# 2003 PW3

## Owners / Service Manual

*“CHAMPIONS START HERE”*

For **parts orders** contact your local dealer

To locate your closest Cobra dealer
log on to
www.cobramotorcycle.com
or call
(330) 549-9600

If you need **technical assistance**
contact your local dealer or call
the Cobra Technical Support Hotline at
(330) 549-9603

Cobra Motorcycle MFG., Inc.
11511 Springfield Road
North Lima, Ohio 44452

MCPW2003.4

## DISCLAIMER OF WARRANTY

*This motorcycle is sold "as is" with all faults, obvious or not. There are no warranties expressed or implied, including any warranty of merchantability and warranty of fitness for any particular purpose.*

# *"WARNING"*

**THE COBRA PW3 IS A COMPETITION MODEL ONLY AND IS NOT MANUFACTURED FOR, NOR SHOULD IT BE USED ON PUBLIC STREETS, ROADS OR HIGHWAYS.**

**THE USE OF THIS BIKE SHOULD BE LIMITED TO PARTICIPATION IN SANCTIONED COMPETITION EVENTS UPON A CLOSED COURSE BY A SUFFICIENTLY SKILLED RIDER AND SHOULD NOT BE USED FOR GENERAL OFF-ROAD RECREATIONAL RIDING.**

**IMPROPER USE OF THIS MOTORCYCLE CAN CAUSE INJURY OR DEATH.**

**THIS BIKE IS INTENDED FOR EXPERIENCED RACERS ONLY AND NOT FOR BEGINNERS.**

**IT IS YOUR RESPONSIBILITY AS THE OWNER OF THIS COBRA MOTORCYCLE OR AS THE PARENT, OR LEGAL GUARDIAN OF THE OPERATOR, TO KEEP THIS COBRA MOTORCYCLE IN PROPER OPERATING CONDITION.**

**THIS BIKE WAS DESIGNED FOR RIDERS THAT WEIGH LESS THAN 80 LBS WITH FULL RIDING GEAR AND SHOULD NOT BE OPERATED BY RIDERS THAT WEIGH MORE THAT.**

**BE SURE THAT THE RIDER ALWAYS WEARS ADEQUATE SAFETY GEAR EVERYTIME HE OR SHE RIDES THEIR COBRA MOTORCYCLE.**

## IMPORTANT SAFETY NOTICE

**⚠ WARNING**

Failure to follow WARNING instructions could result in severe injury or death to the machine operator, a bystander, or a person inspecting or repairing the machine.

CAUTION:
A CAUTION indicates special precautions that must be taken to avoid damage to the machine.

**NOTE:**
A NOTE provides key information to make procedures easier or clearer.

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# General Information

## Specifications - General

| Items | PW3 |
|---|---|
| **Dimensions** | |
| Wheelbase | 35.75” (908mm) |
| Wheel size | 10” (254mm) |
| Seat height | 22” (559 mm) Stock #TCHO0001 |
| | 23.9” (607 mm) Optional #TCHJ0001 |
| **Engine** | |
| Type | 2-stroke, single cylinder, reed valve |
| Cooling system | Liquid-cooled |
| Displacement | 49.8 cc |
| Bore and stroke | 39 mm x 41.7 mm |
| Ignition system | Digital Electronic |
| Spark plug | Champion C53, NGK B11EGV |
| Gap | 0.023” – 0.025” (0.58 – 0.64 mm) |
| Fuel type | *Sunoco MO2$_X$* or 93 octane pump gasoline |
| | **OTHER RACE FUELS ARE NOT RECOMMENDED** |
| Injector oil type | *Cobra Venom 2-cycle Race Oil* |
| Fuel / oil mix ratios | Fill oil reservoir as required |
| Ignition timing | Fixed |
| Carburetion | 12 mm Dell’Orto PHVA - PS |
| Main jet | 82 |
| Slow (Pilot) jet | 42 |
| Float height | 5 mm $\pm$ 0.3mm (0.2” $\pm$ 0.012”) |
| **Transmission** | |
| Speed | Single |
| Clutch | 3 shoe centrifugal |
| Final drive ratio | 10/46 T |
| Transmission / clutch oil type | *Cobra Venom 3 Shoe Clutch Milk,* or Dexron III |
| Quantity | 250 ml (8.5oz) |

| | |
|---|---|
| **Chassis** | |
| Front tire | 2.50 - 10 |
| Pressure | 15 psi minimum |
| Rear tire | 2.75 - 10 |
| Pressure | 15 psi min. (20 psi for hard pack or rocky conditions) |
| Front fork | Marzocchi 32mm |
| Fork oil type | SAE 20 weight |
| Fork oil amount | 200 ml (6.8 oz) oil change, 220 ml (7.4 oz) rebuild |
| Fork oil height | 70 mm (2.75”) collapsed from top with spring (no spacer) |

# Specifications - Torque Values

| Fastener | Torque Value | | | Size & Remarks |
|---|---|---|---|---|
| | ft-lb | in-lb | Nm | |
| Front engine mount bolts | 22 | 264 | 30 | 8 x 1.25 |
| Rear engine mount bolts | 22 | 264 | 30 | 8 x 1.25 |
| Swingarm pivot bolt | 21 | 250 | 28 | 14 x 2 |
| Rear sprocket bolts | 18 | 216 | 24 | 7 x 1 |
| Rear axle bolts | 25 | 300 | 34 | 12 x 1.25 |
| Rear shock mounts | 40 | 480 | 54 | 10 x 1.5 |
| Clutch adjust access plug | 10 | 124 | 14 | 12 x 1.25 |

**Units of mm unless otherwise specified**

# Optional Components

- Carburetor jets
    - Main jets #'s 74, 76, 78, 80, 84, 86, 88
    - Slow jets #'s 38, 40, 45,
- Sprockets
    - Front sprocket, 11T
    - Rear sprocket, 39 T – 45 T
- Seat – higher seat height 23.9" (607 mm) part # TCHJ0001
- Suspension Springs

| Weight of Rider (lb) | Fork Spring | Shock Spring |
|---|---|---|
| Less than 38 (light) | KCMZ0012A | SCMU0321 (yellow, 320 lb/in) |
| 38 – 45 (std) | KCMZ0012 | SCMU1360 (red, 260 lb/in) |
| 46 to 55 (stiff) | KCMZ0012B | SCMU1380 (white, 380 lb/in) |
| Extra stiff | | SCMU1400 (silver, 400 lb/in) |

- Suspension Valving

| Damping Rate | Fork Valving Compression (right) | Fork Valving Rebound (left) | Shock Valving (kit) |
|---|---|---|---|
| Soft (fast) | KCMZ0033A | KCMZ0032A | SCMU0318A |
| Standard | KCMZ0033 | KCMZ0032 | SCMU0318 |
| Hard (slow) | KCMZ0033B | KCMZ0032B | SCMU0318B |

# Break-In Procedure

Your Cobra PW3 is a close-tolerance high performance machine and break-in time is very important for maximum life and performance. The PW3 can be ridden hard after the first ½ hour break-in time but it is recommended that no adjustments are made to the carburetion or suspension until the full 8 hours of bike break-in has elapsed. Also, after the engine, transmission, and drive train have been broken-in for the full 8 hours, the bike will be faster!

Fill the fuel tank with 93 octane pump gas, or *Sunoco* $MO2_X$ without oil. Also, fill the oil injection reservoir with Cobra's specially formulated *Cobra Venom 2-cycle Race Oil*. (Part # MCMUOL02)

CAUTION:
Failure to use proper fuel or oil may result in premature engine wear, or damage to the machine.

Adhering to the following break-in schedule will result in long lasting high performance machine.

- First ½ hour of operation
  - Follow the starting procedure listed in this manual.
  - Avoid prolonged operation at Wide Open Throttle.
- After 1 hour of operation
  - Check for loose bolts and nuts on the bike and retighten as necessary (proper toque values are listed under Specifications).
  - Clean the carburetor bowl.
  - Change the transmission / clutch lubricant.
- After 8 hours of operation
  - Change the fork oil.
  - Have a Certified Cobra Mechanic change the shock oil.
- Your bike is now ready for the highest level of competition!

# Starting Procedure

Before starting the machine inspect the following:

- Fill the 2-stroke injector oil reservoir with Cobra's specially formulated *Cobra Venom 2-cycle Race Oil*.
- Insure that the fuel tank contains an adequate volume of fuel to complete the distance required. (*Sunoco MO2X* or 93 octane pump gas).
- Check for proper tire pressure in both tires.
- Observe the chain tension and adjust if necessary.
- Observe the coolant level and fill if necessary.
- Verify that the chain rollers do not have improper wear.
- Inspect the frame for;
  - Cracks in the metal.
  - Cracking paint which might indicate overly stressed material.
- Verify that the handlebars are tight.
- Check the throttle for;
  - Smooth operation and sound closing.
  - Frayed strands of the cable inside the throttle housing.
- Check for loose bolts and nuts, and re-torque as necessary.
- Verify that the air filter is clean and properly saturated with oil.
- Turn the fuel on by rotating the fuel petcock knob to the vertically downward position (reserve position is horizontally forward).

CAUTION:
For best results from your Cobra Motorcycle use only the recommended fuels. Testing has shown that most 'race' fuels actually degrade performance.

When your pre-ride inspection is complete the bike may be started. For a cold engine follow this procedure.

1. Place the motorcycle on a stand of sufficient strength that positions the motorcycle in a level upright position with the rear wheel off the ground.
2. On the carburetor, flip the black choke knob upward from the right side of the bike.
3. Kick start the engine by kicking the lever forward.
4. Rev the engine in short spurts, turning the throttle no more than 1/4 open until the engine will run without the choke.
5. Verify a functional engine shut-off switch by shutting off the engine.
6. Restart the engine and proceed with riding when the engine is sufficiently warm (i.e. the side of the cylinder is warm to touch).

CAUTION:
Never rev an engine full throttle when it's cold or slightly warmed up. Cobra recommends that you tell your child to take it easy the first couple of minutes in practice until the engine comes up to full operating temperature. Make sure your engine is properly warmed up before racing.

