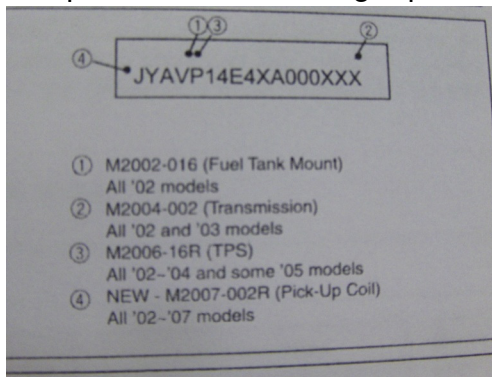


Set-Up Tips Before Performing Trouble Shooting or Repairs:

Before you perform a maintenance tune-up or a dyno-tune, and before you troubleshoot some problem with your Warrior or complete certain modifications, its important to be sure the bike is 'set-up' correctly. Performing a set-up routine will often fix odd problems. A correct set-up will also make tuning more effective, and dyno-tuning more powerful and less expensive. On the other hand if your bike isn't set-up correctly then you have no foundation, and this will effect trouble shooting and repair and tuning results. Use this information to build a checklist and your Warrior's condition will lead you to where you want to be.

Before you start, be sure all recalls that may apply to your model year are properly completed. The following replication of 'one style' of the Warrior's VIN plate shows



how recall completion is 'supposed to be indicated' by the repair station, however these marks were often omitted. If you are unsure then contact your Yamaha dealer and give them the VIN from your motorcycle's neck plate or frame-stamp (written documents can be wrong).

If you are in the USA then you can call Yamaha at (800) 962-7926, they're in California (pacific time).

The Set-Up Routine:

1. Be sure the air filters are clean and seated. Check for obstructions at control cables, under air filters, and inside throttle bodies – including butterfly obstructions.

2. Be sure the engine oil is clean enough and oil level is correct, and the filter is fresh. You should already know the special method required to check the oil level (the Warrior has a semi-dry-sump). If your motor oil turns gritty / dirty too fast, be sure the oil filter you use has an appropriate pressure-bypass rating. The Warrior's oil 'circuit' has an internal valve that bypasses the oil filter beginning at about 11.3 ~ 17.1 psi (80~120 kPa). As a side effect, if the spin-on filter clogs but it's bypass fails then oil can still bypass near the oil pump component, unfiltered, to avoid immediate engine failure. When you buy oil filters, either buy one without a bypass valve (not recommended) or buy one with a bypass valve rated close to the same psi as the Warrior's internal bypass valve. Why? For example, if you select a spin-on oil filter with a low-range bypass valve rated to open at for example ~8psi, then your oil will be unfiltered above ~8psi instead. Remember, the motorcycle's internal bypass would continue to send the oil to the filter until sometime between 11psi and 17psi, so the lower spin-on filter bypass psi is extending the unfiltered window. Unfiltered oil turns dark and gritty too soon. These oil filter psi ratings can be found on-line although recently its becoming harder to get accurate data. Or use the admittedly-mid-quality oem filter and change oil every 3000 miles. Also, both of the oil drain plugs are 14mm x 1.5 pitch with 17mm hex head. Try to use new gaskets on the drain plugs. If your local auto parts store doesn't stock them, try 14mm crush-washer gaskets from

<https://www.belmetric.com>. I have used their aluminum GA14X20 and their copper GCA14X20 gaskets are okay too, but avoid nylon gaskets as they require too much torque. The oil plug threads are steel, while the engine thread is aluminum, so torque carefully and use new crush washer gaskets.

