

# Timing Tool Kit User Manual



Read Carefully Before Use  
Keep for Future Reference

# SAFETY INFORMATION

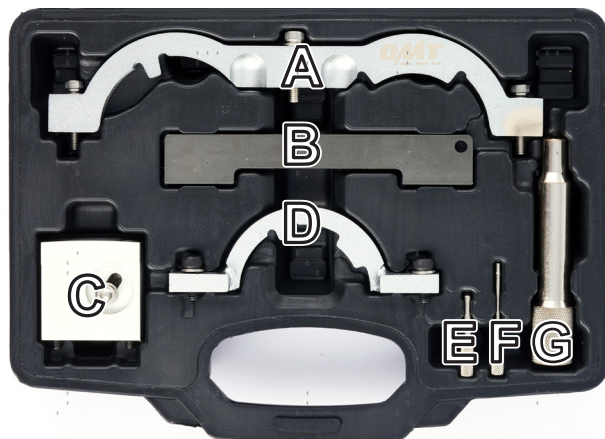
## DANGER!

- The instructions provided herein are only for general information. **ALWAYS** perform all repairs in full compliance with your vehicle's service manual. After any repair, test your engine and vehicle in your workshop and at low speed before returning to normal use. Failure to do so may result in brake failure, serious property damage, and severe personal injury.
- **DO NOT** allow children or those unfamiliar with this product and its compatible engines to use it. Do not use while under the influence of alcohol, drugs, or any medication that negatively affects your judgment or reflexes. Keep children and bystanders away during use.
- Keep your work site clean and well lit. Cluttered and dark work areas invite accidents.
- For best results, keep the kit clean and dry. Remove any fluid, oil, or grease before and after work, particularly from the handle and fittings.
- **ALWAYS** use personal protective equipment (PPE) suitable to your task. Always wear ANSI-approved eye and hand protection while using this product. Nonslip footwear is also highly recommended. Other equipment such as ear, head, and body protection may also be necessary depending on your work and other equipment.
- Dress properly for automotive servicing. Do not wear loose clothing or jewelry and keep hair, clothing, gloves, hoses, and tools away from any moving parts during use.
- **ALWAYS** know and understand the specific safety warnings and instructions for your vehicle before using this kit. Use the correct fluids, pressures, adapters, etc. for your vehicle. Make sure the parking brake is activated before beginning any work. Use with jack and jack stands able to fully support the necessary weight. Never touch any heated surface with exposed skin.
- Do not overreach. Keep proper footing and balance at all times.
- **DO NOT** use excessive pressure with this product and do not force it or its attachments.
- Maintain this product. Check for misalignment, binding, wear, or other damage before use. If any damage is detected, repair or replace the problematic components before further use. In a large shop, mark such tools **DO NOT USE** until they have been repaired. Only replace components with identical parts.

# SPECIFICATIONS

<b>Material</b>	AISI 1045 Steel	
<b>Case Dimensions</b>	11.8×8.5×2.4 in.	30×21.5×6.2 cm
<b>Net Weight</b>	4 lb.	1.8 kg

# PARTS LIST



No.	Name	OEM Equivalent
A	Camshaft Sensor Setting Tool	EN-49977-100
B	Camshaft Locking Plate	KM-953-A
C	Camshaft Sprocket Holding Tool	EN-49977-200
D	Camshaft Sensor Setting Tool	EN-499-78
E	4 mm Chain Tensioner Locking Pin	KM-955-1
F	2.5 mm Chain Tensioner Locking Pin	KM-955-2
G	Crankshaft Locking Pin	KM-952 & EN-952

## OPERATION

### Timing Check

1. Remove the engine cover. Use a suitable tool to remove the ignition module and the camshaft cover.
2. Rotate the crankshaft in the direction of the engine's rotation until the mark on the crankshaft pulley is aligned with the corresponding mark on the engine. This step helps ensure that the crankshaft is in the correct position for timing adjustments.



3. Locate and remove the blanking plug located at the front of the engine. This plug provides access to essential components for timing inspection and adjustment.



