

D001–Hinges



1. Description

This procedure describes the replacement of door hinges. Inspection and evaluation requirements are also included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of door hinges. This procedure is intended for use by professionals who are qualified through training and experience.



3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

- CP01A Corrosion Protection
- CP01S Corrosion Protection
- DO21 Door
- PS01 Personnel Safety
- RF01P Surface Preparation
- RF01S Surface Preparation
- RF41 Finish Application
- WE01A GMA (MIG) Plug Weld
- WE01S GMA (MIG) Plug Weld
- WE11A GMA (MIG) Fillet Weld
- WE11S GMA (MIG) Fillet Weld

3.2 Other Information

- Equipment-specific information
- Product-specific information
- Recycled parts information
- Vehicle-specific repair information



4. Equipment And Material Requirements

4.1 Equipment

The use of this equipment is included in this procedure:

- spring compressor
- hinge pin-removal tool

4.2 Hinge Repair Materials

The use of these materials is included in this procedure:

- seam sealers
- anti-corrosion materials
- hinge lubricant

4.3 Welding Equipment

Use **GMA (MIG) welding** equipment as described in **WE 01A, WE01S, WE11A, or WE11S**.



5. Damage Analysis

5.1 General Damage

Inspect doors and hinges for these conditions or types of damage:

- visible damage
- improper previous repairs
- damaged hinge pins, bushings, springs, or fasteners
- non-uniform fit or gaps to the vehicle body
- damaged **spot welds**
- sticking or binding door mechanisms
- improper operation of the door checks or brake
- sagging door

Any binding or misalignment, that cannot be compensated for with a minor hinge adjustment, requires repair or replacement of the hinge, pillar, or door. Hinges with damaged hinge pins or bushings require replacement of the damaged parts, or complete hinge replacement.

Plan to replace any defective fasteners with the same type, size, and grade.

Plan to replace any fasteners that have damaged coatings, spacers, or other protective materials used to prevent **galvanic corrosion**.



6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Hinge Replacement Safety

Make sure the door is properly supported and use proper lifting techniques during removal and installation.

Some hinges have attached springs under tension. Use caution during removal and installation.

6.3 Welding Safety

Welding safety information is in **WE01A**, **WE01S**, **WE11A**, or **WE11S**.



7. Environmental Safety

Does not apply.



8. Vehicle Protection

8.1 Electronic Parts

To protect computers and other sensitive parts from damage:

- Follow the vehicle maker's recommendations for recording and resetting **electronic memories**.
- Ensure that the ignition switch is in the LOCK position, and the key is removed.
- Disconnect and isolate the negative battery cable, and disarm the **passive restraint system**. Follow the vehicle maker's recommendations.
- Carefully remove computer modules when welding or heating within 300 mm (12"), or a greater distance when recommended by the vehicle maker.
- Protect modules, connectors, and wiring from dirt, heat, static electricity, and moisture.
- Loosen or remove any wiring harnesses or electrical parts that could be damaged during the repair process.

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8. Vehicle Protection (cont'd)

8.2 Door And Adjacent Areas

When removing or replacing door hinges:

- Properly handle and store the door to prevent damage.
- Protect adjacent areas from damage.
- Avoid cutting into the finish when marking hinge locations.
- Protect glass, upholstery, and other **cosmetic surfaces** from damage caused by welding or cutting sparks. Remove interior and exterior trim and adjacent parts that cannot be protected.



9. Repair Procedure

For replacing mechanically fastened door hinges, see **9.1**. For replacing welded-on door hinges, see **9.2**.

