



Providing Mobility for
the Physically
Challenged Since 1952

Drive-Master

Providing Mobility for the Physically Challenged Since 1952

Back-Up Steering system

Installation Manual and Owner's Guide

1980 & Up Generic Vehicles



37 Daniel Rd. West, Fairfield, NJ 07004-2521 • 973-808-9709 • FAX 973-808-9713 • E-MAIL: sales@drivemaster.net



GENERIC REV-3/09



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DRIVE-MASTER CO., INC.

37 DANIEL ROAD WEST
FAIRFIELD, NJ 07004-2521

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IT HAS BEEN BROUGHT TO OUR ATTENTION THAT SOME DEALERS HAVE NOT BEEN COMPLYING WITH THE ORIGINAL 10/97 SERVICE DIRECTIVE WHICH IS REPRINTED BELOW. BY NOW, ALL PRIOR INSTALLATIONS SHOULD HAVE BEEN ADDRESSED - HOWEVER THE PROBLEM STILL EXISTS ON THESE VEHICLES.

ALL VEHICLES FOR BACK-UP STEERING MUST BE INSPECTED FOR THIS DEFECT.

SERVICE DIRECTIVE

AUGUST 21, 1998

1980 & UP GENERIC VEHICLE

(Reprinted from 10/1/97 Directive)

We at DRIVE-MASTER have found an improper machining technique by the manufacturers of the OEM power steering pump installed in the vehicles listed above.

The end of the return line into the OEM pump is crimped closed to one half of it's flow capacity and must be cut off and de-burred to open the return hole. If this is not done, the pressure will build and blow the seal in the DRIVE-MASTER Back-up Steering Pumps. This must be taken care of IMMEDIATELY for all of your customers with DRIVE-MASTER Back-up Systems in Chrysler, Dodge, Plymouth mini-vans.

You MUST remove the OEM return line to the OEM Power Steering Pump and inspect for the Dodge substandard hole. If the hole is not modified as directed in this Service Directive, and on the attached diagram listing the Procedure to Repair, you will blow the seal between the DRIVE-MASTER Back-up Steering Pump and Motor. If this happens we will not warranty the seal, pump or motor. You will have to pay for the new parts.

If you require technical assistance before you start installation, please call.



Providing Mobility for the Physically Challenged Since 1952

Mobility Dealer and Installing Technician

Congratulations,

You have just purchased the finest, most reliable Back-Up Steering system manufactured. We are offering a 3 year/36,000 mile manufacturer's components warranty – see warranty pages for details. Please read and reread these instructions as improvements have been made to make your installation easier and the components last longer. If you follow the directions step by step as instructed, you will not encounter any problems and you will have a proper installation.



If you have any questions call 973-808-9709 between 8 am and 4:30 pm, Monday through Friday and ask for technical assistance.

Thank you for supporting Drive-Master Products.

Yours in mobility,

A handwritten signature in black ink that reads "Peter B. Repprecht". The signature is written in a cursive, flowing style.

President

Subject: Possible OEM Line/Fitting Restrictions.

All B.U.S. except Dodge/Chrysler Caravans

Referenced Area: Any OEM molded plastic fitting or OEM metal fitting you are connecting Drive-Master Back up Steering Hoses, i.e.: OEM Power Steering Pump & OEM Power Steering Reservoir.

Action: You must look in these openings to make sure that there are no obstructions from the OEM. There must be full flow through the opening. If you find obstruction or deformity, you must use a drill bit or other tool to open the fitting for full flow.

If you do not do this, you will experience a restriction in the system. It will build pressure, and blow the reservoir can off the BUS pump. Warranty Void.

Background: Some dealers report the plastic fitting out of OEM P.S. Pump Reservoir is not fully open and must be drilled out.

DEALER WARNINGS

1. The back-up system should not be used to take the place of the factory power steering system.
2. Route all hoses to prevent rupture or chafing of back-up and factory lines and keep away from hot exhaust & manifold components.
3. Only trained and certified technicians can install Drive-Master back-up systems, otherwise the warranty will be void.
4. Do not mount back-up steering pump unit with the reservoir ports facing down towards the ground.
5. Flow sensor fittings and wires were specially checked for security prior to leaving our factory. Take care when installing not to loosen or break wires. To do so will **DAMAGE FLOW SENSOR AND INVALIDATE WARRANTY**. Refer to troubleshooting guide for test procedures
6. Do not make any electrical connections that are different than the Drive-Master wiring instructions.
7. Disassembling components without prior Drive-Master notification and a valid Return Authorization (RA) in writing by a Drive-Master office liaison will void warranty, and a charge will be issued for any replacement parts. **DO NOT CUT HARNESS' WHEN REMOVING ELECTRICAL WIRING FOR RETURN-THIS WILL VOID WARRANTY!**
8. 2001 through 2005 Daimler/Chrysler minivan products-Check the OEM return line from the cooler to the OEM fill reservoir to see if there is a metal restrictor in the line. This can be seen from under hood, right side of motor from reservoir. If there, remove and discard the line. Replace with the yellow push-lok hose supplied. **FAILURE TO DO THIS WILL RESULT IN HOSE FAILURE AT THE COOLER END AND VOID THE WARRANTY!**
9. Drive-Master does not have a labor reimbursement program. So, if you cannot diagnose the problem in 15 minutes, do not waste any more time and phone for technical assistance. (973) 808-9709 Mon. - Fri. 8:00AM - 4:30PM EST.

Back-Up Steering System Operation for the owner/user

The Drive-Master Back-Up Steering system is designed to provide emergency power steering in the event of engine stall or OEM power steering failure. You have a Back-Up Steering System because your OEM steering is modified to low or no effort. The Drive-Master back-up steering pump will automatically activate when the OEM power steering flow is disrupted. Audible and visual alarms alert the driver of the activation of the back-up steering system. (WARNING: THE ALARM BUZZER WILL STAY ACTIVE AS A REMINDER TO THE DRIVER TO GET OFF THE ROAD AS SOON AS POSSIBLE. STOP AND TURN OFF THE VEHICLE AND SUMMON HELP.)

