

ASSEMBLY & INSTALLATION NOTES

JUBU Caterham 410 Power Kit (JU01600PRD) for Caterham 340

Please follow the instructions in this manual for a proper assembly & installation of the JUBU Caterham 410 Powerkit for Caterham 340.

Please find in this document:

- 1. PART LIST**
- 2. ASSEMBLY & INSTALLATION NOTES**

1. PART LIST for product JU01600PRD

#	ITEM	ART-NO.	UNITS
1	Caterham 340 JUBU camshaft set	JU01385ART	1
2	Upgrade valve spring set	JU01386ART	1
3	Valve spring retainers set	JU01387ART	1
4	Spark plugs	CA00481	4
5	Upgrade Air filter	JU00749ART	1
6	Haltech JUBU ECU	JU00078ART	1
7	ECU JUBU Adapter box	JU00262PRD	1
8	ECU Adapter box bracket	JU01276ART	1
9	ECU Adapter Wiring harness without heater Box	-	1
10	ECU Adapter Wiring harness with heater Box S3	-	1
11	ECU Adapter Wiring harness with heater Box S5	-	1
12	OBD-II adapter wiring loom		1
13	Haltech cable		1

#	ITEM	ART-NO.	UNITS
14	Ø50 Cable grommet	-	1
15	M4x12 countersunk screws	-	4
16	Self-adhesive Velcro-fasteners	-	1

Blue marked: Depending on the specifications of the car

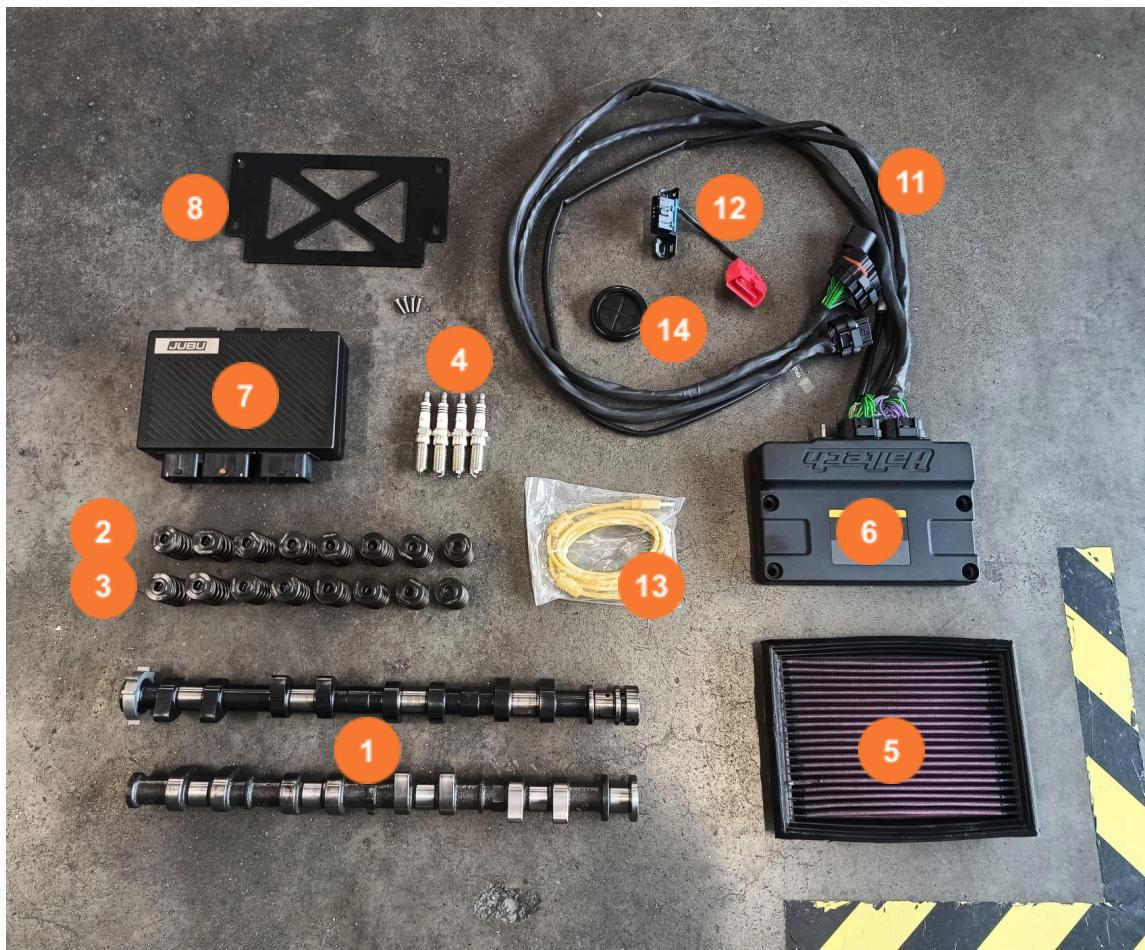


Fig 1: Scope of delivery 1

2. ASSEMBLY & INSTALLATION NOTES

Level of difficulty: **COMPLEX**

Required time: **5h - 8h** (depends on experience, available tools & skills)



NOTE: Unless specified otherwise, following torques are applied on the screws:

- M4: 3Nm
- M5: 6Nm
- M6: 10Nm
- M8: 25Nm
- M10: 50Nm

Required special tools:

- Crankshaft locking pin for Ford Duratec
- Valve clearance tool
- Valve spring remove tool kit
- Spark plug to air hose connector adapter (e.g. from cylinder leak-down tester kit)
- Camshaft positioning tool for Ford Duratec
- M6x50 screw (for positioning the crankshaft pulley)
- Dial gauge with bracket
- Ignition wire extension for Ford Duratec
- Ignition flash gun (we recommend YATO YT-7312)
- Laptop

