# 5-0 IGNITE RB30 12+1 (24+1)* CRANK TRIGGER INSTALLATION GUIDE

This installation guide is applicable to the following engine;

- Nissan RB30 Single Overhead Cam (SOHC)

*24 tooth terminology is based on the OEM location of the 'crank angle sensor'. RB 'crank angle sensor' are mounted on the camshaft from factory. 12 tooth on crank = 24 tooth on 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 Crank angle sensor mount
- 1x Crank angle sensor
- 2x M6x1 socket head cap 'long' bolts for crank angle sensor mount with spring washers
- 1x Crank pulley shim (refer to supplement section of this guide, used for aftermarket balancer)
- 1x Cam angle sensor (distributor) cover
- 1x Cam 'home' trigger disc - SMALL diameter for Mitsubishi Sensor
- 1x Cam 'home' trigger disc - BIG diameter for Hitachi Sensor
- 1x Cam trigger disc mounting washer
- 2x M5 stainless button head bolts for distributor cover
- 1x M5 socket head cap bolts with flat and spring washer for trigger disc
- 1x Replacement OEM distributor female connector with terminals and seals
- 1X Connector boot

**NOTE:**

- **YOU WILL NEED YOUR OEM DISTRIBUTOR TO MOUNT YOUR NEW TRIGGER DISC ONTO FOR HOME SIGNAL.**
- **THIS KIT REMOVES THE FUCNTIONAILITY OF THE DISTRIBUTOR. COIL ON PLUG OR COIL NEAR PLUG CONVERSION IS ALSO REQUIRED FOR SPARK.**
- **If your optical sensor within the distributor is faulty, it is recommended to rebuild the distributor with new bearing and optical sensor (using kits such as GOSS SC001M for Hitachi type sensor or GOSS SC003 for Mitsubishi type sensor)**

## 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, 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 specifications found in their factory service manual (FSM).

## PROCEDURE

**NOTE:** The procedure of mounting the crank sensor is similar to the DOHC variants on the RB. Slight differences are the timing belt tensioner/idler and the oil pump casting variation on the exhaust side which are irrelevant to this installation guide.

1. Drain coolant.

2. Set the engine to TDC.

3. Disconnect/remove;
    a. Radiator and fan
    b. Ancillary belts
    c. Crank pulley. **The thin cup washer behind the crank pulley is no longer required**.
    d. Upper and lower timing belt cover

4. Ensure the engine is on TDC by aligning the mark of the crank timing sprocket to the oil pump.

5. Remove timing belt.

6. Remove crank timing sprocket. Caution, prying against the oil pump may crack the casting!

7. Remove the crank timing sprocket backing plate (the one between the sprocket and front main seal).

8. Ensure that the both half-moon key and key slot on the crank snout is in good condition.

**At this stage, replacing the timing belt along with front main seal is recommended. We also recommend inspecting your crank pulley (balancer) from deterioration. Replace if necessary when visible cracks/chips/splits or other defects are present.**

9. Remove the two oil pump bolts indicated.

*Figure 1 - Remove Bolts on Oil Pump*

10. Mark the slot to be cut with a die grinder on the oil pump cover by installing the crank angle sensor mount (with the sensor on it). Due to OEM casting variations, if your bolt does not fasten fully onto the mount, grind a small amount on the end of the bolt to shorten the bolt. Screw the sensor in until it touches the oil pump housing and mark the outline with a sharpie. This slot is for the crank sensor to go through. Place a tape over the crank snout to prevent damage prior to grinding.

*Figure 2 - Grind Slot on Oil Pump Housing*

11. Install the crank angle sensor mount (with the sensor on it) back in, this time, apply medium strength 'blue' Loctite to the threads and torque the bolts to 10Nm.

12. Screw the sensor in and check the clearance on the oil pump housing. 1mm clearance around the sensor where you have ground the casting is sufficient.

