5-0 IGNITE SR20 24-1 CAM TRIGGER V3 [MAX] INSTALLATION MANUAL

This installation manual is applicable to the following engine;

- Nissan SR20 RWD VARIANTS (S13, S14 & S15)

Please read this installation manual carefully prior to installing the product.

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If in doubt, seek professional help.

For further information, visit www.50ignite.com/terms-and-conditions/

PREFACE

Thank you for purchasing 5-0 Ignite SR20 cam trigger kit. We have done all the hard work to ensure that your installation is a breeze and clean. Your kit should include the following items;

- 1x Cam Trigger Sensor
- 1x 24-1 Tooth Cam Trigger Wheel
- 3x Trigger Wheel Shims
- 2x M8x1.25 – 20mm Class 12.9 Socket Head Cap Bolts
- 2x M8 Spring Washers
- 1x M14x1.5 – 40mm Class 10.9/12.9 Hex Head Bolt
- 1x M14 Heavy Duty Washer
- 1x 4 Pin CAS 'Grey' Connector Set

Replacement O-ring part number: N70-118 (BS118, 0.862"x 0.103") purchasable anywhere.

INFORMATION AND LIMITATIONS

Installation of this kit requires moderate level of mechanical skills and experience due to the requirement of timing component removal/installation and calibration of the vehicle's ECU.

This kit will require a modern/capable STANDALONE ECU (such as Haltech Elite/Nexus, Link G4+/G4X/etc, Motec, Emtron and etc.) that allows you to set the trigger type (multitooth/missing), trigger edge and trigger angle. This guide covers the basic trigger settings for Haltech Elite/Nexus and Link G4+/G4X. <u>For all other ECUs, please consult with your ECU manufacturer.</u>

Fastening of bolts (i.e timing chain tensioner, cam sprocket, cam pulley bolt etc.) shall follow manufacturer's recommended specifications.

PROCEDURE

1. Remove existing ignition coils, valve cover and the OEM CAS.

2. Set the engine to TDC (guide can be found in google or FSM) and mark a position on the chain relative to the cam sprocket.

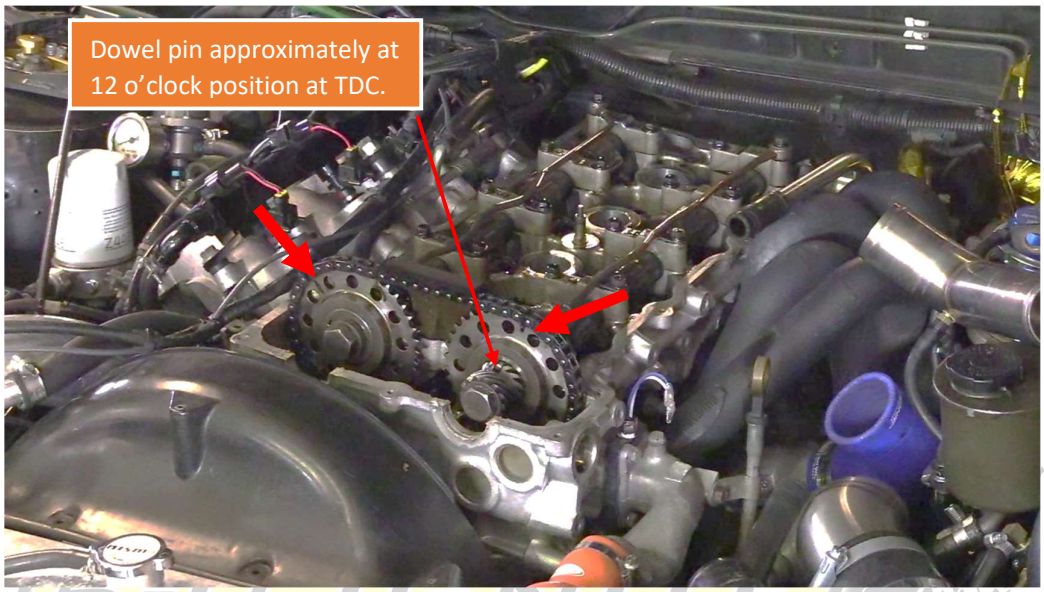

Figure 1 - Set the Engine to TDC

3. **Turn the crank counter clockwise by a small amount to release tension on the timing chain.**

In this guide, we will be performing the short-cut method in removing the CAS gear with the help of a 2nd person. If you are uncomfortable with this method, proceed with removing the timing chain tensioner and the exhaust cam sprocket as per Nissan's FSM.

