

Instruction 510-0354

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Version 3

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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: TC3 Cam Support Plates for 1999-up Harley-Davidson® Big Twins.

DISCLAIMER:

These parts are designed as service repair components for the maintenance of Harley-Davidson® motorcycle engines. They are intended to provide the same fit and function as the stock components that they replace.

It is the sole and exclusive responsibility of the user to determine the suitability of the product for his or her use, and the user shall assume all legal, personal injury risk and liability and all other obligations, duties, and risks associated therewith.

The words Harley®, Harley-Davidson®, H-D®, Sportster®, Evolution®, and all H-D part numbers and model designations are used in reference only. S&S Cycle is not associated with Harley-Davidson, Inc.

SAFE INSTALLATION AND OPERATION RULES:

Before installing your new S&S part it is your responsibility to read and follow the installation and maintenance procedures in these instructions and follow the basic rules below for your personal safety.

- Gasoline is extremely flammable and explosive under certain conditions and toxic when breathed. Do not smoke. Perform installation in a well ventilated area away from open flames or sparks.
- If motorcycle has been running, wait until engine and exhaust pipes have cooled down to avoid getting burned before performing any installation steps.
- Before performing any installation steps disconnect battery to eliminate potential sparks and inadvertent engagement of starter while working on electrical components.
- Read instructions thoroughly and carefully so all procedures are completely understood before performing any installation steps. Contact S&S with any questions you may have if any steps are unclear or any abnormalities occur during installation or operation of motorcycle with a S&S part on it.
- Consult an appropriate service manual for your motorcycle for correct disassembly and reassembly procedures for any parts that need to be removed to facilitate installation.
- Use good judgment when performing installation and operating motorcycle. Good judgment begins with a clear head. Don't let alcohol, drugs, or fatigue impair your judgment. Start installation when you are fresh.
- Be sure all federal, state, and local laws are obeyed with the installation.
- For optimum performance and safety and to minimize potential damage to carb or other components, use all mounting hardware that is provided and follow all installation instructions.
- Motorcycle exhaust fumes are toxic and poisonous and must not be breathed. Run motorcycle in a well ventilated area where fumes can dissipate.

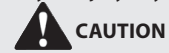
IMPORTANT NOTICE:

Statements in this instruction sheet preceded by the following words are of special significance.



WARNING

Means there is the possibility of injury to yourself or others.



CAUTION

Means there is the possibility of damage to the part or motorcycle.

NOTE

Other information of particular importance has been placed in italic type.

S&S recommends you take special notice of these items.

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' 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.
- (4) S&S parts are designed exclusively for use in Harley-Davidson® and other American v-twin motorcycles. S&S shall have no warranty or liability obligation if an S&S part is used in any other application.

NOTES AND PREPARATION INSTRUCTIONS – ALL INSTALLATIONS

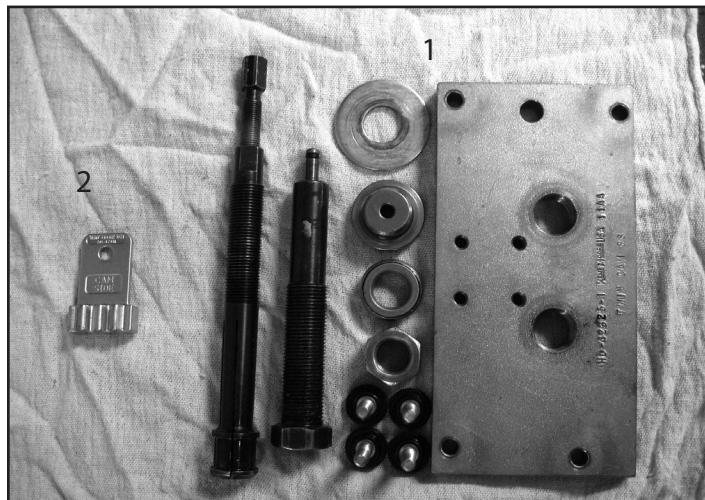
310-0623 TC3 Cam Support Plate for 1999-'06 models except 2006 Dyna® models (must use late style pump, late style hydraulic chain tensioners).