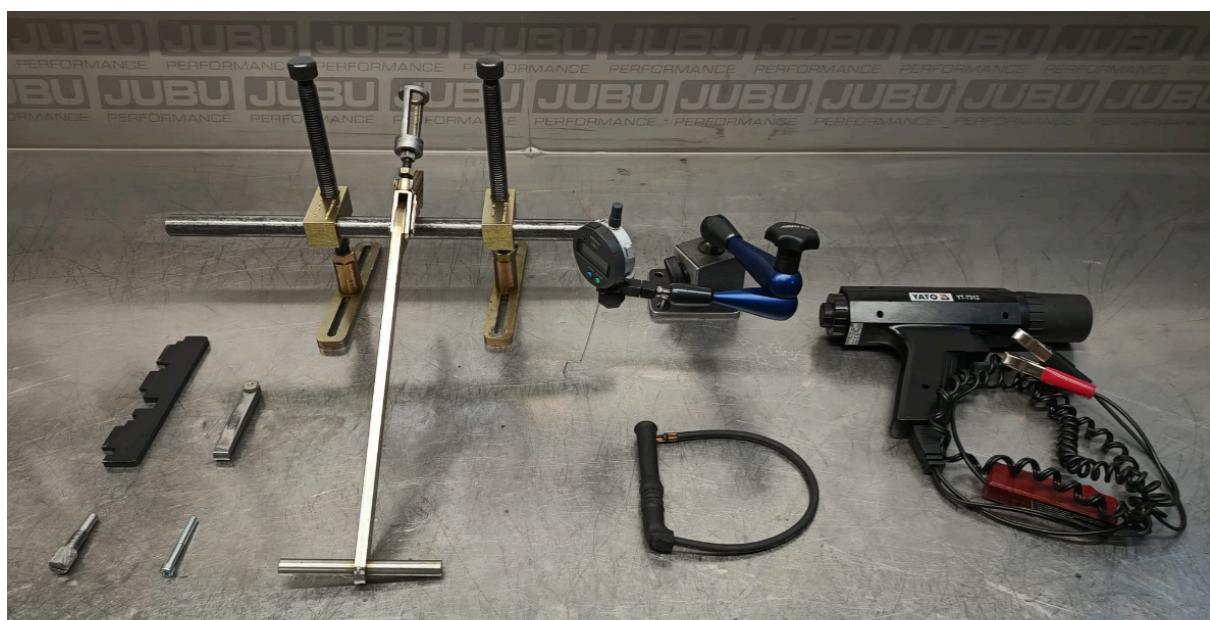


Fig 2: Required special tools

Replacing the Camshafts

1. Remove the valve cover and the timing cover as well as the spark plugs

 **NOTE:** When uninstalling the pulley make sure to not lose the shims.

2. Remove the timing chain and the camshaft sprockets.

 **NOTE:** Never ever loosen the sensor for the crankshaft signal. A slightly misaligned crankshaft sensor will impair the performance of the kit and could cause damage to the engine.

3. Remove the OEM camshafts and the valve tappets.

 **NOTE:** Do not interchange the camshaft bearings or the valve tappets.

4. The valve springs are replaced by the upgrade springs (2) and valve spring retainers (3).

Add pressure to the combustion chamber via the spark plug to air hose connector adapter. Then a suitable valve spring remove tool kit is used for removing the OEM springs and for installing the new ones (2 & 3).

 **NOTE:** Without adding pressure to the combustion chamber the valves will fall in.

5. Reassemble the valve tappets.

6. After rotating the crankshaft to mid-stroke position, the new camshafts (1) are installed. For this step the bearings are lubricated and their screws are tightened crosswise with max. 16Nm.

7. After rotating the camshafts 360° the valve clearance must be checked. On the intake side the clearance should be 0.025mm -0.05mm + 0.10mm. On the exhaust side the clearance should be 0.30mm -0.05mm + 0.10mm.

 **NOTE:** Should the clearance be out of tolerance, exchange the valve tappets.

 **NOTE:** Unfortunately it is not uncommon that the OEM clearance is out of tolerance.

8. The camshafts (1) must be rotated to TDC (use the camshaft positioning tool) and then the crankshaft is set and locked at TDC.

 **NOTE:** Double check if you reached TDC on the first piston via the thread for the spark plug. There is another fixing point on BDC which might be confusing

9. After loosely installing the camshaft sprockets, the timing chain is put back in place. Make sure that the timing chain tensioner is working properly.

10. Rotate the intake camshaft until the intake valves on the 4th cylinder make 0.6mm lift and fix the camshaft phasers with max. 72Nm. Repeat this on the exhaust camshaft at 1.1mm of lift as well.



Fig 4: Use a dial gauge to measure the lift on the valve tappets.

11. After rotating the crankshaft 360° the crankshaft is locked at TDC again, so the lift values can be doublechecked.
12. Reinstall the timing cover and seal it.
13. Double check the crankshaft it must be still at TDC. Rotate the crankshaft pulley until the $\varnothing 6\text{mm}$ hole at its bottom can be positioned with a M6 screw to the timing cover. Once the position is correct, the crankshaft pulley is fixed with 100Nm to the crankshaft. Use *LOCTITE 243* screw locking lacquer.

