

Clutch Replacement Options in 2019

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Valeo manufactured the original equipment clutch for the ZR-1 in Germany. It's an excellent clutch. It can handle up to 600 hp with OE style tires. It works well up to 525 hp with drag radials on a sticky track. Unfortunately it has been discontinued for about 10 years. Where do we go from here?

Assessing the Condition of the Clutch.

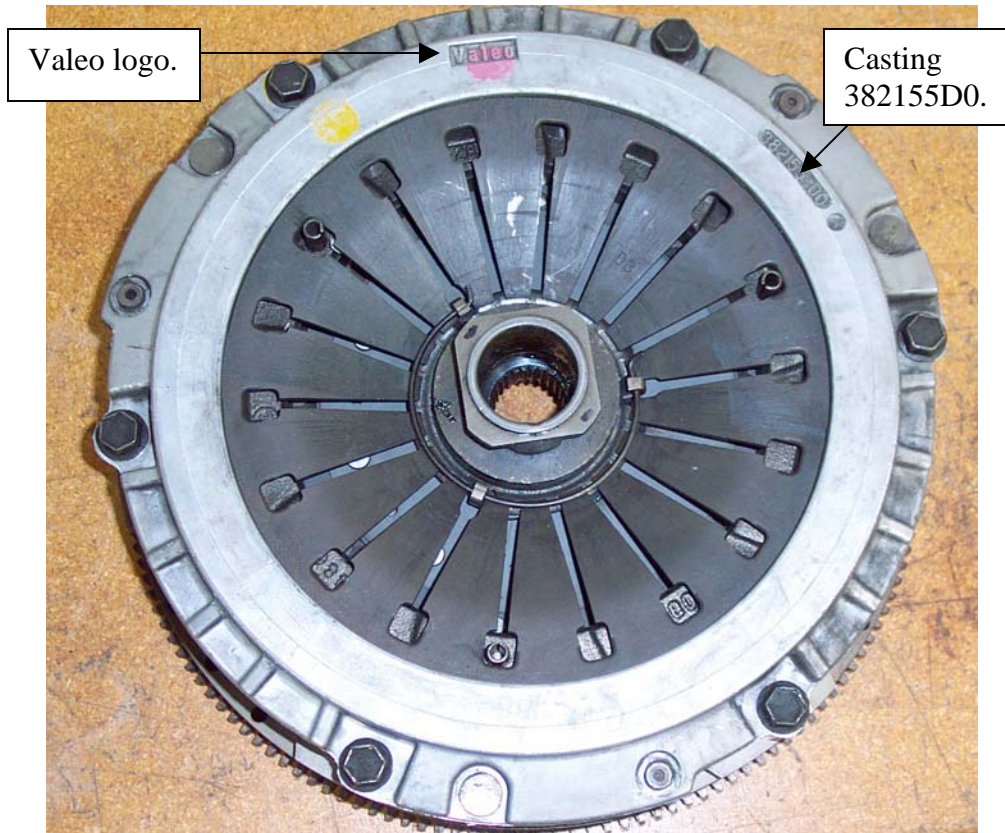
A new clutch begins to engage when the pedal is about 1.5 inches above the floor. As the disk wears the engagement point at the pedal will rise toward the top of the pedal travel.

Standard Clutch Replacement.

For service I recommend keeping the OE pressure plate. The OE part is good for 100k miles if the car has been driven in a spirited way, as a high performance car should be. If the original clutch needs to be replaced we inspect the pressure plate. If it is in good condition, it is placed back in service. A new Valeo pressure plate has a surface that has a .008" cup. When inspecting the clutch, don't incorrectly identify the cup as a warped surface.

We use a Centerforce disk that is made for the ZR-1 application. Summit Racing part number CTF-384100. The disk is .015" too thick. The pressure plate needs to be shimmed in-order for it to release cleanly. Use .015" shims under the pressure plate posts. Six shims are needed. McMaster-Carr part number 97235K147.

