S&S CAMSHAFT KIT

P/N 2882248

APPLICATION

2011-17 Cross Country, Cross Country Tour, Cross Roads, Magnum, and Hard-Ball Models. See Fitment Guide for more details.

IMPORTANT

This component has not been type approved for operation in the European Union (EU). Before placing into service in the EU, apply for type approval at an appropriate institution. POLARIS does not assume any liability whatsoever that a type approval will be granted and will not assume any cost for the approval procedure or its failure.

Additional kit required (sold separately): Victory Tri-Oval Stage 1 Exhaust Kit (PN 2879325-156, PN 2879325-266, PN 2879371-156, PN 2879371-266) or Victory Stage 1 Exhaust Kit (PN 2878037)

BEFORE YOU BEGIN

Read these instructions and check to be sure all parts and tools are accounted for. Please retain these installation instructions for future reference and parts ordering information.

KIT CONTENTS

This Kit includes:

REF	QTY	PART DESCRIPTION	PART NUMBER
1	1	Front Cam	3023220
2	1	Rear Cam	3023221
3	1	High Flow Air Dam	5453462
4	2	8" Cable Tie	7080138
5	1	Cam Drive Gasket	5814359
6	1	CARB Label	7185273
7	1	Calibration Card	4012186
	1	Instructions	9927661

TOOLS REQUIRED

- 10mm Socket
- 6mm Allen Driver
- 19mm Socket
- 19mm Box End Wrench
- Phillips Screw Driver
- 5mm Allen Wrench
- 5mm Allen Driver
- 13mm Socket
- 26mm 12 Point Socket
- Ratchet
- 27mm Open End Wrench

IMPORTANT

Your S&S CAMSHAFT KIT is exclusively designed for your vehicle. Please read the installation instructions thoroughly before beginning. Installation is easier if the vehicle is clean and free of debris. For your safety, and to ensure a satisfactory installation, perform all installation steps correctly in the sequence shown.

ASSEMBLY TIME

Approximately 4 hrs.

WARRANTY

All S&S parts are guaranteed to the original purchaser to be free of manufacturing defects in materials and workmanship for a period of twelve (12) months from the date of purchase. Merchandise that fails to conform to these conditions will be repaired or replaced at S&S's option if the parts are returned to us by the purchaser within the 12 month warranty period or within 10 days thereafter.

In the event warranty service is required, the original purchaser must call or write S&S immediately with the problem. Some problems can be rectified by a telephone call and need no further course of action.

A part that is suspect of being defective must not be replaced by a Dealer without prior authorization from S&S. If it is deemed necessary for S&S to make an evaluation to determine whether the part was defective, a return authorization number must be obtained from S&S. The parts must be packaged properly so as to not cause further damage and be returned prepaid to S&S with a copy of the original invoice of purchase and a detailed letter outlining the nature of the problem, how the part was used and the circumstances at the time of failure. If after an evaluation has been made by S&S and the part was found to be defective, repair, replacement or refund will be granted.

ADDITIONAL WARRANTY PROVISIONS

1. S&S shall have no obligation in the event an S&S part is modified by any other person or organization.
2. S&S shall have no obligation if an S&S part becomes defective in whole or in part as a result of improper installation, improper maintenance, improper use, abnormal operation, or any other misuse or mistreatment of the S&S part.
3. S&S shall not be liable for any consequential or incidental damages resulting from the failure of an S&S part, the breach of any warranties, the failure to deliver, delay in delivery, delivery in non-conforming condition, or for any other breach of contract or duty between S&S and a customer.

S&S Cycle, Inc.
14025 Cty Hwy G PO Box 215
Viola, Wisconsin 54664
Phone: 608-627-1497 • Fax: 608-627-1488
Technical Service Phone: 608-627-TECH (8324)
Technical Service Email: sstech@sscycle.com
Website: www.sscycle.com

INSTALLATION INSTRUCTIONS

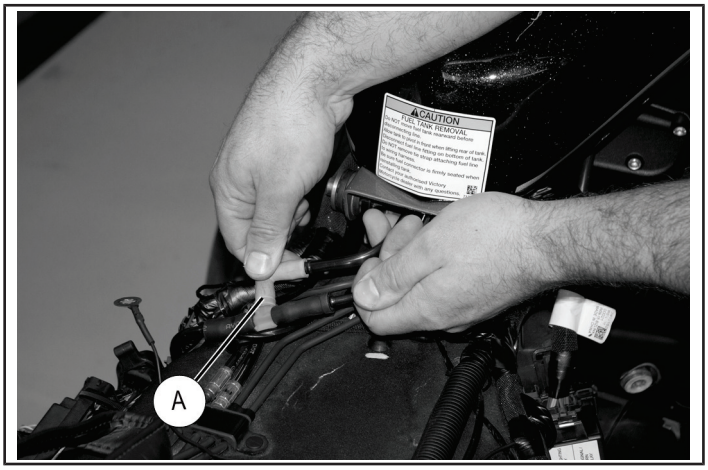
The procedure detailed below describes how to install S&S performance camshafts in 2011-17 Victory Cross Country, Cross Country Tour, Cross Roads, Magnum and Hard-Ball models without removing the engine from the chassis.

1. Secure the motorcycle on a lift using a front wheel vise and tie down straps. Wear safety goggles while performing below removal and installation processes.

