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RBCOLLAR G Revision 19032024

Installation Instructions: RB OIL PUMPS, COLLARS & ADJUSTMENT

We recommend that you have your PRP FLAT DRIVE* OR QUAD KEY SPLINE DRIVE COLLAR installed by a qualified machine shop with either crank grinding or turning equipment. Tolerance is crucial so please don't risk it.

Preparation of Crank

In order to fit the upgraded pump drive system you will first need to remove the OEM drive from the crank.The recommended specifications for this process are detailed below. Please first get familiar with these notes first.

Important Notes before you start

These are tolerance fit items and the crankshaft should be machined down to a diameter slightly larger than the Internal diameter of the drive being installed (specifications below).

You will need to accurately measure the internal diameter of the drive being installed in order to determine the target diameter of the crankshaft surface.

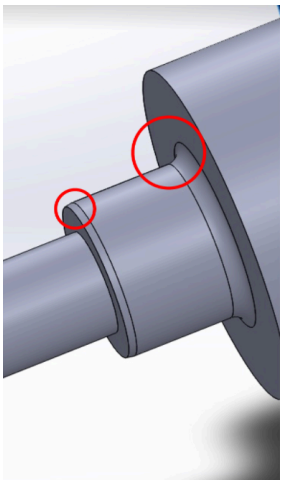
A radius is required to be machined and observed where the drive surface meets the step (right hand red circle below) This is a critical profile and can not be skipped in order to maintain the highest possible strength.

It is recommended you machine in a small taper on the leading edge (left hand circle below) in order to ease installation.

Target Shaft OD tolerance: Drive item I.D + 1.5 thou +/- 0.2 thou (0.0015 +/- 0.0002)

Radius at Step: R1.5

OEM crank pre modification



Please use a micrometer & bore gauge.
Please reference the PRP video <Click Here>.

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Step 2.

Heat up the collar with a blow torch, oxy, or high frequency current equipment (400 degrees C, or cherry red).
Fit it over the prepped and ready crank nose, use a flogging tube and hammer or brass punch or equivalent tooling.

Trial fit your oil pump or oil pump gear to ensure there is no binding, we recommend using a 'PRP oil pump alignment tool' as it will help ensure that you have aligned the pump and gears correctly which will lead to a failsafe operation. Please ensure you DO NOT USE grub screws, sealants or Loctite as these methods are not required with our quality gears whether it be spline or flat drive.

Now its very important establish where the crank shout protrudes through the oil seal, there are many variables that will have an effect on where the timing gear backing washer sits and if its too close to the oil pump it will gouge the oil pump and heat the seal and cause you an oil leak.

Bear in mind the back of the timing belt guide washer is flanged backwards in order to not cut the belt.

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	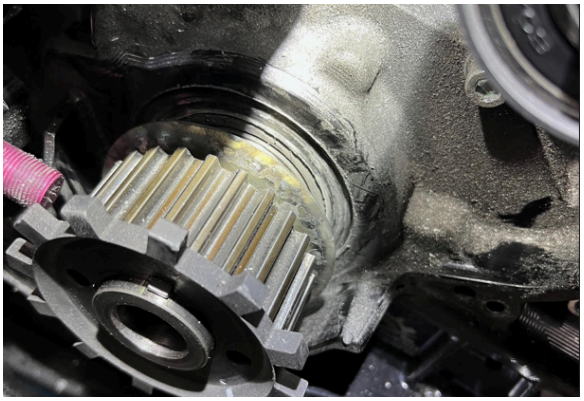	
Pic1: the section of collar that protrudes past the oil sealing area.	Pic2: demonstrates the aftermath of not having enough collar protrusion	Pic3: OEM timing belt guide (goes between the crank timing belt gear and oil pump), Note: Flared backwards

Some background on variables:

* Nissan's tolerances where not what they are today when you consider the RB, and the thrust position was most likely cut by hand, so they do differ from block to block, so even if you replace the engine bearings you may find the crankshaft in a different position that the next RB you build

* Aftermarket collars all differ in length slightly, in saying that their installation position also varies as its also installed by hand and sometimes the nose is skimmed after installation so variables are introduced.

* standard long nose cranks, second hand cranks, billet cranks all differ in crank snout protrusion also varies substantially.

* Thrust bearings often need to be settled on new builds, so you may not notice you have a problem until the engine is run in, so please allow an extra .002" - .004" in total you want to aim for .020" clearance between the back of the installed washer and oil pump housing.

* Another common variable is the compression of the OEM gasket becomes very thin giving you more clearance, so although you may not have any visible witness parks on the old pump, when you install the new one with a new gasket you might then inadvertently alter your crank collar protrusion.

What you can do if you don't have enough crank snout protrusion:

*The safest and easiest fix is to simply remove the oil pump gasket, ultra grey still gives you an acceptable seal on the RB engine.