13. Screw the sensor back (retract).

14. Clean the oil pump housing free of dirt/dust/swarf.

15. Ensure the half-moon key is installed on the crank for the sprocket. Apply light amount of anti-seize onto the crank snout.

16. With the OEM backing plate installed (removed on step 7, refer to figure 3), mount your timing belt onto the supplied crank sprocket with the trigger wheel then slide it into position onto the crank snout. Trigger teeth towards the front of the car.

*Figure 3 - Sliding your Sprocket In*

17. Install your timing belt back onto the cam pulley as per manufacturer's recommendation. Tighten your tensioner pulley as per manufacturer's recommendation.

18. Using feeler gauge, screw the crank sensor in until the gap between the sensor face to the crank trigger teeth is 0.8mm.

*Figure 4 - Setting Sensor Gap*

19. Turn the crank around and ensure that the gap between all 12 teeth are at about 0.8mm.

20. Apply medium strength 'blue' Loctite and tighten the sensor nut and the grub screw to lock the sensor into place. The grub screw must be flush to the surface.

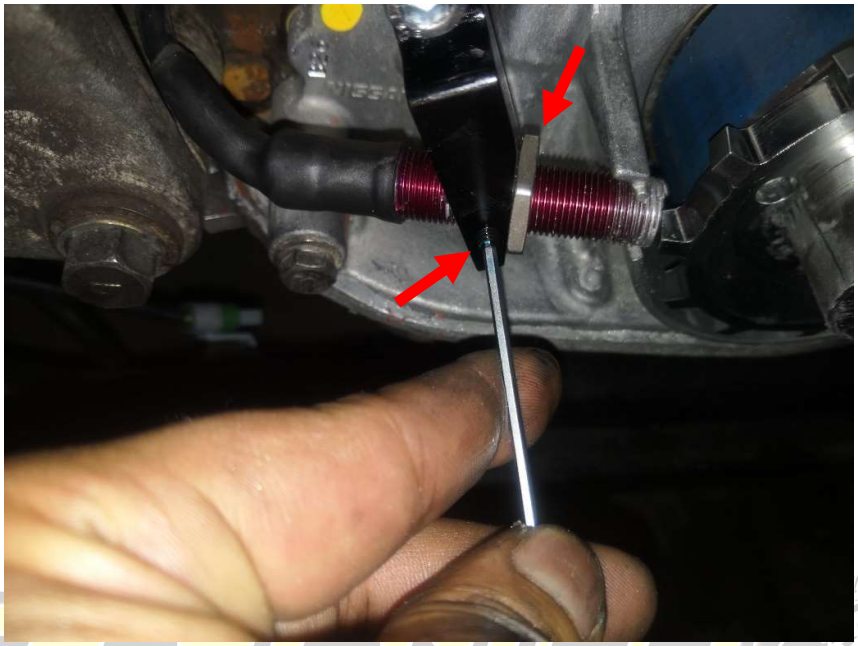
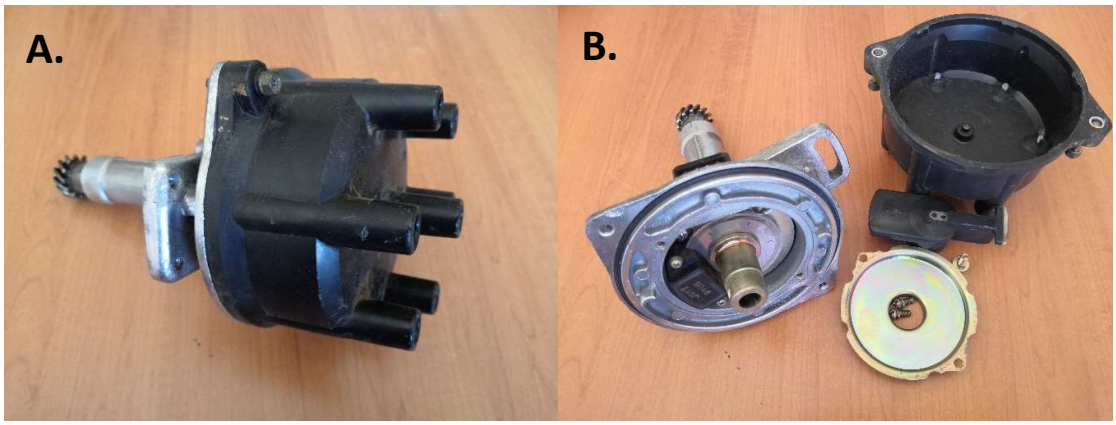


