



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

This installation guide is applicable to the following engine;

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

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



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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
- 5x Trigger Wheel Shims (0.3mm thick each)
- 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 elsewhere.



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. For all other ECUs, please consult with your ECU manufacturer.

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.

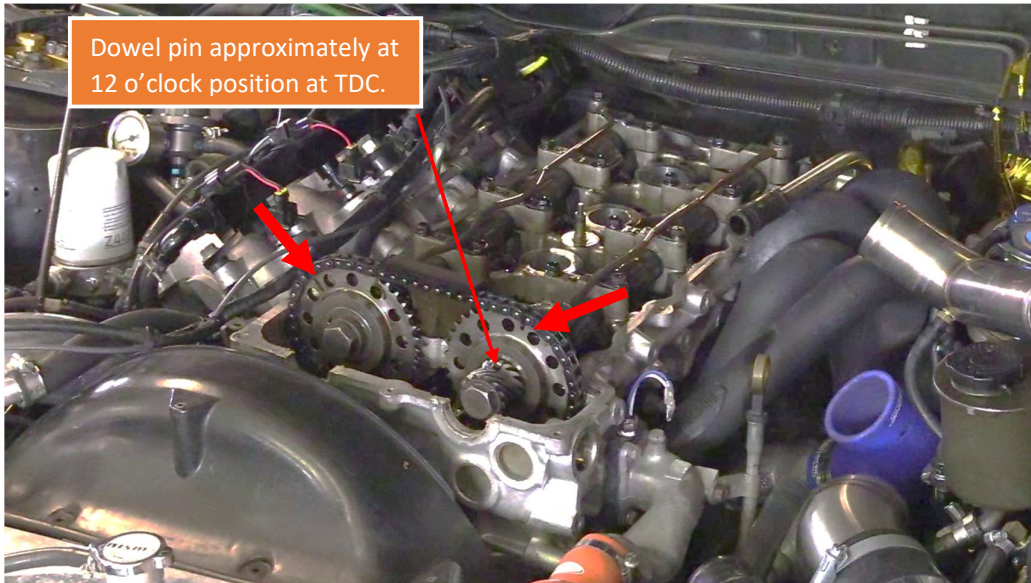


Figure 1 - Set the Engine to TDC

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.**

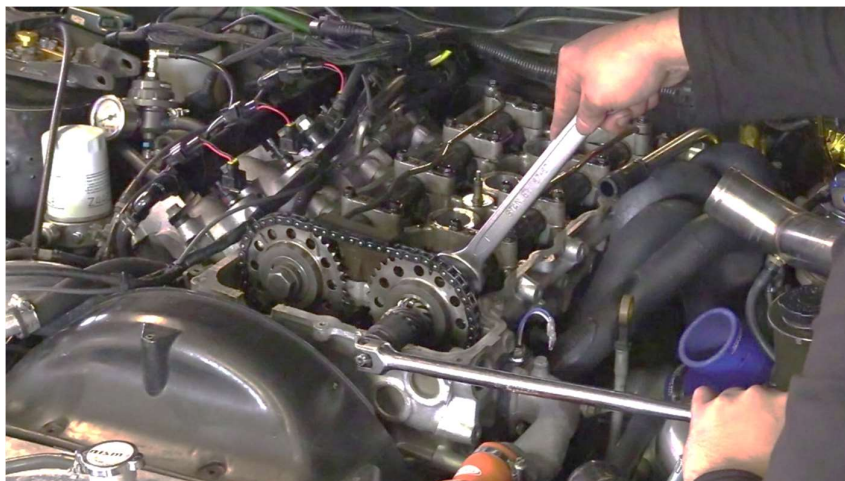


Figure 2 - Loosen the Exhaust Cam Sprocket Bolt

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.

