



5-0 IGNITE SR20 24+1 CAM TRIGGER V2 [NEO] 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.

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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 (**Pull-Up Resistor Built-In**)
- 1x 24+1 Tooth Cam Trigger Wheel
- 2x 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

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 ECU (such as Haltech, Link, Motec, Emtron, AEM, HKS FCon Vpro/Gold) that allows you to set the trigger type (24 and 1 multitooth), trigger edge and trigger angle.

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

PROCEDURE

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

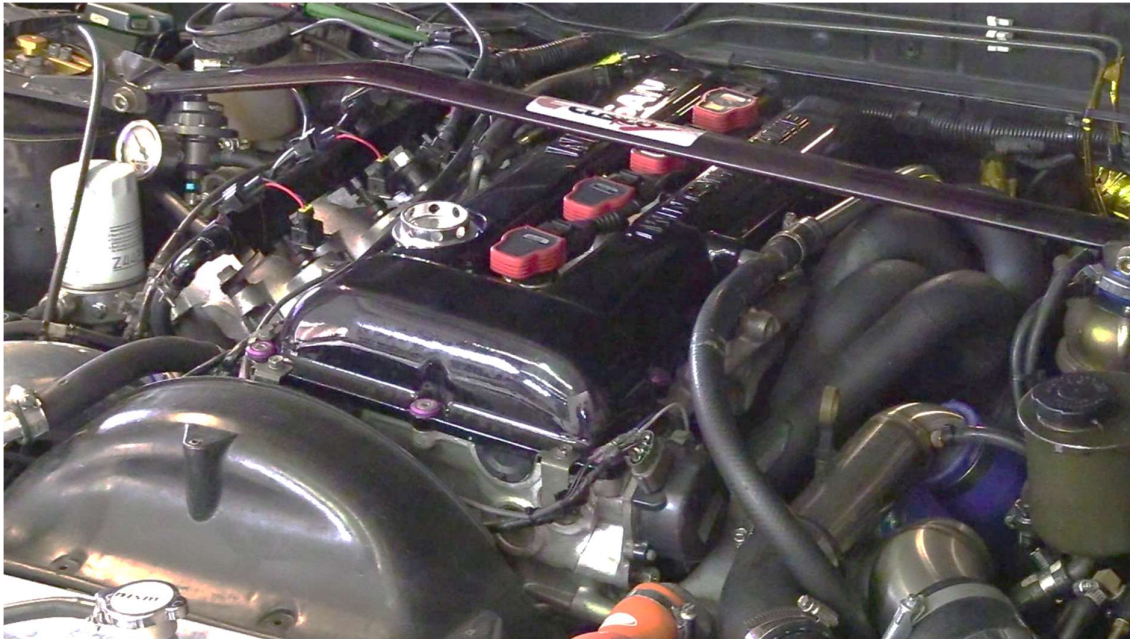


Figure 1 - Remove Valve Cover, CAS and All Upper Components

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.