3. Be sure the spark plugs are clean and gapped. It only takes ~25 miles to foul all 4 new plugs if the injectors are pumping too much fuel . . . or melt them if air:fuel is very lean. Its good practice to use new spark plug crush washers every re-install. If your local parts store doesn't stock them, get 12mm #P-678 from www.sparkplugs.com (get plenty – they are very cheap insurance against stripping your heads). Since spark plugs are seldom removed its handy to spread a dab of nickel-based anti-seize around the spark plug threads to prevent galling of the threads in the heads, but anti-sieze is slippery and will fool your torque wrench every time, therefore use a wrench and stop when its tight and the crush washer is 'just crushed plus a bump.'

4. Be sure the secondary spark plug wires (coils-to-plugs) are not shorting-out along their length, or at boot. Look for barely-visibly black arc-marks on the wire or adjacent metal, or view the running bike on a dark night or in a darkened garage looking for sparks arcing. Be sure the stock coil ends are still hard-connected into the coil AND the spark plug ends are threaded fully into the wire itself (yes the boots thread on). If you have aftermarket coils (like DC2-1) be certain both ends are fully seated.

5. Be sure the stock coil primary wires (bike-to-coils) are gently pushed all the way onto the coils (front of the bike at neck, push-on connectors, two per coil, be gentle) or the aftermarket wire connection fasteners are tight and not shorting at their mounts. Read-up on how each coil serves one jug and take into account their jug-matching intake-air-pressure sensor whose vacuum hose and electric plug must match the jug.

6. Unclick both dry-breaks and spray a small bit of WD40 onto the visible o-rings for protection, then gently re-connect them with firm pressure until they audibly click. This will help make sure the o-ring is soft, fuel is flowing, and the tank is venting properly so there is enough fuel flowing into the bottom tank to keep-up with fuel injector demand.

7. Check the two small vacuum hoses at the front-left frame neck under the tank, and also the vacuum hoses and nipples at the intakes, for cracks collapse damage. Also check that the LCV is working properly, and that the two air supply hoses from the LCV to the intakes are not leaking air. If the LCV is not working, first discover if it failed in an 'open' or 'closed' condition before deciding on the best repair, and make that repair before adjusting idle speed to counteract a failed LCV because you will usually compound an unstable condition and create phantom troubles that will drive you nuts.

8. Are you running a PC3-Serial or PC3-USB? Then look at the TPS wire (right side between the jugs and behind the stock right-side air filter). Is there a (usually red) crimp-connector on the TPS wire, and is it corroded? This corrosion can interrupt TPS signals and cause phantom troubles. Therefore, why wait. Even if its not corroded yet, you should seriously consider performing the 'PC3 Perfect Install' for better results and less long-term maintenance headache. It's a PITA to heal the small/fragile TPS wire but its worth every drop of nervous sweat. Some good news: if your PC3-USB is the

newer (Gen2) version then it will have a complete plug-and-play connection including a TPS plug (meaning you won't have a crimp connector on the TPS wire and also meaning you do not need to 'Perfect Install' it, so be sure first. The newer PC-V (which will indeed work perfectly on 2002-2010 warriors) is not hampered by these difficulties and requires no re-wiring to work perfectly. Just occasionally check the ground wire (s) from your fuel manager to the frame ground (near the oil filler).

9. In case it becomes handy later, its good to identify 'if' your stock ECU has been 'bumped' so do this by inspecting ECU wires #27 and #29. If they have been cut, an air-fuel ratio 'bump' may have been performed and likely was not documented. If these wires are not cut, its likely the ECU remains in factory condition BUT its possible to bump by manually removing the #27 - #29 wire-loop pins from the ECU connector (thankfully its rare because its harder to do and generally unknown). If you have a good quality fuel manager then you do not benefit from an ECU Bump. But if you Bump it then record the before and after values every time so you can retrace your steps back to where you started (and can communicate it to any future owner).