4. Using 1" spanner, 24mm socket and a breaker bar, loosen the exhaust cam sprocket bolt. **DO NOT USE an impact wrench**.

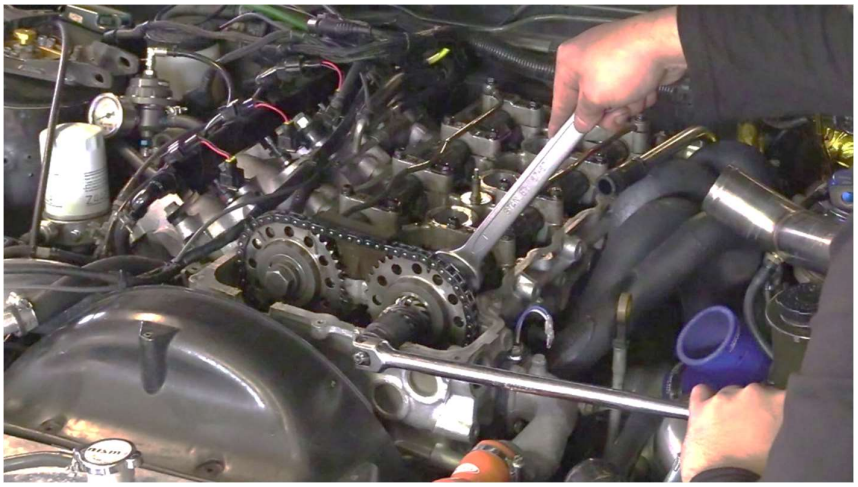

Figure 2 - Loosen the Exhaust Cam Sprocket Bolt

5. With the help of 2nd person, hold the exhaust cam sprocket in place FIRMLY whilst you remove the cam sprocket bolt.

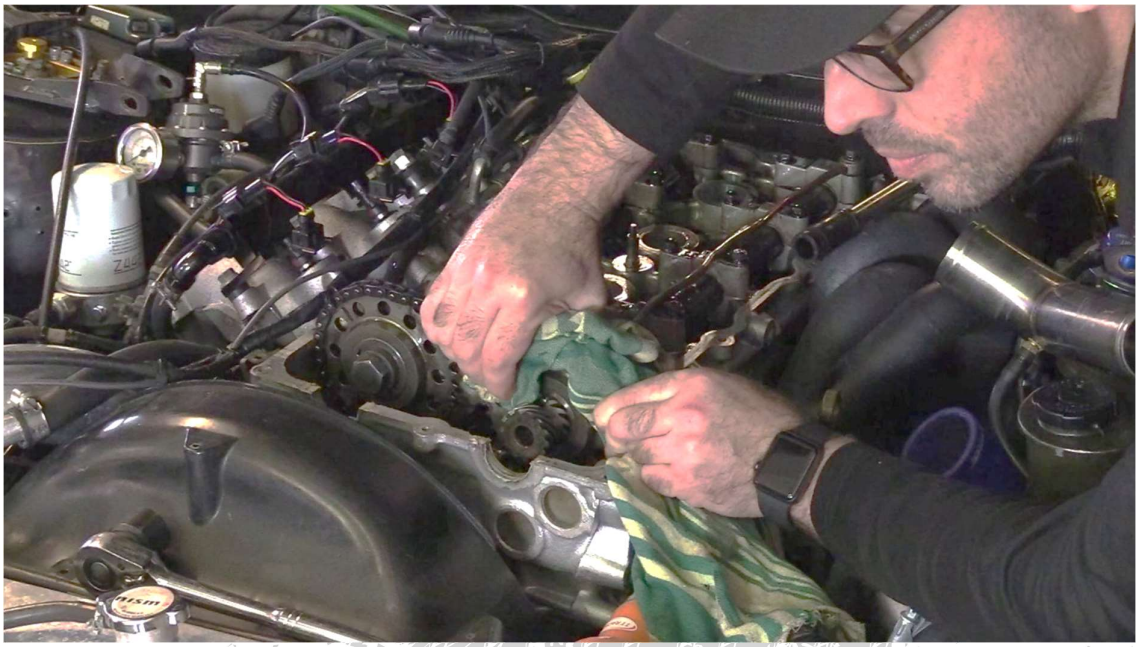

Figure 3 - Remove the Exhaust Cam Sprocket Bolt

6. With the help of 2nd person in place holding the exhaust cam sprocket firmly, use a hammer and gently tap the CAS gear repeatedly at 9, 12 and 3 o'clock positions until it is removed from the cam sprocket.

