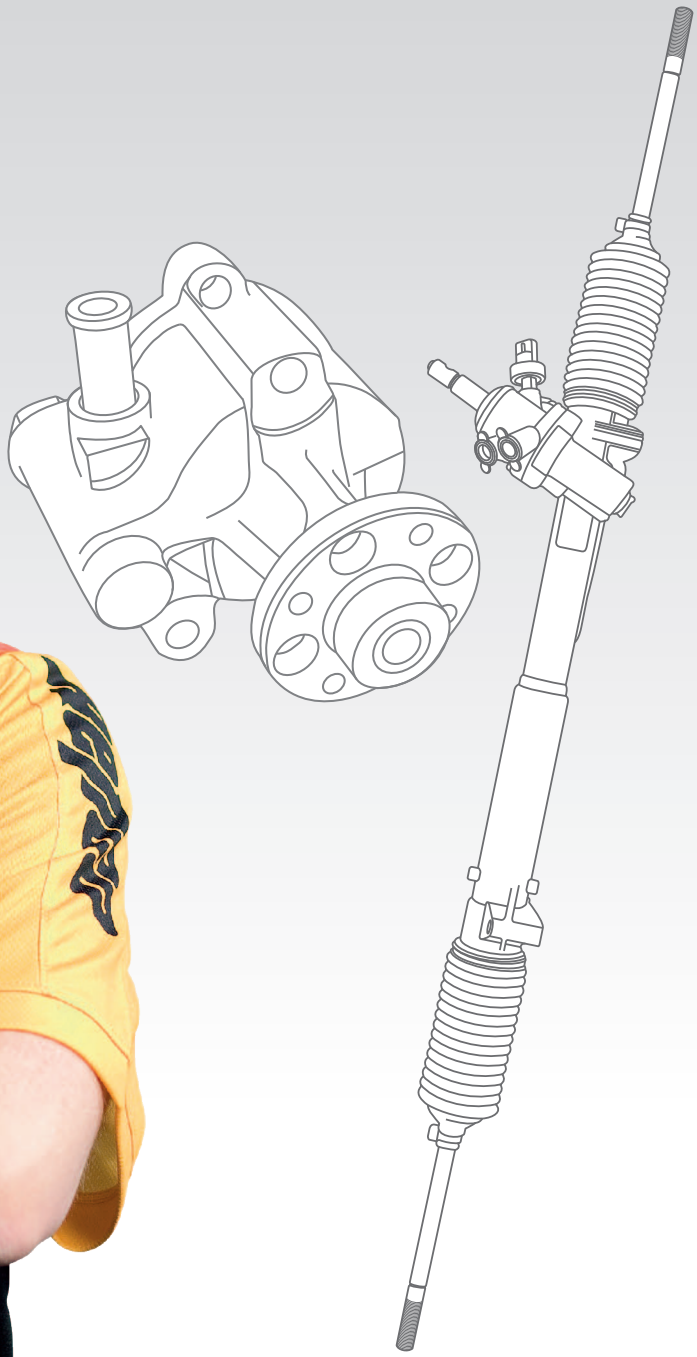
Repco

Remanufactured Steering

Product Guide



What an
AUTO STORE
ought to be

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Warranty Information

Warranty Policy

Repco provides a two-year, 40,000 KM warranty on our product range. Our low warranty rate of 0.3% for legitimate warranties, is a source of great pride to our supplier and is indicative of the commitment they have to producing quality products. A labour claim plus wheel alignment will be re-imbursed to the person undertaking the removal and refit of the unit. Before any work is undertaken it is expected that the branch or trade customer will contact our supplier's technical department on our **1800 023 976** number so that they can assist in advising as to whether it is in fact a warranty claim issue.

Quality Certification

Our suppliers and steering products have been accredited to the following certification:
ISO 9001 : 2008 Management System.
AS/NZS 4801 : 2001 Occupational Health and Safety Management System.
ISO 4001 : 2004 Environmental Management System.