4. Insert the crankshaft locking pin (G) fully into the engine, ensuring that it engages securely. This should lock the crankshaft at the top dead center (TDC) position.



5. Check the position of the slots in the rear of the camshafts. With cylinder number 1 at the TDC position, the slots should be positioned horizontally and above the surface of the cylinder head. This indicates that the camshafts are properly aligned.

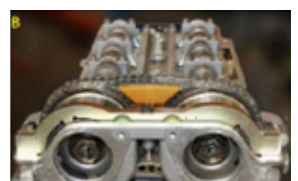


If you find that the slots in the camshaft are horizontally positioned but located below the surface of the cylinder head, remove the crankshaft locking pin and rotate the crankshaft one full revolution in the direction of the engine's rotation. Then, reinsert the crankshaft locking pin and recheck the position of the slots in the rear of the camshafts.

6. Install the camshaft setting plate into the slots at the rear of the camshafts. These setting plates help maintain the proper alignment of the camshafts during the timing check process.



7. Select the appropriate camshaft sensor setting tool. For 1.0L 3-cylinder engines, use tool D. For 1.2L/1.4L 4-cylinder engines, use tool A. Install the chosen tool correctly to ensure precise timing adjustments.



## Engine Timing Adjustment

1. Remove all previously installed tools. Remove the valves from the cylinder head according to the instructions in your vehicle's service manual.

2. Rotate the crankshaft in the direction of the engine's rotation until the mark on the crankshaft pulley is aligned with the corresponding mark on the engine. This ensures proper positioning of the crankshaft for timing adjustments. Install the crankshaft locking pin fully into the engine, making sure that it securely locks the crankshaft at the top dead center (TDC) position.



3. Remove the timing chain tensioner cap to prepare for further adjustments.

4. Using a suitable wrench, apply force in the direction of engine rotation to compress the chain tensioner. While the tensioner is in its compressed position, install the 2.5 mm tensioner locking pin (F).

5. Use an appropriate wrench on the machined hexagon of the inlet camshaft as a counter hold and release the central bolt of the camshaft sprocket. This will allow the camshaft sprocket/timing disc to rotate freely.

6. With a wrench on the machined hexagon, adjust the position of each camshaft so that the slots in the rear of the camshafts are positioned horizontally and above the surface of the cylinder head. Install the camshaft setting plate to maintain proper alignment.



7. Replace the camshaft sprocket central bolts, ensuring that the Variable Valve Timing (VVT) units and sensor discs can rotate freely on the camshafts. Apply a small amount of clean engine oil to the flange of the new bolts before fitting them to prevent rotation of the sensor disc during the final tightening procedure.

8. Remove the 2.5 mm tensioner locking pin from the timing chain tensioner.

## Camshaft Timing and Sensor Adjustment

1. Remove the timing chain guide from the cylinder head according to your vehicle's service manual.

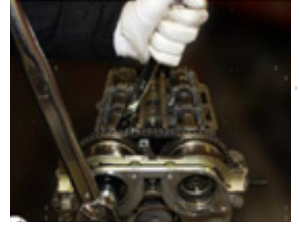
2. Install the camshaft sprocket holding tool (C) onto the cylinder head, leaving the two retaining screws and one locking bolt loose.

3. Slide the camshaft sprocket holding tool towards the inlet camshaft sprocket and tighten the two retaining bolts securely.

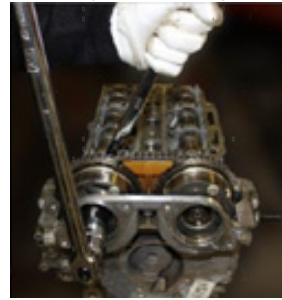
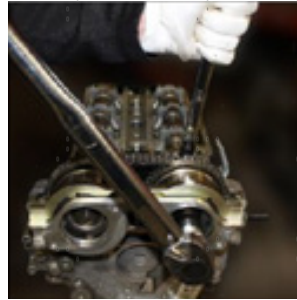
4. Adjust the locking wedge until it fully engages in the teeth of the inlet camshaft sprocket. Then, tighten the bolt to lock the wedge and sprocket in position.



