

Safety Information

See Safety Information on page 8.

Bold Text

Bold emphasis is used in procedures to highlight selectable items such as buttons and menu options.

Example:

Use UP/DOWN to select the desired measurement unit.

Bold-Italic Text

Bold-italic text is used in the procedures to highlight the menus on the tester screen. Example: Use UP/DOWN to select Language from System Setup screen.

Symbols and Icons

√ Check Note

Additional information about the subject in the preceding paragraph is introduced by a √ Check Note.

Example:

√ The pressure tester is set to display English menus by default.

IMPORTANT indicates a situation which, if not avoided, may result in damage to the test equipment or vehicle.

Example:

IMPORTANT Do not soak keypad as water might find its way into the pressure tester.

Screens

Some help messages, information, and data displayed on the scanner are also shown in graphical text boxes.

3. About This Tool

The CRD700 is a specialised tool for fast and accurate diagnosis of faults in common rail systems. It represents the state of art technology for measuring the pressure in common rail systems.

3.1 Tester controls

A. **LCD Display** -shows menus, test results and operation tips.

B. **Back Key** – cancels an action and returns to previous screen or level.

C. **Printing Key**– sends the test results to a printer.

D.**OK Key** -confirms an action or movement and goes to next level, and saves test data.

E. **Wireless Receiver Key** - sends data to a PC using the wireless receiver.

F. **Left / Right Scroll Key** – checks the maximum pressure and actual pressure for dynamic pressure test.

G. **Up / Down Key** -moves selection up/down when testing.

I. **Engine Key** – quick starts the engine during the max high pressure test.

H. **Switch Key**-turns the pressure tester on/off.

J. **Power Wire**-creates the connection with the vehicle's battery.

K. **Sensor Port** – connection between the pressure tester and sensor.

IMPORTANT Do not use solvents such as alcohol to clean keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth.

IMPORTANT Do not soak keypad as water might find its way into the scanner.

3.2 Kit Contents

CRD700 digital high pressure CR tester	User's guide
M12*1.5 / M12*1.5 pressure hoses (x2)	M12*1.5 / M14*1.5 pressure hoses (x2)
M12*1.5 / M12*1.5 metal tube	High pressure "T" adaptor
High pressure probe	USB wireless Bluetooth receiver
Plastic case	CD with software / operations guide

3.3 Specifications

No.	Item	Spec.
1	Sensor type	Radiometric
2	Measuring range	0 to 2000 bar / 0-29000 psi
3	Resolution	1 bar
4	Display	Backlit 64*128pixels graphic LCD
5	Sensor accuracy	+/-1%
6	Over pressure limit	3000 bar
7	Data transmission interface	Bluetooth
8	Printer Interface	Bluetooth
9	Storage Temperature	-20 to 70°C (-4 to158°F)
10	Working Temperature	0 to 60°C (32 to 140°F)

3.4 System Setup

System Setup allows you to customise the tester:

- Select the language
- Change measurement unit (Bar or Psi)
- Save the workshop

√ **System Setup** settings remain until changes to the existing setups are made.

To do system setup:

Enter setup mode by pressing the **OK key** when the tester is turned on.

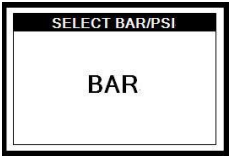
3.4.1 Select Language

To select the system language:

1. Use **Up/Down** key to select language from the screen.
2. Press **OK** key to confirm.

3.4.2 Change Measurement Unit

After language selection, the screen will show the measurement unit.



√ **Bar** is the default measurement unit.

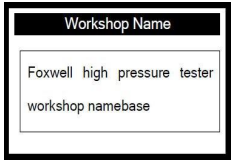
To change the measurement unit:

1.Use **Up/Down** key to select bar/psi from the screen.

2.Press **OK** key to confirm.

3.4.3Save Workshop Details

√The workshop name is used when sending test data to the PC and / or report printing.



1. Use **Up/Down** key to scroll though lower case letters, numbers, upper case letters.
2. Use **Right** scroll key to move to the next letter.

4.Diagnosis Tests

As described in the introduction, the CRD700 is an essential tool for diagnosing the condition of the high pressure fuel delivery circuit.