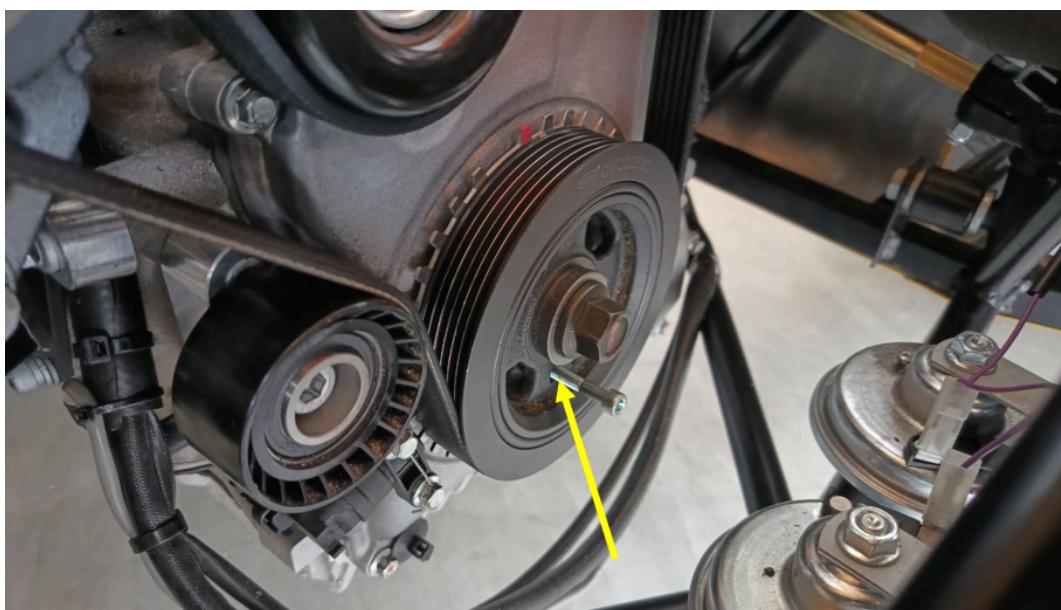


Fig 5: Use the marked hole for positioning the crankshaft pulley correctly to the crankshaft.

14. The remaining engine is reassembled including new spark plugs (4). **Refill the engine oil!**
15. The OEM ECU is replaced by the adapter box (7) which is bolted to the adapter bracket (8) with 4 pcs M4x12 countersunk screws (15). The adapter bracket (8) will be later mounted below the battery with the battery bracket.
16. The position of the Haltech ECU (6) depends on your car.

If your car has no heater the ECU (7) is placed in the engine bay in the center of the bulkhead.

If your car has a heater and is based on the small S3 chassis, the ECU (6) is placed on in the passenger footwell as shown in Fig 6.



Fig 6: Placement of the ECU (6) in a S3 Chassis.

If your car has a heater and based on the bigger S5 chassis, the ECU (6) is placed on the bulkhead in the driver footwell as shown in Fig 7.



Fig 7: Placement of the ECU (6) in a S5 Chassis.

Once you know your position, the ECU (6) is fixed to its place with self adhesive velcro fasteners (16).

17. If the ECU (6) is placed in the footwell a Ø50mm hole is drilled into the bulkhead as shown in Fig 5 or Fig 6 depending on if you are working on a S3 chassis (Fig 8) or S5 chassis (Fig 9).



Fig 8: Creating a passage in the bulkhead for the wiring harness (10) on a S3 chassis.



Fig 9: Creating a passage in the bulkhead for the wiring harness (11) on a S5 chassis.

18. Connect the ECU (6) to the adapter box (7) via the adapter wiring harness (9/10 / 11). Use a cable grommet to protect the wiring loom through the bulkhead (14).
19. Once everything is connected and all cables are fastened, put the battery back into position and fit them together with the adapter box bracket (8).
20. Install the upgrade air-filter (5).
21. Double check the position of the crankshaft pulley. Set the crankshaft to TDC with the locking pin and double check the position on the first spark plug hole.
22. Choose a good visible tooth on the crankshaft sensor ring and mark it with a bright colour. Also mark the current position of the selected tooth on the timing cover. The locking pin **must** be removed again.