*Figure 5 - Locking the Sensor into Place*

21. Set the engine back to TDC.

22. Remove the OEM distributor.

23. Clean the distributor, remove the igniter module on the side and install the new trigger disc.



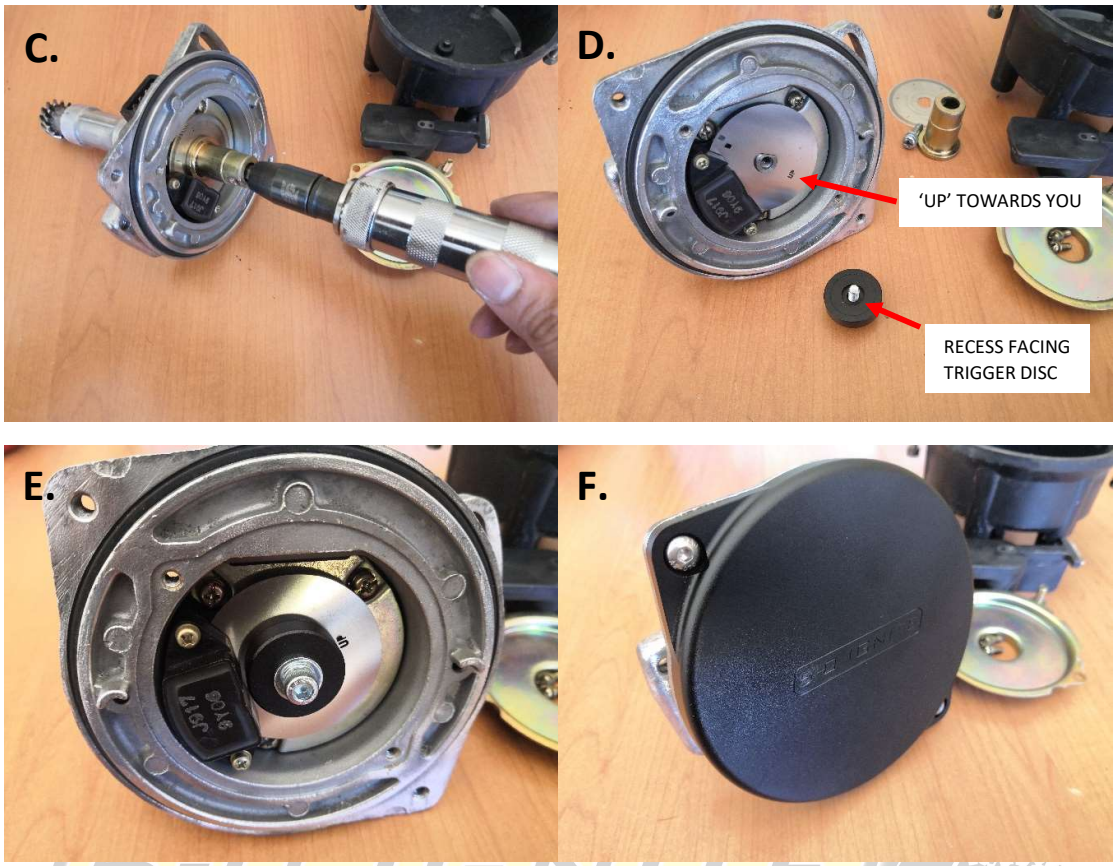



*Figure 6 - Install the Trigger Disc*

**Note:**

- Impact bit may be required to remove the screw as seen on photo 'C'.
- Note the direction of the trigger disc and the mounting washer as seen on photo 'D'.
- CHECK which sensor you have inside your distributor. SMALL diameter disc is for Mitsubishi type sensor. BIG diameter disc is for Hitachi type sensor.
- The trigger disc has two slots, you may choose to utilise the outer or inner sensor indicated in the wiring section. ONLY ONE CAM SENSOR OUTPUT IS REQUIRED, the other is for spare/redundancy.

24. Install the distributor back onto the engine. Follow the marker as per FSM for alignment.

25. **Perform the wiring work for the sensors (refer to the wiring diagram section of this guide).**

**WARNING**


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 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.

26. Install, in reverse order;
    a. Lower and upper timing belt cover
    b. Crank pulley
    c. Ancillary belts
    d. Radiator and fan

27. Plug the distributor sensor connector in.

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

28. Connect the ECU to your laptop and configure these settings;
    a. Trigger edge: Falling
    b. Pull up resistor: Enabled for both trigger 1 (crank) and trigger 2 (cam)
    c. Tooth on crank: 12
    d. Tooth on cam: 1
    e. Crank sensor type: Hall Effect
    f. Cam sensor type: Hall Effect
    g. Filter level: 0 for both trigger 1 (crank) and trigger 2 (cam)
    h. Trigger 'TDC' angle: Start at 60° and adjust with timing light with ignition lock enabled

The trigger angle above is for starting point only as it may be affected by head or block machining, head gasket thickness, camshafts or any other variable that may alter camshaft timing. On certain ECUs (such as Haltech Platinum Sport), **the TDC angle must also be set higher than the maximum ignition timing that you intend to run, this can be achieved by altering the trigger tooth offset.**