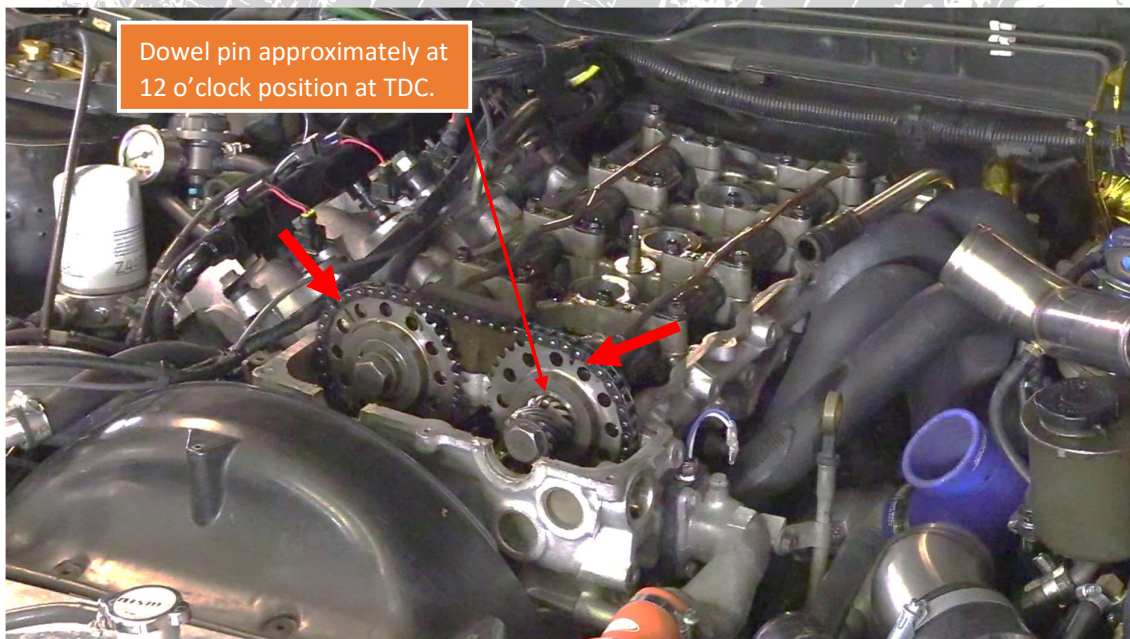


Figure 2 - Set the Engine to TDC

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.

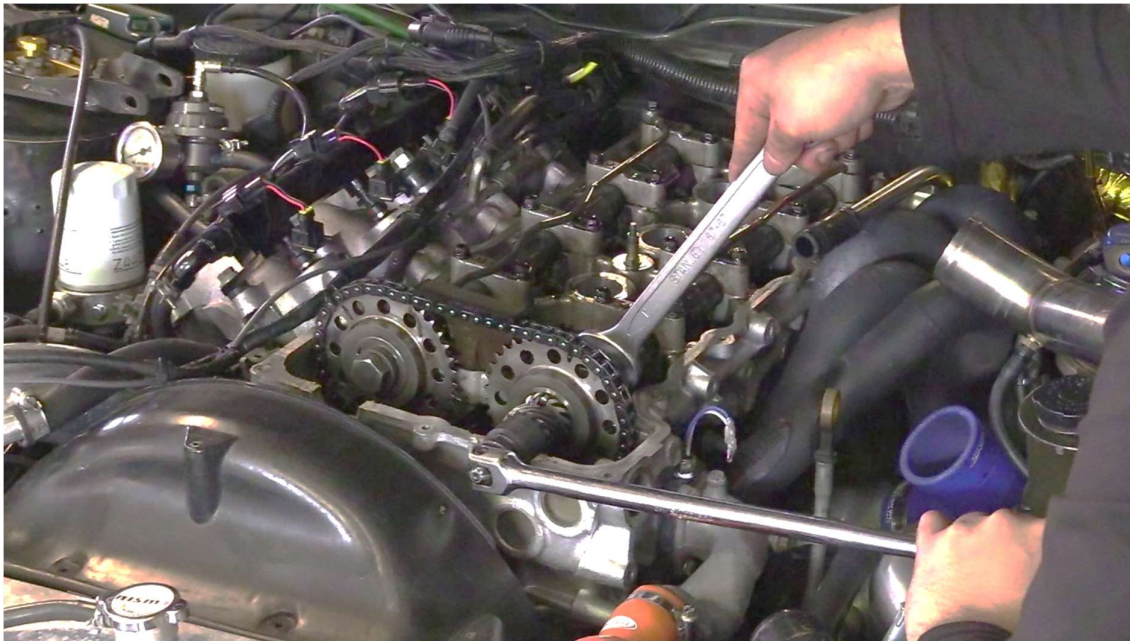


Figure 3 - Loosen the Exhaust Cam Sprocket Bolt

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



Figure 4 - 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.