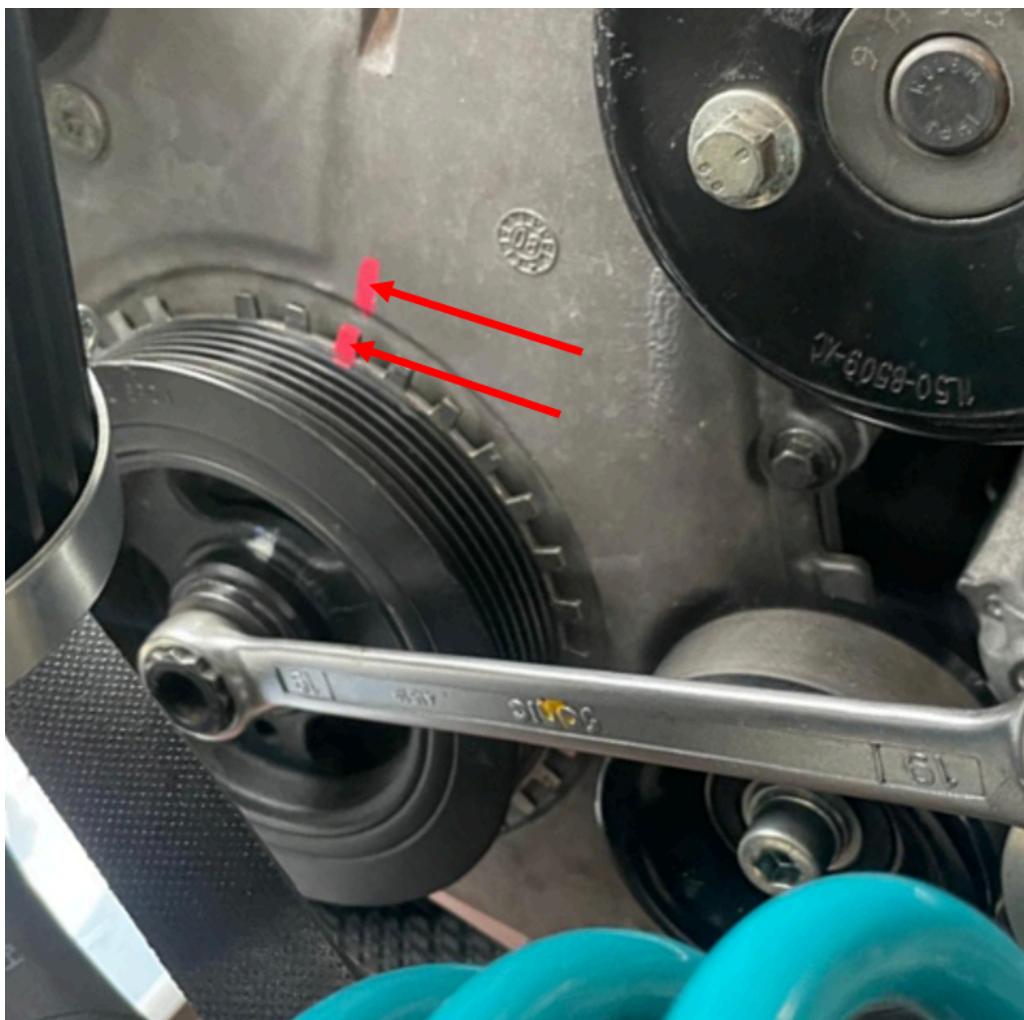


Fig 10: Mark the position of the crankshaft sensor ring.

23. Put the ignition wire extension between the spark plug on cylinder one and its ignition coil.
24. Connect the ignition flash gun to the battery and take the signal from the ignition wire extension. Check if the ignition flash gun is working while the engine is running.
25. Prepare your laptop by installing Haltech NSP and TeamViewer and contact our JUBU technician 2-3 days before you are ready to start with the meeting.
26. Connect your laptop to the Haltech ECU (6) via the Haltech cable (13). If your car battery voltage is bad, please connect your car to a 12V battery charger.

⚠ NOTE: Make sure to have a stable internet connection for the next steps.

27. Connect to the JUBU Software engineer (René) via TeamViewer.

⚠ NOTE: You will get the TeamViewer ID and password via email at r.rosinger@jubu-performance.com or via WhatsApp +43 664 466 69 36.

28. The JUBU Software engineer will set the ignition timing to 0°.
29. The ignition flash gun is used to check if the two markings that were made on the tooth of the crankshaft sensor ring and the timing cover meet each other while the ignition flash gun is flashing.
 - ⚠ NOTE:** Make sure that the ignition flash gun is set to 0° as well.
 - ⚠ NOTE:** If the markings are on different positions, it means that the crankshaft pulley is out of position. A very precise pulley position is required for maximum power output and a healthy running engine.
30. If the correct crankshaft position is confirmed the JUBU technician will set the ignition timing back to normal and the JUBU power kit 410 is ready to use.
31. If you intend to use the OBD-II connector, the OBD-II adapter wiring loom (12) is required, because otherwise the signal will be corrupted.

If you have any questions or need additional information, please contact us by email:
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