Torq Zone Academy – Quick Reference

Contents

Headset Disassembly, Assembly & Adjustment

Threadless Headset	
Disassembly/Removal 1. Loosen stem binder bolts 2. Loosen and remove top cap bolt and cap 3. Note location and orientation of washers and/or spacers 4. Remove stem and all spacers from steering column 5. Pull fork from bike, if necessary, use mallet to tap top of column 6. Remove fork from frame & note orientation of cage bearing retainers, cartridge bearings, or rubber seals 7. Clean and inspect all parts **Assembly** 8. Pack grease into bearing retainers and bearing race cups, & lubricate all bolts 9. Install bearing retainers into upper and lower cup shaped races 10. If cartridge bearing, drop in with concave side facing cone shape races 11. Install fork steering column through head tube 12. Install top adjustable race, compression ring, centring-washer and bearing cup onto column (compression ring should not be at 6 or 12 o'clock) 13. Press centring-washer and bearing cup down to contact adjusting race 14. Install all spacers and accessories on steering column 15. Install stem on column, push stem against spacers and race 16. Snug stem bolts to hold fork Check acceptable clearance from top of column to top of stem and install top cap with cap bolt.	**Adjustment** 17. Remove top cap and inspect steering column length relative to cap 18. Lubricate top cap bolt, reinstall top cap and bolt. Do not tighten 19. Loosen stem bolts and ensure stem is loose 20. Straighten stem to front wheel and gently secure top cap bolt until resistance is felt 21. Tighten stem bolts and check for play by pulling back and forth on fork 22. There may be play in this early setting 23. If play felt, loosen stem bolts, and turn top cap bolt a 1/8 to ¼ turn clockwise only 24. Re-secure stem bolts and check for play 25. Check alignment of stem and tighten stem bolts fully

Gear Setting – Front Derailleur

Front Derailleur Cage Alignment (cable disconnected)

1. Set height adjustment
   - Pull derailleur forward
   - Ensure a 1 to 3mm clearance at closest point between cage and teeth of largest chainring
2. Set rotational adjustment
   - Pull derailleur forward
   - Ensure outer cage parallel to largest chainring
3. Tighten and torque derailleur fastening bolt

L-limit Screw – Stops inboard travel of front derailleur

1. Ensure chain on innermost sprocket and innermost chainring
2. Locate "L" screw
3. Adjust "L" screw until there is a gap of 0,5 – 1mm between chain and inner cage plate
4. Turn barrel adjustor all the way in and then 2 – 3 full turns out
5. Pull on cable, run levers through all indexing and connect cable
6. Test shifting between small and middle/outer chainring
   - If not shifting up
     - Gap may be too large
     - Cable tension may be too slack
     - Cage alignment may be incorrect
   - If not shifting down
     - Gap may be too small
     - Cable tension may be too tight
     - Cage alignment may be incorrect
   - If chain slips inboard off of small chain ring, then gap too large or cage alignment off
7. If chain rubs against inner cage of derailleur or still drops off inner chainring check
   - Chainline
   - Cage alignment

H-limit Screw – Stops outboard travel of front derailleur

1. Ensure chain outermost sprocket and outermost chainring
2. Locate "H" screw
3. Pull derailleur cable by hand or maintain pressure on shift lever to ensure there is pressure on the against the H-limit screw
4. Adjust "H" screw until there is a gap of 0,5 – 1mm between chain and outer cage plate
5. Rotate cranks slowly and continue to sight gap. Set clearance at tightest point.
6. Test shifting between middle and outer chainring
   - If not shifting up
     - Gap may be too small
     - Cage alignment may be incorrect
   - If not shifting down
     - Gap may be too large
     - Cage alignment may be incorrect
   - If chain slips outboard off large chainring then gap too large or cage alignment off
7. If chain rubs against outer cage of derailleur or still drops off outer chainring other problems
   - Chainline
   - Derailleur rotation