The Drive-Master Back-Up system will become operational after the vehicle is running. This exclusive feature is accomplished by the Drive-Master back-up module (or relay in the toggle switch equipped model). Excessive current draw from the battery is eliminated until the engine is started. The back-up system's operation can be tested two ways:

1. Start the engine. Turn the steering wheel left or right fully to end stops. The system will engage when the wheel hits the stop. The warning buzzer will sound (if equipped with buzzer), and the LED will light, alerting the driver of the back-up system's operation.
2. The test/emergency switch can be manually operated from the Drive-Master back-up steering control module (or toggle switch) which overrides the system and activates the back-up steering immediately. Push the button or operate the toggle switch to the on position - the pump will run. Push the button again or toggle the switch to off & the pump will turn off.

The flow rate of the back-up steering pump is 3.5 gallons per minute. The system is V.A. tested and accepted. It will operate beyond the 180 second specification required for V.A. clients. The back-up system has its own one quart reservoir, and operates on the vehicle's 12 volt battery.

Maintenance: Maintain normal fluid level in the OEM power steering reservoir. This should be checked when engine oil and filter are changed, every 3000 to 5000 miles.

Leaks: Any dripping or leak detection under vehicle – return to your mobility equipment dealer for repairs immediately.

Steering: If steering becomes hard to steer or noisy - return to your mobility equipment dealer for repairs immediately.

Annually, or every 30,000 miles - Return to your mobility equipment dealer for complete system check and replacement of the hydraulic low pour fluid in the system.

Continuous Operation: if the BUS motor runs continuously, turn vehicle off immediately and call your dealer for service.

DRIVE-MASTER BACK-UP STEERING SYSTEM LIMITED PARTS ONLY WARRANTY

DRIVE-MASTER warrants that the parts of your new Back-Up Steering System are free from defects in materials or workmanship for a period of 3 years or 36,000 miles from date of first retail purchase, whichever occurs first.

Return of Warranty Registration Card

Your return of the attached Warranty Registration Card within 10 days of your purchase is a condition of performance under this Limited Parts-Only Warranty.

What This Warranty Gives You:

If your Drive-Master Back-up Steering System is properly operated and maintained, any component covered by this limited warranty found to be defective in materials or workmanship, will be replaced without charge.

Under this limited warranty, the sole and exclusive remedy is the replacement of defective parts with new or remanufactured parts, within Drive-Master's sole discretion.

NOTE – the cost of labor to install parts provided under this Limited Parts-Only Warranty is not covered by this Limited Parts-Only Warranty.

This Is Your Only Written Warranty

This Limited Parts-Only Warranty is the only express warranty applicable to your Back-up Steering System. Drive-Master does not authorize anyone to modify this Limited Parts-Only Warranty or to assume for Drive-Master any other obligation or liability in connection with this Limited Parts-Only Warranty.

Limitation on Implied Warranties and Consequential Damages

All Implied Warranties, including the implied warranties of merchantability and fitness for a particular use, are limited, to the extent allowed by law, to the time period covered by this Drive-Master New Back-up Steering System Limited Parts-Only Warranty, or to the applicable time period provided by state law, whichever period is shorter.

Drive-Master is not responsible for any time that you lose, for any inconvenience you might be caused, for any commercial loss, for the cost of alternative transportation or hotels, or for any other incidental or consequential damages you may incur.

Some states do not permit a limitation on how long an Implied Warranty will last, or the exclusion or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This Warranty gives owners specific legal rights, and they may also have other rights that vary from state to state.

What Is *Not* Covered under this Limited Parts-Only Warranty

- Damage caused by accident or misuse or abuse*
- Alteration, tampering or modification of the Back-up Steering System*
- Claims involving disconnection or alteration of the vehicle odometer, or where the actual vehicle mileage cannot otherwise be determined*
- Damage caused by failure to maintain or improper maintenance of the Back-up Steering System*

See your Owner Maintenance section for proper maintenance of your Back-up Steering System.

We recommend servicing at qualified NMEDA dealers. Make sure your service location fills out the maintenance record in your owners manual so you will have a means to demonstrate that proper service has been performed.

- Other items and conditions not covered by this limited warranty*
- Non - Drive-Master parts*
- Normal wear and tear*

How To Make A Claim

Contact Drive-Master at the following address and telephone:

37 Daniel Rd. West, Fairfield, NJ 07004 - 973-808-9709

Return of defective parts may be a condition of claim approval.

We suggest that you use mobility dealers who are members of the National Mobility Equipment Dealers Association (NMEDA). See www.nmeda.org or call us at 973-808-9709 and ask for the closest dealer.

IMPORTANT

NEW

Instructions for Generic Vehicles

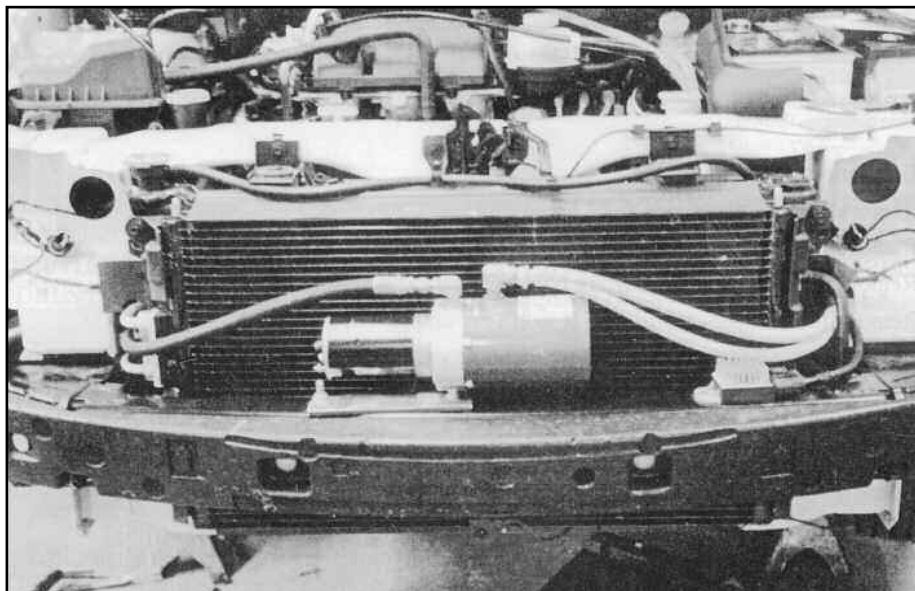
1. Disconnect the battery.
2. Find location to mount B.U.S. Pump and Bolt. Call with measurement of hoses.
3. Upon receiving hoses from us, follow power steering flow diagram to mount hoses. See page 11.
4. Mount the solenoid.
5. Make sure all the lines are away from any sharp edges that will cut or chafe during vibration and away from the exhaust system. Secure as necessary - Remember this is your responsibility as the installing dealer.

