

RB30 DOHC

R32 & R33 Skyline Specific
Last Update – 25th March 2005

This guide has originated from the following HUGE thread on SAU.
[Skylines Australia RB30 DOHC Guide](#)



Compatible DOHC Heads

Three heads can be used for the twin cam conversion.

- RB26DETT Head
- RB25DE (R32) Head
- RB25DE/T (R33) VCT Head

All three heads cc up around the 62-64cc mark.

However, please be sure to double check, there have been cases where people have bought heads that for some reason are way off. Possibly aftermarket.



As a reference point the RB30's SOHC head cc's up around the 56 to 58cc mark.

The **RB26DETT** head from the R32/33 GTR bolts only requires a modification to the head stud holes. The RB26DETT runs larger studs. All water/oil galleys line up.

The **R32 RB25DE** head bolts straight up to the RB30E bottom end. All water/oil galleys line up. N/A valve springs have less tension which may cause issues when running big boost. Cams and springs are interchangeable with RB20DET items.

The **R33 RB25DE/T** has variable cam timing (VCT/NVCS); this requires welding of the heads VCT oil feed. The head still requires oil to its VCT, you will have to tap in to the oil galley and run an oil feed to it. The most common used feed is T'ing into the oil pressure sender feed. Compare the pictures below to gain an understanding of how the head needs to be modified.



RB25DET VCT Bottom End



RB30E Bottom End No-VCT oil galley

The RB20DE/T has smaller ports and much smaller valves to the RB25 & 26 heads.

R32 RB20DET Inlet – 30mm

R32 RB20DET Exhaust – 27mm

R32 RB25 Inlet – 35mm

R32 RB25 Exhaust – 29.5mm

Specs on the R33 RB25 valves are a little shady. However it appears they do indeed run slightly smaller valves. The RB26 runs the same sized valves as the R32 RB25DE head.

R32 RB25 head runs the RB20DET style ports but larger.

The ports are still not 'as' large as the R33 RB25 or RB26 heads, nothing a little bit of porting can't fix.

The 'slightly' smaller ports should not put you off this head. I would recommend this head for an R32 for ease of installation and compatibility with existing sensors.

R33 RB25 & RB26 heads run the same style inlet ports with the same or very similar measurements.

Use one of these two heads if you are putting the rb30det in to a R33/R34.

R34 RB25 heads apparently have a different water/oil galley design. I will update here when I know for sure.

Approximately 9-9.5mm lift the R32 RB25DE & R33 RB25DE/T heads will require some machining so the cam lobes clear.

Upon purchase of your head ensure you get it checked out by your cylinder head specialist.

I have had first hand experience with two different RB25 heads where one had perfect valve seat tension and the other was a little loose.

You don't want to be left wondering why you are getting valve float and dropped a valve with big boost.

Head Gasket

Personal preference.

Tried and proven is to O-ring the block and use a standard Nissan RB26 OEM head gasket.

I personally used a COMETIC 3layer metal head gasket with a built-in O-ring setup. Similar to some of the Jap brands.

Inlet Manifold and Plenum

R32/R33 RB25 plenums and inlet manifolds are not interchangeable. The R32 RB20DET plenum bolts on to the R32 RB25 Inlet manifold.

R32 RB25 & RB26 heads run top feed injectors.
R33 heads run side feed injectors.
The R33 RB25 & GTR ports are slightly larger than the R32 RB25's.

For comparisons sake, a picture of an RB20DET Inlet manifold with a R32 RB25DE gasket over the top. Note the port size difference.



Exhaust Manifold

R32 RB20/25, R33 RB25 have the same exhaust manifold bolt up. They are interchangeable.
RB26 exhaust manifolds utilize a different bolt up pattern.

In order to bolt up the exhaust manifold of your choice you must grind down the water galleys protruding lumps that run from the front to the rear of the block.
They must be removed as they foul the exhaust manifold.



Short Motor

When selecting a RB30 short motor be sure to select one that has the provision for the turbo's oil feed/return and water return.
Yellow highlights vertical to one another are the oil feed and return.
The Yellow highlight towards the rear of the block is the water return.
Water feed is provided from a hose/steel pipe assembly that feeds from the opposite side of the block.

However, it is not too much of a problem to drill and tap to suit your connections.

The RB30's head oil feed restrictors are approximately 1.8mm in diameter, the RB25/20 twin cam blocks are 2.4mm.
The head with the smaller restrictors will still receive enough oil.
The smaller restrictors will prevent excessive oil being thrown in to the top end when being revved hard for long periods of time.