Indexing – Three chainring

1. Shift chain to middle chainring and innermost sprocket
2. View gap between inner cage plate and chain
   - Gap as small as possible without rubbing
   - Reduce gap by turning barrel adjustor outward
   - Increase gap by turning barrel adjustor inward
   - Check gap and repeat if necessary
3. If barrel adjustor is all way in or all way out making no adjustment possible, reset cable tension
   - Shift to inner most chainring
   - Loosen cable
   - Turn barrel adjuster all way clockwise, back out two or three turns
   - Pull cable tight and tighten pinch bolt
   - Repeat index procedure
4. Test shifting

Indexing – Two chainring

1. Shift chain to outer chainring and outermost sprocket
2. View gap between outer cage plate and chain
   - Gap as small as possible without rubbing
   - Reduce gap by turning barrel adjustor outward
   - Increase gap by turning barrel adjustor inward
   - Check gap and repeat if necessary
3. If barrel adjustor is all way in or all way out making no adjustment possible, reset cable tension
   - Shift to inner most chainring
   - Loosen cable
   - Turn barrel adjuster all way clockwise, back out two or three turns
   - Pull cable tight and tighten pinch bolt
   - Repeat index procedure
4. Test shifting

Gear Setting – Rear Derailleur

1. Check hanger alignment

H-limit Screw (cable disconnected)

1. Disconnect cable
2. Locate “H” screw
3. Adjust “H” screw so guide pulley aligned with smallest sprocket
4. Should be around 6 o’clock position

Connect Cable

1. Ensure chain on smallest sprocket
2. Ensure shifter indexed to smallest chainring
3. Turn barrel adjuster two full turns out
4. Pull on cable and run levers through all indexing
5. Connect cable and torque clamping bolt

Indexing

1. Front shift chain to front middle/outside chainring
2. Shift chain into second smallest sprocket
   - If chain doesn’t shift increase cable tension at cable clamp bolt
3. While peddling turn barrel adjustor out until chain makes a “chattering” noise
4. Turn barrel adjustor in quarter turns until noise stops
5. Run through gears in both directions
6. If it sluggish shifting up
   - Too little cable tension
   - Go back to second smallest sprocket
   - Increase cable tension by turning barrel adjustor outward
7. If sluggish shifting down
   - Too much cable tension
   - Go back to second smallest sprocket
   - Decrease cable tension by turning barrel adjustor inward
8. Repeat until smooth transition in both directions

L-limit Screw

1. Shift derailleur cage towards largest sprocket
2. Locate “L” screw
3. Adjust “L” screw so guide pulley aligned with largest sprocket
4. Should be around half-past-five position
5. Shift back to smallest sprocket

B-limit Screw

1. Shift derailleur to largest sprocket
2. Shift front derailleur to smallest chainring
3. Locate “B” limit screw
4. Adjust gap to manufacturers specifications

Limit Screw Test

1. Forcefully push/pull derailleur ensuring limit screws allow movement to smallest and largest sprocket
   - Prevent chain slipping off smallest and largest sprocket

