



TRU-TIME
ADJUSTABLE
CAM GEAR

Installation Instructions for:
Part Number 23-805
01-02 Honda Civic (D17)

Adjustable Cam Gears

AEM Tru-Time adjustable cam gears enable an engine's cam timing to match its tuning state, whether it is stock, modified, forced-induction or normally-aspirated. They are used by top race teams throughout the world and are a must for applications where the cylinder head or block is milled or where aftermarket or reground camshafts are installed. **AEM** cam gears feature true laser-etched markings; precision cut gear teeth that are guaranteed to match the Original Equipment (O.E.) drive tooth profile and are hard-anodized on the outer edge. **AEM** Tru-Time adjustable cam gears are the most durable on the market-**AEM** has developed them on high performance engines that have run 100,000 miles with no wearing of the belt or belt surface.

Using the **AEM** cam gears to set the proper cam timing for your particular engine combination can optimize its performance. The advancement or retardation of the cam timing will affect the peak power of the engine by moving the power band up or down within the usable rpm range. Typically, advancing the cam timing will give more low-end power and retarding the cam timing will give a higher peak rpm in addition to higher peak power. Adjustment of an **AEM** cam gear is best carried out on a dynamometer so that quantifiable results can be measured. ***Please be aware that this information is only a generalization, we provide it so that you have a better understanding of what this product is capable of accomplishing. Under no circumstances should you attempt to adjust the cam gears without having a way of verifying and/or comparing the results of that adjustment.***

Bill of Materials for Part Number: 23-805

QTY.	Part Number	Description
1	2-807	Inner Hub
1	2-808	Outer Gear
1	2-709	Trigger Wheel
3	1-304	Stainless Steel Washer
3	1-2036	5/8" Long Cam Gear Bolt
3	1-2050	8-32 Self-Locking Flat Head
1	10-354	Instructions
2	10-922S	Large AEM Decal - Silver

Read and understand these instructions **BEFORE** attempting to install this product. An improperly installed cam gear will cause damage to the motor.

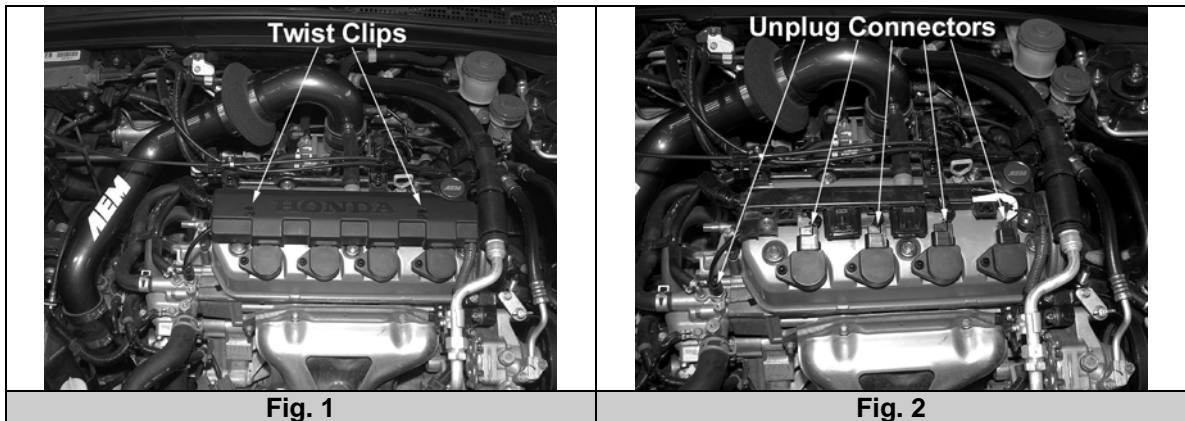
Note: *The installation of this kit requires familiarity with overhead cam motors and timing belt installations. If you are not familiar with or have no experience in these matters, please refer the installation to a qualified technician.*

