

S E R V I C E

M A N U A L

24V MODELS



E-BikeTM
Service Manual
24V MODELS

EV Global Motors Company
10900 Wilshire Boulevard
Suite 310
Los Angeles, CA 90024

Tel: 310/208-7076
Fax: 310/208-2444

www.ebike.com

Copyright © 2000 EV Global Motors Company

Second Edition
September, 2000
LIT-82001-00-00

All rights reserved. No parts of this publication may be reproduced or transmitted in any form or by any means without the prior permission of EV Global Motors Company.

Although every precaution has been taken to assure this publication is complete and accurate, EV Global assumes no liability for errors or omissions. All information contained in this publication is based on the latest information available at the time of publication and is subject to change without notice.

TABLE OF CONTENTS

Chapter One: General Information	1-1
Beep/LED Codes	
Terms	
Vehicle Identification Number	
Key number	
Model Code	
How to Read the Model Code	
Terms	
Lubricants	
Threadlock	
Recommended Maintenance Schedule	
Special Tools	
Chapter Two: Specifications	2-1
Mechanical Specifications	
Gear Ratios	
Electrical Specifications	
Torque Specifications	
Performance Specifications	
Frame Specifications	
Chapter Three: Battery Pack	3-1
Charging the Batteries	
Replacing the Batteries	
Replacing the Charger	
Battery Pack	
Chapter Four: Handlebar and Controls	4-1
Handlebar Position	
Handlebar Height Adjustment	
Handlebar Replacement	
Throttle Control-Housing	
Accessory Control Housing	
Headset	
Chapter Five: Brakes	5-1
Brake Cable Replacement	
Brake Lever	
Brake Lever Free Play Adjustment	
Brake Pad	
Brake Pad Alignment	
Caliper Arm	
Disc Brake	
Chapter Six: Shifter and Derailleur	6-1
Shifter	
Shifter Cable	
Derailleur	
Chapter Seven: Chain and Crankset	7-1
Chain	
Crank Arm	
Chainring	
Pedal	
Bottom-Bracket Cartridge	
Chapter Eight: Electrical	8-1
Connector Identification	
Right Side Cover	
Left Side Cover	
Controller	
Quick-Release Connector	
Motor	
Headlight	
Taillight	
Troubleshooting	
Electrical Schematic	

Chapter One

GENERAL INFORMATION

BEEP/LED CODES

The E-Bike™ beeps and flashes various codes to alert the rider to particular conditions. The following chart lists the codes and describes their various functions. Beep codes consist of a series of long and short beeps, like Morse code. A long beep is represented by a dash (-). A short beep is represented by a dot (●).

Code	Meaning	Beep	LEDs
OK	The battery pack is installed and properly connected.	--- ●-	
GO	Sounds at power knob ON. The system is on and ready to operate.	-- ● ---	The charge level LEDs cycle twice in sequence.
Pedal assist	The system requests pedal assist. Sounds when on a steep hill or when the motor has overheated.	● --- ●	
Over heat 1	The motor is overheated. The system will disable the motor within 3-5 seconds.	--- ●●●● Followed by the pedal assist code (●---●) every 8 seconds	
Over heat 2	Sounds at power knob ON if the motor has been disabled.	--- -●-	
System refusal	An error has been detected. The system will not operate.	- ● ---	
Battery state of charge	Indicates the battery state of charge within 3 seconds of power knob ON.		Green = 100-60% Yellow = 60-20% Red = 20-0%
Low battery	The system will shut down within 3 to 5 seconds.	●●● ---	Charge level LEDs cycle continuously in sequence.

VEHICLE IDENTIFICATION NUMBER

The 17-digit vehicle identification number (VIN) is printed on a label that is affixed to the inside face of the right frame seat stay.

This label also contains the gross-vehicle weight rating and recommended tire inflation pressure.

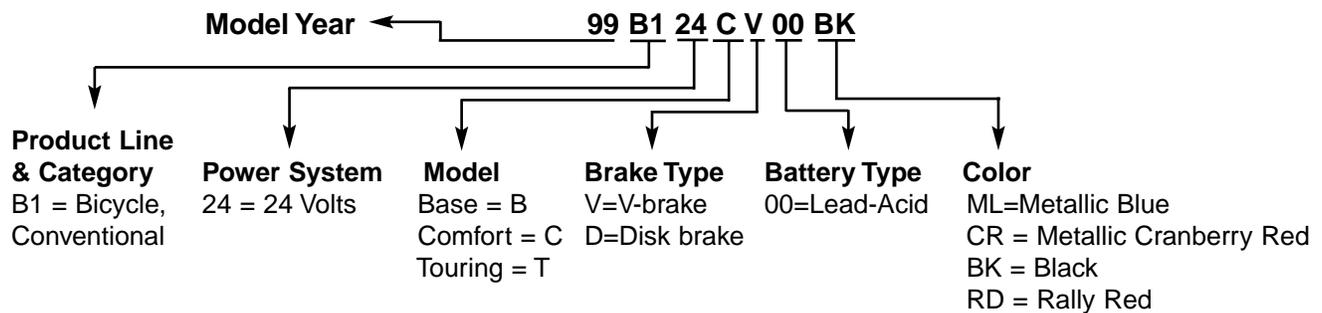
KEY NUMBER

The 4-digit key number is stamped on the upper portion of the key shaft.