# General Tips

1. Always wear a helmet and other protective riding gear.
2. Cobra recommends that you tell your child to take it easy the first couple of minutes in practice until the engine comes up to full operating temperature.
3. Make sure your riders' foot is not resting on the foot brake while they are riding.
4. Evaluate the bikes jetting only after it has been warmed up to race temperatures.
5. A properly maintained machine is safer, faster, and more fun to ride.
6. When washing the bike, be careful to not directly aim the hose at the bottom edge of the seat, or water is apt to enter the airbox.
7. Your Cobra Motorcycle has a 10 digit VIN (Vehicle Identification Number). The first two digits indicate the model and the seventh indicates the model year (MY).
    a. Example, OIxxxx3xxx is a 2003 MY PW3.

# Maintenance

## Schedule & Tips

It is important that you adhere to this maintenance schedule so as to promote the longevity of your Cobra Motorcycle.

- Between each ride
  - Fill the 2-stroke injector oil reservoir.
  - Check the air filter (clean and re-oil as necessary).
  - Insure the smooth operation of the throttle cable (throttle soundly 'clacks' shut).
  - Check for frayed strands of the throttle cable inside the throttle housing and replace if necessary.
  - Check for adequate tire pressures and adjust if necessary.
  - Check all nuts and bolts for proper torque and re-torque if necessary.
  - Spray all moving parts with WD40 or other light oil.
  - Check drive chain for
    - Proper tension and adjust if necessary.
    - Adequate lubrication and lubricate if necessary.
  - Insure that the ignition stator and rotor are clean and dry.
  - Check the frame for cracks in the metal or cracks in the paint that might indicate that the metal has been stressed beyond it's safe limits. Replace or get properly rewelded as necessary.
  - Fill the 2-stroke injector oil reservoir with Cobra's specially formulated *Cobra Venom 2-cycle Race Oil*.
- Every 2 hours of operation
  - Replace the transmission oil.
- Every 10 hours of operation
  - Replace the fork oil.
  - Have the shock oil replaced by a Certified Cobra Mechanic.

CAUTION:

1. If you ever need to weld anything on the bike, disconnect the spark plug cap, unplug the ignition, disconnect the kill switch, scrape the paint bare near the area to be welded and put the ground clamp as close to the area to be welded as possible.

**⚠ WARNING**

Be sure the fuel tank and carburetor have been removed and safely located away from the welding process.

2. The frame is 4130 Chrome Moly and it is important to weld it with the proper rod and heat settings set as light as possible. Cobra recommends replacing the frame with a new one if the old one becomes damaged.

# M1: Replacing Transmission / Clutch Lubricant

**Tools needed:**

- 250 ml (8.5oz) *Cobra Venom 3 Shoe Clutch Milk* (Part # MCMUGF01) or Dexron III Automatic Transmission Fluid
- #3 Phillips screwdriver
- large flat blade screwdriver or coin

**Procedure:**

1. Begin this procedure with a bike that has been ridden more than 5 minutes but less than 10 minutes. It is desired to have the engine warm enough so that the oil 'runny' but not so hot that there is risk of being burned by the engine or the oil.

**⚠ WARNING**

Hot oil and hot components on the motorcycle may cause burns.

2. Lean bike against something or set on stand with oil drain hole.
3. Using Phillips screwdriver, remove the oil drain bolt located on the right side of the engine (figure 1).

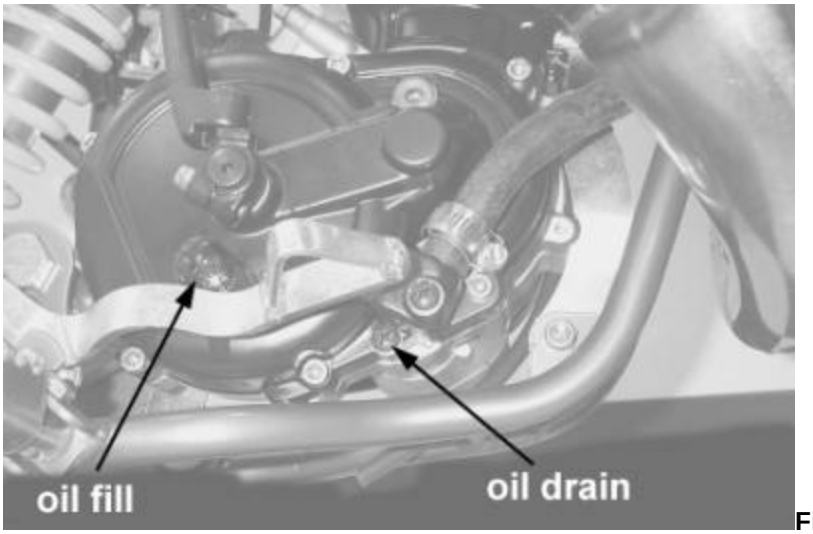



**Figure 1**

**NOTE:** You may need to adjust the brake pedal (up or down) to gain access to the drain bolt.

4. After it has drained, reinstall the drain screw with gasket.
5. Refill oil from oil fill plug 250 ml (8.5oz) *Cobra Venom 3 Shoe Clutch Milk* (Part # MCMUGF01), or Dexron III Automatic Transmission Fluid, thru the fill plug.

**NOTE:** Leaning the bike over onto it's left hand side will facilitate the oil filling procedure.

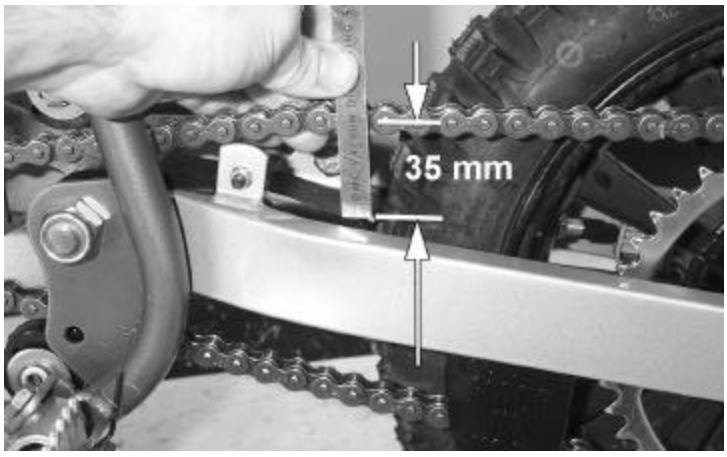
6. Reapply the oil fill screw, securely, being sure the gasket is in place.

CAUTION:
Cobra has spent considerable time and money developing the proper lubrication to handle the harsh environment of the automatic clutch and transmission of this motorcycle. Cobra was forced to put forth this effort because the other available options and not adequate. Cobra's specially developed *Cobra Venom 3 Shoe Clutch Milk* (Part # MCMUGF01) is the recommended lubricant for your PW3 motorcycle.

# M2: Chain adjustment

**Tools required for chain adjustment**

- Two 19 mm wrenches or sockets
- 13 mm wrench or socket




1. Make sure that the rear wheel is aligned properly.
2. For proper adjustment, the chain should have 35 mm (1 3/8") free movement just behind the chain block with no load on the bike (figure 2)

**Figure 2**

CAUTION:
Verify that the chain has a minimum of 6mm (1/4") free movement when the suspension is collapsed.

3. If the chain requires adjusting, loosen the axel with a pair of 19 mm wrenches and tighten the chain by rotating the adjuster bolts clockwise (CW) or loosen the chain by rotating the adjuster bolts (CCW).
4. Retighten the axel bolt to 25 ft-lb (34 Nm).

**Figure 3**

# M3: Front brake adjustment

**Tools recommended for front brake maintenance:**

- 10mm open end wrench

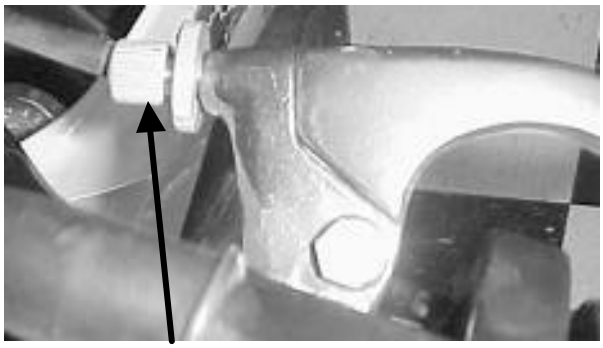


**Figure 4,** from the brake lever

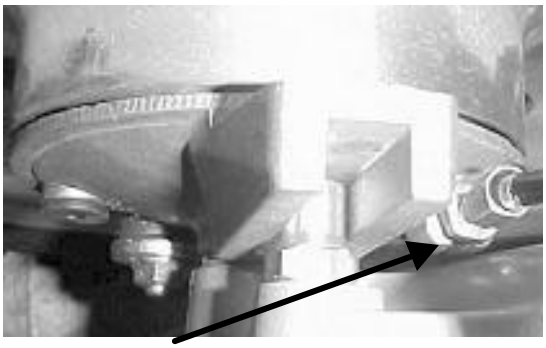


**Figure 5,** from the brake hub

**From the brake lever:**

1. Loosen the locking nut on the brake lever.
2. Adjust the bolt to desirable position.
3. Tighten the locking nut.

**From the brake hub:**

1. Loosen the 10mm nut on the hub.
2. Adjust the brake cable to desirable position
3. Tighten the 10mm nut.

CAUTION:

If you tighten the front brake up too much, the brakes may hang up causing the brake pads to wear incorrectly and prematurely.

# M4: Rear brake adjustment

**Tools recommended for rear brake maintenance:**

- 10mm open end wrench

There are 2 adjustments on the brake.