1) Getting started

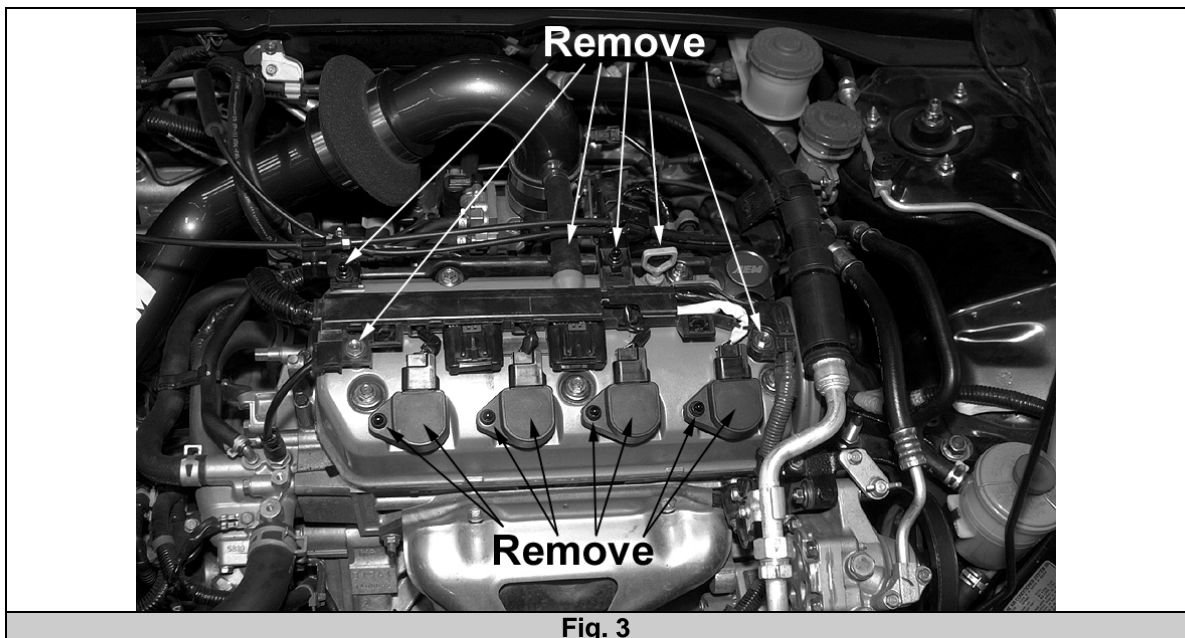
- a) Make sure vehicle is parked on a level surface and set the parking brake.
- b) Jack up the front of the vehicle.
- c) Support the vehicle with properly rated jack stands.
- d) Remove the vehicle's driver side front wheel.

2) Removing the stock cam gear

- a) Remove the ignition coil cover by loosening the two ¼ turn twist clips. **(Fig. 1)**
- b) Unplug the electrical harness connectors for the engine coolant temperature (ECT) sensor and the 4 ignition coils. **(Fig. 2)**



- c) Remove the hardware holding the coils, engine harness and throttle cable brackets. **(Fig. 3)**
- d) Remove the coils, breather hose and dip stick from the valve cover. **(Fig. 3)**



- e) Remove the spark plugs. **Do not allow any debris to fall down the spark plug holes.**
- f) Remove the hardware for the A/C hard-line bracket and engine harness bracket. **(Fig. 4)**
- g) Remove the A/C hard-line bracket and move the engine harness towards the front of the vehicle.
- h) Next to the oil cap, unclip the P/S hose from its bracket. **(Fig. 5)**

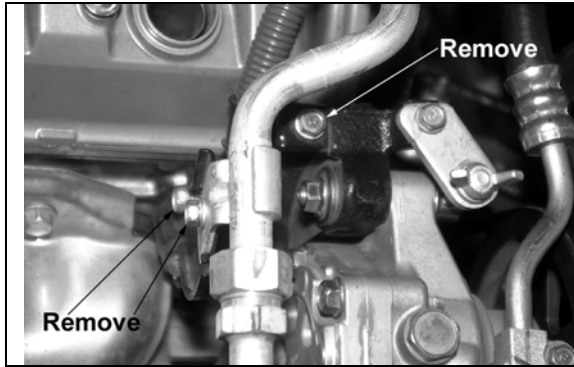


Fig. 4

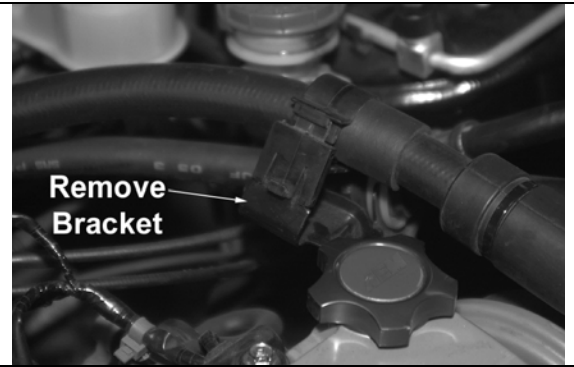


Fig. 5

- i) Loosen the five bolts that secure the valve cover to the cylinder head. **(Fig.6)**
- j) Remove the valve cover from the cylinder head. **(Fig. 7)**