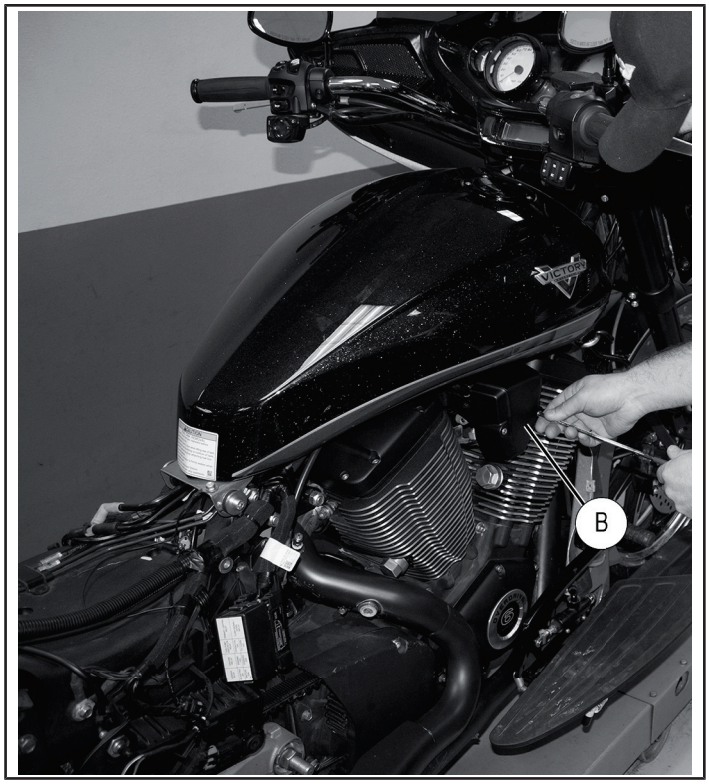
⚠ WARNING

Improperly connecting or disconnecting battery cables can result in an explosion and cause serious injury or death. When removing the battery, always disconnect the negative (black) cable first. When reinstalling the battery, always connect the negative (black) cable last.

2. Remove the right side chin fairing (for Magnum), chin fairing and highway bar (for Cross Country), chin fairing, highway bar, and lower fairing (for Cross Country Tour) referring Victory service manual (PN 9926246) to access the battery. Disconnect the negative battery cable.
3. Remove the two bolts that hold the front of the seat to the chassis. Lift up the front of the seat and pull forward to remove the seat.
4. Disconnect the evaporative emissions, overflow lines (A) from the rear of the fuel tank.



5. Disconnect the ground wire from the rear of the fuel tank with a 10mm socket.
6. Remove the two bolts holding the rear of the fuel tank to the frame using a 6mm Allen driver.
7. Remove the right side IAC cover (B) to access the fuel connection to the throttle body.



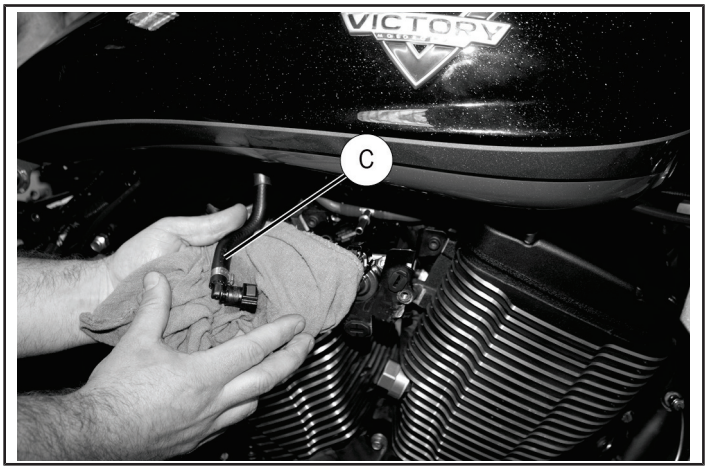
⚠ WARNING

Gasoline is extremely flammable and explosive under certain conditions. Open flames, sparks and cigarettes must be kept away from gasoline.

⚠ WARNING

Allow engine and exhaust to cool completely before disconnecting fuel line or removing tank. Wear eye protection.

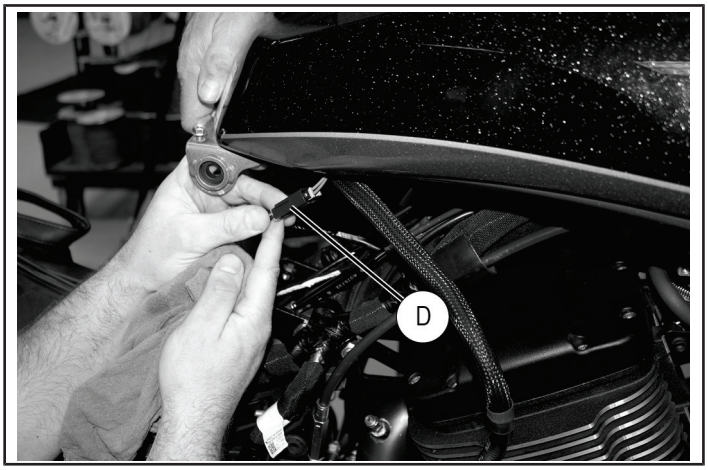
8. Hold a shop rag under the fuel line (C). Pinch the buttons on the quick disconnect fitting together and pull the fuel line (C) free from the fuel inlet on the throttle body.



