



5-0 IGNITE 12+1 (24+1) CRANK TRIGGER INSTALLATION GUIDE

This installation guide is applicable to the following engine;

- Nissan CA18DET RWD Twin Cam

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



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PREFACE

Thank you for purchasing 5-0 Ignite crank 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 Crank sprocket with machined 12 tooth trigger wheel
- 1x Cam angle sensor housing
- 1x Cam 'home' key
- 1x Crank angle sensor mount
- 1x Cam angle sensor
- 1x Crank angle sensor
- 4x M7x1 grade 8.8 bolt for cam key
- 4x M6x1 socket head cap 'short' bolts for cam angle sensor housing (one installed)
- 3x M6 dress up washers for cam angle sensor housing
- 2x M7x1 bolts for crank angle sensor mount
- 1x 4 pin connector set (male and female) to replace OEM CAS connector
- 1x 3 pin female connector for cam sensor with terminals and seals
- 4x Barrel crimps
- 3x Cam sensor spacer shims
- 1x Crank pulley washer shim (refer to the supplement section at the end of this installation manual)



INFORMATION AND LIMITATIONS

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

This kit will require a modern/capable ECU (Haltech, Link, Motec, Emtron, AEM) that allows you to set the trigger type (multitooth+home), trigger edge and trigger angle.

This kit will require a sound knowledge of automotive electrical wiring systems (sheathing, splicing, crimping and terminations).

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

PROCEDURE

1. Set the engine to TDC.
2. Disconnect/remove;
 - a. Radiator fan/fan shroud
 - b. Ancillary belts and water pump pulley
 - c. OEM crank angle sensor (CAS)
 - d. Upper timing belt cover
 - e. Crank pulley. **The cup washer behind the pulley no longer required.**
 - f. Lower timing belt cover
3. Ensure the engine is on T.D.C by aligning the mark on the crank timing sprocket to the oil pump.
4. Remove timing belt.
5. Remove crank timing sprocket. CA18 crank sprocket is notoriously difficult to remove due to coolant leak dripping down to the sprocket causing the sprocket to seize on the crank snout. We recommend drilling 2 holes, 180 degrees apart, on the OEM sprocket and tapping it M6 in order to use a steering wheel puller to remove the old sprocket. Otherwise, attempts to remove the sprocket by prying against the oil pump **WILL DAMAGE** the oil pump.

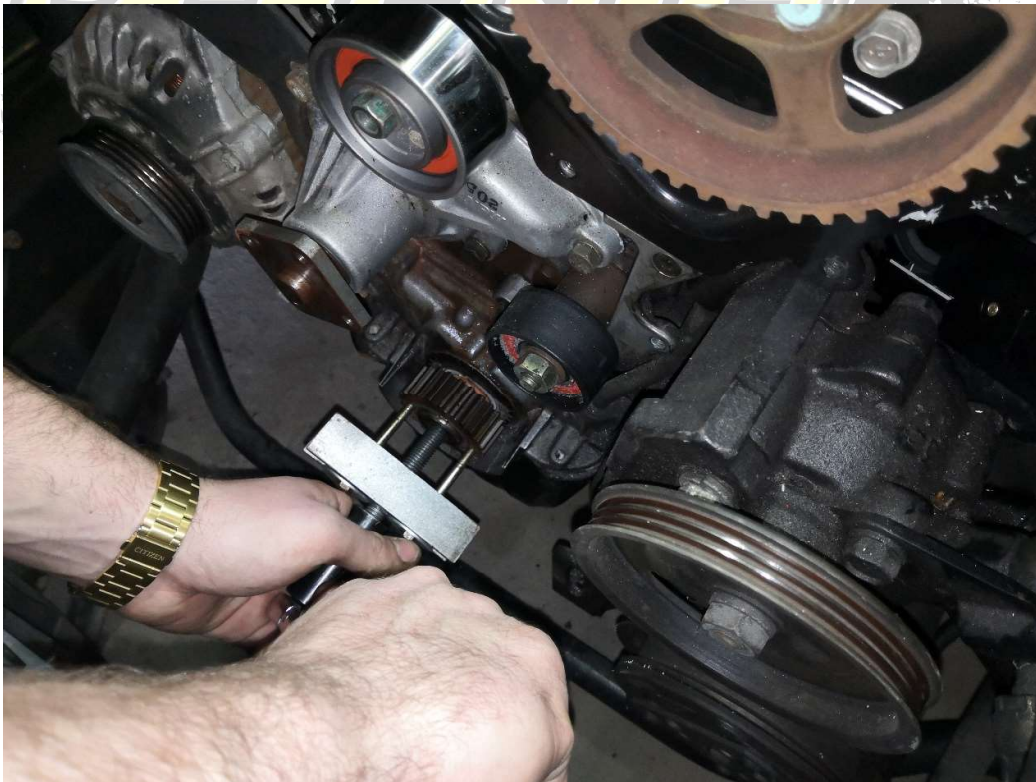


Figure 1 - Removing the Old Sprocket Using Steering Wheel Puller

6. Remove the crank timing sprocket backing plate (the one between the sprocket and front main seal)
7. Ensure that the half-moon key and key slot on the crank snout is in good condition.