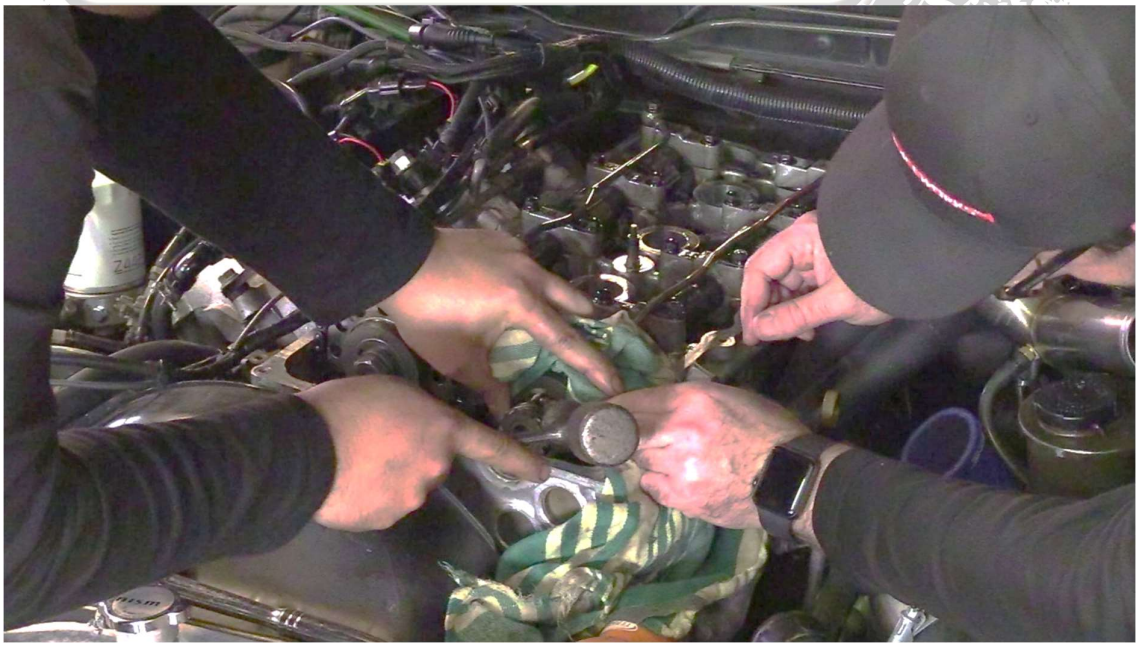

Figure 4 - Remove the CAS Gear

Figure 5 - CAS Gear Removed, 2nd Person Holding the Sprocket Firmly

7. Using the supplied bolt and washer (flat side of the washer facing trigger wheel side), trial install the trigger wheel **WITHOUT** any shims and the sensor, ensuring all items are bolted down. Check the sensor air gap using flat blade feeler gauge.

   For the purpose of this guide, the dimple on the trigger wheel with yellow marker is the default position and should be at 12 o'clock position at TDC. There are 6 slots available to give 6 possible configurations of the trigger wheel position at TDC depending on your ECU requirement (i.e. ECU master has limited TDC offset angle).

   The nominal sensor air gap is to be between 0.4-0.8mm. Install shim(s) behind the trigger wheel if necessary. Each shim is 0.6mm thick. **TIP: Dab a small amount of grease between the shim and the trigger wheel to retain the shim in place for easier install. Sensor gap will need to be re-checked if you made changes to the camshaft or cam gear, therefore, keep your remaining shims secured for future use.**

   Once the sensor air gap has been confirmed, apply medium strength thread locker to the bolt for final installation. Using 21mm Socket and 1" spanner, torque this bolt to 140Nm. **Ensure that your timing mark has not moved!**

   Note: The trigger wheel should fit snug into the cam gear with minimal side-side play.

