

Overview:

The NA and Nb harnesses are fairly similar, but only the injector Clips are the same.

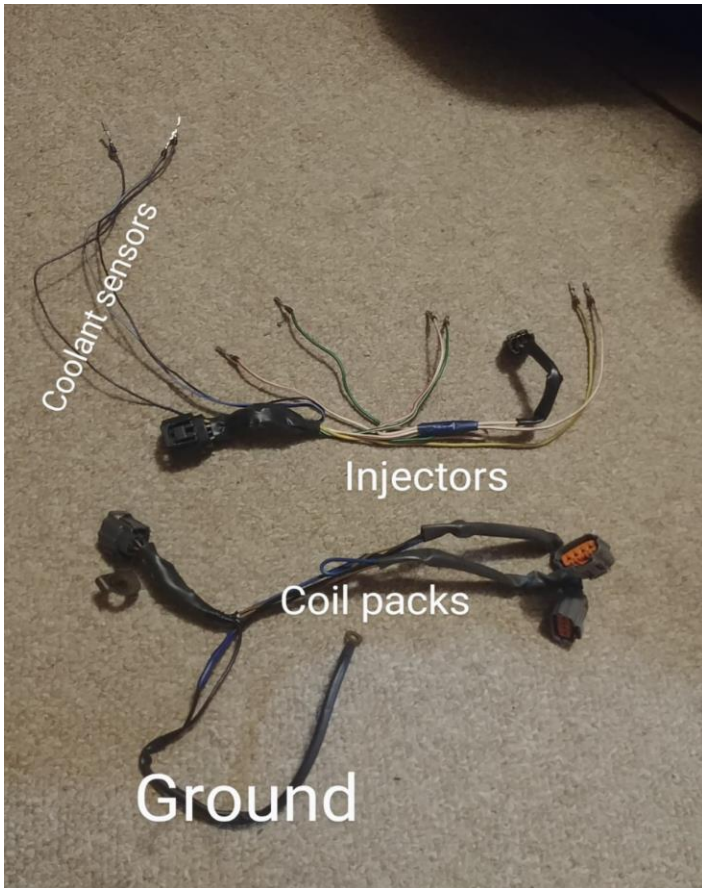
This guide is going to Cover converting an NA8 body, and engine harness to NB style sensors, as either the VVT engine needs them to work right, or they are an upgrade to the NA style.

the NA harness breaks into 3 parts,

1)the main wire looms on the body side of things, with connectors for the 2 sub harnesses, and clips for CAS and EGR.

2)an Injector and coolant temp sensor Sub loom, with a 8 pin connector

3)and A coil pack sub loom with a 4 pin connector



The NB harness, is different

I chose to keep the NA injector and coolant sensor loom,

and remake the coil pack Sub loom without the 4 pin intermediate connector.

As well as cutting off the clip for the NA CAS. This swap can be done reversibly but would require making a hand full of NA to NB adapter sub looms

Injectors:

NA 1.6 and 1.8 injectors fit in the head with the electrical plug facing up

NB 1.8 injectors fit in the head with the electrical plug **facing down**



This causes issues for the wiring clips that face upwards. The best way I saw to fix this, and the broken retaining locks on the injector clips, was to depin, and replace them.

Once the connectors are off it's much easier to rotate the wires 180° and reinstall them in the same order, into the new "upside down" clips.

The 3 Na coolant temp wires are on the NA injector sub loom as well.

Injector polarity doesn't matter so it's okay to reverse the side each pin is on in order to get them to fit best.

NA/NB injector lips: https://www.bmotorsports.com/shop/product_info.php/products_id/2261



Coolant Temp Sensor(s):