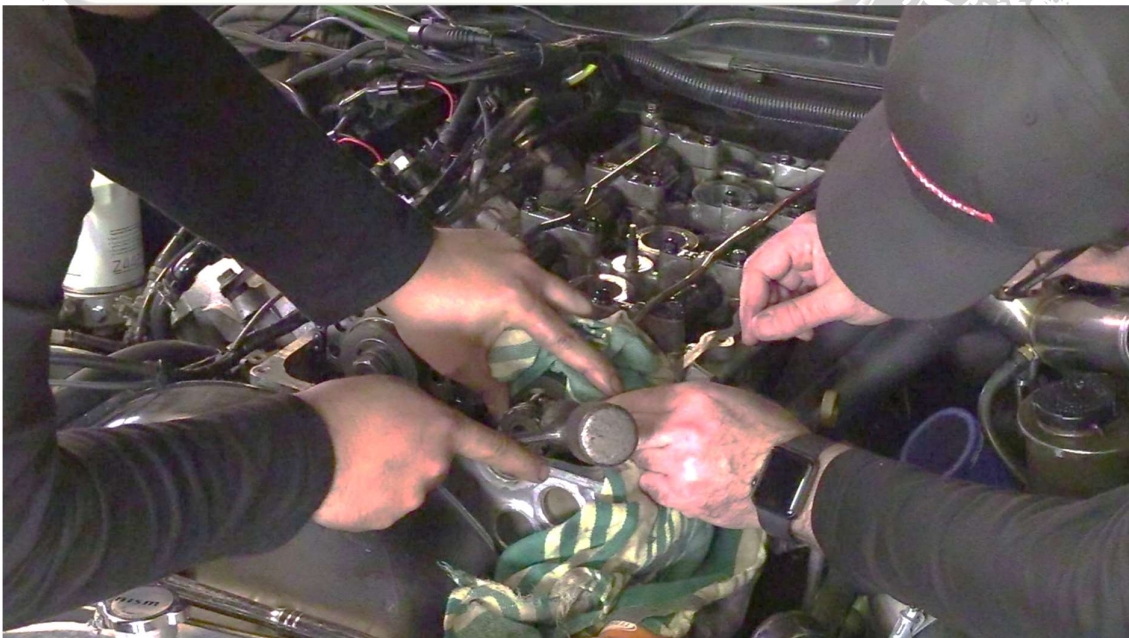


Figure 4 - Remove the CAS Gear



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 0.6-0.9mm. Install shim(s) behind the trigger wheel if necessary. Each shim is 0.3mm 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

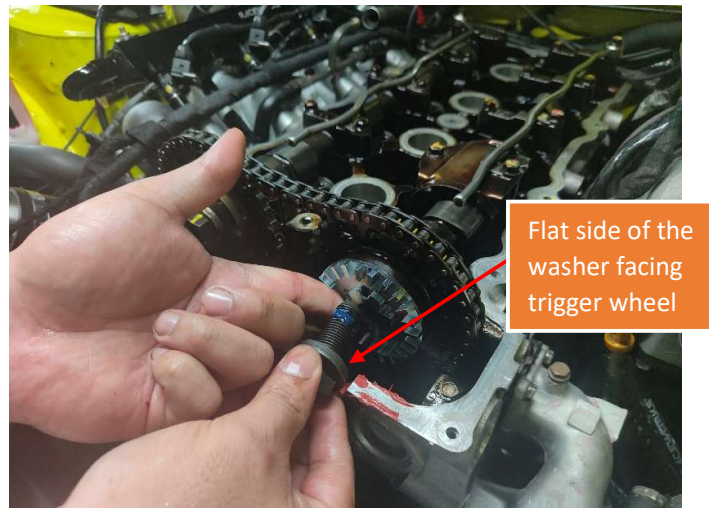


Figure 7 – Apply Medium Loctite On The Thread

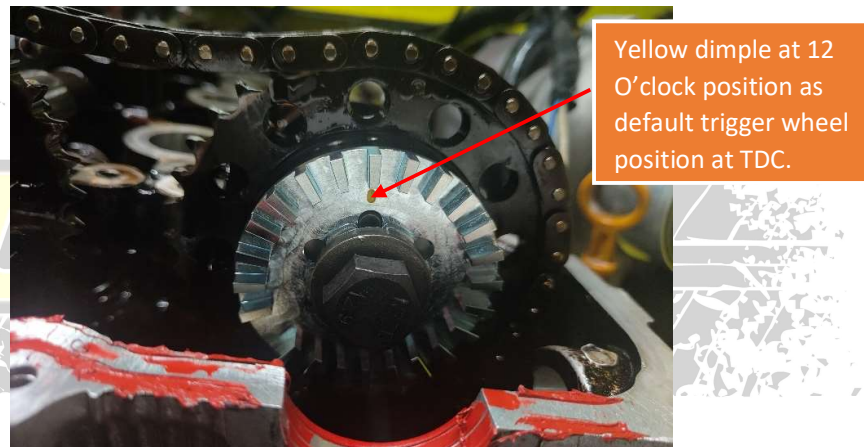


Figure 8 - Trigger Wheel Installed



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.