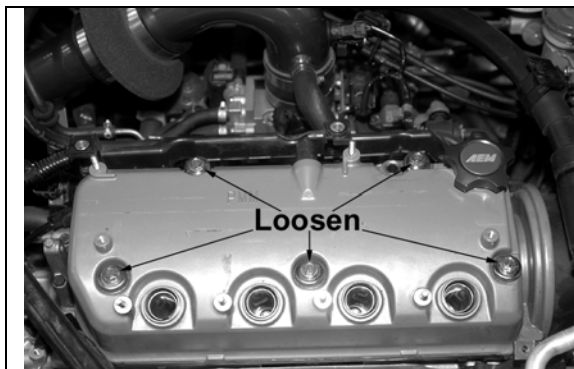


Fig. 6



Fig. 7

- k) Loosen the hardware holding the P/S pump (Power Steering) to its mounting bracket. **(Fig. 8)**
- l) Remove the P/S belt by loosening the wing nut located on the P/S bracket.
- m) Remove the pump's mounting hardware. Remove the pump's reservoir from its bracket and place the pump by the left shock tower.
- n) Remove the rubber grommet from the plastic cover and unplug the cam sensor harness.
- o) Remove the three bolts that hold the plastic upper cover to the cylinder head. **(Fig. 9)**

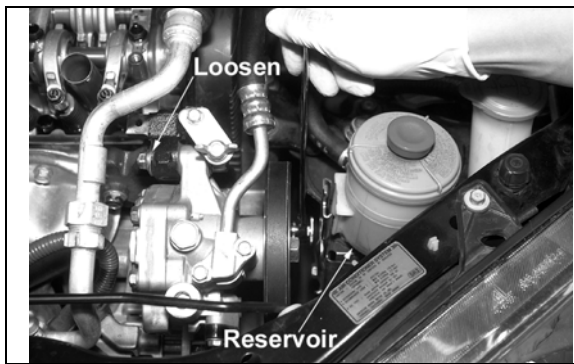


Fig. 8

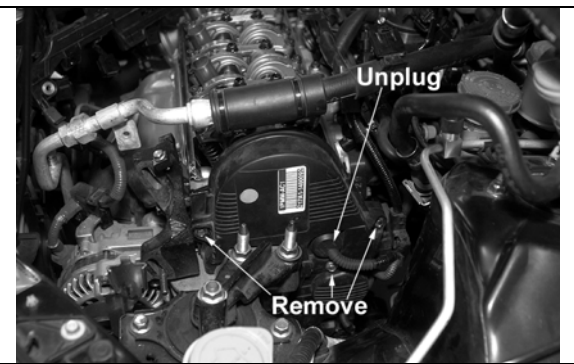


Fig. 9

- p) Remove the plastic upper cover to expose the cam gear. **(Fig. 10)**
- q) In the driver's side wheel well, remove the two clips that hold the splash shield in place. **(Fig. 11)**

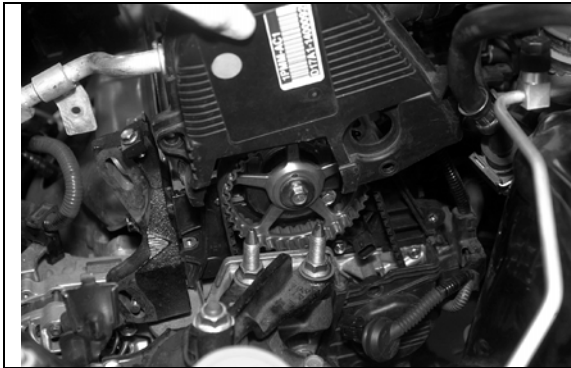


Fig. 10

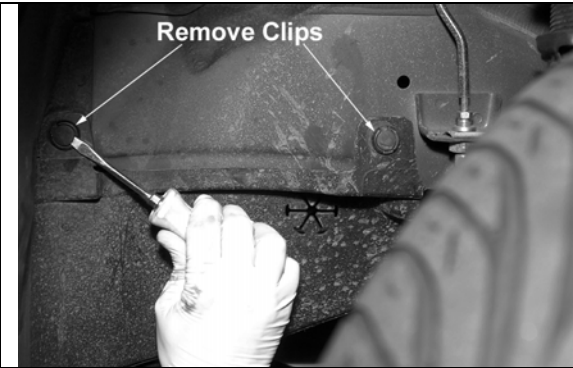


Fig. 11

- r) Pull the splash shield down to allow access to the crank pulley.
- s) Place a ratchet, an extension and the correct size socket onto the crankshaft pulley bolt. **(Fig. 12)**
- t) Rotate the crankshaft pulley counter clockwise until the TDC mark (white line) on the crankshaft pulley aligns with the pointer on the lower plastic cover. **(Fig.13)**

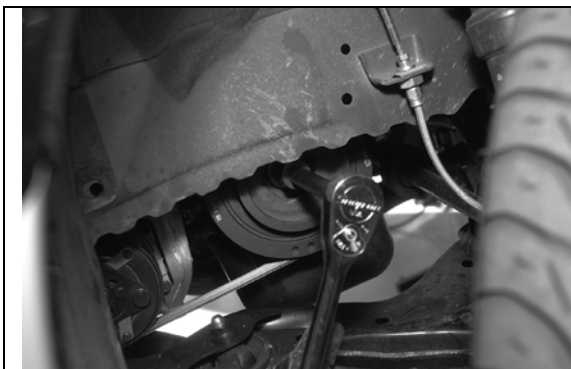


Fig. 12



Fig.13

- u) This illustration better depicts the markings. A: TDC Mark (white line) B: Pointer **(Fig. 14)**
- v) Since the camshaft turns at $\frac{1}{2}$ the speed of the crankshaft, check the cam gear to see if the motor is at TDC for cylinder 1. A: The "UP" mark should be at the top. B: The TDC marks on the cam gear should align with the top edge of the cylinder head. **(Fig. 15)**