10. After these set-up steps are completed, fully-warm the bike by riding for a few minutes. In the absence of a Power Commander or other similar fuel manager, you can use the motorcycle's tachometer to set the warm idle rpm. For example, with a Power Commander installed, its better and easier to set warm idle with a computer connected to the installed Power Commander because the idle rpm displays digitally on-screen. Either way, use the idle screw under the rider seat to adjust the warm idle to 850~950rpm (its built to grow 'sticky' so first turn can be hard). If you use a computer, try to set the warm idle so it never falls below 850rpm even if it sometimes momentarily exceeds 950rpm. Blip the throttle between every idle screw adjustment, allowing everything to free-up after moving the screw, then wait ~10 seconds for the idle to stabilize again (as much as a V-Twin will stabilize). Its helpful to know the Warrior's electrical charging system uses gear-reduction, so too low an idle will often not allow the battery to fully charge, and if the ECU doesn't receive adequate power to transform 12v to 5v for the sensor array then sensor functions fault creating phantom problems often resembling CPS or TPS sensor problems. Plus other pesky problems including battery fatigue. Additionally, the oil pump is geared too, meaning low idle reduces lubrication. So the specified 850~950rpm warm idle is best.

11. After all the above steps are completed, inspect and set-up your fuel manager's basic settings again. For example, set the Power Commander's zero% rpm (warm idle) to read 0% on your computer screen, and also set it's 100% throttle setting to 100%. See your specific fuel manager's manual for settings to revisit at this point.

12. If you get a dynotune, then always have them reset the fuel manager's basic settings. For example, reset the bike's actual warm-idle to 850~950rpm, and then reset the power commander's '0% warm idle' to 0%, and finally reset the 100% throttle to 100%, and do this after everything else is finished.

13. These steps can identify or solve most observed and un-seen problems without the need to go further. Plus it keeps your hot rod beast in top shape. When you make modifications, remember to make one at a time (when possible) so any problems that arise can be attributed to a specific change. Keep good notes including aftermarket

part numbers and sources, and take digital pictures for your service manual when ever possible.

Additional Set-Up Tips Before Performing Dynotuning:

14. If your Power Commander (or similar) has 'buttons' to allow air:fuel adjustments then you need to know that using these buttons does not adjust the fuel map but instead makes completely separate adjustments that are in addition to the fuel map. So its important to ask your dynotuner to zero these buttons in all rpm ranges before starting their tuning procedure. This solves troubles before they occur and reduces time meaning it costs you less.

15. If you have confirmed your ECU has been bumped and you do 'not know' the original settings, then there are benefits to setting CO1 and CO2 both to zero (0) after you arrive at the dynotuner's location but before the tuning begins. This can solve troubles before they occur. Because this step can seriously effect engine performance, communicate with your dynotuner in advance and again on arrival so they know to adjust both low-rpm air:fuel and warm idle back into an acceptable range quickly to avoid very-lean or very-rich conditions negatively effecting the motorcycle.

Tips on Oil Filters. Much info is old enough that it needs to be revisited. There have been design changes over the years. Plus companies change hands. The image below has floated around the net for over a decade, I've noted and drawn lines and arrows over time to try to retain as much as can be verified by manufacturer's data. This can be the root of a new effort to verify if anyone has the time and energy:

[5]