The most recent External Audit of the three systems was undertaken in March 2010.

The final paragraph in the Auditor's report is testament to the outcome:

"There were no Corrective Action Reports raised at this audit. The fully integrated system is operating satisfactorily."

Features & Benefits

Repco Power Steering Racks, Boxes and Pumps are remanufactured not reconditioned, and each part number (unit) endures a mandatory quality check and is fitted with the latest refinements.

Features & Benefits

- Repco Remanufactured Steering Pumps and Steering Racks are fully remanufactured and thoroughly tested to meet the OE manufacturer's specification.
- All designated high risk parts are replaced with new parts whether worn or not.
- All electronic controlled steering racks come fitted with new modulating valve and/or switches.
- Critical pump applications are supplied with a power steering suction hose.
- Only genuine OE components are used in the remanufacturing process.
- Each steering gear must pass a minimum of five separate tests to attain the Repco Remanufacturing Standard.

Product Differentiation

There is a significant difference between the reconditioning of a steering gear and the complete remanufacturing of a steering gear. Our supplier sets a standard for remanufacturing steering gears that no other Independant Aftermarket company has been able to emulate. All consumables must be replaced if a minimum standard of quality is to be achieved.

Reconditioning

A company that reconditions a steering gear will locate the problem e.g. a leaking pinion seal or power chamber seal, replace that component then adjust the gear to remove any obvious movement or slack in the centre position in the steering gear.

Repco Remanufacturing Means

- Gears are completely dismantled.
- All tie rods, boots and seals are discarded.
- All teflon seals are removed and discarded.
- The pinion and valve assembly is dismantled and rebalanced.
- The rack and also pinion, valve and sleeve assembly are tested and discarded if cracks are detected.
- Gears are rebuilt to OE specification.
- All bent and damaged components are discarded.
- All teflon seals, tie rods and boots are replaced with new genuine OE standard quality components.
- If the pinion shows excessive wear, pitting or is cracked, it is replaced.
- Each gear is tested for leaking, attainment of correct pressure between chambers, returnability and elimination of light / heavy sensation.

Product Development / Support

Repco is continually adding new products to the range with new applications added each month. Each time we are asked to service a unit we do not have in our system, we add that part number to our catalogue. We are continually investing in new product for the benefit of our customers.

When new vehicle models come onto the market, we ensure we have those units in our system before the vehicle model is out of new car warranty.

There is extensive investment on tooling, test rigs etc each time new models are introduced. New tools require manufacturing or purchasing to ensure correct processes are performed in the re-manufacture of each new model. This process of continual addition of new tooling and fixtures ensures that all new additions to the range have the same level of comprehensive testing as all existing part numbers.

Features & Benefits

Value Adding

In Line Filter
Repco supply a Magnefine Return Line Filter with all Power Steering Racks and Power Steering Boxes. This enables the filtering out of microscopic metal particles which cause constant wear not only to the pumps but also to the other components such as bearing surfaces, seals, valve and pinion etc. Fitting a filter has proven to reduce the likelihood of warranty claims due to contamination.

Return Line Hose
Our RNSP1844 and RNSP1845 (Commodore VS-VY) power steering pumps are supplied with a new Return Line Hose. This value adding precludes any perceived warranties due to the use of the pre-existing worn out hose.

