



Full Assembly Instructions for a
Completely Knocked Down (CKD)
Bicycle

Fork Installation

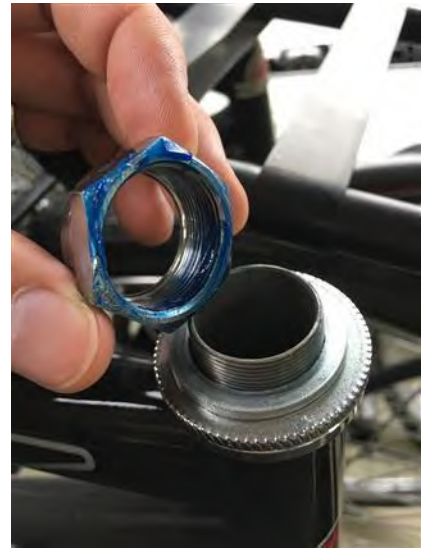
1. Check and ensure both top and bottom headset cups are pressed all the way home prior to fitting the fork (as per picture)



2. Clean headset cups and steerer tube.
3. Add grease and bearings to both headset cups. Bearings should be installed with the back of the bearing retainer facing out of the cup.



Properly installed headset bearing



Properly greased locknut/spacer

4. Grease the threads of the upper bearing race and install it with proper adjustment.
5. Install the spacer
6. Grease the threads and bottom surface of the locknut and tighten it against the spacer **securely**. (torque 15-25Nm)
7. Check for wobble or over-tightness in the bearings. A bearing that creates a small amount of resistance to turning is properly adjusted. The bearing will smooth out after the bike is used for a short period.

Note: After a headset is used, then it should not be adjusted to include this resistance. This is only required for new headsets.



Properly assembled headset

Bottom Bracket and Crank Installation

Bottom Bracket:

1. Clean and then grease the threads of the BB shell of the frame.
2. Clean and then grease the inside of the LH cup.
3. The righthand cup comes securely attached to the bottom bracket and can only be inserted from the right hand side of the BB shell. This side is a lefthand thread



4. Thread this cartridge (RH side) in until four threads **or less** remain outside the frame. If this cannot be done by hand, then put the frame aside **for bottom bracket thread** repair.
5. **Thread the LH cup same as per point "4" but remember this cup is a righthand thread.**
6. Tighten the cartridge (RH side) to 36Nm torque using a click-type torque wrench (note that 31-38Nm is the acceptable range). These torque wrenches should only be used for final tightening. They should NEVER be used as ratchet wrenches. After tightening, there should be no gap between the BB flange and the frame.
7. Tighten the LH cup to 31-38Nm torque using a click-type torque wrench (note that 31-38Nm is the acceptable range). These torque wrenches should only be used for final tightening. They should NEVER be used as ratchet wrenches. After After tightening, there will be a small gap between the cup and the frame which is filled by the rubber o-ring.



Step 1



Step 2



Step 3

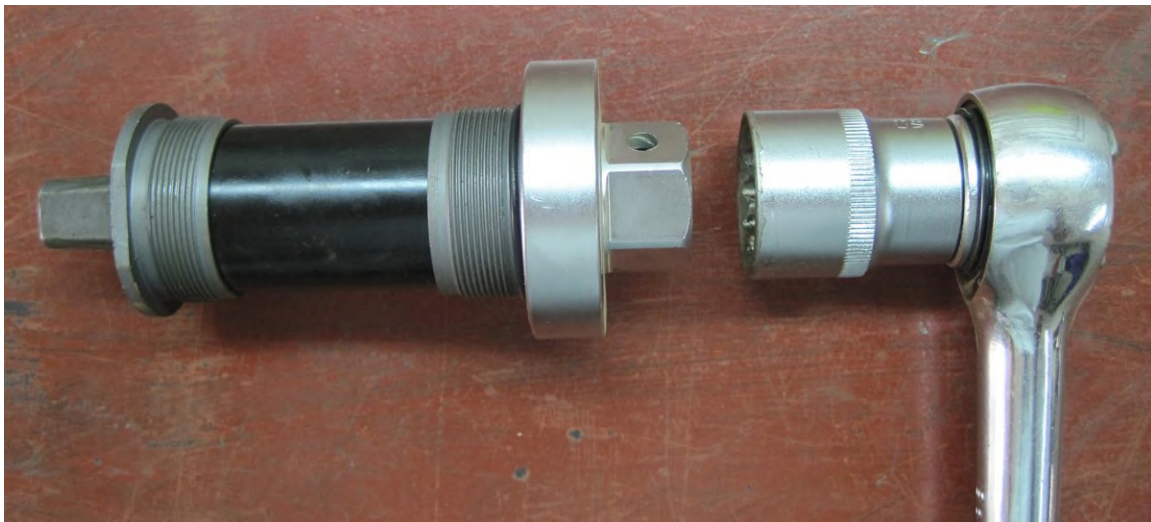


Step 4

Steps of BB installation

Removal of the BB simply requires unscrewing the two cups from the frame starting with the LH cup.

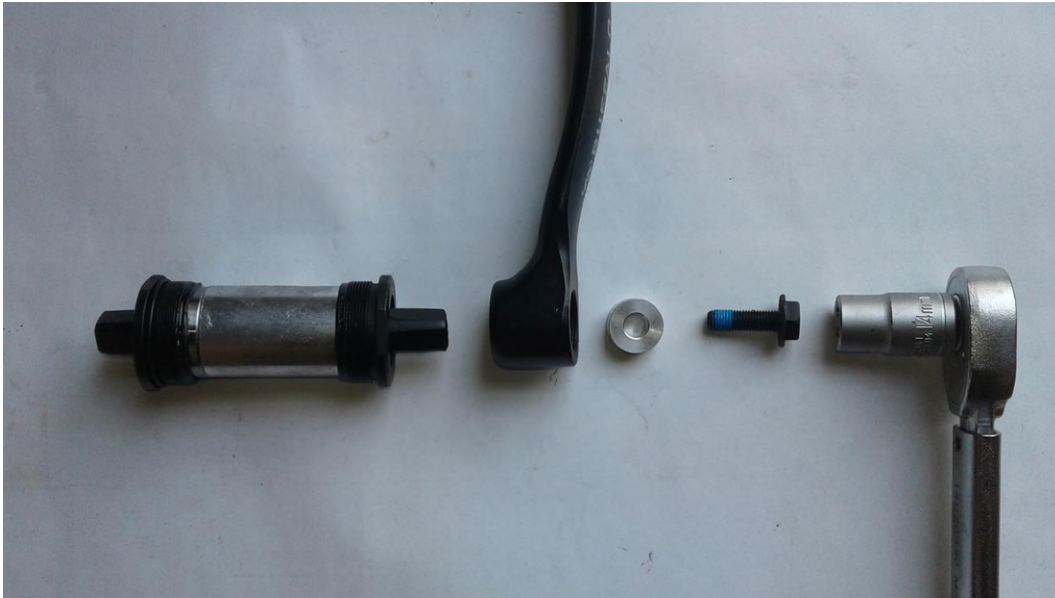
Note: In the field, a standard 36mm wrench may be used in place of the sockets and ratchets used in assembly. Take care not to round off the wrench flats on the BB cups.