310-0625 TC3 Cam Support Plate for 2007-up and 06 Dyna® models with bushing style cams.

NOTES:

- S&S TC3 oil pumps and cam support plates for 1999-'16 Harley-Davidson® big twin engines are machined from aluminum forgings. This provides the strength and dimensional stability of a billet part, and eliminates voids, inclusions, and other structural defects associated with castings. Due to the material used and the as-forged texture of the parts, there may be some variation in the color of the blue anodized finish. This does not constitute a defect. Despite variations in color, the ability of the anodized coating to protect the parts is unchanged. You may install these products with confidence, knowing that they will function as they are intended.
- S&S does not manufacture a Cam Support Plate for use with early 1999-2006 oil pumps or spring loaded chain tensioners as we feel these are inferior to the later style components and are best not used.
- Possible failure may result if thread locking compound is not applied to the cam drive sprocket flange bolts. Always prepare threads according to the instructions on the container.
- All reference to Harley-Davidson® part numbers is for identification purposes only. We in no way are implying that any of S&S Cycle's products are original equipment parts or that they are equivalent to the corresponding Harley-Davidson® part numbers
- Installation of S&S cam support plate requires the use of special tools and repair manuals for the model bike you will be doing the work on. Attempting the installation without the proper tools and manuals will be difficult. Damage can result which will not be covered under warranty. **See Pictures 1 and 2**

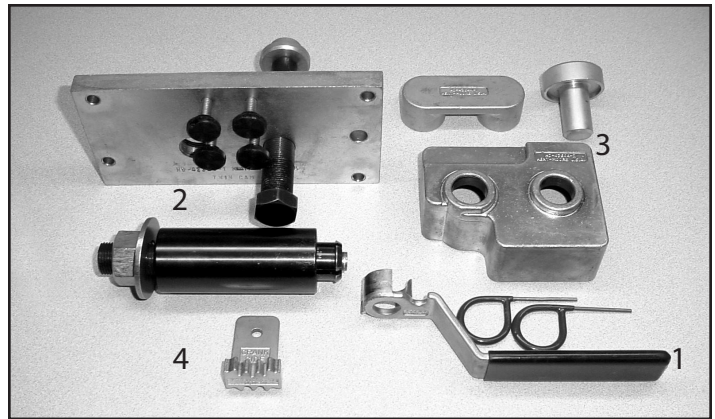
1. Camshaft Needle Bearing Remover / Installer, HD® Part Number: 42325



