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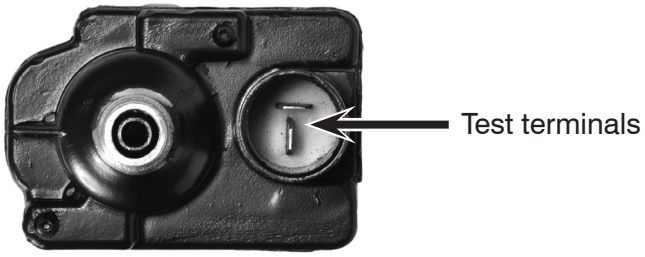
Bench Test for Case-Grounded Window Lift Motors

Application: Vehicles with electric windows using the following window motors: 42-11, 12, 13, 14, 15, 17, 18, 20.

Problem: Replacement motor seems to be shorted right out of the box.

Cause: Typical 2-terminal bench testing methods create a short, giving the appearance of a faulty motor.

Solution: Most 2-terminal or 2-wire motors are bench tested simply by applying positive and negative voltage to the respective terminals. If the motor runs in any direction and draws typically less then 5 amps (no load), it is a good motor. Because the motors listed above use the motor housing as a common ground, if power supply power and ground are applied directly to the terminals a short may result. Instead, for these motors, battery ground is applied to the housing, then +12 volts DC is applied to either terminal. When that circuit is completed, the motor should run continuously in one direction. Now put the +12 volts to the other terminal, the motor should run in the other direction.



Case-grounded Bench Test

Minimum power supply requirements: 12 volts DC, 5 amps. This test is performed with motor out of the vehicle.

1. Connect power supply ground (-12 VDC) to motor housing for all tests.
2. Connect +12 VDC to one motor terminal; the motor runs continuously in one direction.
3. Disconnect +12 VDC and connect to the other motor terminal. Motor now runs continuously in the other direction.
4. Disconnect wires. Test complete.

If motor passes bench test, check the vehicle wiring and switch. Check the window lift mechanizium for proper operation.

Note: This ProTech bulletin is supplied as technical information only and is not an authorization for repair.

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Identifying Cardone Window Motor Part Numbers

How to identify CARDONE Select part number configuration for Window Lift Motors and Regulators:

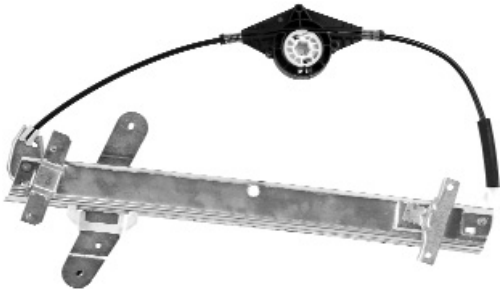
- Part numbers without a letter as the suffix are motors without regulators.
- Part numbers ending with an "R" are motors with regulators.
- Part numbers ending with a letter other than "R" are regulator only (no motor supplied).

Examples:

- Part number 82-383 = motor only (no regulator).
- Part number 82-383A = regulator only (no motor).
- Part number 82-614R = motor with a regulator.
- Part number 82-153AR = motor with a regulator.

Regulator with motor

Regulator without motor



Note: Refer to instructions supplied with the unit to complete the installation. Refer to the vehicle service manual for detailed installation procedures.

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Power Window Lift Motors and Regulators: Top 10 Do's and Don'ts

The tips and hints below will help ensure a safe and successful installation of the replacement unit. However, for complete step-by-step installation instructions always refer to the vehicle service manual or equivalent reference and the information supplied with the unit. If you do not have the experience or proper tools to safely remove and install both units, you should seek the services of a qualified technician.

Things to DO:

1. **Do** secure the glass while working on the motor or regulator to prevent it from dropping and breaking.
2. **Do** lubricate the running surfaces of the regulator mechanism with high-temperature urethane-based grease before installing in the door.
3. **Do** install the motor so the window glass movement matches the direction selected by the window switch.
4. **Do** test all functions of the window after completing the installation:
   - 2 and 4 wire motors - check that up and down action matches switch direction.
   - 4 and 6 wire motors - check that all auto-functions work correctly.
   - 6 and more wire motors - check anti-pinch safety function reverses when encountering an obstacle in the travel path of the glass.
5. **Do** secure any wire harness or cable that may snag on the window regulator as it moves past.

