endeavour

ET1041

Instructions

Multi-Purpose Cooling System Test Kit

Key Features

This specially designed kit is an essential workshop tool for testing the major components in a vehicle's cooling system. Universal vehicle application.

This kit REQUIRES a manual pressure pump. This pressure pump is included in our ET1039 Master Radiator Pressure Tester Kit, or can be purchased separately (ET1039-1).

This pump is NOT included as a standard item in this kit.

Cooling System Tests

Safety Precautions

Always read instructions carefully before working
This kit is for testing cooling system components ONLY
DO NOT use this kit on other automotive systems
DO NOT start engine when doing pressure (leakage) test
Always be careful of hot coolant when doing pressure test, installing and removing tools
DO NOT touch cooling fan when it is working
Always ensure tool installation is securely connected before doing tests
Always release pressure after finishing using pressure pump
DO NOT disconnect the digital detector when coolant is hot
Always wear eye protection
Always wear gloves when working with this kit
Ensure the working area has adequate lighting
Keep children and unauthorized persons away from the working area
Keep working area clean, tidy, dry and free from unrelated materials
DO NOT allow untrained persons to use this kit

Contents

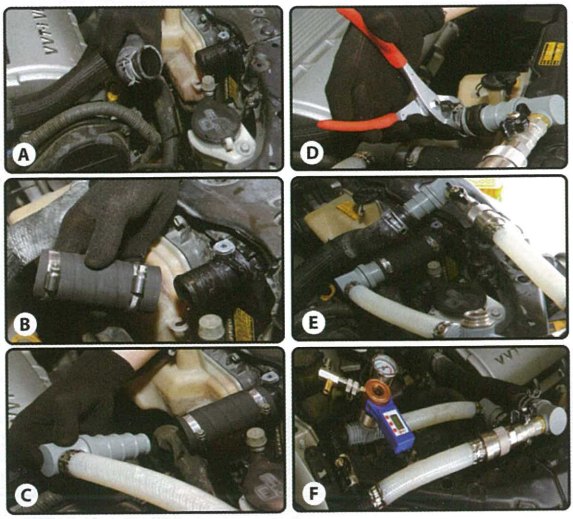
Item	Description
1	Digital Detector
2	Coolant Flow
3	Rubber Pipe
4	Step Adaptors
5	Female Coupling
6	Hose Clamp Driver
7	Hose Clamps (8 PCE)
8	Coolant Hose
9	Release Hose

Optional Accessories

Part Number	Description
ET1039-1	Pressure Tester Pump

Installation Instructions

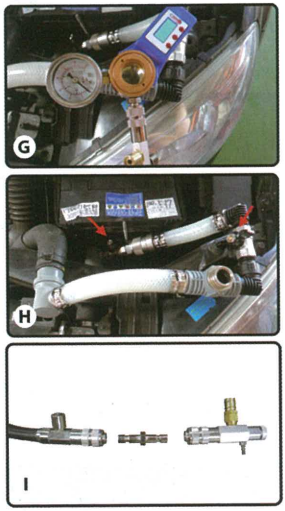
1. Disconnect the upper hose (**Fig. A**) and connect a suitable sized rubber pipe (**No. 3**) and hose clamps (**No. 7**) as shown in (**Fig. B**).
2. Connect step adaptors (**No. 4**) to the coolant flow pipe (**No. 2**) and connect to rubber pipe (**Fig. C**) and upper hose.
3. Use a plier to fasten the connection points (**Fig. D, E**).
4. Connect the digital detector (**No. 1**) to the coolant flow pipe (**Fig. F**).



Pre-Operation Self Test

1. Pump the pressure pump (optional accessory) and the release the pressure to confirm that the pump is operating correctly.
2. Turn the digital detector on (**No. 1**) and switch it to the different modes to confirm that this unit is also operating correctly. (**Fig. G**).
3. Turn on / off the valves on the coolant flow pipe (**No. 2**) to confirm that they are in good condition (as per the arrows in **Fig. H**).
4. ⚠ DO NOT adjust the pressure safety release valve on the female coupling (**A on No.5**).
5. Connect the pressure pump and female coupling (**No. 5**) to the adaptor provided (**Fig. I**). Pump pressure to more than 14.2 psi to confirm that the safety release valve on the female coupling (**A on No. 5**) can release its pressure automatically. Then, rotate the manual release valve on female coupling (**B on No. 5**) to confirm that the pressure can be released when rotated

NOTE: Please contact your distributor for a replacement part should any of the above tests fail.

