

Thank you for purchasing a Sealey product. Manufactured to a high standard this product will, if used according to these instructions and properly maintained, give you years of trouble free performance.



IMPORTANT: PLEASE READ THESE INSTRUCTIONS CAREFULLY. NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS AND CAUTIONS. USE THE PRODUCT CORRECTLY AND WITH CARE FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY. PLEASE KEEP INSTRUCTIONS SAFE FOR FUTURE USE.

1. SAFETY INSTRUCTIONS

- WARNING!** Ensure Health and Safety, local authority and general workshop practice regulations are adhered to when using tools.
- DO NOT** use tools if damaged.
- Maintain tools in good and clean condition for best and safest performance.
- Ensure that a vehicle which has been jacked up is adequately supported with axle stands.
- Wear approved eye protection. A full range of personal safety equipment is available from your Sealey dealer.
- Wear suitable clothing to avoid snagging. **DO NOT** wear jewellery and tie back long hair.
- DO NOT** attempt to start engine or move vehicle whilst in gear with locking devices fitted.
- Always display warning notification on steering wheel when locking engine components.
- Account for all tools, locking bolts, pins and parts being used and do not leave them in or near the engine.
- WARNING!** Incorrect or out of phase camshaft timing can result in contact between valve head and piston crown causing damage to the engine.
- IMPORTANT:** These instructions are provided as a guide only. Always refer to the vehicle manufacturer's service instructions, or a proprietary manual, to establish the current procedure and data.

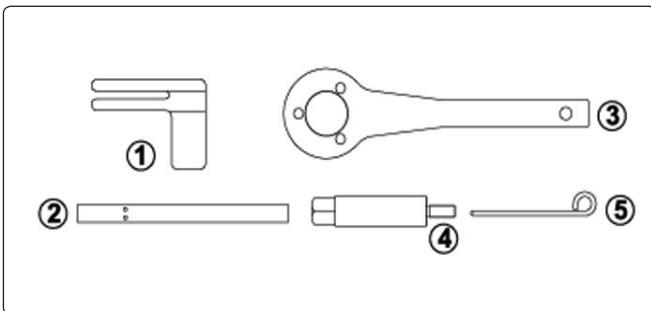
2. CONTENTS & APPLICATIONS

Required for removal/installation of the timing chain assembly. Relevant setting/locking tools for particular vehicles/engines will also be required (not supplied in this set). Set contains balance shaft alignment, crankshaft holding and chain tensioner tools.

Additional Sealey Tools required:

VS4939 Handle - for use with VS5018 Holding Tool.

NOTE: Additional Camshaft Setting Plate(s) and Flywheel Locking Pin will be required from the appropriate Setting/Locking Tool Kit associated with the engine - see application chart overleaf.



Item	Part Number	Description
1	VS5016	Balancer Shaft Alignment Tool
2	VS5017	Balancer Shaft Alignment Tool
3	VS5018	Crankshaft Gear Holding Tool
4	VS5019	Crankshaft Gear Holding Tool Support
5	VS4413	Chain Tensioner Pin
--	VS5045-84	Case and Insert

Applications:

BMW 1.8, 2.0, 2.5, 3.0, BMW Mini / Citroën - Peugeot 1.4 and 1.6 Petrol engines (Chain) in:

BMW:	Engines:
118i E87 (04-07) 120i E87 (04-07) 316i E46 (01-05) 316ti Compact E46 (01-05) 318i E46 (01-07) 318ti Compact E46 (01-05) 318i E90 (05-08) 320i E90 (05-08) 520i E60 (04-08) Z4 2.0 E85 (04-08) X3 2.0i E83 (05-08)	N42 / N46 B18 B18A B20 B20A B20B
116i E81/E87 (03-08) 316i E46/E90 (01-08) 316Ci E46 (01-06) 316ti E46 (01-05)	N40 / N45 / N45T B16
128i E82 (07-08) 130i E81/E87 (05-08) 135iS E82 (07-08) 323i E90/91/92/93 (04-08) 325i/xi E90/91/92/93 (04-08) 328i/xi E90/91/92/93 (04-08) 330i/xi E90/91/92/93 (04-08) 335i/xi E90/91/92/93 (05-08) 523i/Li E60/61 (04-08) 525i/Li/xi E60/61 (04-08) 528i/xi E60/61 (06-08) 530i/Li/xi E60/61 (05-08) 535i/xi E60/61 (06-08) 630i E63/64 (04-08) 730i/Li E65/66 (04-08) X3 2.5/3.0 E83 (06-08) X5 3.0 E70 (06-08) Z4 2.5/3.0 E85/86 (05-08)	N51 / N52 / N52K / N53 / N54 Valvetronic N53 / N54 Direct Injection Non - Valvetronic
BMW Mini: R55/R56 Cooper S (06-09) R55/R56 Cooper (06-09) R56 Mini One (07-09)	N12 / N14
Peugeot: 207 (06-09) 207CC (07-09) 308 (07-09) Citroën: C4 Picasso (08-09) C4 (08-09)	EP3(8FS) EP6(5FW) EP6DT(5FX) EP6DTS(5FY)

IMPORTANT: Always refer to the vehicle manufacturer's service instructions, or proprietary manual, to establish the current procedures and data. Product Information Sets detail applications and use of the tools with any general instructions provided as a guide only.

VS5045 Timing Chain Service Tool Set

Removal of the Timing Chain assembly requires the use of the appropriate Camshaft Setting Plates and Flywheel Locking Pins (not in VS5045 kit) from the associated Engine Setting / Locking Tool Kits listed in the application chart below.

The service tools in this set are required when replacing the timing chain and other applications which involve the removal of the chain assembly on the models / engines detailed below:-

Set contents:

- **VS5016** Balancer Shaft Alignment Tool
- **VS5017** Balancer Shaft Alignment Tool
- **VS5018** Crankshaft Gear Holding Tool
- **VS5019** Crankshaft Gear Holding Tool Support
- **VS4413** Chain Tensioner Pin

Application Chart							
Models	Engines	VS5016	VS5017	VS5018	VS5019	VS4413	Associated Tool Kits required for Camshaft Setting Plate and Flywheel Locking Pin
BMW 118i E87 120i E87 316i E46 316ti E46 318i E46 318ti E46 318i E90 320i E90 520i E60 Z4. 2.0 E85 X3 2.0i E83	N42/N46 B18/B18A B20/B20A B20B	●	●	●		●	Exhaust Camshaft Alignment Tool Screw Inlet Camshaft Alignment Tool Exhaust Camshaft Alignment Tool Flywheel TDC Locking Pin
116i E81/E87 316i E46/E90 316Ci E46 316ti E46	N40/N45/N45T B16	●	●	●		●	VS4870 Kit VS4868 Camshaft Setting Plate Assembly VS4801 Flywheel Locking Pin
128i E82 130i E81/E87 135iS E82 323i E90/91/92/93 325i/xi E90/91/92/93 328i/xi E90/91/92/93 330i/xi E90/91/92/93 335i/xi E90/91/92/93 523i/Li E60/61 525i/Li/xi E60/61 528i/xi E60/61 530i/Li/xi E60/E61 535i/xi E60/E61 630i E63/64 730i/Li E65/66 X3 2.5/3.0 E83 X5 3.0 E70 Z4 2.5/3.0 E85/86	N51/N52/ N52K/N53/N54 Valvetronic N53/N54 Direct Injection Non - Valvetronic			●	●	●	VS5000 Kit VS5002 Camshaft Setting Assembly VS5001 Flywheel Locking Pin
BMW Mini R55/R56 Cooper S R55/R56 Cooper R56 Mini One	N12/N14			●		●	VS5020 Kit VS5021 Flywheel Locking Pin. VS5022 Exhaust Camshaft Setting Plate (N12/N14). VS5023 Inlet Camshaft Setting Plate (N12). VS5024 Inlet Camshaft Setting Plate (N14).
PSA Peugeot 207CC 207 308 Citroën C4 Picasso C4	EP3(8FS) EP6(5FW) EP6DT(5FX) EP6DTS(5FY)			●		●	VS5020 Kit VS5021 Flywheel Locking Pin. VS5022 Exhaust Camshaft Setting Plate (EP3/EP6/EP6DT). VS5023 Inlet Camshaft Setting Plate (EP3/EP6). VS5024 Inlet Camshaft Setting Plate (EP6DT/EP6DTS).