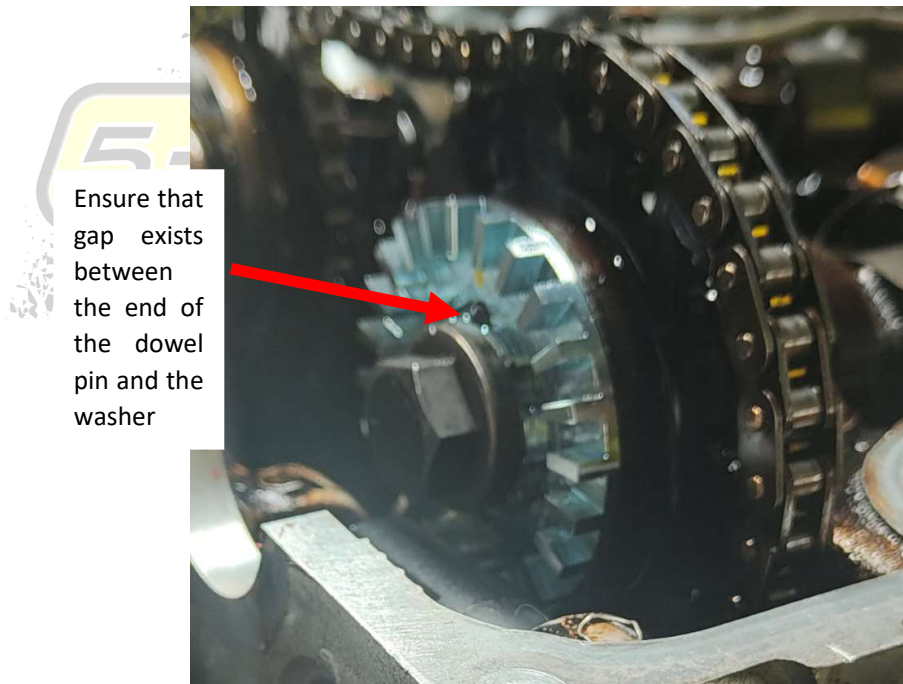


Figure 11 - Check Dowel Pin Gap

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 and perform the wiring. The wiring pinout is on figure 15 of this installation guide.

WARNING

While this trigger kit uses the OEM Nissan 4-pin CAS connector for a true plug-and-play installation, it is essential to run a new, dedicated shielded wiring loom (including power, signal, and ground) directly to your ECU. The sensor must be powered by a regulated voltage source—such as the ECU's 5V or 8V output (and **NOT** from the ECU's 12V input supplied via the main ECCS relay). The warranty does not cover damaged sensor from incorrect wiring, physical damage or powering the sensor with an unregulated voltage source. This kit includes a replacement 4-pin grey CAS connector for your convenience.



The original 12V feed for the crank angle sensor (CAS) on OEM or aftermarket plug and play wiring loom is typically shared with ignition coils, injectors and is **NOT** a regulated voltage source.

All sensors have undergone a stringent recorded physical operational test prior to dispatch to ensure full functionality. It is the installer's responsibility to check and verify wiring prior to powering up the sensor. The installation guide can be found on the website.

FAILURE TO HEED THIS WARNING MAY RESULT IN PERMANENT SENSOR DAMAGE

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

General settings for a variety of ECUs

- 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: **ENABLED**
- 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)

The screenshot displays the configuration interface for a Haltech Elite/Nexus ECU. The interface is divided into two main sections: 'Trigger Signal' and 'Home Signal'. Both sections have a red rectangular box highlighting specific settings.