Figure 6 – Shim Placement

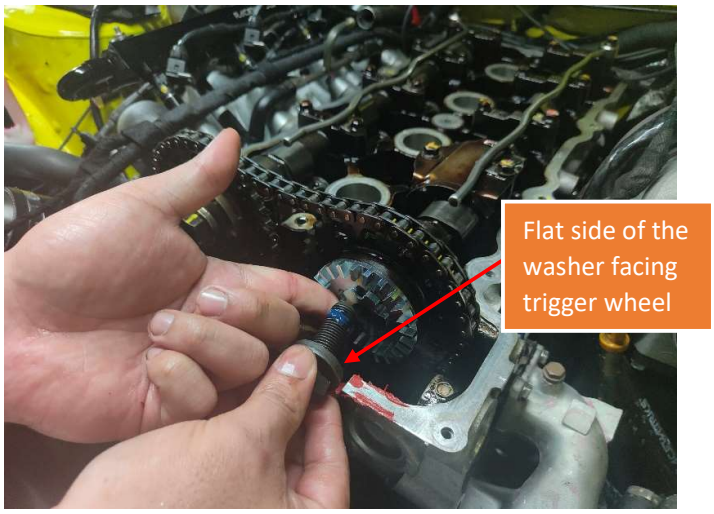

Figure 7 – Apply Medium Loctite On The Thread

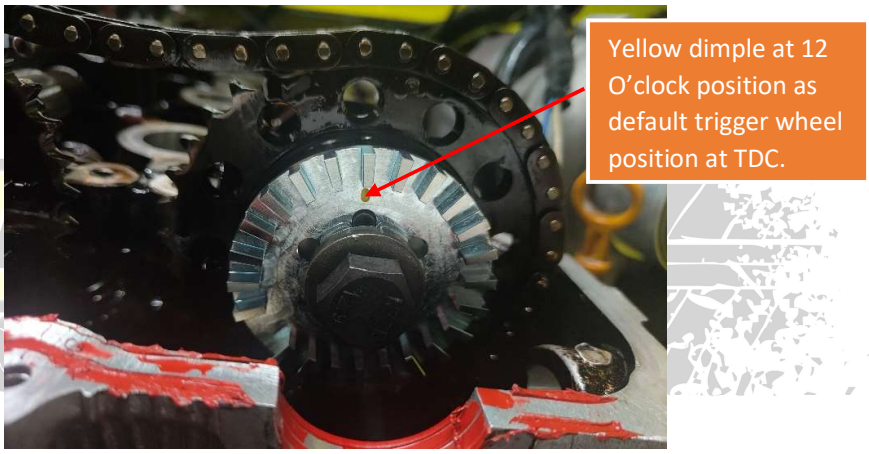

Figure 8 - Trigger Wheel Installed

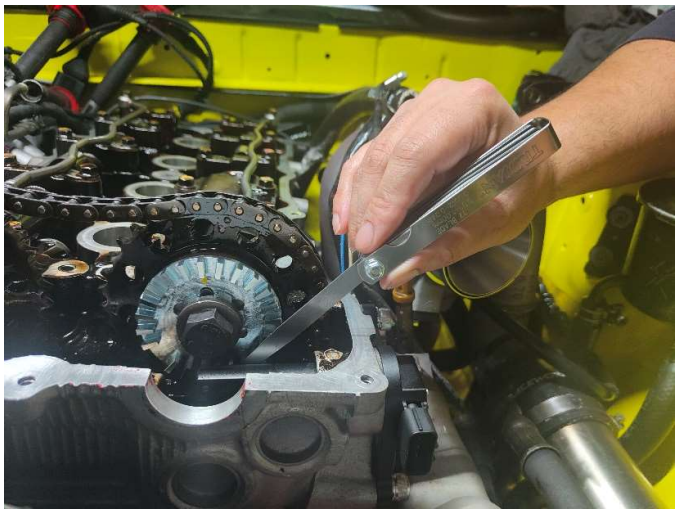

Figure 9 – Check Sensor Air Gap

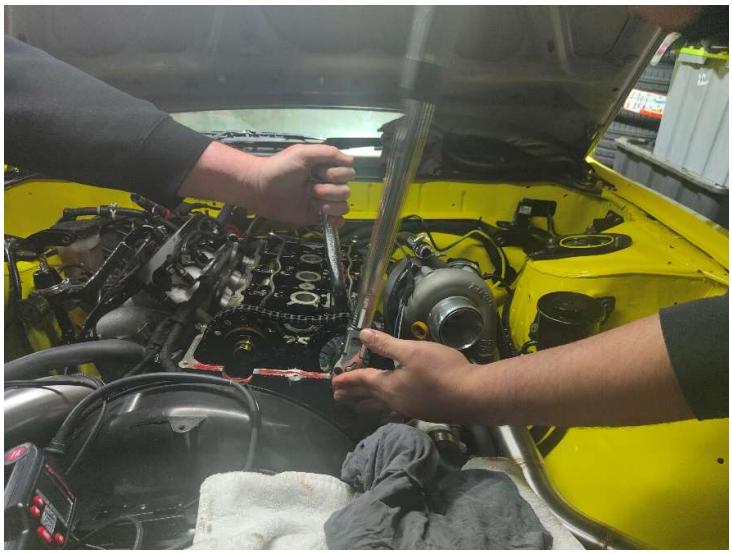

Figure 10 – Torque Cam Bolt To Spec

8. CHECK that there is a gap between the dowel pin and the washer. Some aftermarket cam did not press the dowel pin deep enough which you will need to tap in or grind shorter.

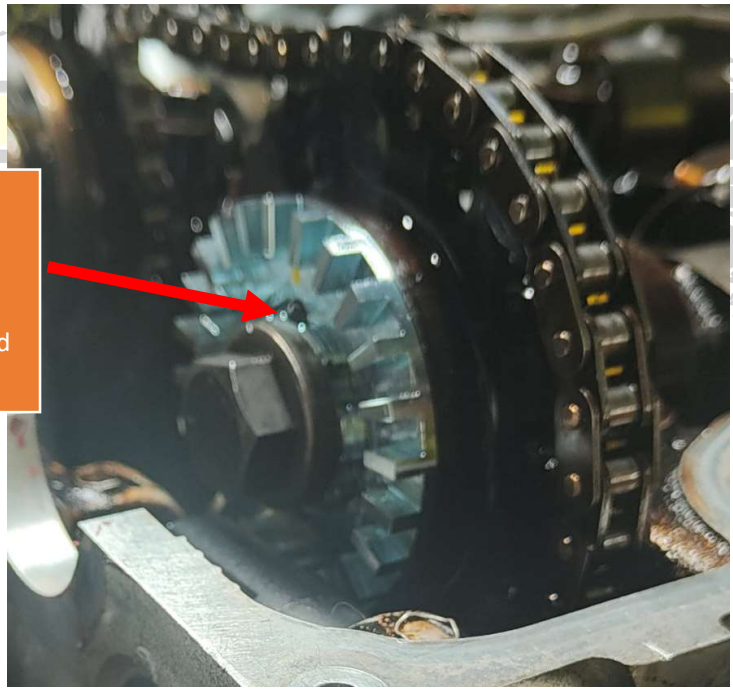

Figure 11 - Check Dowel Pin Gap

9. Smear a small amount of rubber grease onto the trigger sensor O-ring and slide the sensor in carefully. Screw in the bolts using spring washers provided. Spring washer **MUST BE USED** to provide ground contact to the cylinder head.

10. Hardware installation is now complete. Assemble everything back together.

It is highly recommended to run a regulated power source to the cam trigger sensor. The +5V/8V/12V power output from the ECU is normally used. Making a new harness for the trigger sensor to ECU using shielded wires is also recommended to replace the crusty 30-year-old wiring.

Some ECUs will require you to swap the two trigger wires to output the right signals into the ECU. Refer to the troubleshooting section and figure 15.

DO NOT PERFORM THESE ECU SETTINGS IF YOU ARE NOT EXPERIENCED OR HAVE A GOOD UNDERSTANDING, OTHERWISE, ENGINE DAMAGE MAY OCCUR. If in doubt, seek assistance from your ECU manufacturer or your tuner.

At this stage, you are now ready to configure your ECU.

11. Connect the ECU to your laptop and configure these settings

<u>General settings for a variety of ECUs</u>

a. Trigger edge: Falling

Note: The sensor signal pull to ground when a tooth is present, VCC when not near a tooth.

b. Pull up resistor: <u>ENABLED</u>
c. Trigger type: Multi-tooth/Missing
d. Tooth position: On Cam
e. Tooth on cam: 24
f. Missing tooth: 1
g. Cam sensor type: Hall Effect
h. Trigger offset angle: Set using the timing light with timing lock on.
i. Trigger filter: 0 or 1

FOR ECU SETTINGS NOT PRESENTED IN THIS GUIDE: ASK YOUR ECU MANUFACTURER OR TUNER FOR ASSISTANCE.