Removal & Installation

Three Piece Crank	Two Piece Crank (Compression Slotted)	Two Piece Crank (Self Extracting)
Removal 1. Shift chain to largest chain ring (protects against cuts) 2. Remove dust cap (if applicable) 3. Remove crank bolts or nuts 4. Remove any washers inside crank 5. Start on drive side 6. Thread crank puller into arm and secure with wrench 7. Turn stud clockwise until resistance is met 8. Continue turning stub using wrench until crank arm comes off 9. Unthread crank puller 10. Repeat on non-drive side **Installation** 11. Grease threads of bolt or nut 12. For square tapered spindle, leave clear of grease 13. Grease the splines of spline type spindles 14. Start on drive side 15. Install crank 16. Thread in bolt and tighten to manufacturers' specifications 17. Align left arm and repeat 18. Insert dust caps (if applicable)	**Removal** 1. Fully loosen pinch bolts of on no-drive side 2. Remove fixing cap (if necessary) 3. Inspect for stop plate in left arm slot 4. Use a thin screwdriver or cone wrench to lift plate upwards (acts as a safety redundancy to prevent left arm removal) 5. Pull off spindle non-drive side crank arm by hand 6. From drive side, pull crank and remove from bike. This may require soft tap with mallet 7. Disassemble non-drive side crank arm pinch bolts and plate **Installation** 8. Grease spindle surface and non-drive side crank arm pinch bolts 9. Reassemble non-drive side crank arm pinch bolts and plate 10. Install drive side crank arm through BB (use mallet if necessary) 11. Make sure plate is lifted and press non-drive side crank onto spindle 12. Thread on fixing cap and adjust until correct pre-load 13. Tighten each compression bolt firmly moving between bolts until fully and evenly tightened	**Removal** 1. Identify which crank arm, drive side or non-drive side, has the self-extracting bolt 2. If the self-extracting bolt has a retaining ring or cover leave this in place 3. Use a hex wrench to unthread the crank bolt and continue until crank arm slides of spindle 4. From other side, pull crank and remove from bike. This may require a soft tap with a mallet 5. Take note of location and orientation of any washers and spacers being removed 6. If the self-extracting bolt has a retaining ring or cover disassemble it 7. If the crankset has a bearing load adjustor zero it **Installation** 8. Grease spindle surface, self-extracting bolt, and retaining ring or cover threads 9. If the self-extracting bolt has a retaining ring or cover reassemble it 10. Reinstall crank arm with integrated spindle through BB (use mallet if necessary) 11. Ensure all washers and spacers are fitted 12. Reinstall self-extracting crank arm 180^{o} from first using a hex wrench and torque up to manufacturer's specifications 13. If applicable, adjust load until pre-load correct.

Bottom Bracket Removal, Installation & Adjustment

Cup & Cone BB	Internal Cartridge BB	External Cartridge Bearing

Removal
1. Remove cranks
2. Start non-drive side
3. Remove lock ring and adjustable cup
4. Remove bearings and spindle, note
  ○ Non-drive side of spindle, it might be shorter or longer
  ○ Number of ball bearings if not caged
5. Remove any dust sleeve from inside BB shell
6. Reach through shell & remove bearings from inside
7. Remove drive side fixed cup
8. Clean parts and inspect
Installation
9. Thread preparation critical
10. Install and secure fixed cup (drive side)
11. Heavily grease bearing cages
12. Place bearing cage on fixed cup (drive side) side of spindle
13. Install spindle through shell into fixed cup (drive side)
14. Install dust sleeve
15. Grease second bearing cage & install into adjustable cup (non-drive side)
16. Thread adjustable cup (non-drive side) into place
Adjustment
17. Re-install drive side crank
18. Gently tighten adjustable cup clockwise until it bumps into bearing
19. Hold adjustable cup firmly with correct spanner
20. Tighten lockring fully (40nm)
21. Check for free rotation and no play
22. If necessary, loosen lockring and loosen/tighten adjustable cup 1/18
23. Tighten lockring fully (40nm) and check free rotation and no play
24. Install left side crank
	Removal
	1. Remove both cranks
	2. Insert BB tool into/onto non-drive side and remove (anti-clockwise) locking cup or ring
	3. Insert BB tool into/onto drive side and remove (clockwise) BB body
	
	Installation
	4. Grease threads of BB body adequately
	5. Orientate drive side, “R”, and non-drive side, “L” of BB body
	6. Insert BB body into drive side (anti-clockwise)
	7. If BB has a plastic threaded side and a metal threaded side, insert metal threaded side first
	8. Inspect non-dive side to see if spindle appears to be off-centre (cross threaded)
	9. Insert non-drive adaptor or cup
	10. Install locking cup or ring and torque both sides
		Removal
		1. Remove non-drive side crank arm
		2. Remove drive side crank and crank arm
		3. Hook chain around BB shell
		4. Unthread non-drive side “L” external cartridge side anti-clockwise
		5. Unthread drive side “R” external cartridge clockwise
		
		Installation
		6. Prepare BB shell with grease
		7. Install correct number of spacers on drive side “R”
		8. Thread drive side cup anti-clockwise and torque
		9. Install correct number of spacers on non-drive side “L”
		10. Thread non-drive side cup clockwise and torque
		11. Install drive side crank and crank arm
		12. Install non-drive side crank arm
		13. Torque binding bolts