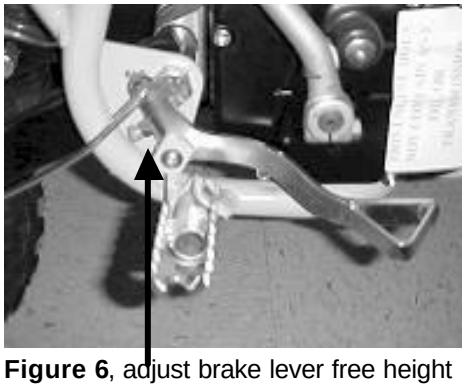


**Figure 6**, adjust brake lever free height

**Figure 7**, adjust lever 'free play'

**From the brake lever:**

4. Loosen the 10mm nut on the back of the brake pedal.
5. Adjust the bolt to desirable position
6. Tighten the 10mm nut.

**From the brake hub:**

1. Adjust the wing nut up to desirable position.

CAUTION:
If you tighten the wing nut up too much, the brakes may remain engaged. If so, the brake pads will burn up, and need replaced.

# M5: Air Filter Cleaning

**Tools recommended for air filter maintenance:**

- #2 Phillips head screwdriver
- 4 mm hex key (Allen)
- Foam filter oil

**Procedure**

1. Removed the seat with the 4 mm hex key
2. Remove the two Phillips head screws holding the filter to the entrance of the airbox.
3. Clean the filter in a nonflammable solvent to remove the filter oil.
4. Clean the filter in hot soapy water to remove all dirt particles.
5. Allow to dry thoroughly.
6. Saturate with filter oil and remove excess.

**⚠ WARNING**

Do not clean the air filter with gasoline or other highly volatile petroleum product. Diesel fuel or kerosene would be preferred but caution should still be taken. Hot soapy water works well.

**NOTE:**

The Cobra is equipped with a special designed Air box. It is very important to keep the air filter clean and properly oiled with high quality water-resistant foam filter oil. It's very important to oil your filter consistently each time because varied amounts of oil will change your carburetor jetting.

**NOTE:**

Make sure you change or clean your filter after each moto. We recommend carrying three or more filters in your toolbox.

- 1 for practice
- 1 for each moto

# M6: Fork Oil Replacement

**Tools required**

- 5 & 6 mm Allen wrench
- 19 mm wrench or socket (two required)
- Spring clip remover

**Disassembly**

1. Remove the front wheel.
2. Remove the fork legs from the triple clamps.
3. Perform the following on one leg at a time.
4. Using your hands, remove the black rubber plug from the top of the fork leg exposing the white plastic cap.
5. Secure the fork leg assembly in a vice by gripping the leg across the flats through which the axle bolt goes through.
6. Depress the white plastic cap inwards (down) and remove the wire spring clip from its groove.
7. Remove the white cap, the fork spring preload sleeve, and the fork spring.

**NOTE:** Depressing the fork leg will facilitate removing the white cap.

8. The fork can now be turned upside down and drained.

**Assembly**

1. Fill the leg with 200 cc (6.8 oz) 20 wt fork oil.
2. Standard fork oil level is 70 mm (2.75") from the top edge with the fork collapsed.

**NOTE:** Remove the preload sleeve but leave the spring in for the measurement.

3. Install the preload sleeve.
4. Install and depress the white cap while installing the spring clip.
5. Fork may be reinstalled.

# M7: Clutch Adjustment

### Tools required

6 mm hex key (Allen wrench)
large flat blade screw driver

### Process

1. Remove the clutch adjustment access plug (6mm hex key).

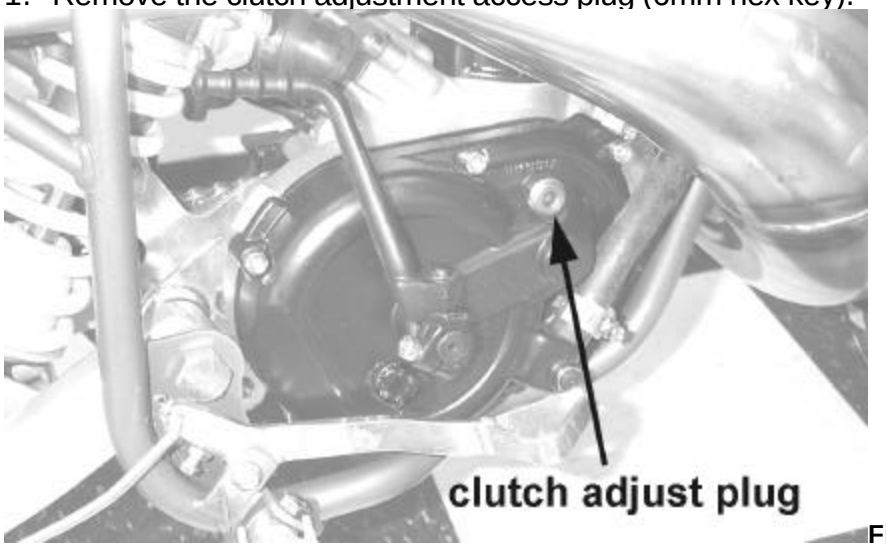



**Figure 8**

2. Using the kick lever, turn the engine over (rotate the crank) until one of the large flat head screws is visible through the access hole (this flat head screw is one of the three adjusters).

**NOTE:** Turning the adjusting screw Counter Clock Wise (CCW) will allow the shoe to engage at a lower RPM, this is the direction you should adjust to compensate for shoe wear. Alternatively, a Clock Wise (CW) adjustment of the screw will allow the clutch to engage at a higher RPM.

3. Subsequently use the kick lever to rotate the crank and expose the other two clutch shoe adjusters and adjust them by the same amount.

CAUTION:
Be sure to adjust each of the three shoe adjustors by the same amount.

4. Reinstall the clutch adjust access plug (10 ft-lb, 14 Nm).

# Engine Service / Parts

Factory trained technicians with precision gauging and proper assembly fixtures carefully assemble all Cobra engines to specific clearances. If you feel you have the skills, and the appropriate tools, to perform the following service tasks please follow the instructions closely. The part numbers are listed throughout to help you when ordering parts from your local Cobra dealer.

If you don't feel comfortable with the service work, simply take your engine out of the frame and sent it to:

Cobra Precision Engines
11511 Springfield Road
North Lima, Ohio 44452

Cobra's technicians will go through the entire engine, replacing gaskets, bolts, any old part that is worn. The engine will be rebuilt using the same precision gauging and assembly fixtures as when it was assembled new. Before leaving, the engines performance will be measured on a dynamometer to ensure that your engine is operating at its highest potential. All this for one low nominal fee, plus cost of parts. Call (330) 549-9603 for details.

# ES1: Top End Parts

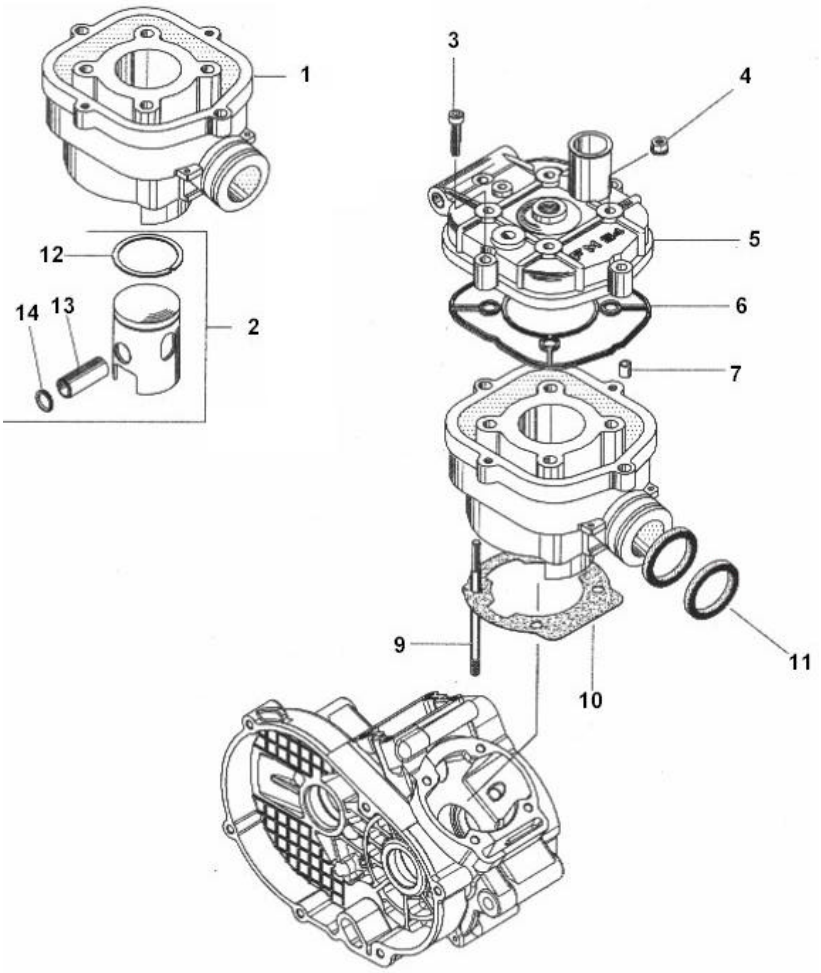



**Figure 9,** Top End Components

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMOTE01 | CYLINDER - CHROME |
| 2 | ECMOTE02 | PISTON KIT - SINGLE RING |
| 3 | HCBC0603 | 6X30 CAP SCREW |
| 4 | HCNF0601 | FLANGED NUT 6MM |
| 5 | ECMOTE05 | CYLINDER HEAD |
| 6 | ZCMOTE06 | CYLINDER HEAD O-RING |
| 7 | ECMU0026 | 6MM DOWEL |
| 9 | ECMOTE09 | CYLINDER HEAD STUD BOLT 6MM |
| 10 | ZCMOTE10 | BASE GASKET |
| 11 | ZCMOTE11 | O-RING - EXHAUST FLANGE |
| 12 | ECMU0056 | PISTON RING - CAST |
| 13 | ECMU0076 | WRIST PIN |
| 14 | ECMUSR04 | SNAP RING-FRANCO PISTON |

