MAINTENANCE LOGBOOK FOR A TWO-STROKE MINI

COMPONENT	ENGINE HOUR INTERVALS				
	2hrs.	5	10	25	50
Bolts	C&I				
Air filter	C&I			R	
Chain	C&I			R	
Coolant		C&I			R
Cables		C&I			R
Brake pads	C&I			R	
Brake fluid	C&I				R
Tire psi	C&I				
Trans oil		R			
Magneto			C&I		
Clutch plates				R	
Top end			R		
Bottom end					R
Wheel bears.				C&I	
Steering			C&I		R
Linkage					C&I
Fork seals	C&I			R	
Shock oil					R
Carb clean					C&I

MAINTENANCE LOGBOOK FOR A FOUR-STROKE 150CC RACER

COMPONENT	ENGINE HOUR INTERVALS				
	2hrs.	5	10	25	50
Bolts	C&I				
Air filter	C&I			R	
Chain	C&I			R	
Coolant		C&I			R
Cables		C&I			R
Brake pads	C&I			R	
Brake fluid	C&I				
Tire psi	C&I				
Trans oil		R			
Crank oil	R				
Clutch plates				R	
Top end			R		
Bottom end					R
Wheel bears.				C&I	
Steering			C&I		
Linkage					C&I
Fork seals	C&I			R	
Shock oil					R
Valve adjust		C&I		R	
Cam chain					R
Carb clean				C&I	

Key: Clean & Inspect (C&I), Replace Fluid (RF), Lubricate (L), Rebuild (RB), Replace (R).

PROJECT 26 Comprehensive Twin-Chamber Servicing

Time: 2–3 hours

Tools: Race Tech cartridge fork tool set

Talent: ★★★

Tab: $95

Parts: Pivot Works Rebuild Kit, fork oil, grease

Benefits: Better handling

Maintenance Intervals

Modern two-staged sealed cartridge forks don't require as much maintenance as the older-style cartridge forks, because the cartridge is sealed from contamination produced from the fork tubes and springs. Here is a list of the typical tasks and intervals associated with servicing modern forks:

Seals and Wipers

High-performance seals with relatively low drag need to be changed about twice a season, or approximately every 40 hours. You can buy durable seals that require less maintenance, but the stiction will be so great that it will affect the damping performance.

Race Tech makes a variety of suspension tools; this is what you need to service Showa twin chamber forks.

Bushings

The bushings are the load-bearing surfaces of the fork. There are three bushings in each fork leg. The bushings are located in the slider tube, on the fork tube, and inside the fork cylinder. The bushings are very durable and don't wear quickly unless they become damaged during a seal and wiper change.

Outer Tube Oil Change

The outer fork tubes contain the oil that lubricates the seals and bushings and provide a means of tuning the air spring. There is no need to use high-quality expensive oil, just one with good lubrication properties. The service interval for cleaning and oil changing is the same as the seals and wipers, twice a season or every 40 hours, whichever is greater.

Cartridge Service

The cartridge needs to be cleaned about once per season or every 80–100 hours of usage. High-quality oil like Motorex 2.5 should be used, because its formulization best matches the cartridge bushings and bleed setups.

Top Left: Disassembling the Forks
Use a Race Tech eight-point, 50-mm box wrench to remove the outer fork cap. Depress the slider tube and drain the oil from the outer chamber. Capture the oil and recycle it at an automotive garage or oil express.

Bottom Left: Unthread the rebound adjuster bolt with a 21-mm socket while holding the axle clamp in a vise. The rebound adjuster bolt will separate from the fork tube, but it still needs to be unthreaded from the cylinder rod. Extend the cylinder rod by pushing on the top of the cartridge to expose the damper rod jam nut. Place a Race Tech flat wrench on the cylinder rod and loosen the jam nut and rebound adjuster bolt.

