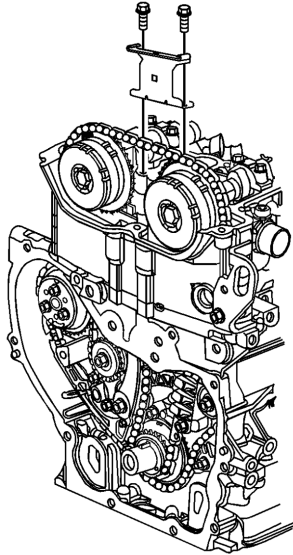


# Camshaft Timing Chain, Sprocket, and Tensioner Replacement

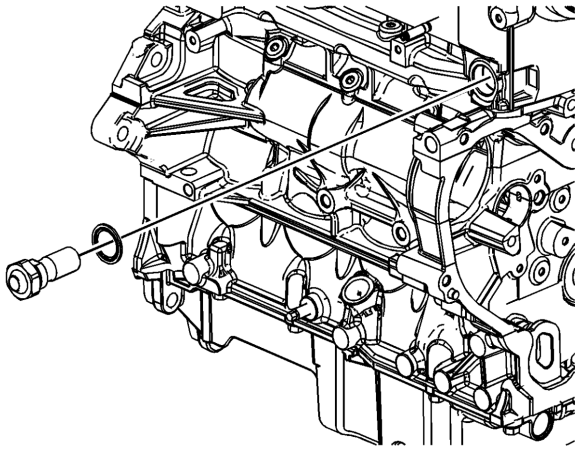
## Special Tools

- J 45027 Tensioner Tool
- J 45059 Angle Meter

## [Removal Procedure](#)

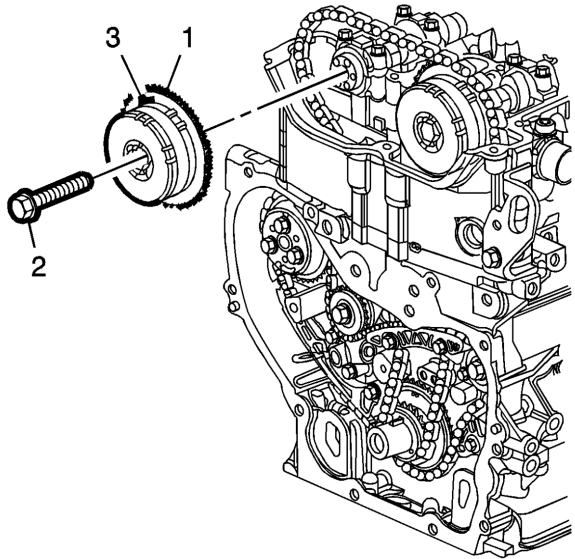


1. Remove the number 1 cylinder spark plug. Refer to [Spark Plug Replacement](#).
2. Rotate the crankshaft in the engine rotational direction clockwise, until the number 1 piston is at top dead center (TDC) on the exhaust stroke.
3. Remove the camshaft cover. Refer to [Camshaft Cover Replacement](#).
4. Remove the engine front cover. Refer to [Engine Front Cover Replacement](#).
5. Remove the upper timing chain guide bolts and guide.



**Note:** The timing chain tensioner must be removed to unload chain tension before the timing chain is removed. If it is not, the timing chain will become cocked and it will be difficult to remove.