9.1 Mechanically Fastened Hinge Replacement

To replace mechanically fastened door hinges:

- 1. Remove and carefully store the door.
- 2. Remove the remaining hinge mounting fasteners and the striker pin.
- 3. Refinish the replacement hinges before installation.
- 4. Apply seam sealers, if required.
- 5. Repair and refinish the pillar, as required.
- 6. Position the hinges on the vehicle and the door, if the hinge pins were removed, and align them to the paint marks.
- 7. Install the door.
- 8. Check the door for proper fit and alignment. Adjust if necessary. Torque all fasteners to the vehicle maker's recommendations.
- 9. Reinstall and align the striker pin.
- 10. Check the door alignment to the striker pin. Adjust the striker pin if necessary.
- 11. Lubricate the hinges.
- 12. Test the operation of the door, glass, and electrical accessories.
- 13. Perform air and water leak tests to insure proper door-to-body and glass-to-door seals.
- 14. Continue vehicle reassembly.

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9. Repair Procedure (cont'd)

9.2 Welded-On Hinge Replacement

To replace welded-on door hinges:

- 1. Remove and carefully store the door.
- 2. Identify all hinge spot weld locations.
- 3. Remove the spot welds. If the hinge is **fillet welded**, cut the hinge off of the door or pillar. Avoid damaging the door or pillar.
- 4. Remove any burrs or spot weld **nuggets**. Avoid removing any **zinc coating**.
- 5. If **plug welding** the hinges, refer to the vehicle maker's recommendations for the location, number, and size of plug weld holes. If no recommendations are available, punch or drill holes that duplicate the size of the original spot welds, at the same locations used by the vehicle maker. One hole should be large enough to allow for minor adjustments when the door is temporarily held in place.
- 6. Position the hinges on the vehicle and the door, and align them to the paint marks.
- 7. Install nuts and bolts, or other temporary mechanical fasteners, to securely hold the hinges in position.
- 8. Support the door while aligning the door to the hinges.
- 9. Install the hinge pins and bushings.
- 10. Close the door enough to check the alignment of the door to the adjacent panels. Adjust the hinges as necessary to obtain proper alignment.
- 11. Tighten the temporary fasteners to prevent movement of the hinges.
- 12. Support the door and remove the hinge pins.
- 13. Remove and store the door.
- 14. Mark the hinge locations.
- 15. Remove the hinges.
- 16. Apply **weld-through primer** to all steel mating surfaces that do not have zinc coating or where the zinc coating was removed. Follow the vehicle maker's recommendations. Due to the poor adhesion property of some weld-through primers, it may have to be removed from all exposed surfaces after welding, before applying other coatings and sealants.
- 17. Make test welds, before welding on the vehicle, using the same type and thickness metal that will be welded on the vehicle. Make the test welds in the same position as the welds on the vehicle, using weld-through primer if applicable. Visually inspect and **destructively test** the welds before welding on the vehicle.



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9. Repair Procedure (cont'd)

- 18. Make the required welds.
- 19. **Dress the welds** as necessary.
- 20. Apply corrosion-resistant primer to all surfaces.
- 21. Apply seam sealer as necessary.
- 22. Refinish the repair area to restore the appearance.
- 23. Install the door.
- 24. Lubricate the hinges.
- 25. Check the door for proper fit and alignment. Adjust if necessary.
- 26. Perform air and water leak tests to insure proper door-to-body and glass-to-door seals.
- 27. Continue vehicle reassembly.



10. Use Of Recycled (Salvage) Parts

10.1 Inspection Of **Salvage Parts**

Do not install salvage hinges that have any of these defects:

- unrepairable damage
- worn or damaged hinge-pin bushing holes

Replace any worn or damaged hinge pins and bushings before installation.



11. Inspection And Testing

11.1 Inspection Of Replaced Door Hinges

Inspect a door with replaced hinges for these conditions:

- weld quality
- proper application of seam sealers and corrosion protection
- proper finish appearance
- proper alignment with adjacent panels
- proper latching and release
- proper operation of the door checks or brakes
- proper installation of all interior trim, labels, weatherstripping, and fasteners
- proper operation of electrical accessories; such as interior lighting, key chime, door ajar warning lamp, and security system, if applicable.
- proper operation of mirrors, door glass, and door locks
- ease of operation
- proper weatherstrip sealing
- proper lubrication

Correct any defects.