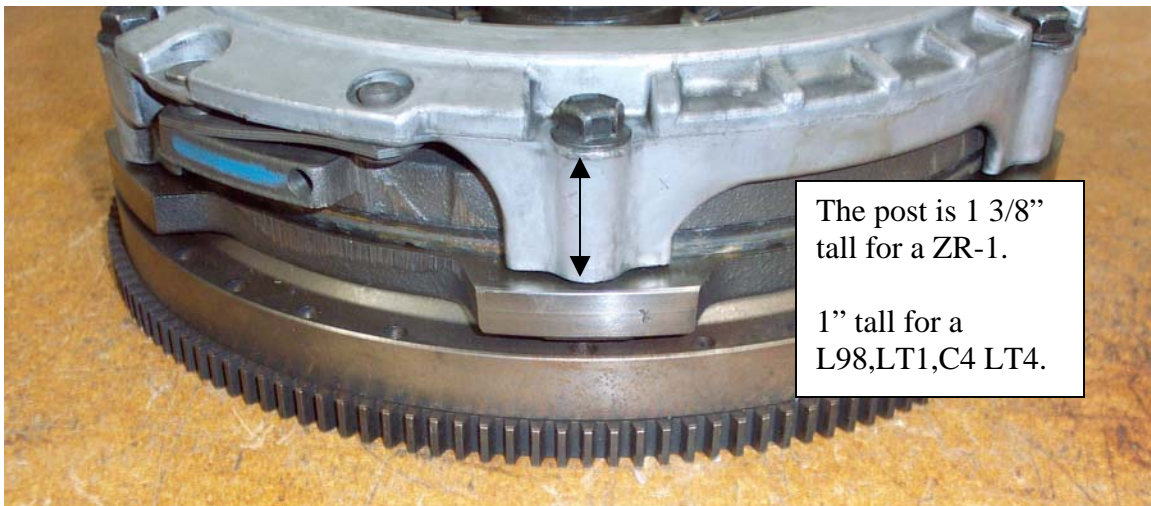
The original pressure plate has a Valeo logo on the casting. The posts are 1 3/8" tall.



Valeo logo.

Casting
382155D0.

This pressure plate was installed at the factory.



The post is 1 3/8" tall for a ZR-1.

1" tall for a L98,LT1,C4 LT4.

The Throw Out Bearing.

We have never seen a noisy throw out bearing. Every time we have encountered a problem with noise or high frequency vibration when engaging the clutch it was caused by the pilot bearing. About 25% of the ZR-1 pilot bearings fail in a mode where the bronze bushing spins in the crankshaft. These bearings can be removed with a finger. Sometimes they fall out when the transmission is removed. We have had a problem with replacement bronze bushing spinning in the crankshaft. GM had a problem with the bronze bushing too. Service bulletin 92-230-6 was issued in June of '92. It specifies

replacement with a fluted bronze bushing. Service bulletin 46-73-02 was issued in October of '94. to specify a roller pilot bearing. GM part number 14061685 AC-Delco part number CT1078.

Be careful to avoid damaging the crankshaft when removing the pilot bearing. There is a soft plug behind the bearing. If pressure were applied behind the bearing the plug can be dislodged, which would result in an oil leak when the engine is started. Using grease behind the bearing to hydraulically push the bearing out will damage the plug.

The OE throw out bearing is marked with the bearing manufacture's logo INA on the seal. We have seen the Chinese version of the bearing fail after a few thousand miles. The Chinese bearing does not have a logo on the seal. The failure mode is a broken crimp on the tube. When this happens the clutch pedal will jam solid.

Marked with the logo INA on the seal.



Hydraulic Parts.

We have had very good experience with the Dorman replacement parts. The cylinders are iron. They are made in China. We have never seen one fail. They are not coated for corrosion protection. Paint them to prevent rust. The master cylinder is part number CM39763. The slave cylinder is part number CS360017.