IMPORTANT

Revision 9-7-01 DUE TO ELECTRICAL INTERFERENCE BETWEEN THE BACK-UP STEERING MOTOR AND THE VEHICLE'S ELECTRICAL SYSTEM, THE FOLLOWING MUST BE DONE.

6. A negative cable must be attached to the back-up steering pump motor mount and the negative terminal of the vehicle battery.
7. This cable must be wrapped around the positive cable loosely - 4 to 6 times and both cables must be mounted away from OEM wires, cables and harnesses by at least 1/2".
8. Fill back-up steering with OEM fluid with preferred filling instructions on page 9.
9. Fill out warranty protection card, have customer sign and return mail to Drive-Master to register the equipment.
10. Explain the system to your customer and give him the supplied Drive-Master Back-Up Owner's Manual.
11. Affix warning label.

**Suggested
Mounting
Location**



PREFERRED FILLING INSTRUCTIONS

You must purchase this tool for all back up steering installations & use for repairs.

WARNING: The fluid level should be checked with engine off to prevent injury from moving components.

CAUTION: OEM Power Steering Fluid is to be used in the power steering system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.

CAUTION: If the air is not purged from the power steering system correctly, pump failure could result.

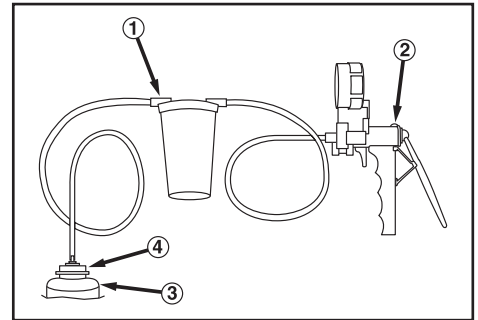
NOTE: Be sure the vacuum tool used in the following procedure is clean and free of any fluids.

1. Check the fluid level. As measured on the side of the reservoir, the level should indicate between MAX and MIN when the fluid is at normal ambient temperature. Adjust the fluid level as necessary. (Refer to 19 - Steering/Pump/FLUID - Standard (Procedure).

2. Tightly insert Power Steering Cap Adapter (4), Special Tool 9688, into the mouth of the reservoir (3).

CAUTION: Failure to use a vacuum pump reservoir (1) may allow power steering fluid to be sucked into the hand vacuum pump.

3. Attach Hand Vacuum Pump (2), Special Tool C-4207 or equivalent, with reservoir (1) attached, to the Power Steering Cap Adapter (4). Call 973-495-6182 Mactools. Ask for Kevin O'Malley. He has offered us special pricing for the tool and reservoir adapter M4000 Pump and MIL9688 Adapter



CAUTION: Do not run the engine while vacuum is applied to the power steering system.
Damage to the power steering pump can occur.

NOTE: When performing the following step make sure the vacuum level is maintained during the entire time period.

4. Using Hand Vacuum Pump (2), apply 68-85 kPa (20-25 in. Hg) of vacuum to the system for a minimum of three minutes.

5. Slowly release the vacuum and remove the special tools.

6. Adjust the fluid level as necessary. Refer to **Step #1**.

7. Repeat **Step #1** through **Step #6** until the fluid no longer drops when vacuum is applied.

8. Start the engine and cycle the steering wheel lock-to-lock three times.

NOTE: Do not hold the steering wheel at the stops.

POWER STEERING FLUID LEVEL CHECKING

WARNING: Fluid level should be checked with the engine OFF to prevent personal injury from moving parts and to assure an accurate fluid level reading.

CAUTION: OEM Power Steering Fluid is to be used in the power steering system. No other power steering fluid is to be used in the system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.

NOTE: Although not required at specific intervals, the fluid level may be checked periodically. Check the fluid level anytime there is a system noise or fluid leak suspected.

The power steering fluid level can be viewed through the side of the power steering fluid reservoir. Compare the fluid level to the markings on the side of the reservoir. When the fluid is at normal ambient temperature, approximately 21°C (70°F to 80°F), the fluid level should read between the MAX. and MIN. markings. When the fluid is hot, fluid level is allowed to read up to the MAX. line.