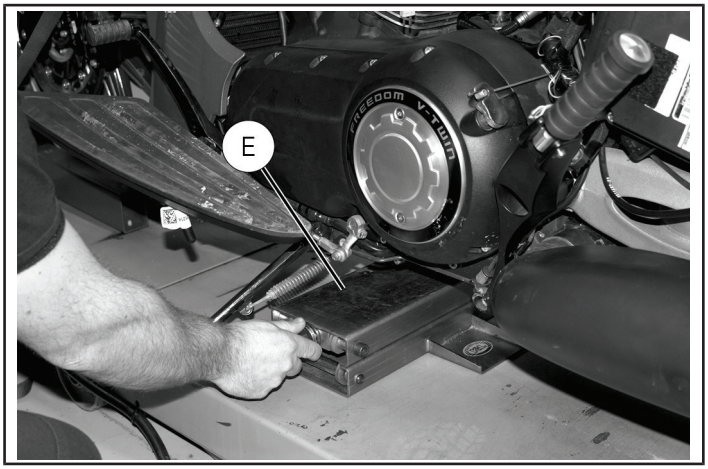
CAUTION

DO NOT move tank rearward prior to disconnecting fuel line. To disconnect the fuel line fitting located on the bottom of the tank, lift up rear of tank allowing tank to pivot on front isolators. The fuel line is secured to the main wiring harness by a tie strap that should not be removed.

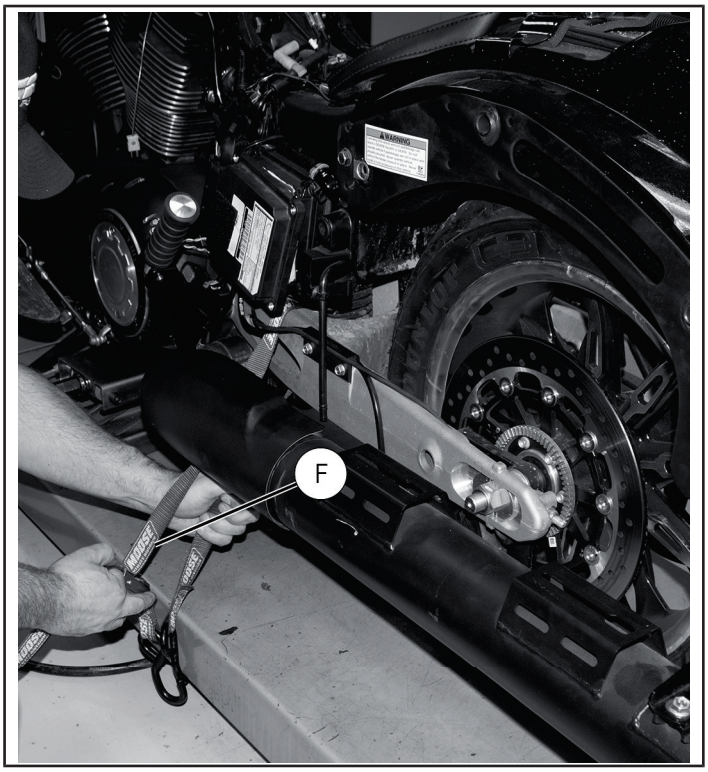
9. Disconnect the fuel pump electrical connector (D) which is located toward the rear of the fuel tank.



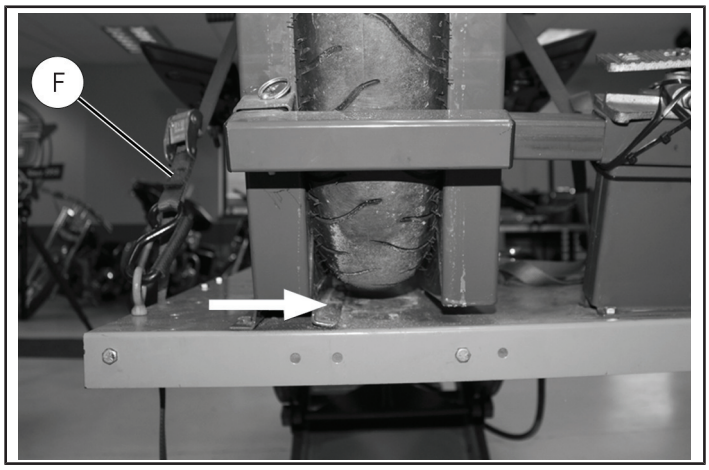
10. Lift the rear of the fuel tank, and pull the tank back off the rubber mounting bosses. Remove the tank and set it aside.
11. Remove the air filter retainer using a 10mm socket. This part will be replaced with an S&S air dam assembly.
12. Place a jack (E) under the engine, just behind the kick stand.



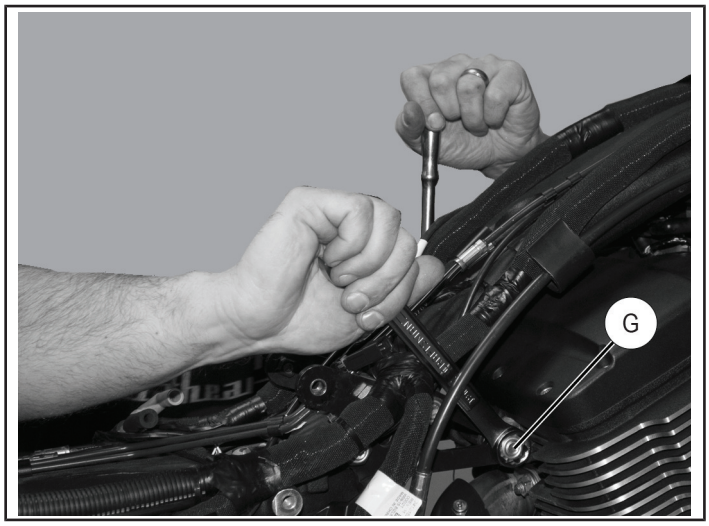
13. Strap the rear of the motorcycle to the lift table. Route the straps (F) under the brake lines on the left swing arm, to avoid damaging them.