3. INSTRUCTIONS

VS5016 / VS5017 Balancer Shaft Alignment Tools

VS5016 and VS5017 are used to re-adjust the balancer shafts when replacing the timing chain.

VS5018 / VS5019 Crankshaft Gear Holding Tool and Support

VS5018 is used to counter-hold the crankshaft when releasing / tightening the central bolt. VS5018 is used in conjunction with VS4939 Handle assembly. (VS4939 Associated Tool - not in set)

NOTE: On N51 and N52 engines the central bolt requires a torque of 100 Nm and +360°. As it is difficult to hold Tool VS5018 steady whilst applying such a high torque/angle specification, support Tool VS5019 is provided to assist retention of the VS5018 Holding Tool whilst tightening the central bolt.

VS4413 Tensioner Pin

VS4413 is used for locking the chain tensioner in position when removing the tensioner on the N51 and N52 engines. It is also used to lock the drive belt tensioner when removing the alternator drive belt, when replacing the timing chain on the N40 N42 N45 N46 engines.

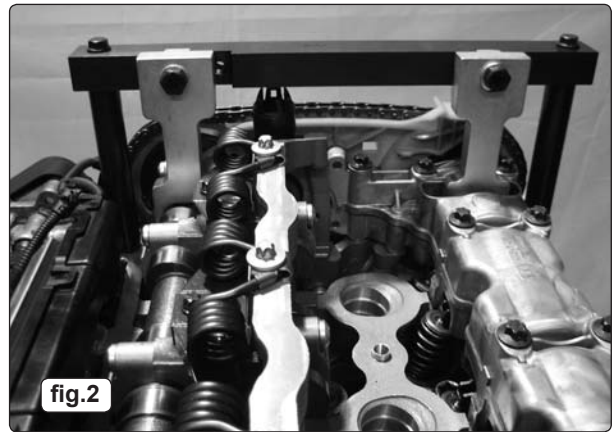
3.1. Removal of the Timing Chain - all listed engines.

It will be necessary to remove the cylinder head cover, all spark plugs, the chain tensioner, belt tensioner and vibration damper.



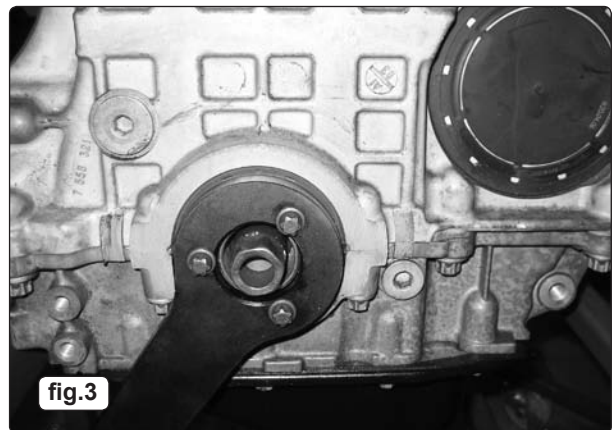
- 3.1.1. With the engine positioned at TDC No.1 cylinder, select the appropriate Flywheel Locking Pin from the relevant Timing Kit (refer to application chart) and insert it through the datum hole, which is located underneath the starter motor, and into the timing hole in the flywheel.

NOTE: The datum hole can be difficult to locate and may be constricted by dirt / corrosion.