Freehub & Freewheel Removal & Installation

Freehub	Freewheel Sprocket
Removal 1. Mount bicycle in repair stand and remove rear wheel 2. Remove quick release skewer 3. Inspect cassette and select correct cassette lockring remover 4. Place axle vice in bench vice and lockring remover into axle vice 5. Engage lockring into splines of remover 6. Hold sprockets from rotating anti-clockwise with chain whip 7. Turn wheel anti-clockwise to loosen lockring (expect to hear clicking sound) 8. Continue turning until lockring is removed from body 9. Remove lockring and sprockets **Installation** 10. Inspect splines on freehub body and observe wide spline 11. Inspect internal splines of sprocket and observe wide spline 12. Align splines and engage all sprockets and spacers 13. Grease threads of lockring 14. Thread lockring into freehub body 15. Insert lockring remover into splines of lockring 16. Turn lockring tool until snug and then until torque	**Removal** 1. Mount bicycle in repair stand and remove rear wheel 2. Remove quick release skewer 3. Inspect cassette and select correct remover 4. Place axle vice in bench vice and clamp remover into axle vice 5. Engage lockring into splines of remover 6. Turn wheel anti-clockwise until unthreaded **Installation** 7. Grease inside of thread on freewheel 8. Lay wheel on bench and lay flat 9. Begin threading freewheel clockwise until fully threaded 10. Use chain whip / cassette lockring tool in axle vice in bench vice to fully seat freewheel clockwise against hub

Hub Disassembly, Assembly & Adjustment

Adjustable Cup and Cone		
Disassembly 1. For rear hub, remove rear sprocket 2. Remove quick release skewer or axle nuts 3. Begin dismantling from non-drive side (left) 4. Mount in axle vice drive side down (right) 5. Remove rubber cover/seal, if any 6. Hold cone using cone wrench and loosen locknut 7. Remove locknut and washers 8. Remove cone 9. Remove non-drive side (left) ball bearings 10. Loosen bench vice and lift wheel by non-drive side axle 11. Turn wheel onto bench and allow axle to be lifted by bench 12. Remove axle 13. Remove drive side (right) ball bearings 14. Try not to remove dust caps 15. Clean and dry all parts 16. Inspect parts ○ Pitting on cup and cone ○ Bent axle (roll on flat surface)	**Assembly** 1. Grease axle threads 2. Grease heavily inside hub shell cups 3. Place ball bearings in both cups and cover with grease making sure the ball bearings are seated 4. Assemble drive side (right) using the same order they came off 5. Install axle through drive side 6. Turn wheel over and install non-drive side parts in same order as they came off 7. Snug the cone down to bearings then turn back ¼ turn 8. Fully tighten the lock ring onto cone while holding the cone down with a cone wrench 9. NB – check the threaded axle does not protrude beyond the dropout face	**Adjustment** 1. Remove wheel from bicycle 2. Holding both sides of the axle feel for free rotation with no play 3. Secure drive side axle in axle vice 4. Remove any seals and rubber booting 5. If restricted rotation ○ Loosen lock ring ○ Loosen cone back cone 1/32 ○ Tighten lock ring while holding cone with cone wrench ○ Remove wheel from axle vice, test for free rotation with no play ○ Repeat if necessary 6. If play is felt ○ Loosen lock ring ○ Tighten cone forward cone 1/32 ○ Tighten lock ring while holding cone with cone wrench ○ Remove wheel from axle vice, test for free rotation with no play ○ Repeat if necessary 7. Reinstall any seals and rubber booting

Brake Adjustment – Calliper Centring Hydraulic Disc Brake & Mechanical Disk Brake