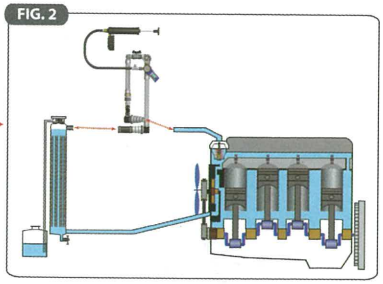


Leakage Test

Step 1 Connect the pressure pump to the digital detector (**Fig. 1** & 2).
Step 2 Pump the pressure to a range between 10-15 psi (**Fig. 2**)

FIG. 1

FIG. 2



Leakage Test Analysis

FIG. 4

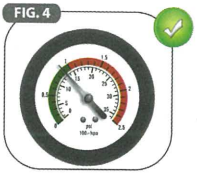


FIG. 5

Step 1 Check if the gauge reading holds or decreases.
Step 2 If the gauge reading stays in the same position (**Fig. 4**), then please conduct the Temperature Sensor Test.
Step 3 If the gauge reading decreases (**Fig. 5**), check firstly that all parts are securely connected.
Step 4 If the leakage still exists, please prepare hose clamp for Radiator Leakage Test and Engine Leakage Test.

Radiator Leakage Test

Step 5 Turn the engine off and connect the digital detector to the radiator pipe. (**Fig. 6** & **7**).
Step 6 Disconnect one part of the Coolant Flow Pipe (**No. 2**, connected with a step adapter already) and turn the valve off. Connect that part to the lower hose near the radiator.
Step 7 Pump the pressure to a range of 10-15 psi, and check gauge reading (**Fig. 4** & **5**).
Step 8 If there is no leakage, please conduct Engine Leakage Test.

FIG. 6

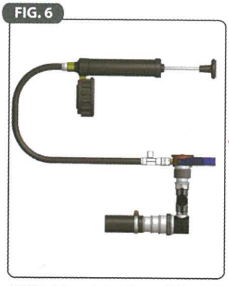


FIG. 7

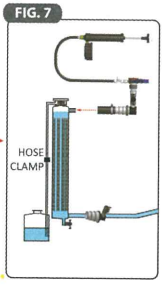
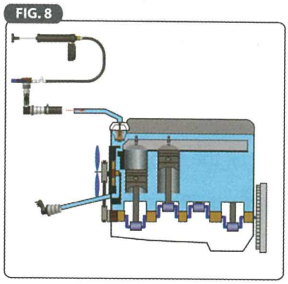


FIG. 8



NOTE: When doing the radiator leakage test, use a hose clamp to block the coolant passage between the radiator and the recovery tank.

Engine Leakage Test

Step 9 Turn the engine off, and connect the digital detector to the upper pipe on the engine side.(**Fig. 6** & **8**)
Step 10 Disconnect one part of the Coolant Flow Pipe (**No. 2**) and turn the valve off. Connect that part to the lower hose near the engine.
Step 11 Pump the pressure to 10-15 psi, and check if any leakage occurs. (**Fig. 4** & **5**)

Temperature Sensor Test

This test can **ONLY** be conducted when no leaks exist in the cooling system.

Step 1 Connect the digital detector to the radiator upper pipes **(Fig. 11, 12 & 13)**
Step 2 Turn engine on and check the temperature reading displayed on the LCD.