<p>These Oil Filters have 20 x 1.5mm threads, 14 psi by-pass valve, anti-drain back valve, 2.3" O.D. gasket, 2.5" to 3.5" long. If you have the room, I recommend the longer filters.</p> <p>Motorcycle Filters. None are recommended.</p> <ul style="list-style-type: none"> AC Delco PF2135 MSOI SMF103 Carquest 85356 AC Delco PF2135 FRAM FH601A Honda HX10-MCJ-000 K&B K1004, about \$13. Metric nut on end for easy removal. NAPA Gold 1368 Purulotor MLL1417. Imported, not made by Purulotor. STP SMO 17 WIX 51358 	<p>Recommended filters. All have superior filtering.</p> <p>About 2.5 inches long.</p> <ul style="list-style-type: none"> Purulotor Pure One PL14612, about \$6. Mobil M1-108, about \$12. Made by Champion. Bosch 3300, about \$6. Made by Champion. Wal-Mart SuperTech ST6607 Made by Champion. <p>About 3.25 inches long.</p> <ul style="list-style-type: none"> Purulotor Pure One PL14610, about \$6. Mobil 1 M1-110, about \$10. Made by Champion. Bosch 3322, about \$6. Made by Champion. WalMart SuperTech ST7317, about \$2. Made by Champion. 	<p>Automobile Filters. about 2.5 inches long.</p> <ul style="list-style-type: none"> AC Delco PF1237 Baldwin B1400 Firestone TF2876 Hastings F113 NAPA Gold 1365 Purulotor L14612 STP S-02876 WalMart SuperTech ST6607 WIX 51365 <p>Automobile Filters. about 3.25 inches long.</p> <ul style="list-style-type: none"> AC Delco FE-2057 Auto Pro 233 Autopride CF2400 Baldwin B1402 Carquest 85356 Carquest Red B4400 Castrol CF240 Castrol 7317 Delco-Parts Ph2867 Deutsches D-370 Federal Filters LF240F Fram Double Guard DG7317 Fram PH7317 	<p>Automobile Filters. about 3.25 inches long.</p> <ul style="list-style-type: none"> Fram Tough Guard TG7317 Fram Xtra Guard XG7317 Group 7 V4610 Group 7 V4620 Hastings F240 NightHawk 4612 Mobil 1 ML-3593 Motorcraft Long Life FL-821 Napa FIL1356 Napa Gold 1356 Parts Plus PH2867 Pennrol PZ-109 Penske 7317 Powerflo SL14610 Powerflo SL14620 Pro Gauge PGO-4620 Pro Tec 164 Protective PH4610 Pronto P035924 Purulotor L14610 Service Champ OF-4622 Shell SH49 Shell SH529 Top S-02867 Valvoline V050 Warrior WH2867 Wix 51358
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Made by Champion 1999

Made by Purolator 2008



AW added in 2020 If your oil filter leaks because it's o-ring will not seat against the motor then investigate the MOCAL #TNM20 (M20X1.5 by M20X1.5) oil filter unions (UK / USA) and also search for more information by ArizonaWarrior on RSWARRIOR.COM



Purolator Pure One

(this info is pre-2010 its on the web by several sources uncertain who first authored)

About Ambient & Intake Air Sensors and Ignition Coils:

The Ignition Coils:

The ignition coils share a black-red (+) primary wire, plus:

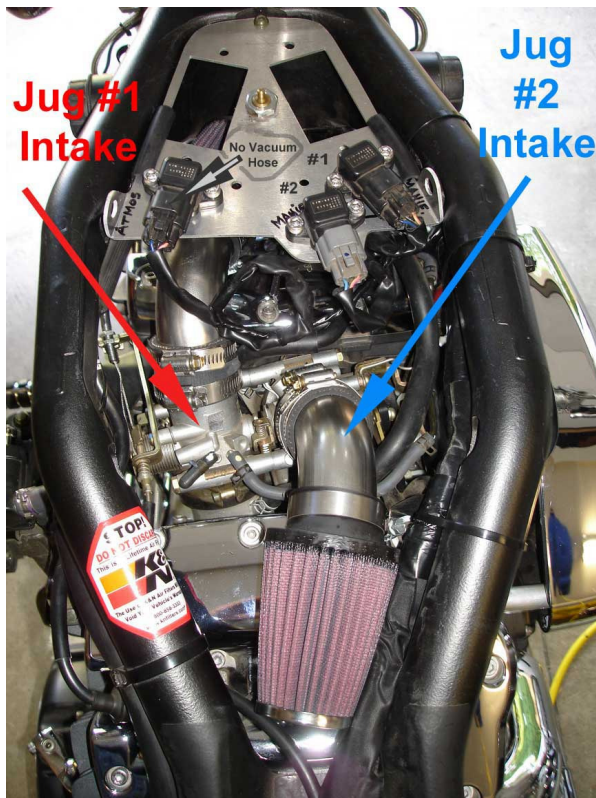
Jug #1: The rear coil has a black/orange wire. Both spark plug wires go to the rear jug.