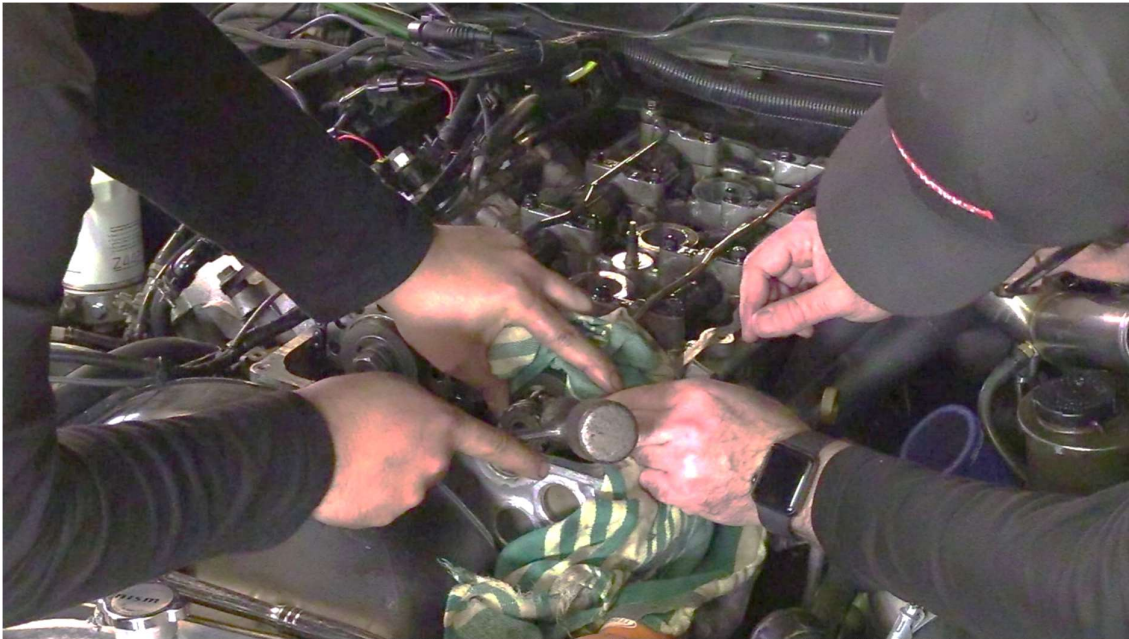


Figure 5 - Remove the CAS Gear



Figure 6 - 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. Referring to **STEP 10**, if the gap is beyond 0.8mm, install the required shims. Once the sensor 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!**



Figure 7 - Trigger Wheel Installed



Figure 8 - Install Shim onto Trigger Wheel to reduce the Gap **ONLY IF REQUIRED**.

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

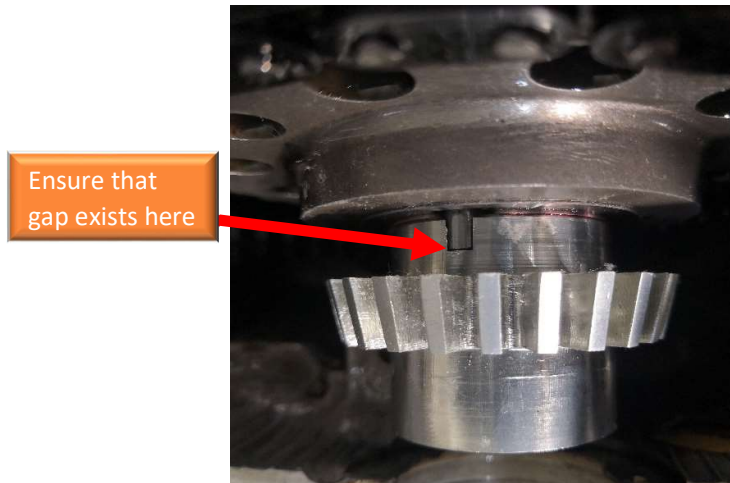


Figure 9 - Check Dowel Pin Gap

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.

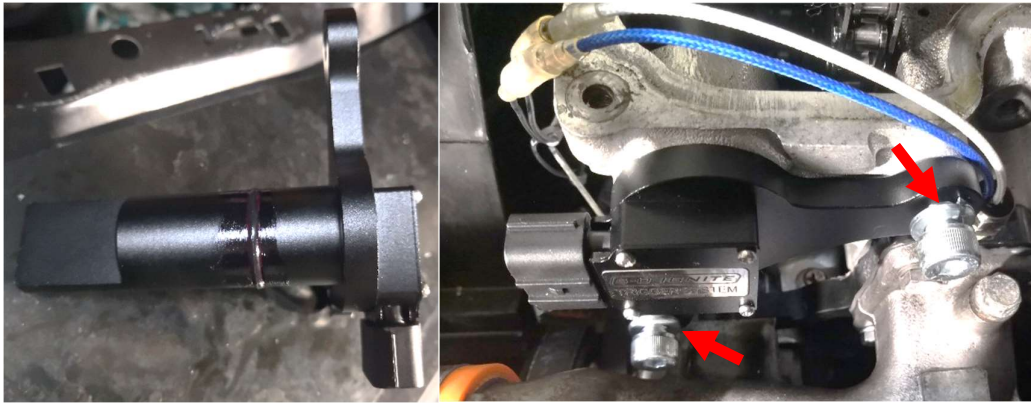


Figure 10 - Install the Sensor

10. Using a bent type feeler gauge, **CHECK** the sensor gap on the rear and front teeth. Add trigger wheel shim if necessary (step 7).