A BB socket, 24mm socket, and ratchet wrench for installing the BB

Crank Installation:

1. Do NOT apply grease to the **square taper of the** crank, BB spindle, or bolt.
2. Fit both crankarms onto the BB spindle.
3. Place the aluminum spacers on the crank bolts and thread the bolts into the BB spindle. Tighten both bolts securely (bolt torque 40Nm).



A 14mm socket and ratchet wrench for installing the crank arm

Crankset Removal

1. Remove the crank bolts using a 14mm socket.
2. Use a wrench to thread the crank puller completely into the crank. Make sure to loosen the center of the puller so that it does not cause interference during this process. If the puller is not fully threaded into the crank, then the threads on the puller and crank will be damaged.
3. Tighten the center of the puller with a wrench until the crank arm comes loose from the BB spindle.
4. Remove the crank puller from the crank arm.

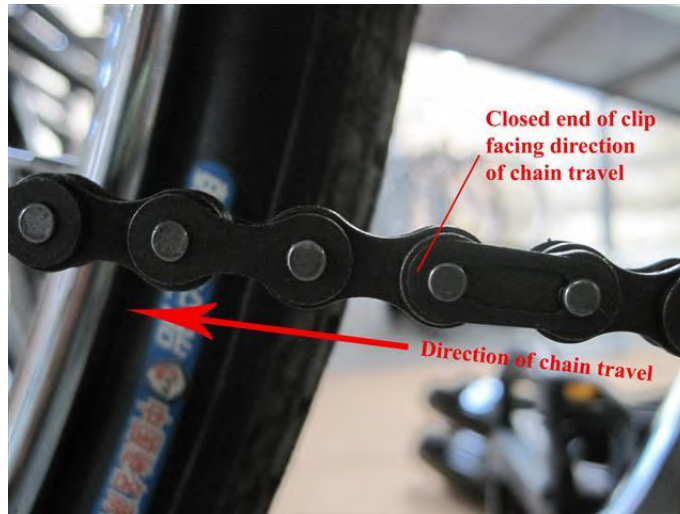


Crank puller being used to remove crankarm

Chain Installation

Single Speed Bike

1. The closed end of the connector clip should face the direction of the chain's travel when pedaling in the forward direction.



Multi-Speed Bike

1. Thread the chain through the frame and the derailleur as shown below.



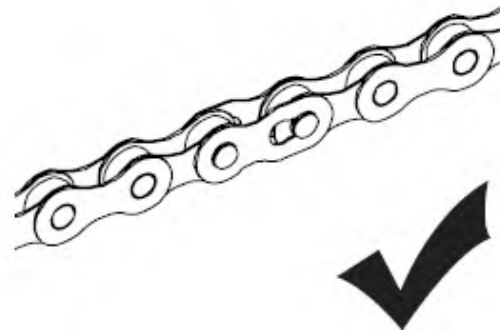
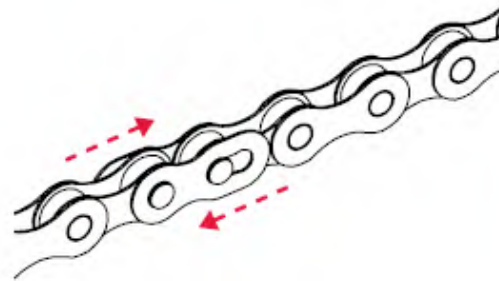
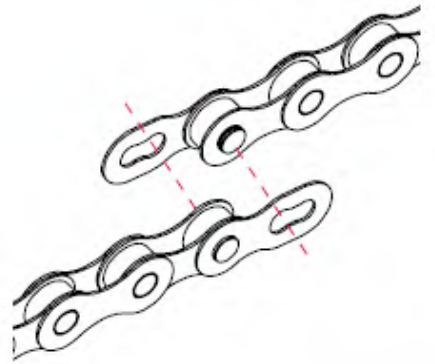
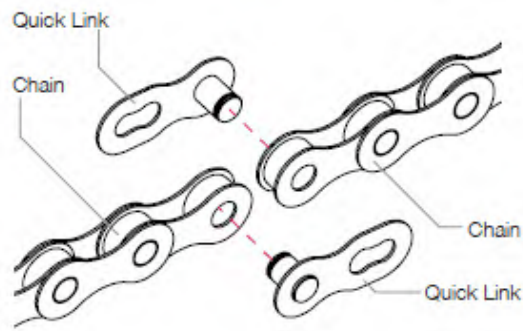
Proper threading of the chain through the derailleur

2. Join the chain using the 6 speed KMC quick link as per diagram below

Chain (Quick link)

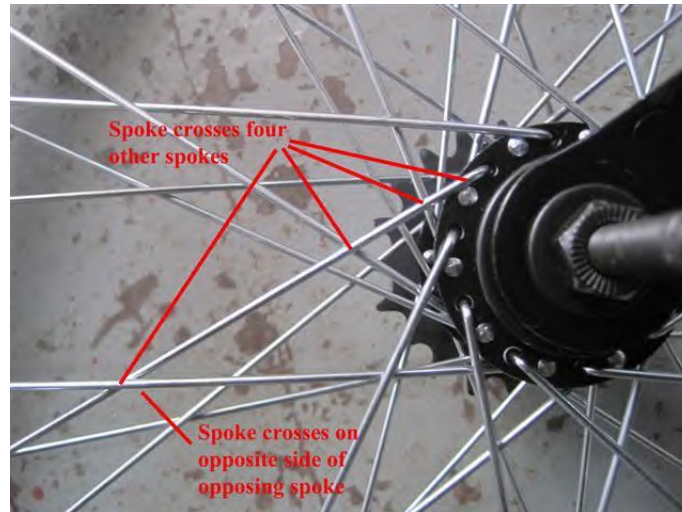
Required Tools

Pliers



Wheel Building

1. The spoke threads must be oiled before lacing the wheels. This significantly reduces spoke wind-up when tensioning.
2. Front and rear wheels should be laced in the 4X (four cross) pattern. On the final cross, the spoke must pass on the opposite side of the opposing spoke.