At this stage, replacing the timing belt along with the oil pump and cam seals are recommended if haven't already done so previously. We also recommend on inspecting your crank pulley from deterioration. Replace the pulley if necessary when visible cracks or other defects are present.

8. Remove the two oil pump bolts indicated.

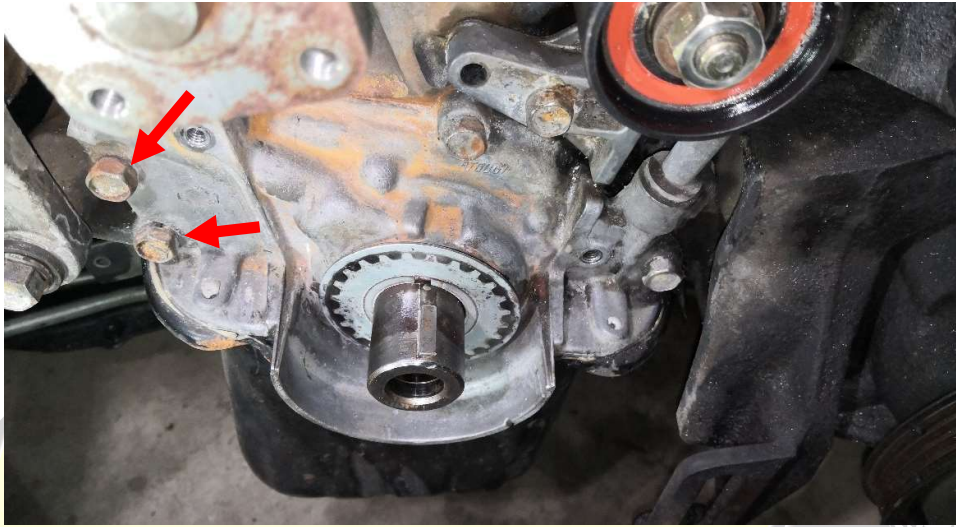


Figure 2 - Remove the Indicated Bolts on Oil Pump

9. Cut a slot on the lower timing cover. With multiple trial fitment and finesse, you can achieve the clearance required without cutting too much of the cover. However, it is up to you if you would like to trim it completely.



Figure 3 – Cut a Slot on The Lower Timing Cover for Crank Sensor Provision

10. With the OEM backing plate installed, mount your timing belt onto the supplied crank sprocket with the trigger wheel then slide it into position onto the crank snout fully. Trigger teeth towards the front of the car.



Figure 4 - Sliding your Sprocket In, Rear Backing Plate Installed

11. Install your timing belt back onto the cam pulleys as per manufacturer's recommendation. Tighten your tensioner pulley as per manufacturer's recommendation.
12. Install the lower timing cover.
13. Install the crank sensor. Rotate the crank until a tooth is aligned with the sensor. Due to clearance between the hole on the crank sensor to the bolt, position the crank sensor so that the centreline of the sensor is aligned with the centreline of the tooth.
14. Using a feeler gauge, screw the crank sensor in until the gap between the sensor face to the crank trigger teeth is approximately 0.8mm.



Figure 5 - Setting Sensor Gap

15. Turn the crank around and ensure that the sensor gap between all 12 teeth is at ~0.8mm. Should the teeth touch the lower timing cover, bend the cover slightly outwards with a plier.
16. Apply medium strength 'blue' Loctite and tighten the sensor nut and the grub screw to lock the sensor into place.
17. Set the engine back to TDC.
18. Remove the 4 bolts on the exhaust cam pulley. **The square plate washer and OEM exhaust cam pulley bolts are no longer required.**
19. Apply medium strength 'blue' Loctite onto the supplied M7 bolt threads, install the supplied cam key onto the exhaust cam pulley. The key shall be at approximately 7 o'clock position. Torque the 4 bolts to 16Nm.