NOTE: Fig.2 shows N52 engine

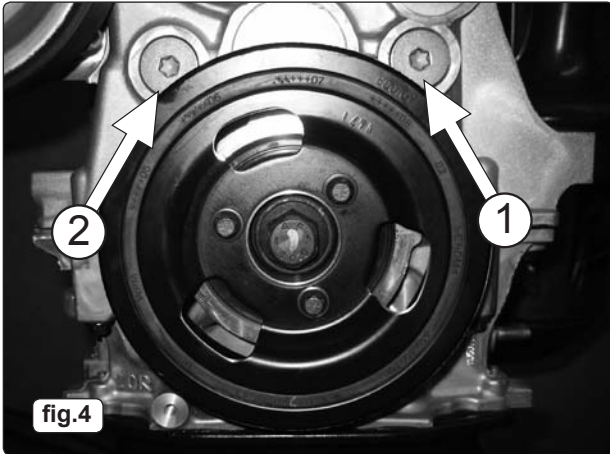
- 3.1.2. Select the appropriate Camshaft Setting Tool from the relevant Timing Kit (refer to application chart). Refer to the individual Kit instructions and position the Camshaft Setting Tools onto the camshaft. If Setting Tools are already in position from earlier applications, do not remove.



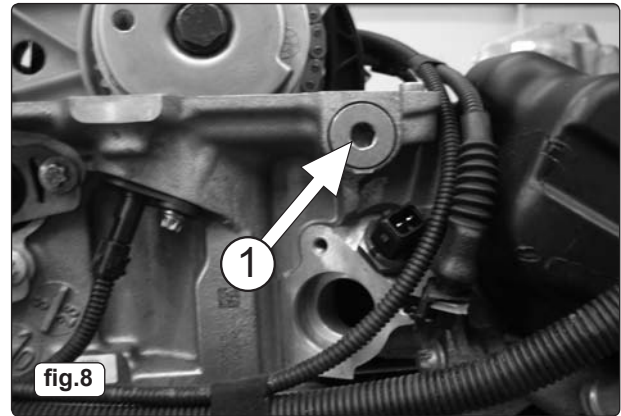
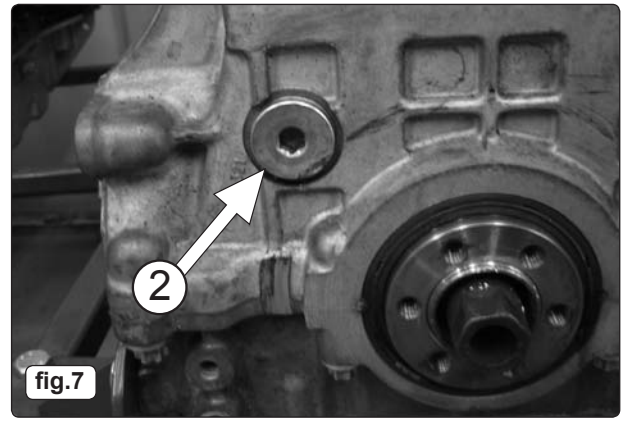
- 3.1.3. Position VS5018 Crankshaft Gear Holding Tool on the hub of the vibration damper and release the central bolt, removing with the hub (fig.3).

IMPORTANT: It is advisable not to rely on the Flywheel Locking Pin and Camshaft Setting Plate Assembly to counter-hold when loosening the central bolt. When releasing the central bolt, hold using a second person the Crankshaft Gear Holding Tool and slacken a quarter turn to approximately 60 Nm. The flywheel pin may now be used as the counter-hold to continue to release the central bolt.