Use the RB20/25/26's oil dip stick & holder as the RB30's is not long enough to clear the DOHC inlet manifold.

You will have to use the RB20/RB25 block heater hose attachments accordingly. They are situated on the inlet side of the motor at the front where the thermostat resides and towards the back of the motor roughly where cylinders 5 & 6 reside.



Sumps

Grind off the RB20/25/26 fins towards the back of the sump, the rb30 crank and rods have a longer throw and will foul.
The RB30 sump has no clearance issues in the R32/R33 Skylines.

Pistons

RB30ET Pistons
~7.1:1 CR. Too low, you will loose response and fuel economy.
RB30E Pistons
~8.2:1 CR. Nice, however 8.5:1 even 9:1 is preferred depending on fuel quality.



The RB25/26 spec pistons have a smaller deck height vs. RB30 pistons.
The piston will sit lower in the bore when at TDC. Deck the block to compensate. Always measure first!

Try to set up the squish (quench) tolerance for 0.040" to 0.050". Squish = Deck Height + Head gasket Thickness.
A well setup quench improves the burn efficiency. As a result you see improved fuel economy and improved torque in the low to mid ranges of RPM. Most engine builders don't worry about quench and simply 'slap' it together. Insist.
High RPM without a well setup quench isn't affected as much as the fuel doesn't have time to de-atomize, so to speak.

Rods

Prepped stock rods will hold up to around 350rwkw with no more than 6500rpm. A set of forged H-beam rods are likely to cost in the vicinity of \$1500-1800.



Crank

The crank is nitrated from factory, providing it is in good condition, a finish is only required. On some high km RB30 cranks the front and rear seals eat away at the crank a little, if bad enough this has to be re-leaved.

Engine Bearings

The Genuine Nissan Bearings are good. Clevites & King Performance bearings are both excellent. Ensure you have plenty of oil flow (pressure is not so important), nice tolerances and you will have a strong motor.

Oil Pump

Many have had success using the RB30ET oil pump. It is best to use an oil pump from a twin cam motor as these provide more flow and pressure.



R32 RB20/26 oil pumps all bolt up to the RB30E crank with no issues. RB26 pumps do however have a reliability issue with cracking. This in my opinion is due to the oil pressure and forces placed on the small crank gear drive. R33 RB25 Series 1 oil pumps bolt up and are in my opinion the pick of the bunch due to its reliability and high oil flow. R33 RB26 oil pumps will not directly bolt up to the crank without a \$600 JUN crank collar.

Ensure you use **lock tight** on the bolts when assembling the oil pump as they are known to rattle loose causing a gradual loss of oil pressure.

Piston Oil Squirters

Oil squirters are used in the imported turbo Skylines to help remove heat from the piston which improves reliability.

Ceramic coating the tops of the pistons works well but can create hotspots elsewhere. If ceramic coating, ceramic coat the whole combustion chamber.

Adapting the oil squirters to the RB30 block is possible; however the main bearing oil gallery is in a slightly different position to those in an RB20/25/26. So machining is required to make them fit.



Water pump & Thermostat

All GTR, R32 RB20/25 & VL/R31 RB30 water pumps and thermostats are interchangeable.

R33 RB25 water pump have a slightly different bolt up pattern. The RB30E aftermarket water pump will set you back \$70 to \$90. The RB26 N1 water pump is anti-cavitation and flows more.

Genuine thermostats feel and look much better quality than aftermarkets. You will be required to use the RB20/25 thermostat housing to allow for stock hose positioning.



Flywheel

All of the RB20 & 25 Flywheels are interchangeable.

Ancillaries

The only modification to bolt up ancillaries is the Power steering bracket.
Originally the top lug of the power steer bracket bolts up to the head.

Due to the extra deck height it now must bolt up to the block.
You will be required to grind the lug flat so the bracket is able to sit flat on the block.

The R31 Skyline power steer bracket looks identical to the modified R32 power steering bracket. Look in to it.

The picture attached is of the modified R32 power steering bracket.



ECU

Use the corresponding ECU to the head you are using. It simplifies wiring, injector and sensor compatibility.

The R32 ECU's can be re-mapped; AP Engineering PowerFC's are also available.

Ensure the ECU you select supports the following features:

- Closed Loop – Fuel economy
- Knock Sensor – Safety
- Sequential Injection – Fuel economy & higher average power
- 6 ignition drivers – Doesn't overwork your coils

The R33 & R32 ECU's will run the RB30DET with no problems for the run-in period.
However disconnect your waste gate as the stock ecu won't handle the fuelling requirements once on boost.