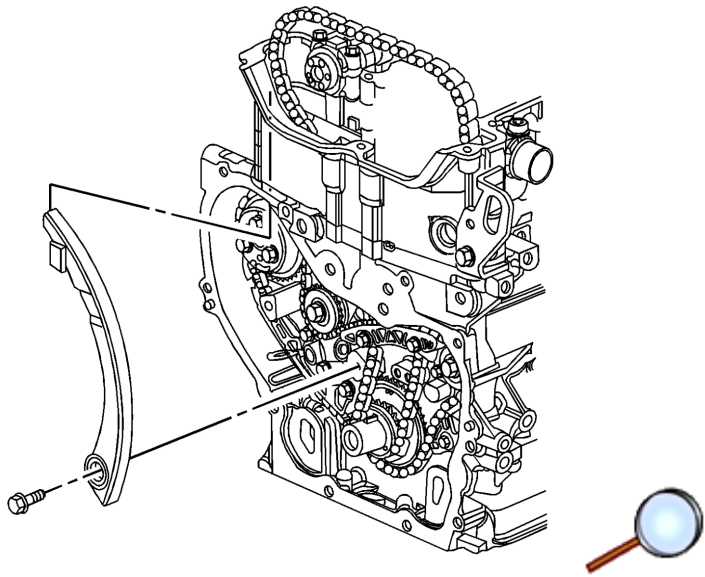
6. Remove the timing chain tensioner.



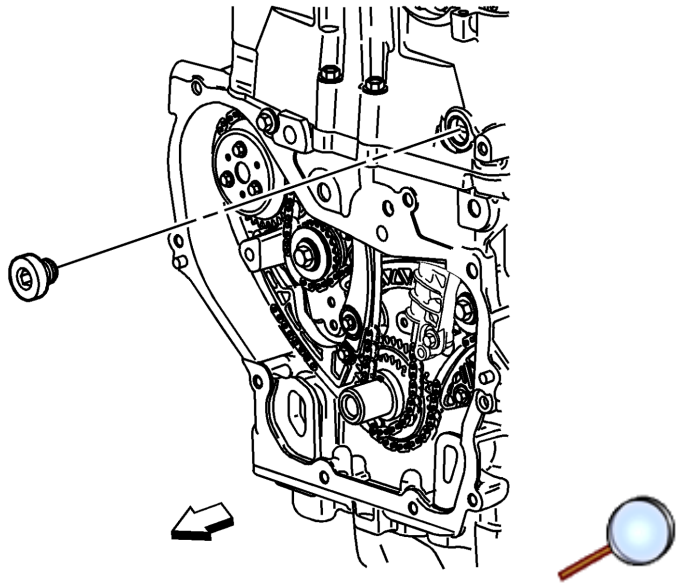
7. Install a 24 mm wrench on the hex on the exhaust camshaft in order to hold the camshaft.

8. Remove and discard the exhaust camshaft actuator bolt (2).

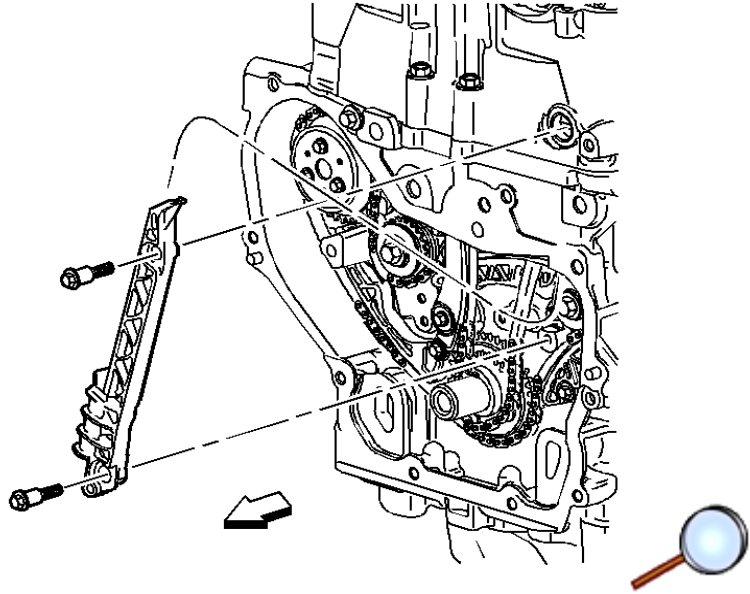
9. Remove the exhaust camshaft actuator (1, 3) from the camshaft and timing chain.