Four cross lacing pattern

3. The following table defines the proper spoke length that must be used.

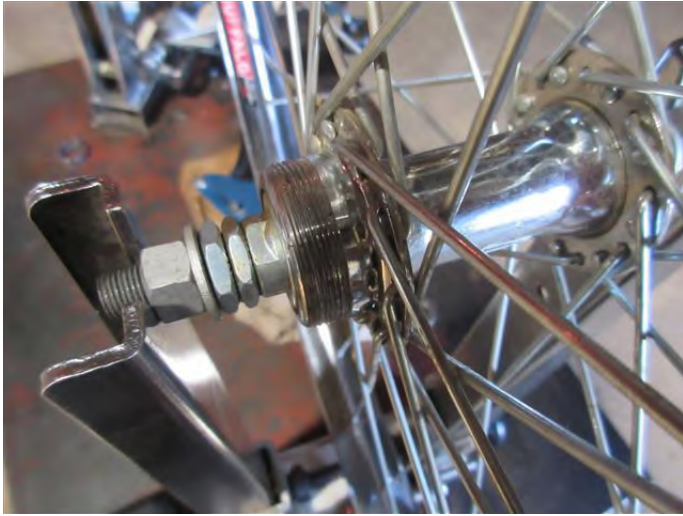
Bike	Wheel	Spoke Specification	
Universal MTB	Front and Rear	269mm spokes	
Charger	Front	271.5mm spokes	
	Rear	RH	271.5mm spokes
		LH	271.5mm spokes

Spoke length table

4. Ensure that the hub is properly held in the **Park Tool wheel building** stand. Axle nuts and washers should be outside of the stand forks. Make sure that the extra locknut for the servo brake is inside the stand forks and tight.



Correct placement of the wheel in the alignment stand



Incorrect placement of the wheel in the alignment stand

5. Truing and tensioning the spokes should be done stepwise to maintain even tension. When beginning to tension, a starting point should be established by tightening ALL the nipples to the SAME point. This can be done by either leaving exactly one spoke thread visible below the nipple or setting the bottom of the slot to be flush with the top of the spoke. This sets the spokes at an even starting point which will allow tension to be added to the wheel progressively and evenly. This will result in a faster wheel building process and a stronger wheel. After the spokes are set evenly, all tensioning should be conducted by adding the exact same number of turns to all nipples. This ensures that the same tension is added to each spoke rather than a random process where some spokes are given more tension than others. Note: Lots of factors can affect the torque required to turn a nipple such as burrs on the rim, malformed threads, dirt in the threads, etc. Never use the “feel” of the tightening torque to judge spoke tension.
6. To begin tensioning, start at the valve hole and go around the rim turning all the nipples exactly the same number of turns until the entire wheel is at low tension.
7. Once the spokes are under low tension, true and dish the wheel, then add exactly one more turn to each nipple.
8. Continue tensioning, truing, and stressing until the wheel is in proper tension, true, and dish. With experience this should only require two tensionings, two stressings, and two truing.



A nipple with exactly one thread showing below it.

Dish: Dishing means centering the rim between the two locknuts of the hub which in turn means that the rim will be centered in the frame. On symmetric hubs like the coaster brake, evenly tensioning the spokes will automatically dish the wheel. However, on asymmetric hubs like those that accommodate gear clusters or hub brakes, dishing becomes more complicated. Spokes on one side of the wheel will be at a steeper angle than those on the other side. As a result, the spoke tension will be different on each side of the wheel (and sometimes the spoke length also). **All wheels must be trued on the Park Tool TS2.2 wheel alignment jig, a correctly dished wheel will be as indicated in the red box below. Adjusting the dishing can be done as per the pictures in the green boxes below.**

N.B. These Park Tool TS2.2 wheels stands need to have the alignment checked every three months with the Park Tool alignment gauge.

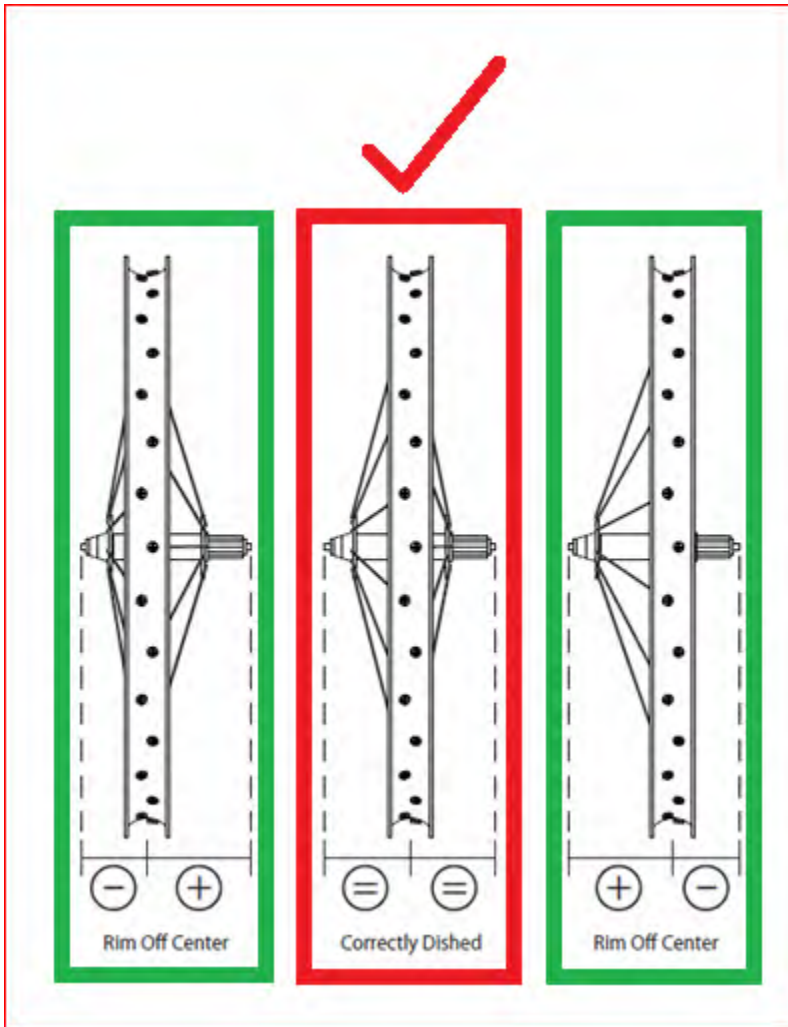


Diagram shows wheels that are out of dish and how spoke tension needs to be changed.