FIG. 11

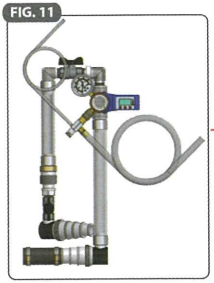


FIG. 12

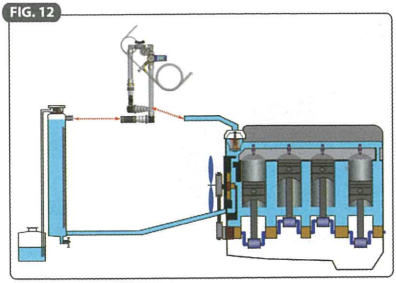


FIG. 13

Vehicle engine	ON	
Power button (thermometer)	ON	
LED button	OFF	
Valves	ON	

Temperature Sensor Test Analysis

Compare the temperature on the LCD and on the dashboard at the same time.
(C on dashboard is generally about 40˚C and H is about 120˚C)

E.g. The temperature displayed on the LCD is 58˚C **(Fig. 14)**.
If this temperature is displayed on the dashboard **(Fig. 15)**, then the temperature sensor is working normally.
However if a different temperature is displayed on the dashboard **(Fig. 16)**, then the temperature sensor could be defective.

Unit Conversion	
40˚C	104˚F
58˚C	136˚F
100˚C	212˚F
120˚C	248˚F

FIG. 14

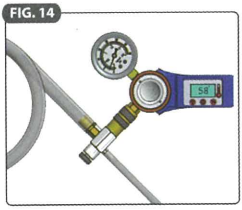
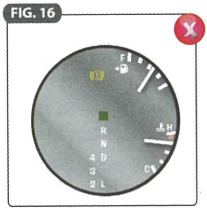


FIG. 15

FIG. 16



Thermostat Test

This test can **ONLY** be conducted if the temperature sensor is in good condition.

Step 1 Connect the digital detector **(Fig. 17, 18 & 19)**

FIG. 17

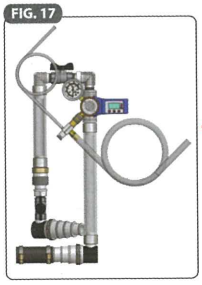


FIG. 18

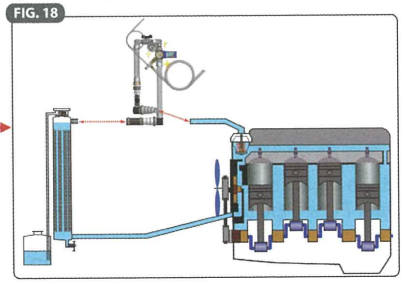


FIG. 19

Vehicle engine	ON	
Power button (thermometer)	ON	
LED button	ON	
Valves	ON	

Step 2 Under normal conditions, the thermostat operates as below:

- When the engine temperature is lower than the proper engine working temperature, the thermostat is closed. (Fig.20)
- When the engine temperature is higher that the proper engine working temperature, the thermostat opens. (Fig. 21)

FIG. 20

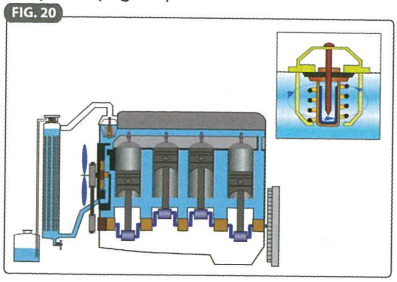
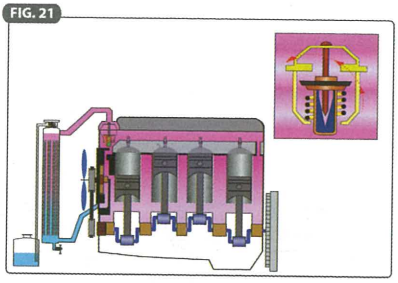


FIG. 21



Thermostat Test Analysis

Refer to the auto service manual for thermostat opening temperature, and check that both the displayed temperature on the LCD, and the coolant flow from the detector window.

E.g. Thermostat opening temperature is 85°C

(Fig.23) Thermostat opens correctly at 85°C temperature and coolant starts to circulate.

(Fig.24) A defective thermostat opens at 60°C, and coolant cannot circulate (too early).

(Fig.25) A defective thermostat does not open at 95°C, and coolant cannot circulate (too late).