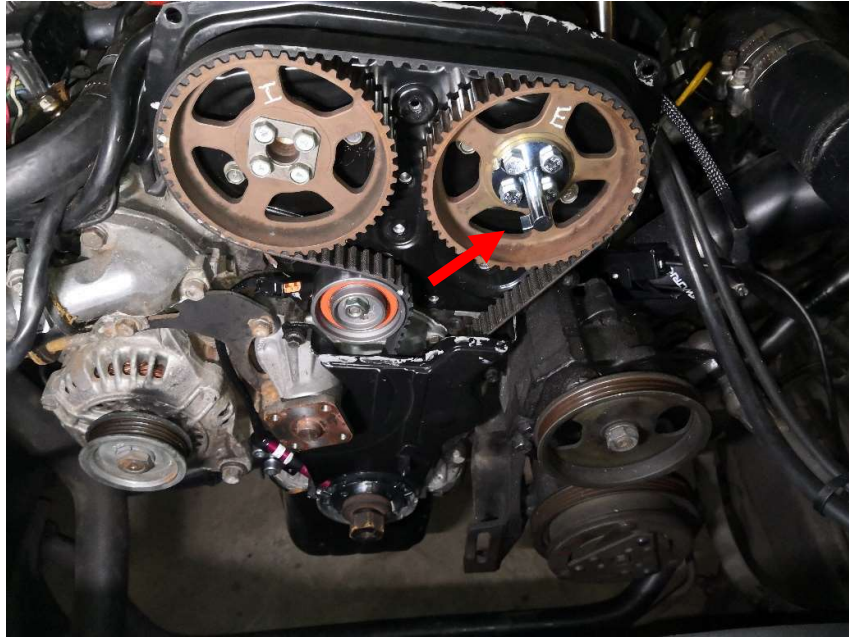


Figure 6 - Position of Cam Key when Engine at TDC

20. Install, in reverse order;
 - a. Upper timing belt cover
 - b. Ancillary belts
21. Install the cam sensor housing with the sensor. At T.D.C, prior to bolting in, rotate the cam sensor housing to ensure that the sensor shall not make contact with the cam key. The sensor to key gap can be measured with a short vernier calliper;
 - Remove the sensor and rotate the cam sensor housing until the key is on the centre of the sensor hole.
 - Measure the depth between the top of the key to the cam sensor mounting face on the housing (i.e. 32.6mm)
 - Measure the depth on the cam sensor (i.e. 32.0mm)
 - In this instance, the sensor gap is 0.6mm. Ideally, the sensor gap is to be set at 0.8mm therefore, one shim is to be used (supplied).



Figure 7 - Measure the Gap on The Cam Sensor

22. Rotate the cam sensor housing so that the dimple mark is aligned with the 1 o'clock bolt hole position. Tighten the cam housing bolt, using the supplied dress up washers, lightly. **The cam sensor housing will be required to be rotated in the next stage during ECU configuration.**
23. Perform the wiring work for the sensors (refer to the wiring diagram section of this installation guide).

WARNING



It is essential to run a new, dedicated shielded wiring loom (including power, signal, and ground) directly to your ECU. The sensors must be powered by a regulated voltage source—such as the ECU's 5V, 8V, or 12V output (not to be confused with the ECU's 12V input supplied via the main relay). **The warranty does not cover damaged sensor(s) from incorrect wiring, physical damage or powering the sensor(s) with an unregulated voltage source.**

All sensors have undergone bench testing prior to dispatch to ensure full functionality. It is the installer's responsibility to check and verify wiring before powering up the sensors.

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

Baseline Configuration for Haltech Elite ECU

The screenshot displays the Haltech Elite ECU configuration interface. The left sidebar contains icons for Engine, Functions, Devices, and Datalog. The top navigation bar has tabs for Main, Trigger, Fuel, and Ignition. The 'Trigger' tab is active, showing the 'Trigger Configuration' section with the following settings:

- Trigger Type: Generic - Multi-tooth - Single Tooth Home
- Trigger Signal Location: On Crank
- Number Of Teeth: 12
- Number Of Missing Teeth: 2
- TDC Offset Angle: 110.0 °
- ☐ TDC Offset Angle Table Enable
- RPM Filter Level: 1
- Quick Start: Enable

Below the Trigger Configuration is the 'Trigger Signal' section:

- Sensor Type: Hall Effect
- Edge: Falling Edge
- Filter Level: 0
- Pull Up: Enabled
- Ground Reference: Disable
- Digital Reference: Disable
- Signal Coupling: DC

To the right of the Trigger Signal section is the 'Home Signal' section:

- Sensor Type: Hall Effect
- Edge: Falling Edge
- Filter Level: 0
- Pull Up: Enabled
- Ground Reference: Disable
- Digital Reference: Disable
- Signal Coupling: DC
- Minimum RPM: 1000 RPM
- Synchronisation Mode: Always
- Maximum RPM: 2000 RPM
- Maximum Throttle Position: 0.5 %

Figure 8 - Haltech Elite Trigger Configuration

- Enable timing lock (i.e. at 0°) and disable the injectors.
- With a timing light and coil on plug extension lead installed (such as DAT-Equipment TE010), crank the engine.
- Adjust the TDC offset angle until the ignition timing on the crank pulley matches the timing lock figure.
- Enable the injectors and start the engine. Let it idle until it reaches operating temperature.
- On the main Haltech ESP diagnostics tab, add a window that displays 'Home % Travel'



Figure 9 - Home % Travel Window

- With the engine at operating temperature and running, rotate the cam sensor housing by the slightest amount (1 degree clockwise or anticlockwise) in order to achieve the 'Home % Travel' to be as close to 50%*. **Note: Every white line marker on the cam sensor housing represents 1 camshaft degrees. Every red line marker on the cam sensor housing represents 5 camshaft degrees.**