Haltech Elite/Nexus (ESP/NSP)

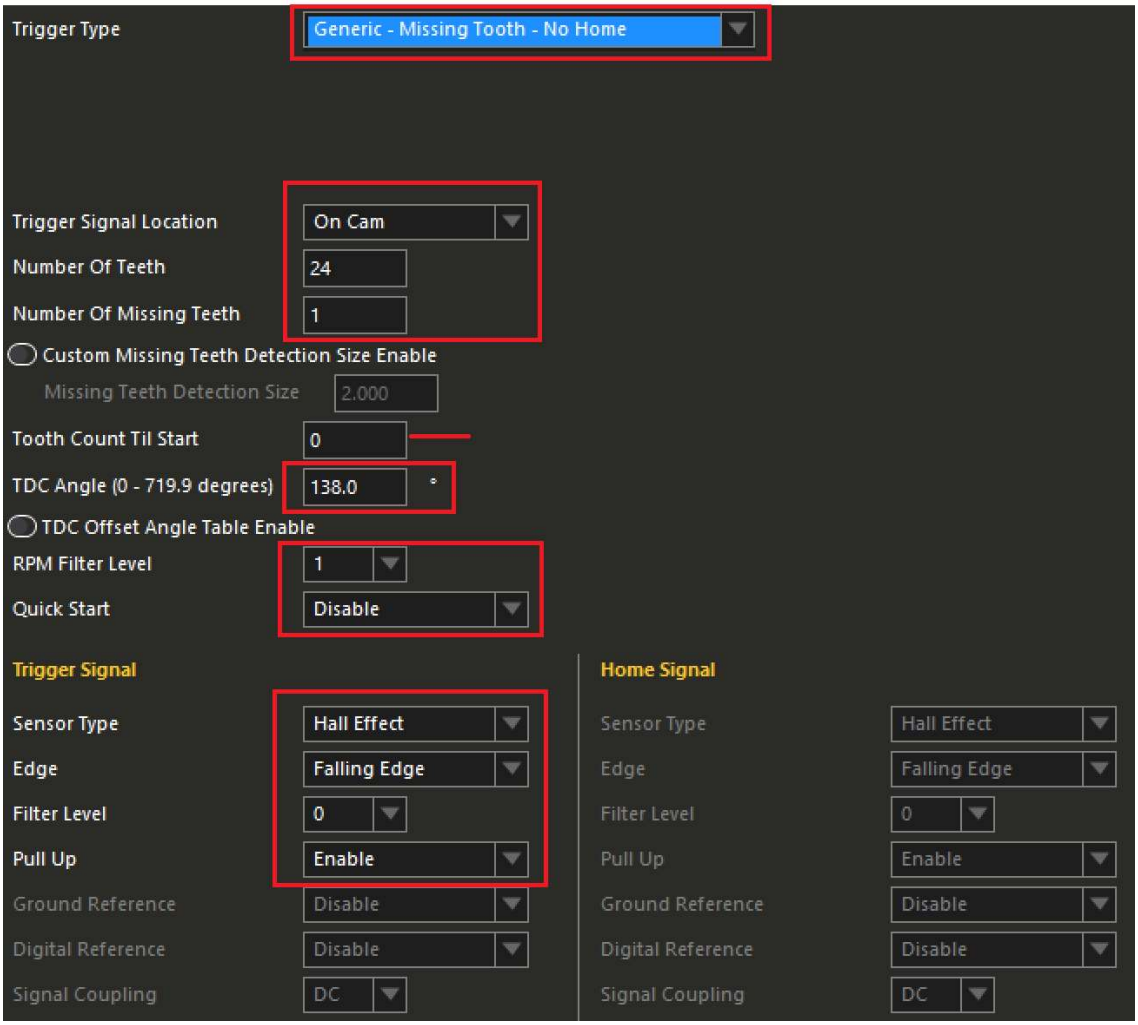

Figure 12 - Haltech Elite/Nexus Configuration

-> Perform timing lock and adjust TDC angle. Use COP extension lead for reliable signal to latch your timing light onto. Do not rely on the factory wire loop or attempt to pick up signal from the ignition wiring. Ensure battery is charged otherwise weak ignition output will not trigger the timing light.

Note: 'Tooth Count Til Start' can be configured to a high number (i.e 24 or 25) to prevent the reporting of 'trigger signal error' DTC during cranking as the ECU attempts to synchronise. This allows the trigger to undergo a full cranking cycle before the ECU attempts to synchronise.