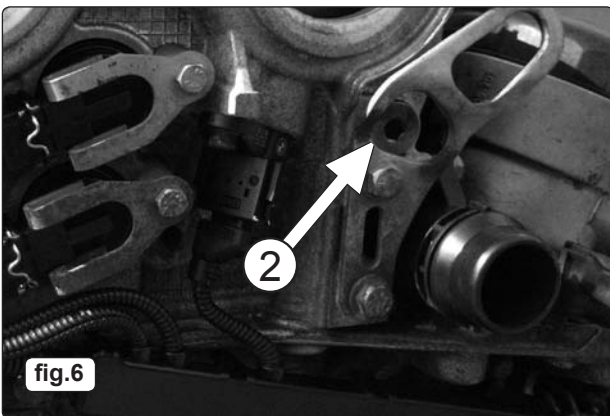
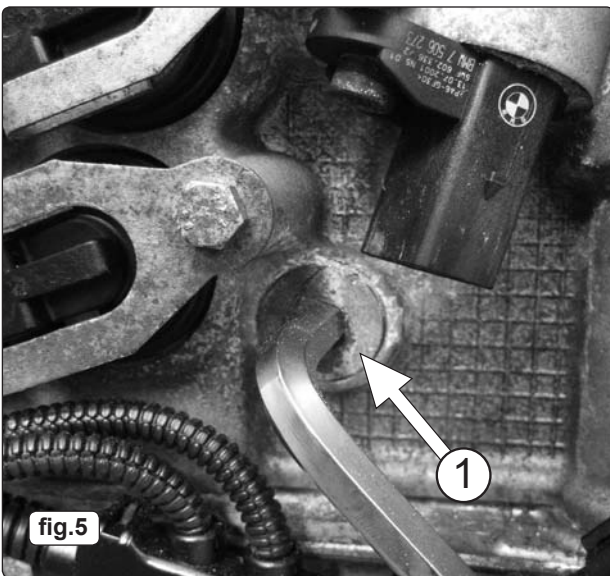
3.2. Release of Bearing Pins on Chain Guide Rails



3.2.1. Fig.4 - N12/N14 chain guide rail bearing pin positions.



3.2.3. Figs.7 and 8 - N51/N52 chain guide rail bearing pin positions.



3.2.2. Figs.5 and 6 - N40/N42/N45/N46 chain guide rail bearing pin positions



3.2.4. **ALL Engines** - Open sealing plugs and release the pins of the chain guide rails.

3.3. VANOS Unit(s) - all engines.

NOTE: On some engines VANOS units are fitted on the Inlet only.

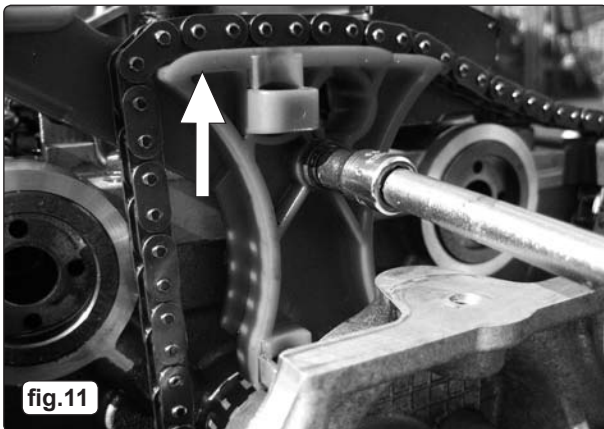


- 3.3.1. Slacken the centre bolts of the VANOS Units. (N51 Engine shown for illustration purposes in fig.10)

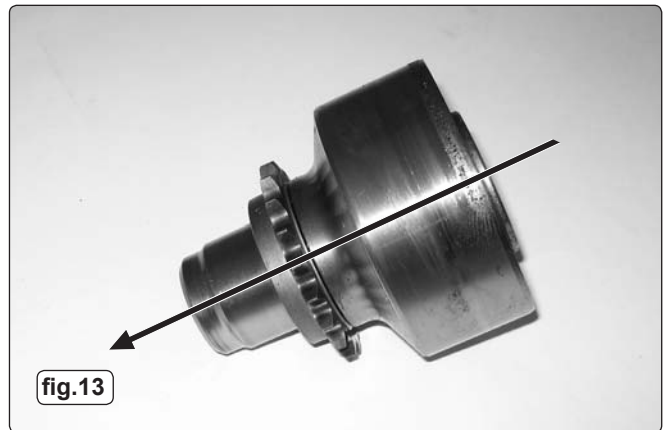
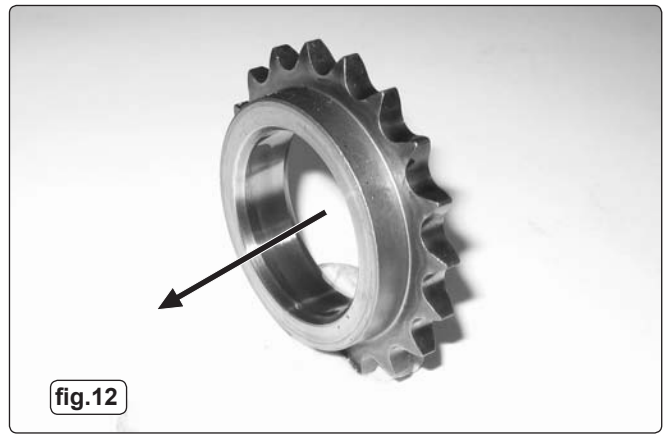
WARNING: These bolts are likely to be tight. It is recommended to counter-hold against camshaft rotation at the hexagon at the rear of the camshafts. It is advisable not to rely on the Flywheel Locking Pin and Camshaft Setting Assembly to counter-hold when loosening these bolts.

