DRIVE MASTER

Providing Mobility for the Physically Challenged Since 1952

Back Up Steering Installation Instructions Toyota Sienna 2004 - Present

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

MEMBER OF ADA

Association of Driving Evaluators for the Physically Challenged MEMBER

ACCESSIBLE VANS of America LLC

24 HOUR TURNAROUND SERVICE

TBUS REV - 03-09

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,

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.

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IMPORTANT ADDENDUM

FOR CHEVY-FORD-TOYOTA

BACK-UP STEERING SYSTEMS

You must drain all fluid from the back-up steering system and refill with Lubriplate Special Low Pour hydraulic oil 5 gallon pail Part #LO767-060

If your local supplier does not have this product, call Lubriplate at 1-800-347-5343 for the nearest dealer who carries it.

If this fluid is not changed, there is the possibility the back-up pump reservoir will blow off the Back-up Steering Pump, and/or cause other serious damage. This will not be a warranty item.

021003

37 Daniel Road West, Fairfield, NJ 07004
Phone: (973) 808-9709 Fax: (973) 808-9713
E-mail: drivemaster@drivemaster.net
Web: www.drive-master.com

Contents of Kit

1 BUS Pump assembly with solenoid attached
3 Bus Pump Assembly Brackets
1 BUS Module and wiring harness
1 33” BLUE marked high pressure line 1/4npt x 10mm compression
1 48” RED marked high pressure line 1/4npt x 10mm compression
1 48” 3/8” PUSH-LOK hose
1 96” RED 2 gauge power wire
1 12” BLACK 4 gauge ground wire
2 5/16” 2 gauge wire lugs
4 3/8” x 16 x 1” grade 8 bolts
2 3/8 washers
2 3/8 fender washers
2 3/8 x 16 lock nuts

Rack Removal

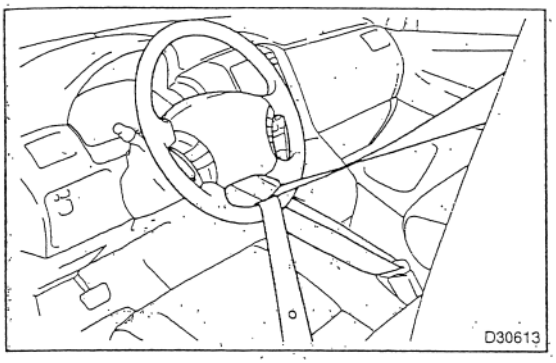
- The first few steps for rack removal can be found in the Toyota Sienna Repair Manual Volume 2. No. RM1025U2 Pub. No. RM1025U2.

- You will be able to locate rack removal information on pages 51-19 through 51-21 in the above listed manual. It is VERY IMPORTANT to mark (scribe) the intermediate shaft and the power steering gear assembly. This assembly if not well marked can be re-installed incorrectly and will cause unequal steering from right to left. The assembly is splined 360 degrees.

- Toyota advises using an SST 09023-12700 tool to disconnect the high pressure line from the rack. This tool is not required a simple line wrench can be used.

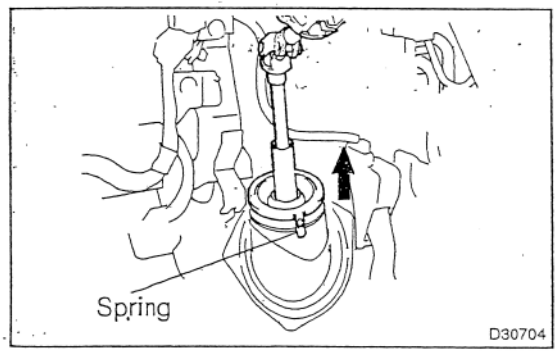
- You can disconnect the low pressure line from the return tube by releasing the OEM spring clip and can ship the rack with the low pressure flexible rubber hose still connected to the rack.

Rack Removal

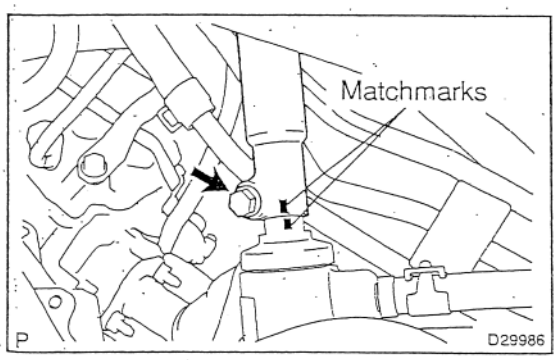


1. SEPARATE STEERING INTERMEDIATE SHAFT ASSY

(a) Fix the Steering wheel with the seat belt.



(b) Release the 3 springs and separate the dust cover.



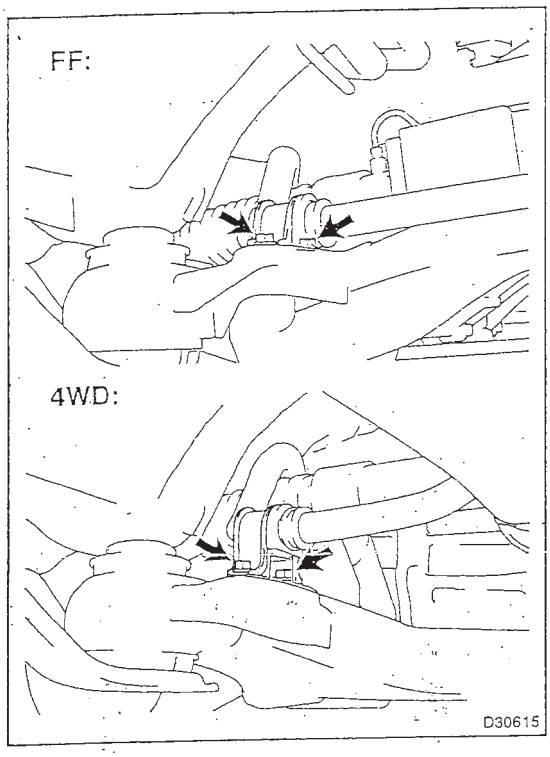
(c) Place matchmarks on the intermediate shaft assy and power steering gear assy.

(d) Remove the bolt and separate the intermediate shaft assy.

2. SEPARATE FRONT STABILIZER LINK ASSY LH (See page 30-18)

3. SEPARATE FRONT STABILIZER LINK ASSY RH.

Hint:
Perform the same procedure on the other side.

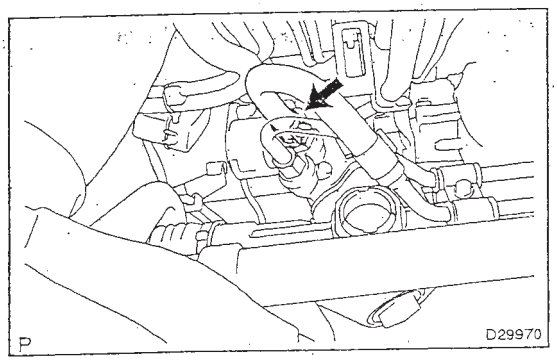


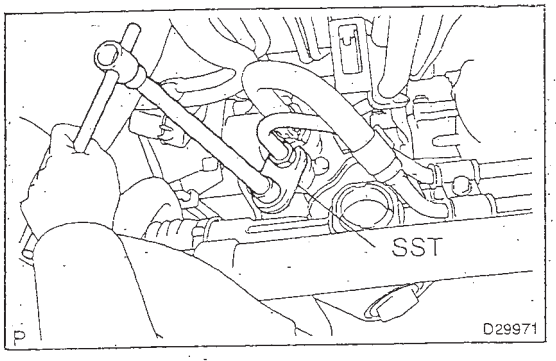
4. REMOVE FRONT STABILIZER BRACKET NO. 1 LH.

(a) Remove the 2 bolts and remove the stabilizer bracket No. 1.

5. REMOVE FRONT STABILIZER BRACKET NO. 1 RH.

Hint:
Perform the same procedure on the other side.