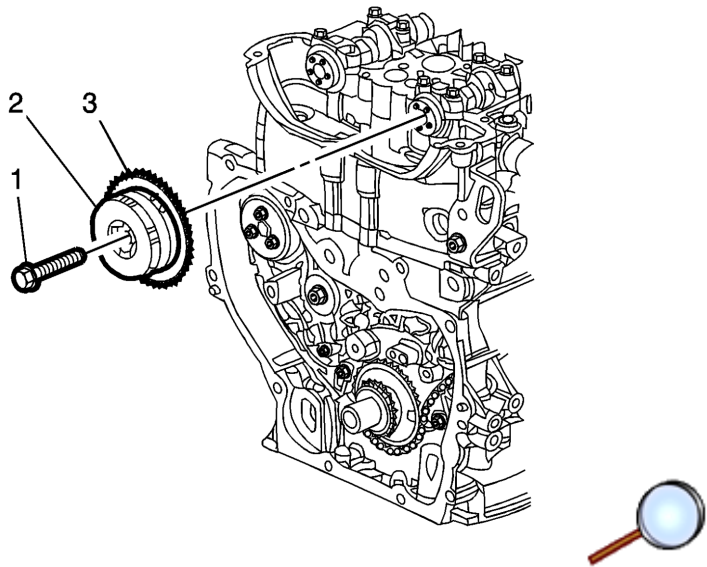
10. Remove the timing chain tensioner guide bolt and guide.



11. Remove the fixed timing chain guide access plug.



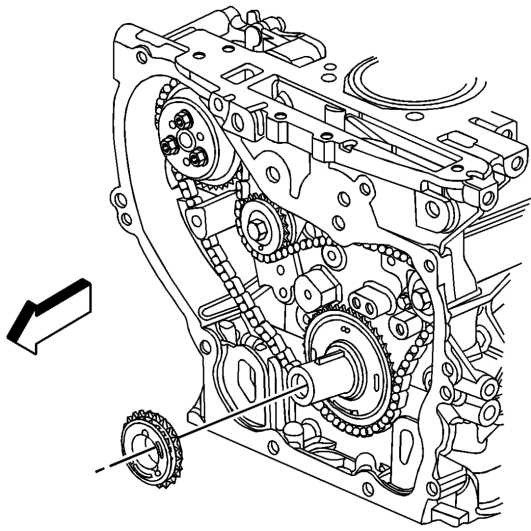
12. Remove the fixed timing chain guide bolts and guide.



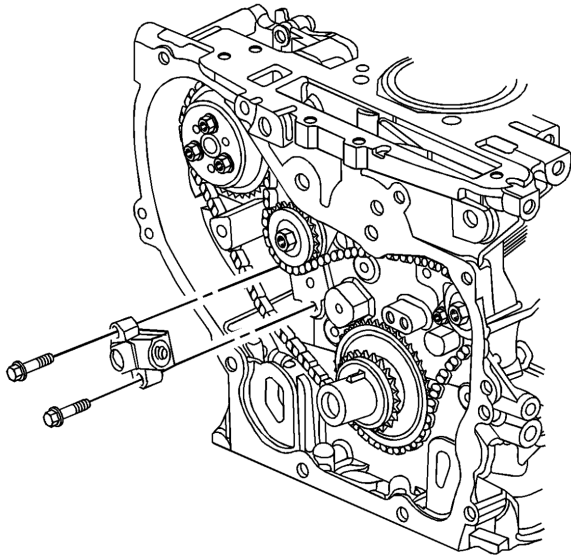
13. Install a 24 mm wrench on the hex on the intake camshaft in order to hold the camshaft.