- 3.3.2. If VANOS units are fitted to both Inlet and Exhaust camshafts, first detach the exhaust VANOS unit followed by the inlet VANOS unit.

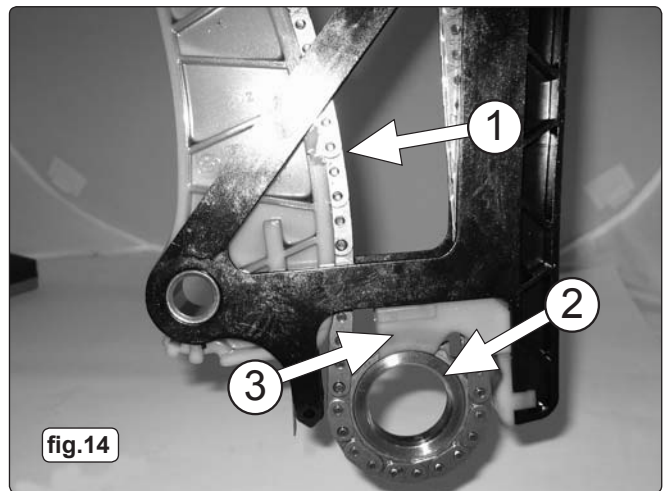
3.4. Removal of Timing Chain Assembly - all engines.



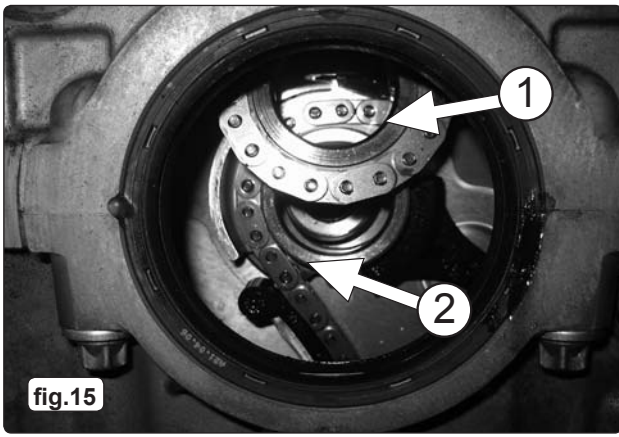
- 3.4.1. Release screw of chain guide.
Remove the timing chain module with timing chain and camshaft sprocket wheel upwards in the direction of arrow shown in fig.11.