Jug #2: The front coil has a black/white wire. Both spark plug wires go to the front jug.

Your Warrior ignition coils may be marked with (+) and possibly (-) signs near the primary terminals. Generally, if there are (+) (-) indicators near the primary terminals then connect accordingly. If not, then connect the shared black-red (+) primary to the same oriented terminal on both coils for consistency. Then connect the other primary wire (as above) to the (-) terminal. Some coils may be polarity sensitive, others are not.

NOTE: When installing aftermarket ignition coils, be sure the primary wire terminal screws are not touching their metal mounting plate or bracket or the coils will short-to-ground. If you can fit at least a credit-card thickness in the air gap between the primary wire terminals (etc) and any surrounding metal, then you are good.

The Air Pressure Sensors:



There are three air pressure sensors and all are the same identical replacement part number. They have different hoses and wires and must be correctly connected to work.

1. Intake Air Pressure Sensor 1 (IAPS1)
Jug #1 (rear): black plug with pink/white, solid light blue, and black/blue wires. The vacuum hose goes to the rear cylinder's intake nipple - this intake slants over the front cylinder and is the 'left' intake on top of the motor when sitting on the rider seat.

2. Intake Air Pressure Sensor 2 (IAPS2)
Jug #2 (front): gray plug with pink/yellow, solid light blue, and black/blue wires. The vacuum hose goes to the front cylinder's intake nipple - this intake slants over the rear cylinder and is the 'right' intake on top of the motor when sitting on the rider seat.

3. Air Pressure Sensor (APS): black plug with solid pink, solid light blue, and black/blue wires. No vacuum hose. (shown top left)

Assembled by ArizonaWarrior

Notes from my Service Manual
ArizonaWarrior
(updated May 2021)
(much data stolen from smart guys)

Page 1-30 Instrument Panel: Make a note that the Odometer's memory is stored inside the Speedometer.

Page 2-2 Fuel - Fuel Tank Capacity: Make a note 3.965 US Gallons (4.0 USG including fuel in the lines). 3.2 USG in the main tank, plus 0.8 USG in the auxiliary tank under the rider seat. The fuel level sensor is in the upper area of the under-seat auxiliary tank. The low fuel light will illuminate as the fuel level drops below the sensor. This timing can vary a bit. The low-fuel sensor is not separately available.

Page 2-18 Bulbs (voltage/wattage): Make a note the Narva-brand H4 100/90 #P43T-38 works well in the Warrior headlight. Many of us have run it for years with zero wiring issues. Its brighter, but its not HID or SB-LED. Separate from this, note the stock turn signal bulb design changed in 2005. The 2002-2004 Warriors use front 1156 and rear 1157 clear bulbs. The 2005+ Warriors use PY21W (BAU15s) rear and BAZ15D3 front amber international bulbs. These are not interchangeable. Tip: some EU/UK and South Africa bikes used international turn signal bulbs earlier so its still wise to check what setup exists as always.

Page 2-23 Drive Sprocket: fix error: not 72foot/lbs so make it read 110 foot/lbs. tightening torque (verified by Churchkey). Some indicate over the years that 100 foot/lbs or even slightly less has worked well.

Page 2-24 Handlebar holder (lower): make a note Yami TT-bar bolt size is M12x70mm zinc. Need bushings and washers under risers.

Page 2-25 Rear wheel axle nut M18: fix error: not 110 Ft/Lbs so make it read 72 Ft/Lbs tightening torque (verified with Churchkey - he discovered this was confused w/drive sprocket torque).

Page 2-25 Rear wheel sprocket and rear wheel drive hub: the 68ft/lbs shown is correct (verified with Churchkey).

Page 2-26: add helpful info about the rear fender stay oem bolts from published topics:

Fender stay, rear bolts = M8x1.25 25 mm long.