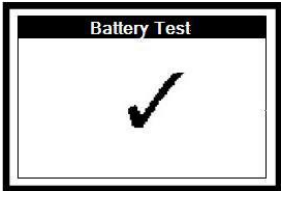
This digital tester has three key diagnostic functions. For the most accurate diagnosis, this tester should be used in conjunction with an engine scan tool to also monitor live engine data.

4.1.Self Diagnostic / Start Up Test

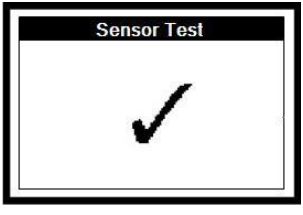
1. Connect the sensor to the pressure tester.
2. Connect the red and black clamps to the vehicle battery.
3. Press the “Power” switch to turn on the tester.
4. The screen will display the following welcome message.

√ The pressure tester checks the vehicle's battery status, and the tester's memory, sensor and fuse. Test results are displayed onscreen.

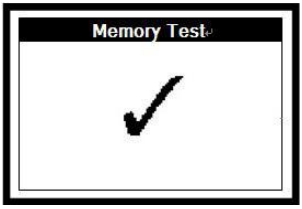
5. Battery test



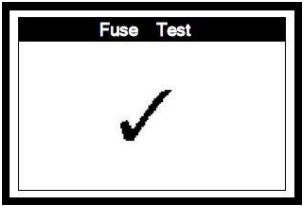
6.Sensor test



7.Memory test



8. Fuse test



√ If the“Power on test” fails, a message explaining the problem will be showed.

4.2 Dynamic High Pressure Test

The “Dynamic high pressure test” function is used to measures actual pressure in common rail circuit with engine running.

This function is useful to view a snapshot of the operation of common rail system by reading the actual and maximum pressure.

WARNING	Ensure engine is turned OFF and Key / Toggle removed from vehicle before disconnecting hoses.
DANGER	Always release fuel pressure before disconnecting hoses. Fuel lines operate under high pressure. If disconnected while under pressure, injuries may occur.

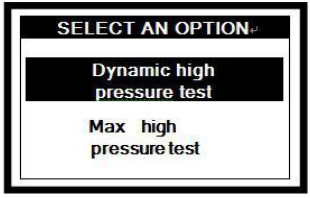
Before the test:

1. Ensure that the engine is OFF. Release fuel pressure.
2. Connect the high pressure flexible hoses to the T-adaptor.
3. Connect the high pressure sensor and pipe to the T-adaptor.
4. Remove the high-pressure delivery line from the pump outlet to the common rail and connect the two high pressure flexible hoses in its place. The thread sizes on the vehicle's pump and rail can vary. Fit the correct pipe sizes.

To perform the dynamic high pressure test:

1.Start engine.

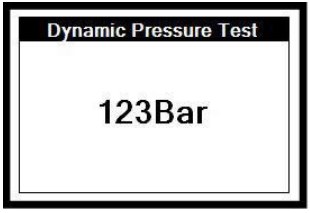
2.Use **UP/Down** key to select the **Dynamic high pressure test** from option menu screen.



3. Press **OK** key to confirm.

4. Use the **Left/Right** key to move between the maximum and actual reading.

5. View tested pressures on screen.



√Accelerate or decelerate the engine to check if the pressure varies correctly.

6.Use **Left** key to clear the maximum reading.

7.Use **Right** key to check the stored maximum reading.

√ The maximum reading is stored even when the display shows the actual pressure.

WARNING	Ensure engine is turned OFF and Key / Toggle removed from vehicle before disconnecting hoses.
DANGER	Always release fuel pressure before disconnecting hoses. Fuel lines operate under high pressure. If disconnected while under pressure, injuries may occur.

Before the test:

1.Connect the fuel pump outlet directly to the sensor.

2.Connect the red cable of the tester to the starter of the engine. The black cable should be connected to the **black** battery terminal.

With this setup, the tester will control the starter to turn the high pressure pump on. If you cannot connect the cable to the starter, connect it instead to the starter relay.