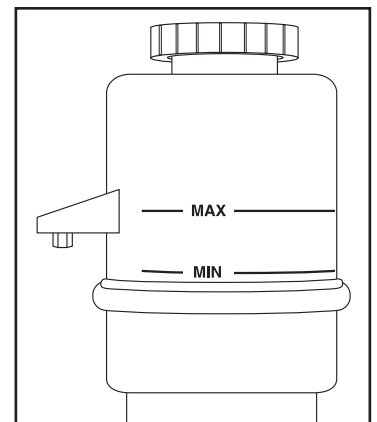
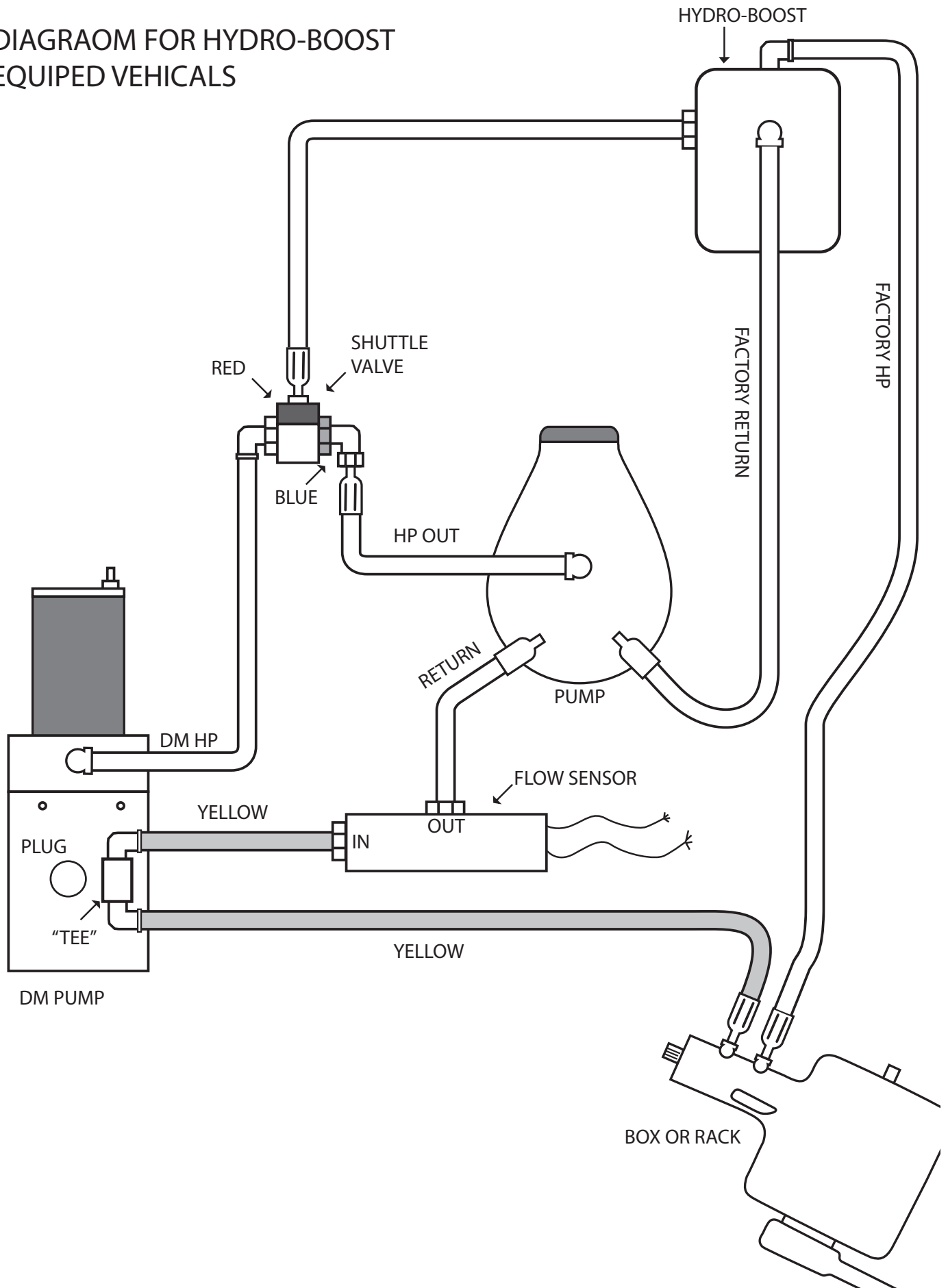
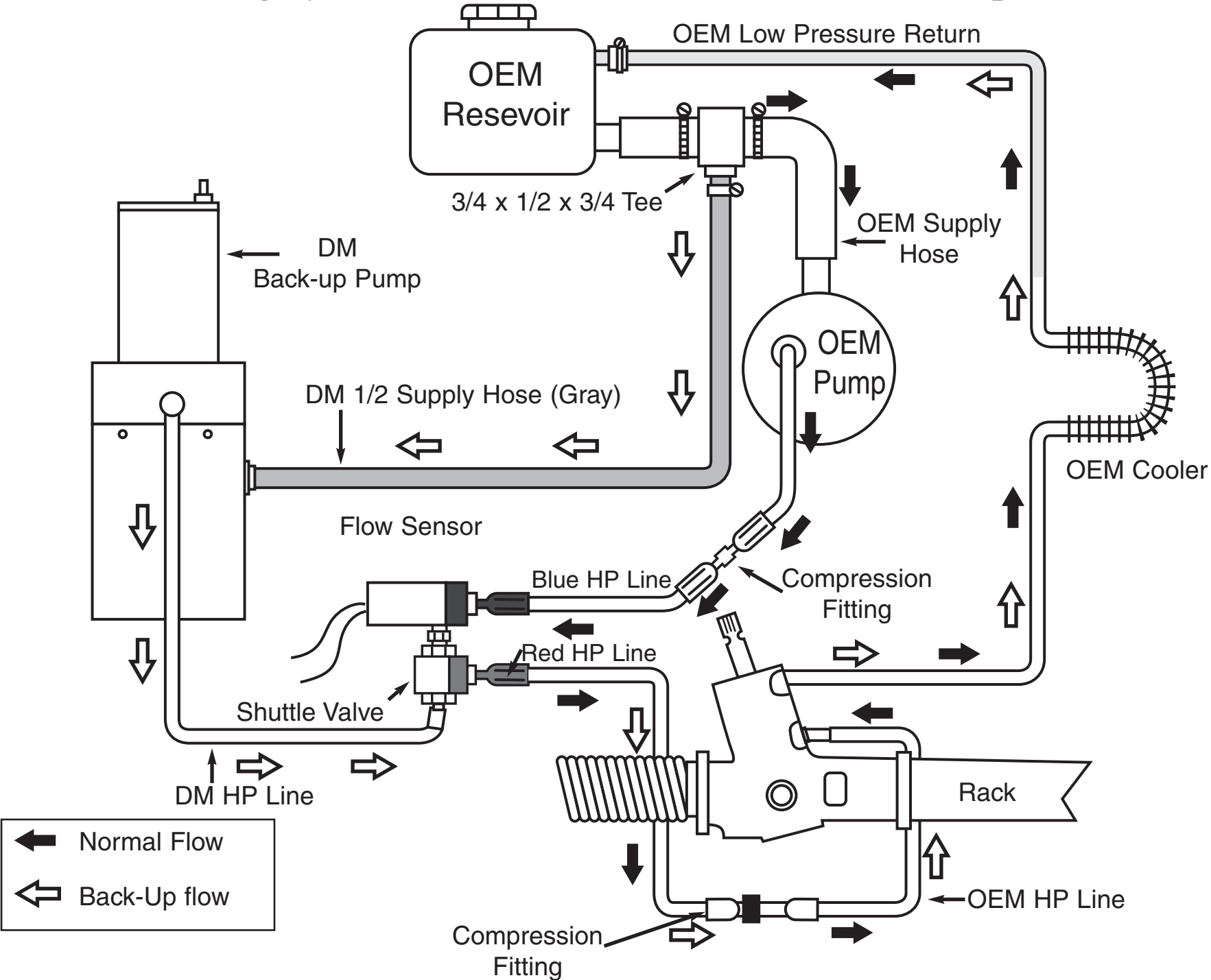