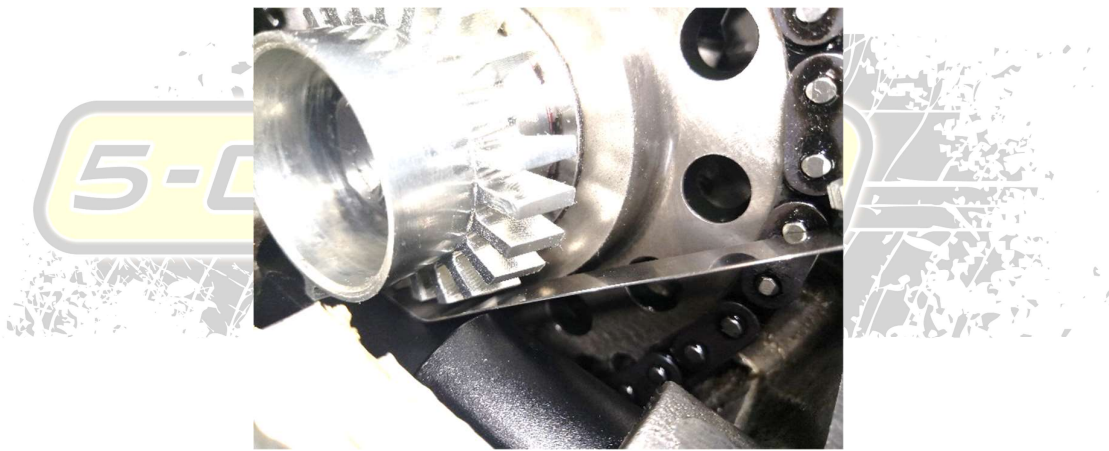


Figure 11 – Checking the Sensor Gap **IS MANDATORY!**

- **Nominal sensor gap: 0.45mm to 0.8mm**
 - Adding one trigger wheel shim will reduce the sensor gap by approximately 0.2mm.
 - **Too close or too far of sensor gap will affect sensor read performance detrimentally.**
 - This checking step is only required to be performed once unless changes has been made that would affect the geometry such as changing cylinder head, changing camshaft, changing cam gear or repair work to the cam journal bore/caps.
 - The cam gear hub thickness varies between OEM and aftermarket brands of cam gear. This affects the sensor gap!
11. Hardware installation is now complete. Assemble everything back together.

NOTE: 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.

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

12. Connect the ECU to your laptop and configure these settings (**DO NOT PERFORM THESE SETTINGS IF YOU ARE NOT EXPERIENCED OR ENGINE DAMAGE MAY OCCUR**);

NOTE: 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 19.

General settings for variety of ECUs

- a. Trigger edge: Falling

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

- b. Pull up resistor: **DISABLED (PULL-UP RESISTOR IS BUILT INTO THE SENSOR)**
- c. Trigger type: Multi-tooth crank, 1 tooth home
- d. Tooth on cam: 24, or otherwise, tooth on crank: 12
- e. Tooth on cam: 1
- f. Crank sensor type: Hall Effect
- 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