True: A wheel is true when it does not move side to side while rotating. When truing a wheel, adjacent spokes must be tightened AND loosened. If the wheel is trued by only tightening spokes, then that area of the wheel will have higher total tension than the rest of the wheel. This will pull the wheel out of round. By tightening and loosening, the total tension in that area of the wheel remains constant.

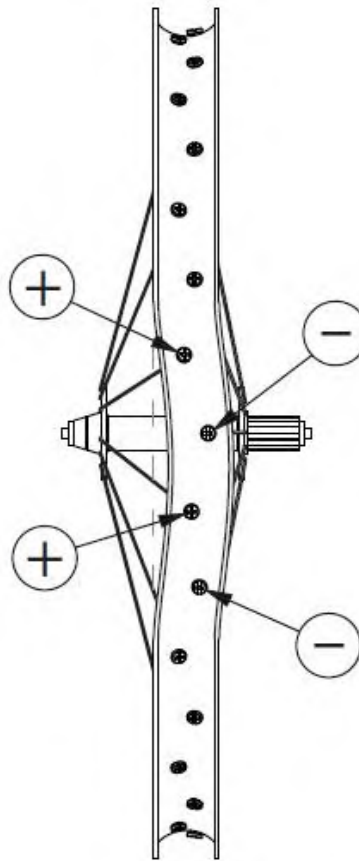
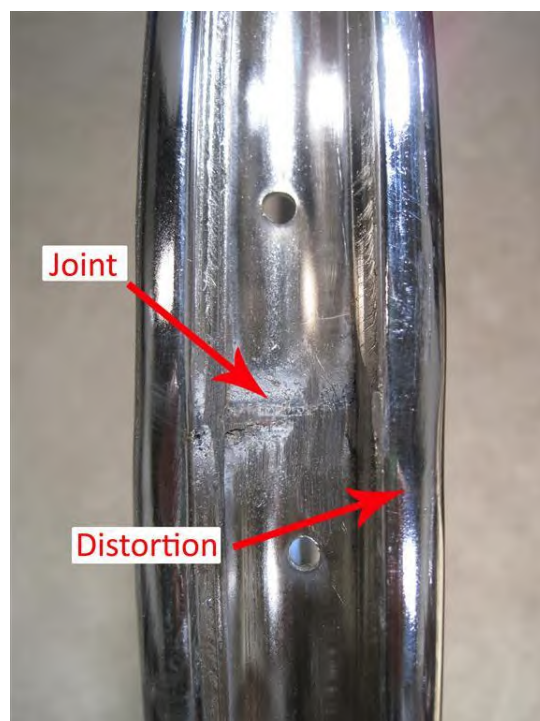


Diagram shows a wheel that is out of true and how spoke tension needs to be changed.

Note: If all components and techniques were perfect, truing would not be necessary when using the above method. Truing is required to compensate for imperfections. One imperfection that should not be over-compensated for is distortion of the rim at the joint where the rim is welded. These joints are underneath the sticker and can easily be seen on the outside of the rim. When these joints are distorted, the rim cannot be perfectly trued. Instead, allow the imperfection to remain while maintaining proper spoke tension.



A distorted joint

Round: A wheel will be round when all of the spokes are tensioned evenly. If one area of the wheel has higher tension than another part, the high tension area will be pulled in towards the hub. The result is a wheel that is not circular.

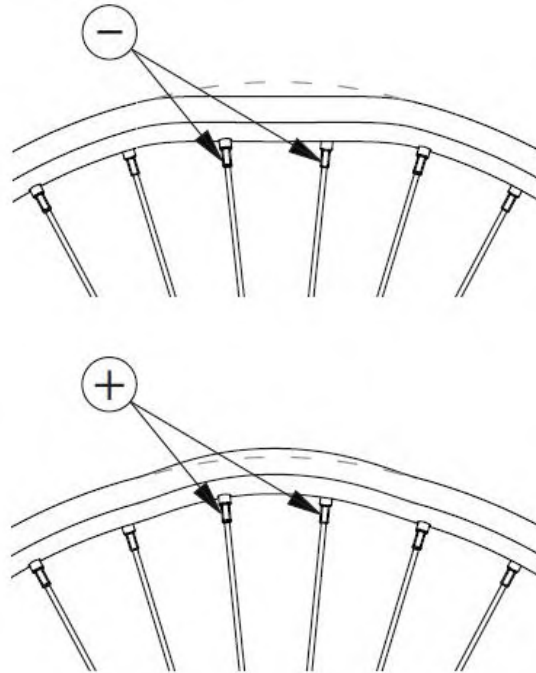


Diagram shows wheels that are out of round and how spoke tension needs to be changed.

9. The wheel must be stressed before and after its final truing. If this is not done, the wheel will go out of true the first time that it's ridden. This is due to spoke twisting/wind-up that occurs during tensioning of the wheel. The stressing releases the wind-up.



In the above picture, the wheel is stressed by pushing down with the elbows. This should be repeated multiple times in different positions on both sides of the wheel. The technique should be done gently and the clicking sound of the spokes should be heard. Oiling the spoke threads reduces spoke wind-up and will reduce the clicking that you hear. Reduced spoke wind-up makes the wheel much easier to true.

10. It is possible to over-tighten the spokes when building a wheel. When the wheel is complete, squeeze two adjacent spokes together. They should feel firm (slightly flexible) but not rigid. An over-tightened wheel will distort easily when stressed or ridden. Using a Park tension meter, the following table lists the proper spoke tension range for each type of wheel.

Wheel	Left Side	Right Side
Universal MTB Front	24-28	21-25
Universal MTB Rear	24-28	24-28
Charger Front	25-27	22-24
Charger Rear	21-24	25-27

Table of proper spoke tension values when measuring with a Park TM-1 tension meter.

11. For easy inflation, the valve stem hole should be positioned at one of the “windows” between spokes.
12. For aesthetics, the rim label should be readable from the RH side of the bike.



13. For aesthetics, the hub label should be facing the valve stem hole and facing towards the rear of the bike as if it were readable while sitting on the saddle. Note, not all hubs and rims have labels.