Above: Remove the cartridge assembly and the spring from the top of the fork leg. Clamp the upper part of the cylinder in a shaft block and vise, then use a box wrench to remove the compression-valve assembly. Pull to separate the compression valve from the cartridge cylinder.

Disassemble the cartridge for cleaning. Start by clamping the cylinder rod in a shaft block and unthreading the jam nut. Now slide the cylinder rod out of the top of the cylinder. The best method for cleaning the oily components of the fork is a high-flash-point (120 degrees Fahrenheit) mineral-spirits solvent. Solvent breaks up the mixture of grease, oil, and metal debris that contaminates the forks. Commercially available products include PB Blaster, available from most auto parts stores. Non-chlorinated brake cleaner is the best choice for final cleaning. Allow the parts to drip dry.

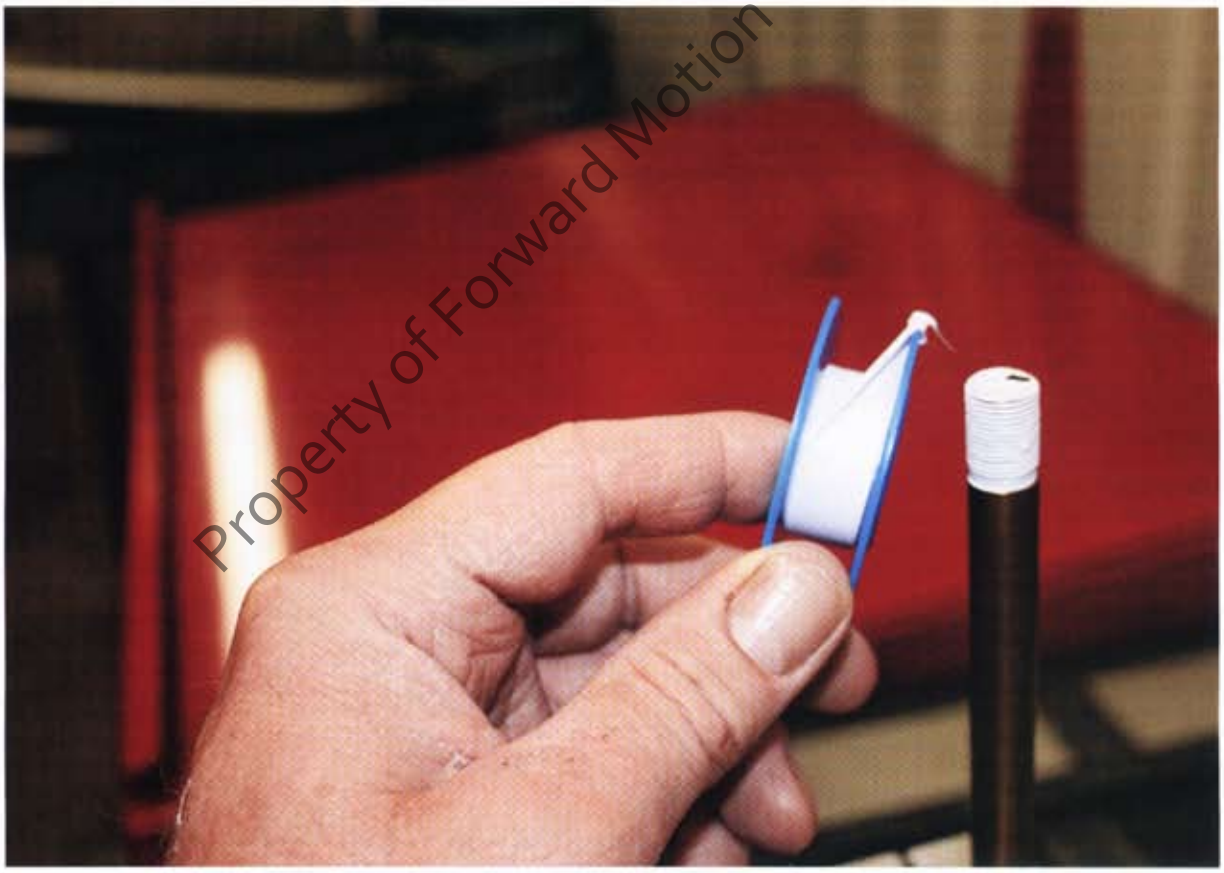
Changing Seals, Wipers, and Bushings

The fork tube and slider must be separated to change the seals and bushings. Use a small, straight-blade screwdriver to pry off the wiper; now remove the circlip and slide the parts down the tube. Heat the lower part of the fork slider with a propane torch to expand the fork slider away from the outer bushing; this will make it easier to separate the tube and fork slider. This will also prevent the outer bushing from being pushed over the inner bushing, which can scrub off the Teflon coating.

Grasp the fork tubes with your hands and quickly extend them several times until the tubes separate. The bushings, seals, circlip, and wiper will be retained on the inner fork tube. Now remove the fork tube bushing by spreading it with a screwdriver, and slide it off the end of the tube. Discard the old oil and dust seals and inspect the bushings for wear.

Put a dab of grease under the lip of the oil seal and dust wiper. Install a new wiper and bushing on the fork tube. Place a seal bullet or a plastic bag over the end of the fork tube to prevent damage to the new seal. Make sure to install seals, bushings, aluminum spacer, and circlip in the exact order.

Use a seal driver on the aluminum spacer to seat the outer bushing in the fork slider, and then use the driver on the seal. Install the circlip and use a plastic mallet to tap the wiper evenly into the slider. Set the fork tubes aside and get ready to assemble the inner cartridge.



Assembling the Cartridge