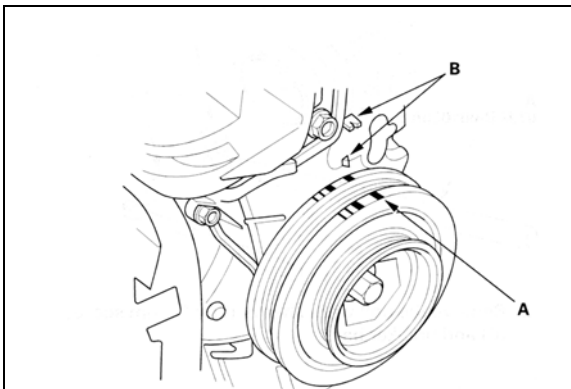


Fig. 14

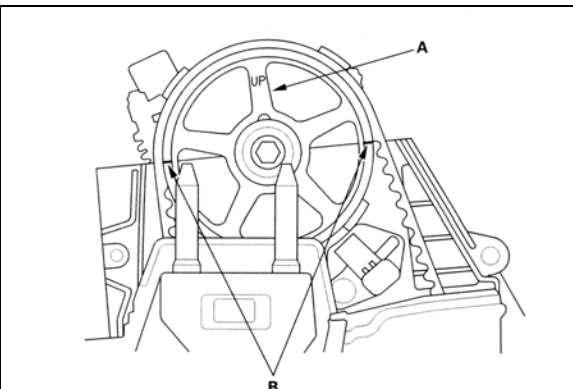


Fig. 15

- w) Remove the alternator/air-conditioning belt. First loosen the adjuster locking bolt and the alternator-pivot bolt. Then relieve the tension on the belt by turning the wing nut counter clockwise. A: *Wing nut* B: *Adjuster locking bolt* C: *Alternator-pivot bolt* (Fig. 16)
- x) Remove the crankshaft pulley. Use a commercially available Honda crankshaft pulley holder to prevent the crankshaft from rotating while loosening the crankshaft pulley bolt. (Fig. 17)

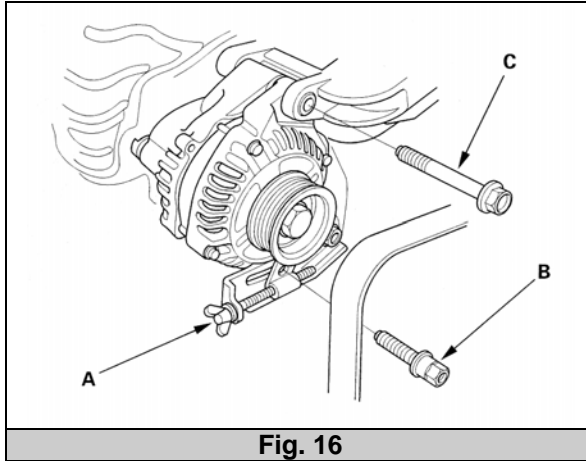


Fig. 16

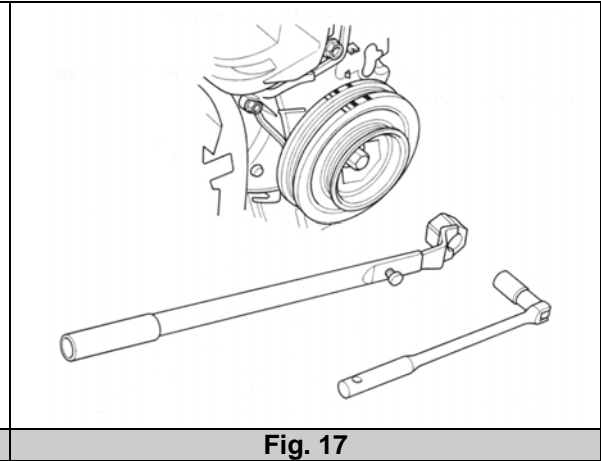


Fig. 17

- y) Locate the crank angle sensor harness and remove it from the lower plastic cover. (Fig. 18)
- z) Remove the 4 bolts that hold the lower plastic cover to the engine. (Fig. 18)
- aa) Remove the lower plastic cover. (Fig. 19)