Valve stem is facing the hub label

Tire and Wheel Installation

1. **Our** tires are directional. The tire label should be on the drive side and, for aesthetics, should be positioned above the valve stem.
2. The wheel reflector should be installed opposite the valve stem with the wide part towards the rim. The reflector should be braced by spokes and not hanging loose.
3. Partially inflate the tube before putting on the tire. This will help the tube to be properly positioned and avoid pinching during installation.
4. Push the valve stem up into tire before full inflation to make sure the tube is not caught under the bead of the tire.
5. While inflating, confirm that the tire is seating on the rim properly to avoid the tire bead sliding off the rim and the tube blowing out.
6. After installing the tire, spin the wheel to confirm that the tire is seated properly. If there are any bumps or hops in the tire, remove the air and reseal the tire. Sometimes soapy water can improve tire seating.
7. The front axle should be pushed all the way up into the fork dropouts before tightening. This will center the wheel in the fork.
8. The rear wheel of the Charger should be pushed all the way into dropout to where it contacts the derailleur bracket.
9. The axle washers are to be placed on the outside of the mudguard stays underneath the nut. The rough side of the washer should face in and the smooth side should face the nut. The axle nuts should be tightened securely. (torque 25-35Nm)



Proper axle washer installation

10. The derailleur guard ,carrier and mud guard stay should be fitted onto the frame as shown in the pictures below. The stand and the derailleur should be attached to the main axle as per pictures below as well



Photos showing proper installation of components on rear axle of Charger.

Single Speed

1. Grease the inside surface of the coaster brake hub RH dust cover.
2. Install the cog on the hub with the concave surface facing out such that the teeth are farthest from the spokes.



3. Adjustment of the chain tension should be conducted using the chain adjusters. When doing this, the wheel should be fully fitted to the bike and the axle nuts should be hand tight. After adjustment, lock the wheel in place by tightening the axle nuts at 25-35Nm of torque. The chain adjusters should not be tightened or loosened after the axle nuts are tight.
4. Proper chain tension is achieved when the chain has 20-30mm of vertical movement at its tightest point.
5. The brake arm band should be clamped on both sides of the brake arm as per picture below.



Properly installed brake arm band

Shifting System

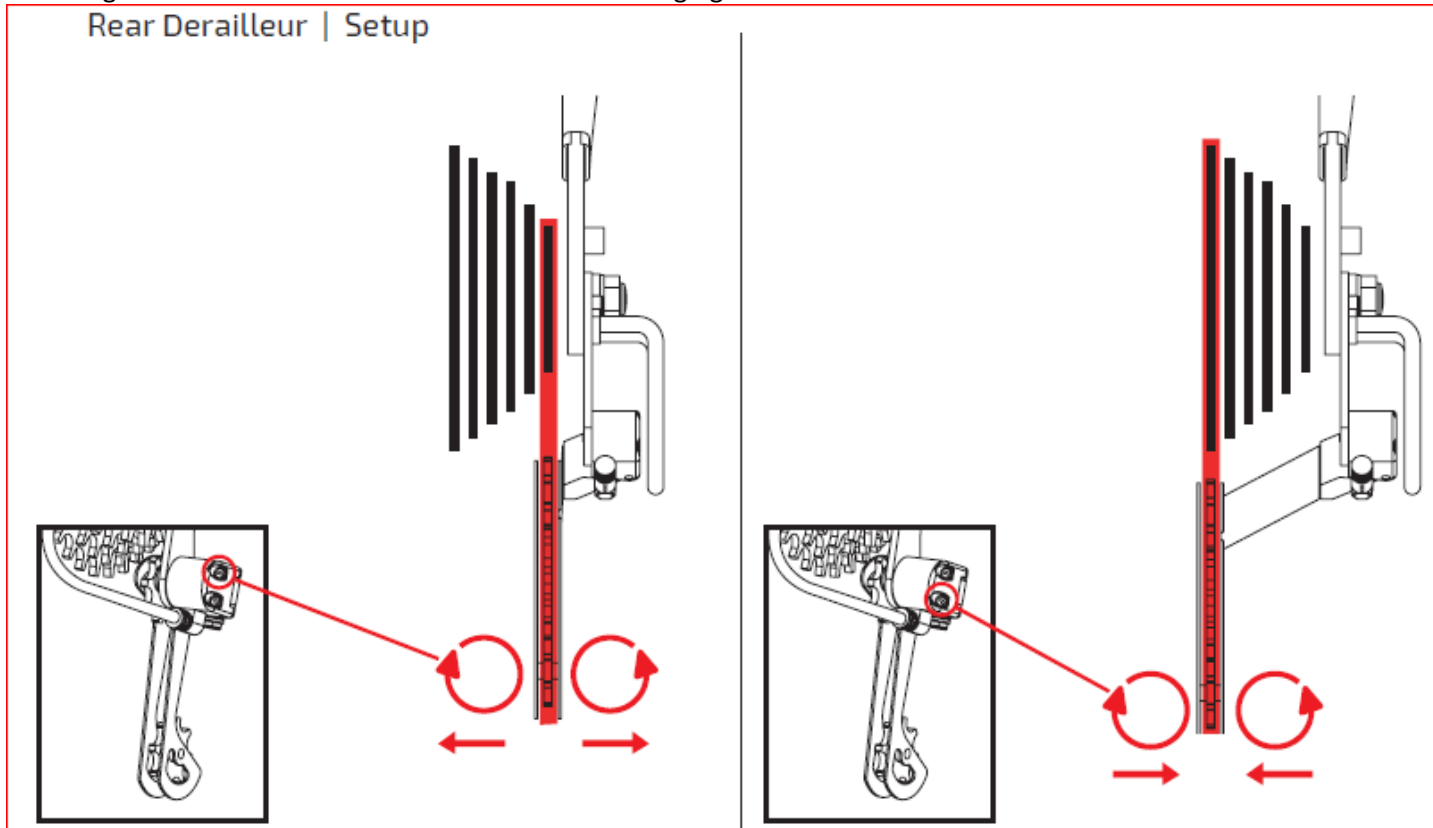
1. Attach the derailleur to the frame dropout using a 9mm wrench. Ensure that the derailleur is pushed to the rear of the dropout and the slot is aligned.



