

23 upgrades for '94-'04 Land Rover Discoverys



WEAK LINKS STRONG FIXES

By Harry Wagner and Bill Davis *Photography: Harry Wagner and courtesy of the manufacturers*

From the Camel Trophy to the G4 Challenge, Land Rovers have long been recognized for their off-pavement prowess. The '94-'99 Discovery and '99-'04 Discovery II are some of the best of the bunch, sharing many of the same attributes as the famed Range Rover without the upscale price tag. The low gearing, solid axles, and flexible suspension provide Discos with a very capable platform that can perform even better with the parts and upgrades detailed below.

Get The Shaft

Weak Link: Front Driveshaft

Models Affected: All

What Happens: First-gen Discoverys have some odd front driveshaft geometry that can create problems with even minor suspension lifts. The U-joint angles are unequal, the differential and transfer box are offset, and the U-joints are clocked 40 degrees out of phase. Land Rover solved the front driveshaft geometry problems on the D II by adding a double-cardan (CV) front driveshaft. Unfortunately, they created an even worse problem. The new driveshaft is not serviceable, is in close proximity to the catalytic converter, and the air-conditioning compressor drains onto the shaft. In other words, the catalytic converter bakes all of the lubrication out of the shaft and you can't add any more. Unfortunately, the shaft will frequently break completely in half with very little warning and will usually knock a hole in the side of your transmission.



Sturdy Fix: Custom-built double-cardan driveshafts are available from Great Basin Rovers. These solve the vibration problems in the Discovery and are completely serviceable for the D II. Great Basin Rovers also sells a driveshaft service kit to upgrade the D II front driveshaft to fully serviceable if you want to save money and install the parts yourself.
Contact: Great Basin Rovers

WEAK LINKS, STRONG FIXES



No Mo Roto

Weak Link: Rotoflex Joint

Models Affected: '99-'04 Discovery II

What Happens: A rubber coupler called a rotoreflex joint is fitted between the transfer-case output flange and rear driveshaft to attenuate driveline vibration and smoothly transfer torque to the rear axle. Although this makes for a quiet ride on the street, the rotoreflex joints rapidly fail when subjected to high angularity and binding on the trail.

Sturdy Fix 1: A factory replacement rotoreflex joint is available from your local dealer. The joints are reasonably priced, don't take up much cargo space, and are easy to change out on the trail.

Sturdy Fix 2: An even better solution, although more expensive, is to scrap the rotoreflex joint entirely and convert to a standard U-joint.

Atlantic British offers a kit that contains all the necessary parts to bolt a U-jointed driveshaft and yoke on your Discovery.

Contact: Your local dealer or Atlantic British

Keep It Locked Up

Weak Link: Center Differential

Models Affected: '99-'03 Discovery II

What Happens: The Discovery II has a center differential in the transfer case similar to an axle differential. The center diff transfers power to the front and rear axles for full-time four-wheel drive. Unfortunately, the differential does not come with provisions from the factory to be locked for a 50/50 torque split when off-pavement. The '99-'01 1/2 D IIs have the internal provisions to lock the transfer case, but no method to engage. The '01 1/2-'03 D IIs must have the entire transfer case swapped out in order to have a locked low-range.

Sturdy Fix: In its final year of production, the D II came from the factory with a center diff-lock shifter to lock the center differential. The cable-actuated '04 CDL shifter is available from Expedition Exchange and can be retrofitted to '01 1/2-'03 D IIs. The CDL Kit is composed of all Land Rover parts and contains everything one needs to lock one's CDL-ready transfer box, including the shifter knob, '04 CDL shifter body, cables, and fasteners. The '99-'01 1/2 D IIs only need to be retrofitted with the necessary parts from a DI.

Contact: Expedition Exchange

That's The Brakes

Weak Link: Park Mechanism

Models Affected: '95-'99 Discovery I

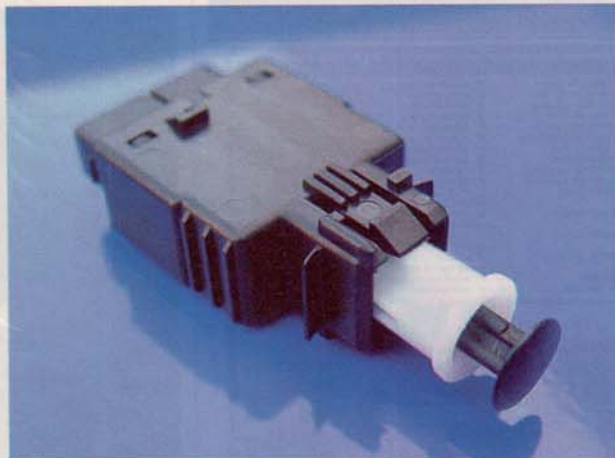
What Happens:

Controls on the Discovery prohibit the transmission from being shifted out of Park if the brake system is not functioning properly. While this is useful in preventing accidents, unfortunately the controls fail at a higher rate than the brake system.