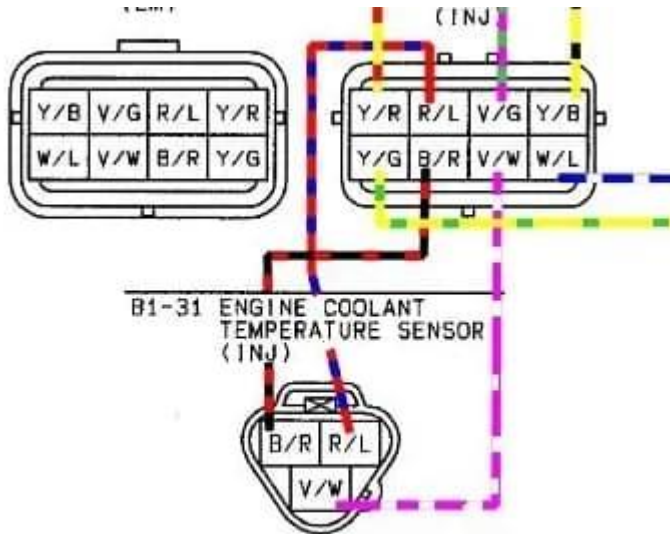
The NA uses 2 coolant temp sensors.

A 2 wire plug to the ecu, and a single wire clip that goes to the dashboard mounted temp gauge.

The NB sensor combines the 2 into a single 3 wire sensor.

Unfortunately, they use different styles of pins, so I cut and re-pinned all three wires for the new clip.

With the single wire sensor in the V/W pin, according to this diagram



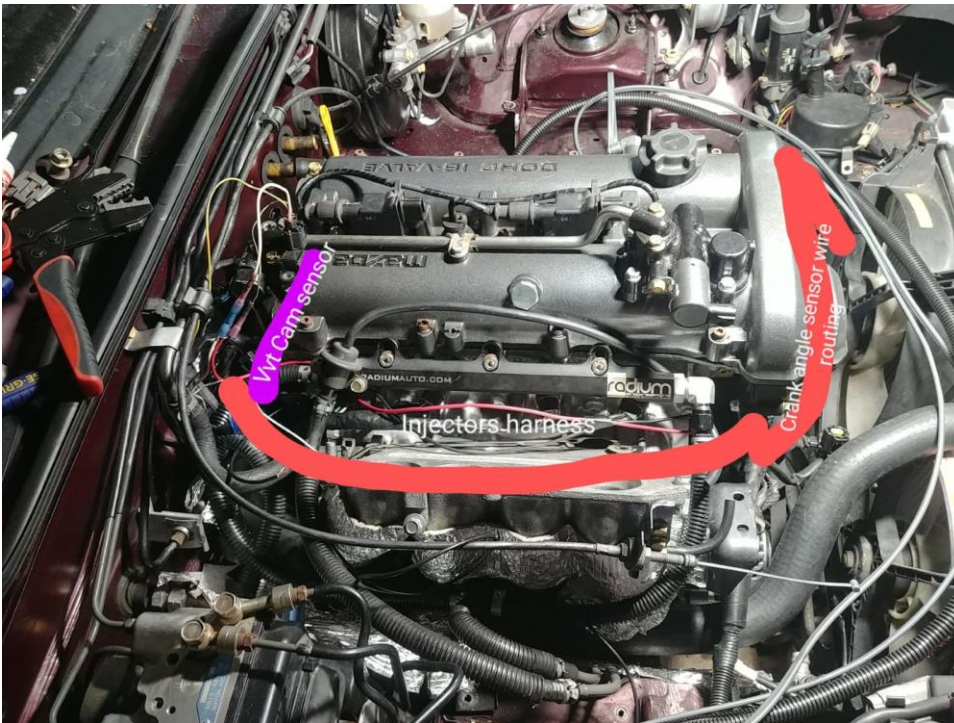
NB coolant sensor plug: https://www.bmotorsports.com/shop/product_info.php/products_id/4138

NA CAS to NB Cam & Crank sensor(s):

