Aeromaster Wiper System
W-Series

Contents
Overview........................................................................................................................................2
Troubleshooting Procedure ...........................................................................................................3
Wiper Blades..................................................................................................................................5
Washer Nozzle Spray Adjustment .................................................................................................5
Wiper Arms ...................................................................................................................................6
Wiper Assembly .............................................................................................................................8
Motor ............................................................................................................................................14
Pivot Assembly ............................................................................................................................16
Link Assembly ...............................................................................................................................19
Ford Wiper Wiring Diagram .........................................................................................................21
Ford E-Series Wiper Control Module ..........................................................................................22
Overview

Wiper system overview
Troubleshooting Procedure

The following troubleshooting and repair procedure should be followed when encountering problems with wiper systems.

1. Wiper motor inoperative at high or low speed.
   - **Condition**: Fuse OK?
     - Yes: Remove and replace wiper motor.
     - No: Power available at high and low speed terminal of motor connector?
       - Yes: Repair open circuit between wiper switch and wiper motor connectors.
       - No: Power available at high and low speed wiper switch terminals?
         - Yes: Power available from ignition switch to wiper switch?
           - No: Remove and replace wiper switch.
           - Yes: Repair open circuit between ignition and wiper switch connectors.
         - No: Repair open circuit between wiper switch and wiper motor connectors.

2. Wiper motor runs, but wiper arms do not move.
   - **Condition**: Motor crank broken or loose?
     - Yes: Check motor shaft splines and replace damaged parts.
     - No: Wiper arms loose on pivots?
       - Yes: Tighten wiper arms.
       - No: Linkage moves freely when removed from motor shaft?
         - Yes: Replace linkage and/or pivot assembly.
         - No: Replace wiper motor.

3. Wiper motor inoperative at low speed.
   - **Condition**: Power available at low speed terminal of motor connector?
     - Yes: Remove and replace wiper motor.
     - No: Power available at low speed terminal of wiper switch connector?
       - Yes: Repair open circuit between wiper switch and wiper motor connectors.
       - No: Remove and replace wiper switch.
4. Wiper motor inoperative at high speed.
   - Power available at high speed terminal of motor connector? No
     - Remove and replace wiper motor.
     - Power available at high speed terminal of wiper switch connector? No
       - Remove and replace wiper switch.
     - Yes
       - Repair open circuit between wiper switch and wiper motor connectors.

5. Wipers operational but stop immediately when switched off.
   - Power available at park terminal of wiper motor connector? No
     - Repair open circuit between wiper switch and wiper motor connectors.
     - Yes
       - Remove and replace wiper motor.

6. Wipers operational but always park incorrectly in the same position.
   - Wiper motor crank in the correct park position? No
     - Remove wiper motor crank, check motor shaft for damaged splines, replace damaged parts, and reinstall crank in the correct park position.
   - Yes
     - Remove wiper motor crank, check motor shaft for damaged splines, replace damaged parts, run motor and park. Reinstall wiper arms in correct park position.

7. Wiper Oversweep or Undersweep.
   - Correct Park Position of Wiper Arms and/or Motor Crank. No
     - Check for Loose/Worn Linkage, Excessive Play in Pivot Shaft and Replace Damaged Parts as Necessary.
     - Yes
       - Park Position of Wiper Arms OK?
         - Yes
           - Replace Linkage.
Wiper Blades

CAUTION: Always install wiper arms and blades according to the manufacturer’s instructions to avoid interference with the windshield molding.

Removal
1. Pull the wiper arm away from the windshield and lock the arm into the Service position.
2. Rotate the blade about 90° and push the blade toward the windshield about 1". The rubber insert will bow outward from the arm pushing against it.
3. Unhook the blade assembly from the arm.

Installation
1. Hook in a replacement blade and push it away from the vehicle until the blade locks in place.
2. Rotate the blade to its normal position and lower the arm.

Washer Nozzle Spray Adjustment
1. Use a screwdriver to adjust middle nozzle 90 degrees (perpendicular) to the windshield.
2. Adjust inboard nozzle to point approximately 60 degrees outward of middle nozzle and the outboard nozzle to point approximately 82.5 degrees outward of middle nozzle.
Wiper Arms
Removal

NOTE: Keep all fasteners unless noted otherwise.

1. Disconnect the washer hose from the T-fitting pump assembly under the hood. Remove the grommet and the hose through the cowl.

2. Remove the arm-retaining cap nut and washer with a 13 mm wrench and remove the wiper arm.

3. Use a battery post puller to release the arm from the shaft, if necessary.
**Installation**

1. Turn the ignition On, and run the wiper system. Return the wiper control to the Off position to allow the wiper motor to park itself.

2. Push the arm heads over the tapered knurl shaft. The blades should be approximately 4" from the top edge of the windshield glass frit band and the bottom edge of the wiper.