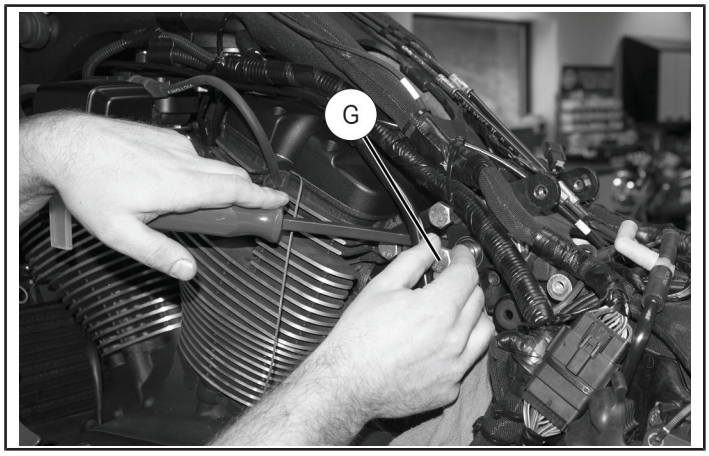
14. Loosen the front wheel vise slightly, just so the wheel can move up or down. Begin removing tension from the straps holding the front end of the motorcycle to allow the front wheel to be raised.
15. Alternate between raising the jack and loosening the front straps until the front wheel has been raised 1 to 2 inches off the lift table. The straps (F) holding the rear of the motorcycle may also need to be loosened slightly. Once the front wheel is raised, make sure the straps are snug to prevent the motorcycle from moving.



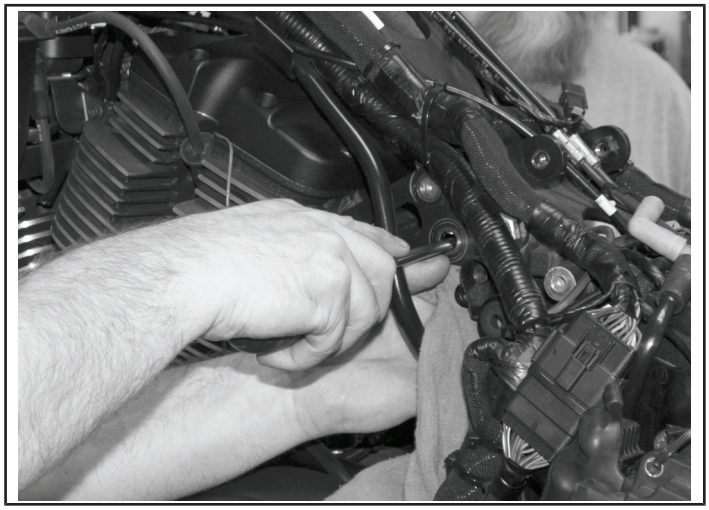
16. Using a 19mm socket and a 19mm box end wrench, loosen the three bolts (G) holding the rear motor mount bracket to the rear cylinder head and to the frame backbone section.



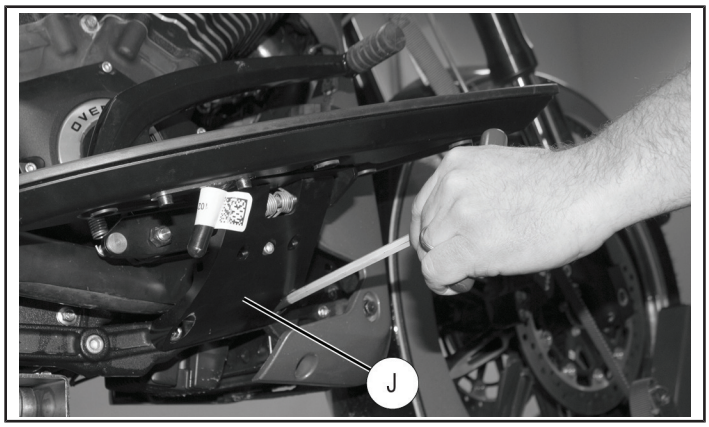
17. Insert a pry bar through the cut-out in the rear motor mount bracket. Pad the end with a shop rag to avoid damaging the paint, and pry upward on the rear end of the back bone rail to relieve any stress on the two bolts (G) that hold the bracket to the frame section.



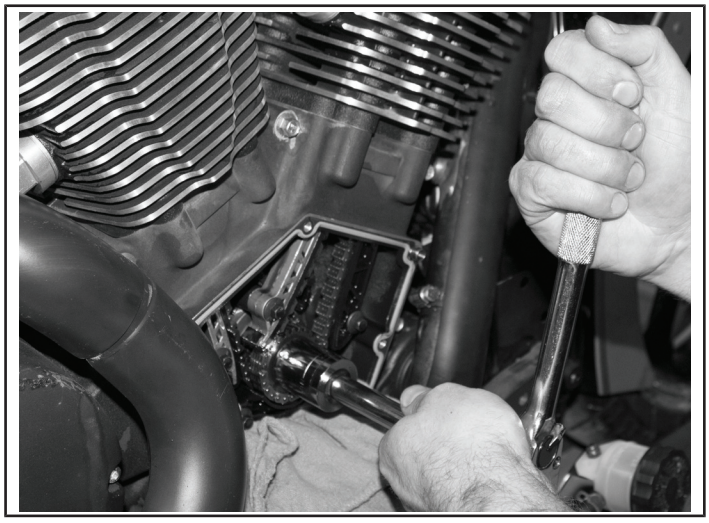
18. Remove the two bolts and continue prying the backbone rail upward until a large Phillips screw driver or steel rod can be inserted in the lower bolt hole to hold the end of the backbone rail up. This will give enough clearance between the backbone rail and the cylinder heads to remove the valve covers and the cams.

