**Installing Mitsubishi Camshaft & Cam Shaft Timing - 4cyl SOHC**

--------------------------------------------------------------------------------

The most involved job that you can really do as a Non - Mechanic. We absolutely recommend this is done by a professional, and use this as more of a guide on how to dial the camshaft rather than install the camshaft. But, if you do plan on doing this yourself, then this is one way to do it.

--------------------------------------------------------------------------------

**Installation Guide - Mitsubishi 4 cyl. SOHC Camshaft Dialing**

Okay you have a camshaft and you want to install it into your engine. We will do a separate guide to the actual fitment at a later stage. This guide is for the actual dialing in of the camshafts. It is very important as the setting up of a camshaft wrong, severely affects the idling and drivability of the vehicle. There are many ways of doing this and many people want to know the lift / duration and cam opening / closing times etc. This is all too hard way of doing it.

RPW instead uses the following method called the "Center Line Method" by working off the centerline of the camshafts. Is a lot easier and we have been doing this successfully for a number of years. We hope this makes life a little easier for you to do as well. We will try to be as specific as we can with detailed photos. RPW takes no responsibility for this guide and is not liable for any wrong fittings, accidents and anything relating to this information. Any reference to this information is done at the users own risk.

**Installation Guides**

**(A) Tools Required - You will require the following tools.**

1.Dial wheel / cam wheel to be fitted to the crankshaft of the engine.

2.Dial gauge with 6" extension with magnetic base to affix to top of cylinder head.

3.Socket set with 6" extension

4.Screwdriver set

5.Allen key set (If you have RPW Vernier Camshaft Gear)

6.Small hammer

7.Small container to place all screws and clips so they don't get lost (Trust me on this)

**(B) Step 1 - Removing Rocker Covers**

1. Ensure vehicle engine is turned off (Obvious we know), out of gear and the handbrake is on. Preference is on a flat driveway as at some stage the vehicle will have to have the handbrake turned off and on again. Chock wheels if possible.

2. Remove rocker cover and all items across the top of the motor. If you are having difficulty with any of this stop now, refit everything up and take the vehicle to someone who knows what they are doing. It is a lot cheaper in the long run.

3. Get the crankshaft on top dead center on number one cylinder and ensure that the rocker gear is on top dead center number one, not number four cylinder.

4. Fit your degree wheel to the crankshaft and affix a marker to where zero degrees is on your crankshaft pulley. This may necessitate removal of your front pulley off your engine. Ensure you get the car on TDC number 1 before removing the pulley.



5. Once this is done (It is assumed at this point your new camshaft and cam gears are already fitted to the vehicle), we are now ready to find out where the timing of your camshaft is.

**(C) Step 2 - Working out where you are now - exhaust lobe**

1. Turn the motor over until number 1 cylinder exhaust lobe is at its highest lift point Example: When the exhaust valve is depressed the most. At this stage fit the magnetic base dial gauge to the top of the cylinder head, and set it up so that you are in the middle of its adjustment with 50% loading. Example: If you have four revolutions of movement, then set it so that you are on the 2nd revolution of movement.



2. Now turn the motor backwards half a revolution and zero your dial gauge again.

3. Turn your motor forwards until reading off the dial gauge, you have reached the maximum lift point / max depression on the exhaust valve.

4. You will note that there is a degree of movement, usually 10 degrees of where you can continue to turn the motor without the dial gauge moving. You can either work on the halfway point, or the start and finish of this movement, as long as you use the same reference point on all measuring.

5. Using whatever method described above, mark the position on your degree wheel that this max lift point is. Best to write it down on a piece of paper. It will be something like for example, 110 degrees BTDC etc.

**(C) Step 3 - Working out where you are now - Intake lobe**

1. Repeat the above method, but this time on number one cylinder perform it on the intake lobe.

2. Using whatever method described above, mark the position on your degree wheel that this max lift point is. Best to write it down on a piece of paper. It will be something like 120 degrees ATDC etc.

**(C) Step 4 - Working out the center line of your camshaft.**

1. Now you have your figures, and for ease of understanding let’s say that the max lift point of your Intake lobe is 120 degrees ATDC and the Exhaust lobe max lift point is 110 BTDC to save confusion.

2. To work out the centerline of your camshaft the formula is Exhaust Lobe Max lift point minus Intake Lobe Max Lift Point. This would then work out

110 Deg BTDC minus 120 Deg ATDC which would result in the camshaft center line being 10 Degrees ATDC. Therefore the camshaft is at this time running 10 degrees Advanced.

3. Now that you know where your camshaft center line is, it gets really easy.

**(C) Step 5 - Adjusting your camshaft**

1. Going on the principle that the camshaft is currently 10 degrees advanced and we want to set it to true zero, you firstly adjust the cam gear to move the camshaft the desired direction.

2. From here choosing either the intake or exhaust lobe position, repeat the finding of your max lift point. Mark the position again and see how far you have moved the camshaft. If you have moved it too much then whilst you are this point, adjust it to where you want it and check again.

3. Remember this is a circle so whatever amount of degrees you wish to move it, divide it by half. For example we want a 10 degree movement in total here. So that means we need to reposition the max lift point of the exhaust lobe to 115 degrees BTDC as this will then relocate the intake lobe to 115 degrees ATDC. I hope you can see how this works.