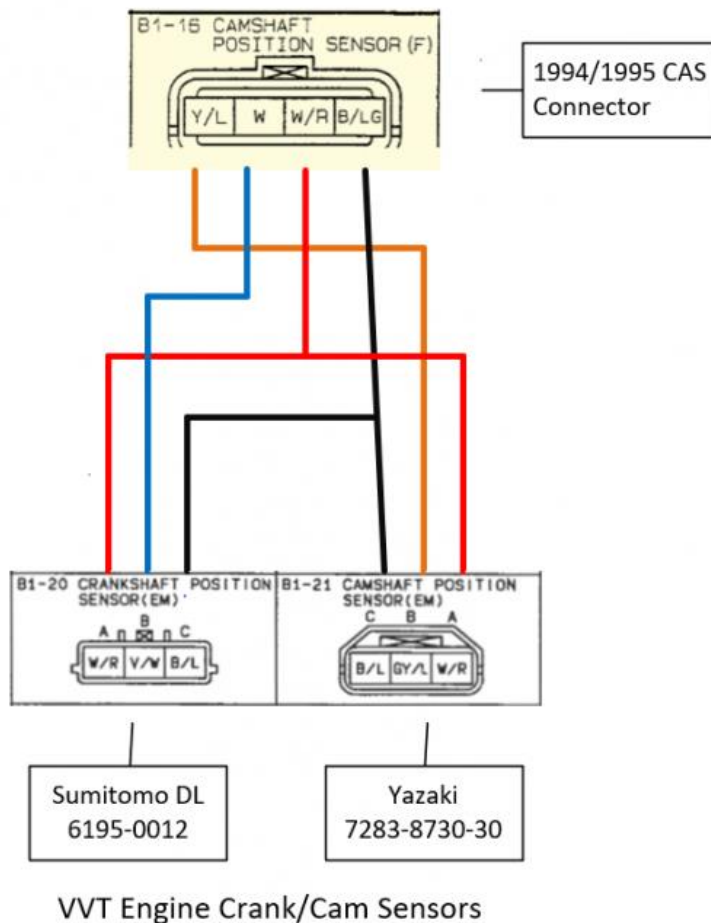
The NA CAS has both crank and cam signals generated from it, a great article here <http://www.rivercityroad.com/garage/cas.htm>.

I cut the connector off the NA body harness, the White wire needs extending, all the way down the injector harness, and around the front of the motor to the crank angle sensor connector.

As well as a power and ground wire.

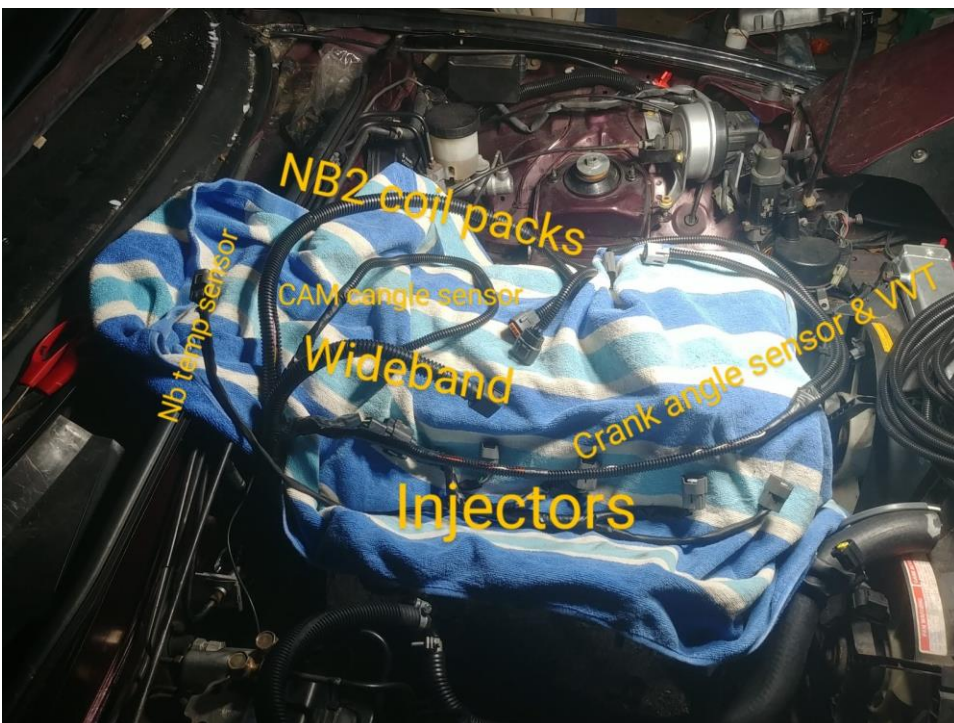


My NA cam position signal wire was long enough to reach the rear mounted VVT cam angle sensor, for a BP4W it would need to be extended and follow the injectors to the front. Both sensor power and ground wires can be Teed off the original CAS power and ground wires as shown.