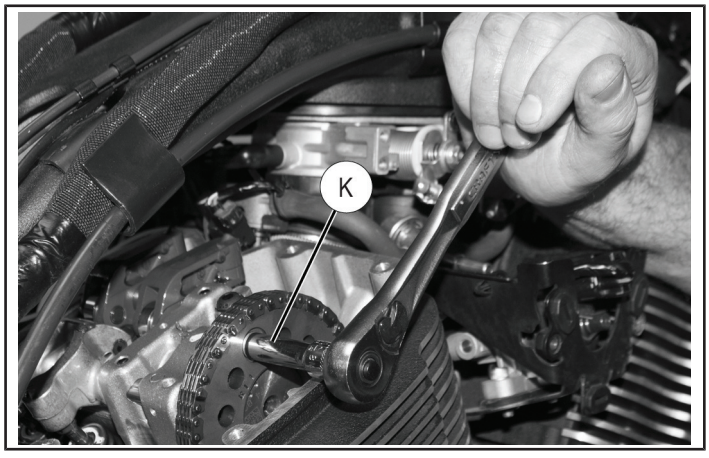


19. Use a 5mm Allen wrench to remove the valve cover fasteners and remove the valve covers.
20. Remove the spark plugs.
21. Remove the right floorboard (J) to gain access to the cam drive cover.

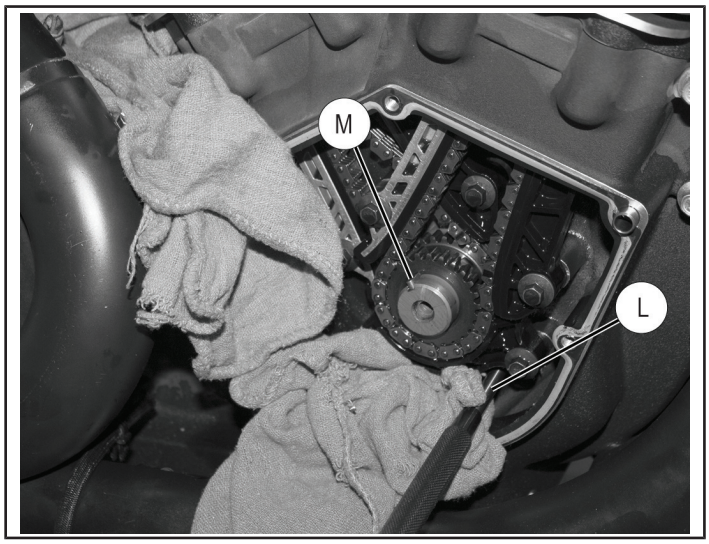


22. Loosen the crankshaft position sensor wire from the crankcase by either unbolting the mounting bracket from the crankcase or pushing the cable clamp anchor through the hole in the bracket.
23. Remove the oil dipstick and plug the dipstick hole with a rag to prevent foreign material from contaminating the engine oil.
24. Using a 5mm Allen driver remove the cam drive cover fasteners, and remove the cam drive cover from the case and secure cover out of the way.
25. Place a rag in the bottom of the cam drive cavity to prevent objects from falling into the crankcase.
26. Loosen the crank position sensor wheel mounting bolt with a 13mm socket, and remove the wheel from the end of the crankshaft.
27. Remove front and rear valve covers.
28. Beginning with the rear cylinder, using a crank tool or a 26mm 12 point socket and ratchet handle rotate the crankshaft until the timing marks on the camshaft sprocket are not visible. Be sure not to damage the key. Remove the visible camshaft drive sprocket mounting bolt (K) with an 8mm socket.