4. Once you have set the camshaft centerline to zero degrees, you can now choose to either leave it there, advance or retard your cam timing to whatever your desired position. We recommend once you have found the zero point, mark the cam gear so that you can go back to that anytime without having to do all this work again.

5. This can also be done without having any of the rocker gear fitted and reading directly off the camshaft to the same degree.

\*We hope this helps with the fitting and dialing of the camshaft into your engine. Note this method does not require any camshaft specifications, because you are working directly off the centerline of the camshaft, which allows you to do so easily without having to know any technical knowledge.

--------------------------------------------------------------------------------

**Found on the CORDIA Forum**

Not only do I always foolishly end up with orphan cars for which parts and even info are NLA, but I'm always modifying and trying to improve orphan engines that nobody modifies, let alone races. My modified orphan is an '87 Dodge Colt Vista (Mitsu Nimbus in Oz) with a rebuilt-by-me 2.0L SOHC non-turbo G63B.

Besides taking up less space in the motor-well than a 4-valve and/or turbo motor, my little 2-valve four should get decent torque in the lower rev-range I want to use, so I'm happy with a lower-tech engine than most of you would want. I'm trying to improve the cylinder-filling and residual-exhaust filling with a homemade 4-2-1 tube exhaust header. I've cleaned up the ports (the first thing an old 2-stroke racer does to any vehicle!), and got the cam reground with a hair more lift and duration. This rig came with two, count 'em, two catalytic converters; I got rid of the first, and am keeping the main cat for now, having checked that it's in good shape. Oh, the trouble-prone dual-EGR system is gone.

The factory computer-controlled Hitachi carb was unrebuildable, and I replaced it by adapting a Weber 32/36 DGV (Formula Ford carb) that's simpler and better. Since the simple computer was left with nothing to do, I tore it out one day, along with lots of associated wires and hoses, the happiest afternoon I've ever spent working on a car!! (computer, "Dave, what are you doing?"; me, "Don't worry, Hal."; computer, "Dave, will I dream?"; me, maniacally, "Dream? HAH HAH HAH HAH!!!!").

There's actually a question coming, but the guru that can answer it might want background. And others might enjoy reading about this goofy project.

The distributor in the carbureted version of this engine is a standard non-computerized unit with mechanical and vacuum advance. My vacuum advancer leaked, and is NLA. And I didn't want it anyway; with all the modifications I've made, the factory advance curves no longer are appropriate, and I'll have to come up with new optimal curves on my own. For a new vacuum advancer, I bought a Mr. Gasket adjustable advancer for a Chevy HEI dizzy. I knocked the stock advancer unit apart, saving the section that plugs into the dizzy. To that I brazed some plates to mount the Mr. Gasket advancer. The assembled combination looks like no dizzy you ever saw . . . the new advancer sticks out a mile, hilarious! But, installed in the sideways-mounted engine, the protruding advancer hangs vertically-down in an unused hole, out of the way, so it works out well.



Now I have to tune and time the critter. Stock timing specs for the original smog engine are as follows:

Initial timing: 8 degrees BTDC at 700rpm

Mechanical advance: 0 degrees at 1200rpm 12 degrees at 2800rpm max. 20 degrees at 6000rpm

Vacuum advance: max 28 degrees at 9 1/2" Hg 0 degrees at 2 1/2" Hg

(The original set-up used a ported-vacuum source for the vacuum advancer, which slightly helps ppm of unburned HC, and is undesirable in all other respects; I'll use manifold vacuum.)

And HERE is where I could use some educated input!! While I'll have to finalize my timing with road testing, I'd like to get closer to what the engine now needs than the above specs. l should say that I do not have access to a distributor machine that will check anything newer than a breaker-points dizzy, but I DO have a dial-back timing light, a vacuum gauge, a tachometer, and a stopwatch. My notion is that the factory max. total advance at idle of 36 degrees (8 initial plus 28 vacuum) is going to be a few degrees high. I have fabricated an adjustable travel-limiter on that Mr. Gasket advancer to take care of that. And having thus dealt with the maximum vacuum advance, the adjustable preload spring will let me move the vacuum advance curve around with an Allen wrench.

The mechanical/centrifugal advance is more trouble, and I think the factory spec is far from what I want, with the curve not coming all-in until 6000rpm. Usually modified engines have the mechanical advance all-in at somewhere around half of that. The 20 degree maximum might be pretty close, and can be moved one way or other with some effort. But what I need right now are some mech. advance SPRINGS, and you don't find an assortment of Mitsubishi (actually a Nippondenso dizzy) advance springs at your local auto parts store, speed shop, or even Mitsu dealer (Dodge dealers never heard of this car!). Like most mechanical dizzies, this one has one light and one heavy advance spring; since I want the curve to come in quicker, my first step is to find a second light spring to replace the heavy one.

Anybody still with me?? :) What I'd like from you is: 1) timing specs to shoot for based on your actual vast experience in tuning upgraded non-turbo G62B's :lol: ; 2) a factory timing curve for a higher-performance N.A. G63B than the Vista, preferably an Australia model without all the emissions stuff that comes on 'Merkin cars; 3) any light springs you don't need that fit these Denso dizzies!! :D

Q: Did anybody (a group) ever race the non-turbo G63B's anywhere (Aussies could have done something this weird; haven't I seen a couple of them on this site?)? And if so, is there an experienced tuner/engine-man/guru who knows it all?

I thank you for your kind attention and patience!!

--Smitty