The cap on the OE master cylinder says to use DOT 3 fluid. However, the service manual says to use a specialty clutch fluid with a friction modifier to avoid piston cup chatter or squeaking. We use AutoZone part number 87372. It is a full synthetic fluid. Fill the OE style master cylinder to the lower of the two level lines on the reservoir before inserting the air displacement bladder. Fill the Dorman master cylinder to within ¼" of the top.

It's a good practice to bench bleed the parts before installing them. The system is designed to automatically bleed. Pump the pedal quickly ten times and the bleeding will complete.

Inspect the Clutch Fork.

Make sure that it is straight. Lubricate the pivot ball with extreme pressure grease. A dry pivot ball will increase the pedal load significantly. Really high friction can cause the fork to bend or crack.

Replacement Pressure Plates.

If the pressure plate needs to be replaced look for the Valeo ZR-1 unit. A used one in good condition is an excellent choice. After Valeo discontinued the ZR-1 1 3/8" tall pressure plate they provided the L98/LT1/LT4 pressure plate in the ZR-1 clutch kits. The L98/LT1/LT4 pressure plate has Valeo cast into the cover and has one-inch tall posts. The iron pressure plate is 3/8" thinner than the ZR-1 unit. It has the same torque capacity as the thicker ZR-1 pressure plate when cold. It has less mass to absorb heat. The Valeo L98/LT1/LT4 pressure plate works well for street driving. Drag racing on a sticky track should be avoided.

The one inch thick pressure plate uses 3/8" shorter bolts. These bolts must be acquired. They are 1 3/4" long under the head. Use bolts with a solid shank towards the top. .370" in diameter. This is a critical dimension needed to center the pressure plate. Fully threaded bolts will not center the pressure plate and could cause an engine vibration.

Avoid the Chinese copy of the pressure plate. It is not marked with the Valeo logo and has the number C70043 cast into it.

A new pressure plate should be balanced with the flywheel. Some flywheels fail with parts moving around inside. If the flywheel balance shifts unexpectedly on the balancing machine, it should be discarded to avoid a vibration problem.

Don't use the disk that is packaged with the Chinese pressure plate. We have seen several of them explode when shifted over 6000 rpm. They work fine on a L98 because they don't rev past 6000 rpm.

Inspection of the Dual mass Flywheel.

The face should turn about 1/2" CW, return to center +/- 1/4" and turn with about the same force 1/2" CCW. A slightly loose flywheel face does not seem to cause any problem. The flywheel was manufactured with a .010" cup.

A Light Weight Flywheel.

If the flywheel needs to be replaced, the Fidanza aluminum flywheel is available. Part number 198551. It is 24 pounds lighter than the dual mass flywheel. On an inertial chassis dyno like the Dynojet the engine will produce 15 more hp at the crankshaft. The downside is that the transmission cluster gears will rattle at idle and up to 2000 rpm in gear. There is a lot of variation in the rattle sound level. On some cars it is slight. On some cars the sound is similar to a diesel engine.

Centerforce has a sprung center clutch disk that can be used with the single mass flywheel. Summit Racing part number CTF-381039. The disk is .005" too thick. Use .005" shims under the posts of the pressure plate. Six shims are needed. McMaster-Carr part number 97235K138.

Conversion Clutch Kit.

RAM makes high quality conversion kits. There is a replacement kit for the OE pressure plate, disk, throw out bearing, hydraulic release cylinder and flywheel. This is a good choice for a high mileage car that needs to replace everything. The flywheel in the kit is a single mass unit so the transmission gear noise as described will occur. The clutch kit as available from RAM is a custom installation and needs some small modifications. Jerry's Gaskets has RAM kits that include the customization so they are a bolt in installation.

Break-in.

A new clutch should be driven in traffic for 500 miles. This seats the disk to the cupped pressure plate and flywheel surfaces. If done too soon, one standing start can slip the disk and permanently burn a glaze on it.

A High Capacity Clutch Kit.

RAM makes a dual disk clutch. It's good for drag racing with slicks and 700 hp. Jerry's Gaskets has it customized and ready for bolt in installation.