5. Select the appropriate camshaft sensor setting tool. For 1.0L 3-cylinder engines, use tool D. For 1.2L/1.4L 4-cylinder engines, use tool A. Install the chosen tool correctly to ensure precise timing adjustments.



6. Use an appropriate wrench on the machined hexagon of the inlet camshaft as a counter hold and tighten the central bolt of the camshaft sprocket to 50 Nm. Repeat the same process for the exhaust camshaft.



7. Remove the camshaft sprocket holding tool and reattach the timing chain guide to the cylinder head.
8. Use an appropriate wrench on the machined hexagon of the inlet camshaft as a counter hold and tighten the central bolt of the camshaft sprocket to its final torque value (50Nm + 60°). Repeat the same process for the exhaust camshaft.
9. Remove all tools used for adjusting the camshaft timing.
10. Rotate the crankshaft two full revolutions in the direction of the engine's rotation, returning to the top dead center (TDC) position on cylinder No.1.
11. Check the engine timing by refitting the crankshaft locking pin, camshaft locking plate, and appropriate camshaft sensor setting tool.
12. If you encounter any difficulties or are unable to fit all the tools correctly, it indicates that further timing adjustment is required. In such cases, it is recommended to seek assistance from a qualified technician or refer to the vehicle's repair manual for further guidance.



## MAINTENANCE

- Clean the tools with a soft damp cloth using a mild detergent or solution after use. Do not rinse them or use abrasive cleaners or caustic chemicals.
- For best results, lubricate the tools with high-quality anti-corrosive oil between uses.
- Check the parts of the tools periodically for any wear or damage. Repair or replace any problematic parts before further use.
- If the tools will not be used for an extended period of time, clean and lubricate them and store them in a cool dry place inaccessible to children.

# FITMENT

Make	Model	Engine	Engine Code	
Cadillac	ELR(2014)	1.0L	A10XEP	
Chevrolet	Aveo (2011–2015)	1.0L Ecoflex	A10XEP	
	Cruze (2011–2015)	1.2L	A12XEL	
	Orlando (2011–2015)		LWD/A12XEL	
	Trax( (2013–2015))		L2Q/A12XEL	
	Volt (2012–2014)		LWD/B12XEL	
Holden	Volt (2012–2014)	1.2L Ecoflex	A12XEL	
Vauxhall/Opel	Agila (2000–2003)		A12XER	
	Agila B (2008–2010)	1.4L	A14XER	LDD/B14XEJ
	Adam (2012–2018)		LUJ/A14NET	LDD/B14XEL
	Adam Rocks (2014–2018)		LDD/A14XEL	LDD/B14XER
	Ampera (2011–2016)		LDD/A14XER	LUH/B14NEL
	Astra GTC (2015–2018)		LDD/A14XEL	LUJ/B14NEH
	Astra–J (2009–2018)		A14XEL	LUJ/B14NEL
	Cascada (2013–2018)		L2Z/A14XEL	LUJ/B14NET
	Corsa C (2000–2014)		1.4L Ecoflex	LDD
	Corsa D (2006–2014)	LUU		LDD/B14XEL
	Corsa E (2015–2018)	LUJ/A14NET		LDD/B14XER
	Insignia (2011–2017)	A14XER		LUJ/B14NEL
	Meriva B (2010–2017)	LUH/A14NEL		LUJ/B14NET
	Mokka (2012–2016)	1.4L Turbo		LUJ/A14NET
	Mokka X (2016–2018)		LUJ/A14NEL	
	Zafira C Tourer (2012–2018)	1.6L	LDE/A16XER	
			LDE/B16XER	

## Contact Us

Thank you for choosing our products! If you have any questions or comments, contact us at [support@orionmotortech.com](mailto:support@orionmotortech.com) and we'll resolve your issue ASAP!

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