Trigger Signal Section:

- Trigger Type:** A dropdown menu set to 'Generic - Missing Tooth - No Home'.
- Trigger Signal Location:** A dropdown menu set to 'On Cam'.
- Number Of Teeth:** A text input field containing '24'.
- Number Of Missing Teeth:** A text input field containing '1'.
- Custom Missing Teeth Detection Size Enable:** An unchecked radio button.
- Missing Teeth Detection Size:** A text input field containing '2.000'.
- Tooth Count Til Start:** A text input field containing '0'.
- TDC Angle (0 - 719.9 degrees):** A text input field containing '138.0' with a degree symbol.
- TDC Offset Angle Table Enable:** An unchecked radio button.
- RPM Filter Level:** A dropdown menu set to '1'.
- Quick Start:** A dropdown menu set to 'Disable'.

Home Signal Section:

- Sensor Type:** A dropdown menu set to 'Hall Effect'.
- Edge:** A dropdown menu set to 'Falling Edge'.
- Filter Level:** A dropdown menu set to '0'.
- Pull Up:** A dropdown menu set to 'Enable'.
- Ground Reference:** A dropdown menu set to 'Disable'.
- Digital Reference:** A dropdown menu set to 'Disable'.
- Signal Coupling:** A dropdown menu set to 'DC'.

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)

