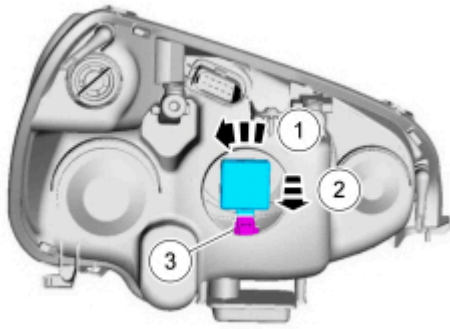


# Your Ultimate Source for OEM Repair Manuals

FactoryManuals.net is a great resource for anyone who wants to save money on repairs by doing their own work. The manuals provide detailed instructions and diagrams that make it easy to understand how to fix a vehicle.

## 2003 FORD Thunderbird OEM Service and Repair Workshop Manual

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E85027

## Diagnosis and Testing Information

### ELEMENTS OF DIAGNOSIS AND TESTING

Diagnosis and Testing may include:

- Preliminary Inspection
  - In older manuals, Inspection and Verification
- Symptom Chart
- DTC (diagnostic trouble code) Chart
- Pinpoint Tests
- Component Tests

Some diagnostics may be contained in Symptom Based Diagnostics. Some engine performance and emission diagnostics may be placed in a separately published PC/ED (powertrain control/emissions diagnosis) manual.

### MODULE NAMES MATCH THE DIAGNOSTIC SCAN TOOL

Module names and PID (parameter identification) names in this manual match the Ford diagnostic scan tool: IDS (Integrated Diagnostic System) or FDRS (Ford Diagnosis and Repair System) .

The same diagnostic scan tool module name is found in some DTC (diagnostic trouble code) definitions (for example, U024B Lost Communication with Seat Control Module "G").



## Battery and Battery Charging Health and Safety Precautions

<i>100-00 General Information</i>	<i>2022 F-150</i>
<i>Description and Operation</i>	<i>Procedure revision date: 04/17/2019</i>

### Battery and Battery Charging Health and Safety Precautions

#### WARNING

Batteries contain sulfuric acid and produce explosive gases. Work in a well-ventilated area. Do not allow the battery to come in contact with flames, sparks or burning substances. Avoid contact with skin, eyes or clothing. Shield eyes when working near the battery to protect against possible splashing of acid solution. In case of acid contact with skin or eyes, flush immediately with water for a minimum of 15 minutes, then get prompt medical attention. If acid is swallowed, call a physician immediately. Failure to follow these instructions may result in serious personal injury.

#### WARNING

Always lift a plastic-cased battery with a battery carrier or with hands on opposite corners. Excessive pressure on the battery end walls may cause acid to flow through the vent caps, resulting in personal injury and/or damage to the vehicle or battery.

#### WARNING

Battery posts, terminals and related accessories contain lead and lead components. Wash hands after handling. Failure to follow these instructions may result in serious personal injury.

#### Li-ion Batteries:

#### WARNING



## Body Repair Health and Safety and General Precautions

<b>100-00 General Information</b>	<b>2022 F-150</b>
<b>Description and Operation</b>	<b>Procedure revision date: 01/8/2015</b>

### Body Repair Health and Safety and General Precautions

#### WARNING

Always refer to Material Safety Data Sheet (MSDS) when handling chemicals and wear protective equipment as directed. Examples may include but are not limited to respirators and chemically resistant gloves. Failure to follow these instructions may result in serious personal injury.

#### WARNING

Always wear protective equipment including eye protection with side shields, and a dust mask when sanding or grinding. Failure to follow these instructions may result in serious personal injury.

#### WARNING

Do not carry out body side sectioning repairs in areas of door hinge or striker anchoring points. Welding within 50 mm (1.96 in) of door hinge or striker locations may compromise structural integrity during a collision. Failure to follow these instructions may result in serious injury to vehicle occupant(s).

#### WARNING

Invisible ultraviolet and infrared rays emitted in welding can injure unprotected eyes and skin. Always use protection such as a welder's helmet with dark-colored filter lenses of the correct density. Electric welding will produce intense radiation, therefore, filter plate lenses of the deepest shade providing adequate



## Brake and Clutch Systems Health and Safety Precautions

<b>100-00 General Information</b>	<b>2022 F-150</b>
<b>Description and Operation</b>	<b>Procedure revision date: 01/8/2015</b>

### Brake and Clutch Systems Health and Safety Precautions

#### WARNING

Do not use any fluid other than clean brake fluid meeting manufacturer's specification. Additionally, do not use brake fluid that has been previously drained. Following these instructions will help prevent system contamination, brake component damage and the risk of serious personal injury.

#### WARNING

Do not breathe dust or use compressed air to blow dust from storage containers or friction components. Remove dust using government-approved techniques. Friction component dust may be a cancer and lung disease hazard. Exposure to potentially hazardous components may occur if dusts are created during repair of friction components, such as brake pads and clutch discs. Exposure may also cause irritation to skin, eyes and respiratory tract, and may cause allergic reactions and/or may lead to other chronic health effects. If irritation persists, seek medical attention or advice. Failure to follow these instructions may result in serious personal injury.

#### NOTICE

If the brake fluid is spilled on the paintwork, the affected area must be immediately washed down with cold water.

Before disconnecting any heater water hoses, shut OFF the engine and wait until engine is fully cool. Failure to comply with this warning may result in serious injury or burns from hot liquid escaping from the engine cooling system.