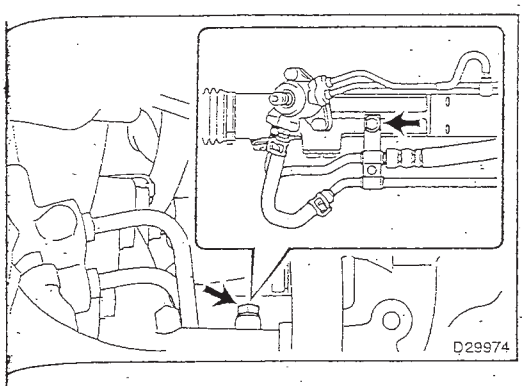




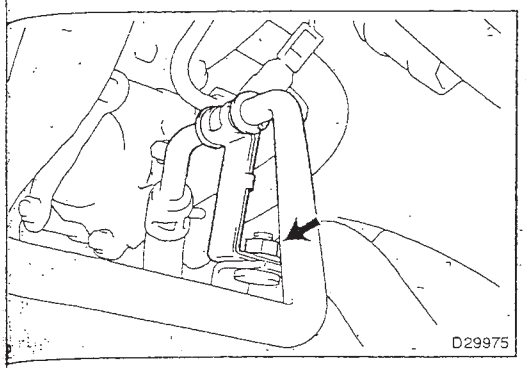
6. DISCONNECT PRESSURE FEED TUBE ASSY.

(a) Remove the clip and disconnect the return tube assy from the power steering gear assy.

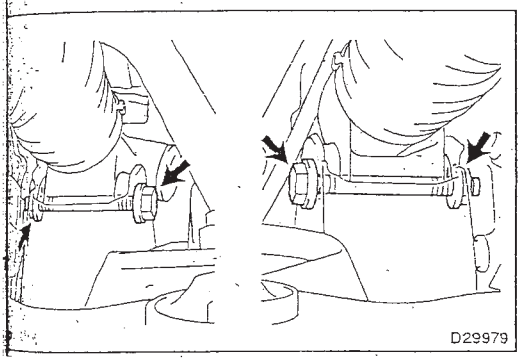
(b) Using SST, disconnect the pressure feed tube assy from the power steering gear assy.
SST 09023-12700



(c) Remove the bolt and separate the tube clamp.



(d) Remove the nut and separate the tube clamp.



7. REMOVE RACK & PINION POWER STEERING GEAR ASSY.

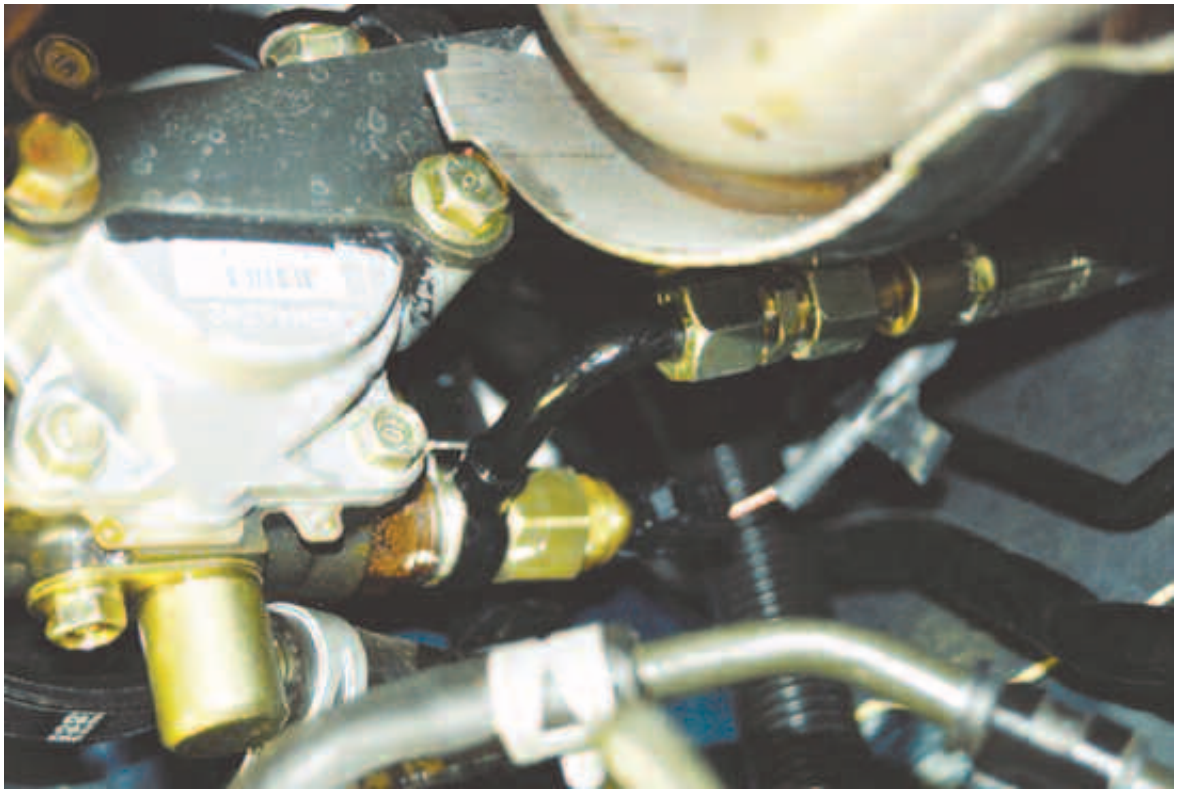
(a) Remove the 2 bolts, nuts and the power steering gear assy.

NOTICE:
Do not damage the 2 pressure tubes.

BUS Installation

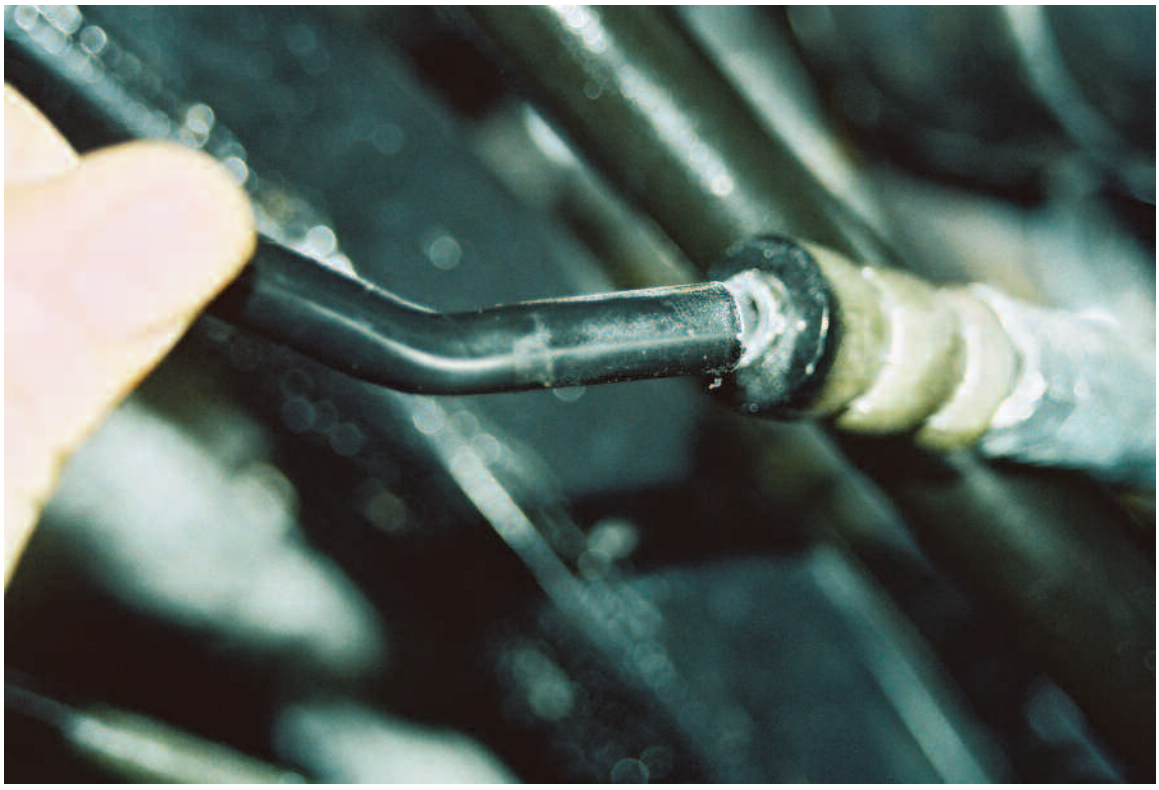
1. Unclip the sensor attached to the OEM banjo bolt located on the high pressure output of the power steering pump.