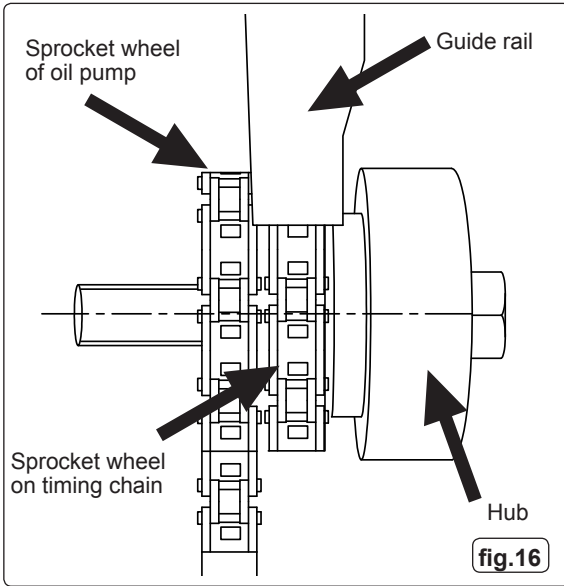
IMPORTANT: Note the installation direction of the crankshaft sprocket wheel in relation to the crankshaft, as incorrect assembly will result in engine damage (figs.12 and 13).



- 3.4.2. Prior to installing the chain assembly, pull timing chain (fig.14.1) upwards until the crankshaft sprocket wheel (fig.14.2) engages in the chain guide rail (fig.14.3).
- 3.4.3. The chain (fig.14.1) and crankshaft sprocket wheel (fig.14.2) **MUST BE** installed as an assembly. To keep the chain assembly together place a rubber band around the two guide rails. Insert the timing chain assembly, ensuring that the timing chain remains in this position to prevent the chain getting jammed.



3.4.4. Fig.15.1. Sprocket wheel of timing chain
Fig.15.2. Sprocket wheel of oil pump



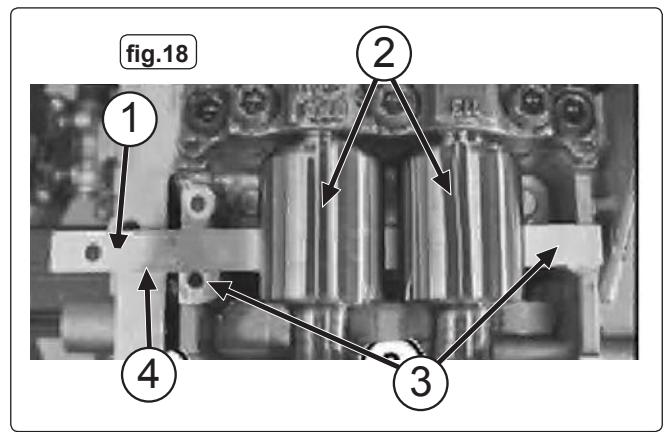
3.4.5. **Note: (Fig.16)** The installation positions of each sprocket wheel in relation to the guide rail and the hub. The sprocket wheel for the oil pump is positioned **BEHIND** the sprocket wheel for the timing chain.

Install the timing chain and sprocket wheel assembly, insert the hub and secure to the crankshaft using a new central bolt, **DO NOT** tighten down.

3.5. Balancer Shafts / Timing Chain Assembly on N40/N42/N45/N46 Engines



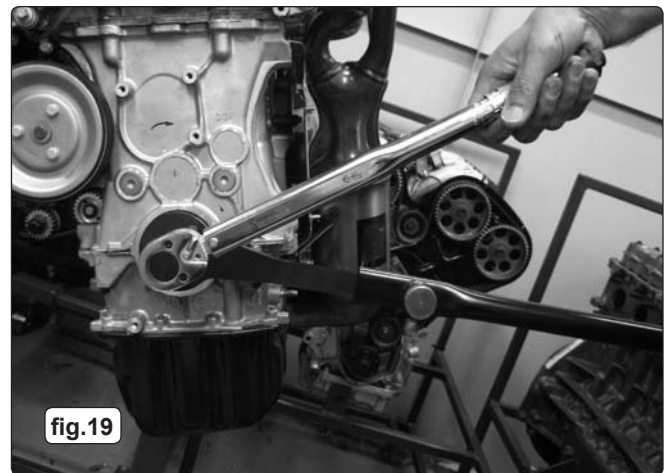
3.5.1. After fitment of the new chain, and whilst the central bolt is slackened, the balancing shafts can be rotated by hand. Rotate the balancer shafts until VS5016 can be inserted from the **INLET** side, and ensure it locates fully on each shaft. The tool is designed to align the shafts to each other (fig.17).