Picture 1 Special tools required for 2007-later models

2. Crankshaft / Camshaft Sprocket Locking Tool, HD® Part Number: 47941 (for late roller style chains).

1. H-D #42313 Cam Chain Tensioner Unloader for removing cam chains

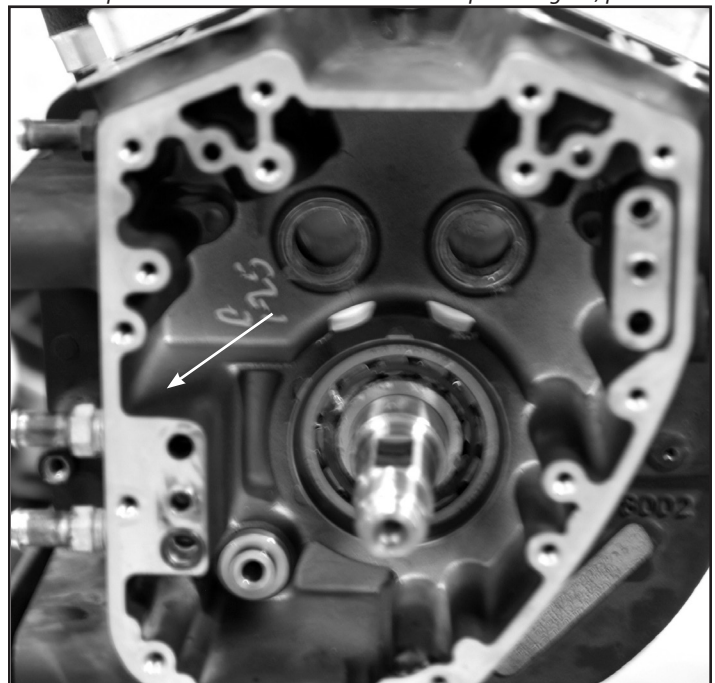


Picture 2 Special tools required for 1999-'06 models from 1999-2006 bikes with spring loaded cam chain tensioners.

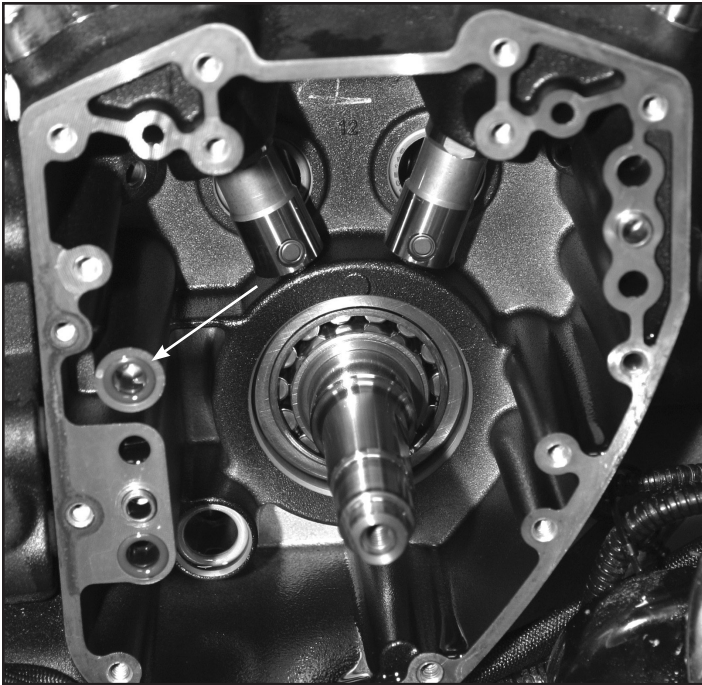
2. H-D #42325 Camshaft Needle Bearing Remover/Installer
3. H-D #43644 Camshaft Remover/Installer
4. H-D #42314 Crankshaft/Camshaft Sprocket Locking Tool

- Some early 1999 model engines do not have a chain oiler boss. See **Pictures 3 and 4**. If Your engine does not have this boss, screw #50-0413-S must be installed to block the oil hole in the back side of the cam plate. Install with red thread locker and tighten to 70 in-lb. **See Figure 1.**

- 1999 models used interchangeable ball bearings on the outer end of both cams. For 2000 and up, the rear bearing is a roller type and the front bearing is a ball bearing type. It is highly recommended to update 1999 models to the 2000 and up bearing set, pictured in



Picture 3



Picture 4

Picture 5. These bearings are included in the S&S cam installation kits for chain drive cams.

Installation steps for all cam plates

1. Inspect plate to verify that it is the correct part number for your application. Refer to assembly drawings on last two pages. Find



Picture 5

drawing for the plate that you have. Check to make sure all parts listed have been included. Call S&S if any parts are missing.

2. Check to make sure all plugs have been installed.
3. Wash cam plate with clean parts cleaning solvent.
4. Before starting any work on motorcycle disconnect negative terminal of battery to eliminate potential sparks and inadvertent engagement of starter while working on motorcycle.
5. Clean and flush your oil tank/pan and oil lines to prevent foreign material from being sucked through your oil pump and through your new cam support plate. The oil filter should also be changed.