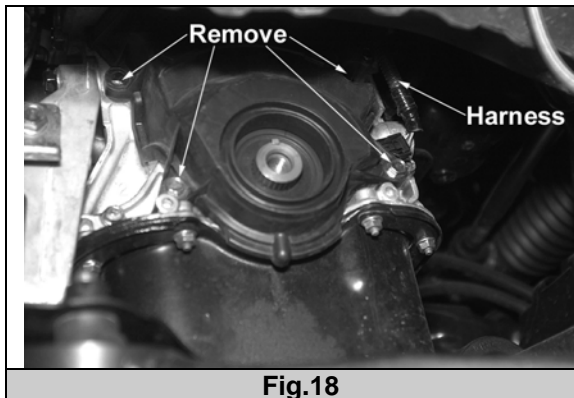


Fig.18

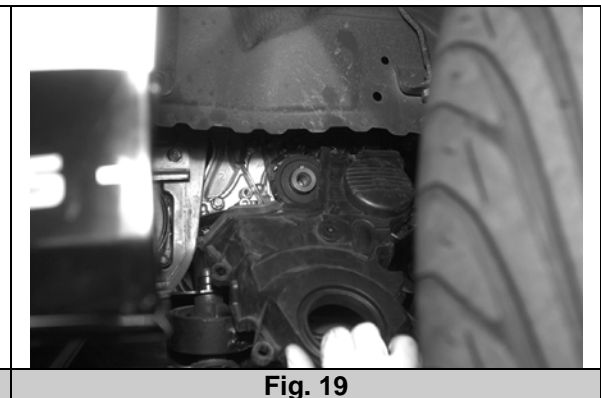


Fig. 19

- bb) Place the correct size Allen-key into the hex slot on the side of the timing belt tensioner. (Fig. 20)
- cc) Remove the cam angle sensor. (Fig. 21)