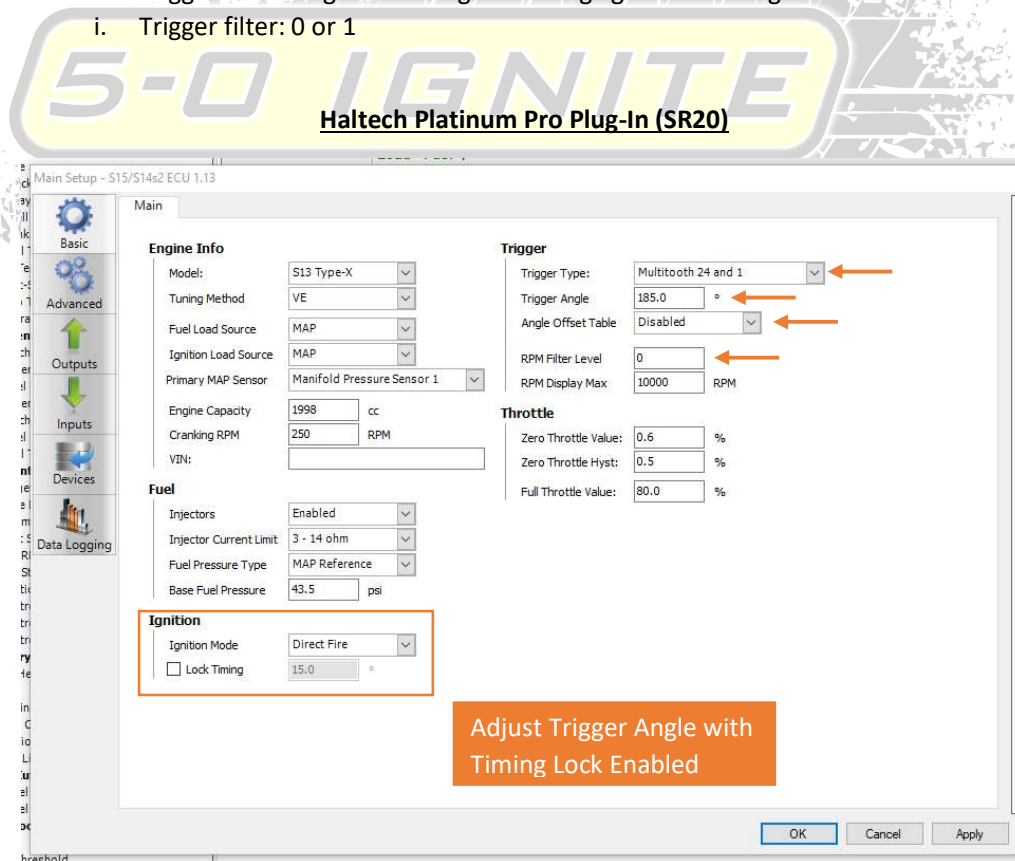


Figure 12 - Haltech Platinum Pro Plug-In Configuration

Trigger edge setting is not available on Haltech platinum pro ECUs, therefore, the factory default edge setting is used.

-> Perform timing lock and adjust trigger angle.

Haltech Elite (ESP/NSP)

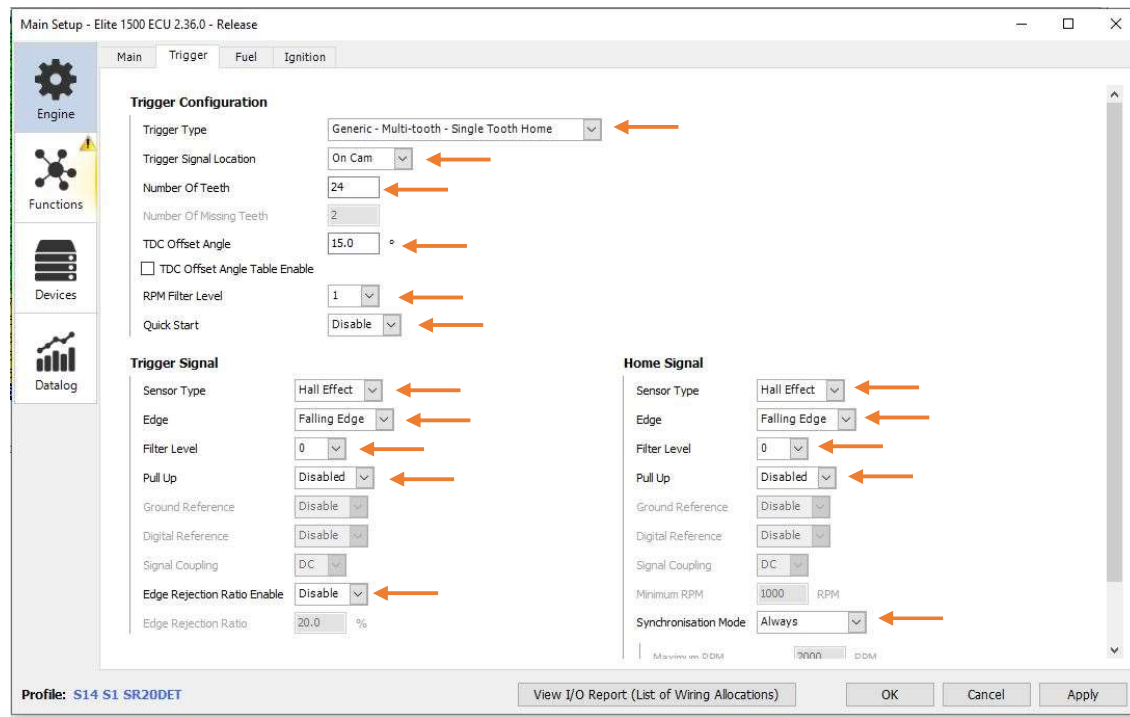


Figure 13 - Haltech Elite Configuration on ESP (NSP similar)

-> Perform timing lock and adjust trigger angle.