NOTE: It is very difficult to remove all of the debris from oil pans with the swaged on baffle plate without removing the plate. If you have a pan with a swaged on baffle plate and have had a large amount of debris go through the motor it is advisable to remove this plate clean the pan and then drill and tap the pan to accept screws to reinstall the plate.

6. Refer to proper H-D manual for the model of bike you will be working on for the proper removal of all components. Save the original fasteners to be reused when S&S cam support plate is installed.
7. Once you have properly removed the cam support plate and oil pump from the motor per HD® manual, inspect flywheel for pinion shaft run out. Refer to manual for proper inspection procedure. S&S recommends no more than .003" total indicated run out on pinion shaft while checked in the cases.
8. If you intend to reuse your existing oil pump it must be inspected to ensure that it is serviceable. Refer to manufacturer service wear limits for the gears and pump body bores. If the areas under the pump gears are scored (kidney shaped ports, separator plate) this will adversely affect the pumps ability to supply and or return oil properly to and from your motor.
9. Inspect inner cam bearings, now is the time to replace these bearings while the engine is apart. Refer to manual for proper procedure and proper tools to use when replacing these bearings.

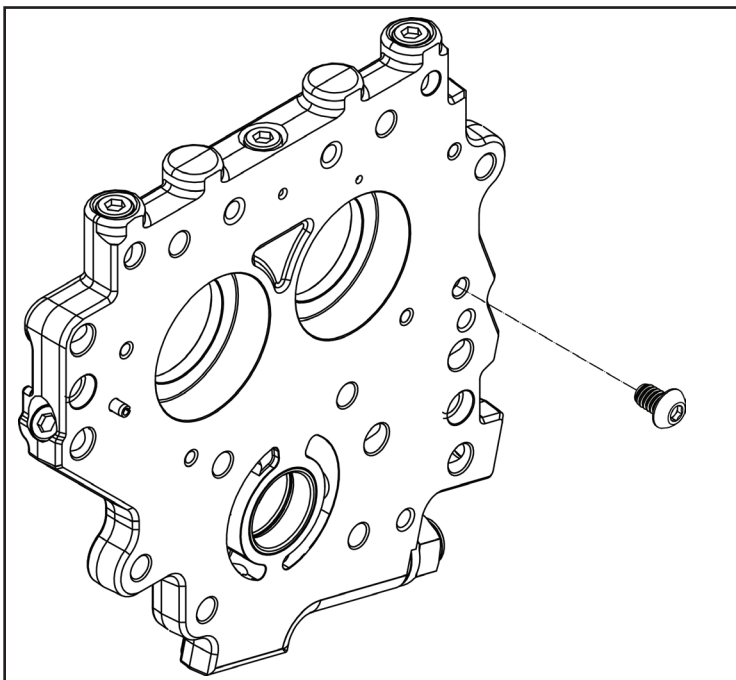


Figure 1

10. Install cam plate, oil pump, and cams per the factory manual or instructions provided by manufacturer of aftermarket cams or oil pump. S&S recommends that all mounting hardware on cam support plate and oil pump be tightened to 100 in-lb using the torque sequences shown in **Figure 2**. Cam support plate fasteners are shown in circles. Oil pump fasteners are shown in squares.