Sturdy Fix 1: The first step is to see if your brake lights are functioning. If not, check the F1 fuse to see if it is blown. Also check the brake-light terminals to ensure that they are not touching and causing a short.

Sturdy Fix 2: If the fuse is intact, the brake switch is the likely culprit. This switch activates your brake lights as well as the shift interlock solenoid that permits your shifter to move from Park when the brake pedal is depressed. While there is no aftermarket upgrade available, factory replacements are available from Expedition Exchange for less than \$35. It is recommended you carry a spare brake switch since they are small, inexpensive, and easy to swap out if necessary.

Contact: Expedition Exchange



Anti Break Brakes

Weak Link: ABS Sensors

Models Affected: '99-'04 Discovery II

What Happens: Once you have lifted your Discovery II and modified the suspension for more wheel travel, the ABS cables can become impromptu limiting straps. Ripping off an ABS sensor is a dangerous (not to mention expensive) predicament. Additionally, the traction control is tied into the antilock brakes, so if you lose your ABS, you lose your traction control as well.

Sturdy Fix: Plug-and-play ABS extensions are available from Slickrock Fabrication for considerably less cost than repairing broken ABS components. The extensions are manufactured by WABCO, makers of the factory ABS on Rovers. Consider this cheap insurance if you have a flexible suspension.

Contact: Slickrock Fabrication

Spline Shortage

Weak Link: Rear Axleshafts

Models Affected: All

What Happens: Even with the full-floating design, early Discovery I models are not exempt from rear-axle breakage. The axle-shafts, at 32 mm and 24 splines, are comparable to a Dana 35 in terms of strength. The semi-floating shafts in Discovery IIs are even weaker. Once the differential has been upgraded to a limited-slip or locker, the axleshafts become the weak link in the chain.

Sturdy Fix: Great Basin Rovers manufactures heavy-duty axleshafts that are made of aviation-grade chromoly. These shafts are available for both the Discovery and D II and offer bolt-in installation while being significantly stronger than stock.

Contact: Great Basin Rovers

Cool It

Weak Link: Radiator Hoses

Models Affected: '99-'04 Discovery II

What Happens: Over time, the heater hoses may leak due to insufficiently tightened clamps, causing coolant to puddle on the intake manifold. In addition to making a smelly mess, this can also result in low coolant levels that can lead to larger problems.

Sturdy Fix: The easiest fix is to simply tighten the existing fasteners, but replacing the hose clamps with fuel-injection clamps will improve reliability.

Contact: Your local parts store

Spaghetti Steering

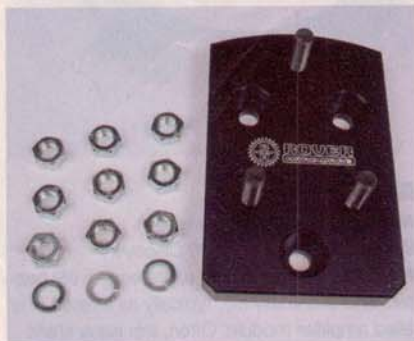
Weak Link: Steering Rods

Models Affected: '99-'04 Discovery II

What Happens: The stock tie rod and drag link are constructed out of wimpy 0.80-inch tubing with a 0.10-inch wall thickness. They suffer a severe allergic reaction to rocks and tall tires by bending themselves into all kinds of inconvenient shapes.

Sturdy Fix: Steering links constructed from 1.25-inch tubing with almost double the wall thickness are available from Rover Tracks. The new steering links are also threaded for tie-rod ends at both ends, unlike the stock tie rod, which has crimped ends and is not reusable with new tie-rod ends. Additionally, a high-clearance tie rod is available for even greater protection against bending and breakage.

Contact: Rover Tracks



Fearing For Steering

Weak Link: Steering Damper Location

Models Affected: '95-'99 Discovery I

What Happens: The factory location for the steering damper on the Discovery is low and poorly protected, making it an easy and common item to damage on the trail.