3. Replace arm-retaining cap nuts and wavy washers and with a 13 mm wrench.

4. Inspect by turning the ignition On, and run the wiper system. Return the wiper control to the Off position to allow the wiper motor to park itself.

5. Torque to 13–17 ft•lbs.

6. Push the washer hose through the holes in the cowl and connect to the T-fitting washer pump.

7. Re-torque after 30 minutes.
Wiper Assembly

Removal

NOTE: Removal of the washer bottle assembly is only necessary on the Ford E-Series chassis. Do not disconnect washer bottle or hose

NOTE: Keep all fasteners unless noted otherwise.

1. On the Ford E-Series chassis, remove (4) Torx screws from washer bottle bracket and set assembly aside.

2. Turn the ignition On, and run the wiper system. Return the wiper control to the Off position to allow the wiper motor to park itself.
3. Mark the Park position on motor bracket using a marker or grease pencil. The lower crank arm should be horizontal and point toward the passenger side of the vehicle.

4. Park position marked on wiper motor bracket.

5. Disconnect the wiper arm washer hoses from the T-fitting under the hood. Remove the grommet and the hose through the cowl.


7. Disconnect the wiper motor harness from the jumper harness.
8. Remove the wiper arm.

9. Use a deep socket and a wrench under the cowl to remove M20 locknuts and flat washers from pivots.

NOTE: If outside locknut is seized on the housing, use a rotary style cutter to remove nut.
10. Remove (2) 5/16" nuts on the cowl.

11. Remove (2) 5/16" flange screw from the lower cowl channel.

12. Remove the entire wiper assembly from under cowl.
Installation

*Fasteners to secure bracket to cowl*

**CAUTION:** Do NOT cross-thread the bolts into the pivot flange. If a screw does not thread easily by hand, align pivot flange with holes in the cowl. Enlarge hole if needed.

**NOTE:** Wiper assembly may be wire-tied to prevent motor crank rotation during vehicle installation. Remove after vehicle installation of system.

**NOTE:** Secure with flange screws only on 2015 wiper systems or later or if removing assembly to replace pivots. See pivot installation.

1. Place wiper assembly under cowl and loosely fasten (2) 5/16- x 1.25 flange screws in pivot flange holes starting from the passenger side.
2. Loosely tighten the M20 hex nut and flat washer to each pivot.

*Pivot fasteners*

3. Push the motor bracket inside of the cowl channel and insert (2) 5/16" studs through the upper cowl. Secure with (2) 5/16" nuts.
4. Use (2) flange screws to secure the motor bracket to the lower cowl channel.
5. Torque (4) motor bracket fasteners to 11–17 ft•lbs.
6. Install pivot caps.
8. Secure harness with wire ties.
9. Turn the ignition On, and run the wiper system. Return the wiper control to the Off position to allow the wiper motor to park itself.
10. Install wiper arms.
**Motor**

---

**CAUTION:** The wiper motor is equipped with an internal thermal overload protection switch that stops the wiper motor in case of overload. Thus, if the motor is not unplugged, the motor may activate itself without warning. Always unplug the motor when working on or disconnecting wiper linkages.

---

**Removal**

1. Disconnect the wiper motor harness from the jumper harness.

   NOTE: The Ford E-Series chassis requires moving the washer bottle bracket to service the wiper motor.

2. Place the wiper arms up into the service Up position away from the windshield.

3. Rotate the motor crank to the Down position to gain access to the crank retaining nut on the motor shaft.

4. Use a 1” open end wrench to hold the crank arm in place.

5. Remove the M8 nut on the motor shaft and set aside for reuse.

6. Position the 1” wrench between the motor and the crank arm. Pry the motor crank off the shaft and move the linkage down until clear of the bracket.

7. Remove (4) fasteners securing the motor bracket to cowl and remove motor assembly.

8. Remove the (3) M6 screws and washers from motor and set aside bracket and fasteners.

---

*Overview of motor removal*

---

*Crank in Down position (bracket omitted for clarity)*
Installation

**CAUTION:** Do not let the motor crank rotate while tightening. If the crank rotates, remove fasteners and run the wiper system to return the motor to Park position.

1. Attach the motor to the bracket using the (3) M6 hex screws and washers.
2. Torque to 6–7 ft-lbs.
3. Use (2) 5/16" nuts to fasten the wiper motor bracket inside of the cowl channel.
4. Use (2) flange bolts with U-nuts to secure to the lower cowl channel.
5. Torque all bracket fasteners to 7–11 ft-lbs.
6. Connect the wiper motor to the jumper harness.
7. Turn the ignition On, and run the wiper system. Return the wiper control to the Off position to allow the wiper motor to park itself.
8. Disconnect the wiper motor jumper harness.
9. Lift the wiper arms to the Service position.
10. Place crank arm on the motor shaft in the Down position with both pivot levers pointing down.