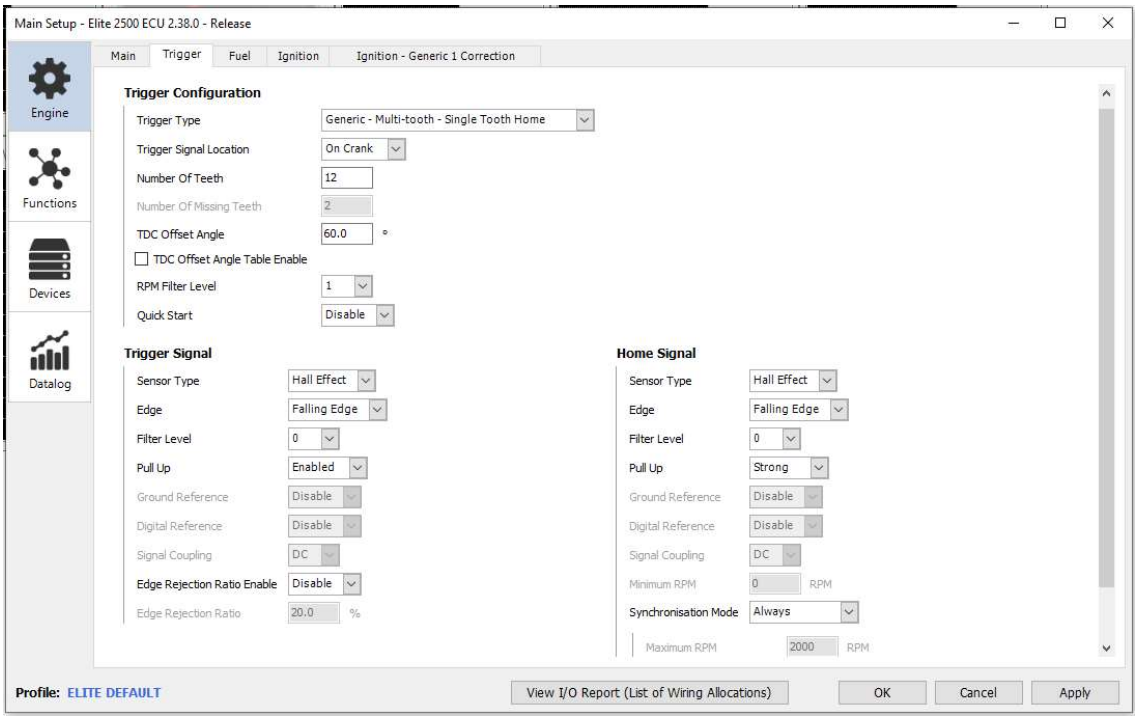



*Figure 7 – Haltech Elite Trigger Configuration Example (ESP Software)*

29. Enable timing lock (i.e. at 10°) and disable the injectors.

30. With a timing light, crank the engine and adjust the trigger angle until the timing on the crank pulley matches the timing lock figure on the ECU. If you have converted to C.O.P, coil on plug extension lead such as DAT-Equipment TE010 or the like, is required to mount your timing light inductive clamp onto.

31. Once all parameters are satisfactorily configured, enable the injectors, fill coolant and start the engine.
32. With the engine idling and timing lock still enabled, double check that the timing is still synchronised with the timing lock. Re-adjustment is normal, where the TDC angle is previously set, was set at lower cranking speed.

33. Using a digital oscilloscope or the diagnosis function in your ECU software, analyse the crank and cam home signal simultaneously when the engine is running at operating temperature. **The falling edges between the crank and cam signal must be separated by rotating your distributor housing, otherwise, overlapping signal edges will cause misfire/synchronisation error.**

    For Haltech Elite, rotate the distributor housing until 'home%travel' channel reads approximately 50%. Re-adjust the trigger angle until the ignition timing matches the 'locked' value.

34. Once all set, disable the timing lock.

35. For future timing belt 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.** | • Check if wiring is correct.<br>• Ensure crank trigger sensor gap is set as per step 18, 19 and 20.<br>• Make sure pull up resistor is enabled. |
| **Sensors are outputting signal but engine does not start. Continuous miss counts.** | • Check that the crank signal goes into the crank signal input (trigger 1) on the ECU.<br>• Check that the cam signal goes into the cam signal input (trigger 2) on the ECU. |
| **Engine misfires at operating temperature or under load. *** | • Analyse the signal output, adjust as recommended in step 33. |
| **Engine misfires when clutch is pressed in.** | • Your engine has a worn thrust bearing causing excessive crankshaft axial movement, placing trigger teeth outside the sensor's range. |

*When the cam sensor housing is set incorrectly, belt stretch at high load or even at operating temp may shift the falling edge of the cam home signal to overlap with the crank signal's falling edge. This produces misfire condition as a result of synchronisation error.

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

## CONCLUSION

Installation is now complete. Crank trigger kit on RBs 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 safety margin.