2. Remove the (24 mm) OEM banjo bolt.



3. After removing the connector and the banjo bolt cut the high pressure line AS CLOSE AS POSSIBLE to the crimped portion of the OEM high pressure line.

4. It will be necessary to use an air saw or other cutting device to allow the maximum amount of room for the compression fitting.



5. Remove any burrs and OEM coating from cut portion of the OEM high pressure line.

6. The high pressure line can be lightly sanded to allow the compression fitting to slide all the way onto the high pressure line.

NOTE: MAKE SURE ALL BURRS ARE REMOVED FROM THE INSIDE. FLUSH THE LINE WITH SOLVENT WASH THEN BLOW OUT THE INSIDE OF THE LINE.

7. Locate and connect the compression side of the 33” BLUE marked high pressure BUS hose.

8. Be sure to insert the OEM line all the way into the compression fitting to avoid leaking fluid.

9. Connect the remaining portion of the 33” high pressure BUS line.

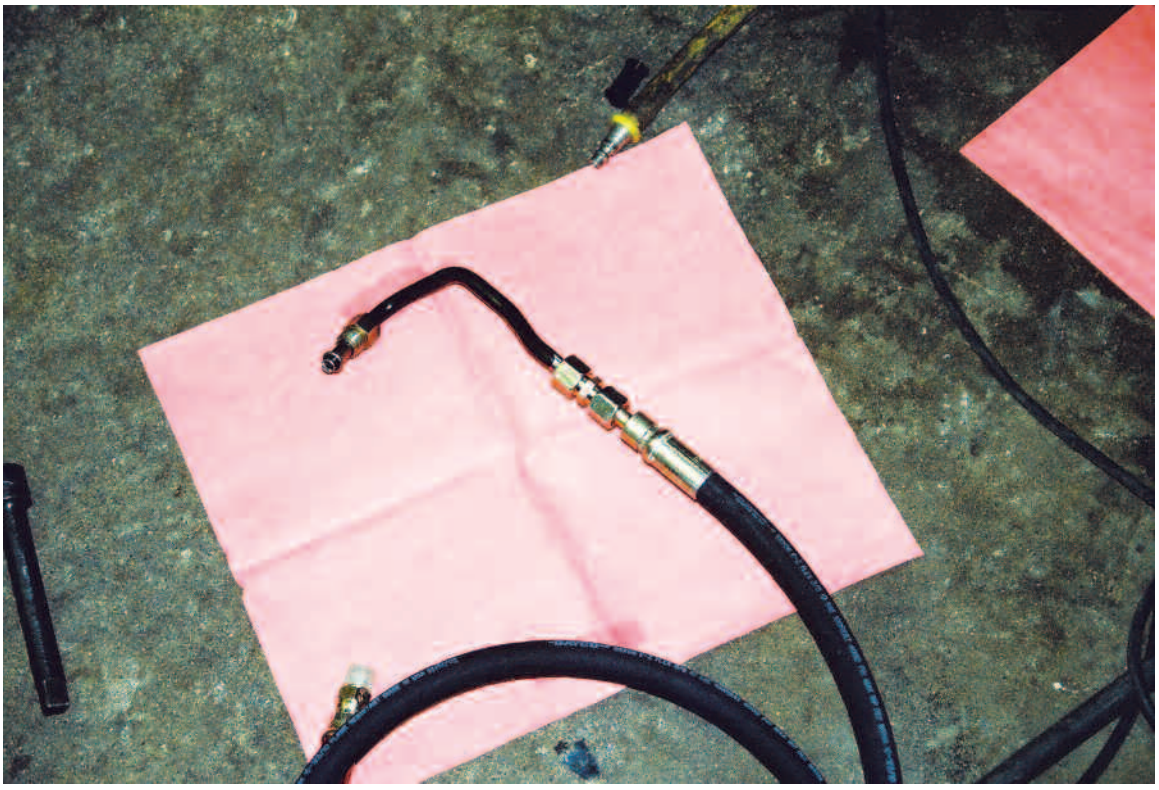
10. Locate the other end of the OEM high pressure line and cut it AS CLOSE AS POSSIBLE to the crimped portion of the line.

11. Remove any burrs and OEM coating to allow the compression fitting to slide onto the OEM high pressure line.

NOTE: MAKE SURE ALL BURRS ARE REMOVED FROM THE INSIDE. FLUSH WITH SOLVENT WASH THEN BLOW OUT THE INSIDE OF THE LINE

12. Locate the 48” RED marked BUS high pressure line.

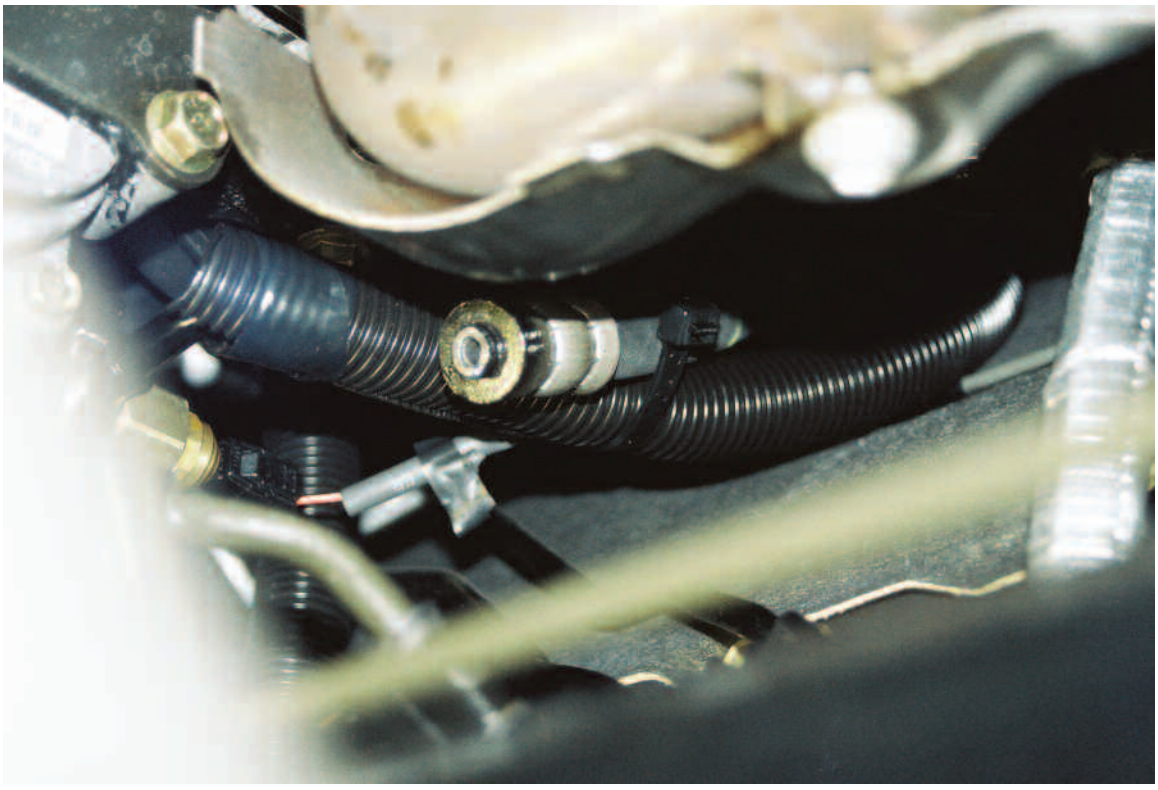
13. Attach the compression fitting to the OEM line making sure the OEM line is inserted all the way into the compression fitting before tightening.