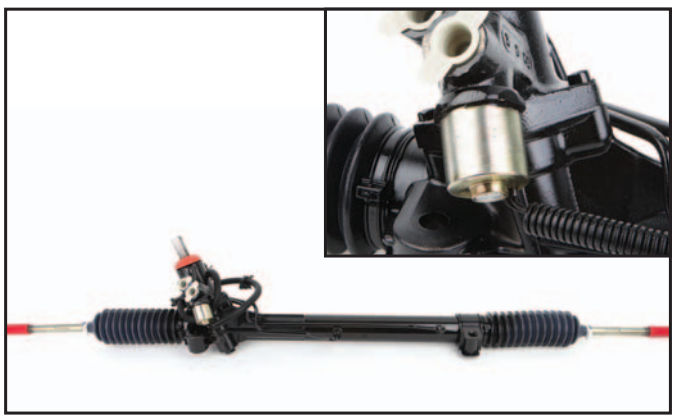
Modulating Valves for Variatronic Steering Gears
All Ford & Holden power steering gears are fitted and tested with modulating valves that are essential to the performance of the vehicle.

Idle Up Switch
All Ford gears from EA to AU are fitted with a new genuine Idle Up Switch. Again, this is vital to the performance of the gear.

In line Filter

Return Line Hose

Idle Up Switch



Modulating Valves

Removal & Installation Tips

These tips are intended only to provide assistance to suitably qualified and trained technicians, and should not be attempted by unqualified and untrained persons.

Bleeding Power Steering Systems

1. Fill reservoir to cold level.
2. Start engine and run for one or two seconds to circulate fluid.
3. Top up reservoir to cold level.
4. Repeat step 2 and 3 until reservoir remains full.
5. With engine idling turn the steering wheel from left lock to right lock several times lightly touching full lock either side.
6. Stop engine and top up reservoir.

Note: Some pumps can develop air locks and will fail to circulate fluid at initial start up. To simply overcome this problem:

a) Start engine and leave at idle.

b) Cover reservoir inlet with one hand and place air gun between webbing of thumb / index finger thus creating a seal (see Fig: 1)

c) Apply light air pressure for 30 seconds to displace air trapped within pump body or till pump reciprocates circulation.

d) Top up reservoir to cold level then refer Steps **5** & **6**.

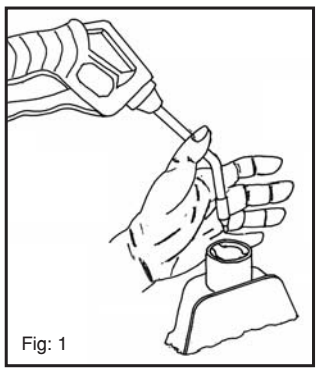


Fig: 1

Air Bags

Caution: If the vehicle is fitted with an SRS (air bag), a steering wheel clamp must be fitted to the steering wheel in the straight ahead position (and the ignition key removed as an added measure to engage the steering lock) locking the steering column. If this procedure is not carried out and the steering wheel is spun while the steering rack is removed, the clock spring on the upper end of the steering column will be destroyed, causing non-deployment of the air bag! (Refer to vehicle service manual).

Speed sensitive power steering - resetting the body control module (BCM) Commodore / Calais / Statesman 10/91 - Speed sensitive power steering provides the driver with maximum assistance at low speeds and gradually reduces the assistance as the vehicle speed increases. When a steering rack is replaced or the wiring loom disconnected, you will need to reset the BCM to restore the steering back to normal operating conditions.

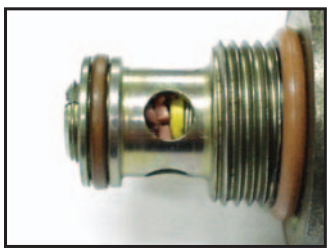
Follow this simple procedure to reset the BCM:

a) Switch off the ignition.
b) Remove fuse for approx. 3 seconds. (Located in engine compartment relay housing).
c) Refit the fuse, the BCM should click.
d) The vehicle indicators or interior lighting will flash to indicate resetting has been successful.

Please Note: Speed sensing steering racks contain a plastic damper, which over time deteriorates and crumbles, spreading contaminants throughout the hydraulic system. When replacing a speed sensitive rack, it is recommended to flush all lines and inspect the old modulating valve for evidence of plastic contamination. This will identify if both power steering rack and pump are contaminated and require replacement. Failure to do so may effect the total hydraulic system within a short period of time and may void warranty.