Things NOT to DO:

1. **Do not** operate the window mechanism with hands or any body part near the window regulator mechanism to prevent pinching or injury.
2. **Do not** install using smaller gauge wiring or connectors that may not be able to handle the electric current.
3. **Do not** remove a motor from an "unlocked" regulator with an energized spring. Clamp or secure by drilling a hole through the regulator gear and frame. Then install a bolt with a nut and washers to lock the regulator and avoid sudden release.
4. **Do not** allow children or others to play or be in the area unsupervised during the repair.
5. Tighten securely, but **do not** over-tighten clamps or brackets that hold the glass.

Safety concerns and information:

Because of original manufacturer verification and consolidation, wire color and connections must not be assumed. Before operating a window for the first time, be sure arms, hands and head are clear of the window path.

ProTech Bulletin Summary: Motors

Before replacing any motor, the cause of original unit failure must be determined and corrected. Installing a replacement unit without correcting the problem will lead to early failure. Always refer to the vehicle service manual for specific installation procedures and specifications. The ProTech bulletins listed below cover topics that should be done BEFORE, DURING or AFTER installation of the replacement unit. They assist with part selection, describe typical problems and solutions, and provide installation help and service advice.

WIPER MOTORS

Before Installation:
PT 40-0002 Do not run motor before installed
PT 40-0005 40-158 park problem caused by defective pulseboard

During Installation:
PT 40-0001 Faulty ground causes park problems
PT 40-0008 Replacement unit solves water intrusion problem; vehicle checks

After Installation:
PT 40-0003 Bench Test for 40-169: test motor operation off vehicle
PT 40-0004 Bench Test for 40-158, 159, 192, 1003, 1004
PT 40-0007 Bench Test for 40-190, 191
PT 40-0009 Bench Test 40-267, 297, 299

WINDOW LIFT MOTORS

Before Installation:
PT 42-0002 Ford picture guide

After Installation:
PT 42-0001 Bench Test for 2-wire window lift motors
PT 42-0003 Window Lift switch test
PT 42-0004 Weatherstripping and regulator binding cause poor performance
PT 42-0005 Noisy operation on cable-type regulators may not be caused by motor

TRANSFER CASE MOTORS

Before Installation:
PT 48-0001 Protect replacement unit from water intrusion

After Installation:
PT 48-0002 Ford units require transfer of sensor wiring and pins

CARDONE Technical Service develops ProTech bulletins that are intended to help the installer avoid common installation and service errors. The information presented is derived from our own experience and product knowledge gained from component analysis and research. Following these tips will ensure the best possible performance and service life of the replacement unit.

Please note that these bulletins are provided for your technical information only and are not authorization for repair.

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47-1377: Resetting Limit Switch

Application: Nissan and Toyota vehicles equipped with anti-pinch window lift motors using mechanical limit switches (like 47-1377).

Problem: When "Auto-Up" is selected, the window closes but bounces down 2 or 3 inches and stops.

Cause: Motor was bench tested or operated before being installed into the window regulator, which cancels the upper limit position.

Solution: The window travel limits must be set for the motor to "know" whether the window is closed or open. Follow the installation steps below to set travel limits and to confirm that the replacement motor is functioning correctly. **Note:** If there are wires running to the motor back plate, this is an anti-pitch application.

1. Remove cover panel or other necessary door components. Remove window lift motor from the regulator, keep motor connected to the electrical connector.
2. Lift the window control switch for that motor for 10 seconds, as though raising the window; the motor will run freely. After 10 seconds, release the window switch.
3. Install the motor into the regulator. Using the window control switch, place the regulator near the middle of its travel — neither completely up nor completely down.
4. Install the cover panel or other necessary door components and ensure the wire harness for the motor is tied down with the strain relief. Be sure the wiring does not interfere with window operation.
5. Lift the window control switch to fully lift the window. Release the switch when window reaches the top.
6. Lower the window fully to reset the ring gear sensor mechanism. Hold the switch down manually.
7. Repeat step sequence 5 and 6 three (3) times.
8. Now lift the window using the Express Up feature (lift the switch up as far as it will travel and release). The window should continue to rise automatically all the way to its closed full up position. The window glass should NOT "bounce" down after stopping at the top of the window opening. If the window "bounces", the travel limit was not set properly. Repeat the process, carefully following every part of steps 1-6.
9. Lower the window completely using the Auto-Down feature.