## WIRING DIAGRAM

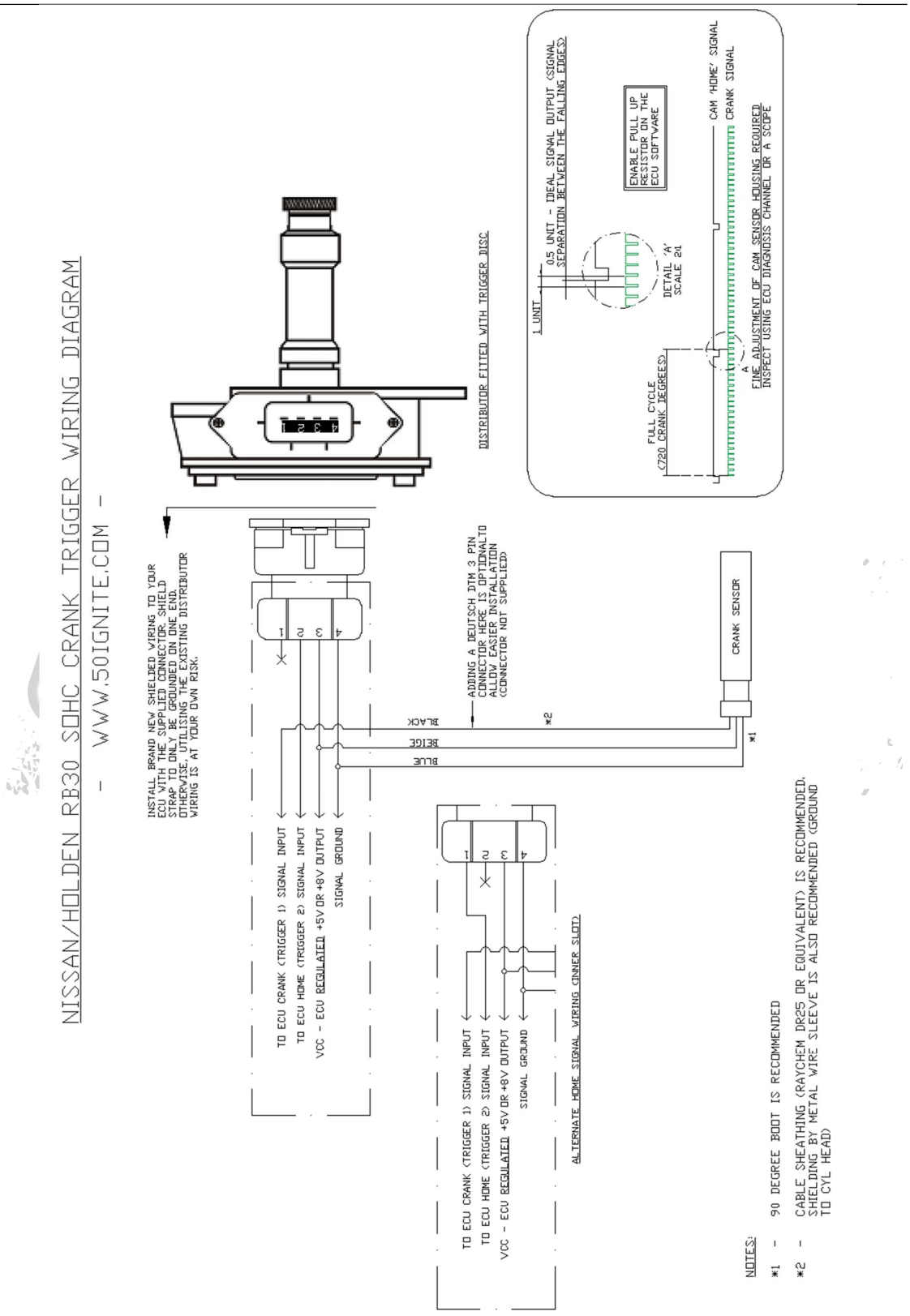



*Figure 8 - RB30 SOHC Trigger Wiring Diagram*

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

Due to possible variance in machining of the OEM crank pulley hub, **some RB crank pulley hub seating face** has insufficient chamfer on the outer edge diameter. Insufficient chamfer leads to incorrect seating of the crank pulley when mated to the supplied crank trigger sprocket. **This is also applicable to some aftermarket brand crank pulleys for all RB**. Use the supplied washer shim only if necessary.