AFM

The standard RB20/RB25DET AFM's are 80mm. They will handle up to around 220rwkw before running out of scope.
You have a couple of options.

The Z32 AFM (80mm) or the VH41/Q45 AFM (90mm).

The Z32 AFM runs out of scope around 260rwkw where as the VH41/Q45 will handle up to around 300rwkw.

Injectors

The R32 RB20/25 (270cc) and RB26 (440cc) injectors are top feed. However the RB26's run low imp. Injectors.

The R33 RB25DE/T run side feed injectors. The Turbo injectors are 370cc's.
A good upgrade for the R33 RB25DE/T head is to use S15 injectors as they are 480cc.

Turbo

Learn how to read compressor and turbine maps. There is plenty of information available via Google.
It appears the GT35R is perfect for the RB30DET and will not run out of air flow.
The GT30R is borderline as its turbine wheel is a restriction to flow at high rpm.

Remember a smaller exhaust A/R will hit hard and create wheel spin, a larger exhaust A/R will be more progressive and allow easier throttle control.

When using the stock turbo you will be required to use a longer piece of oil resistant hose for the oil drain pipe, you will also be required to bend and stretch the oil and water lines to meet with the turbo. It's not a problem.

Gearbox/Clutch

All of the RB gearboxes have the same bolt up pattern.

Series 1 R33's & R32's have a push type clutch setup,
Series 2 R33's use a pull type setup which is much stronger than the push setup which is prone to breaking.

The RB20T gearboxes will hold up to around 250rwkw providing you run sensible standardish street tyres.
The moment you slap on a set of slicks, nitto's or RE55's it will let go.

The RB25T gearbox is known to hold up to 450-500rwkw.

The RB26 gearbox can be bolted up however you are required to cut the transfer case off and weld a plate over the hole.

Engine Mounts

The RB30DET block is approximately 38mm taller than any of the other RB blocks. This causes a few fouling issues with the bonnet when used with the high RB25 stock inlet manifold/plenum.

The RB26 inlet manifold/plenum doesn't have these issues as it sits much lower.

If you want to run the stock RB25 inlet manifold/plenum you will have to lower the engine by 15mm on the driver's side and 12mm on the passenger's side.

You will then be required to remove the lower lip of the radiators shroud otherwise the fan will munch it up.

I also found it worthwhile to relieve the gearbox and centre bearing mount slightly. In an attempt to reduce driveline angles to an absolute minimum.

Just one more reason to use the RB26 head. :D

Factory Cam Specs

Model	Engine code	Type	Cam Duration (IN)	Cam Duration (EX)	Cam lift IN(mm)	Cam lift EX(mm)	Lobe centre angle (IN)	Lobe centre angle (EX)	NVCS range (rpm)
BNR32	RB26 DETT	Solid	240°	236°	8.58	8.28	113°	125°	
BCNR33								120°	
BCNR33 N1							117°	121°	
BNR34									
BNR34 N1									
R31	RB20DET	Lash	248°	240°	7.80	7.80	108°	118°	
HCR32	RB20DE	Lash	232°	240°	7.30	7.80	111°	117°	
	RB20DET		240°		7.80		115°	120°	
	RB25DE		232°	7.30	111°	118°			
ECR33	RB25DE	Lash	240°	240°	7.80	7.80	120°	117°	1050
	RB25DET								4500
ER34	RB25DE	Solid	236°	232°	8.40	6.90	119°	115°	below
	RB25DET					8.70			5400

This information was pulled from [Tomei's web site](#). It may not be 100% correct.