* If by chance you have already installed the sump and perhaps engine back in the car before you realise you have a problem you may then decide to space the timing belt backing washer guide with a <click here: PRP crank shaft packing washer>, we do not include these in our oil pump kits as we prefer you to take the time to set the pump up properly and ensure you have clearance, the packing washer is a BAND-AID solution and we recommend you don't use it unless you have to

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Video Links:

Video on how to prep an RB crank

Video on Oil pump gears, pumps and alignment

NOTE: You must prime your RB oil pump before use! New engines take an extremely long time to build oil pressure when the pump is dry, it needs oil to seal and start sucking oil from the pan, either prime your engine with a priming tank or at the least pour oil in the -10 fitting on the right hand hand side of the pump (as you look at the front) this will help you get pressure faster and will help avoid pump damage.

NOTE 2: **Please check that your A/C bracket and or water pump do not push on the oil pump in any direction as it can and will push the pump out of alignment and cause your gears to bind.**

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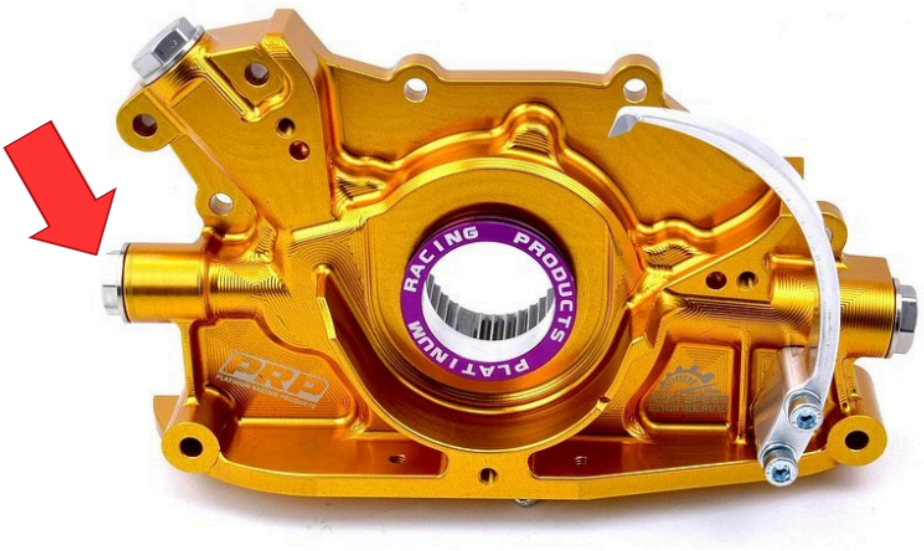
OIL PUMP PRESSURE ADJUSTMENT

Oil pump pressure can be easily adjusted by shimming the pressure relief valve with 1 shim which should give you approx 8 -16 psi pressure increase across the board, flow is determined by your bearing clearances, the larger the clearance the more flow. Pressure is determined by the pressure relief bypass valve that is always bypassing oil to maintain the desired oil pressure.

Average bearing clearances .002" Big ends and .0025 Main bearing clearance for example, you should see 100-100 psi cold at idle, once warm you should expect 30 – 40 psi cold, and 80- 100 psi warm (depending on the viscosity of oil you are using, oil temperature and of course your bearing clearance).

If you wish to see more gauge oil pressure, remove the plug shown below, and shim the inside of the plug with 1 shim or washer and you should see 20 – 30 Psi increase, please only increase one washer at a time with a maximum of 2 shims or washers, this should see you at over 140 psi up top warm.



NOTE: The pressures mentioned above are a guide, we are not advising you to run any specific oil pressure as there are many variables, your PRP pump comes set up as a pre-set bolt in for the greater average of RB engines and is calibrated to conform with the industry standard average zone as far as pressure is concerned for a performance engine, although completely adjustable to suit your particular requirements.

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FLAT DRIVE INSTALLATION NOTES

The OEM style flat drive gear has been cut to replicate tolerances found in the OEM drive collar. If you are running an aftermarket crank or collar, please ensure you check the tolerance. An acceptable tolerance for the OD of the collar to the drive gear is 0.12-0.22mm (0.06-0.11 per side). The tolerance for the flats is 0.3-0.4mm (0.15-0.2 per side) which can be measured with a feeler gauge.

PRP will always recommend cutting off the OEM collar and running spline drive, so if you are out of tolerance, removing the crank, or want to avoid the hassle, please speak to our team about upgrading to the PRP Quad key spline drive solution as it is far superior.

Please note: it is advisable to cut off the OEM oil pump drive collar regardless of whether its short or long snout as the steel is inherently soft lending itself to premature wear compared to the 4340 Billet PRP version.

Rotate drive gear from hard clockwise (LHS image) to hard counterclockwise (RHS image) to measure the tolerance on the flat.