# ES2: Bottom end & transmission

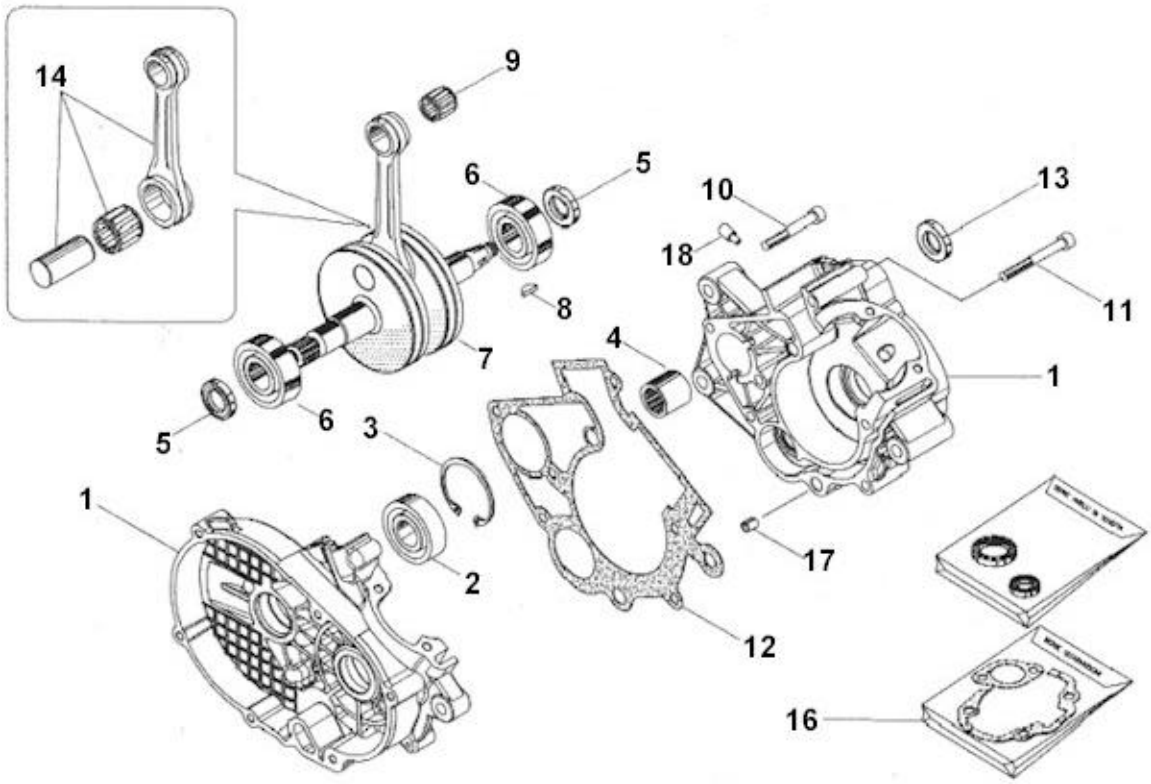



**Figure 10,** bottom end components

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMOBE01 | CASES - COMPLETE SET |
| 2 | ECMOBE02 | OUTPUT BEARING |
| 3 | ECMOBE03 | OUTPUT BEARING - SNAP RING |
| 4 | ECMOBE04 | PRECISION BEARING |
| 5 | ECMOBE05 | CRANK SEAL |
| 6 | ECMU0016 | CRANK BEARING |
| 7 | ECMOBE07 | CRANKSHAFT COMPLETE |
| 8 | ECMOBE08 | FLYWHEEL KEY |
| 9 | ECMU0077 | WRIST PIN BEARING |
| 10 | HCBC0660 | 6X60 CAP SCREW |
| 11 | HCBC0607 | 6X50 CAP SCREW |
| 12 | ZCMOBE12 | CRANKCASE GASKET |
| 13 | ECMOBE13 | OUTPUT SEAL |
| 14 | ECMOBE14 | ROD WITH WRIST PIN AND BEARING |
| 15 | | S6 V/EC.+COM. SET OF SEAL |
| 16 | ZKMOBE16 | GASKET KIT |
| 17 | ECMOBE17 | DOWEL PIN - CASE |
| 18 | ECMOBE18 | CASE VENT PIPE |

**CAUTION:**
Take caution when handling the crankshaft. It is the main power transfer to the rest of the engine. If it is out of alignment, it will cause premature failure of your bearings which can lead to serious damage to the cylinder and the rest of the engine. Do not try to true the crank yourself. Truing the crank should be done professionally.

Cobra trues every crank before it leaves the factory, and also welds the pin to keep it true. If there are any problems send the engine in, or call tech support (330) 549-9603 to determine what the problem is.

CAUTION:

- If you split the cases, check the gear tooth faces for chapping & signs of fatigue.
- Check the small needle bearings for fatigue. If the bearings are damaged, the engine cases should be checked to make sure the needle-bearing casing didn't oblong the bearing hole in the case.
- Needle bearings should be replaced every racing season.

# Kick lever mechanism

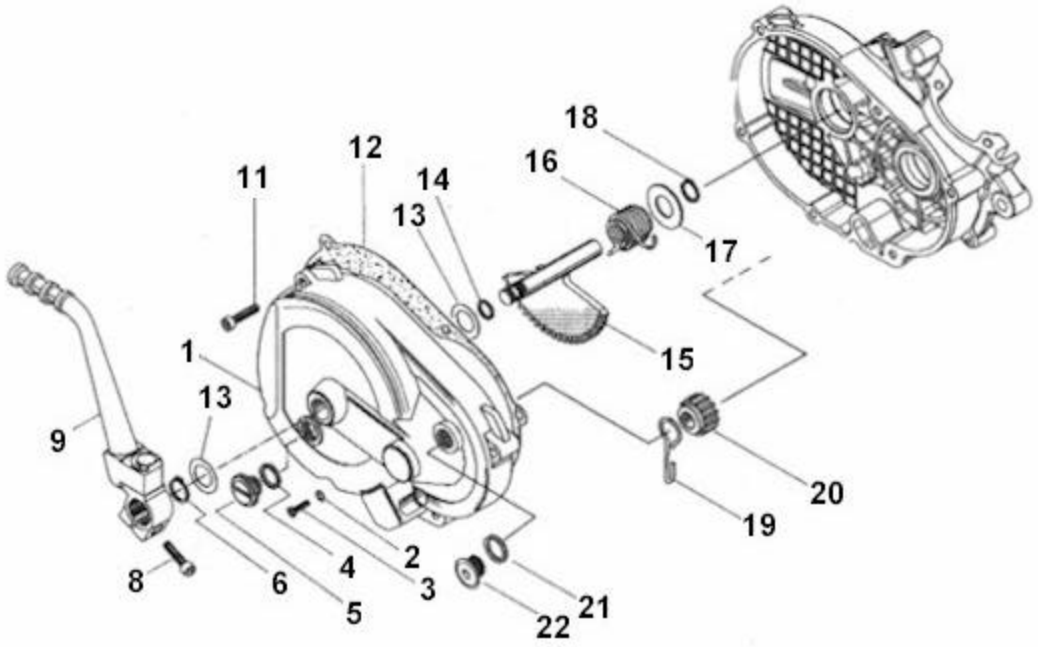



**Figure 11, kick mechanism**

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMOKS01 | CLUTCH COVER |
| 2 | ECMOKS02 | CRUSH WASHER - WATER DRAIN PLUG |
| 3 | ECMOKS03 | WATER DRAIN PLUG - 6X8 |
| 4 | ZCMU0001 | OIL FILL PLUG GASKET |
| 5 | ECMU0037 | OIL FILL PLUG |
| 6 | ECMOKS06 | RETAINER CLIP - THRUST WASHER |
| 8 | HCBC0625 | 6X25 CAP SCREW |
| 9 | ECMPKS09 | KICK START LEVER |
| 11 | HCBC0603 | 6X30 CAP SCREW |
| 12 | ZCMOKS12 | CLUTCH COVER GASKET |
| 13 | ECMOKS13 | THRUST WASHER |
| 14 | ECMOKS14 | SEAL - KICK START SHAFT |
| 15 | ECMOKS15 | KICK START SHAFT WITH GEAR |
| 16 | ECMOKS16 | KICK START SPRING |
| 17 | ECMOKS17 | WASHER - RETURN SPRING RETAINER |
| 18 | ECMOKS18 | RETAINER CLIP - RETURN SPRING |
| 19 | ECMOKS19 | J-SPRING KICK START |
| 20 | ECMOKS20 | DOG GEAR |
| 21 | ECMOKS21 | GASKET - ADJUSTING PLUG |
| 22 | ECMOKS22 | ADJUSTING PLUG |