Wrap a piece of Teflon tape around the threads of the piston rod before inserting into the cylinder. This will prevent chafing of the internal seal, which is extremely difficult to replace. Insert the piston rod assembly into the cylinder using a 10-mm T-handle to manipulate the piston rod into place.

When installing the jam nut on the end of the piston rod, ensure that the jam nut is threaded all the way up on the piston rod. Clamp the cylinder in the shaft-block and tighten the vise so you can hold the cartridge upright for oil filling.

Overfill the cartridge to an oil height of about 100-mm from the top edge of the cylinder with Motorex 2.5 oil. You'll need a total of two bottles to refurbish both fork tubes. Perform nonpressurized bleeding of the cartridge by moving the rod a total of 1 inch up and down to help displace trapped air to the top of the cylinder. Stroke the rod about 30 times to bleed the cartridge, then wait 10 minutes for the air to bubble upward. Wipe a dab of grease on the O-ring prior to inserting it into the top of the cartridge. Tighten the fork cap hand-tight. Now perform pressurized bleeding, stroking the cartridge 2 inches or less for a total of 30 times. This will compress the remaining air bubbles and position them near the top for final bleeding. Clamp the bottom of the cartridge in the vise vertically. Compress the cartridge slowly through its full travel. Tip the cartridge to the side to drain the excess oil.

Insert the cartridge into the tube and compress the cartridge until the rod extends far enough to use the flat wrench. Install the long aluminum rebound-adjuster rod into the piston rod flush to the end, then slide the rebound-adjuster tab until it interlocks with the rebound rod. Tighten the rebound-adjuster bolt until it bottoms out on the rod, not the jam nut. There is the danger that the forks will be unequal lengths if you get this procedure wrong.

Filling the Outer Forks with Oil

The next step is to fill the outer fork tubes with 350cc of oil. The oil volume and height generates the air spring's progression. The lower the oil volume, the less progressive the effects of the air spring. The higher the volume, the more progressive your air spring will be. Consult your owner's manual for suggestions on oil volume for your riding demands. There are no bleeding considerations for the outer fork tubes. Tighten the fork cap hand-tight, because the triple clamp provides the extra torque to prevent the cap from unthreading.