NB Cam angle sensor: https://www.bmotorsports.com/shop/product_info.php/products_id/2256

NB Crank angle sensor: https://www.bmotorsports.com/shop/product_info.php/products_id/2077



Coil Packs: from the NA main harness there is a 4 pin connector to the coil pack.

1 power, 1 ground, 2 signal wires back to ecu.

I cut the connector off.

Crimped on power and ground extensions, each splitting with a tee, 1 power 1 ground per coil.

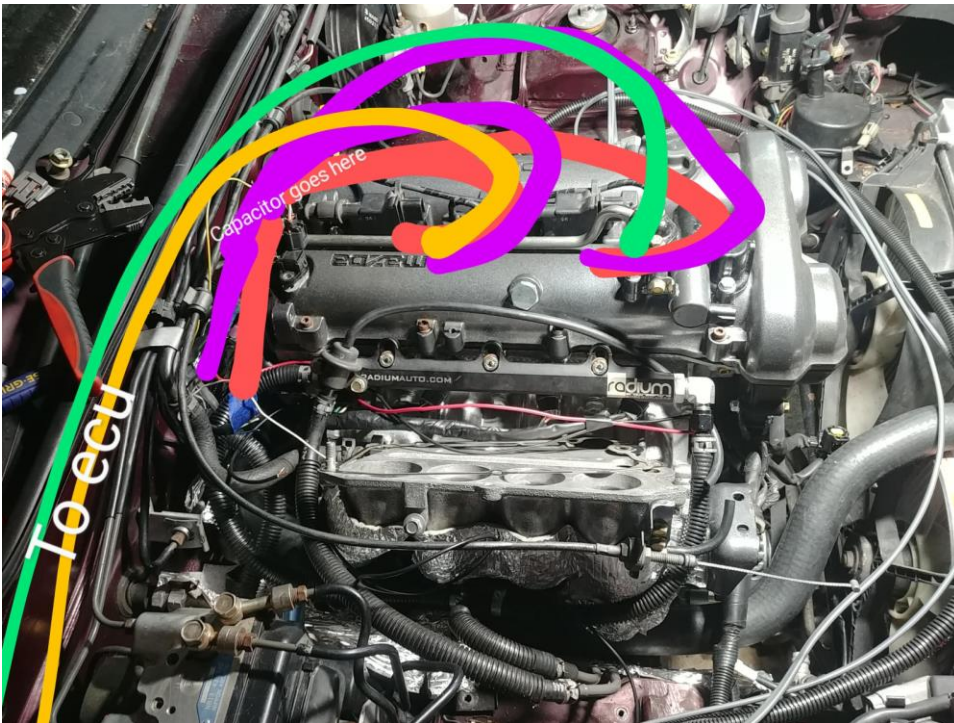
I also installed an aftermarket capacitor in line at the tee, bridging between the power and ground wires

Crimped in wire extensions for the 2 signal wires, one per VVT coil pack.

If making aftermarket coils on plugs

you have to tee in 2 more wires to the signal wires for batch,

or run 2 additional signal wires back to the ECU for sequential spark





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NA coil packs

Na pass-rad fan

NC knock

NB Capacitor

NA 02

NA coils

NA MAF

NA CAS

Nb knock sensor



NB VVT coil pack clips: https://www.bmotorsports.com/shop/product_info.php/products_id/2075

Wideband: the typical LSU 4.9 Wideband is a 6 pin connector.

It needs a 10 amp fuse on its 12v.