Fender stay, front bolts = M8x1.25 30mm long.

Frame bolts = M10x 1.25 60mm long.

Page 2-30 Oil Filters: note that in the early days some member's 'best' choices were K&N and Purolator PureOne. In subsequent years many have standardized on Bosch 3323 (including me) because it's a 3-stage element type filter, black in color, its bypass psi matches the Warrior, it works well with dino oil (3000 miles) and synthetic (6,000 miles) and its 3.25" long. Added 2020: the manufacturer changed the design of many oil filters including Bosch 3323, its spin-on plate is less concave now so the oil filter's o-ring will not seal fully on stock 2002-2005 Warriors (and some 2006+ model years when the oil filter's adapter/union is replaced for any reason even with current revised OEM part). I sourced a MOCAL 20mm x 20mm replacement union, it's a direct fit and solved the trouble because it has a 2mm-thin hex. Source in USA/CAN is BAT Inc / MOCAL USA (Eric Weller) sales@batinc.net phone 941-355-0005 Sarasota Florida. In Europe, google MOCAL these are made in the UK.

Page 2-30 Oil Changes: some aftermarket aluminum crush-washers no longer crush, resulting in drips and requiring much more torque on the plug's steel male thread going into the aluminum motor's female thread. I've switched to www.BelMetric.com (reasonable cost & crush/seal well): GCA14X20 Copper (or) GA14X20 Aluminum hollow crush (1st choice) GCA14X18 Copper (or) GA14X18 Aluminum hollow crush works okay. (duplication of certain info is intended)

Page 3-5 Headlight and Meter Assemblies: Item 4 Tach Assy - sidemount bolts 5.8 ft/lbs torque, bolts are M6x20 1.00 pitch with a special and nice-looking larger diameter button head. If you install (for example) a Boulevard Windshield bracket, it comes with two M6x25 1.0 pitch screws and the instructions show where to install them (Item 10 shows in the bottom holes) and use the stock length M6x20 screws in the other two (upper) holes. Note some reported that a 25mm screw bottomed-out inside Tach's upper holes. All of these Tach bolt have reports on vibrating out, so I use Loctite Blue 243.

Page 3-9: The stock undertank airbox uses a K&N #YA1602-U and this same filter also fits the Speedstar right side scoop, but NOT the stock right side air filter. The trouble here is that there is no real performance gain using the stock airboxes. The better option is the Churchkey VBAK with velocity stacks, which may be upgradeable to K&N 1290 cone filters for a bit more. Other options are to build a DIY kit, or buy a Baron or PR BAK kit and verify if it comes with the K&N 1290 cone filters. Standard paper cone filters are restrictive and a pita.

Page 3-27: use a good 6-point 17mm stubby wrench for the engine oil drain bolt. Same wrench, or 17mm socket, for oil tank drain bolt. In a pinch I can and do change my oil on the ground on the kickstand.

Note that the aftermarket aluminum crush-washers no longer crush, resulting in drips and requiring much more torque on the plug's steel male thread going into the aluminum motor's female thread.

I've switched to www.BelMetric.com (reasonable cost & crush/seal well):
GCA14X20 Copper (or) GA14X20 Aluminum hollow crush (1st choice)
GCA14X18 Copper (or) GA14X18 Aluminum hollow crush works okay.
(duplication of certain info is intended)

Page 4-1 Front wheel and brake discs: Make a note item #7 front wheel axle is 22mm (make same note on Page 4-4 Checking the front wheel). Also note to remove front axle use 19mm allen, or the backend of a spark plug socket is sometimes 19mm.

Page 4-1 also note that beginning 2006 model year bike has radial brakes and some parts are not individually interchangeable although the entire front ends with front brake systems can be swapped.

Page 4-11 Item #3 Rear fender bracket (left and right) bolt is button head Yami #92014-08025-00 (4 each) sorta special.