Old and New Damper

Contaminated Power Steering Pump Housing



Blocked Modulating Valve

Repco Remanufactured Speed Sensitive Steering Racks have all springs and dampers replaced as a matter of course, the valve is retrimmed and a new modulating valve is fitted. The vehicle should now have full power assistance.

BCM Fuse Identification

VP Calais & Statesman	Fuse F21
VR to VS Calais & Statesman	Fuse F23
VT to VX Calais & Statesman	Fuse F31

Removal & Installation Tips

Note: When either of the Power Steering units are replaced you should always inspect the rack modulating valve and the pump flow control valve as it is common for broken pieces of the upper pinion damper to become lodged in either or both of these components which may cause the system to malfunction. The symptoms are intermittent, partial or total loss of power assistance.

Power Racks With Aluminium Pinion Housings

When connecting the hose barrel nuts to any die-cast rack housing, extreme care must be taken not to cross thread or over tighten, as this will damage the housing and cannot be repaired. It could also include a penalty of your core deposit as in most instances the housing is not available as a separate component, and replacement costs are substantial. Most racks use a nitrile seal on the hose connection so it's not necessary to over tighten the barrel nut to obtain a good seal. As a general rule it is best to start barrel nuts with your fingers then torque fittings to no greater than 25 Nm.

Commodore VL-VE & Falcon / Fairlane EA-EL Variable Ratio Power Steering Racks

Prior to installing check the following:

- Upper strut bearings and mounting places (for wear or binding).
- Bottom ball joints.
- Outer tie rod ends.
- Intermediate shaft.
- Steering column.

Note: All Repco Racks are both static and dynamic performance tested. Any binding in the above areas will increase the steering effort above working conditions.

Installation

- Fit tie rod end lock nuts. (Count the number of turns when removing from old unit).
- Fit tie rod ends. (If in any doubt about the condition of the old tie rod ends replace with new).
- Centralise rack assembly and steering wheel spoke
- Connect hoses to rack. DO NOT over tighten barrel nuts and ALWAYS replace seals. New seals are supplied with Exchange Units.

Note: while hoses are disconnected from the rack, care should be taken to prevent any dirt from entering the system as this will cause the pump flow control valve to stick which in turn will lead to lack of assistance at idle.

- Connect tie rod ends to the steering arms making sure that the split pins are re-inserted in the castellated nuts.
- Fill the reservoir with fluid and bleed according to manufacturers instructions. To avoid aerating the fluid DO NOT rev the engine during the start up or during the bleeding procedure. If the fluid does become aerated, switch the engine off and let the vehicle stand for an hour to allow the aeration to dissipate.
- Reset the toe-in to manufacturers specifications and recheck the system for oil leaks.

Warning: Do not turn the steering wheel without the motor running as this can dislodge inner rack seals causing fluid to leak into the boots.

Power Steering Hoses

Not all worn hoses can be detected from an outward inspection, as they deteriorate from the inside out. Steel braided hoses can create groaning noises and vibrations at lock. OE manufacturers use nylon braided rubber hoses to absorb the pulses in the fluid that cause vibration. Most OE hoses also have an internally fitted vibration damper to prevent pulsation. Unless the vehicle is a late model or has low kilometres travelled, all hoses should be replaced.

Hoses fitted to vehicles up to the early 80's used brass or aluminium olives in the connecting fittings to seal the joint, and thereafter using Teflon seal or nitrile 'o'ring seal.

It is important that the seals are replaced whenever the connected fittings are disturbed. When fitting new seals, always smear them with hydraulic fluid to ensure that they are not damaged during installation. Do not over tighten the connecting fitting, as this will damage the new seal and cause leaking at the joint.