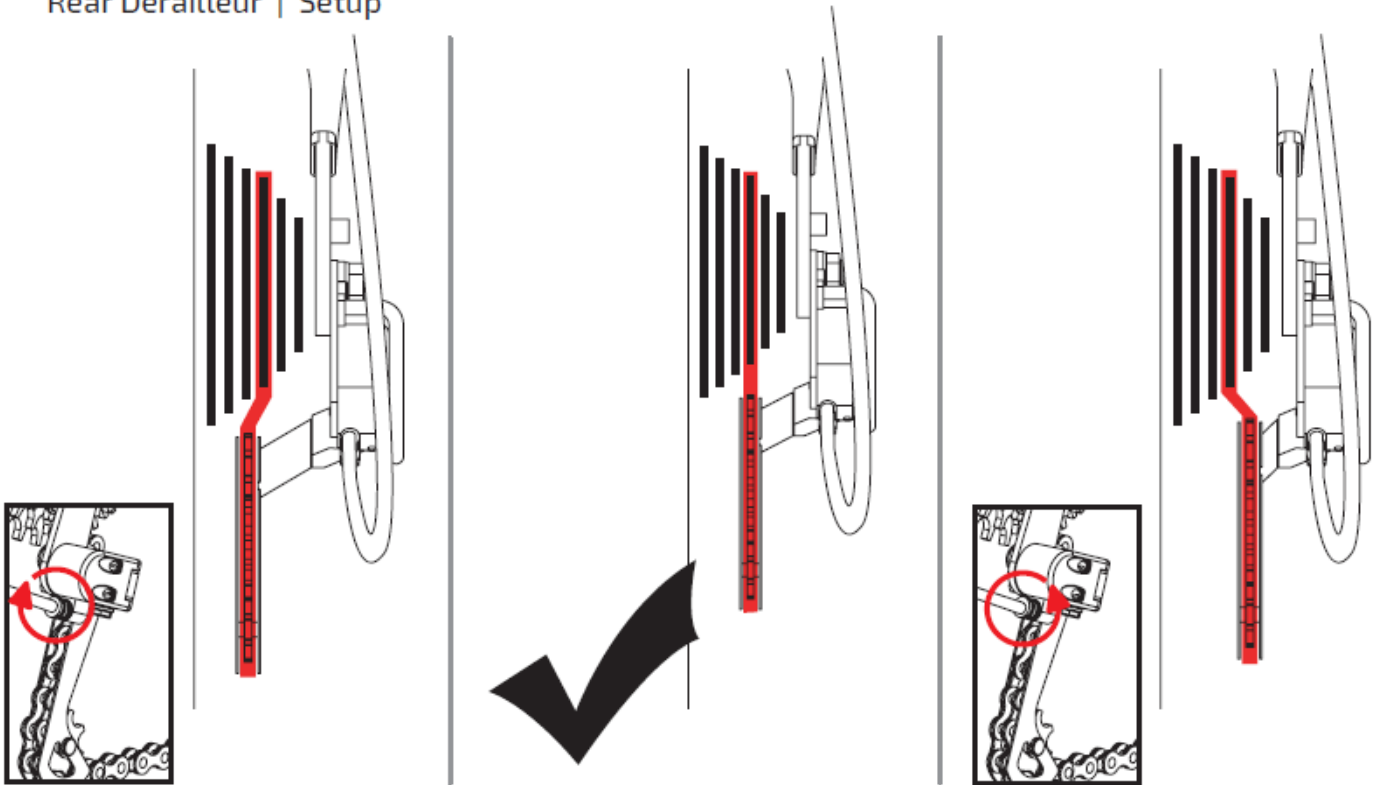
Proper derailleur installation

1. Place the plastic “pie plate” on the rear hub then thread the freewheel on over it. The freewheel does not need to be tightened with a tool since riding will automatically tighten it. Removal of the freewheel requires a special splined tool that fits inside of the freewheel. Different freewheel companies require different tools. Buffalo bikes use Shimano freewheels.
2. Pedal the bicycle hard in the forward direction to ensure that the freewheel is fully tightened.
3. Pedal the bicycle and operate the derailleur up and down by hand and adjust the limit screws so that the chain runs smoothly in the top and bottom cogs without derailing into the spokes. The limit screw labeled “L” is for the low gear limit and the screw labeled “H” is for the high gear limit.

Rear Derailleur | Setup



Rear Derailleur | Setup



4. The shifter should be attached to the RH side of the handlebar to the inside of the brake lever and positioned such that it can operate without interference by the brake lever. Do not over-tighten the clamp.



Shifter attached to handlebar.

5. The shifter should be attached to the RH side of the handlebar to the inside of the brake lever and positioned such that it can operate without interference by the brake lever. Do not over-tighten the clamp.

N.B. If you find the following derailleur cables in the parts box as per picture below please remove the original derailleur inner cable from the shifter and replace with these stainless steel inner cable.



6. The cable housing that is stiffer and has black end caps is the shifter housing. Slide the shift cable into the housing and route it to the derailleur.
7. Check that the housing is seated properly along the frame and then pull the cable taught as you tighten it under the pinch bolt on the derailleur. Ensure that the cable is seated perfectly in the slot built for it on the derailleur.
8. Pedal the bike and operate the shifter. If the chain is not shifting upward with the first click of the shifter, then screw the derailleur barrel adjuster out to tighten the cable. If the cable jumps up too far or refuses to shift back down properly, then screw the barrel adjuster inward to loosen the cable. Continue this adjustment until the shifting is crisp and accurate.