## **WARNING**

The electric booster heater may become hot during use and can burn unprotected skin. Allow enough time for the heater to cool before servicing. Failure to follow this instruction may result in serious personal injury.

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Sample

## resistance.

- Circuits carrying approximately 200-1000 mA may be loaded with a 250-350 mA test light. Measure circuit voltage with a DMM (digital multimeter) while the test light is connected. A reduction in the voltage present during test-light-loading indicates excessive circuit resistance.
  - Conductor sizes 24 gauge (0.5 mm) or smaller are generally used to carry approximately 1000 mA (1 ampere) or less. Use of a 250-350 mA test light to load these circuits is appropriate.
- Circuits carrying more than one ampere should be loaded with a device requiring similar current (for example, a brake light bulb). A reduction in the voltage present during loading indicates excessive resistance.
  - Conductor sizes 20 gauge (0.8 mm) or larger are generally used to carry 1 ampere (1000 mA) or more.
  - Using a voltage-drop measurement is best practice and more accurate for higher current circuits.

## Checking Ground-Providing Circuits

The best method of checking ground circuits is to measure the circuit voltage drop during component operation (or attempted operation).

- An ohmmeter may be accurately used **if the battery has been disconnected.**
  - Expect less than 2 ohms for most small diameter (18 gauge and smaller) wires.
  - Disconnecting the battery is critical because DMM (digital multimeter) ohmmeter readings are commonly corrupted by the normal voltage present (battery connected) across body and chassis ground circuits.

## Checking Circuit Resistance or Continuity

- Expect less than 2 ohms of resistance for most wiring harness circuits.
- A standard DMM (digital multimeter) ohmmeter's low-resistance resolution (approximately 0.1 ohm) limits its accurate use to circuits carrying less than approximately 5 amperes. This is because very small resistances, undetectable by a standard DMM, cause significant voltage and power loss in higher current circuits.
  - A voltage drop measurement is required for higher current circuits.
- Standard DMM (digital multimeter) apply a small amount of voltage to the circuit or component to calculate resistance. As a result, these ohmmeters are very sensitive to any level of voltage present. Voltage present in the circuit will corrupt the DMM (digital multimeter) reading.

- Use back probes specifically designed for the purpose to assist in making a good test connection and to prevent connector or terminal damage during back-probing.
- Back-probing is the wrong test for a single point test for presence of voltage. When zero volts is a possible result, you cannot tell the difference between a bad probe contact and a zero-volt result. Disconnect the circuit and test normally.
- Back-probing is the wrong test for circuit continuity or opens (using an ohmmeter) between two points. You cannot tell the difference between bad probe contacts and an open circuit. Disconnect and isolate the circuit, and test normally.

### **Circuit Analysis Using Jumper Wires (Creating Substitute Circuits)**

Jumper wires may be employed for circuit analysis if the following cautions are carefully observed:

- Always use fused jumper wires — the recommended universal-testing jumper wire fuse is 5 amperes or less; larger fuse ratings should be used only when the load requires them.
- Use flex probes or equivalent to prevent connector terminal damage.
  - Flex probes are not intended to carry high current (greater than 5 amperes). Do not use them to connect power for cooling fans, blower motors, or other high current devices.
- Follow diagnostic test directions carefully when using jumper wires to avoid component or harness damage caused by incorrect jumper connections.
- Never repair a circuit by adding a new wire in parallel to the old one (overlying the circuit) without fully understanding what caused the circuit to fail. Always find, examine, and repair the fault to correct the root cause and to repair any adjacent wiring that has been damaged.

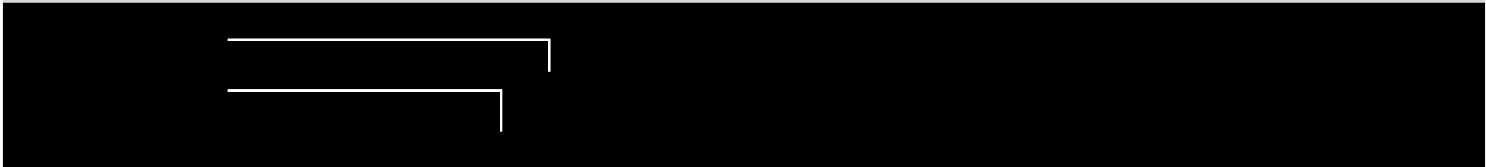
### **Making Voltage-drop Measurements**

A voltage-drop test measures the loss of power or voltage in a circuit. Losses can be measured on the ground or power (negative or positive) circuits of any device.

- Measuring voltage-drop requires
  - A voltmeter connected at the beginning and end of the suspect circuit.
  - An operating, or attempting to operate, circuit. Power must be on and available to flow.
- The polarity of the voltmeter lead connections should follow conventional current flow.
- A zero-volt reading indicates bad voltmeter connections or the component has not been turned on.
- A small amount of voltage indicates normal circuit loss. In 12-volt circuits, this is usually less than 0.5 volts (expect less than 5 percent of circuit operating voltage).



Sample



## Engine Cooling System Health and Safety Precautions

<b>100-00 General Information</b>	<b>2022 F-150</b>
<b>Description and Operation</b>	<b>Procedure revision date: 01/8/2015</b>

### Engine Cooling System Health and Safety Precautions

#### WARNING

Always allow the engine to cool before opening the cooling system. Do not unscrew the coolant pressure relief cap when the engine is operating or the cooling system is hot. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly. Failure to follow these instructions may result in serious personal injury.

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