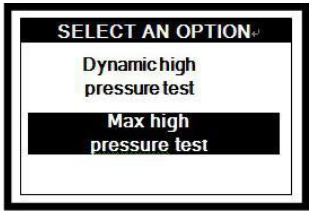
3.Turn on the vehicle ignition, but do NOT start the engine.

4.Press the **Engine** key to activate the starter until the pump reaches at least 1,000 bar.

IMPORTANT	Never activate the starter using the vehicle key when performing the max high pressure tester (and when the sensor is connected directly to the high pressure pump. The starter must only be activated by this pressure tester.

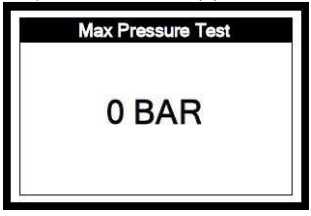
To perform the max high pressure test:

1. Use **Up/Down** key to select the **Max high pressure test** from option menu.



2. Press **OK** key to confirm.
3. View the test result on the screen.

√ The pressure tester will automatically stop the starter if the measured pressure is less than 1,000 bar over four (4) seconds.



Troubleshooting Recommendations:
If the pump is unable to reach 1,000 bar, please check the following:

- Verify input pressure into the fuel pump is correct.You can use this tester to confirm this.
- Ensure that the pressure regulator is working properly. Never simply replace the high pressure pump before confirming the status of the pressure regulator.

If the above are not defective, then the high pressure pump may be faulty (and therefore may need to be replaced).

5.Software Installation and Printing

The tester is supplied with a wireless Bluetooth printing module.This allows you to view testing data on a PC,and print without the need to physically connect the tester to a PC.
Please install the software and the wireless receiver driver.

5.1 Software Installation

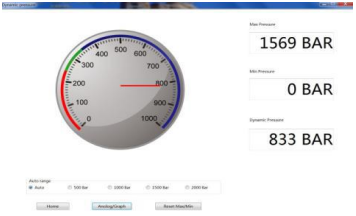
1.Download the program and files from the CD provided.

2.Unzip the files. Follow onscreen instructions to install the software and the driver.

3.Connect the wireless receiver with the computer.

4.Double click the desktop icon to launch the application.

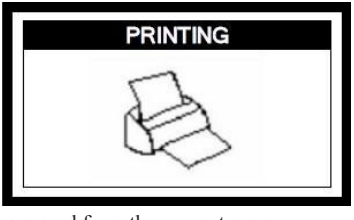
5.Click the Analog / Graph to view the pressure graphs / real time data.



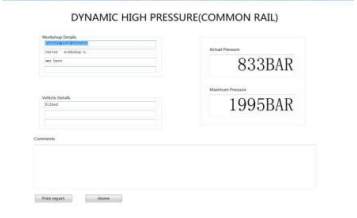
5.2 Printing

Test results can be printed through the wireless printing function.

1. Connect the wireless receiver with the computer.
2. Press the **Printing** key and use **OK** key to confirm.
3. The printer icon will be displayed, which indicates that the pressure tester is sending data to the PC.



4. Check the printing record from the computer screen.



5. Click preview before printing.

6.Shutting Down the Pressure Tester

The vehicle battery status is continuously monitored by the CRD700. To avoid wrong diagnosis (which may occur when the battery voltage is too low), the following message will be displayed, and the tester will turn off.

To manually power off the tester:

1. Press the **POWER** key and the tester will save the testing data you needed and then turn off.

7.Fuse Replacement & Pressure Release

7.1 Fuse Replacement

This pressure tester contains an internal fuse. If the fuse is blown, a message to replace the fuse will appear. Follow these instructions to replace the fuse:

1. Place the tester face down.
2. Remove back cover with a screwdriver.
3. Remove the blown fuse.
4. Install a new 20 Amp5*20mm fuse.
5. Reinstall the back cover with the screwdriver.

7.2 Pressure Release

It's very important to release fuel line pressure before any connectors are disconnected. The fuel lines operate under high pressure and injury may occur if the pressure is not released.

DANGER	Failure to release fuel pressure before disconnecting any connectors may risk serious injury. Never disconnect any fuel line connectors with the ignition on.