14. Remove and discard the intake camshaft actuator bolt (2).

15. Remove the intake camshaft actuator (3), and the timing chain through the top of the cylinder head.

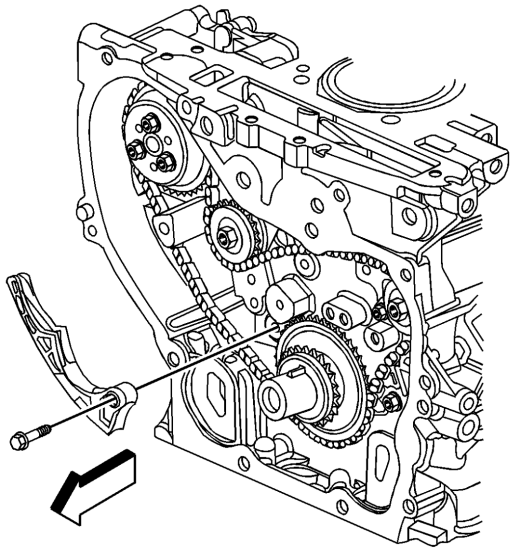


16. Remove the timing chain crankshaft sprocket.

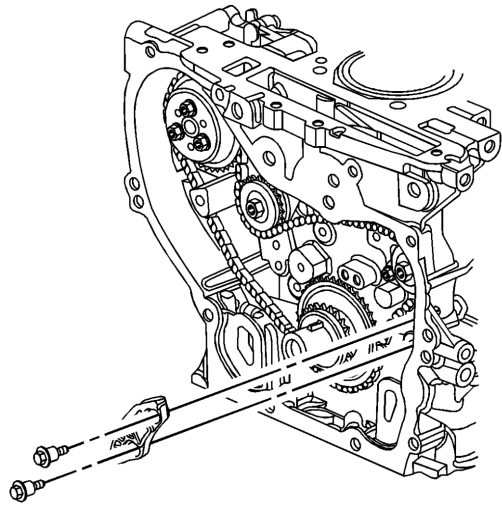


17. If replacing the balance shaft timing chain and sprocket, perform the following steps, if not proceed the step 10 in the installation procedure.

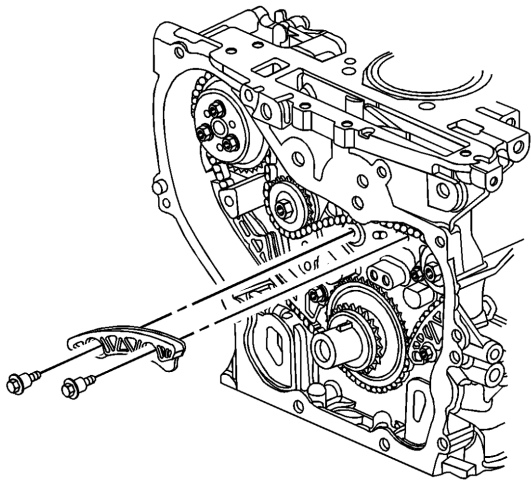
18. Remove the balance shaft drive chain tensioner bolts and tensioner.



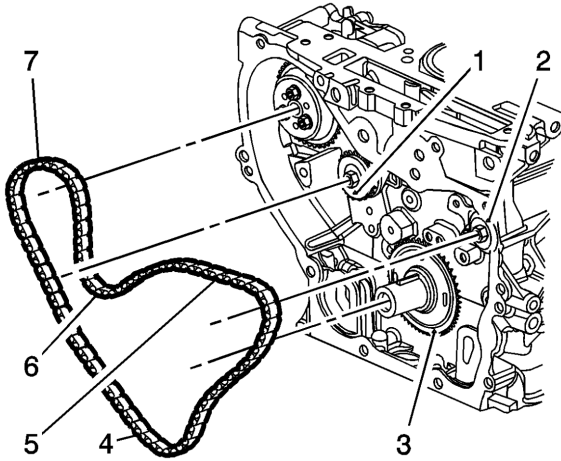
19. Remove the adjustable balance shaft chain guide bolt and guide.



20. Remove the small balance shaft drive chain guide bolts and guide.



21. Remove the upper balance shaft drive chain guide bolts and guide.



**Note:** It may ease removal of the balance shaft drive chain to get all the slack in the chain between the crankshaft and water pump sprockets.

22. Remove the balance shaft drive chain (7).

23. Remove the balance shaft drive sprocket .

### [Installation Procedure](#)