Removal & Installation Tips

Power Steering Fluid

All car manufacturers have a specific fluid used for each of their steering systems, which have been developed to their own durability test specifications. A majority of other oil companies will market an equivalent fluid claiming to meet the same specification; however they may not meet the same quality assurance standards. Use of any other type of fluid could result in permanent damage being done to the system and may void warranty. Note: Always refer to original manufacturer's specifications for the correct fluid to be used.

Oil Contamination

Contaminated fluid will cause premature failure of replacement units. Always flush the system thoroughly and fit a return line filter wherever possible. Note that Repco Remanufactured Steering Racks come with a filter to minimize failure due to contamination of the steering fluid. It is essential that this filter is fitted to the system, failure to do so could void the product warranty.

Power Steering Pumps

Power steering pumps generate the hydraulic pressure needed to operate the steering rack and are designed to provide maximum assistance at engine idle. The Saginaw pump is now the most common pump used on Ford and GM passenger vehicles and there are two basic types of these pumps.

Integral Reservoir

The integral reservoir type is encased in a metal canister with an o'ring. Care must be taken not to lever against the canister when tightening the drive belt, as this is likely to damage the canister and create a fluid leak between the canister and the pump body.

Holden External Reservoir VH-VK (6 CYL)

The VH to VK 6 cyl pump has an external reservoir mounted on the inner skirt of the mudguard and connected by a suction line to the pump body using a banjo type fitting.

This fitting was prone to leaking which allows the pump to suck air and aerate the fluid. When the fluid is aerated the pump becomes noisy in operation and the rack can also become jerky. It is essential that the copper washers on the VK (located on either side of the banjo fitting) are replaced whenever the banjo fitting is removed.

Holden External Reservoir VN-VR

When refitting this pump, be sure to replace the reservoir o'ring with the new o'ring supplied with each pump. Because of high under bonnet temperatures on this vehicle, the o'ring becomes brittle which allows the pump to suck air causing the fluid to aerate. This makes the pump either noisy in operation and can cause the steering to become jerky or will convulse fluid out from the reservoir.

Holden External Reservoir VS-VY

This pump is connected to an external reservoir with the suction hose sliding over a metal tube and retained using a spring clamp. The connection between tube and hose is prone to weeping oil and can also suck air-causing fluid to aerate or convulse from the reservoir. When fitting any new pump, both suction hose and clamps should be replaced.

Nissan Pintara / Skyline

This pump is an external reservoir pump. It has a strainer inside the reservoir on top of the return pipe, which can become blocked causing excessive back pressure in the system. Whenever the pump is replaced the strainer should be removed and cleaned. A retaining clip is located on top of the strainer, which needs to be removed before the strainer can be then cleaned.

Mitsubishi Magna TM-TP

This pump is also an external reservoir pump and is prone to sucking air around the supply hose fittings. Before replacing a pump which is noisy, check that the hose is not damaged and the connections on each end of the hose are properly sealed.

Trouble Shooting

Poor Return Of Steering Wheel

- Steering column friction - align column.
- Steering linkage or ball joints binding - replace.
- Steering gear adjustments too tight - adjust to specs.
- Excessive internal leakage in steering gear - replace steering gear.
- Steering gear to column not aligned - align column.
- Tyres under inflated - inflate to specified pressure.
- Steering column coupling binding - adjust or replace.
- Improper front wheel alignment - align to specs.

Steering Wheel Jerks When Turning

- Low fluid level - fill as required.
- Loose belt at pump - tighten.
- Engine idle too slow - adjust idle speed / check idle up switch if applicable.
- Air in system - check all sealing connections between pump and reservoir.
- Low pump pressure - pressure check / replace pump.
- Steering linkage hitting obstruction - correct clearance.

Occasional Increase In Effort When Turning The Steering Wheel Fast

- Low fluid level - fill as required.
- Pump drive belt loose or glazed - adjust or replace.
- Internal leakage in steering system - check pump pressure / replace pump or steering rack.