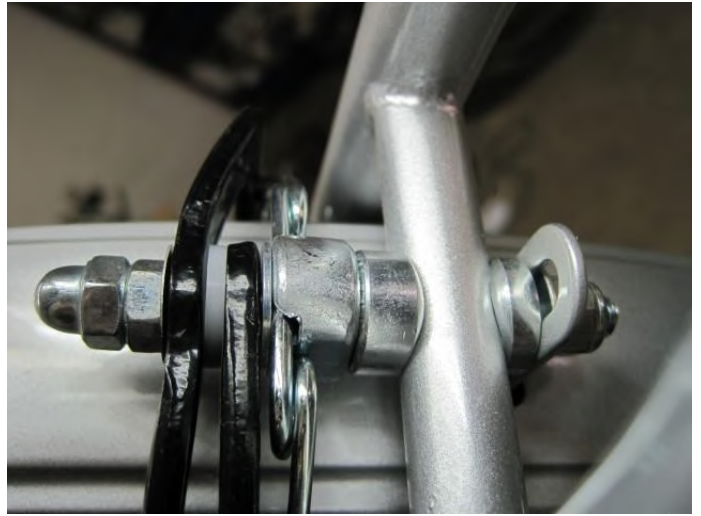
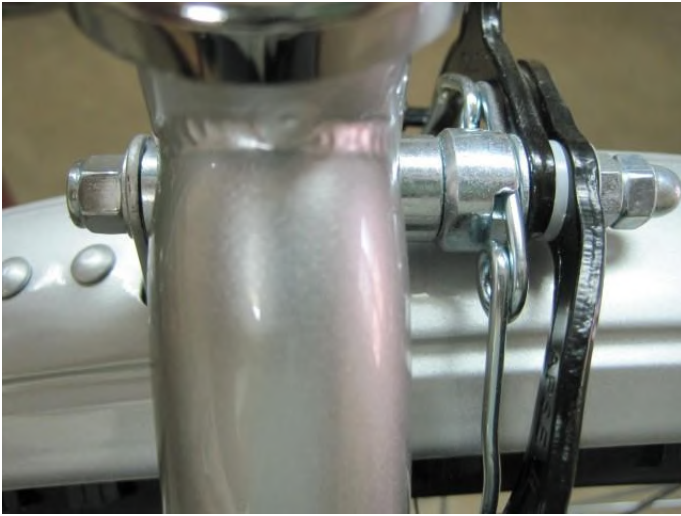
9) The stainless steel derailleur inner cables have been specifically designed for the Buffalo Charger and do not require cutting. The end of the cable closest to the derailleur has also had the ends welded so there is no reason for a cable end to be used, picture below.



Brake System

Side-pull Caliper Brakes

1. Install the brakes to the frame and fork in the arrangements shown below.



Proper front and rear brake attachment.

2. Attach the brake levers to the handlebars so that they are comfortable for the rider's hands and don't interfere with the shifter. Do not over-tighten the clamp. The LH brake lever is for the front brake and the RH brake lever is for the rear brake. Some bikes will only use a hand brake on the front wheel.
3. Attach the housing as shown in the following pictures.



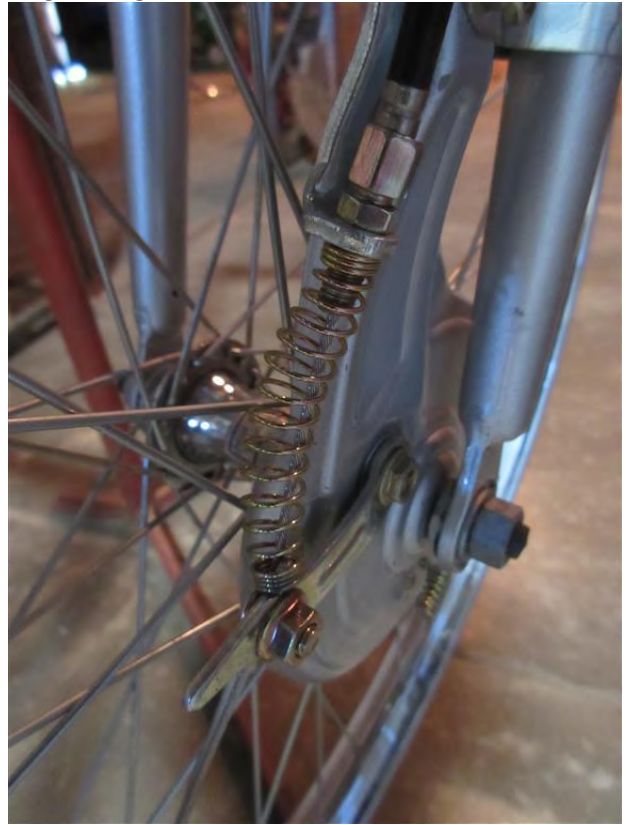
Proper installation of cable housing

4. Loosely attach the cable in the pinch bolt then adjust the brake pads. Position them so they account for the flex in the caliper that will occur when braking while the bike is moving. Loosen the pinch bolt and adjust the cable to the proper position before fully tightening the pinch bolt.
5. Center the caliper by using a 15mm spanner.

Servo Brakes

1. Remove the servo brake securing nut from the LH side of the axle.
2. Add grease to the drum threads of the hub and then thread on the drum
3. Slide the brake housing over the drum, refit the nut, and tighten with a 17mm wrench.

4. Fit the wheel into the frame and secure the reaction arm with the frame clip. The shape of the clip is designed to hold the nut so that only a screwdriver is required for tightening.



Proper installation of the servo brake.

5. Route the housing and temporarily (gently) attach the cable with the pinch bolt.
6. Spin the wheel up to speed and grab the brake with force. This will thread the drum tightly onto the hub.
7. Readjust the cable position and tighten the pinch bolt firmly. Use the barrel adjuster for fine tuning the cable adjustment. Both brake levers should engage the brakes at the same point and should be tensioned to just below the point where the pads start to rub on the drum.

Cockpit

1. All parts of the seat post and stem that make contact with the frame and fork respectively should be greased before installation. Throughout the whole bike, grease should be used sparingly and any excess should be wiped off.



Properly greased handle bar stem and seat post.

2. The stem bolt that holds the handlebars should be securely tightened (torqued at 16-20Nm)
3. The handlebars should be positioned level and centered within the stem such that no knurling can be seen on either side.
4. The grips should be placed in hot water for 15 minutes to make them soft and easy to slide onto the handle bars.

N.B. The grip need to be correctly positioned so that the finger ribs are orientated as per picture .



Incorrect installation



Correct installation

5. The quill bolt on the stem (the one on top) should only be gently tightened so that the handlebars can be easily turned for storage and shipping. The bolt should be fully tightened when the bikes arrive in the field and are ready to be used.
6. The saddle should be installed with the clamp facing the rear of the bike and the clamp centered on the rails. The clamp should be securely tightened (torqued at 20-25Nm)



**Clamp facing
rear of bike**

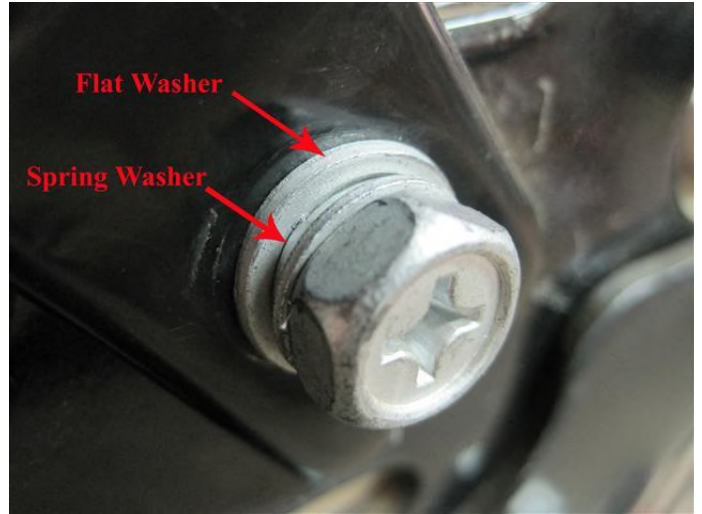
Correct saddle clamp installation

Hardware

1. On the universal MTB, the spring washers for the stand and carrier should be installed under the bolt heads. The carrier bolts also have a flat washer placed under the spring washer. **The bolts should be securely tightened (20-25Nm torque)** The carrier legs should be pushed all the way onto their securing bolts before tightening.