Tighten the jam nut against the rebound adjuster by holding a wrench on the jam nut and a socket on the bolt. Take care when removing the flat wrench, because the spring pressure will cause the rebound adjuster to slam into place. Put a dab of grease on the threads of the rebound adjuster and tighten it into the fork tube to 25 ft-lbs.

PROJECT 27 Installing Enzo Subtanks

Time: 1 hour

Tools: Drill, metric drill bits, tap handle, 8x1.0-mm tap, 9-mm reamer, depth caliper, 10-mm wrench, shaft blocks, Blue Loctite

Talent: ★★★★★

Tab: $350

Parts: Enzo carbon fiber subtanks, tap oil

Benefits: Plusher feel to the front forks and better bottoming resistance

Subtanks serve as a buffer to the air springs, allowing for the use of higher oil heights to increase bottoming resistance and reducing the effects of the high oil height when a rider hits braking bumps. They give a plusher feeling over braking bumps and reduce the shock on a rider's forearms on hard jump landings.

To install subtanks, the fork caps must be drilled, tapped, and reamed to accept the hose fitting.

1) Disassemble the base valve down to the fork cap using shaft blocks, a vise, and a 10-mm wrench. If you haven't ground the end of the base valve shaft already to install an aftermarket base valve, you'll need to do that before attempting to remove the nut (see below).
2) Remove the air bleeder screw and drill a 7-mm hole straight through the bleeder screw hole in the cap.
3) Tap the hole with an 8x1.0-mm tap; apply some oil to the tap to make it easier.
4) Now the hole must be reamed to accept an O-ring. Use a 9-mm reamer in the threaded hole to a depth of 2.5 mm.
5) Apply a dab of Blue Loctite to the hose fitting and thread it into the hole hand-tight.

Installing subtanks is a side project that can be done separately or together with servicing.

The Enzo subtanks are mounted to the fork sliders with a carbon fiber half-clamp. The hoses connect to the fork cap, and the tuning screw in the manifold is easily adjusted with a screwdriver.

The tank hoses connect through the old bleeder screw holes. The holes must be drilled, reamed, and tapped to accept the hose tank fittings.

The hose fittings are fastened to the fork caps.

Chapter 12
SUSPENSION PROJECTS

Projects 26–28

- Cartridge Fork Terminology
- Comprehensive Twin-Chamber Servicing
- Installing Enzo Subtanks
- Installing MX-Tech Mid and Base Valve Kits

The Twin-Chamber Showa cartridge forks used on all CRF models are sturdy and well built. Seals and wipers wear quickly and require changing about twice per riding season. Seal-Savers help stretch the service time but they must be cleaned every ride for best results. Some riders prefer to customize their forks with heavier springs, subtanks, mid valves or base valves, or by limiting travel. This chapter is a guide to step-by-step servicing and tips on installing aftermarket accessories.

Tools of the Trade

In order to service the Showa forks, you'll need some special tools as well as some common sockets and wrenches. Starting from the top of the fork, an eight-point, 50-mm bolt wrench and split-collar seal and bushing driver will be needed for routine servicing, as well as a seal-bullet to protect the seal from tearing upon installation on the fork tube. To remove the cartridge from the fork tubes, a straight, flat wrench is required. A six-point, 21-mm socket and ratchet fits the rebound adjuster bolt.

Cartridge Fork Myths and Truths

Myth—Midstroke harshness is caused by excessive mid valve compression damping.
Truth—Midstroke harshness is caused by excessive progressive elements (air spring and wire spring load) compounding each other against softer compression damping rates.

Myth—Changing the ICS results in an improvement of compression-damping characteristics.
Truth—Changing the ICS only affects the overall spring rate.

Myth—Switching the weight of the oil changes the damping.
Truth—Oil weight changes affect only the lower end of the damping spectrum.

Myth—Midstroke harshness can be improved by reducing the mid valve compression or changing the spring rates of the ICS and main spring.
Truth—Midstroke harshness can be improved by increasing the active compression damping and reducing the air spring force with a lower oil height.