Excessive Steering Wheel Return Or Loose Steering

- Worn or damaged steering linkage or wheel bearings - replace as necessary.
- Worn or damaged rack bar or pinion - replace steering gear.
- Loose steering gear mounting - tighten bolts to specs.
- Improper high point adjustment of steering gear - check and adjust to specs.
- Steering column coupling loose - tighten to specs.
- Air mixed with fluid - check all sealing connections between pump and reservoir.

Heavy Steering

- Excessive internal leakage - pressure check and replace steering gear / pump.
- Low pump output - pressure check - or restriction in system - remove restriction.
- Loose pump belt - tighten.
- Low fluid level in reservoir - check for leaks, fill as required.
- Sticking flow control valve - replace pump.
- Tyres under inflated - inflate to specified pressure.
- Steering linkage binding from lack of lubrication - lubricate.
- Steering column binding - replace worn parts and align.
- Steering gear adjusted too tight - adjust to specs.
- Body control module not operating - reset BCM refer to speed sensitive power steering in fitting tips.
- Obstructed modulating valve or broken wiring loom - clean or replace valve assembly.

If these tips fail to address the symptom, please contact a power steering specialist.

Excessively Light Steering "Driving On A Knife Edge"

- Loose control valve torsion pin or torsion bar - replace rack and pinion.

Car Pulls To One Side

- Low or under inflated tyre pressure - inflate to manufacturer's specs.
- Front end out of alignment - align front end to specs.
- Steering gear control valve worn - replace steering gear.
- Steering linkage or wheel bearings worn - replace as necessary.

Shudder When Parking

- Upper strut bearings binding - replace as required.
- Worn or incorrect rack preload - adjust to specs.
- Outer tie rod ends or bottom ball joints binding - replace as required.
- Bottom ball joints binding - replace as required.
- Low or under inflated tyre pressure - inflate to manufacturers specs.

If these tips fail to address the symptom, please contact a power steering specialist.

System Noise Identification

Rattle

- Pressure hose touching other parts of the car - adjust or secure.
- Loose pump pulley nut - replace nut, tighten to specs.
- Loose pump or gear mountings - tighten bolts to specs.
- Steering linkage looseness - replace if necessary.
- Improper high point adjustment of steering gear - adjust to specs.

Repetitive Thumping Noise

- Loose steering column or column connections - adjust or replace.
- Free play in worm and pinion assembly - centralise steering gear or replace as necessary.
- Steering gear operating off centre - centralise steering gear.
- Worn steering gear - replace as necessary.

Knocking Noise

- Worn or damaged rack bar or pinion - replace steering gear.
- Improper high point adjustment of steering gear - check and adjust to specs.
- Loose rack mountings - replace retaining nuts / tighten to specs.

Gear Squawk Sound

- Cut dampener o'ring on spool valve - replace steering gear.
- Incorrect fluid used in steering system - flush system refill using manufacturers specified fluid.
- Dry steering stops - lubricate contact surfaces.

Fluid Convulsing From Reservoir

- Poor connection between pump and reservoir - replace hose or o'ring.

Hissing

There is some hissing noise in all power steering systems. This sound is most noticeable during slow speed parking, and when the steering wheel reaches the end of its travel. There is no relationship between this noise and the performance of the power steering system.

Note: Do not replace the power steering gear or pump unless the hissing sound is extremely obnoxious. A replacement steering gear should have only a slight hissing sound.

Groan

- Low fluid level - fill as required.
- Aerated fluid - check all sealing connections between pump and reservoir.

Growl

- Restriction in steering gear or hose - remove restriction.
- Low fluid level - fill as required.
- Scored pump pressure plate, thrust plate or worn rotor - replace pump.

Belt Squeal Or Chirp

- Loose or grazed belt - adjust or replace.

Pump Swish Sound

- Pump flow control valve defective - replace pump.

If these tips fail to address the symptom, please contact a power steering specialist.

Repco

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