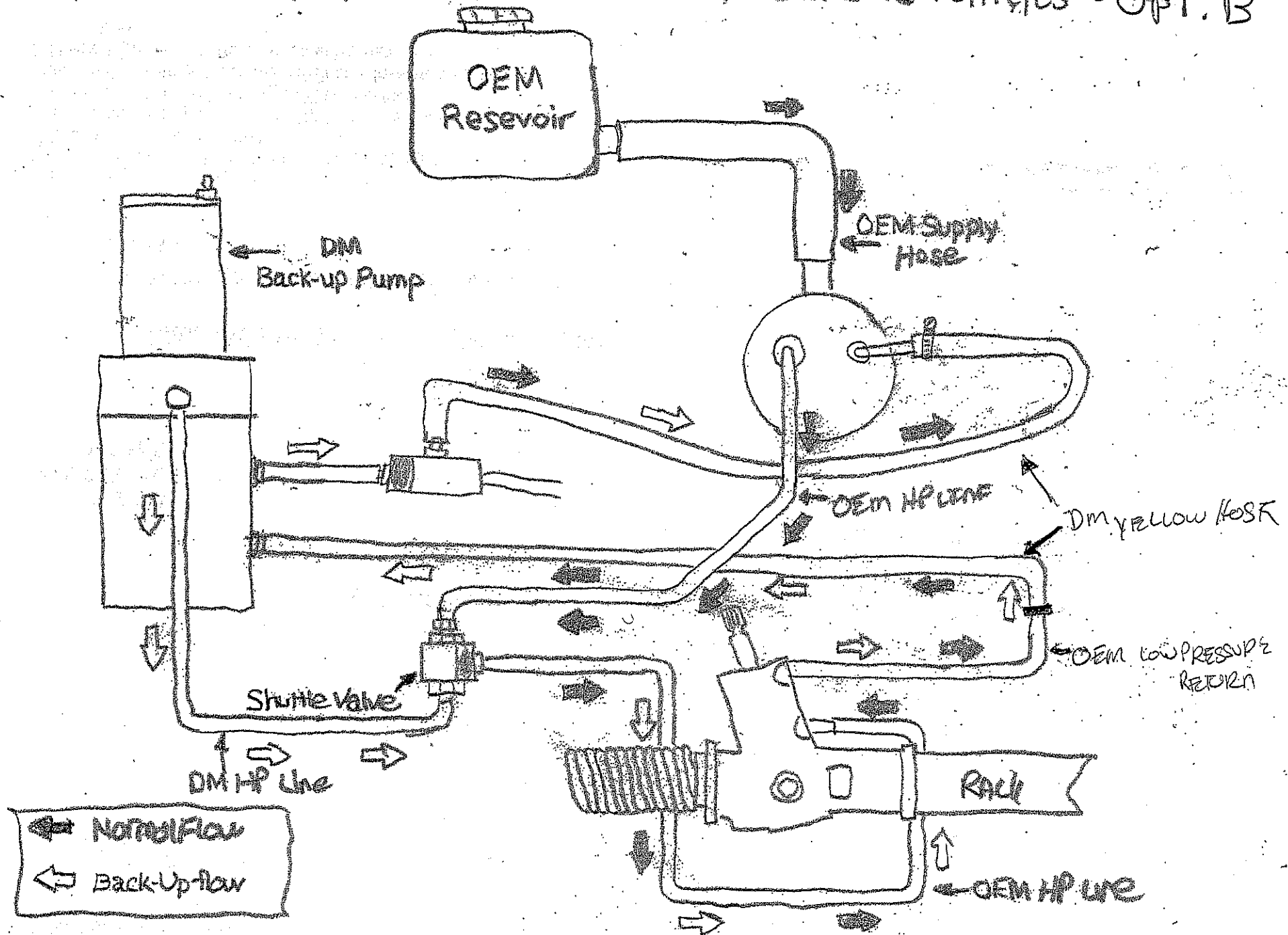
DIAGRAM FOR HYDRO-BOOST EQUIPED VEHICALS