Spring washer installed under bolt head



Flat washer installed underneath spring washer on the stand



Correct



Incorrect

2. On the Charger, the carrier should be installed as shown below and the **bolts should be securely tightened (10-15Nm torque)**



Proper installation of the Charger carrier and mud guard stay with spring and flat washers.

3. On the universal MTB, the chainguard should be installed on the outside of front frame bracket in order to achieve better clearance for the chainring.
4. The seatpost clamp bolt should be torqued at 18-23Nm.



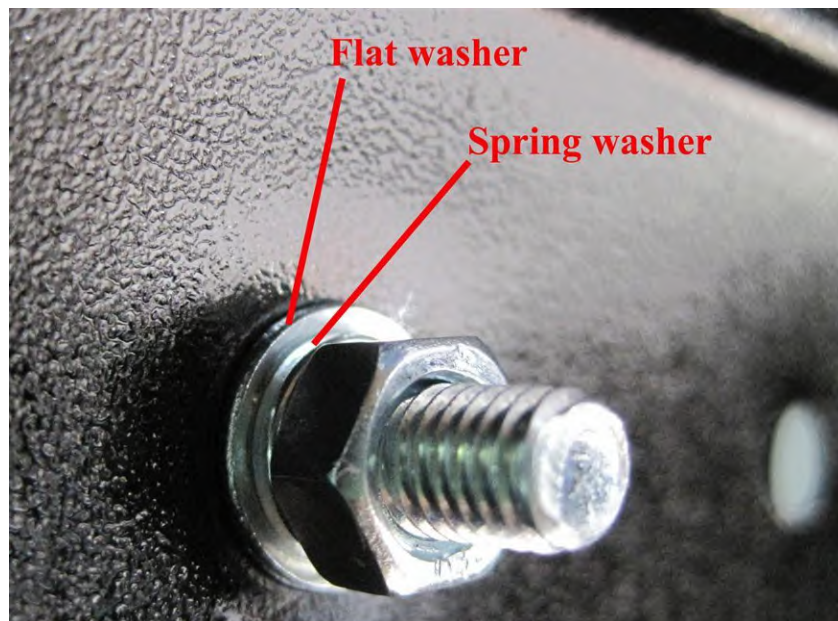
Properly installed chainguard

Mudguards

1. The small spring washers are for use with the mudguard stay brackets. They should be placed under the heads of the bolts on the outside of the mudguard.

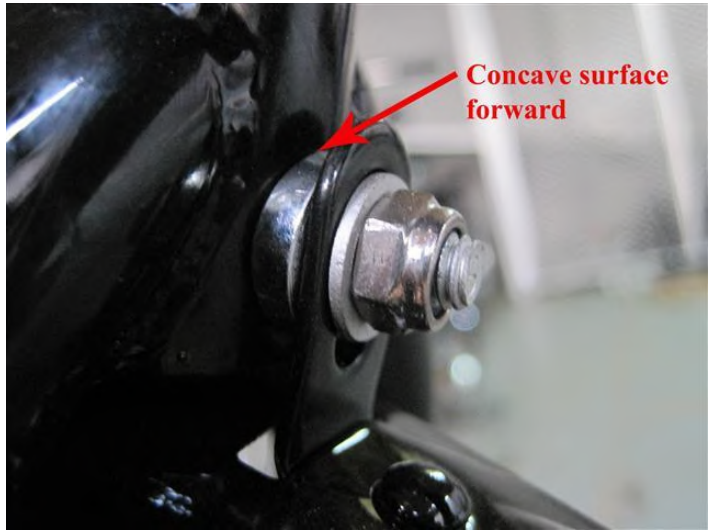


2. The reflector comes with a flat washer AND a spring washer. The spring washer should be installed between the flat washer and the spring washer.



Proper reflector hardware installation

3. Do not over-tighten any of the small nuts and bolts. They need to be snug but not excessively tight. The spring washers and the nylon insert in the nuts will prevent the nuts from coming loose.
4. The concave washers should be installed on the upper bolt of the rear mudguard and on the front fork. The curved face of the washer should be faced to match the curvature of the frame or fork.



Proper concave washer placement

5. The front mudguard bracket should be installed on the back side of the fork.
6. The bolts that hold the front and back mudguards should be securely tightened but not over tightened which will compress the attached tubing .
7. The rear Charger mudguard is attached with a bracket. The bracket should be slid into place and then clamped tightly using pliers. This can be done either on or off the bike.



Clamping rear Charger mudguard bracket onto mudguard

Accessories

1. The bell should be fitted to the LH side of the handlebar where it can be actuated by the riders thumb.



Correctly installed for Charger bell



Correct position of the CB34 bell

Final Check/Quality Control

Drivetrain:

1. Shifting is smooth and accurate
2. BB properly tightened with gap between LH cup and frame
3. Pedals tight (check by hand)
4. Proper chain tension

Brakes:

1. Reaction arm bolts tight (coaster and servo)
2. Side-pull calipers centered and brake pads positioned
3. Proper cable tension on hand brakes
4. Front and rear hand brakes engaging at the same point

Wheels:

1. Wheels true and properly dished
2. Proper spoke tension (approximate by squeezing spokes with hands)
3. Wheel laced for proper position of valve stem
4. Rear wheel centered in frame
5. Tire seated on rim properly
6. Tire label on RH side and over valve stem
7. Valve stem straight

Cockpit:

1. Seat tight and at correct angle
2. Saddle straight and at correct height
3. Handlebars level and centered
4. Stem at correct height
5. Headset bearings adjusted properly and locknut tight

Hardware:

1. All hardware in correct position and tightened
2. Mudguards centered on stays

Other:

1. All appropriate packaging removed
2. Bike wiped down and clean
3. Stickers applied straight, in proper position, and without wrinkles
- 4.