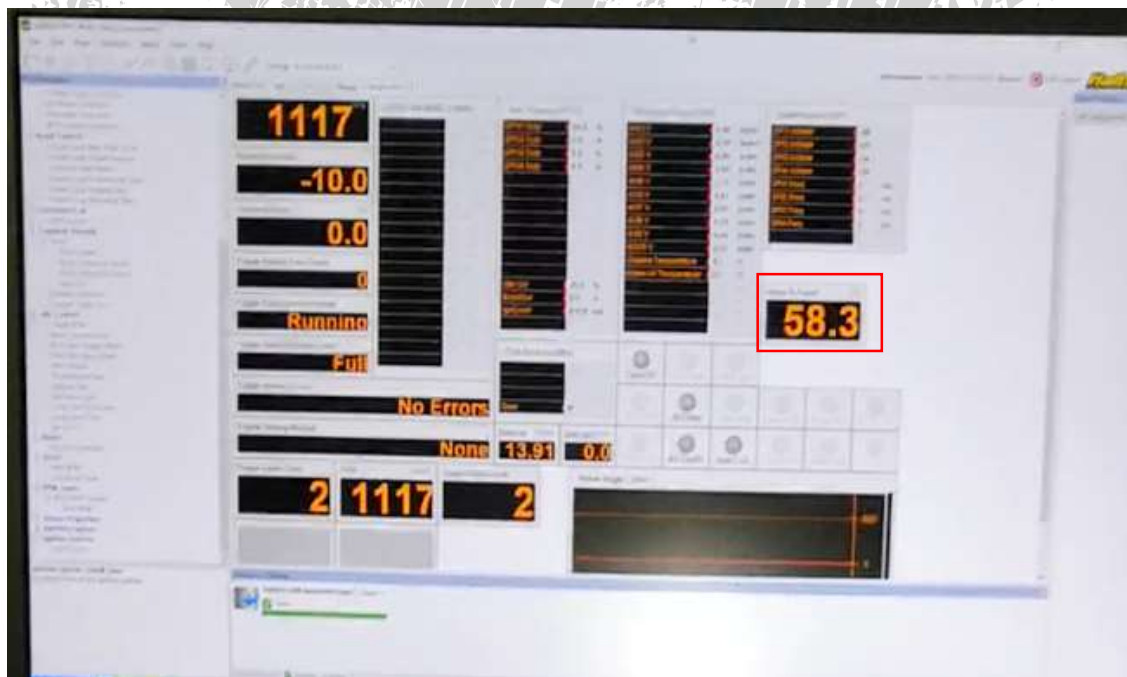


Figure 10 - Rotate the Cam Sensor Housing Until 'Home % Travel' displays ~50%

*When the home % travel is not set correctly, belt stretch at high load or even at operating temp may shift the falling edge of the cam sensor to overlap with the crank sensor’s falling edge. **This does not appear to affect ignition timing but produces misfire condition as a result of sync loss.**

- Once all parameters are set, tighten the cam sensor housing fully and disable timing lock.