Steering System Flow Chart For Generic Vehicles - Opt. A

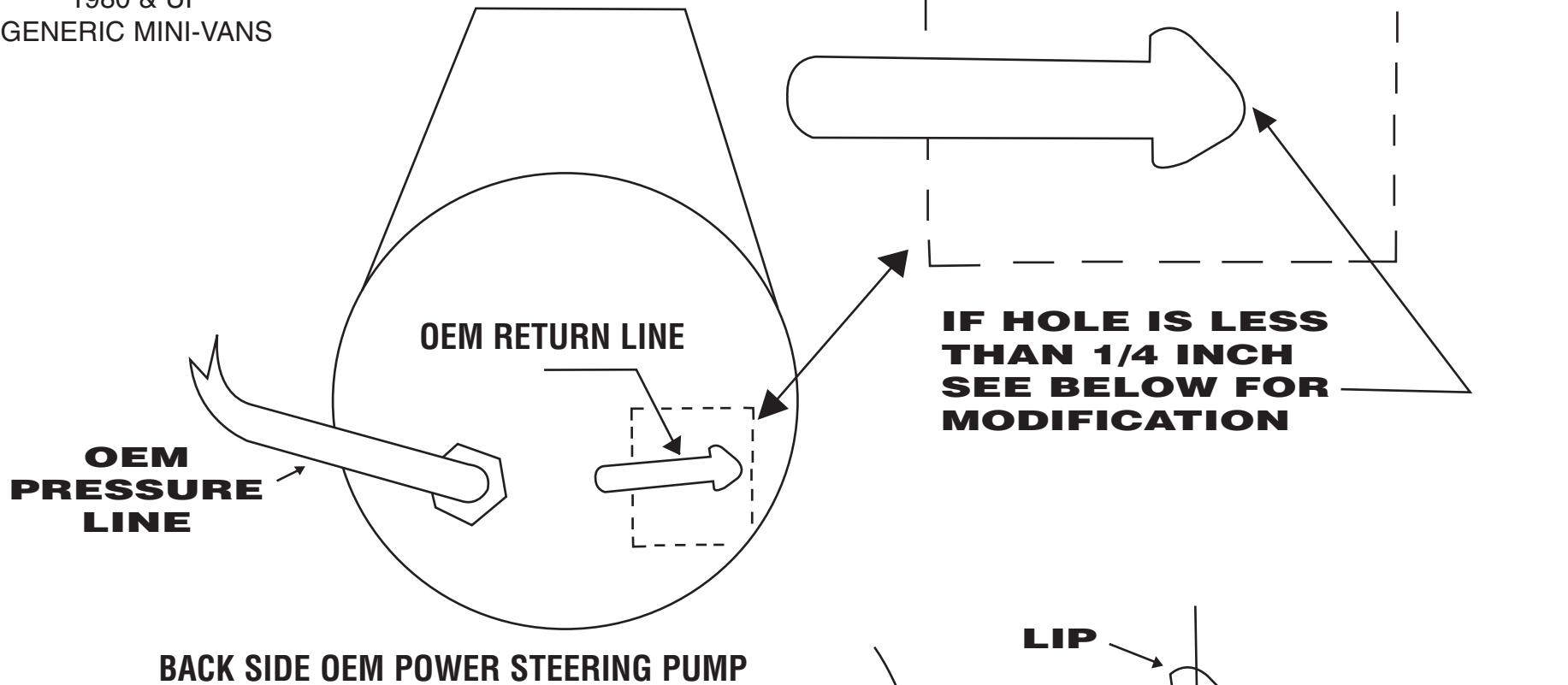


Steering System Flow Chart For Generic Vehicles - Opt. B



SERVICE DIRECTIVE
AUGUST 21, 2008

1980 & UP
GENERIC MINI-VANS



PROCEDURE TO REPAIR: VEHICLE MUST NOT BE RUNNING DURING INSPECTION

1. Park vehicle on level ground
2. Set park brake
3. Open hood.
4. Jack up vehicle front only; use Jack Stands
5. Locate OEM Power Steering Pump using drop light - under right side engine (passenger side).
6. Remove factory return line from OEM Power Steering Pump.
7. Hole must be 1/4" in diameter. (SEE DIAGRAM).
8. After repair, re-attach hose with NEW stainless steel clamp.
9. Fill system per original Back-up Steering instructions.
10. Test for leaks.

PARTS LIST
DRIVE-MASTER CO., INC.
BACK-UP STEERING
1980 & UP GENERIC MINIVANS

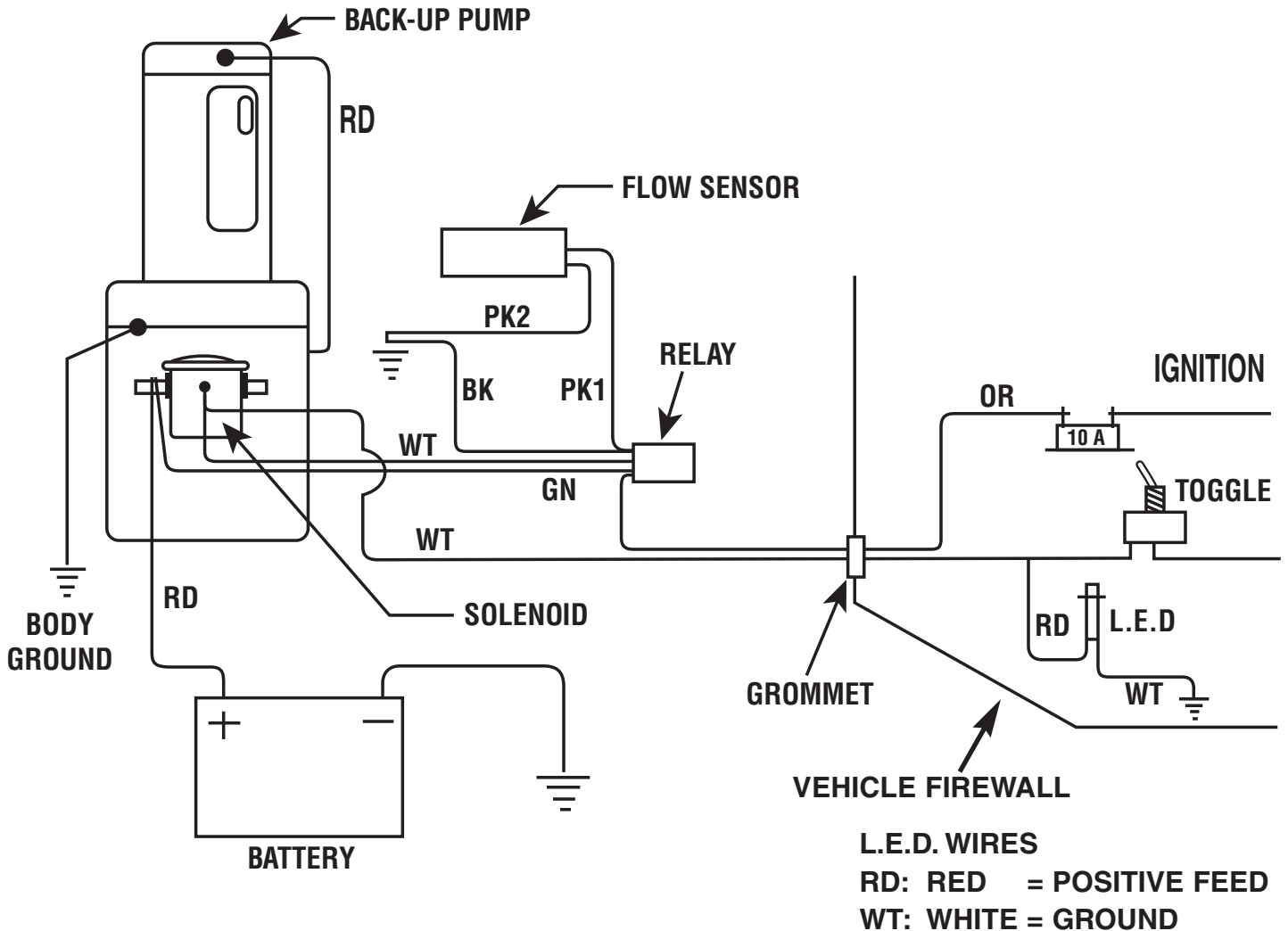
1. One back-up pump and motor assembly with bracket and solenoid attached.
2. One back-up steering control module with wiring harness

OR:

One Toggle Switch (on/off)
One LED warning light
One 8' 14 gauge white wire (switch wiring)
One 8' 14 gauge orange wire (ignition wiring)
One back-up steering relay
Various electrical connectors
One 10 amp. Circuit breaker

3. One flow sensor with fittings.
4. One shuttle valve assembly.
5. One 6'5" back-up steering pressure line.
6. Two 6'5" push lock hoses.
7. One 6" - 2 gauge battery cable with ends.