3.5.2. On some newer versions the balancer shafts are aligned using VS5017 Aligner. Slide VS5017 (fig. 18.1) under balancing shafts (fig.18.2) on contact faces (fig.18.3) as far as pins on VS5017 will allow (fig.18.4). Secure balancer shafts and remove VS5017 Aligner.

3.6. Installation (Tightening the central bolt) N12/N14/N40/N42/N45/N46 engines

IMPORTANT: Do not re-use the original central bolt. A new crankshaft central bolt must be fitted to all engines.



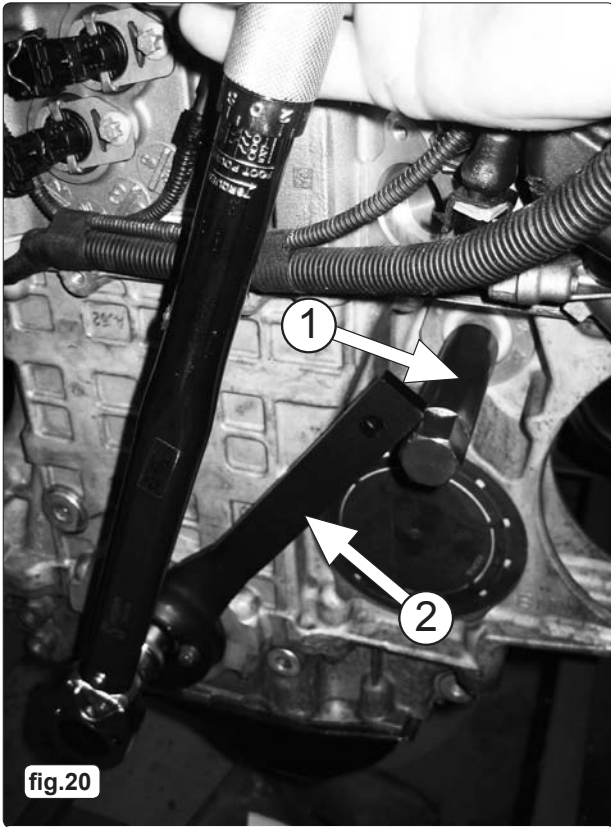
NOTE: Fig.19 shows an N12 Engine

When tightening the crankshaft central bolt use VS5018 Crankshaft Gear Holding Tool together with VS4939 Handle, to counter-hold the crankshaft hub.

WARNING: The Flywheel TDC Locking Pin MUST NOT be used to counter-hold the crankshaft when tightening the crankshaft pulley central bolt to its final tightening torque.

3.6.1. **N12 N14** - Tighten the crankshaft pulley central bolt to its final tightening torque of 50Nm + 100°

3.6.2. **N40 N42 N45 N46** - After applying an initial tightening torque of 60Nm, remove the timing tools. Then tighten the crankshaft pulley central bolt to its final tightening torque of 300Nm.



3.7. N51 and N52 Engines.

3.7.1. Remove the auxiliary belt tensioner from the engine and using the available threaded hole, screw in VS5019 Crankshaft Gear Holding Tool Support (fig.20.1) and position VS5018 Crankshaft Gear Holding Tool (fig.20.2).

3.7.2. Tighten the crankshaft pulley central bolt to its final tightening torque of 100Nm + 360°, marking the central bolt and hub with paint as a starting point for torsion angle tightening.

One complete turn of 360° is required.

3.7.3. **WARNING: The Flywheel TDC Locking Pin MUST NOT be used to counterhold the crankshaft when tightening the crankshaft pulley central bolt to its final tightening torque.**

3.7.4. Install the VANOS unit(s).
Install the chain tensioner.
Crank engine twice.
Check Timing.
Assemble engine.

} Refer to associated toolkit instructions for installation of VANOS units, chain tensioner and checking timing.

NOTE: It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.

IMPORTANT: No liability is accepted for incorrect use of this equipment.

WARRANTY: Guarantee is 12 months from purchase date, proof of which will be required for any claim.

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