FIG. 23

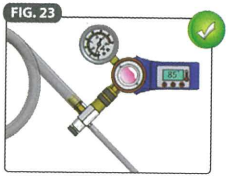


FIG. 24

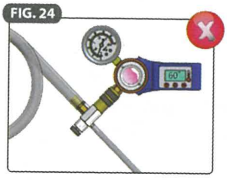
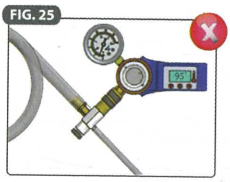


FIG. 25



Unit Conversion	
60°C	140°F
85°C	185°F
95°C	203°F
100°C	212°F

Water Pump Test

This test can **ONLY** be conducted when the thermostat is in good condition.

Step 1 Connect the digital detector as shown in the Water Pump Test (Fig. 26, 27 & 28).

FIG.

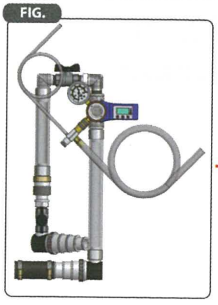


FIG. 27

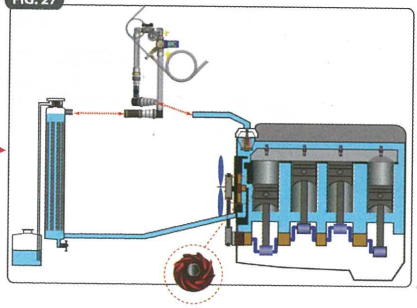


FIG. 28

Vehicle engine	ON	
Power button (thermometer)	ON	
LED button	ON	
Valves	ON	

Step 2 Under normal conditions, the water pump operates as below:

- When RPM is low, water pump rotates at regular speed.
- When RPM is high, water pump rotates rapidly.

Water Pump Analysis

Increase the car RPM (**Fig. 31**), and check both the pressure gauge and the coolant flow.
E.g. When the RPM increases, the coolant flow should increase along with increasing pressure.
(**Fig. 32**) Water pump rotates when in good condition and leads to larger coolant flow and increased pressure.
(**Fig. 33**) A defective water pump does not rotate rapidly enough to increase the coolant flow.

FIG. 31

FIG. 32

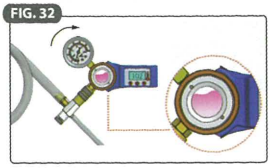
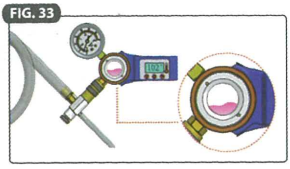


FIG. 33



Cooling Fan Test

This test can **ONLY** be conducted when the thermostat and the temperature sensor are in good condition

Step 1 Connect the digital detector as in the Water Pump Test (**Fig. 26, 27 & 28**)

Step 2 When the engine temperature is lower than the cooling fan working temperature, the cooling fan should not rotate (**Fig. 34**). When the engine temperature is higher than the cooling fan working temperature, the cooling fan rotates. (**Fig. 35**).

FIG. 34

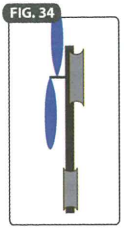
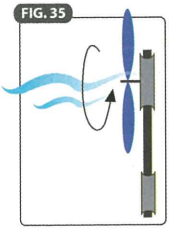


FIG. 35



Cooling Fan Test Analysis

Refer to the auto service manual. Check both the displayed temperature on the LCD and the cooling fan working condition.
If the engine is hot, wait until the engine temperature decreases.
E.g. Cooling fan working temperature is 100°C.
(**Fig. 37**) When cooling fan is working properly it should begin rotating at 100°C.
(**Fig. 38**) A defective cooling fan stays still at 108°C.
(**Fig. 39**) A defective cooling fan rotates as early as at 90°C.

Unit Conversion	
90°C	194°F
100°C	212°F
108°C	226°F

FIG. 37

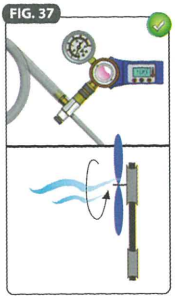


FIG. 38

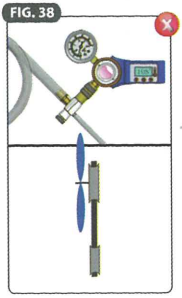


FIG. 39