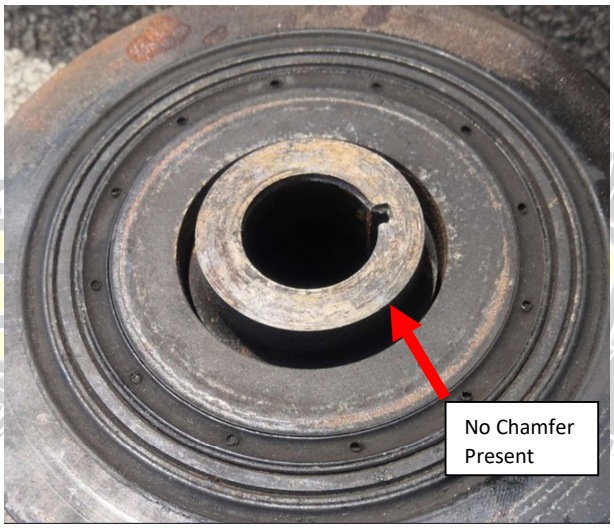



*Figure 9 - R32 GTR OEM Crank Pulley 'A' (Insufficient Chamfer)*

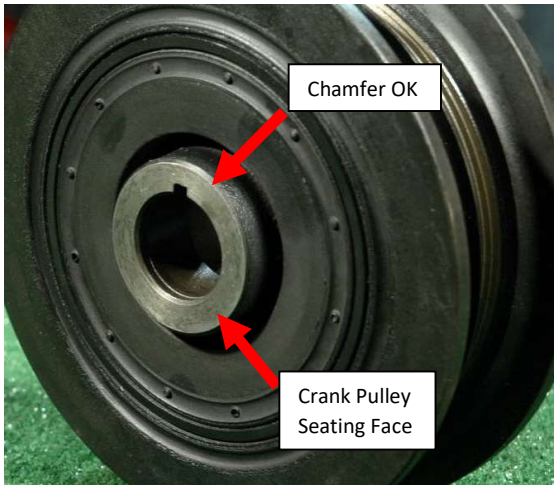



*Figure 10 - R32 GTR OEM Crank Pulley 'B' (Chamfer OK)*

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 11) 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 12) or chamfer the edge of the pulley hub where it makes contact.** Installation of this washer moves the crank pulley forward by negligible amount (~0.6mm).