14. Secure the remaining portion of the OEM high pressure line from the output side of the power steering pump.

15. Leaving the OEM high pressure line and retaining clips intact will be good for reference if the vehicle needs to be changed back to OEM.

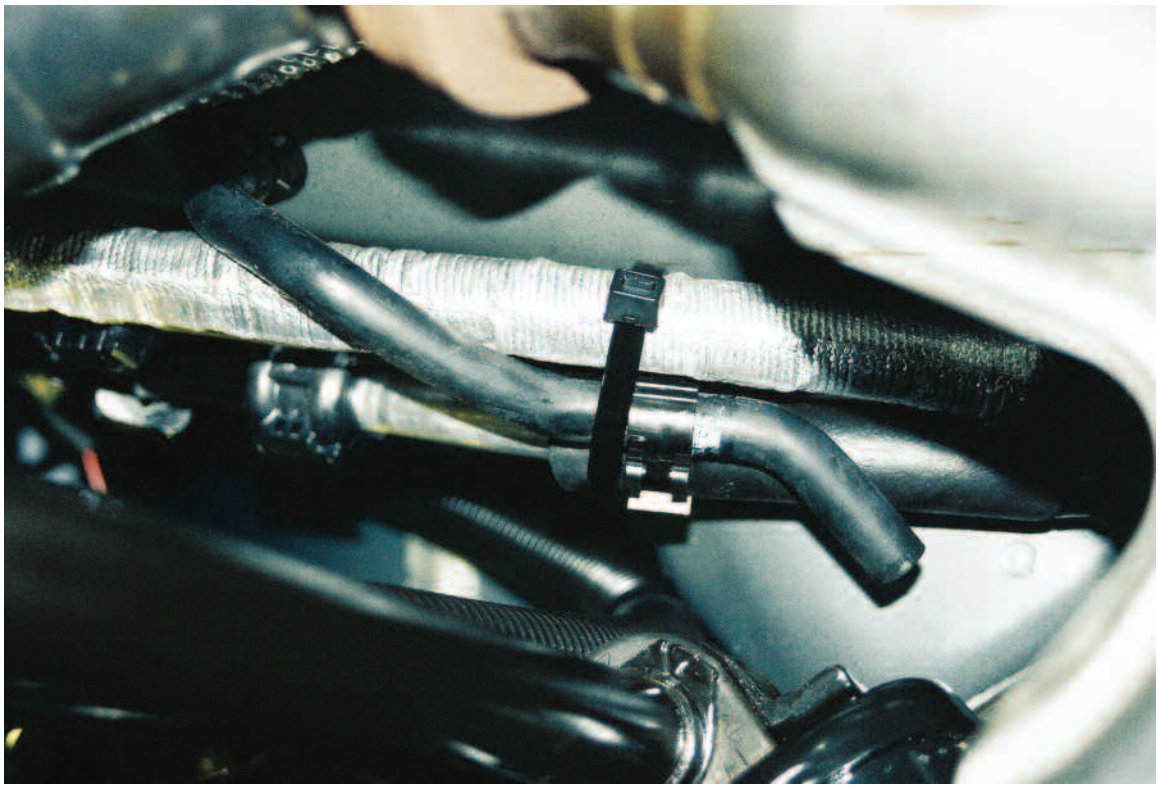
16. You may remove this line if you choose to, but it will add time to your installation.



17. Secure the rack side of the OEM high pressure line that is now not being used.

18. Re-install the modified rack and all removed components.

19. Make sure to align your marks when reconnecting the intermediate shaft and the power steering rack assembly.



BACK UP MOUNTING LOCATION: LEFT SIDE UNDER THE HOOD

20. Locate the raised area (boss) with a threaded hole on inner fender well and drill out the first mounting hole marked X to 3/8". Place one bolt through the BUS mounting bracket.

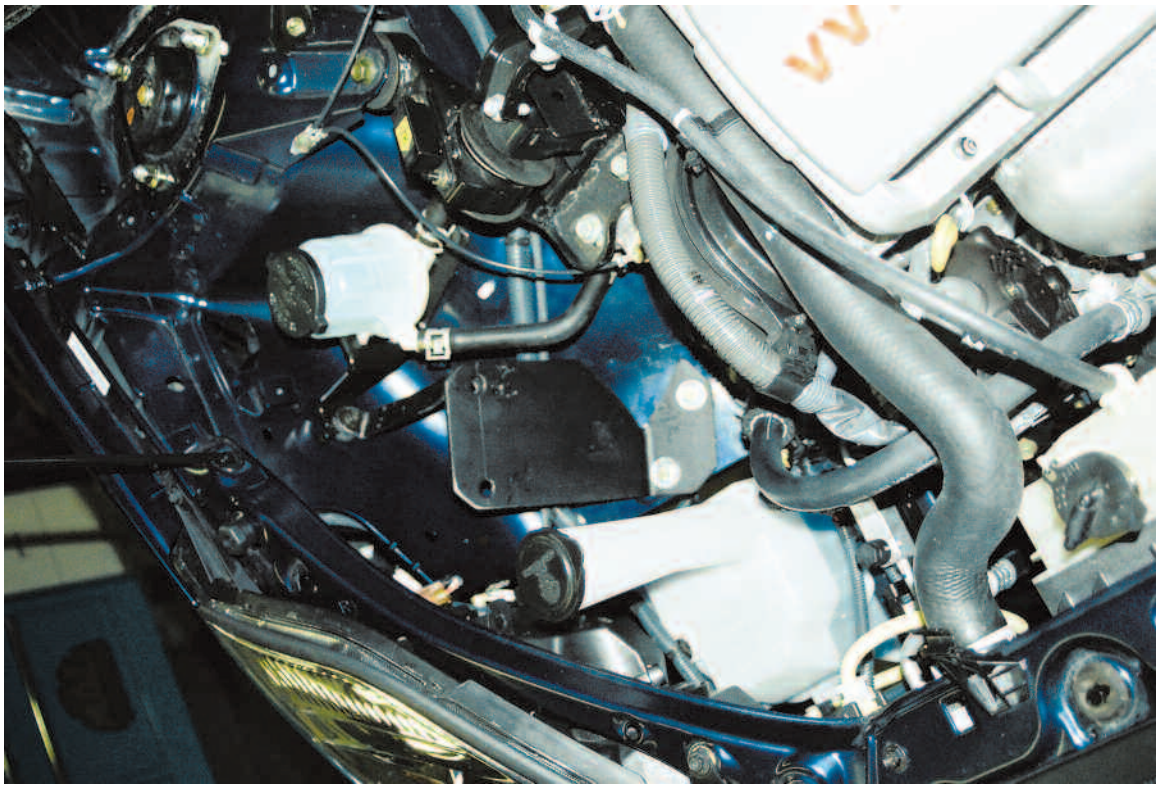
21. Mount the BUS pump to the bracket to determine the mounting angle needed for hood clearance.

22. Adjust the bracket as necessary and mark the location. Remove the BUS pump from the bracket.

23. Mark the second bracket mounting hole. Drill out the second mounting hole for the bracket.

24. Mount the stabilizer bracket using the OEM bolt that secures the OEM power steering reservoir to the inner passenger side fender well.