Baseline Configuration for Link G4X Plug-In ECU

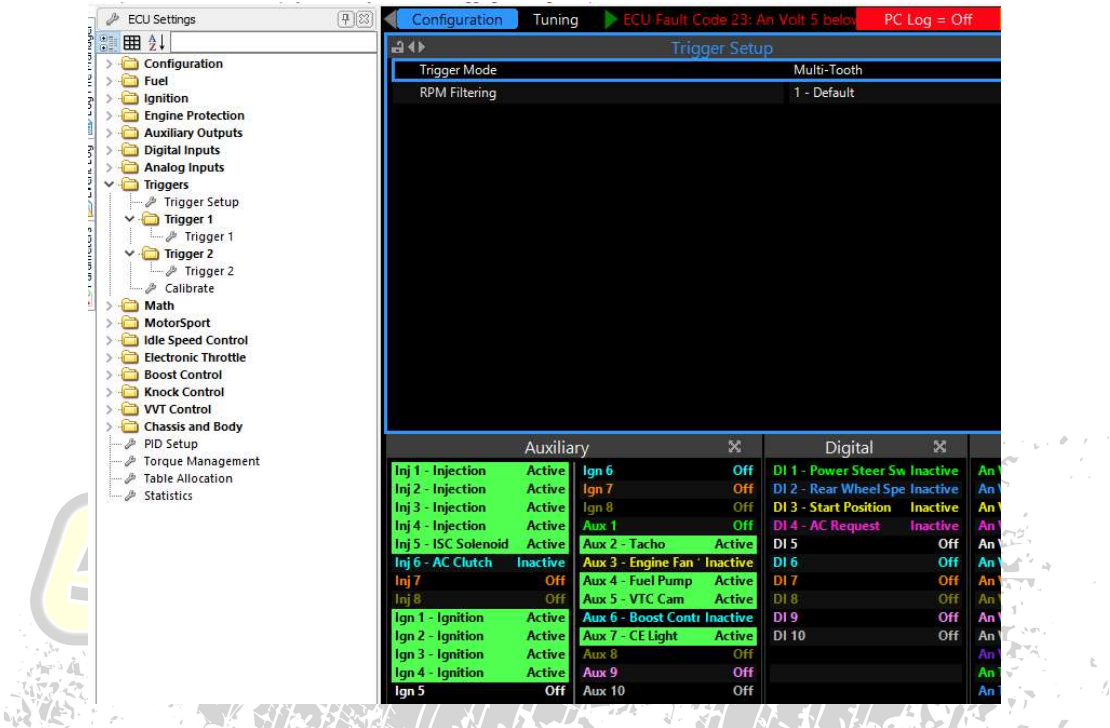


Figure 11 - Link G4X Main Trigger Setup

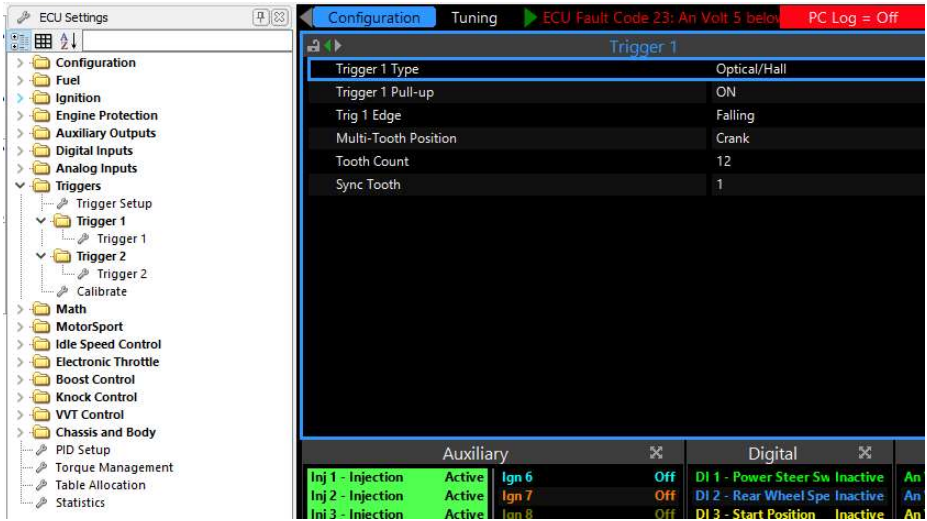


Figure 12 - Link G4X Trigger 1 Setup



Figure 13 - Link G4X Trigger 2 Setup

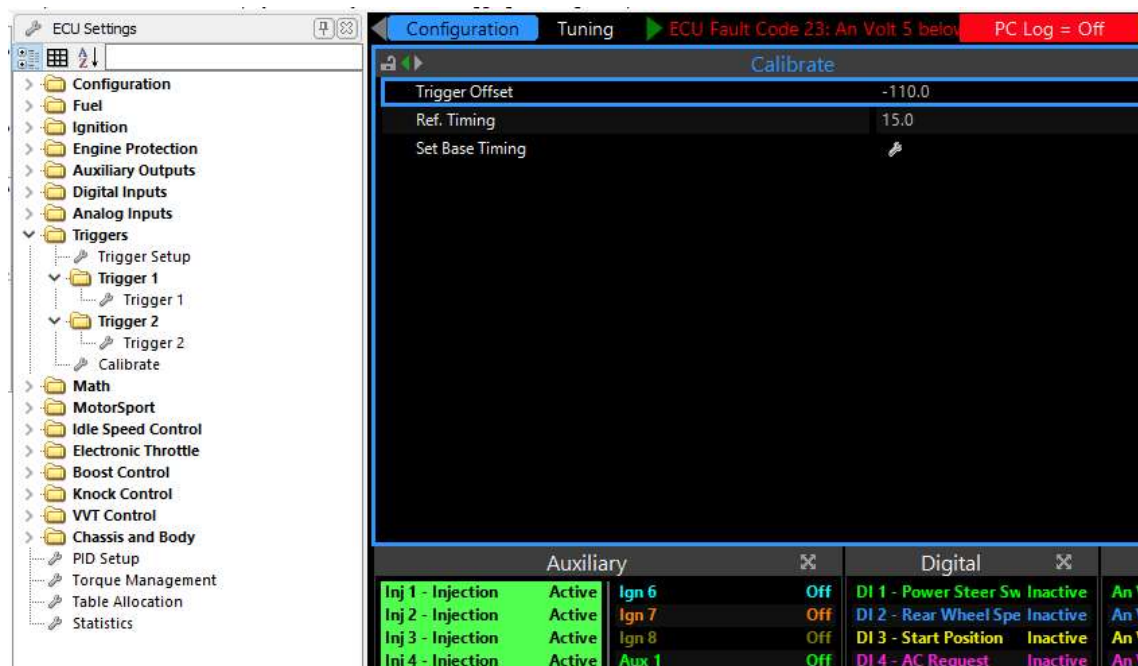


Figure 14 - Link G4X Trigger Calibration

- Disable the injectors (Fuel -> Fuel Main -> Injection Mode=OFF).
- Back to Trigger Calibrations, enter 'Set Base Timing'.
- With a timing light and coil on plug extension lead installed (such as DAT-Equipment TE010), crank the engine.
- Adjust the Trigger Offset angle until the ignition timing on the crank pulley matches the timing lock figure.

- Enable the injectors and start the engine. Let it idle until it reaches operating temperature.
- With the engine at operating temperature and running, open the trigger scope window (ECU Controls -> Trigger Scope)
- Click 'capture'. Rotate the cam sensor housing by the slightest amount (1 degree clockwise or anticlockwise) in order for the falling edge of the trigger 2 signal to be in the middle between the falling edges of trigger 1*. **Note: Every white line marker on the cam sensor housing represents 1 camshaft degrees. Every red line marker on the cam sensor housing represents 5 camshaft degrees.**