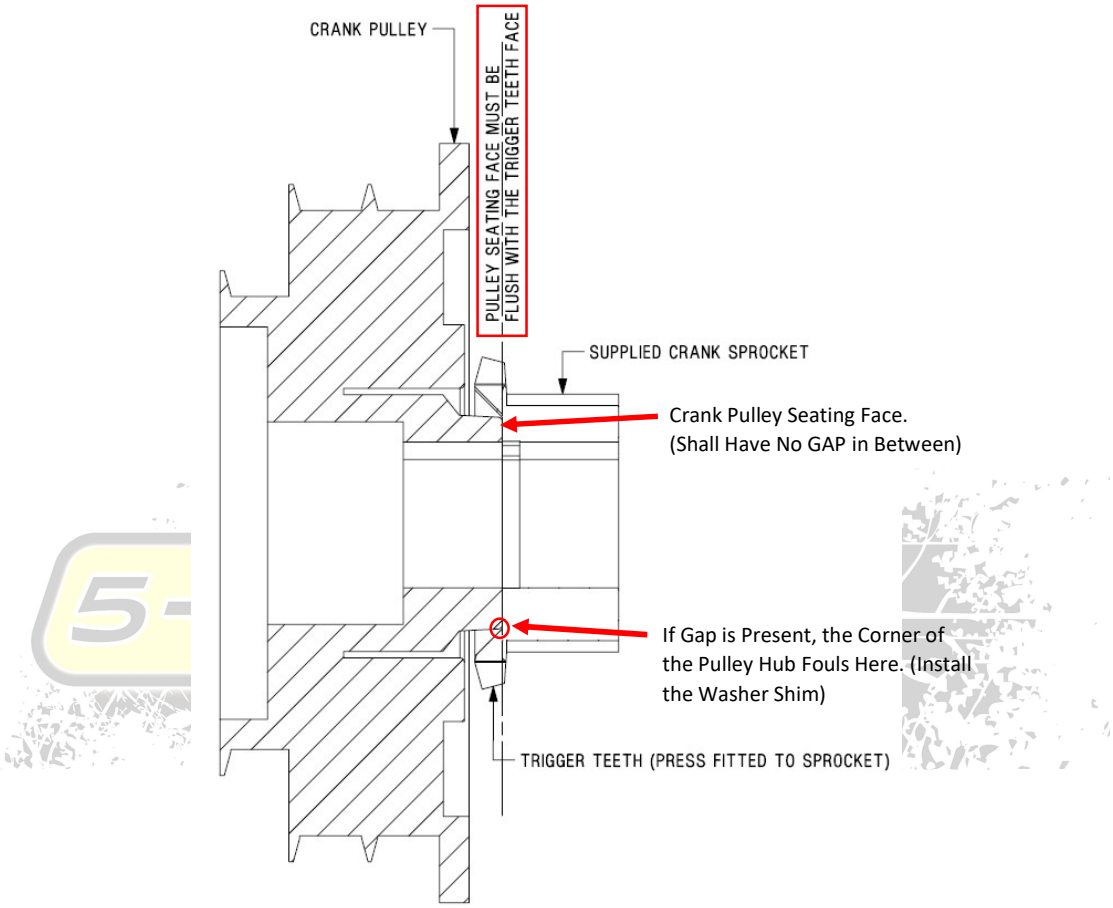



*Figure 11 - Pulley Hub Seating Face Shall be Flush with