Sturdy Fix: Rovers North sells a steering damper relocation kit that puts the damper in a similar location to the Defender. The damper is moved from this vulnerable location to high in front of the axle, out of the reach of most boulders and trail obstacles.

Contact: Rovers North

Offset Or Upset

Weak Link: Spare-tire Location

Models Affected: '99-'04 Discovery II

What Happens: The factory tires on a Discovery are approximately 29 inches tall. Rover provides a fullsize spare and even makes the spare easy to reach on the rear door. However, a larger spare cannot be easily mounted without the tire coming in contact with the bumper and preventing the door from closing.

Sturdy Fix: Fortunately, a simple offset plate is all that's needed to fit a larger tire. Atlantic British offers such a product that is constructed from aluminum and comes complete with countersunk mounting hardware. The offset tire mount accommodates up to a 33-inch spare.

Contact: Atlantic British

Discos For Your Disco

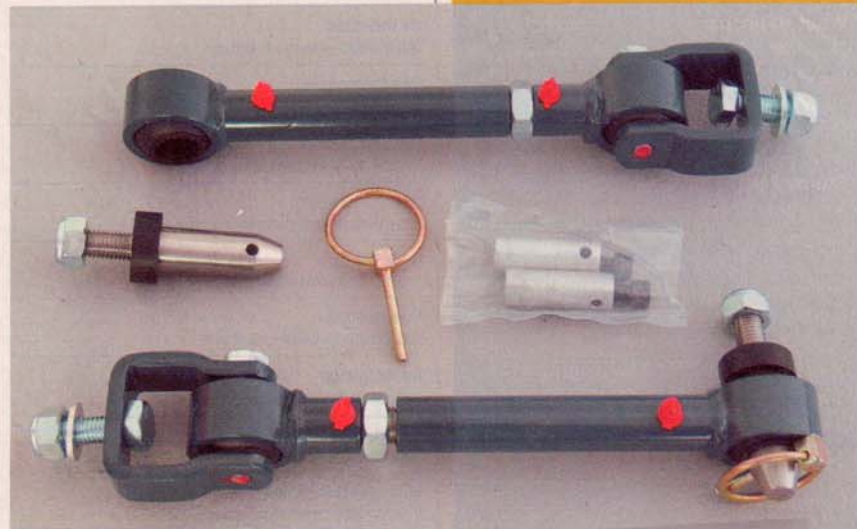
Weak Link: Suspension Articulation

Models Affected: '99-'04 Discovery II

What Happens: Sway bars are beneficial on the street, but on the trail they limit articulation. This contributes to tires lifting off the ground and losing traction.

Sturdy Fix: Fortunately, there's no need to discard the sway bar entirely, as Slickrock Fabrication manufactures sway-bar disconnects exclusively for the Discovery II. These sway-bar discos are length-adjustable to accommodate different lift heights and feature Zerk fittings for squeak-free operation.

Contact: Slickrock Fabrication



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Elementary, My Dear Watts

Weak Link: Watts Linkage

Models Affected: '99-'04 Discovery II

What Happens: During articulation, the rear Watts linkage can bind. This limits wheel travel and can eventually fatigue and lead to failure of the part if not addressed.

Sturdy Fix: Rovertym produces a Watts linkage that is constructed of heavy-duty 1/2-inch-wall tubing for greater strength.

Additionally, the new linkage is curved to prevent binding against the rear axle bracket, and like all Rovertym products, it is made right here in the U.S.A.

Contact: Rovertym



What's The Diff

Weak Link: Plastic Drain Plug

Models Affected: '99-'04 Discovery II

What Happens: We don't mind plastic in our cupholders, but it has no place in differentials. The bean counters at Rover decided to save a few bucks and use plastic differential plugs on the D II axles. The same plug was also used in Discovery and D II radiators, virtually ensuring leaks given enough time.

Sturdy Fix: Great Basin Rovers stocks brass plugs to replace the plastic diff and radiator plugs. The new plugs feature an O-ring for proper sealing, they don't rust, and they're soft enough that they will not cross-thread the factory components.