Link G4/G4+/G4X/Other (SR20)

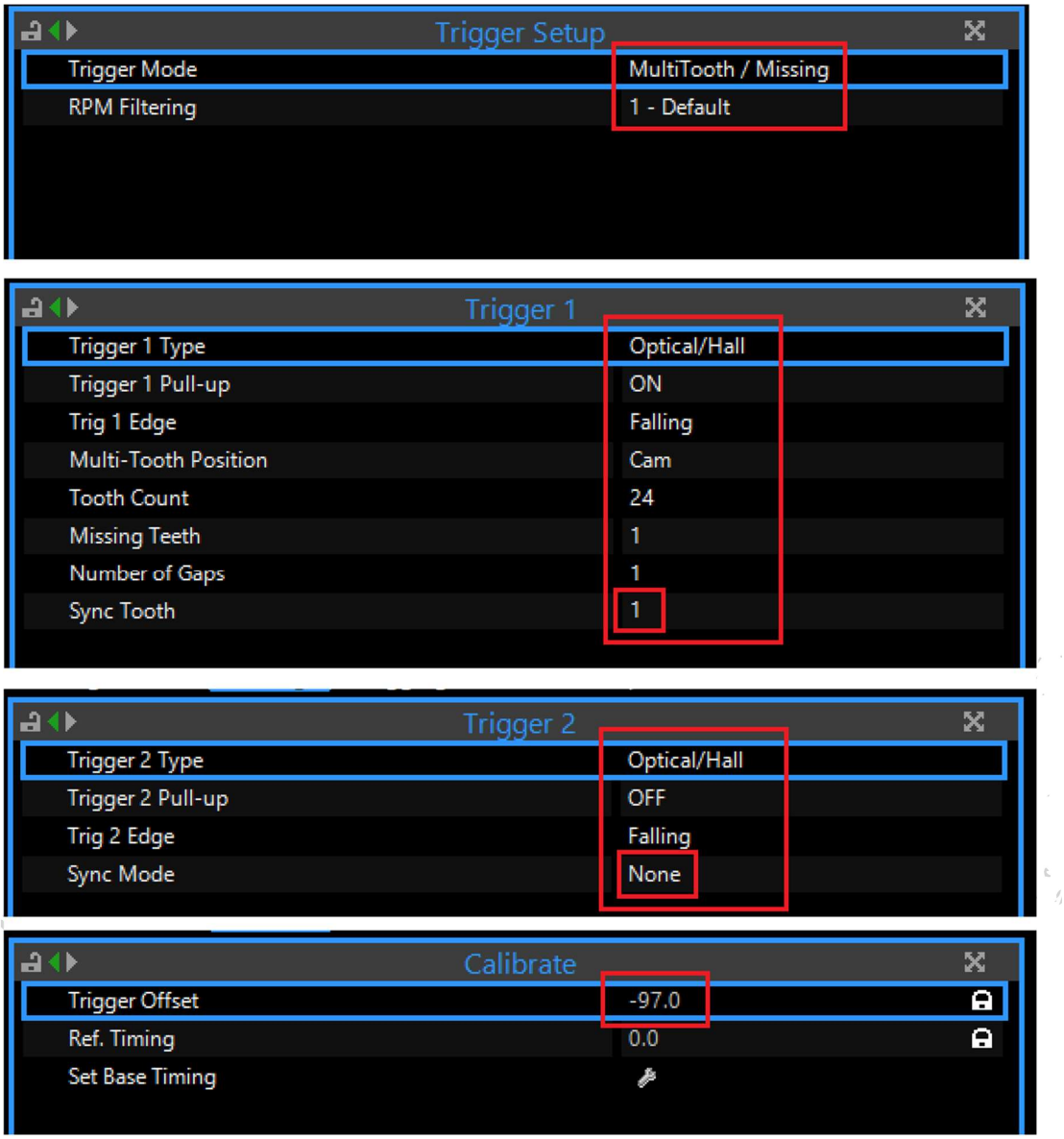

Figure 13 - Link ECU Main Trigger Setup

-> Perform timing lock and adjust TDC angle. Use COP extension lead for reliable signal to latch your timing light onto. Do not rely on the factory wire loop or attempt to pick up signal from the ignition wiring. Ensure battery is charged otherwise weak ignition output will not trigger the timing light.

The TDC (offset) angle above are for a starting reference point only as it may be affected by head or block machining, head gasket thickness, camshafts or any other variable that may alter camshaft position. For some brand of ECU such as Haltech platinum sport, TDC angle must be set higher than the maximum ignition timing that you intend to run i.e. if your TDC angle is 30 degrees, your engine will not run an ignition timing greater than 30 degrees even if you set it at 40 degrees on the timing table. In that circumstance, you need to adjust the trigger wheel position from one of the other 6 available slots and reset the trigger TDC angle to match.