DRIVE-MASTER BACK-UP STEERING ELECTRICAL SCHEMATIC WITH TOGGLE

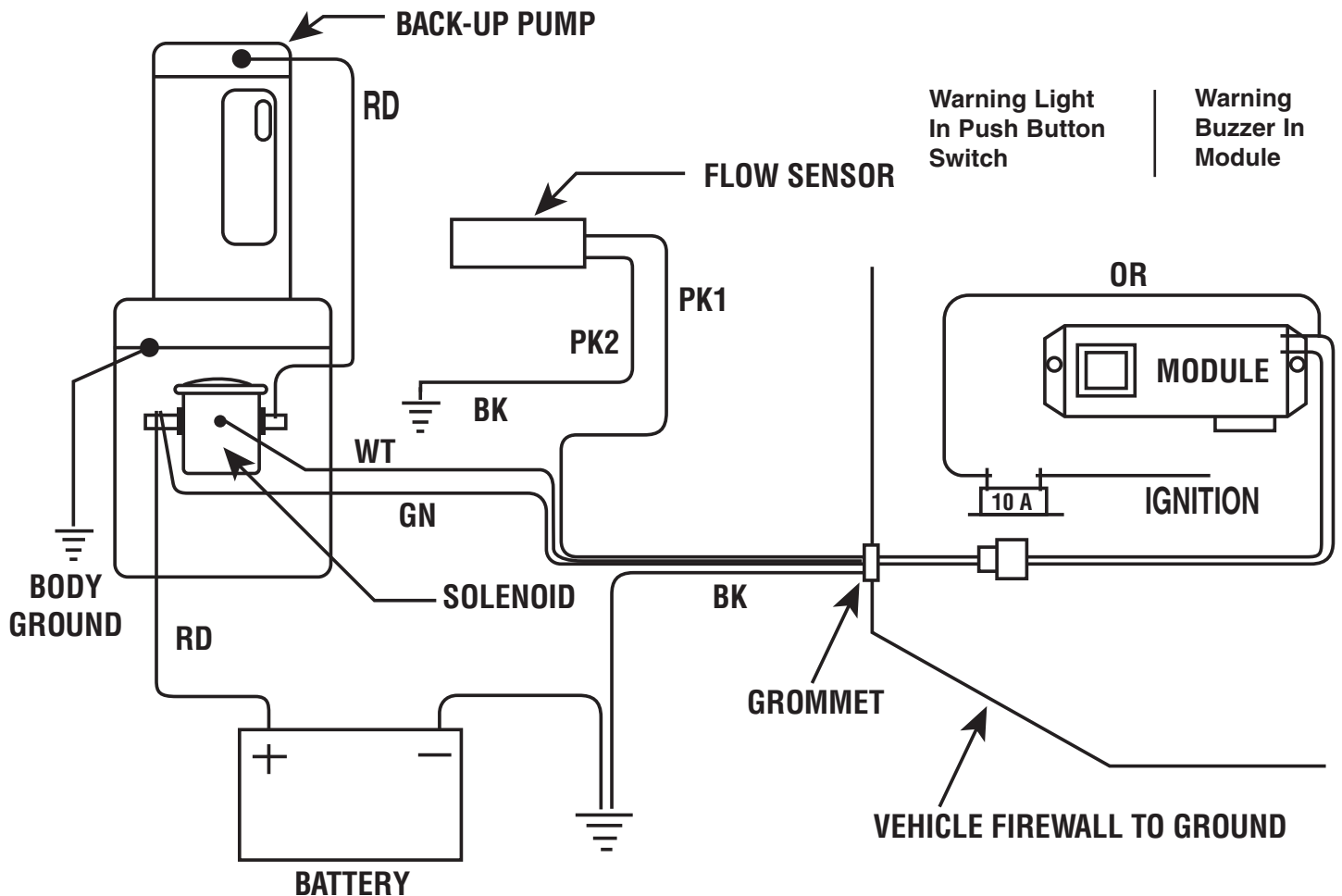


LEGEND

- OR: ORANGE = 12V IGNITION HOT
- GN: GREEN = 12V CONSTANT HOT (SOLENOID)
- BK: BLACK = GROUND
- PK1: RED = FLOW SENSOR TO RELAY/MODULE
- PK2: PINK = FLOW SENSOR TO PUMP GROUND OR CHASSIS GROUND
- WT: WHITE = SOLENOID TRIGGER POST (BOTH SYSTEMS)
- WT: WHITE = 12V HOT TO TRIGGER POST V1A ON/OFF TOGGLE SWITCH
- RD: RED = 12V HOT TO BATTERY (2 GA. WIRE)

WARNING: Do not apply 12 volts directly to either pink wire on the flow sensor. The unit is ground operated and applying direct power will short out the device. The resulting damage is not under OEM warranty, and therefore not under warranty by Drive-Master.