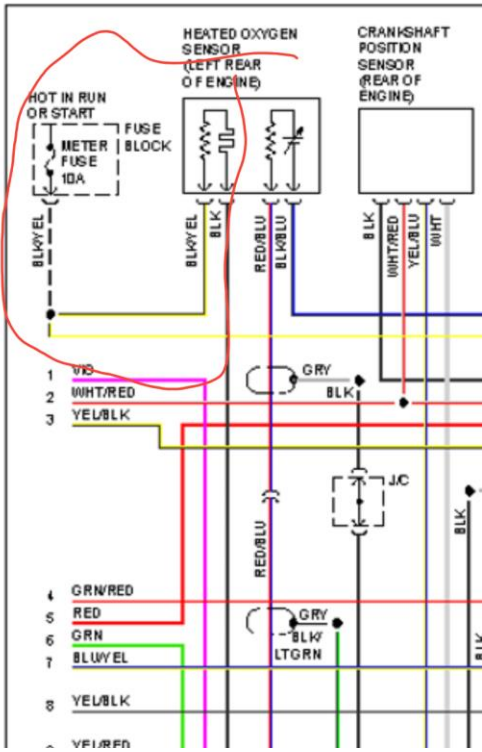
I cut the stock oxygen sensor connector off, extended and used its power wire, and stock fuse.

The rest of the 5 wires ran directly to the options port on my ECU.

If you have a gauge and controller, it would split, consult manufacture installation instructions

The only other note is to start with the wide band sensor screwed into your header or turbo downpipe first so you know how long to make the wires.

2C	WBO Heater -	LSU 4.9 Pin 3
2D	+12v	LSU 4.9 Pin 4
2E	WBO R Trim	LSU 4.9 Pin 5
2F	WBO Ip	LSU 4.9 Pin 1
2G	WBO Vs/Ip	LSU 4.9 Pin 2
2H	WBO Vs	LSU 4.9 Pin 6



Knock: I recommend using an NC miata knock sensor, as they are less prone to melting than the NB knock sensor. they do require a mounting stud to be made.

They may require a 45 or 90 degree adapter for the oil pressure sender.





VVT: For VVT there's only 2 wires. A signal wire that runs all the way back to the ecu.

And a 12v power wire that can be pulled from a few places in the engine bay.

Such as, injector harness, coil harness.

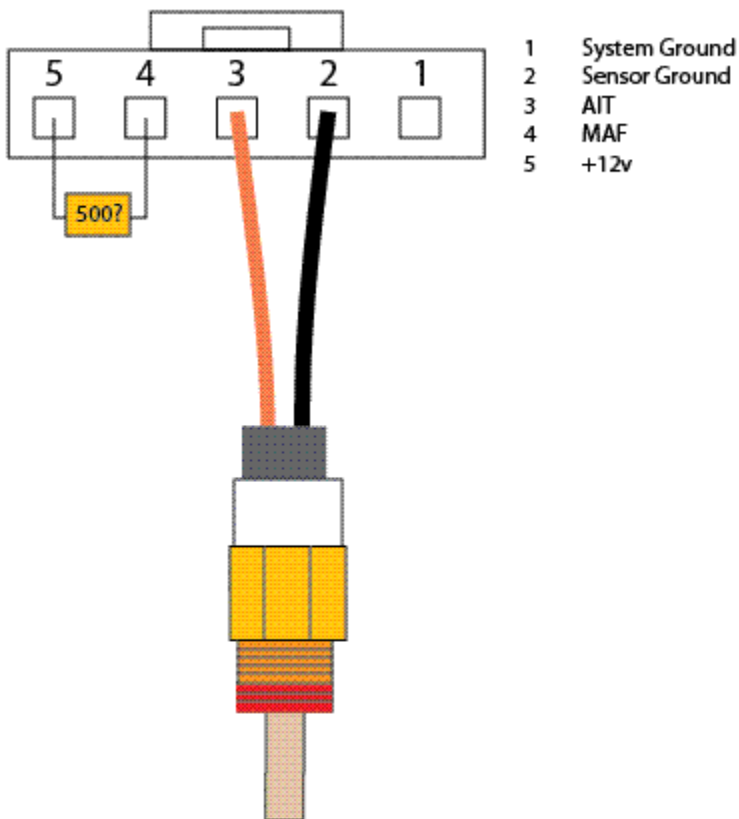
Egr plug, Mass airflow sensor plug.

https://www.bmotorsports.com/shop/product_info.php/products_id/1681

IAT: intake air temp is an easy one with only 2 wires for most aftermarket intake air temp sensors.

Only tricky part is making it long enough. I made mine long enough that it can reach all the way down in front of the radiator, where the end tank of an intercooler might go.