Contact: Great Basin Rovers



A Birf By Any Other Name

Weak Link: Front CV Joints

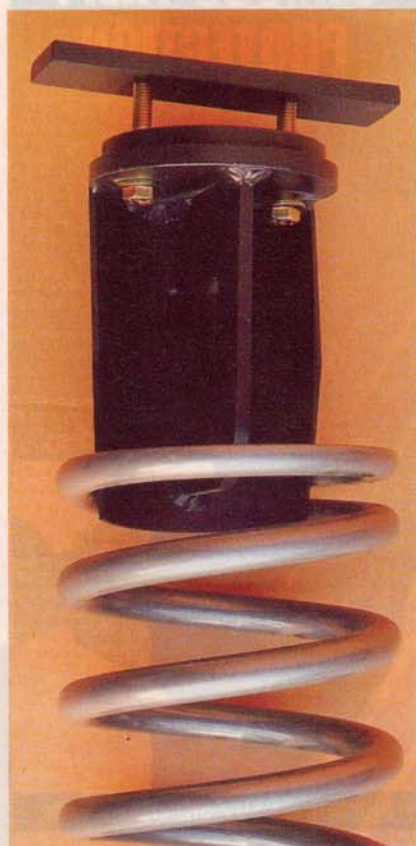
Models Affected: '95-'99 Discovery I

What Happens: Land Rover CVs are prone to breakage, particularly when the front end is bound up and turned to the steering stops. The factory CV is 28 mm and 32-spline, and judging from the metallurgy, appears to be constructed from recycled aluminum cans and scrap metal.

Sturdy Fix 1: A bolt-in CV made from cryogenically stabilized aviation-grade alloy steel is available from CV Unlimited. The internal parts have been heat-treated to withstand the stresses endured off-pavement, and critical components are crafted from 300M.

Sturdy Fix 2: Rover Tracks has developed a kit that allows you to retrofit Longfield 30-spline birfields and axles from a Toyota into your Rover front axle, and even a Toyota pickup third member for additional strength. You already run a Buick engine, so there should be no shame in running Toyota axle components.

Contact: CV Unlimited, Rover Tracks



Coming Uncoiled

Weak Link: Rear Coil Springs

Models Affected: All

What Happens: The rear four-link suspension design used on Rovers is a superb design. After adding longer shocks and brake lines, the articulation becomes so plentiful that the coil spring unseats.

Sturdy Fix: Spring retainers or "cones" are available from Rovers to cure this problem. These simple bolt-on products guide the coil back into the spring retainer and keep them from unseating.

Contact: Rovers

Master Of Caster

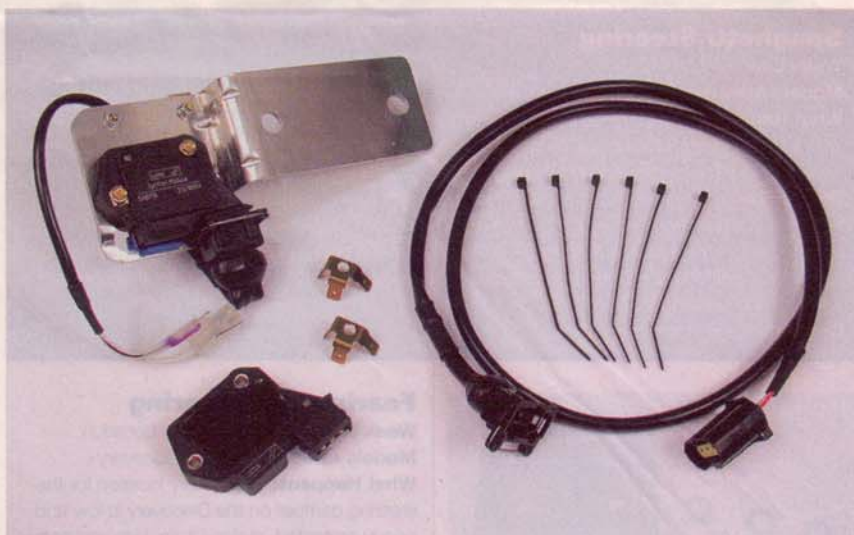
Weak Link: Front End Caster

Models Affected: '95-'99 Discovery I

What Happens: After lifting a Rover, a compromise has to be made between caster and pinion angle. Too little pinion angle results in driveshaft vibrations, and too little caster can result in wandering and vague steering.

Sturdy Fix: Rovers developed Caster Correct Swivel Balls to accommodate 5-inch lifts with proper caster and pinion angles. Higher lifts can be addressed with the Caster Correct Swivel Balls in conjunction with Rovers's heavy-duty radius arms.

Contact: Rovers



Full Of Hot Air

Weak Link: Airbag Suspension

Models Affected: '99-'04 Discovery II

What Happens: Three different rear suspension options were available on the Discovery II, including the SLS self-leveling airbag suspension. While the airbags offer a nice ride, they commonly fail between 60,000 and 90,000 miles. There are already enough potential failure points when you are in the backcountry—no reason to have another one unnecessarily.