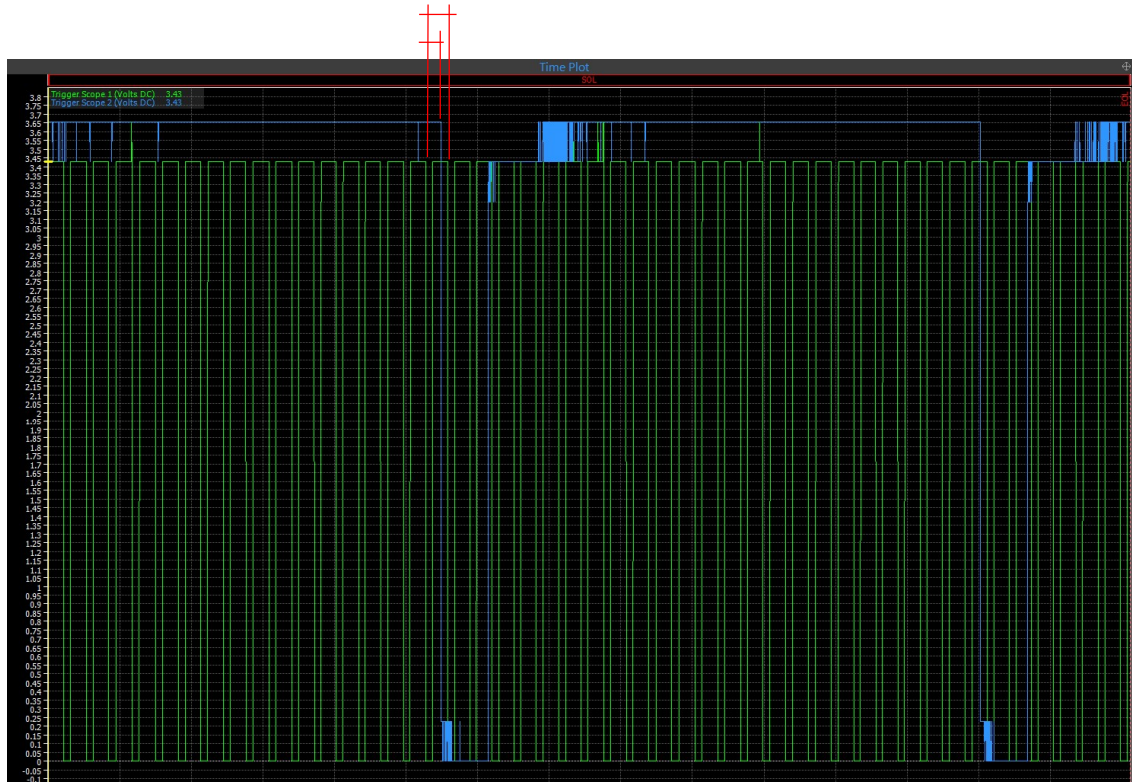


Figure 15 - Adjust the Trigger 2 Falling Edge (blue) to be Halfway in Between Trigger 1 Falling Edges (green)

*When the signal separation is not set correctly, belt stretch at high load or even at operating temp may shift the falling edge of the cam sensor to overlap with the crank sensor's falling edge. **This does not appear to affect ignition timing but produces misfire condition as a result of sync loss.**

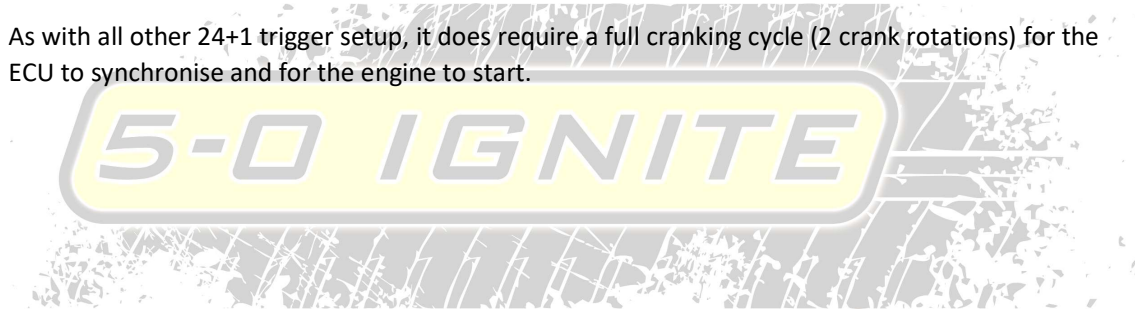
- Once all parameters are set, tighten the cam sensor housing fully.

For future timing belt/sprocket removal, use the two provided M6x1 tapped holes on the crank timing sprocket with a puller.

TROUBLESHOOTING

| PROBLEM | APPROACH |
|--|--|
| No signal output from the sensors. | <ul style="list-style-type: none"> Check if wiring is correct. Ensure crank trigger sensor gap is set correctly. Make sure pull up resistor is enabled. |
| Sensors are outputting signal but engine does not start. Continuous miss counts. | <ul style="list-style-type: none"> Swap the 180° and the 1° sensor wiring on the 4 pin CAS connector. |
| Engine misfires at operating temperature or under load. * | <ul style="list-style-type: none"> Analyse the signal output, adjust as recommended under the 'Baseline Configuration' |
| Engine misfires when clutch is pressed in. | <ul style="list-style-type: none"> Your engine has a worn thrust bearing causing excessive crankshaft axial movement, placing trigger teeth outside the sensor's range. |

As with all other 24+1 trigger setup, it does require a full cranking cycle (2 crank rotations) for the ECU to synchronise and for the engine to start.