10. Test the anti-pinch function by allowing the window to close on a cardboard paper towel roll while raising the window using the Express Up feature. The window should stop and reverse 3 to 4 inches after contacting the paper towel roll.
11. Repeat step sequence 8, 9, and 10 three (3) times to verify correct function.
12. If the window motor does not pass the above testing, the motor should NOT be connected electrically in the door for the customer. Raise the window and disconnect the power cable until the problem can be resolved.

Complete the installation following instructions supplied with the unit and the vehicle service manual.

Note: Please refer to your vehicle's service manual for specific diagnostic instructions. This ProTech bulletin is supplied as technical information only and is not an authorization for repair.

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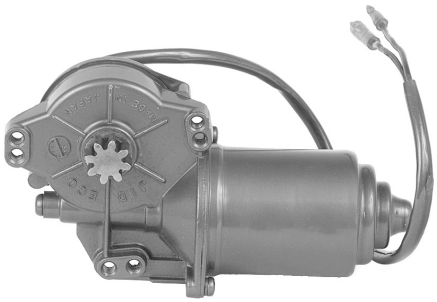
Bench Test for 2-Wire Window Lift Motors

Application: All vehicles with electric windows (2-wire motor).

Problem: Window lift motor replacement only operates in one direction.

Cause: Possible faulty wiring or control switch.

Solution: Most 2-wire window lift motors depend on a voltage polarity change to control direction. If the motor runs in one direction but not the other, the problem is in the vehicle wiring or switching. The test below can be used on 2-wire motors (typical unit shown).



NOTE: Early tailgate window lift motors (42-11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22) use a frame grounded brush and wound field magnets. For these motors the rotation direction is controlled by which terminal has +12 volts directly applied (the other terminal is open). For this test the motor frame must always be connected to ground (battery negative). (See PT 42-0003 for frame-grounded motors & switch test).

Bench Test:

Step 1: Directly connect positive battery voltage to one motor wire and battery ground to the other motor wire. The motor should run in one direction.

Step 2: Reverse battery connections. The motor should now run in the opposite direction. If motor does not run, repeat test making sure connections and voltage source are good. After verifying proper motor operation, check the vehicle for these possible problems:

- Faulty switch circuitry or wiring
- Faulty or misadjusted window lift mechanism
- Refer to vehicle service manual for additional tests

Note: If your window lift motor has more than 2 wires, it will be necessary to refer to the vehicle service manual for proper testing.

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Window Lift Switch Test

Application: Vehicles with Power Windows.

Problem: Window Lift Motor still doesn't work after being replaced.

Cause: One common root cause is a failed control switch.

Solution: Check the switch with a voltmeter as follows:

1. With the ignition on, depress the driver's master window lift control switch to operate any other working window. This ensures there is power to the system; correct problems as necessary. Turn off ignition.
2. Disconnect the problem window motor from its harness in the door.
3. Using a digital voltmeter set to the 12 volt DC scale, connect the meter probes to the two motor contacts in the harness connector (if more than 2 wires see Motor Test below).
4. Operate the master control switch for the problem window. The voltmeter MUST read battery voltage. With the switch still depressed, move your finger around the button checking for intermittent operation - the reading must remain unchanged.
5. Now check the switch on the door with the problem. If the voltmeter does not read battery voltage, the problem is with the vehicle wiring or switch. To verify the operation of a 2-wire motor see motor test below and refer to ProTech PT 42-0001.

Corrosion damage and/or mechanical damage to the wiring, contacts or connectors in car doors prevent power getting to the motor. Simple, but a common problem.

MOTOR TEST: Window Lift Motors with 2 wires operate by applying 12 volts in either of two polarities to the motor. To test, connect +12 volts and ground (fully charged car battery) directly to motor contacts: the motor should run in one direction. Change polarity to reverse motor (in normal use the switch changes polarity). Four wire motors (with express down) have 2 additional control wires, but the same test can be applied if the technician can identify the power wires (usually heavier gauge, refer to vehicle service manual for proper connections). Driver Controls and Child Safety Locks have added additional contact points and complexities to Window Lift Motor control wiring – one open segment disables the motor!

Note: Early Tailgate Window Lift Motors (42-11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22) use a frame grounded brush and wound field magnets. For these motors the rotation direction is controlled by which terminal has +12 volts directly applied (the other terminal is open). For this test the motor frame must always be connected to ground (battery negative).