Trigger Teeth Face*

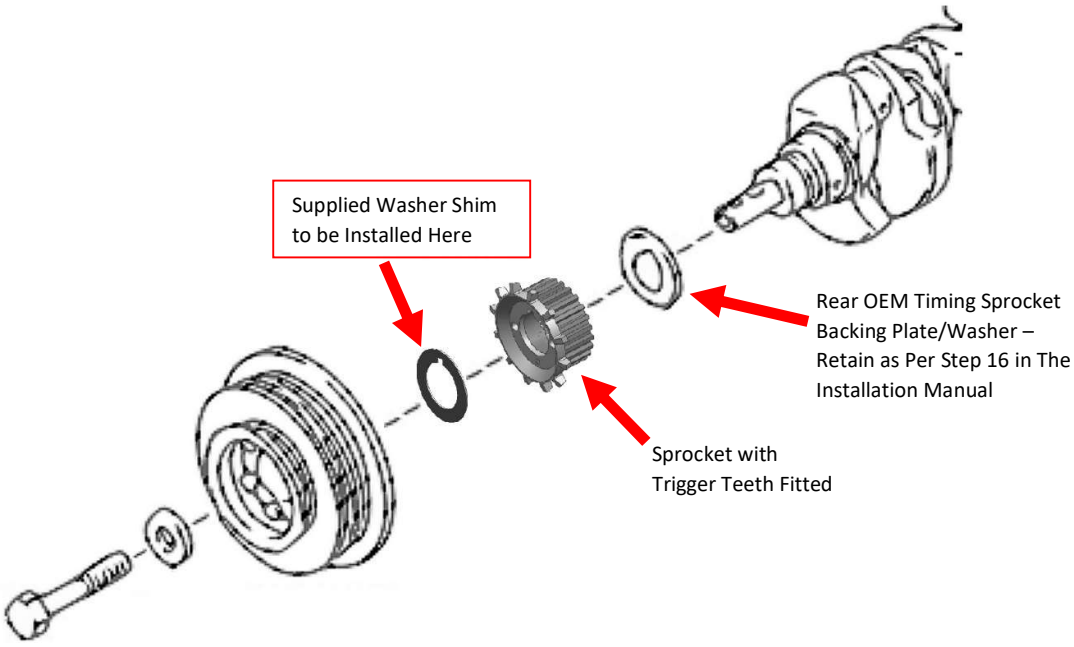



*Figure 12 - Supplied Washer Shim Location*