CONCLUSION

Installation is now complete. Crank trigger kit on CA18s eliminates ignition timing drift in comparison to the inferior OEM CAS or any systems reliant on the camshaft based only. Benefits includes tuner's confidence in maximising ignition timing whilst keeping consistent engine safety margin.

WIRING DIAGRAM

NISSAN SILVIA/180SX CA18DET CRANK TRIGGER WIRING DIAGRAM
- WWW.50IGNITE.COM -

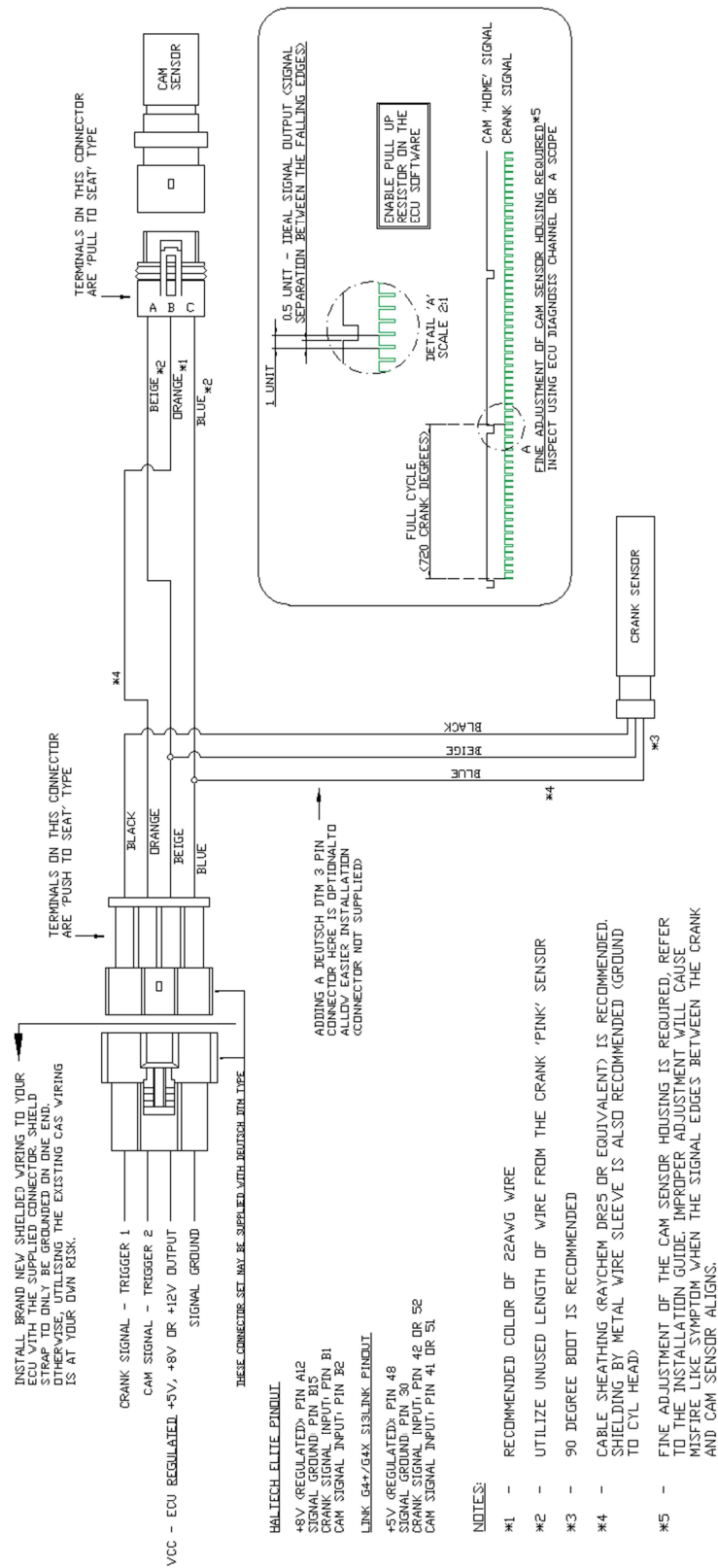


Figure 16 – CA18DET Trigger Wiring Diagram



5-0 IGNITE 24+1 CRANK TRIGGER INSTALLATION MANUAL SUPPLEMENT

Using aftermarket crank pulleys with 2" (50mm) hub diameter

The installer must verify whether the seating face of the crank pulley hub sits flush with the supplied crank sprocket's trigger face (refer to figure 17) by trial placement prior to installation. **If a gap is present, install the supplied washer shim between the crank sprocket and the crank pulley (refer to figure 18) or chamfer the edge of the pulley hub where it makes contact.** Installation of the washer moves the crank pulley forward by negligible amount (~0.6mm).