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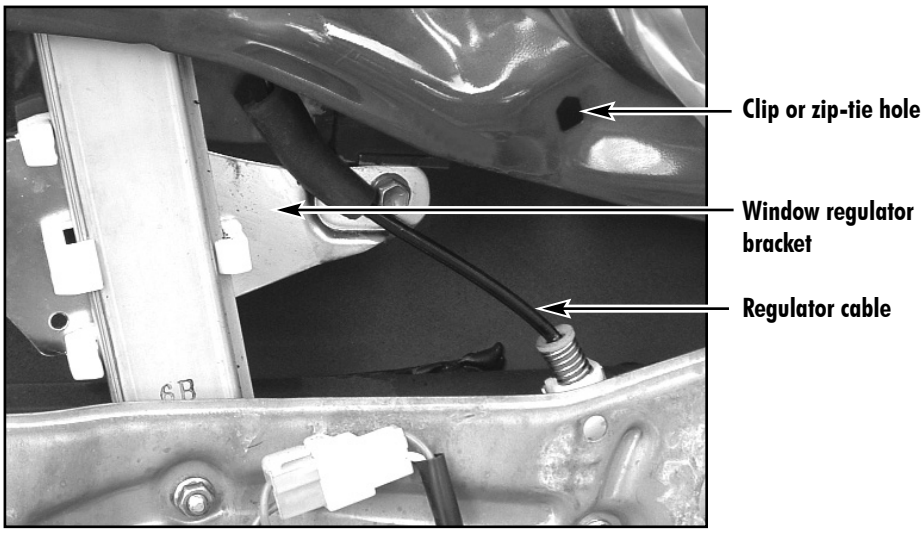
Window Lift Noise May Not Be the Motor or Regulator

Application: Vehicles with cable-type regulators.

Problem: Noisy operation or popping sound diagnosed as a window lift motor or regulator problem.

Cause: Regulator cable hold-down may be broken or missing, allowing the cable to snag on the window regulator bracket as the window is raised, producing the noise.

Solution: Install new hold-down or suitable substitute. The graphic below shows a typical installation and the area needing the hold-down.



Typical installation and hold-down location

Note: Refer to ProTech PT 42-0004 for additional information on noisy or binding operation.

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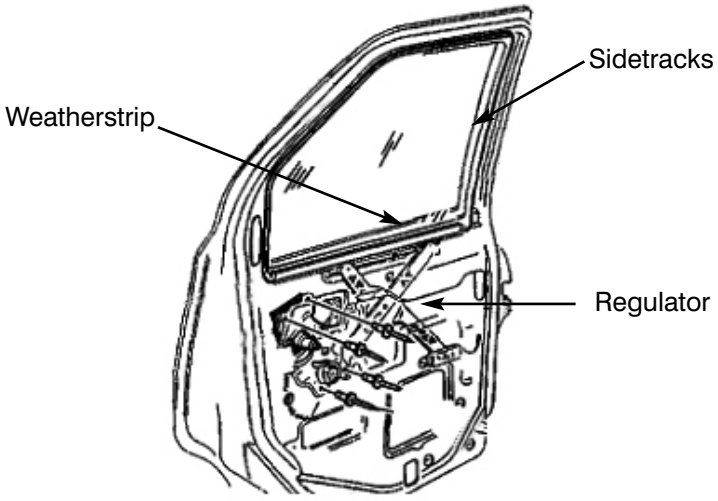
Window Lift Problem Solver for Sluggish Operation

Application: All power window lift motors.

Problem: Slow moving, binding, noisy window operation.

Cause: Dry or worn weatherstrip and tracks, dirty switch contacts, or damaged window regulator.

Solution: Inspect all door weatherstripping inside and out for wear and alignment. Repair or replace as necessary. Ensure both side tracks are aligned straight, the felt inserts are lubricated, and the felt is not worn out. Replace any parts that are bent or worn. Lubricate side track felt and weatherstripping for smooth glass operation. This may require an overnight soak to allow the lubricant to penetrate (refer to your vehicle's factory service manual for approved lubricant and procedures). Check the regulator for worn, bent or binding arms, rollers, pivot points and spring. On cable-type regulators, check cables and cable tracks. **Note: A bad regulator usually results in a window that sticks or binds in some position.** Check the switch for dirty contacts and proper operation. Dirty contacts will cause excessive resistance that prevents the motor from developing full power resulting in poor performance. Clean with electrical contact cleaner if possible or replace as necessary.



Note: Refer to ProTech 42-0001 and 42-0003 for other motor and switch test tips.