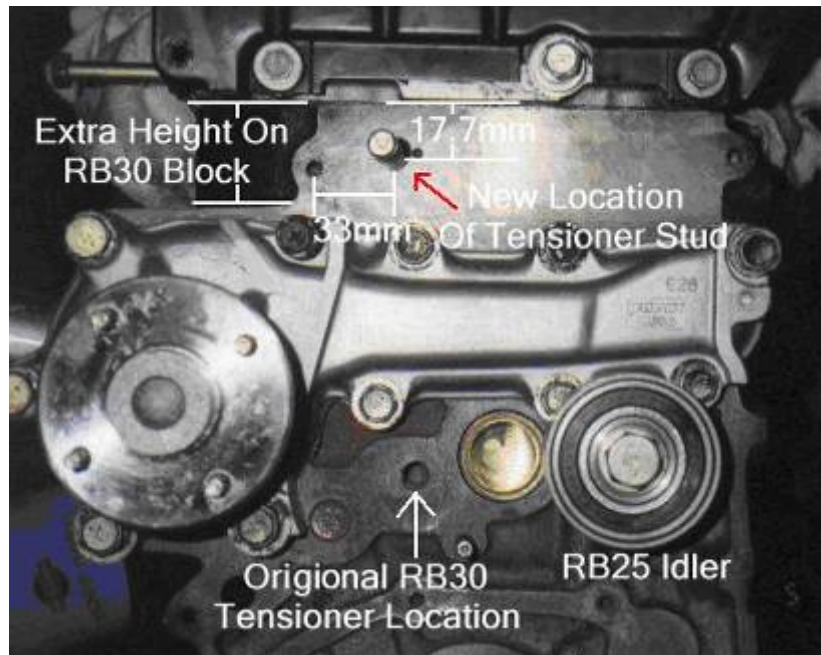
VCT/NVCS, experimentation has indicated that the more power you make the lower the VCT/NVCS engagement rpm will be.

The only way to find is by experimentation or through the use of a computer simulated engine dyno package such as [Dyno2003](#).

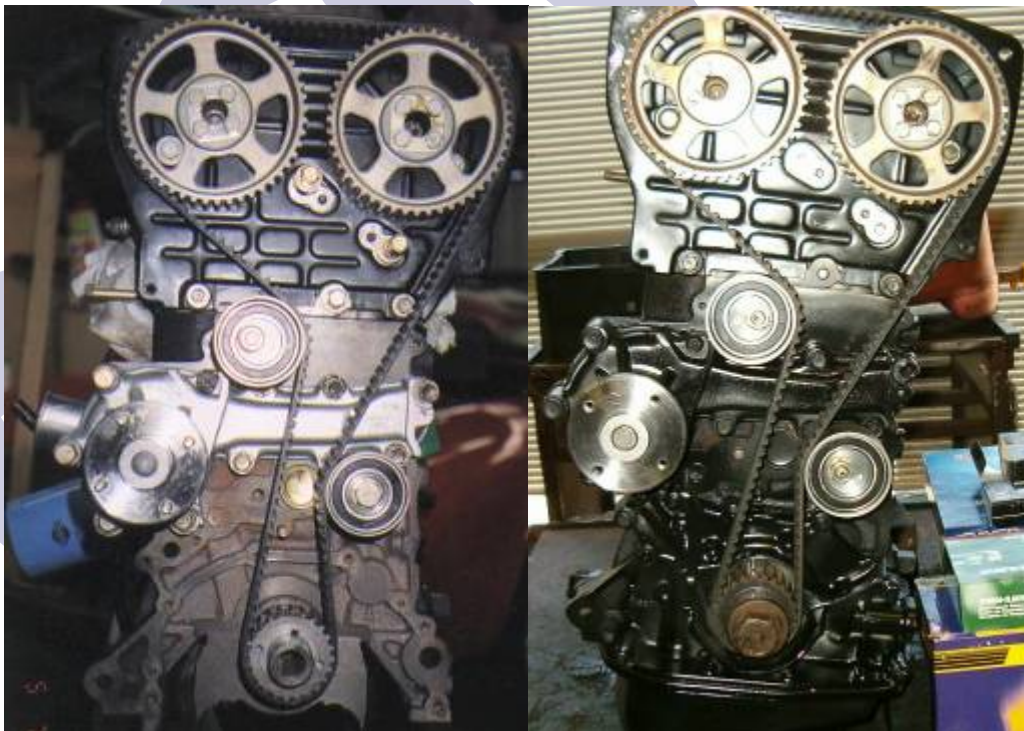
This is reflected when comparing the rpm of NVCS engagement for the turbo and non-turbo engines.

Cam Belt

I positioned a tensioner above the water pump as per the pic below. Don't worry about drilling in to the water galley located approximately 9mm deep as you can tape up the studs thread and it won't leak. Ensure the studs hole is drilled and tapped square!



Due to the extra deck height of the RB30 Block you require a belt that is approximately 11 teeth longer. A total of around 152 teeth will be needed the Dayco part number for this setup is 94407.



Using a tensioner and idler we found the timing belt tension to be greater than the factory recommended spec of 20kg's.