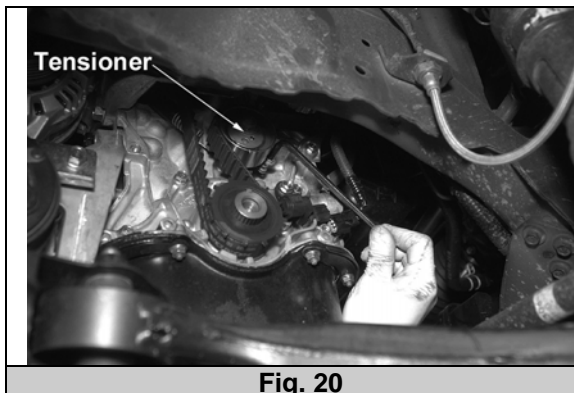


Fig. 20

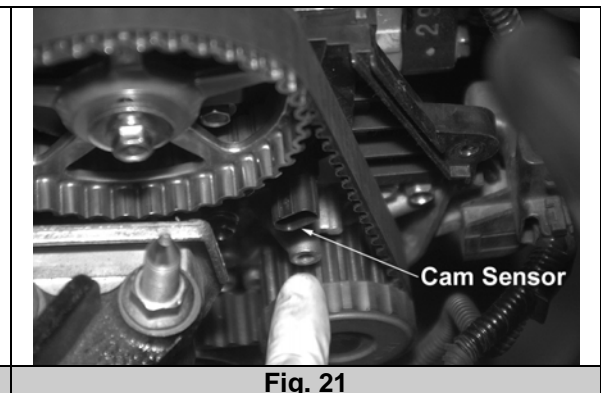
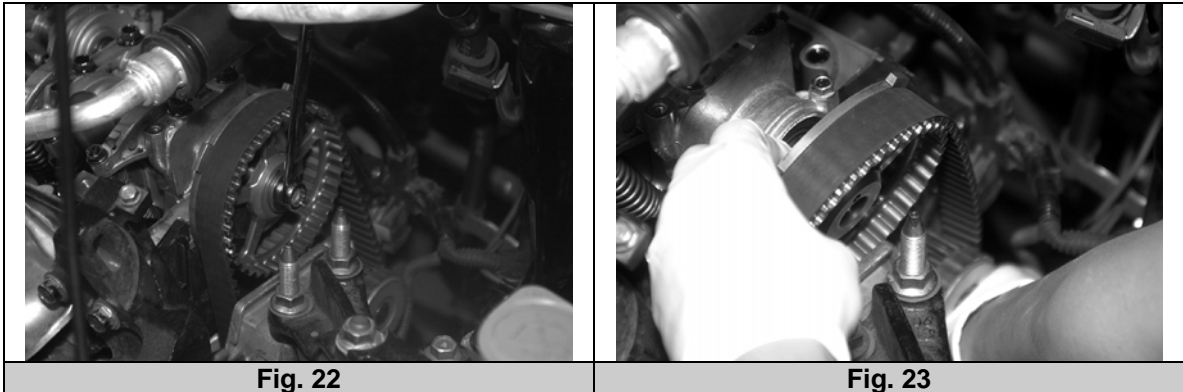
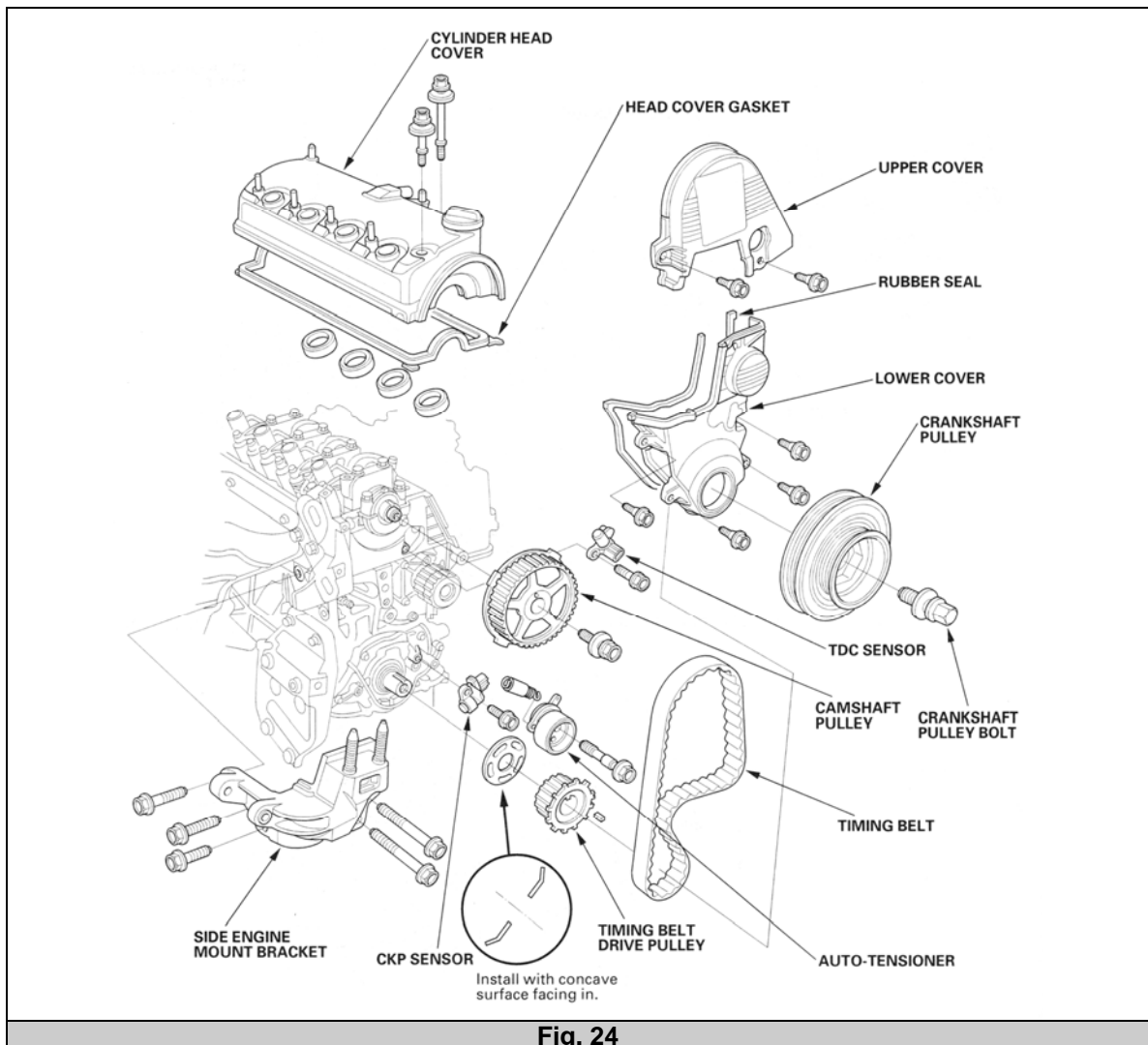


Fig. 21

- dd) Loosen the bolt holding the cam gear to the camshaft. Note: *Be careful not to rotate the camshaft or the crankshaft. The assembly must stay at TDC. (Fig. 22)*
- ee) Remove the cam gear by pulling up (counter clockwise) on the Allen-key that was placed on the timing belt tensioner in step 2) bb). Slide the timing belt off the cam gear and remove it. (Fig. 23)



- ff) Reference this illustration for the placement of all the components that were removed. (Fig. 24)



- gg) Remove the other half of the plastic cam gear cover from the cylinder head. (Fig. 25)
 hh) This illustration clearly depicts the location of the plastic cover. (Fig. 26)