11. Rotate the motor crank arm counterclockwise to the Park position.
12. Hold the motor crank arm in place with a 1” wrench and tighten the crank arm nut with a 13 mm wrench.
13. Rotate the crank arm counterclockwise to the Down position to access the crank nut.
14. Use the 1” wrench to hold the crank arm and torque crank retaining nut to 11–13 ft-lbs.
15. Return wiper arms to the windshield.
16. Connect the wiper motor harness to the jumper harness.
Pivot Assembly

Removal

NOTE: Keep all fasteners for reinstallation.

1. Remove the wiper arms.
2. Remove wiper assembly.
3. On workbench, disconnect the linkage from the pivot by removing the E-clip and washers.
4. Remove the pivots.
Installation

Overview of replacement pivot assembly (LH shown)

NOTE: Replacement pivots require drilling additional holes in cowl.

1. Install replacement pivot in linkage using (2) flat washers on each side of the linkage. Repeat on opposite pivot. Both pivots should point forward with the longer pivot installed on the driver's side (LH).
2. Secure with E-clips.
3. Clean the cowl around the pivot holes.
4. Use a center punch and the holes in the replacement pivots as a guide to mark (2) holes.
5. Drill (4) 3/16" pilot holes in cowl.
6. Use a 3/8" drill bit to enlarge holes.

![Replacement pivot flange fastener holes](image)

7. Deburr holes.
8. Place wiper assembly under cowl and loosely fasten (2) 5/16 x 1.25 flange screws in pivot flange holes starting from the passenger side.
9. Install wiper assembly.
10. Torque pivot 5/16 x 1.25 flange screws to 13–17 ft•lbs.
11. Torque M20 nuts to 13–17 ft•lbs.
12. Install wiper arms.
Link Assembly

Removal

1. Disconnect the electrical harness at the wiper motor.
2. Remove wiper assembly from cowl.
3. Remove the wiper motor drive shaft nut with a 13 mm wrench.
4. Remove the motor crank arm from the wiper motor drive shaft.
5. Remove link assembly from pivots.

Installation

**CAUTION: Do not let the motor crank rotate while tightening fasteners. If the crank rotates, remove fasteners and run the wiper system to return the motor to Park position.**

1. Install pivots on replacement link assembly.
2. Install link assembly motor crank to motor.
3. Hold the motor crank arm in place with a 1” wrench and tighten the crank arm nut.
4. Rotate the crank arm counterclockwise to the Down position to access the nut.
5. Use the 1” wrench to hold the crank arm and torque crank retaining nut to 11–13 ft•lbs.
6. Install the wiper assembly.
7. Install pivot covers.
8. Connect the wiper motor harness to the jumper harness.
9. Turn the ignition On, and run the wiper system. Return the wiper control to the Off position to allow the wiper motor to Park itself.
10. Install wiper arms.
11. Adjust wiper arm position if necessary.
Ford Wiper Wiring Diagram

Wiper Module Connector

- 110 PK/BK 14
- 890 VT 18
- 236 LG 14
- 513 BK
- 510 BK/WT 14
- 890A VT 18
- 890A VT 18
- 110 PK/BK 14
- 511 BK 18

Wiper Switch

- F48 30A
- F35 20A
- IGN SW
- F45 30A

Battery

F48 30A

Wiper Motor

- WIPER MOTOR CONNECTORS
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18

WIPER MOTOR

- MOTOR
- CASE GROUND
- PLATE

Utilimaster

Ford

Battery

Ign SW

F45 30A

Wiper Relay

- WIPER POWER (BK/RD)
- WIPER PARK (BK/YL)
- WIPER HIGH (BK)
- WIPER LOW (DB)
- WIPER MOTOR GND (BK/WT)
- WASHER MOTOR (VT)
- WASHER NON-SWITCH GN (WT)

WIPER SWITCH

- FORD BODYBUILDER CONNECTOR

Wash Pump

16514953a Module Wiper Control #36 FD BKWD/FWD

FORD BODYBUILDER CONNECTOR

- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18

WIPER MODULE CONNECTOR

- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18

WIPER MOTOR CONNECTORS

- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18

WIPER MOTOR CONNECTORS

- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18

WIPER MOTOR CONNECTORS

- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
- 830A RD 18
Ford E-Series Wiper Control Module

WARNING: Always remove the (BLACK) Negative cable first and connect it last.

Removal

1. Disconnect the vehicle Negative (BLACK) battery cable(s).
2. Secure the battery cable(s) away from the terminal to prevent accidental contact.
3. Disconnect the harness connector from the module.
4. Remove (4) screws securing the module to the cowl.

Installation

1. Secure replacement module to the cowl.
2. Secure wiper control harness to the module.
3. Connect the battery.

Utilimaster Customer Service

574-848-2200
Email: CustSvc@Utilimaster.com

03103436-A10004 Wiper System, W-Series
March 2015

©Utilimaster Corp., 603 Earthway Boulevard, Bristol, Indiana 46507 USA

03103436-A10004 Rev. B  574-848-2200  22