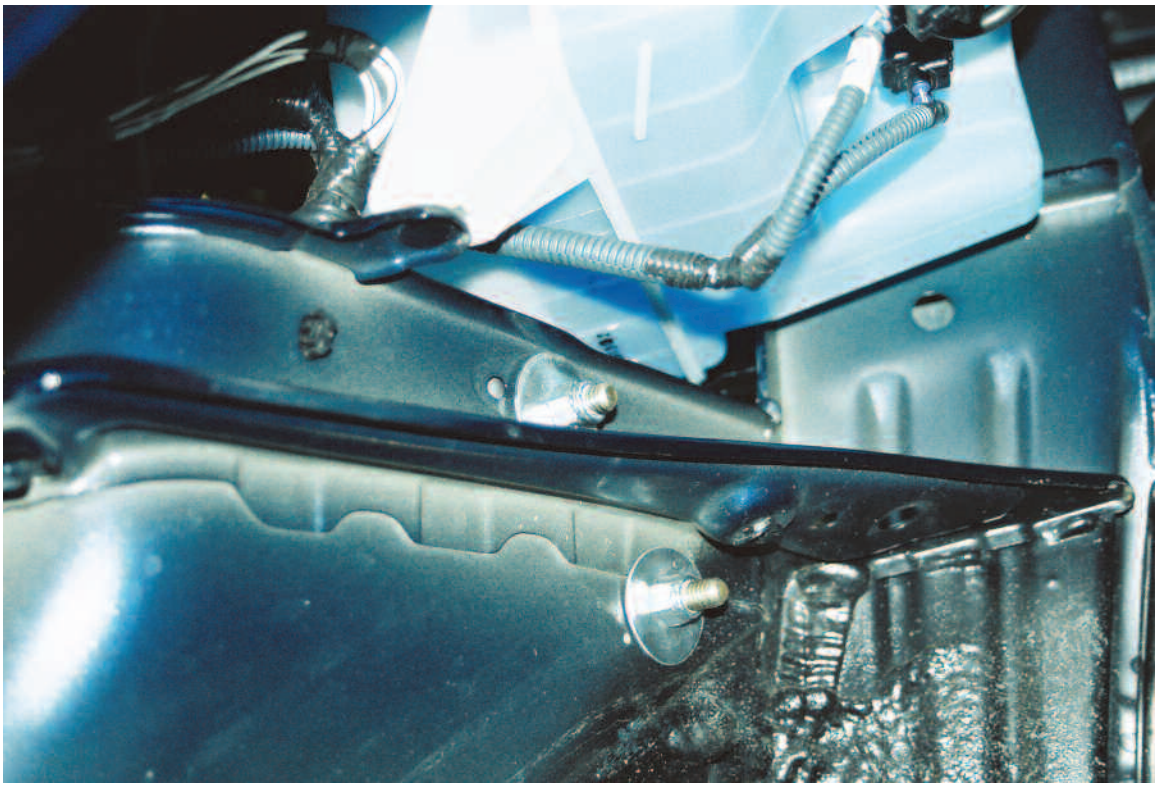
25. Push out the metal insert in the rubber mount and bolt stabilizer brackets back in along with the OEM power steering reservoir. Use a through bolt to connect the 2 stabilizer brackets.



26. Loosen and pull back the passenger side fender well splash cover to tighten the BUS mounting bracket.

27. Use 3/8” fender washers and lock nuts to secure the BUS bracket. Replace the fender well splash cover.

28. Mount the BUS pump to the bracket. Use one 3/8 x 1” bolt to secure the stabilizer to the BUS bracket and the BUS pump. Use the other 3/8 x 1” bolt to secure the BUS pump to the mounting bracket.

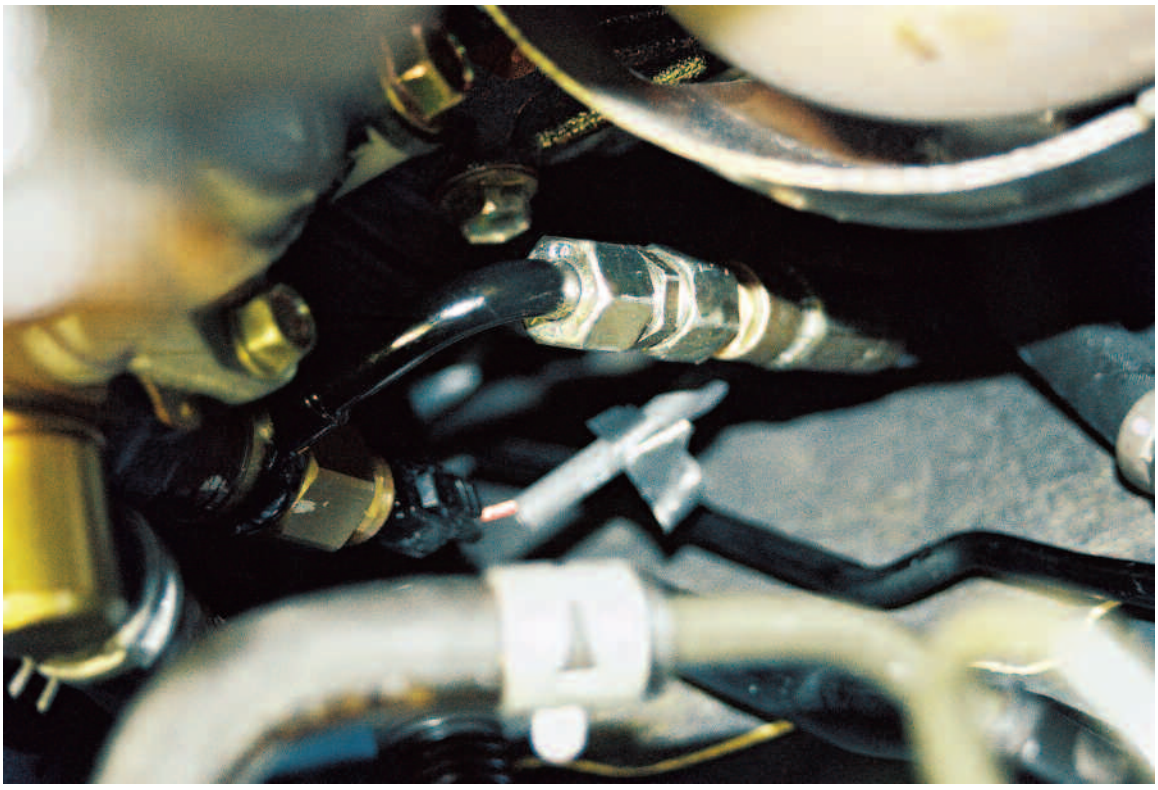


29. Push the 33” high pressure line up the firewall toward the intake manifold.

30. Re-install the OEM banjo bolt with the metal OEM crush rings originally taken out. Do not thread the banjo bolt in with a wrench it must be started by hand or thread damage will occur causing leaking.

31. REMEMBER to clip the OEM harness back onto the sensor located on the banjo bolt. If the sensor is not plugged in the engine will remain at high idle.

32. Connect the remaining pre-assembled high pressure line to the rack. Route the BUS high pressure line in the same direction as the high pressure line from the OEM power steering pump. Reconnect the OEM low pressure hose to the rack.



33. Connect a piece of PUSH-LOK hose between the BUS pump low pressure and the low pressure OEM line located on the passenger side frame rail. A lazy loop is recommended to avoid kinking in the line. Use the remaining piece of PUSH-LOK hose to go from the other BUS pump low pressure to the OEM power steering pump reservoir. Use #6 hose clamps to secure the PUSH-LOK ends going to OEM fittings.

34. Using Teflon tape insert the 48" RED marked high pressure BUS line into the RED marked shuttle valve.

35. Prefill Pump through 3/8 pipe plug on resivoir can. NOTE: Use teflon tape on plug - Do Not reuse red plastic plugs.

WARNING: FILLING PROCEDURE MUST BE DONE AS INSTRUCTED OR DAMAGE AND LOSS OF WARRANTY WILL OCCUR

36. Install the 33" BLUE marked hose using Teflon tape into the flow sensor.

37. Remove the driver's dash knee bolsters. Locate the ignition harness directly under the steering column. Find the OEM BLUE 14 gauge ignition wire. This wire should not lose "+" 12 volts while the starter is cranking. NOTE: This ignition source should shut off "+" when you turn the key to the off position. Solder to the ignition wire with a 10 AMP auto reset breaker in line. The auxiliary side of the circuit breaker will hook up to the ORANGE wire from the BUS module.

38. Follow the wiring diagram to complete the rest of the electrical installation. Add Ground per Nemeda.

39. Affix the warning label to the inside of the vehicle within view of the customer. Instruct customer of it's placement.