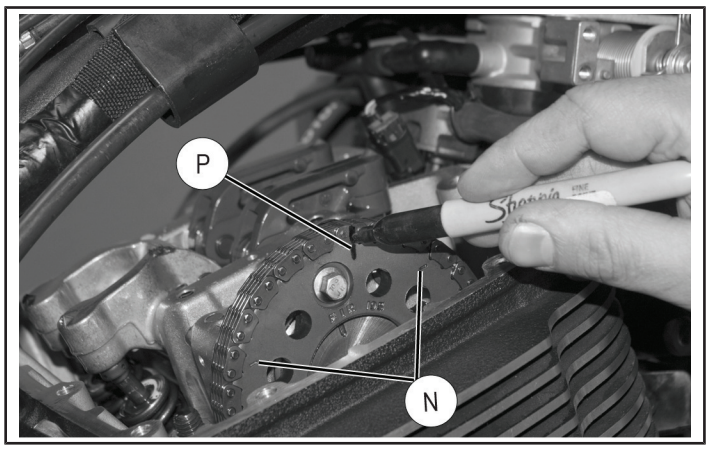




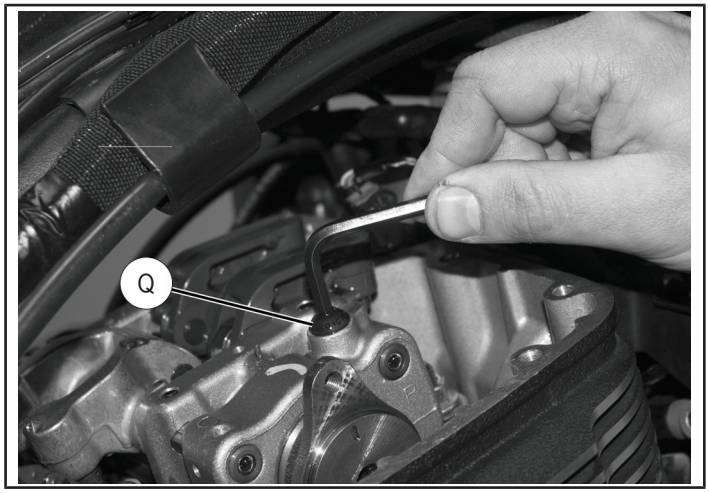
29. Rotate the crankshaft until the rear piston is at TDC compression. Slip a 5/16" straight punch (L) through the front TDC lock hole in the crankcase into the hole in the crankshaft to lock the crankshaft into position. The key (M) in the crankshaft cam drive sprocket will be pointing toward the rear cylinder head.



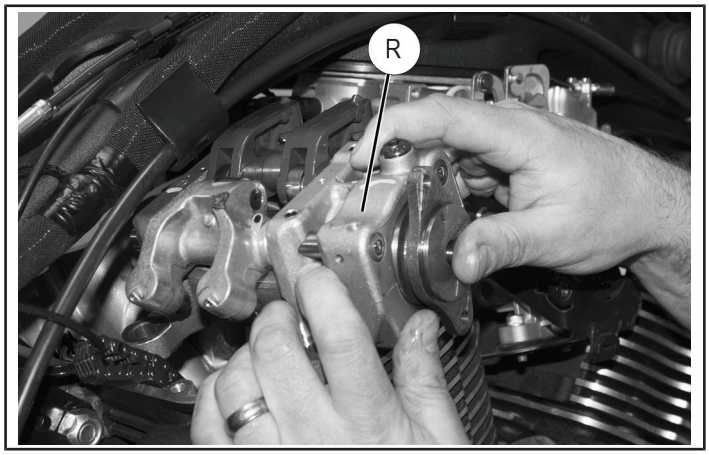
30. The two timing marks (N) on the cam drive sprocket will be parallel to the gasket surface of the cylinder head. As an added precaution, mark a link (P) in the cam drive chain and the cam drive sprocket with a permanent marker to ensure correct camshaft timing on reassembly.



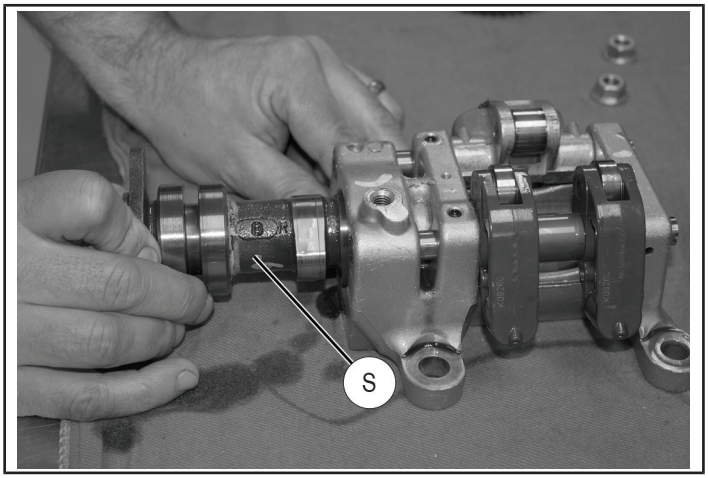
31. Remove the second cam drive sprocket bolt.
32. Remove the rear cam drive chain tensioner from the rear side of the rear cylinder with a 27mm open end wrench. Some oil will come out when the tensioner is removed, so place a rag under the tensioner before removing.
33. Remove the cam drive sprocket from the end of the camshaft. Holding the drive chain firmly so it does not drop, take it off the sprocket and fasten it to the chassis with a wire tie so it is held securely in place and is out of the way.
34. Loosen, but do not remove, the cam locating pin retaining screw (Q) with a 5mm Allen wrench. It is easier to loosen this screw before removing the cam carrier from the cylinder head.



35. Loosen the head bolt nuts that hold the cam carrier in place ½ turn at a time in a crossing pattern until they are all loose. Remove the nuts and washers from the head bolts. A magnet may be helpful to remove the washers.
36. Remove the camshaft carrier (R) from the engine.



37. Remove the camshaft locating pin retaining screw (Q) with a 5mm Allen wrench, and remove the locating pin either by turning the carrier upside down, or by using a magnet to pull it out. Pull the old camshaft (S) out of the camshaft carrier.



38. Clean all parts with solvent and compressed air.

IMPORTANT
Fully wash the new cams before installing to make sure there is no debris.

39. Apply assembly lube to the camshaft carrier camshaft journals, and lubricate the lobes and bearing surfaces of the new camshaft.
40. Install the new camshaft ② in the camshaft carrier. Insert the locating pin chamfer end down, and install the locating pin retaining screw (Q). Torque the screw to specification.