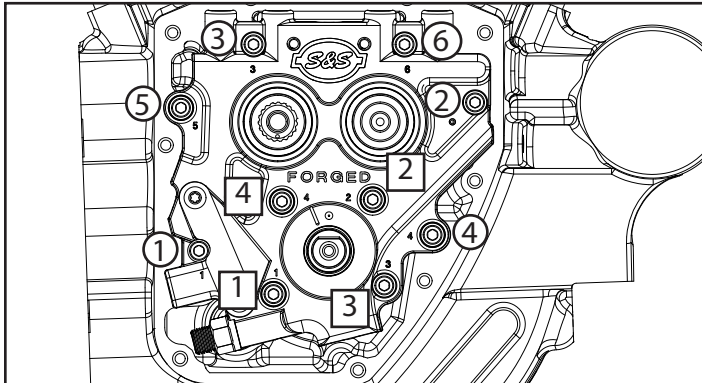


Figure 2

11. Pressure relief valve on S&S cam plate has been set at the factory to relieve at approximately 40 psi. Using a caliper note the distance from the end of the pressure relief screw to the pressure relief nut and note this dimension for future reference. **See Figure 3.**
12. The pressure relief valve is designed to keep the pump from building excessive oil pressure at high RPM's. Resist the temptation to turn the screw in to try and raise the low rpm oil pressure. If your engine has no oil pressure at idle, turning the pressure relief screw in more will normally not help this condition, as this pressure will be below the operating point of the pressure relief valve. If you do adjust the pressure relief valve to something other than the factory setting. We recommend not turning it more than ½ turn at a time. One half turn of the screw will move the adjuster .025" which typically changes oil pressure approximately 4 psi, but other factors may effect the actual change in pressure.

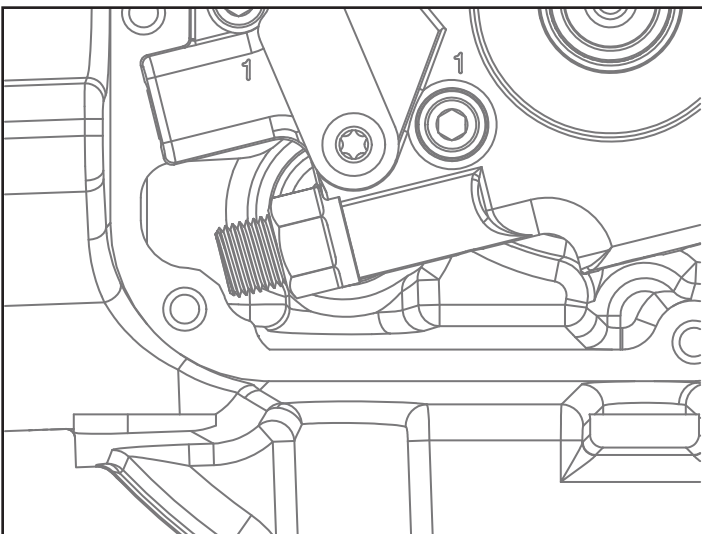
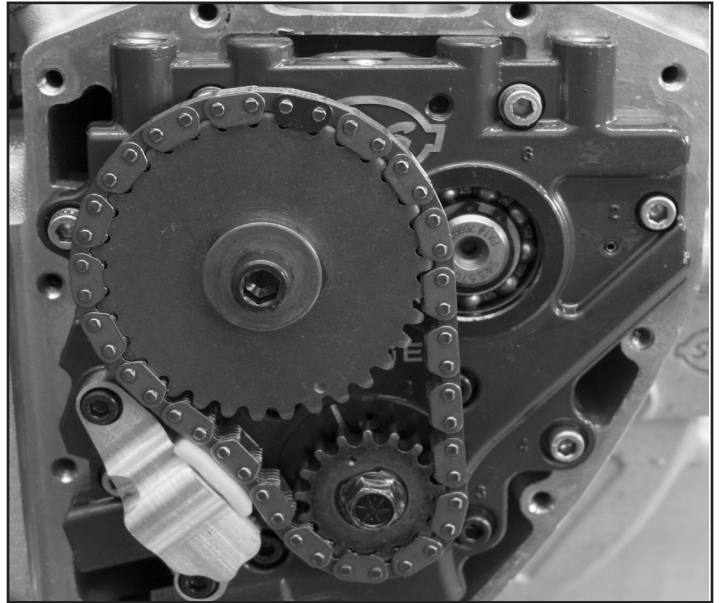