Sturdy Fix: Factory coils or Old Man Emu coil springs can be retrofitted in place of the SLS system and provide better durability, along with the potential for lift with the OME springs. British Pacific stocks everything necessary to make this conversion a quick and easy process.

Contact: British Pacific

Matter Of A Pinion

Weak Link: Stock Two-Pinion Carrier

Models Affected: All

What Happens: All U.S.-specification Discoverys, both early and late models, came factory-equipped with two-pinion differential carriers. They also had small crosspins that were prone to breakage when subjected to hard use on the trail.

Sturdy Fix: A variety of stronger carriers are available from Great Basin Rovers, from four-pinion open carriers, to Truetracs, Air Lockers, or Detroit Lockers. Each user's needs will vary depending on intended use and budget, but all of these options are significantly more robust than the stock differential. Great Basin Rovers is a full-on differential remanufacturing facility and can supply completely remanufactured exchange differentials to your exact specifications.

Contact: Great Basin Rovers

Amped Up

Weak Link: Amplifier Module

Models Affected: '94-'96 Discovery I

What Happens: Over time, the engine will hesitate and eventually die, typically as a result of a failed amplifier module. Often, this issue starts gradually and gets worse as time goes on, particularly when the weather is hot or the engine is under a sustained load.

Sturdy Fix: From the factory, the module is located atop the distributor, where it is subjected to high heat from the engine. Land Rover recognized this issue and moved the amplifier in '97. Atlantic British produces a module-relocation kit for the earlier Discoverys that moves the amplifier to a cooler location in the engine bay where it can operate properly.

Contact: Atlantic British **FW**

SOURCES

Atlantic British

800/533-2210, www.roverparts.com

British Pacific

800/554-4133, www.britishpacific.com

CV Unlimited

800/868-0057, www.cvunlimited.com

DAP Enterprises

802/885-6660, www.dap-inc.com

Expedition Exchange

310/618-1875, www.expeditionexchange.com

Great Basin Rovers

801/486-5049, www.greatbasinrovers.com

Rock Ware

719/328-0796, www.rockware.net

Rovers North

800/403-7591, www.roversnorth.com

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303/506-9429, www.rovertracks.com

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WEAK LINKS, STRONG FIXES

More Plastic Parts

Weak Link: Door Sills

Models Affected: All

What Happens: As if the plastic diff plugs were not enough, the powers that be at Land Rover went so far as to use plastic rocker panels below the doors. While we appreciate that these will not rust, the plastic won't fend off shopping carts, much less rocks or other trail obstacles.

Sturdy Fix: $\frac{3}{8}$ -inch-steel rocker guards are available from Rovers North to protect the doors and rocker panels. The rock sliders offer an easy bolt-on installation, factorylike fit and finish, and even feature a built-in jack point.

Contact: Rovers North



Shocking Discovery

Weak Link: Rear Upper Shock Mounts

Models Affected: '94-'99 Discovery I

What Happens: The rear suspension of the Discovery is an excellent design, but the shocks limit articulation potential when in stock form. More droop is possible if the shocks were not inhibiting articulation.

Sturdy Fix: Longer shocks require new upper mounts in order to provide more space between the upper and lower mounting points, and thus a longer shock. Rock Ware produces shock mounts that are built from 1-inch, 0.120-wall tubing and mount in the factory location. The new mounts allow the use of 12-inch-travel shocks and do not require brake-line or bump-stop modifications.

Contact: Rock Ware



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1500 1999-06 4wd	6" w/knuckles	\$1739.95	\$1997.95
1500 1988-98 4wd	4" w/knuckles	\$1639.95	\$1897.95
Suburban K1500 2000-03	4" w/knuckles	\$1209.95	\$1367.95
1500 1988-98 4wd	6" w/knuckles	\$1319.95	\$1477.95
2500 1988-98 4wd (Blkg)	4" EZ-Ride	\$1209.95	\$1367.95
2500 1988-98 4wd (Blkg)	6" EZ-Ride	\$1309.95	\$1467.95
FU 1973-87 4wd	2" 3/4" EZ-Ride w/rear springs	\$329.95	\$487.95
FU 1973-87 4wd	6" w/arm r/springs & arm	\$639.95	\$787.95
FU 1969-72	2" 4" EZ-Ride w/rear springs	\$739.95	\$877.95
FU 1969-72	6" w/arm r/springs & arm	\$829.95	\$977.95
Colorado 4wd	4" w/knuckles	\$1309.95	\$1467.95
Summer H3 4wd	4" w/knuckles	\$1349.95	\$1507.95