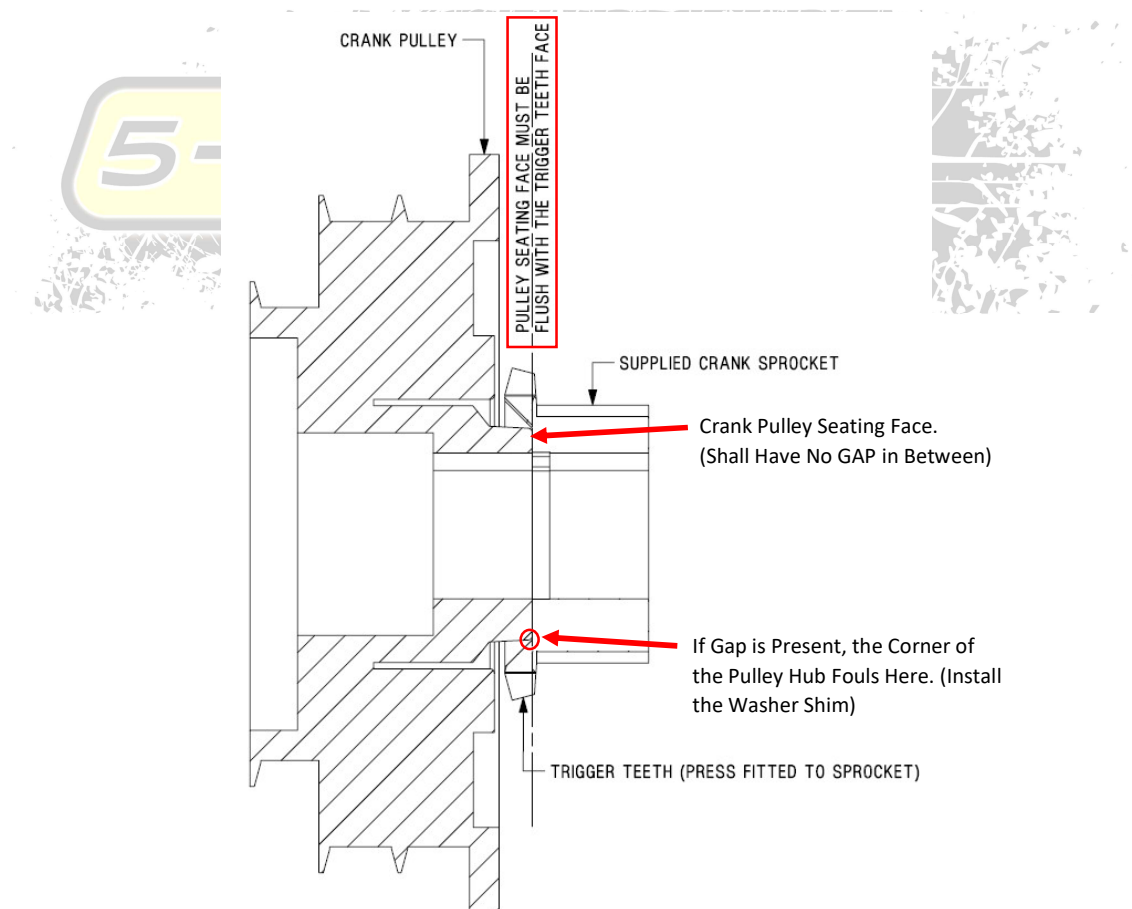


Figure 17 - Pulley Hub Seating Face Shall be Flush with Trigger Teeth Face

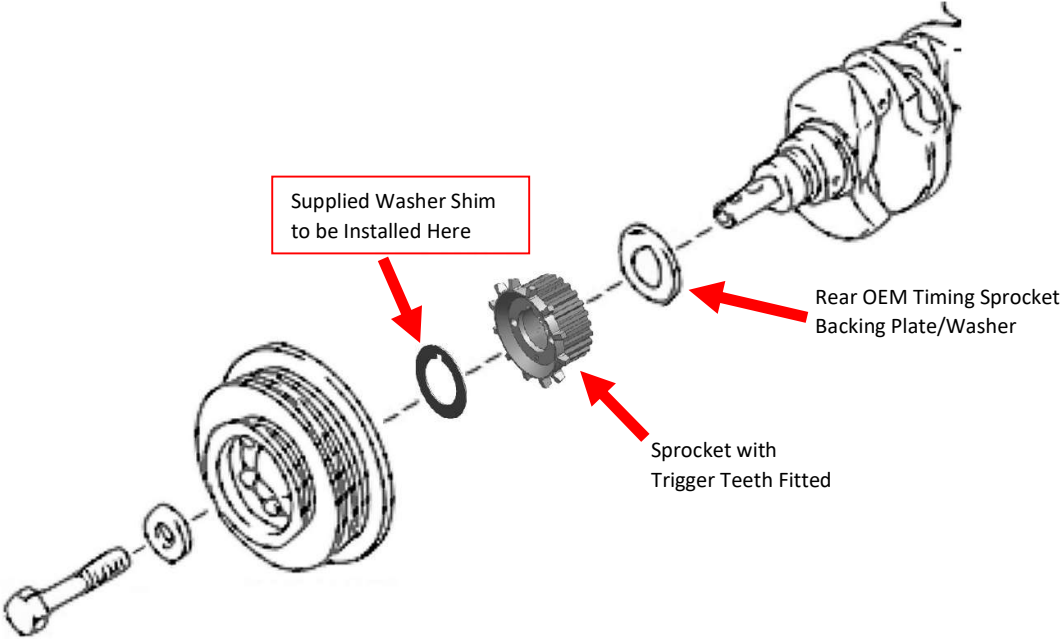


Figure 18 - Supplied Washer Shim Location