12. Enable timing lock (i.e. at 0 or 15°) and disable the injectors.

13. With a timing light connected to CYL #1 COP extension lead, crank the engine. Adjust the 'TDC' angle until the crank timing matches the timing lock figure.

14. Once all parameters are satisfactorily configured, enable the injectors and start the engine.

15. With the engine idling and timing lock still enabled, double check that the timing is still synchronised with the timing lock. Re-adjustment is usually required, where the previously set TDC angle, was set at lower cranking speed where the timing light may not perform accurately.

16. **Once all set, disable the timing lock**.

Figure 14 – 5-0 Ignite SR Cam Trigger V3 Sensor Pinout

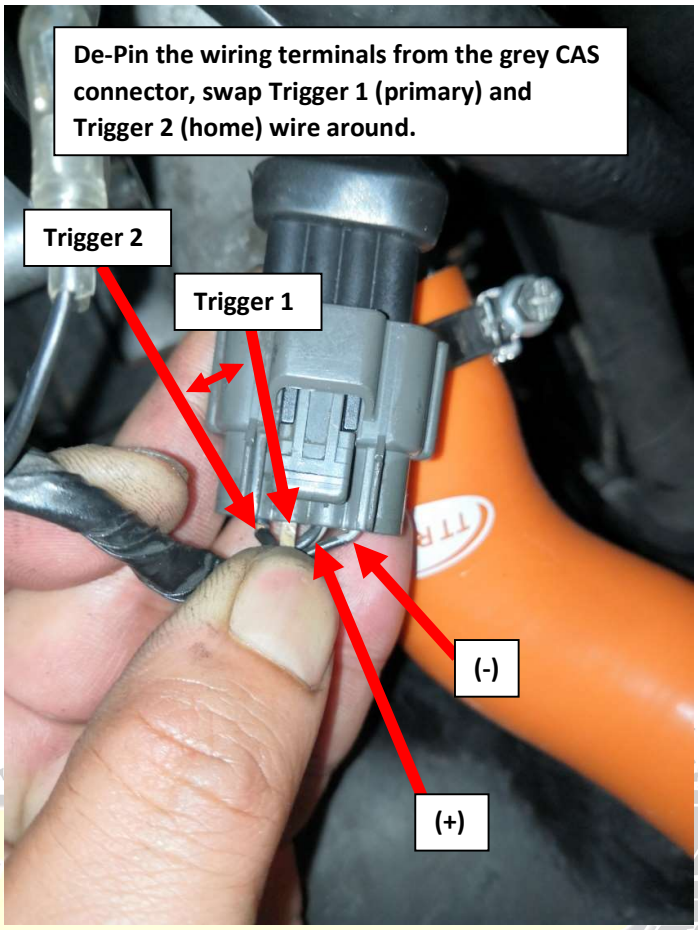

Figure 15 - Swapping Trigger Wires Around (Required on Some ECUs)

It is imperative that the VCC and ground terminal polarity are checked as per the image above before powering up the sensor. All sensor undergoes stringent testing and physical recorded operation check prior to dispatch. No warranty is given to the sensor due to damage from electrical faults.

TROUBLESHOOTING

PROBLEM	APPROACH
No signal output from the sensors.	• Check if wiring is correct. • Ensure trigger sensor gap is set as per step 7. • Check the VCC and ground connection to the sensor. • Swap the 120° and the 1° sensor wiring (trigger 1 and trigger 2) on the 4-pin grey CAS connector, **refer to figure 15.**
Engine misfires intermittently/trigger error	• Check trigger signal using ECU's in-built or external oscilloscope to verify trigger pattern and tooth count. • Check for excessive exhaust camshaft axial play, if beyond factory allowance, using a dial indicator. Factory camshaft axial end play limit is 0.20mm. • Ensure trigger sensor gap is set as per step 7. • Check for noisy signal using oscilloscope, run new shielded wiring to ECU. **Note:** If using an unregulated power supply, faulty charging circuit and extreme voltage spikes will damage the sensor!

CONCLUSION

Installation is now complete. Cam trigger kit on SR20 reduces ignition timing drift by significant amount in comparison to OEM CAS or any trigger disc replacement. Benefits includes tuner's confidence in maximising ignition timing whilst keeping consistent safety margin.