Page 4-89 Drive belt and drive sprocket: change torque for nut #6 to 110 ft/lbs. Make a note for Item #5 oem belt is 130-tooth 1-1/8" wide with 14mm pitch. Its built with same capacity for torque as standard 1.5" belts (which are thinner) according to Yami (who knows). The S&S-Gates X3n Carbon belt is among the strongest belts available for the Warrior: Part# 106-0359 from S&S and HD dealers.

Page 4-91: change: Tighten: Drive sprocket nut (change from 72 ft/lbs to 110 ft/lbs).

Page 7-55 Injectors: Make a note that member Sam Vallas (Vall345) once posted that he successfully used injectors for a 2000 Mitsubishi Starion 4cyl as hot rod replacements for his race Warrior (which has 9-second official runs). He's still around sometimes for questions.

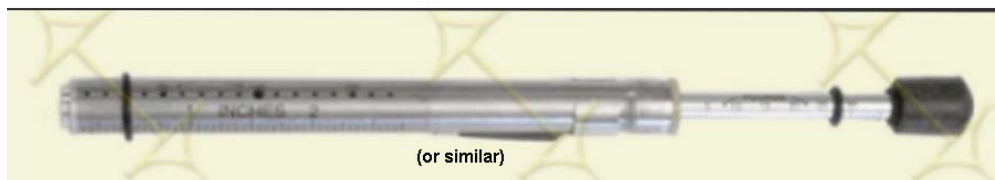
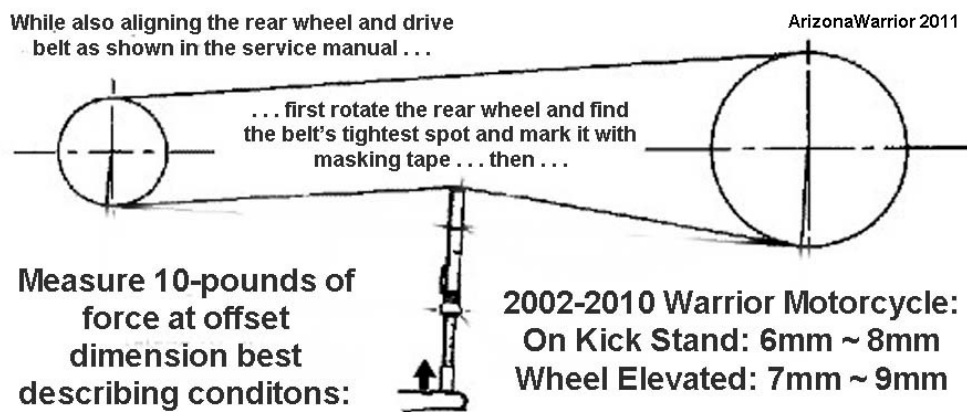
Page 5-22 Pushrods: The pushrod for the rear (#1) cylinder's outboard lifter is longer, and the pushrods for the front (#2) cylinder are identical. When removing pushrods keep the items from each jug separated and tagged and take pics for orientation. Reinstallation requires manually turning the motor until both valves are closed (see service manual) so the pushrod 'gap' is correct.

Page 4-53 Rear Brake Caliper Retaining Bolts: Add a dab of Lithium Soap Based Grease (LS) to the shoulder (slider) area of the two rear brake caliper retaining bolts to encourage movement.

These are some of the notes I have made in my service manual. See also the Model Year Differences topic, the Service Manuals by Model Year topic, and the typed-in-data parts of the old Popular Mods topic, all at www.rswarrior.com for other handy info. I hope this helps you, too.

Assembled by ArizonaWarrior

A Final Tip:



(or similar)

To align the belt, follow the service manual instructions. Verify the rear wheel and belt are properly aligned by spinning the rear wheel forward, then backward, while watching the belt track centered on the front and rear pulleys. The belt should not touch either front pulley edge, but may ride 'soft against' a rear pulley edge.