Can't comment if it needs a resistor in pin 4 & 5



Idle Air Valve:

possibly the easiest job, the Na8 and NB idle air valve are similar electrically, simply depin the NA clip and install the NB clip, pins are the same.

https://www.bmotorsports.com/shop/product_info.php/products_id/2215

Throttle Position Sensor:

to save wiring I'd recommend using an NA8 TPS, though again the NB is similar enough it can just be depinned and a new NB clip added.

Same instructions for most aftermarket throttle position sensors as well.

Chassis/ ECU Side: be sure to run additional wires extra-long for later trimming. I followed the stock wire loom path, but drilled an extra hole in the firewall and added a rubber boot next to where the stock wires pass through the firewall.

It's a good idea to label wires if color codes are not being strictly followed.

For BBM ecus you can follow the pinout below and on https://rusefi.com/docs/pinouts/hellen/hellen64_miataNA6_94/

	A	B	C	D
1	Pin	Type	Comments	
2	2A	Ground		tee in 3x for pins 2L 2M 2N?
3	2B	+5v		tee in 3x for pins 2L 2M 2N?
4	2C	WBO Heater -	LSU 4.9 Pin 3	
5	2D	+12v	LSU 4.9 Pin 4	power vvt? unused if 12v from meter fuse ?
6	2E	WBO R Trim	LSU 4.9 Pin 5	
7	2F	WBO Ip	LSU 4.9 Pin 1	
8	2G	WBO Vs/Ip	LSU 4.9 Pin 2	
9	2H	WBO Vs	LSU 4.9 Pin 6	
10	2I	VVT Output	signal wire	2 wire valve needs 12v
11	2J	Boost Control Output	signal wire,	2 wire valve needs 12v
12	2K	Ground		tee in 3x for pins 2L 2M 2N?
13	2L	Digital Input	Flex Sensor	3 wire sensor, needs 5v and signal ground
14	2M	Pressure Sensor		3 wire sensor, needs 5v and signal ground
15	2N	Temperature Sensor		2 wire sensor needs 5v
16	2O	Ground		
17	2P	Knock Sensor Input		



Grounds: there are 2 kinds of grounds, signal ground, and chassis ground

EGR: f*ck EGR, all my homies hate EGR,

I cut the clip off, and used the 12V to power my VVT solenoid.

Can't confirm if they are different between NA or NB, if you live somewhere it's required, either same de pin process, or use the NA EGR valve

Starter: you can use either NA or NB starter, the connections are the same.

the NB one is slightly lighter/ smaller

Alternator: You **must** use an NA8 alternator, as it is internally regulated.

unless you change the circuit and parameters in the ecu to regulate the NB alternator

Oil Pressure sender: any year oil pressure sender can work, the na8 dashboard gauge is just an on off gauge.

You can retro fit a 1.6 gauge and sender if you want more accurate oil pressure.

An electronic sensor to a separate gauge is also an option.

Extras:

https://raw.githubusercontent.com/wiki/rusefi/rusefi/Images/1994_miata_1.8_3.png?fbclid=IwAR3aiJafWyJ3HYj08vMkFHpf0ENI0mKqEE5-n34ZqLjXDL0MjJCNF-YRslQ

https://raw.githubusercontent.com/wiki/rusefi/rusefi/OEM-Docs/Mazda/2003_Miata/Mazda_miata_2003.png?fbclid=IwAR1jYFJQPvtDrl8wtsBoViii_tGWLgO2_KZD4t2ofXkctmGaD9fv2wERCBk

<https://www.miataturbo.net/engine-performance-56/how-wire-vvt-engine-na-65172/>

<https://www.thecarpassionchannel.com/vvt-wiring>

<http://www.rivercityroad.com/garage/cas.htm>

<https://www.bmotorsports.com/shop/static.php/post/miata>

Phrasing:

Clips: female electrical terminal that “clips” onto male sensor terminal

Connector: male or female electrical harness quick disconnect

Pins: crimped metal connections around the wire that feed into electrical clips and connectors

CAS: typically, NA style cam angle sensor

ECU: engine control unit, the car's computer

TPS: throttle position sensor

IACV: Idle air control valve

IAT: intake air temperature

EGR: exhaust gas recirculation.

VVT: Variable valve timing, For wiring purposes, specifically the VVT Solenoid