Link G4/G4+/G4X (SR20)

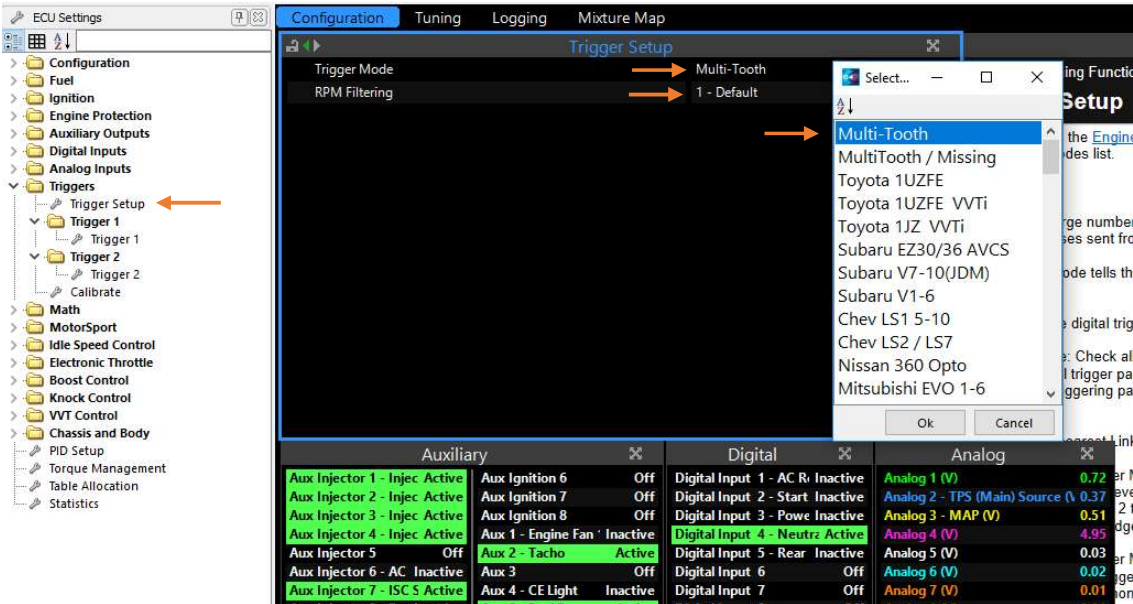


Figure 14 - Link ECU Main Trigger Setup

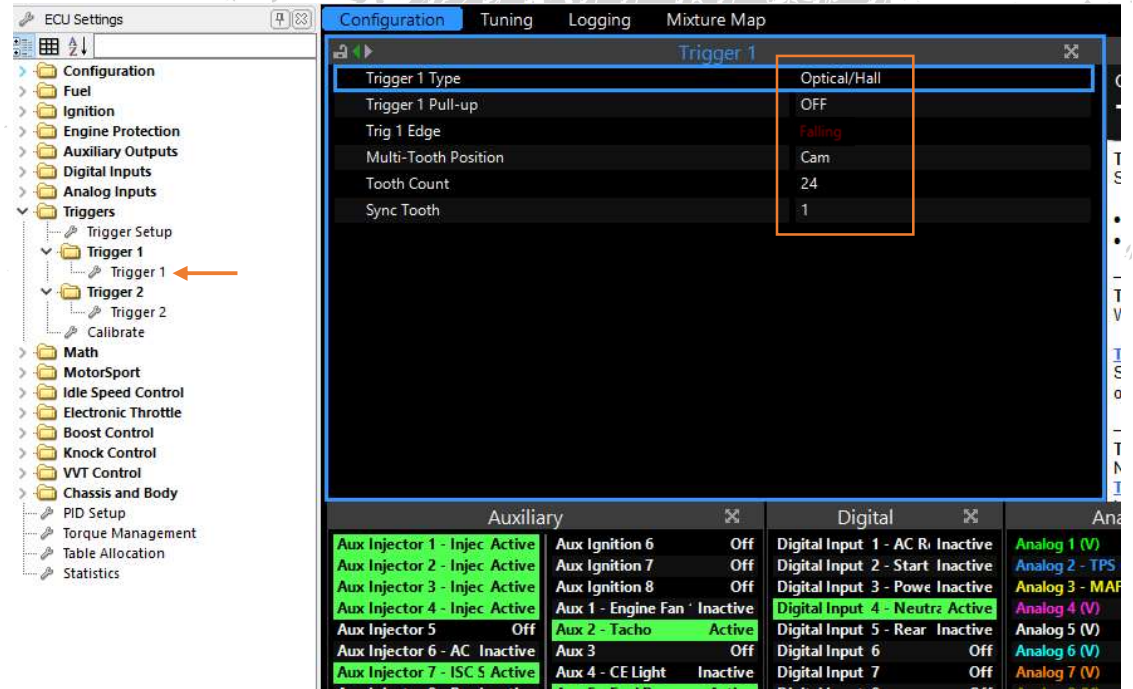


Figure 15 - Link ECU Trigger 1 Setup

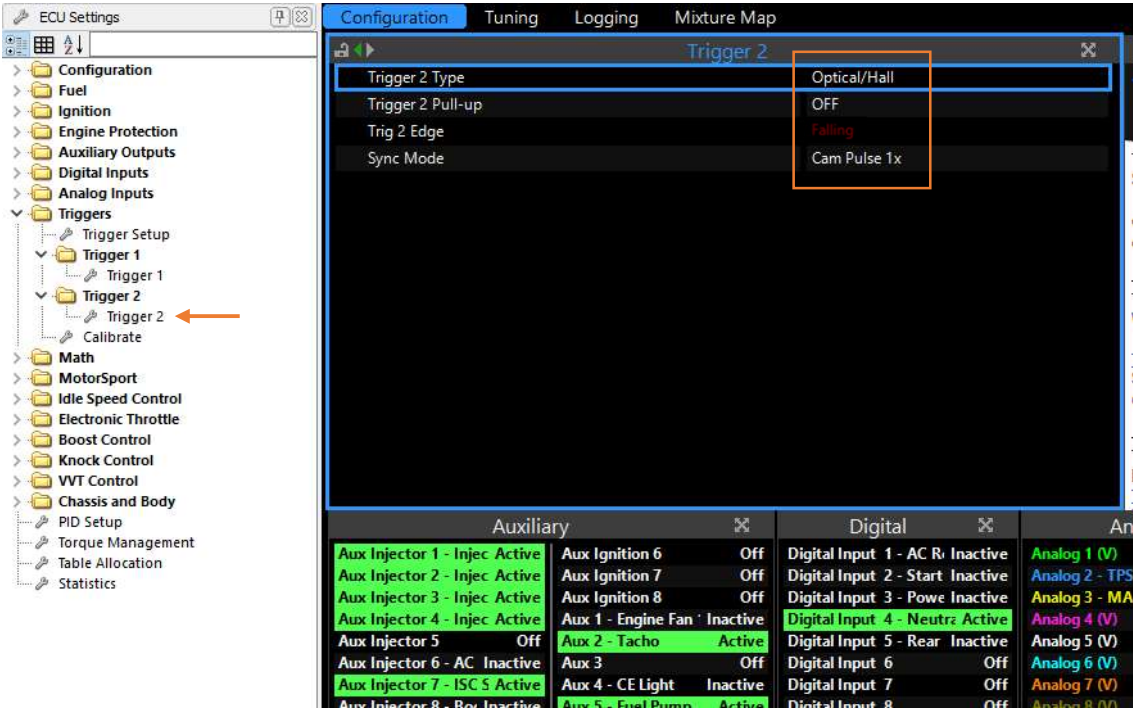


Figure 16 - Link ECU Trigger 2 Setup

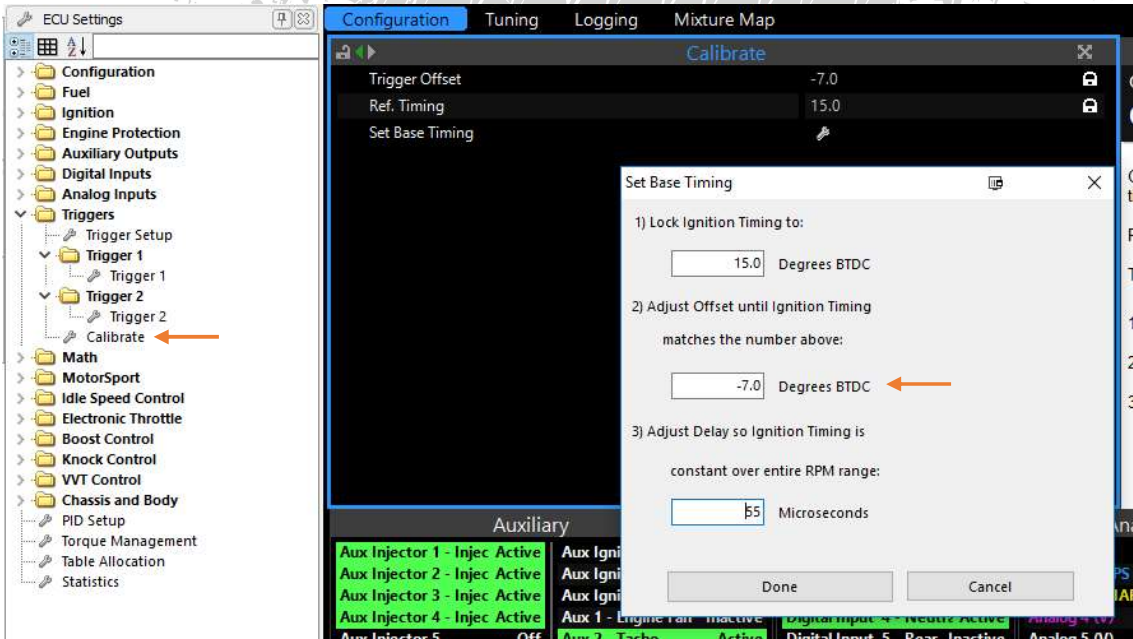


Figure 17 - Link ECU Trigger Offset Angle, Lock Timing Menu

-> Perform timing lock and adjust trigger angle.

HKS FCon Vpro/Gold

内部スイッチ設定

| | | |
|---|--|---|
| G1入力 <input checked="" type="radio"/> 光学式 <input type="radio"/> 電磁式 | G2入力 <input checked="" type="radio"/> 光学式 <input type="radio"/> 電磁式 | NE入力 <input checked="" type="radio"/> 光学式 <input type="radio"/> 電磁式 |
| G1周期 <input checked="" type="radio"/> 720 <input type="radio"/> 360 <input type="radio"/> 180 | G2周期 <input checked="" type="radio"/> 720 <input type="radio"/> 360 <input type="radio"/> 180 | NE周期 <input checked="" type="radio"/> 60 <input type="radio"/> 30 <input type="radio"/> 10 |
| インジェクタ制御 <input checked="" type="radio"/> 電圧 <input type="radio"/> 電流x1 <input type="radio"/> 電流x2 | | |
| 水温入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | 吸気温入力 <input type="radio"/> 通常 <input checked="" type="radio"/> フルアップ | |
| アナログ1入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | アナログ2入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | |