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250 / F350 2005-07 4wd	4.5" EZ-Ride w/arm	\$699.95	\$857.95
250 / F350 1999-04 4wd	3" Spring Relocating	\$519.95	\$677.95
250 / F350 1999-04 4wd	3.5" EZ-Ride	\$739.95	\$897.95
250 / F350 1999-04 4wd	5" EZ-Ride w/arm	\$929.95	\$1103.95
150 2004-06 4wd	6" EZ-Ride	\$1879.95	\$2007.95
150 1997-03 4wd	4" EZ-Ride	\$1459.95	\$1617.95
150 1981-96 4wd	2.5" EZ-Ride	\$429.95	\$583.95
150 1981-96 4wd	4" EZ-Ride w/arm	\$599.95	\$727.95
150 1981-96 4wd	6" Performance w/arm	\$899.95	\$1057.95
150 1973-79 4wd	4" EZ-Ride w/bushings	\$1103.95	\$1263.95
250 1980-97 4wd	2.5" Diesel or Gas	\$389.95	\$547.95
250 1980-97 4wd	4" EZ-Ride w/arm	\$529.95	\$687.95
250 1980-97 4wd	6" EZ-Ride w/arm	\$649.95	\$807.95
250 1980-97 4wd	4" EZ-Ride w/arm w/rear springs & arms	\$819.95	\$977.95
angler 1983-97 4wd	4" EZ-Ride w/arm	\$1159.95	\$1327.95
angler 1983-97 4wd	4" Performance w/arm	\$839.95	\$997.95
explorer 1991-94	4" EZ-Ride w/arm	\$949.95	\$1117.95

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Dodge Ram 1500 2006-07 4wd	2" Leveling Kit	\$59.95
Ford F150 2004-06 4wd	2" Leveling Kit	\$132.95
Ford F250/F350 2005-08 4wd	2.5" Leveling Kit	\$149.95
Ford F250/F350 1999-04 4wd	2.5" Leveling Kit	\$275.95
Toyota Tundra 1999-06 4wd 2wd	2" Leveling Kit	\$125.95
Toyota Tundra 2007 4wd	2" Leveling Kit	\$119.95
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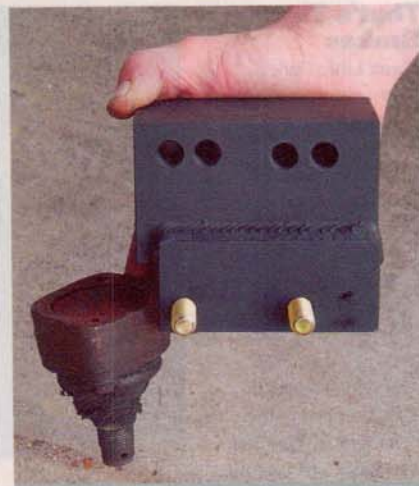
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WEAK LINKS, STRONG FIXES



The "A"s Have It

Weak Link: Rear Suspension Geometry
Models Affected: '94-'99 Discovery I
What Happens: As the rear suspension is lifted with taller coils and longer shocks, the geometry changes. The suspension links are effectively shortened as they become more angled, moving the axle forward in relation to the frame.

Sturdy Fix: Rovertym manufacturers custom A-arm extensions to each user's specifications depending on their suspension setup. The extension bolts to the A-arm and relocates the existing rear swivel link to the rear up to 1 inch. Also, for 3-inch-or-more lifted trucks, this link will restore some of the lost rear A-arm swivel joint geometry, which diminishes as the suspension is lifted.

Contact: Rovertym

Step It Up

Weak Link: IAC Stepper Motor
Models Affected: '94-'99 Discovery I
What Happens: Over time, you may notice a hesitation and rough idle from your engine. The engine may even stall when under a load from the power steering or air conditioning. The problem is that the idle air-control motor is subjected to high amounts of heat and debris that can contaminate it over time. This motor compensates for engine loads at idle by regulating the air that bypassed the throttle plate when it is closed.

Sturdy Fix: The idle air-control motor is a small round motor with an electrical connector on the top, located on the upper air plenum. To service it, you'll have to remove the motor from the plenum and clean the end of the valve. You should also clean the passage that it fits into with carb cleaner. If the symptoms remain after cleaning, the motor more than likely needs to be replaced.

Contact: None