DRIVE-MASTER BACK-UP STEERING ELECTRICAL SCHEMATIC WITH MODULE



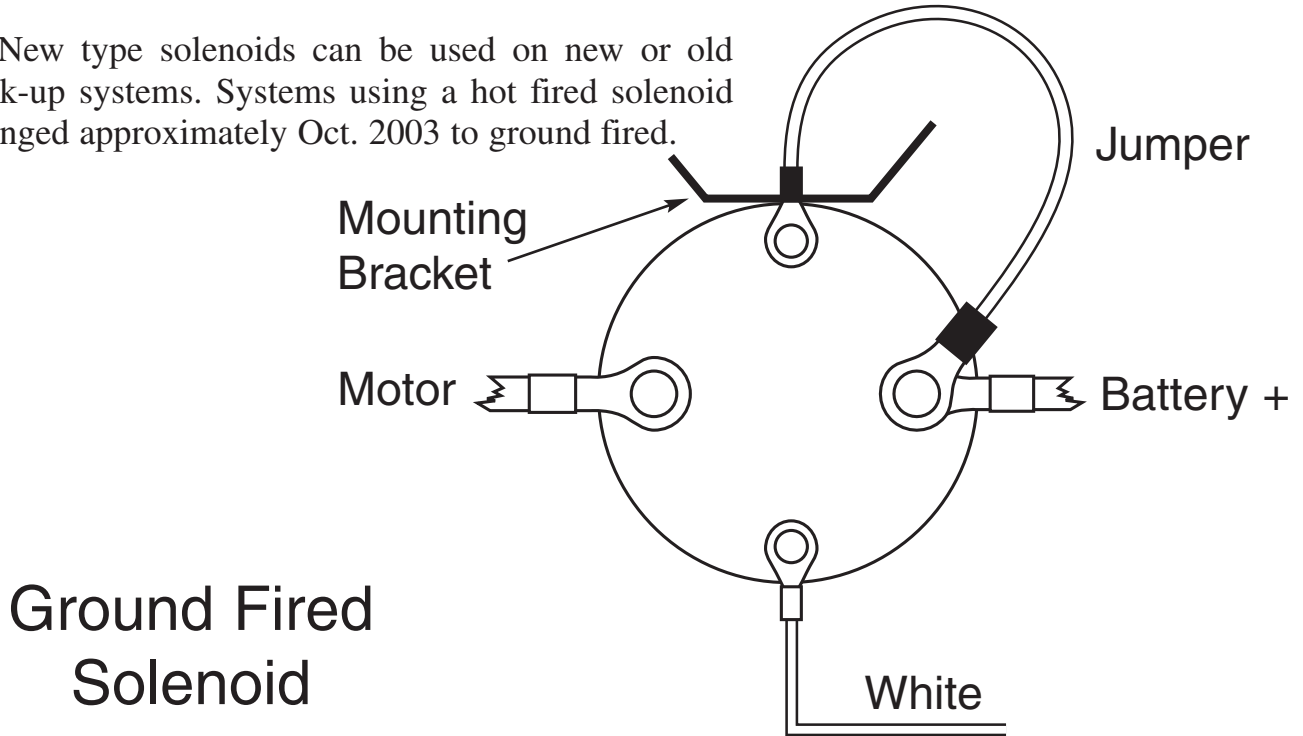
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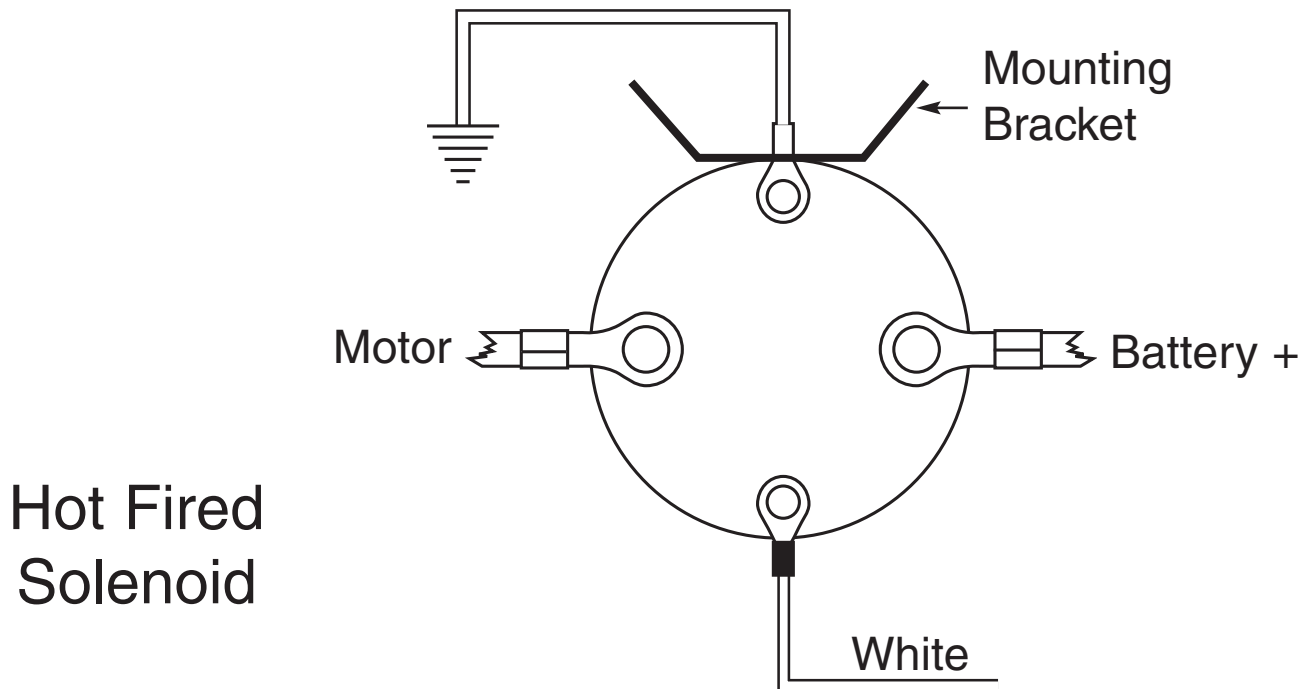
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Solenoid Wiring Diagrams

New type solenoids can be used on new or old back-up systems. Systems using a hot fired solenoid changed approximately Oct. 2003 to ground fired.



Top View



Drive-Master Back-Up Steering

Wiring System

Check list

1. Check wire connections from the control module

Green = Power + key off

Orange = Power + ignition on

Red = Flow Sensor

White = Solenoid trigger post

#2 Red = Positive battery terminal to solenoid
(see diagram)

#2 Wire = Positive from solenoid to Drive- Master
Back-Up Steering pump

2. Verify system for operation with engine failure
 - a. Pull out fuel pump relay while engine is running.
 - b. When engine stalls, Drive-Master Back-Up Steering pump will activate.

Drive-Master Back-Up Steering System Troubleshooting Guide

Do the diagnostics before you call 973-808-9709 – Double check your wiring connections. Mon. - Fri. 8:00 AM - 4:30 PM EST.

Back-up pump does not come on lock-to-lock:

Check green wire connected to the battery side of the solenoid (positive power) with key off.

Check orange wire positive power with ignition on.

With ignition off, cut ungrounded wire at the flow sensor. Check continuity through flow sensor. No continuity, bad flow sensor.

Control module will not turn back-up system on:

With ignition on, ground out the red wire from the gray harness. The back-up pump should activate. Check the pin connector in the control module plug. If the connectors are correct the control module is defective.

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