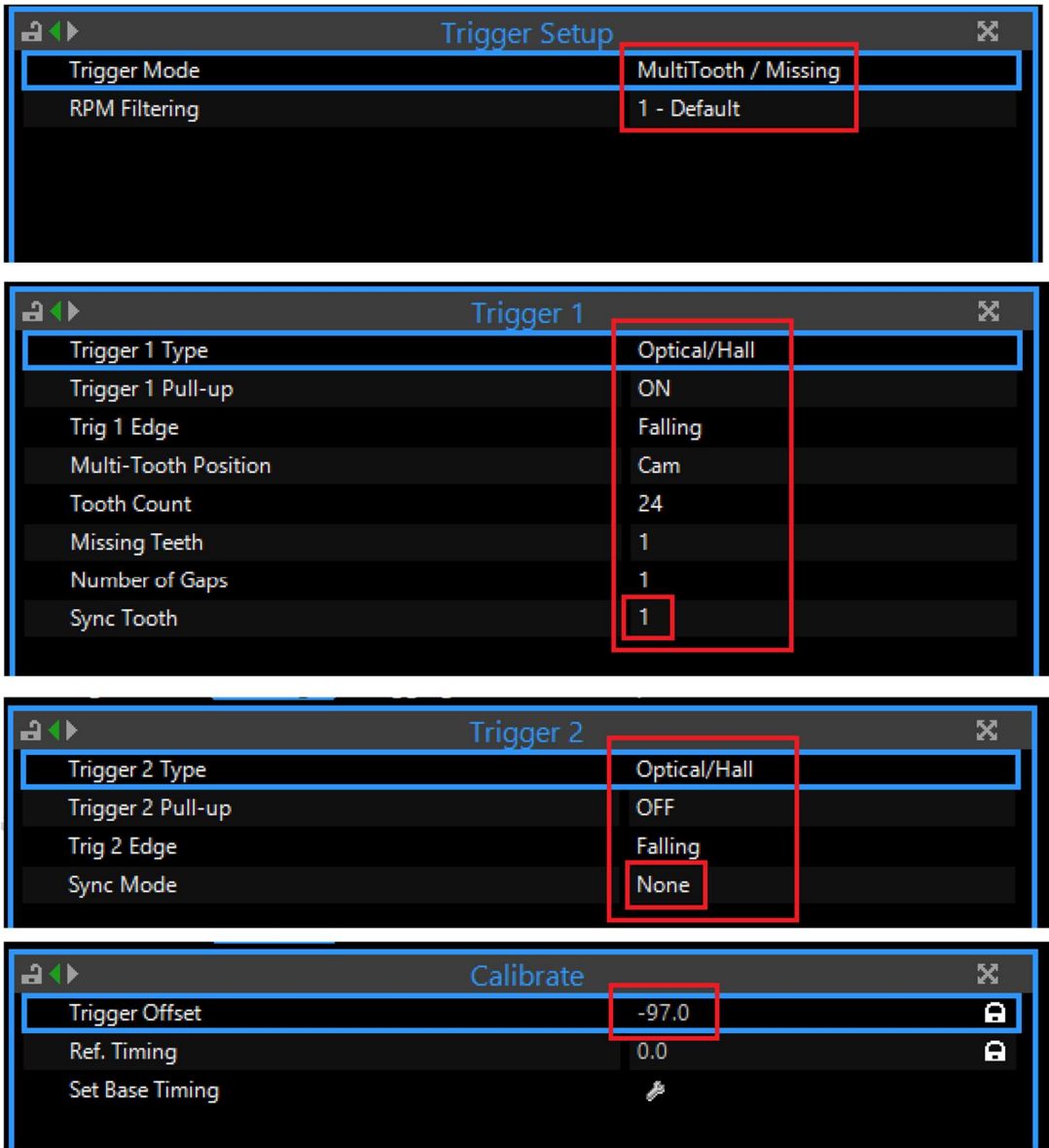


Figure 13 - Link ECU Main Trigger Setup

-> 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.

ECUMaster

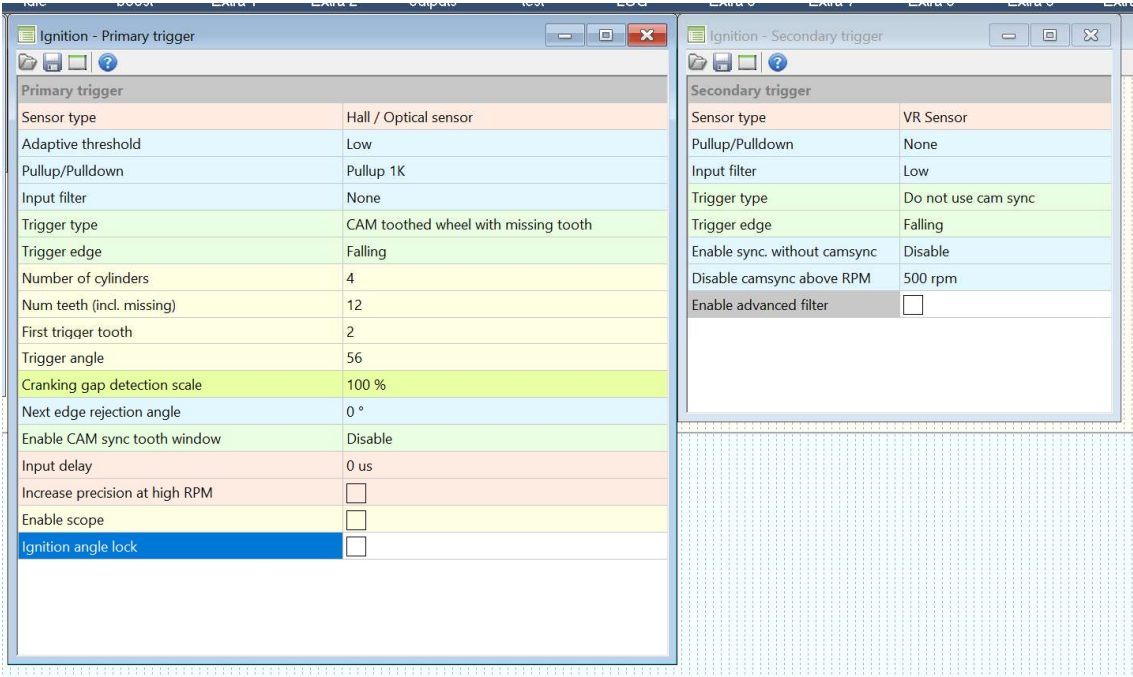


Figure 14 - ECUMaster Trigger Setup

-> Adjust the input filter to filter out noise if required.

Special note with ECUMaster – You may also need to adjust the ignition ‘output offset’ under the ignition output settings to ensure that your coils are firing in the correct order for the engine to start.

Ensure cranking voltage does not drop below 10V as ECUs typically disables its output drivers (ignition, injector and etc) for protection.