TORQUE
60 in. lbs. (6.8 Nm)

41. Turn the camshaft so the lobes are pointing downward, and install the carrier (R) in the cylinder head. The carrier must fit down over the cylinder head bolts and locating collars.
42. Apply motor oil to the cylinder studs, washers, and nuts in positions 1-4, and install hand tight as shown.
43. Following sequence as shown, tighten nuts 1-4 to specification.

TORQUE
22 ft. lbs. (30 Nm)

44. Loosen nuts 1-4 completely.
45. Tighten nuts 1-4 to specification.

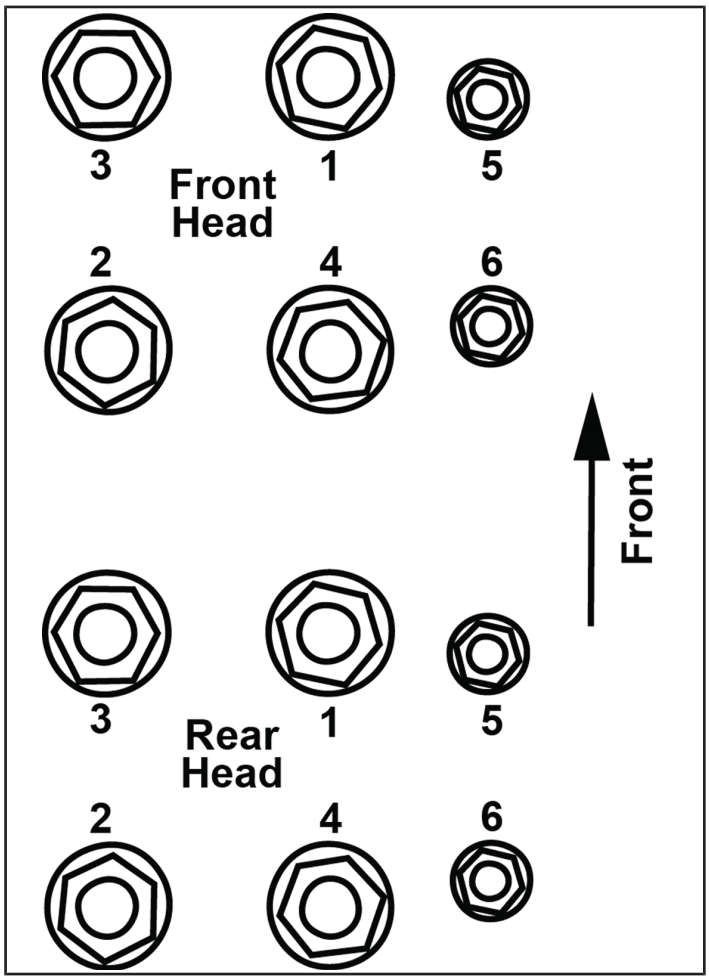
TORQUE
40 ft. lbs. (54 Nm)

46. Retighten nuts 1-4 to torque to specification.

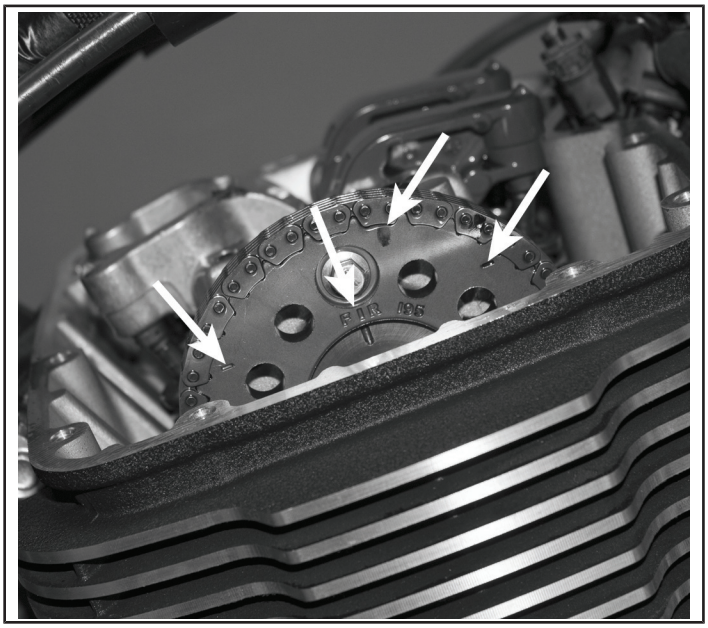
TORQUE
40 ft. lbs. (54 Nm)

47. Tighten nuts 5-6 to torque to specification.

TORQUE
18 ft. lbs. (25 Nm)



48. Unfasten the cam drive chain from the chassis and place it around the cam drive sprocket. Aligning the marked link with the mark on the sprocket is an easy way to ensure the sprocket is in the correct position.
49. Push the sprocket on to the end of the camshaft. The 'R' mark on the camshaft should align with the 'FR' marks on the cam drive sprocket. The cam drive gear timing marks should be parallel to the gasket surface of the head, and the mark on the chain should line up with the mark on the drive gear.



50. Install one of the cam sprocket bolts hand tight.
51. Install the cam chain tensioner to ensure that the cam chain cannot skip a tooth on the sprocket while tightening the bolt. Tighten cam chain tensioner to specification.

TORQUE
55 ft. lbs. (75 Nm)

52. Tighten the cam drive sprocket bolt to specification.

TORQUE
10 ft. lbs. (14 Nm)

53. Remove the punch from the TDC locking hole, and rotate the engine clockwise until the other cam drive sprocket bolt can be installed, and tighten to specification.