We used a second tensioner in place of the idler bearing (lower bearing) in order to bring the belt tension down to the factory recommended spec of 20kg's.

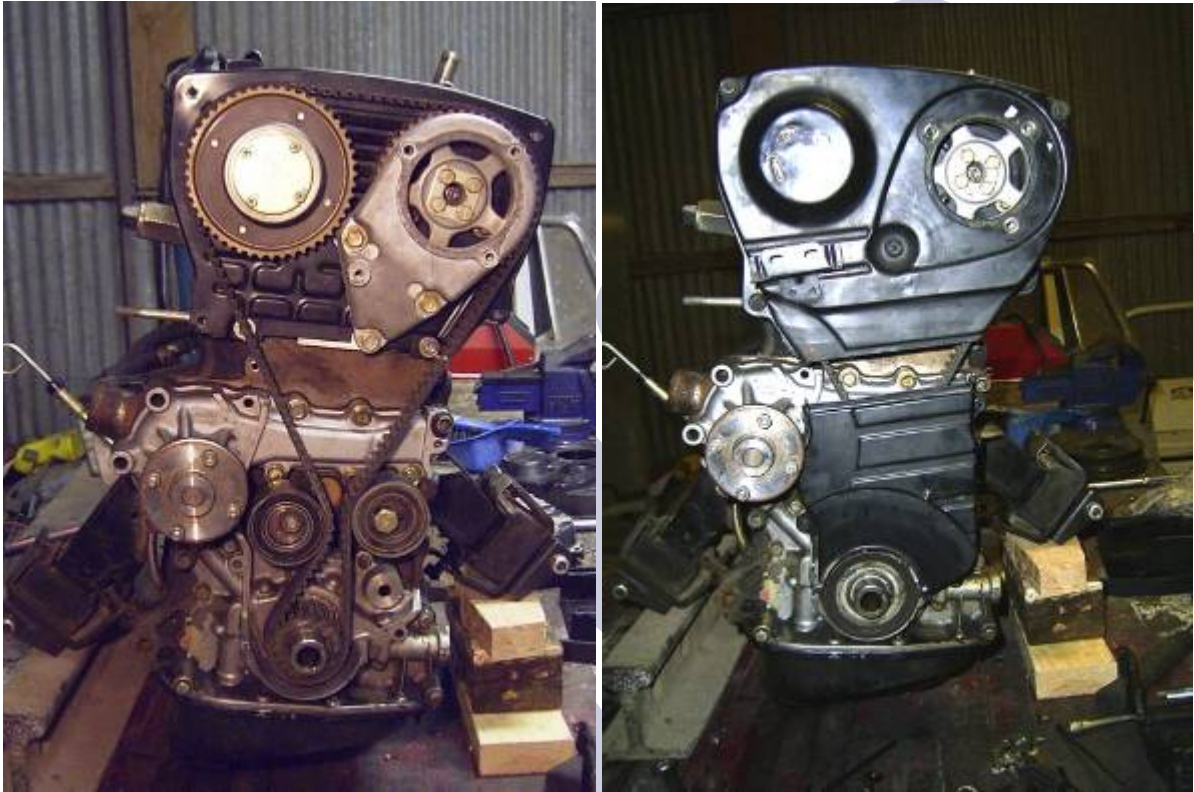
This gives us much more adjustment not to mention how much cheaper a new tensioner is compared to an idler. Use the RB20/25 lower cam belt cover as the RB30 cam belt cover is slightly taller and fouls with the top tensioner.

It is possible to use the factory tensioner and idler locations however once again you will be required to use two tensioners to get the correct belt tension.

I personally do not recommend this method as the belt comes too close together and the belt is also thinner (25mm vs 30mm)

It uses a Gates POWERGRIP GT2 p/n 1200 8MGT 30

It measures 1200mm long, 8mm pitch on teeth, 150 teeth, and 25mm wide but it was cut down from 30mm in the factory.



There is also a Bosch belt that can apparently be used - VB-T866, I have no further information on it.

THE END.

Thanks to Skylines Australia for making my RB30DET and this guide a reality.

A **really big thanks** to all those over at [SAU](#), especially [Christian \(Prank\)](#) for spending his hard earned \$\$ on SAU and [Skylines Downunder](#) who have also shared their knowledge.

Head over to the current [RB30 Thread at Skylines Australia](#).

I am sure you will be thankful for this guide when you check out how large the thread is.

That's it and may very well be the last update this guide receives.

Unless I have forgotten anything or some one brings to my attention an error.