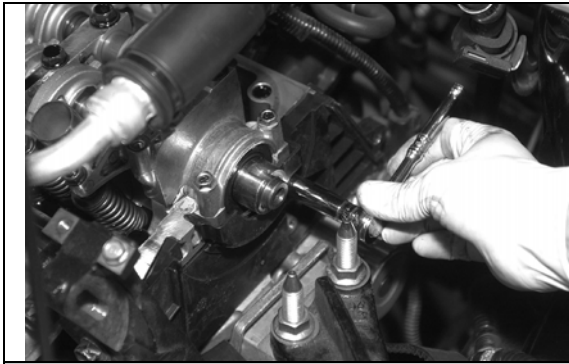


Fig. 25

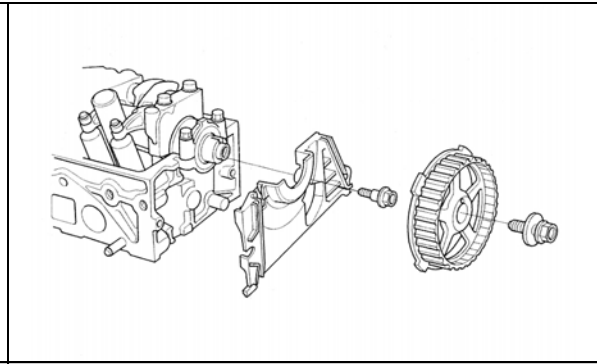


Fig. 26

3) Installing the Tru-Time Adjustable Cam Gear

WARNING! - Before installing the Tru-Time Adjustable Cam Gear onto the camshaft, the locating dowel pin from the O.E. cam gear **MUST** be installed. Failure to do this will result in damage to the engine.

- a) Inspect the **AEM** Tru-Time Adjustable Cam Gear:
1. The laser etched timing marks on inner hub and the outer gear should be clear and easy to read.
 2. Check the three countersunk Allen-bolts that secure the trigger wheel to the outer gear. The Allen-bolts should be tight and the trigger wheel should be sitting flush against the side of the outer gear.
 3. Loosen the three cam gear bolts on the **AEM** cam gear and rotate the hub clockwise and counter clockwise. It should move freely without any binding.
 4. Compare the **AEM** cam gear to the O.E. cam gear. Make sure the major features of the two cam gears are identical. This will include the timing belt tooth profile (placement and count), cam sensor tooth profile (placement and count), dowel pin placement and over all basic dimensions. **(Fig. 27)**

*If the **AEM** cam gear does not function as described or look to be dimensionally correct in any way do not continue with this installation.*

- b) The dowel pin from the O.E. cam gear must be installed onto the **AEM** cam gear. If you do not want to remove the dowel pin from the factory cam gear, you can purchase a new dowel pin (Part# 94303-05080) from your local Honda dealer. Note: *Skip step 3) d) if you are installing a new dowel pin.*
- c) With the front face of the O.E. cam gear facing down measure the installed height of the dowel pin. Write this measurement down for reference. **(Fig. 28)**

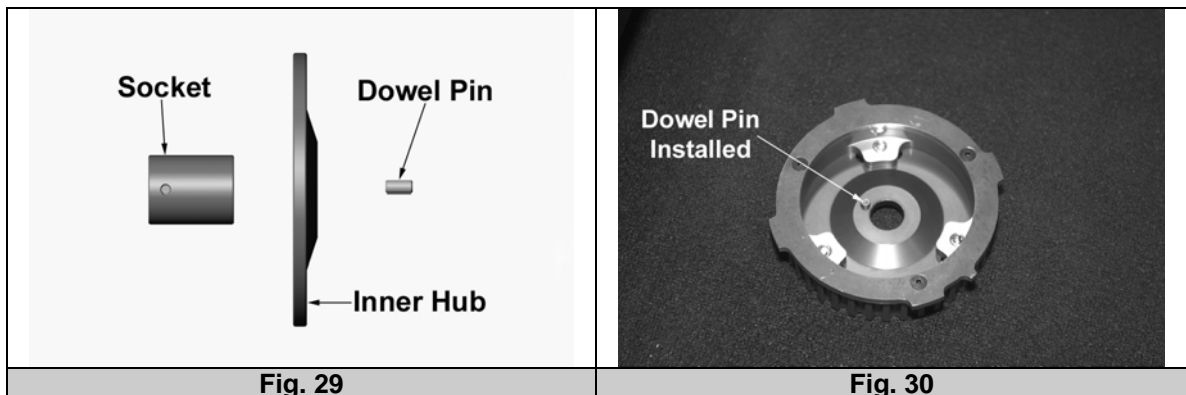


Fig. 27



Fig. 28

- d) Using a suitable size punch, drive the dowel pin out of the O.E. cam gear. *Do not do this step if you are installing a new dowel pin.*
- e) Remove the inner hub from the **AEM** cam gear.
- f) On the inner hub, place the dowel pin into the small through hole from the back.
- g) Place a socket on the front face of the inner hub. The edge of the socket should be placed directly over the hole with the dowel pin and should sit flush against the center face. Note: *Tape can be used on the socket to prevent it from leaving marks on the hub face. (Fig.29)*
- h) Using a bench vise with soft jaws, press the dowel pin into the inner hub of the AEM cam gear. The installed height of the dowel pin must be as close as possible to the measurement taken in step 3) c).
- i) Re-install the inner hub onto the outer gear.
- j) Set the timing mark to 0° and tighten the three cam gear bolts to 15 lb. ft.
- k) A properly installed dowel pin will look similar to **Figure 30**.