Hydraulic Disc Brake	Mechanical Disk Brake
1. Loosen mounting bolts until calliper body can move side to side. 2. Squeeze the lever to centre the calliper body over the rotor. 3. While holding the lever tighten the mounting bolts. 4. Release the lever and spin the wheel to test for rubbing. 5. If no rubbing the calliper is centred. 6. Torque mounting bolts 7. If rubbing look through the calliper, preferably with a white background, and slowly spin the wheel to observe where the rubbing is: ○ Loosen one bolt and adjust by pushing on the calliper in the direction of the rubbing until there is a gap on either side of the rotor. ○ Lightly tighten bolt. ○ Repeat adjustment on other bolt. ○ Repeat on both bolts until no more rubbing. ○ Torque mounting bolts.	**Alignment and Clearance** 1. Loosen calliper mounting bolts to permit lateral movement of calliper body 2. Inspect calliper body for pad adjusting screws 3. Turn inner pad adjustment screw until it locks against rotor 4. Turn back ¼ turn 5. Squeeze lever to lock rotor and while holding secure mounting bolts 6. If no rubbing the calliper is centred. 7. Torque mounting bolts 8. If rubbing look through the calliper, preferably with a white background, and slowly spin the wheel to observe where the rubbing is: ○ Loosen one bolt and adjust by pushing on the calliper in the direction of the rubbing until there is a gap on either side of the rotor. ○ Lightly tighten bolt. ○ Repeat adjustment on other bolt. ○ Repeat on both bolts until no more rubbing. 8. Torque mounting bolts.

Brake Adjustment – Linear Pull / "V" Brake & Cantilever

Linear Pull / "V" Brake	Cantilever
Adjustment 1. Loosen and lubricate brake pad bolts and washers 2. Barrel adjustor should be two turns out from fully threaded 3. Push both pads until pads touch rims 4. Check arms parallel to one another 5. Move washers until arms parallel to one another 6. Install rubber band on back edge of pad 7. Push calliper arm to rim to view alignment 8. Check 4 basic alignments ○ Height – pad close to top edge of rim ○ Tangent – front and back even to rim ○ Vertical face – pad face and rim parallel ○ Toe – Slight gap in trailing edge 9. Tighten pad nut – inspect pad alignment again 10. Repeat on other side 11. Pull cable slack through pinch bolt & secure pinch bolt fully 12. Use setscrews on sides of calliper to centre pads to rim 13. Inspect and readjust if necessary	**Adjustment** 1. Loosen and lubricate brake pad bolts and washers 2. Link Unit ○ Feed cable through all housing pieces ○ Link unit to calliper arm pinch bolt 3. Straddle wire ○ Feed cable through housing and attach cable to straddle wire ○ Attach to straddled wire carrier 4. Barrel adjustor should be two turns out from fully threaded 5. Point pads down away from rim, gently snug nuts 6. Position calliper arms parallel to one another 7. Adjust cable length at calliper arm pinch bolt and secure bolt 8. View cantering of calliper arms to rim by turning set screw 9. Squeeze lever and check cantering 10. Attach rubber band to trailing edge of pad 11. Adjust pad alignment to rim 12. Check 4 basic alignments ○ Height – pad close to top edge of rim ○ Tangent – front and back even to rim ○ Vertical face – pad face and rim parallel ○ Toe – Slight gap in trailing edge 13. Hold mounting bolt with hex wrench and tighten mounting bolt 14. Remove rubber band and observe 15. Repeat on other side 16. Both pads should be touching rim when complete 17. Squeeze lever multiple times to seat brake cable and test cable pinch bolt 18. Set pad clearance at barrel adjustor 19. View pad cantering to rim

Brake Adjustment – Dual-Pivot Cantilever

Dual-Pivot Cantilever

Adjustment
1. Loosen and lubricate threads of pad bolt or nut
2. Squeeze both pads to rim and adjust height for
  ○ Height
  ▪ Right side – lower end of braking surface
  ▪ Left side – upper end of braking surface
  ○ Tangent – front and back even to rim
3. Fully tighten pad-fixing bolts
4. Squeeze lever to test pad clearance
5. Use barrel adjustor to adjust pad clearance
  ○ Set clearance to 3-4mm
  ○ Draw slack from system using brake cable pinch bolt if barrel adjustor is unscrewed to limit
6. View pad centring to rim
  ○ If left pad appears closer to rim, tighten setscrew
7. If right pad appears closer to rim, loosen setscrew