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.**

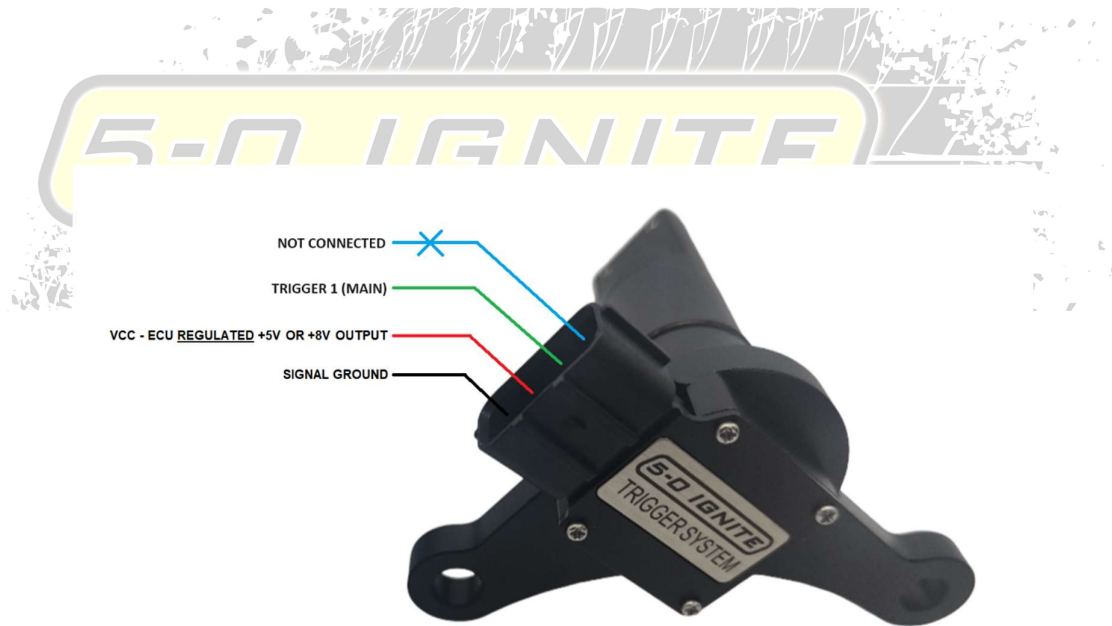


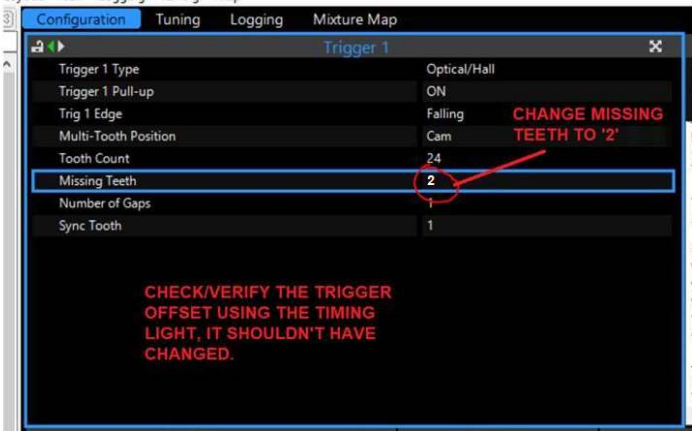
Figure 15 – 5-0 Ignite SR Cam Trigger V3 Sensor Pinout

TROUBLESHOOTING

PROBLEM	APPROACH
No signal output from the sensors.	<ul style="list-style-type: none">• Check if wiring is correct.• Ensure trigger sensor gap is set as per step 7.• Check the VCC and ground connection to the sensor.• Check that the trigger signal out from the sensor is connected to your ECU's trigger 1 input.
Engine misfires intermittently/trigger error	<ul style="list-style-type: none">• 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, shielded wiring shield strap to only be grounded on one end. <p>Note: If using an unregulated power supply, faulty charging circuit and extreme voltage spikes will damage the sensor!</p>

For slow cranking motors, removing an additional tooth on the trigger wheel may be required for the ECU to better distinguish the missing tooth gap, allowing it to sync faster during cranking. This is applicable to ECUs such as Link/Haltech/MaxxECu/Emtron etc. **This is not applicable to ECUMaster as you cannot change the number of missing teeth.**

REMOVE THE
TOOTH BEFORE
THE GAP





The sensor is a non-serviceable part. **DO NOT DISASSEMBLE THE SENSOR.**
DO NOT ATTEMPT TO LOOSEN ANY FASTENERS FROM 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.