- l) Install the **AEM** cam gear using the instructions for the removal of the O.E. cam gear in the opposite order. Refer to **Figure 24** for the placement of all the components that were removed. When installing the lower cover remember to plug in the crank sensor. Note: *The two plastic pieces that make up the upper cover will not be re-installed.*
- m) Apply engine oil to the threads of the camshaft bolt and crankshaft bolt.
- n) Tighten the camshaft bolt to 27 lb. ft.
- o) Tighten the crankshaft bolt to 14 lb. ft. Then tighten the bolt an additional 90°. Use a commercially available Honda crankshaft pulley holder to prevent the crankshaft from rotating while tightening the crankshaft pulley bolt.
- p) Rotate the crankshaft 6 complete revolutions and return it to the TDC mark on the crankshaft pulley. The TDC marks on the AEM cam gear should align with the top edge of the cylinder head. Note: *If marks do not line up the timing belt must be removed, the cam gear repositioned and the timing belt re-installed. Repeat this step until the TDC marks on the **AEM** cam gear line up properly with the upper edge of the cylinder head.*

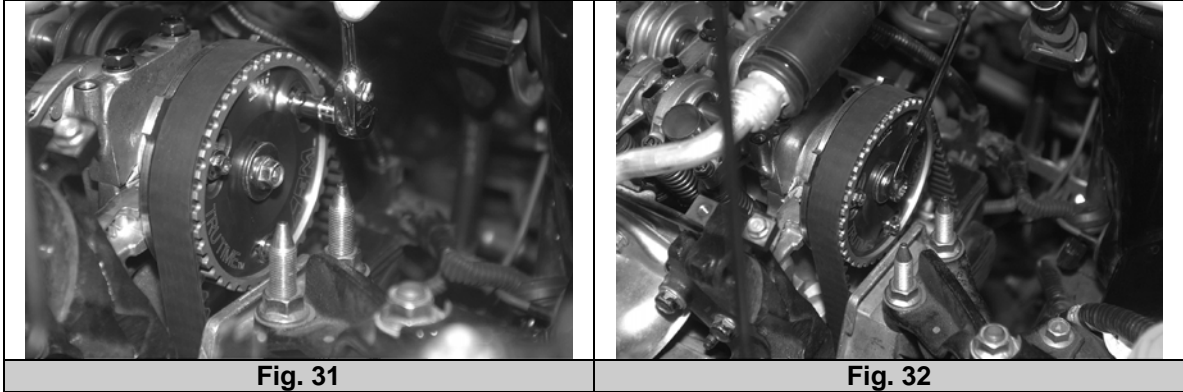
4) Re-assemble the vehicle

- a) Install the alternator/air-conditioning belt. *Refer to the factory manual for proper belt tension.*
- b) Install the power steering pump and belt. *Refer to the factory manual for proper belt tension.*
- c) Install the splash shield.
- d) Install the valve cover.
- e) Install the engine wiring harness.
- f) Install the spark plugs and ignition coils.
- g) Plug-in the coils and any remaining sensors to their corresponding harness plugs.
- h) Install all the remaining items that were removed.
- i) Double-check your installation. The only components you should have left over are the O.E. cam gear, the two plastic upper cover half's and the hardware for the upper covers.
- j) Install the front wheel and torque the lug nuts to the manufacturers recommended value.
- k) Remove the jack stands and lower the vehicle.

5) Calibration of the Tru-Time Adjustable Cam Gear

Adjustment of an AEM cam gear is best carried out on a dynamometer so that quantifiable results can be measured.

- a) Loosen the three cam gear bolts. (Fig. 31)
- b) To change the cam timing, place a wrench on the camshaft bolt. Turn the wrench counter clockwise to advance the cam timing or clockwise to retard the cam timing. (Fig. 32)



- c) Rotate the cam timing to the desired position and retighten the three cam gear bolts to 15 lb. ft. *Note: If the head has been milled, take extreme caution when retarding the cam timing. There must be a minimum clearance of 0.06" between the piston and the valve.*
- d) After changing the cam timing, perform a dyno run. If the results are positive then proceed further in the direction of the timing change. If the performance decreased, then adjust the cam timing in the opposite direction. Repeat this step until the optimum setting is found for your vehicle.
- e) Apply Locite Red, or other suitable thread-locking compound; to the threads of the cam gear bolts. Torque the bolts to 15 lb. ft.

The calibration of the AEM Tru-Time Adjustable Cam Gear is now complete.

Important information for the proper use of the Cam Bolts!

- The recommended torque specification is 15 lb. ft.
- Do not over torque. The maximum torque specification is 20 lb. ft.
- Anything less than the recommended torque value will allow the gear to slip.