# ES3: Clutch

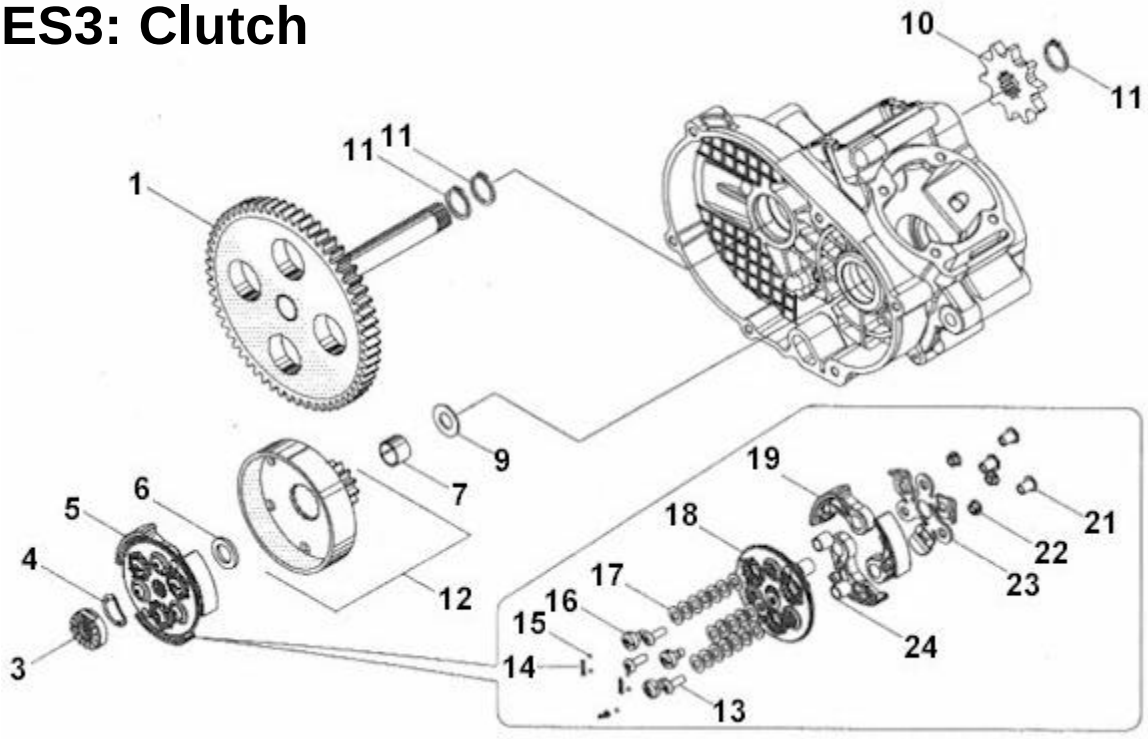



**Figure 12** Clutch components

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMOCL01 | GEAR - DRIVE |
| 3 | ECMOCL03 | CLUTCH START NUT - LH THREAD |
| 4 | ECMOCL04 | WASHER - CLUTCH NUT BACK UP |
| 5 | ECMOCL05 | CLUTCH COMPLETE |
| 6 | ECMOCL06 | SPACER - CLUTCH TO HUB |
| 7 | ECMOCL07 | BUSHING - CLUTCH HUB |
| 9 | ECMOCL09 | WASHER - CLUTCH BASKET BACK UP |
| 10 | PCMOCL10 | SPROCKET - 10 TOOTH |
| 11 | ECMOCL11 | SNAP RING - OUTPUT SHAFT |
| 12 | ECMOCL12 | CLUTCH BASKET WITH GEAR |
| 13 | ECMOCL13 | S6 TCBEI M5X14 SCREW FOR MASS. |
| 14 | ECMOCL14 | ADJUSTING SPRING |
| 15 | ECMOCL15 | S6 D.2,5 BALL |
| 16 | ECMOCL16 | S6 SPECIAL-SCREW |
| 17 | ECMOCL17 | FEDER ATAZZA 6.2X12X0.6 DIN 2093 |
| 18 | ECMOCL18 | CLUTH WASHER |
| 19 | ECMOCL19 | CLUTCH SHOE |
| 21 | ECMOCL21 | S6 CLUTCH PAWL |
| 22 | ECMOCL22 | CLUTCH SCREW COUPLING |
| 23 | ECMOCL23 | S6 CLUTCH SPRIG |
| 24 | ECMOCL24 | BUSH |

# ES4: Ignition

CAUTION:

- Make sure ground wires are secure. If the bike is not grounded it will not run.
- Make sure connections are free of dirt.

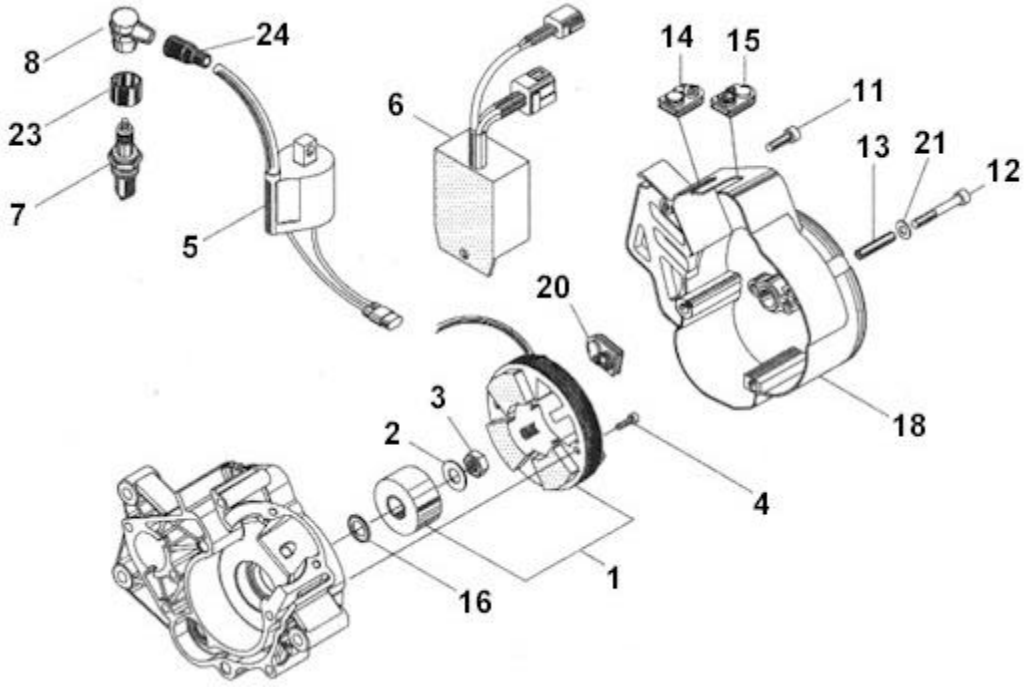



**Figure 13, ignition components**

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMOIG01 | FLYWHEEL |
| 2 | HCWF0801 | 8MM WASHER |
| 3 | HCNS0801 | 8MM NUT |
| 4 | HCBC0401 | 4X10 CAP SCREW |
| 5 | ECMOIG05 | COIL WITHOUT SPARK PLUG CAP |
| 6 | ECMOIG06 | CDI BOX |
| 7 | ECMOIG07 | SPARK PLUG |
| 8 | ECMOIG08 | SPARK PLUG CAP |
| 9 | ECMOIG09 | RUBBER FOR CONTROL UNIT |
| 11 | HCBC0502 | 5X20 CAP SCREW |
| 12 | HCBC0550 | 5X50 CAP SCREW |
| 13 | ECMOIG13 | 7MM DOWEL |
| 14 | ECMOIG14 | IGNITION COVER GROMMET - OPEN |
| 15 | ECMOIG15 | IGNITION COVER GROMMET - CLOSED |
| 16 | ECMOIG16 | SPACER - FLYWHEEL |
| 18 | ECMOIG18 | IGNITION COVER |
| 20 | ECMOIG20 | FLYWHEEL GROMMET |
| 21 | HCWF0501 | 5MM WASHER |
| 23 | ECMOIG23 | SPARK PLUG RUBBER |
| 24 | ECMOIG24 | SPARK PLUG BOOT |

# ES5: Cooling System

## Water pump

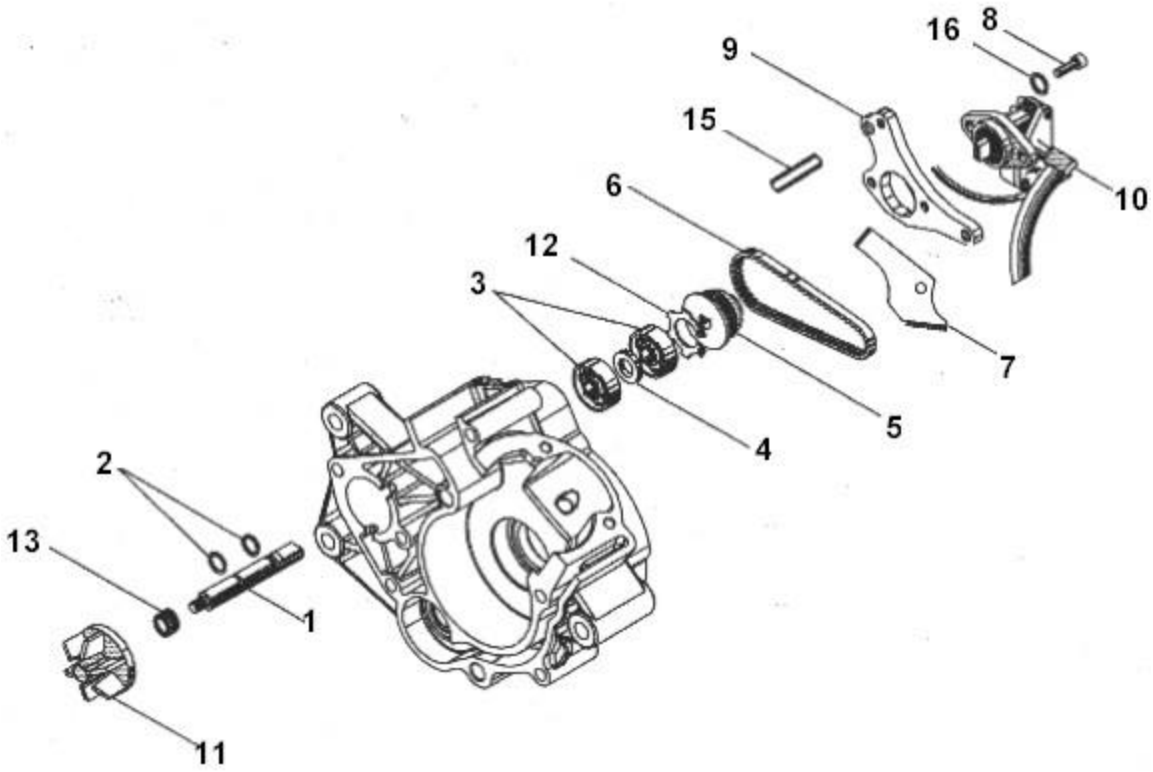



**Figure 14** water pump

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMOWP01 | WATER PUMP SHAFT |
| 2 | ECMOWP02 | RETAINER CLIP - WATER PUMP BEARING |
| 3 | ECMOWP03 | BEARING WATER PUMP |
| 4 | ECMOWP04 | SPACER - WATER PUMP BEARING |
| 5 | ECMOWP05 | CRANK PULLEY |
| 6 | ECMOWP06 | WATER PUMP BELT |
| 7 | ECMPWP07 | CLAMP FOR OIL TUBE |
| 8 | HCBC0501 | 5X12 CAP SCREW |
| 9 | ECMPWP09 | OIL INJECTOR MOUNT PLATE |
| 10 | ECMPWP10 | OIL PUMP WITH TUBE |
| 11 | ECMOWP11 | WATER PUMP IMPELLER |
| 12 | ECMOWP12 | SNAP RING - TOOTHED |
| 13 | ECMOWP13 | WATER PUMP SEAL |
| 14 | ECMOWP14 | WASHER - BEARING RETAINER |
| 15 | ECMPWP15 | DOWEL PIN |
| 16 | HCWF0501 | 5MM WASHER |