| エアソンスイッチ入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | ニュートラルスイッチ入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | |
| スイッチ1入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | スイッチ2入力 <input checked="" type="radio"/> 通常 <input type="radio"/> フルアップ | |

Figure 18 - HKS Fcon Configuration

-> Perform timing lock and adjust trigger angle.

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 plug-in or 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.

13. Enable timing lock (i.e. at 0 or 15°) and disable the injectors.
14. 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. **Note that the TDC angle is set at compression stroke.**
15. Once all parameters are satisfactorily configured, enable the injectors and start the engine.
16. 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.
17. **Once all set, disable the timing lock.**



Figure 19 - Swapping Trigger Wires Around (Required on Some ECUs)

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 10. • Check the 12V and ground connection to the sensor. • From figure 19, check resistance between the positive pin to trigger 1 pin. Value should be $\sim 2200 \Omega$. • From figure 19, check resistance between the positive pin to trigger 2 pin. Value should be $\sim 2200 \Omega$. |
| Sensors are outputting signal but engine does not start. Continuous miss counts. | <ul style="list-style-type: none"> • Swap the 120° and the 1° sensor wiring (trigger 1 and trigger 2) on the 4-pin grey CAS connector, refer to figure 19. |
| 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. • Check for out of round/eccentricity on the cam gear and camshaft snout using dial indicator.** • Check for excessive exhaust camshaft radial play, if beyond factory allowance. This is normally achieved by measuring the 1st cam journal to cam cap/bore clearance. • Ensure trigger sensor gap is set as per step 10. • Check for noisy signal using oscilloscope, run new shielded wiring to ECU. <p>Note: If using an unregulated power supply, faulty charging circuit and extreme voltage spikes will damage the sensor!</p> |

**** Problems with Tomei USA cam / cam gear:** It was brought to our attention that Tomei USA branded cam and cam gear exhibits excessive out-of-roundness on the cam snout. The result of the eccentricity during rotation will cause intermittent sensor read problem. If you're using Tomei USA cam / cam gear, please ensure that you check the cam roundness with a dial indicator.

As with all other 24+1 trigger setup, it does require a full cranking cycle of the engine for the ECU to synchronise and start the engine.

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.