TORQUE
10 ft. lbs. (14 Nm)

54. Rotate the engine until the rear cylinder is again at TDC compression. Verify cam timing by making sure the two alignment marks on the cam drive gear are parallel to the cylinder head gasket surface. Both cam lobes should be facing down.
55. Repeat this procedure to replace cam in the front cylinder head.
56. Replace the valve covers and tighten fasteners to specification.

TORQUE
115 in. lbs (13 Nm)

57. Reinstall the crank position sensor wheel with two drops of red thread locker and tighten the mounting bolt to specification.

TORQUE
17 ft. lbs. (23 Nm)

58. Reinstall the cam drive cover and tighten fasteners torque to specification. Reattach crank position sensor wire to crankcase and reinstall engine oil dipstick.

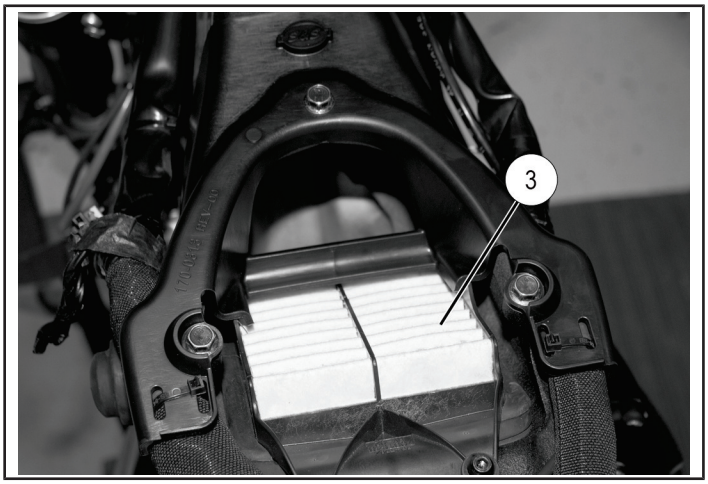
TORQUE
115 in. lbs (13 Nm)

59. Remove the screw driver or steel rod from the rear motor mount bracket and lower the jack beneath the motorcycle until the bolt holes in the bracket and the rear frame section are lined up. Install the bolts, and tighten all three rear motor mount bolts to specification.

TORQUE
82 ft. lbs. (111 Nm)

60. Install the S&S air dam ③ in place of the stock air filter retainer. Tighten fasteners to specification.

TORQUE
36 in. lbs. (4.0 Nm)



61. Replace the fuel tank by reversing the disassembly process. Make sure all connections are secure. Be sure fuel lines are routed properly and do not come in contact with sharp or hot objects, or anything that may cause wear or damage. Tighten ground wire fasteners to specification.

TORQUE
96 in. lbs. (10.8 Nm)

Tighten tank bolts to specification.

TORQUE
18 ft. lbs. (25.4 Nm)

62. Replace the seat. Tighten mounting bolts to specification.

TORQUE
10 ft. lbs. (13.5 Nm)

63. Reconnect the negative battery terminal and replace the right chin faring. Tighten chin faring hex bolts to specification.

TORQUE
19 in. lbs. (26 Nm)

Tighten Allen bolts to specification.

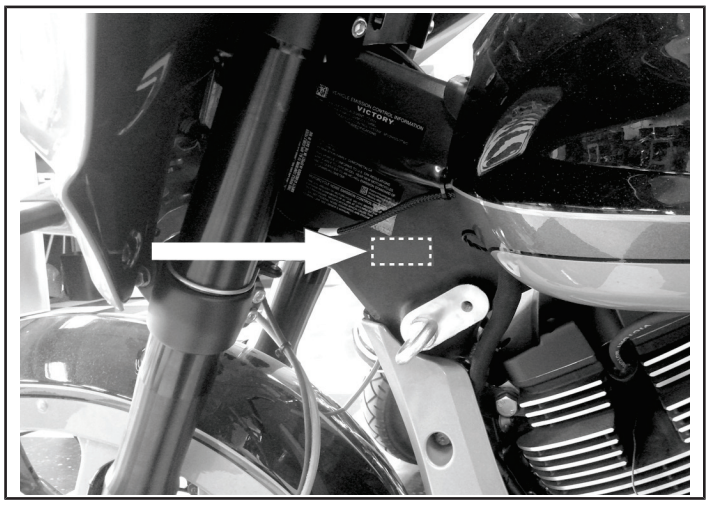
TORQUE
36 in. lbs. (4.0 Nm)

64. Replace the right floorboard. Tighten fasteners to specification.

TORQUE
35 ft. lbs. (48 Nm)

65. Clean motorcycle, taking special care to remove any oil or finger prints from the exhaust system, as these will permanently burn on when the engine is run and the pipes get hot.
66. Apply the included California Air Resources Board (CARB) label ⑥ to the frame casting below the factory label. Do not cover up any portion of the factory label.

⚠ WARNING
Do not apply this label to motorcycles not covered by this application.



Arrow points California Air Resources Board (CARB) label location on vehicle

IMPORTANT
Update ECM with new calibration software using calibration card ⑦. This step must be completed by authorized Victory Dealer. Do not operate the vehicle until recalibration of vehicle is complete.

IMPORTANT
REGULATORY NOTIFICATION: This kit meets EPA emission limits. Tampering with emission related parts can lead to substantial regulatory penalties.