# ES6: Fuel & Air System

## Intake system

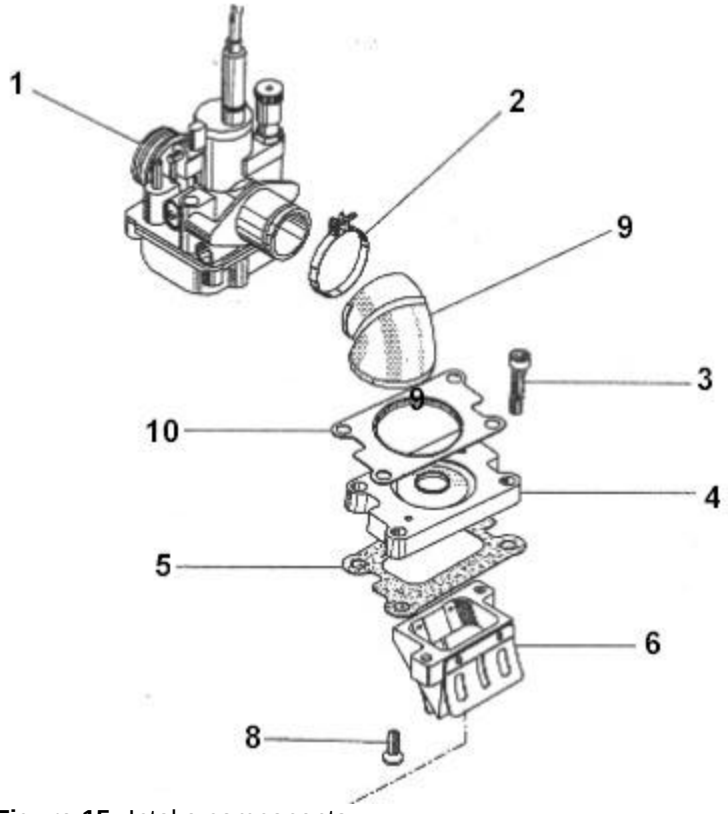



**Figure 15,** Intake components

| REF NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | ECMPIN01 | 12MM CARBURETOR |
| 2 | ECMOIN02 | CLAMP |
| 3 | HCBC0625 | 6X25 CAP SCREW |
| 4 | ECMOIN04 | REED SPACER PLATE |
| 5 | ZCMOIN05 | REED VALVE GASKET |
| 6 | ECMOIN06 | REED VALVE ASSEMBLY |
| 8 | ECMOIN08 | SCREW - REED CAGE TO SPACER PLATE |
| 9 | ECMOIN09 | RUBBER INTAKE BOOT |
| 10 | ECMOIN10 | INTAKE RETAINING PLATE |

# Reeds

- The reeds must lay flat on the reed cage.
- If the reed tips aren't lying flat, replace them immediately.
- The reeds must have a tight seal on the reed cage.
- If the reed is damaged in any way, replace it. This means cracks, chips, and ruptures. Anything abnormal, replace the reeds.

Take the reed cage out and hold it up to the light and look in through the cage. If you see light between the reed pedals and the frame, then replace the reeds. If you do not see light, then the reeds should be ok. (See figure 25)

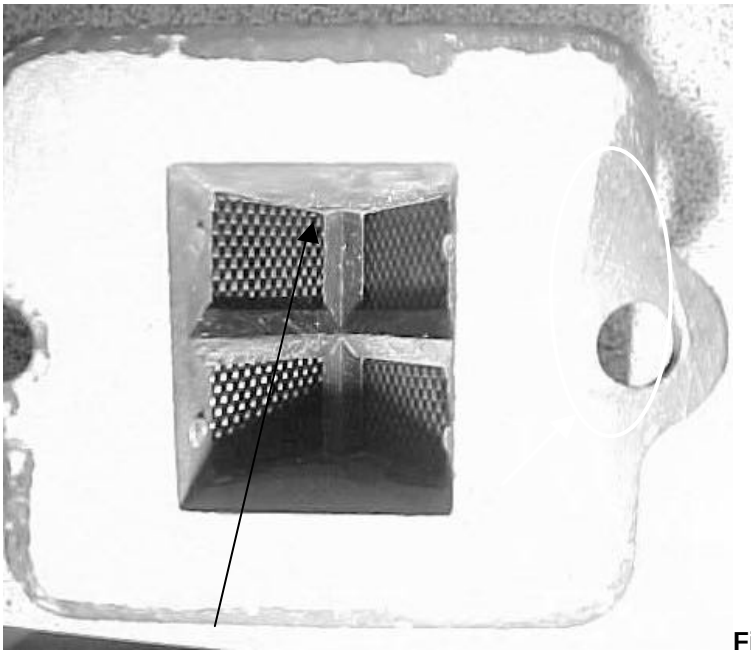


**Figure 16**

The presence of light indicates that the reeds should be replaced, or possibly turned over.

# Carburetor

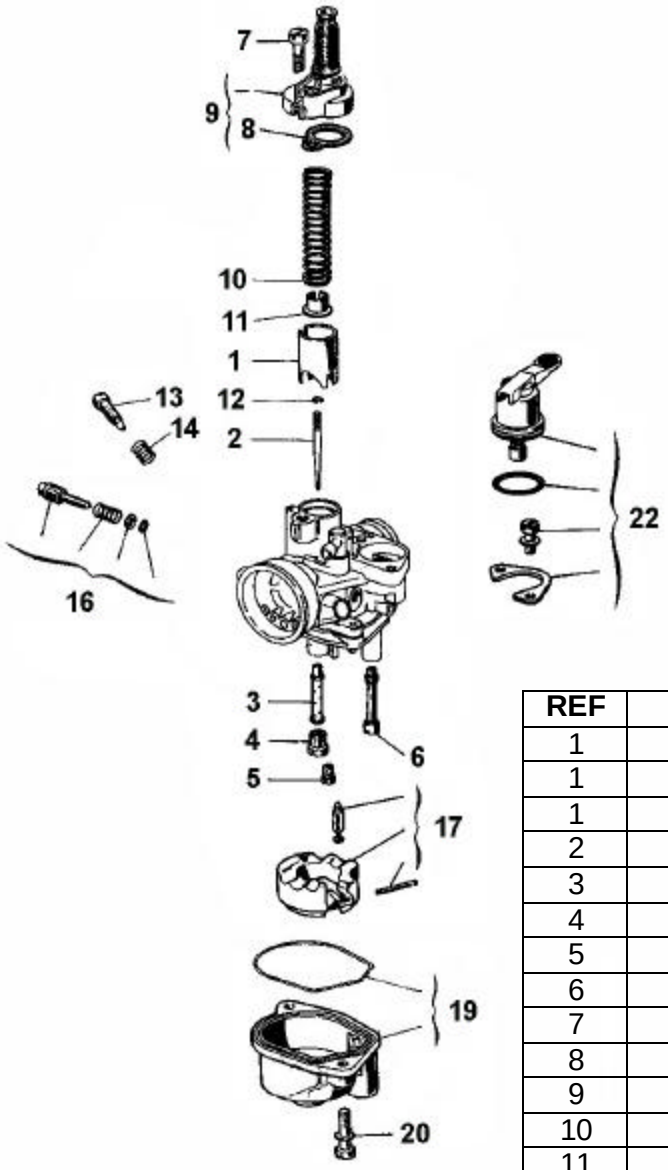



**Figure 17,** carburetor

| REF | DESCRIPTION | PART # |
|---|---|---|
| 1 | SLIDE - 40 - STOCK | RCOI 0001 |
| 1 | SLIDE - 30 | RCOI 0030 |
| 1 | SLIDE - 50 | RCOI 0050 |
| 2 | NEEDLE FOR SLIDE | RCOI 0002 |
| 3 | ATOMIZER | RCOI 0003 |
| 4 | MAIN JET-82 STOCK | RCOI 0004 |
| 5 | PILOT JET-42 STOCK | RCOI 0005 |
| 6 | CHOKE JET | RCOI 0006 |
| 7 | TOP CARB SCREW | RCOI 0007 |
| 8 | ORING FOR CARB TOP | RCOI 0008 |
| 9 | CARB TOP W/ ORING | RCOI 0009 |
| 10 | SLIDE SPRING | RCOI 0010 |
| 11 | NEEDLE RETAINER PLATE | RCOI 0011 |
| 12 | NEEDLE CLIP | RCOI 0012 |
| 13 | IDLE ADJUSTMENT SCREW | RCOI 0013 |
| 14 | IDLE ADJUSTMENT SPRING | RCOI 0014 |
| 16 | FUEL MIXTURE SCREW KIT-4 PIECE | RCOI 0016 |
| 17 | FLOAT KIT – 3 PIECES | RCOI 0017 |
| 19 | FLOAT BOWL WITH ORING – 2 PC | RCOI 0019 |
| 20 | BOTTOM CARB SCREW | RCOI 0020 |
| 22 | CHOKE ASSEMBLY – 4 PIECES | RCOI 0022 |
| 23 | REBUILD KIT | RCOI 0023 |

Your Cobra is equipped with an adjustable carburetor. Some fine-tuning may be needed according to weather condition and altitude. Proper jetting is ***very*** important for engine performance and engine life. Serious damage to the engine can occur if not properly adjusted.