40. Fill out warranty protection card. Have customer sign and return mail to Drive-Master to register the equipment.

41. Explain the system to your customer and give him the supplied Drive-Master Back-Up owner's manual.

PREFERRED FILLING INSTRUCTIONS

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

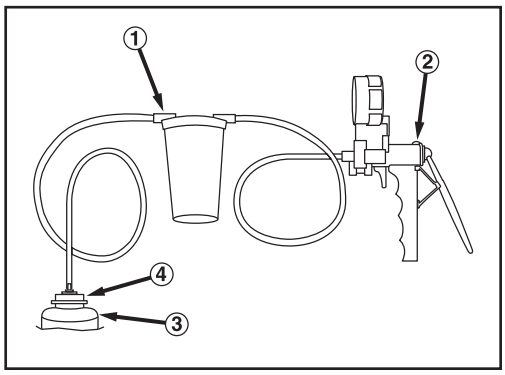
Use OEM power steering fluid.

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.

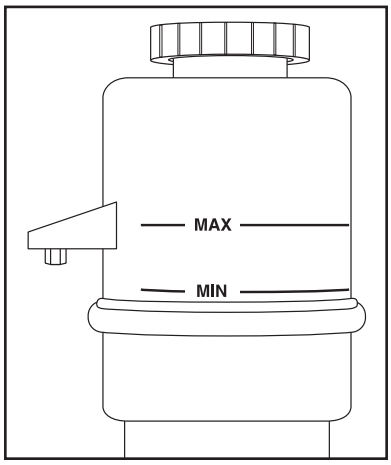
4. Using Hand Vacuum Pump (2), apply 68-85 kPa (20-25 in. Hg) of vacuum to the system for a minimum of three minutes.
5. Slowly release the vacuum and remove the special tools.
6. Adjust the fluid level as necessary. Refer to **Step #1**.
7. Repeat **Step #1** through **Step #6** until the fluid no longer 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.

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.

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 GA. Red = Positive battery terminal to solenoid (see diagram)

   #2 GA. Red = 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.

3. Affix the warning label to the inside of the vehicle within view of the customer. Instruct customer of it's placement.

Drive-Master Back-Up Steering System Troubleshooting Guide

Do your diagnostic before you call 973-808-9709 MON-FRI 8:00 AM-4:30 PM EST. Double check your wiring connections.

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.

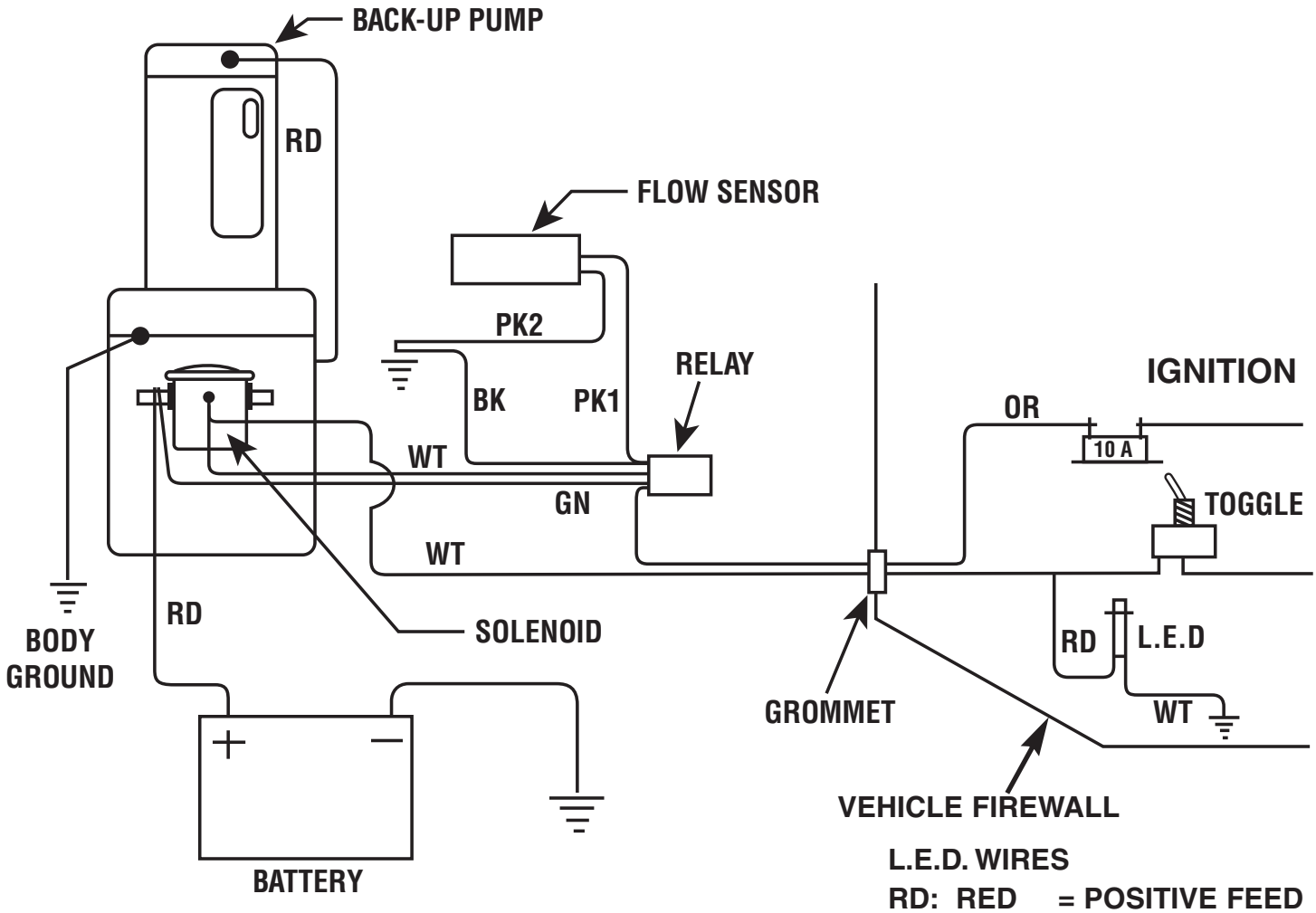
Check orange wire positive power with ignition on.

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 Steering system on:

With ignition on, ground the red wire from the gray harness out. The back-up pump should activate. If no activation check the pin connector in the control module plug. If the connectors are correct the control module is defective.