Figure 3

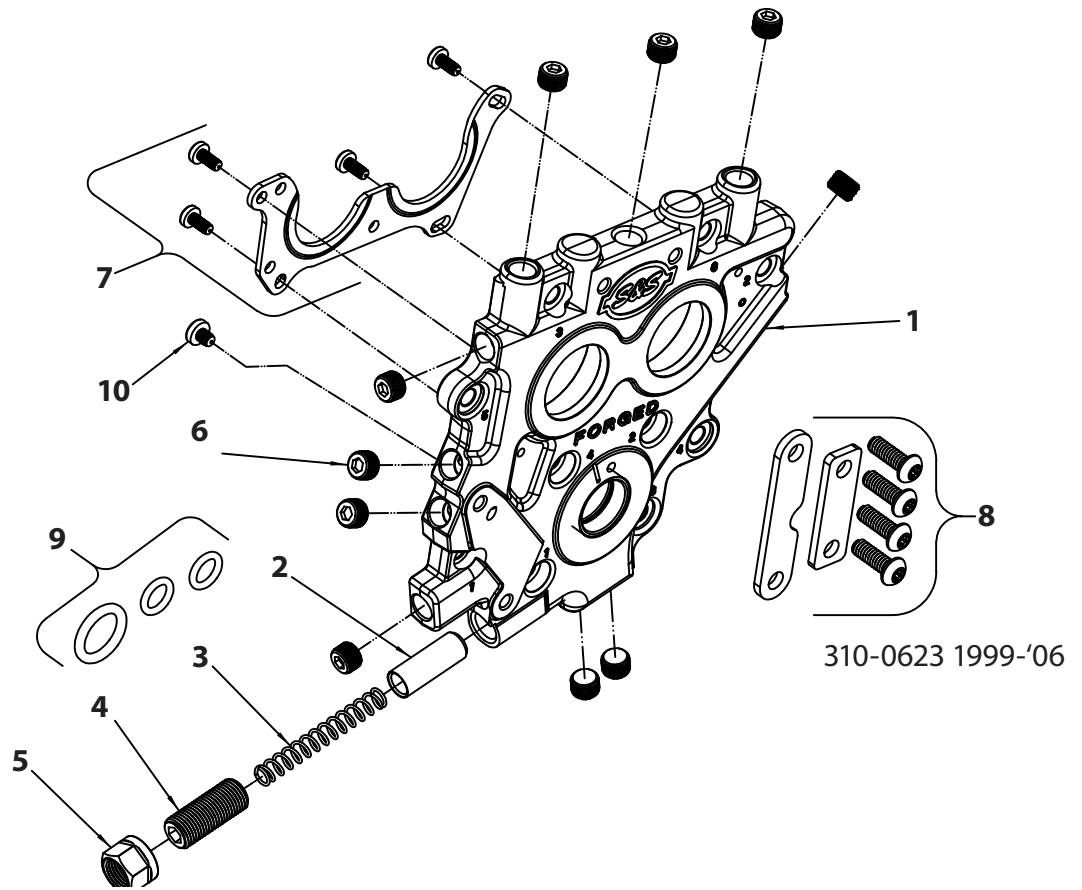
13. Hydraulic cam chain tensioners must be used with the 1999-'06 style S&S cam support plate if using chain drive cams in 1999-'06 models (except 2006 Harley-Davidson® Dyna® models). The stock "silent" chain and sprockets may be used. If the 2007-'16 style chain and sprockets are used, S&S spacer kit #310-0764 will be required to correctly align the sprockets. In addition, S&S Hydraulic Cam Chain Tensioner Kit #330-0518 is recommended. **See Picture 6.**



Picture 6

NOTES:

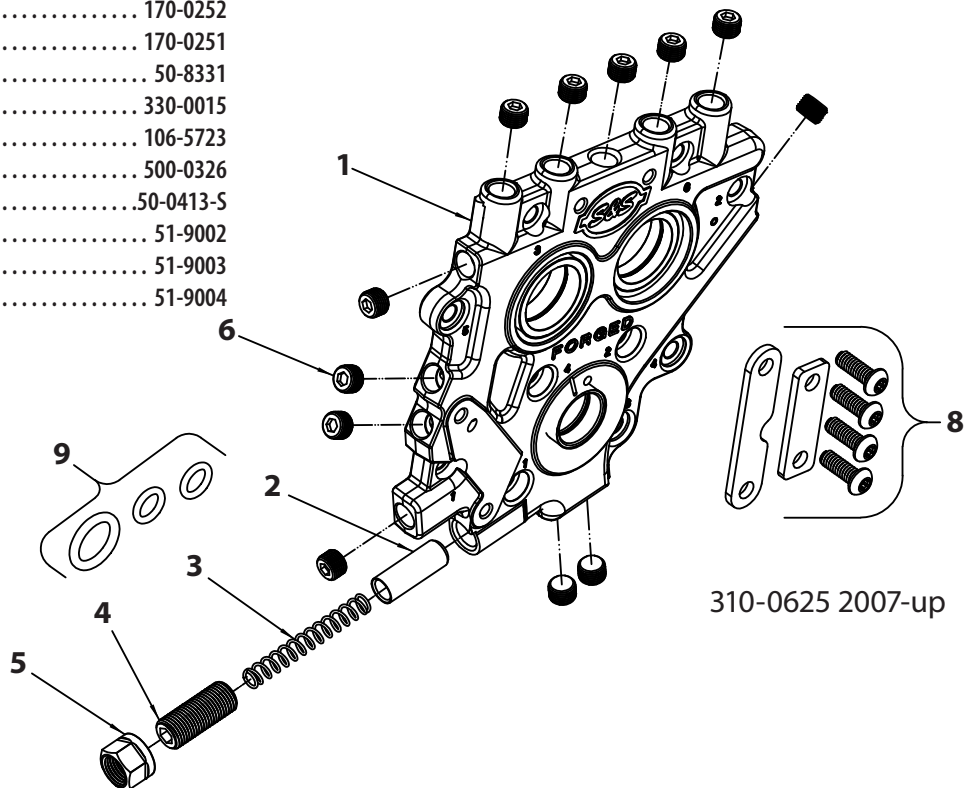
- *Turning the pressure adjusting screw in more than necessary will cause high oil pressure at high RPM's but will also needlessly raise oil temperature and rob horsepower without really raising low rpm oil pressure. Ideally you want to keep your oil pressure as low as you can while keeping the tappets quiet.*
- *If installing cam plate with the motor in the bike put transmission in high gear and raise rear wheel off the table so you can turn the engine over using rear wheel*
- *S&S does not supply hydraulic cam chain tensioners with new cam plates. You will either need to reuse your stock tensioners or purchase new ones. S&S recommends the S&S cam chain tensioner kit 330-0518.*
- *Hydraulic tensioner block off kit is included for use with gear drive cams. Follow gear drive cam instructions for installation.*
- *S&S recommends replacing stock spring style hose clamps on oil cooler lines, where they attach to the filter adaptor, with crimp style clamps. Spring clamps do not provide adequate clamping force to keep oil lines secure on the hose nipples under extended high rpm operation.*



310-0623 1999-'06

Cam Support Plate Replacement Parts

- 1. Cam support plate NA
- 2. Pressure relief valve31-6082-S
- 3. Pressure relief spring 31-6018
- 4. Pressure relief adjusting screw 170-0252
- 5. Pressure relief adjusting screw lock nut 170-0251
- 6. 1/8" 27 taper pipe plug 50-8331
- 7. Bearing retention plate kit 330-0015
- 8. Hydraulic tensioner block off kit 106-5723
- 9. O-ring kit 500-0326
- 10. Screw,BHC,1/4-20 x 3/8",Zinc,Alloy Steel50-0413-S
- 11. Assembly lube (Not pictured) 51-9002
- 12. Loctite #243 Blue .5ml (Not pictured) 51-9003
- 13. Loctite #262 Red .5ml (Not pictured)..... 51-9004



310-0625 2007-up