**IDLE ADJUSTMENT:**
On the left side of the carburetor, there are 2 adjustment screws. The larger screw with the knurled head is the idle adjustment screw. To raise the idle, turn the screw in clockwise (in 1/4 turn increments) and rev the engine after each adjustment. To lower the idle, turn the screw counter-clockwise.

**TOP END JETTING:**
Indications that the engine is running too rich (too much fuel for the air) are:
- Engine not revving out or blubbering at high RPMs.
- Engine will not 'clean out'
- Wet or black spark plug

**NOTE:** Before changing jetting be sure that the air filter is properly cleaned and has the usual amount of air filter oil. An overly dirty air filter can cause the engine to run rich.

**NOTE:** Also before changing jetting, insure that your carburetor has a proper float height of 5

If the engine is running rich on the top end it should be leaned out. Leaning it out can be done by:
1. Changing the main jet to a smaller number.
2. Raising the needle clip (this lowers the jet needle) one notch at a time on the slide.

Indications that the engine is running too lean are:
- Engine cutting out on top end.
- Engine overheating and ultimately seizure.
- White spark plug

CAUTION:
It is much safer to operate the engine slightly rich as opposed to slightly lean. This is because an overly rich engine will just run poorly while an overly lean engine will seize, potentially causing an expensive top end rebuild and a DNF.

To richen the carburetor:
1. Change the main jet one number at a time (larger).
2. Lower the needle clip (raising the jet needle) one notch at a time until the engine starts to blubber on the top end, then move the clip back up one notch or until you get the blubber out.

**FUEL MIXTURE SCREW**
The smaller brass screw that is towards the front of the engine is a fuel mixture

screw. This screw will also richen and lean your engine more on the bottom and mid-range. In warmer conditions, turn the screw in. In colder conditions, turn the screw out. Be sure to keep the carburetor very clean and make sure you don't have water or dirt in the carburetor bowl. Use automotive carburetor cleaner or WD-40 to clean the carburetor inside and out.

**STOCK CARBURETOR SETTINGS**

The 2003 PW3 stock carburetor settings from the factory are:

- 42 pilot jet
- 82 main jet

**Cleaning the carburetor:**

**⚠ WARNING**

Clean the carburetor in a well-ventilated area, and take care that there is no spark or flame anywhere near the working area; this includes any appliance with a pilot light. Because of the danger of highly flammable liquids, do not use gasoline or low flash-point solvent to clean the carburetor.

1. Make sure the fuel is shut off.
2. Remove the carburetor.
3. Drain the fuel in the carburetor.
4. Disassemble the carburetor.

CAUTION:

Do *not* use compressed air on an assembled carburetor. Or the pressure may deform the float. Do not use a strong carburetor cleaning solution, which could attack the parts of the carburetor; instead, use a mild high cleaning solution safe for plastic parts.

5. Immerse all the metal parts in a carburetor cleaning solution.
6. Rinse the parts in water.
7. After the parts are cleaned, dry them with compressed air.
8. Blow out the fuel passages with compressed air.
9. Assemble the carburetor
10. Install the carburetor onto the motorcycle.

**NOTE:**

The **three most common problems** with this carburetor are (figure 18):

1. Installing the **carburetor top backwards**.
2. The carburetor **slide** indexing **pin falling out**.
3. Either side **vent elbow falling out**.

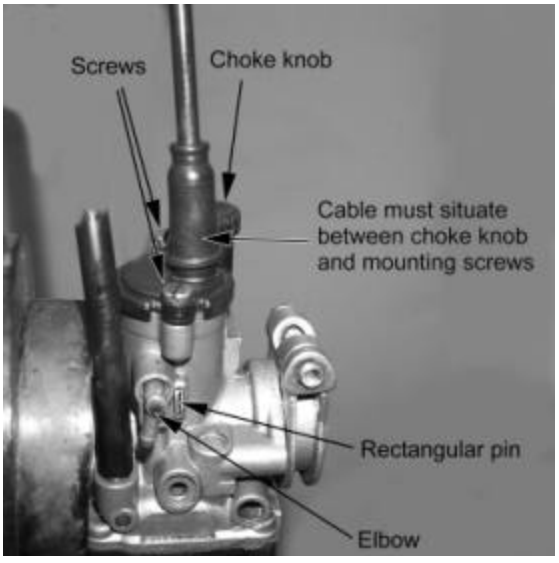



**Figure 18** Proper carburetor top installation and location of rectangular slide indexing pin and one of the elbows that has been known to fall out.

# ES7: Exhaust

The pipe is a crucial element to a motorcycle. Any kinks, dents, or damage done to the pipe will result in a major performance loss.

**NOTE:**
Be sure to take the pipe off, and any carbon that may be built up. Carbon build up is created from exhaust. Exhaust has oils in it, and the oils cling to the walls of the inside of the pipe. Over a long period of time, the diameter of the pipe will decrease, due to carbon build up. So it is essential to clear the residue.

CAUTION:
It is important to repack the silencer. Signs of your silencer needing to be repacked are:

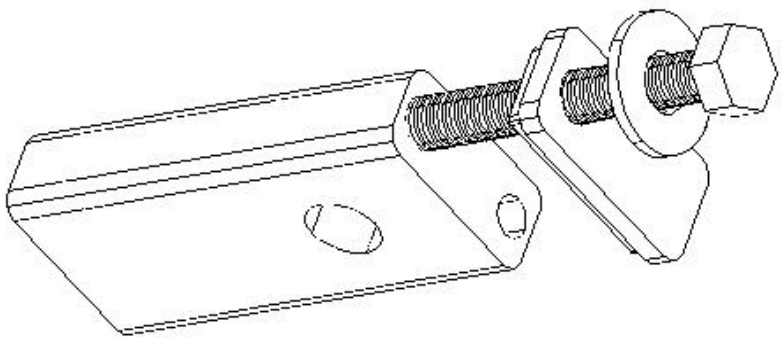
- The bike is louder than normal.
- A loss of power.

# Chassis Service / Parts

# CS1: Wheels & Tires

## Rear wheel pullers

**Disassembly:**



1. Remove axle, and back wheel assembly.
2. Pull the rear wheel pullers out of the back of the swing arm.

**Figure 19**

**Rear wheel alignment:**

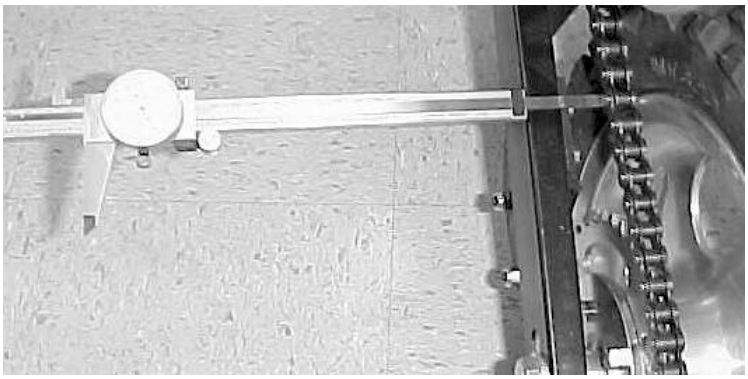


**Figure 20**

1. Measure from the side of the swing arm to the outer edge of the rim and make sure both sides are equal.

2. Adjust the wheel pull bolt on the rear wheel puller to get the distance from the swing arm to the rim about the same.

# CS2: Suspension
## Rear shock

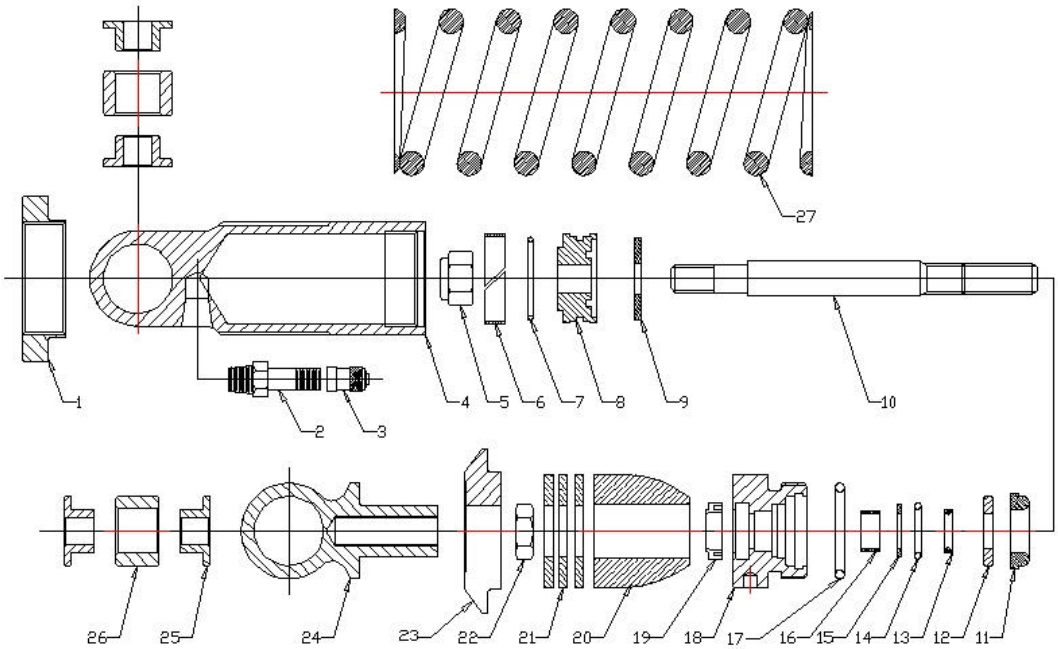



**Figure 21**

| REF # | PART # | DESCRIPTION |
|---|---|---|
| 1 | SCMU0304 | PRELOAD NUT |
| 2 | SCMU0114 | VALVE STEM |
| 3 | SCMU0004 | CAP |
| 4 | SCMU0300 | BODY |
| 5 | HCNJ1001 | LOCKNUT |
| 6 | SCMU0311 | BUSHING |
| 7 | ZCMU0023 | ENERGIZER |
| 8 | SCMU0305 | PISTON |
| 9 | SCMU0322 | STOP DISK |
| 10 | SCMU0301 | SHAFT |
| 11 | SCMU0320 | PISTON BUMPER |
| 12 | SCMU0312 | BUFFER DISK |
| 13 | SCMU0310 | BUFFER SEAL |
| 14 | ZCMU0114 | LOADER |
| 15 | SCMU0314 | BUSHING RETAINER |
| 16 | SCMU0306 | BUSHING |
| 17 | ZCMU0216 | O-RING |
| 18 | SCMU0308 | SEAL HEAD |
| 19 | SCMU0309 | ROD WIPER |
| 20 | SCMU0316 | BUMPER |
| 21 | SCMU0317 | BUMPER SPACER |
| 22 | HCNJ0716 | JAMNUT |
| 23 | SCMU0303 | SPRING STOP |
| 24 | SCMU0307 | ROD END |
| 25 | SCMU0200 | MNTG SPACER (4x) |
| 26 | SCMU0313 | BUSHING (2x) |
| 27 | SCMU0321 | SPRING |

Because of different rider weights, sizes and riding styles, we offer various suspension options:

See *Optional Components* section of this manual for details on these and other optional components for your Cobra Motorcycle.