DRIVE-MASTER BACK-UP STEERING ELECTRICAL SCHEMATIC WITH TOGGLE

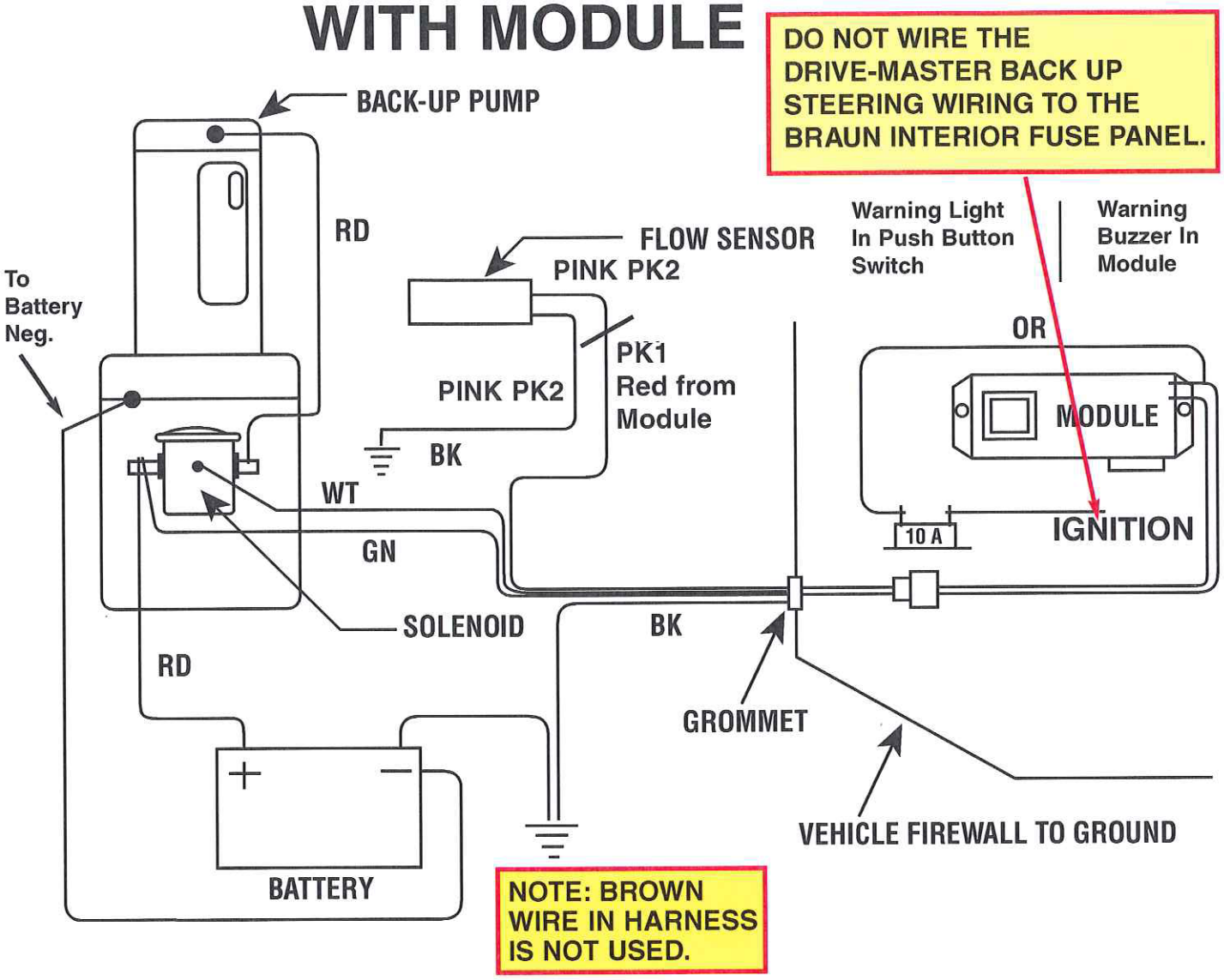


LEGEND

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 therfore not under warranty by Drive-Master.

DRIVE-MASTER BACK-UP STEERING ELECTRICAL SCHEMATIC WITH MODULE



WARNING: THE IGNITION WIRE TO THE BACK-UP STEERING SYSTEM MUST BE A TRUE IGNITION WIRE. IF YOU ATTACH IGNITION WIRE TO AN ACCESSORY CIRCUIT THE BACK-UP STEERING WILL ACTIVATE WHEN YOU TURN THE VEHICLE OFF.

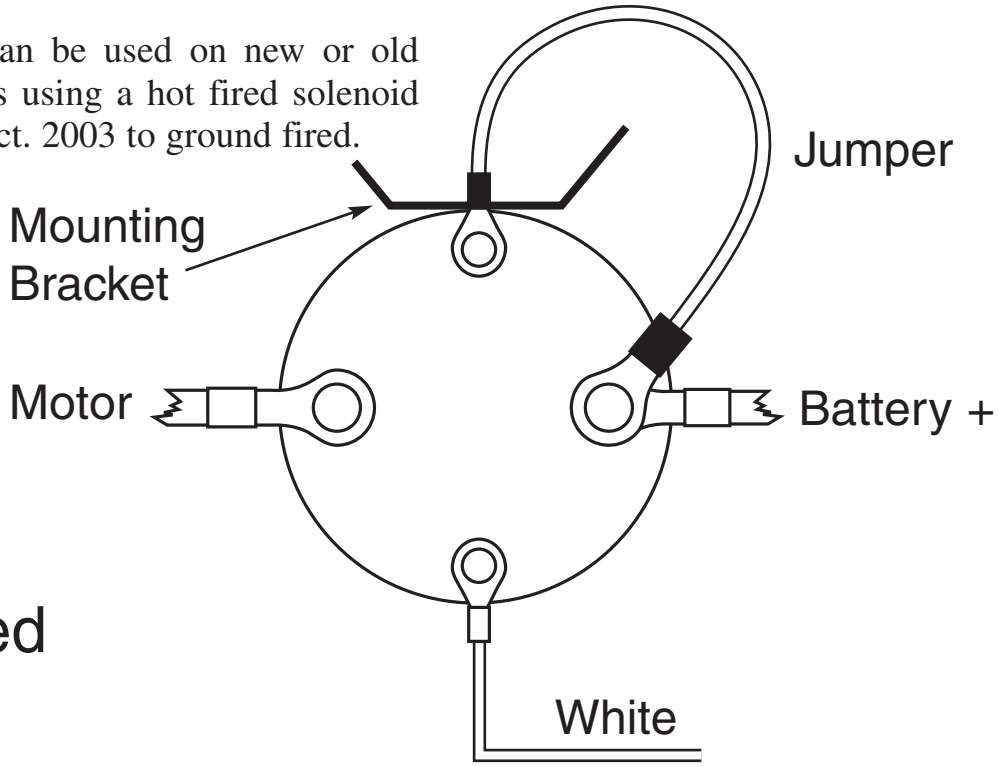
LEGEND

OR:	ORANGE	= 12V IGNITION HOT
GN:	GREEN	= 12V CONSTANT HOT (SOLENOID)
BK:	BLACK	= GROUND
PK1:	PINK	= 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 therfore not under warranty by Drive-Master.

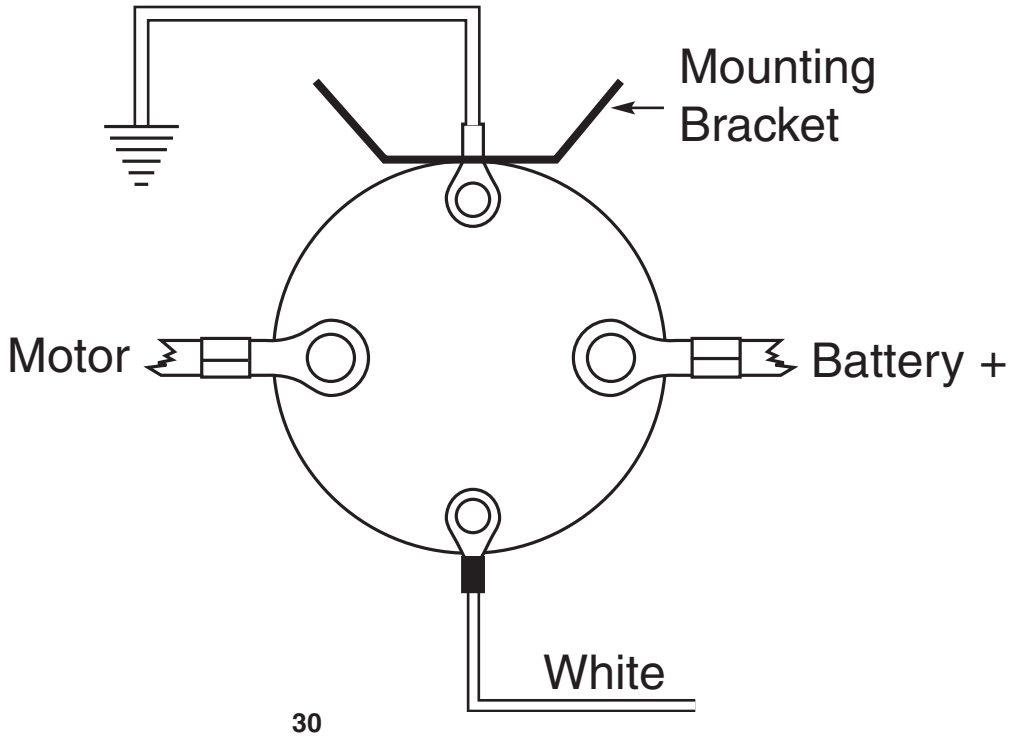
Solenoid Wiring Diagrams

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.

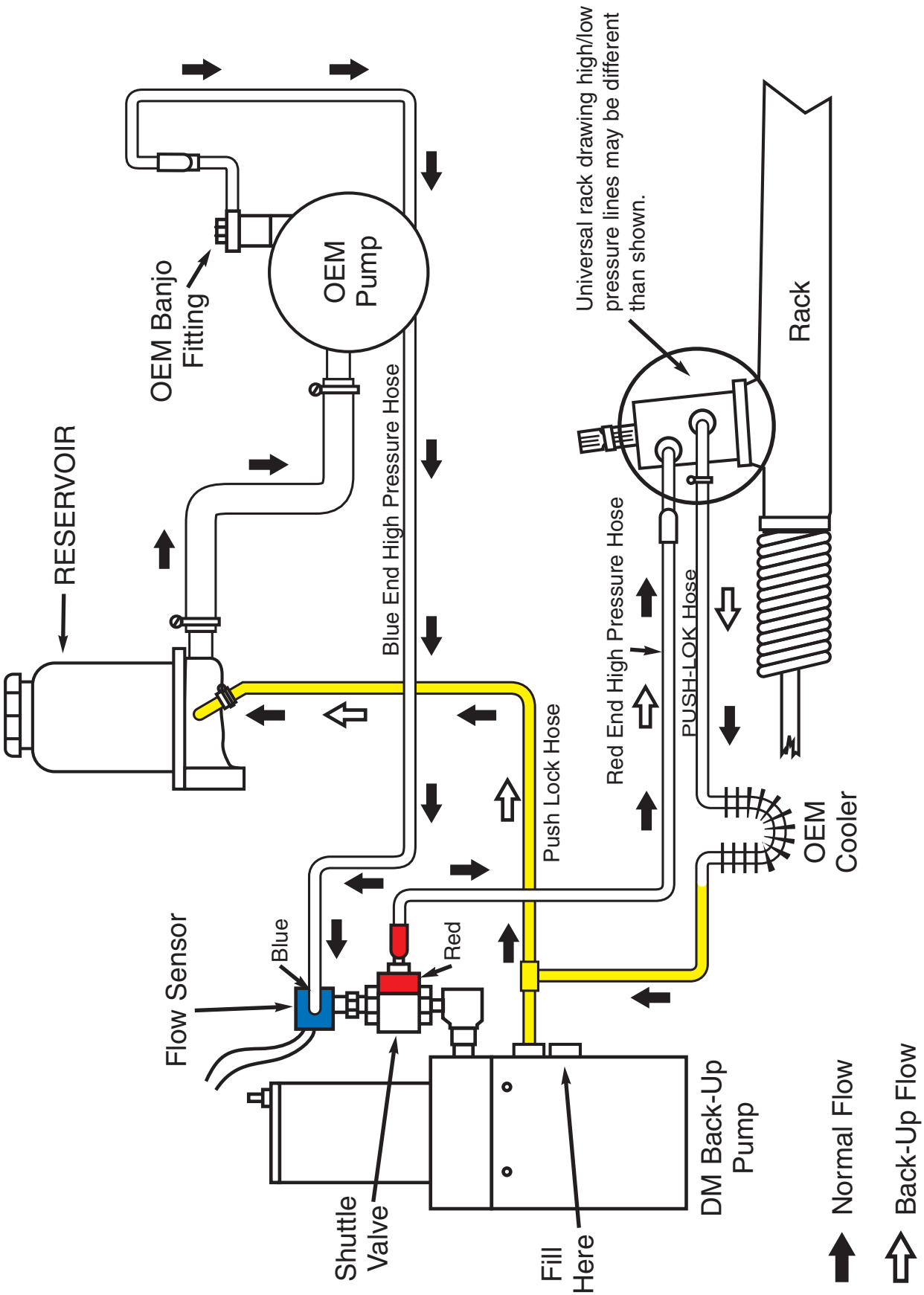


Ground Fired
Solenoid

Top View

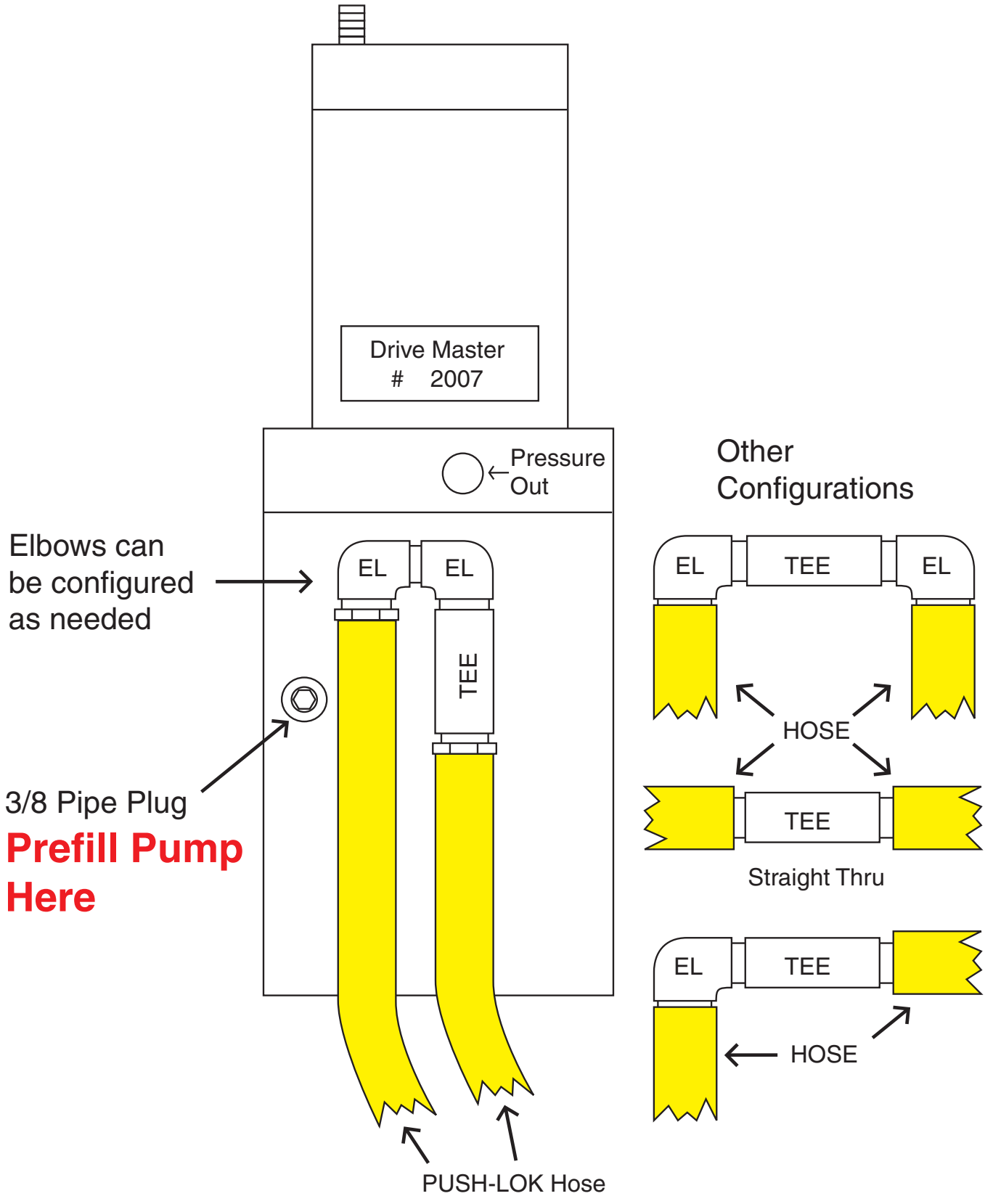


Hot Fired
Solenoid


RESERVOIR
OEM Banjo Fitting
OEM Pump
Blue End High Pressure Hose
Universal rack drawing high/low pressure lines may be different than shown.
Rack
Red End High Pressure Hose
PUSH-LOK Hose
Push Lock Hose
OEM Cooler
Flow Sensor
Blue
Red
Shuttle Valve
Fill Here
DM Back-Up Pump
Normal Flow
Back-Up Flow

ALTERNATIVE FITTING & HOSE CONFIGURATION

ALL B.U.S. EXCEPT DODGE/CHRYSLER CARAVANS



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