**Rear Shock Disassembly**

1. Bleed the gas pressure from the shock.

**⚠ WARNING**
Hold a rag over the bleed (Schrader) valve during this operation as the contents are at extremely high pressure.

2. Remove the spring by removing the lock nut and other nut with a large spanner.

**NOTE:**
Measure the distance from the top of the spring to a feature on the top of the shock for repeatable reassembly.

3. Using a 'Pin' type spanner, separate the top portion of the shock from the bottom.

**NOTE:**
Holding the shock in a vertical manner with the bleed valve 'down' during separation will minimize the amount of oil that is spilled.

4. Drain the oil into a suitable container for proper recycling
5. Clean the components of old oil and contaminates.
6. Look for signs of wear and replace if necessary.

Assembly

1. If the bleed valve was removed, clean the threads of both components, apply some Teflon pipe sealant to the threads of the bleed valve, and install (torque to 10 ft-lb (14 Nm)).
2. With the bottom shock portion situated vertically, fill with 2.5 wt (often called 3 wt) shock oil until 37 – 38 mm from the top edge.
3. Install damper unit, into the bottom portion of the shock taking care to not 'splash' out shock oil in the process (tighten securely).
4. Holding the shock vertical, with the bleed valve **upward**, stroke the piston through its complete travel several times, slowly, and then bleed off any excess air.
5. Charge the shock with 230 psig nitrogen.
6. Reinstall the spring, to the previously measured compressed length and secure with the lock nut.

# Front Forks

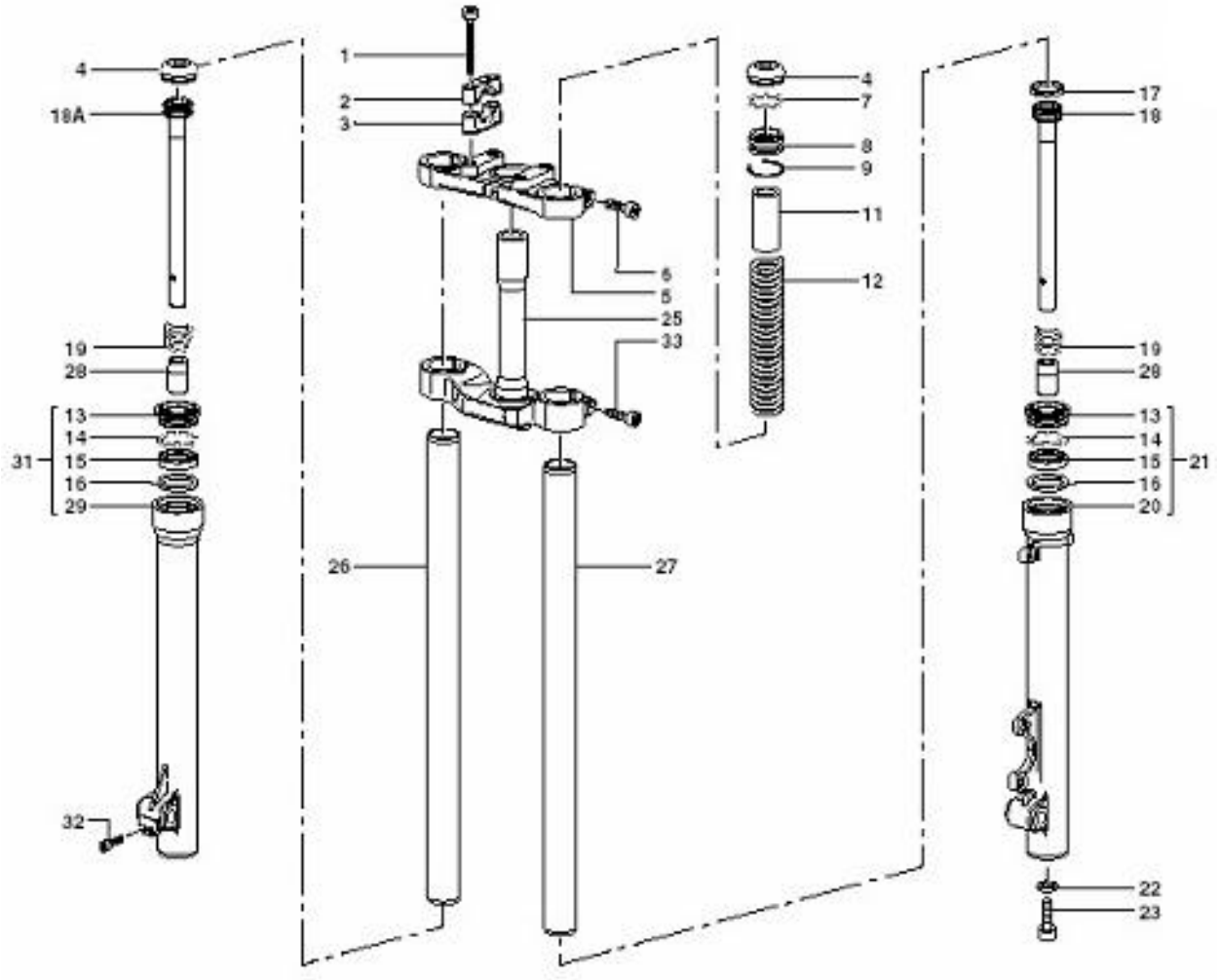



**Figure 22**

Because of different rider weights, sizes and riding styles, we offer various suspension options:

See *Optional Components* section of this manual for details on these and other optional components for your Cobra Motorcycle.

## 2003 PW3 FRONT FORK PARTS LIST

| REF # | PART # | DESCRIPTION |
|---|---|---|
| 1 | KCMZ0001 | 8 X 50 CS |
| 2 | KCMZ0002 | TOP HANDLE BAR CLAMP |
| 3 | KCMZ0003 | LOWER HANDLE BAR CLAMP |
| 4 | KCMZ0004 | FORK PLUG – BLACK |
| 5 | KCMZ0005 | TRIPLE CLAMP UPPER |
| 6 | HCBC0806 | 8 X 30 CS PINCH BOLT FOR TOP TRIPLE CLAMP |
| 7 | KCMZ0007 | SNAP RING FOR FORK CAP |
| 8 | KCMZ0008 | INNER FORK CAP - WHITE |
| 9 | KCMZ0009 | O-RING UNDER FORK CAP |
| 11 | KCMZ0011 | PRELOAD SLEEVE |
| 12 | KCMZ0012 | FORK SPRING |
| 13 | KCMZ0013 | SWIPER |
| 14 | KCMZ0014 | SNAP RING |
| 15 | KCMZ0015 | FORK SEAL |
| 16 | KCMZ0016 | WASHER |
| 17 | KCMZ0017 | SNAP RING FOR PISTON |
| 18 | KCMZ0018 | PISTON ROD - REBOUND |
| 18A | KCMZ0018A | PISTON ROD - COMPRESSION |
| 19 | KCMZ0019 | REBOUND SPRING |
| 20 | KCMZ0020 | FORK LEG OUTER LEFT |
| 21 | KCMZ0021 | FORK LEG – 5 PIECE UNIT – LEFT |
| 22 | HCWC0000 | WASHER |
| 23 | HCBC0806 | 8 X 30 CS |
| 25 | KCMZ0025 | TRIPLE CLAMP BOTTOM W/STEM |
| 26 | KCMZ0026 | FORK TUBE – INNER RIGHT |
| 27 | KCMZ0027 | FORK TUBE – INNER LEFT |
| 28 | KCMZ0028 | TOP OUT BUMPER |
| 29 | KCMZ0029 | FORK LEG – OUTER RIGHT |
| 31 | KCMZ0031 | FORK LEG – 5 PIECE UNIT – RIGHT |
| 32 | HCBC0609 | 6 X 20 CS |
| 33 | HCBC0525 | 6 X 25 CS |

# Troubleshooting

1) **Engine not behaving properly**
    a) Carburetor top is installed backwards (happens a lot)
    b) The carburetor slide indexing pin is missing
2) **Engine is down on power**
    a) Clutch engagement is not set properly
    b) Jetting is incorrect
    c) Silencer needs repacked
    d) Exhaust pipe
        i) Has excess carbon buildup
        ii) Has large dent in it
    e) Compression is low
        i) Piston
        ii) Rings
    f) Reeds are damaged
    g) Ignition timing is incorrect
3) **Engine is excessively loud**
    a) Silencer needs repacking
4) **Engine 'blubbers' at high RPMs**
    a) Jetting too rich
5) **Engine won't start**
    a) Fuel
        i) None in tank
        ii) Is sour or bad
    b) Carburetor is dirty
    c) Ignition
        i) Spark plug fouled
        ii) Spark plug cap off
        iii) Engine Shut-off 'kill' switch is shorted
        iv) Bad electrical ground
        v) Stator winding damaged
    d) Exhaust is plugged
6) **Engine won't idle**
    a) Idle knob needs adjusted
    b) Carburetor jets are dirty

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