MODEL CODE

Model code	Model prefix	Year	Description	Color 1	Color 2	Color 3
B1 Bicycles						
99-B124BV00-BK,RD	1B1	1999	Base	Black (BK)	Rally Red (RD)	NA
99-B124CV00-BK,RD	2B1	1999	Comfort	Black (BK)	Rally Red (RD)	NA
99-B124TV00-ML,CR	2B1	1999	Touring	Metallic Blue (ML)	Metallic Cranberry (CR)	NA

HOW TO READ THE MODEL CODE



TERMS

Left and Right

Most of the time, left and right in this manual refer to the rider's point of view when seated on the E-Bike™ and facing forward. The one exception to this rule involves the brake calipers. Left and right on the calipers refers to a technician's point of view when standing in front of the E-Bike™ and looking directly at the front brake caliper or when standing behind the E-Bike™ and looking directly at the rear brake caliper.

NOTE, CAUTION and WARNING

The terms NOTE, CAUTION and WARNING have specific meaning in this manual. A NOTE provides additional information to make a procedure easier or clearer.

A CAUTION emphasizes precautions that must be taken to avoid damage to your tools or to the E-Bike™.

A WARNING alerts you to a situation where negligence could lead to injury or death. Take WARNINGS seriously. Failure to heed a WARNING could result in serious personal injury or death.

LUBRICANTS

Grease

The bearings and other mechanical components in the E-Bike™ operate at relatively low temperatures so most automotive greases are inappropriate for use on the E-Bike™. Always use grease made specifically for a bicycle, such as grease from Bullshot, Campagnolo, Finish Line, Pedros, Phil Wood, and Shimano.

Oil

Always use oils made specifically for bicycle use. Bicycle oils need to be thin enough to penetrate tight places, they should be durable so they can withstand exposure to the elements, and they must resist the accumulation of dirt.

Suitable oils for the E-bike include Alsop, Bullshot, Campagnolo, Finish Line, Lube Wax, Phil Wood Tenacious Oil, Pedros, Superlube, and Triflow.

Motor oil, WD40, 3-in-1 Oil, sewing machine oil, gun oil, and other common oils are not suitable and should not be used.

In general, applying oil from a drip applica-

promote over-lubrication, which leads to excessive accumulation of dirt. Apply oil sparingly. Apply enough oil to do the job, but not so much that it starts to drip from the component. After applying any oil, wipe off the excess.

THREADLOCK

A threadlocking compound should be used on most fasteners on the E-Bike™. Threadlocking compound prevents loosening caused by vibration and helps seal out moisture.

Loctite 242 (blue) or equivalent is recommended for threadlocking applications. Loctite 242 is a medium-strength threadlocking compound that permits disassembly with common hand tools.

Before applying Loctite to threads, clean the thread surface of oil, grease, and other residue. Apply a small amount of Loctite. Excess compound could work its way down the threads and bond parts together. The torque chart in Chapter Two includes Loctite recommendations for particular fasteners.

RECOMMENDED MAINTENANCE SCHEDULE

Component or Condition	Inspect before every ride	Inspect every 5 to 10 rides*
Brake pad adjustment	X	
Wheel quick release adjustment	X	
Tire pressure	X	
Tire wear/damage	X	
Head/tail/brake light operation	X	
Mirror position	X	
Controls and display	X	
Seat post quick release adjustment	X	
Brake pad wear		X
Brake cable tension/wear	X	X
Spoke tension		X
Wheel true		X
Hub bearings adjustment		X
Hub bearing lubrication		X
Chain lubrication		X
Derailleur adjustment		X
Reflectors		X
Battery and charger		X
Headset adjustment		X
Bottom bracket adjustment		X
Tighten all bolts, nuts, and mounting hardware		X

* Depending upon length of ride and riding conditions. Inspect more frequently when riding in dusty or wet conditions.

SPECIAL TOOLS

The following special tools are needed for servicing the E-Bike™.

Tool	Part number
Hex wrench set: 4mm, 5mm, 6mm	Park AWS-1
Hex wrench set	Park AWS-11C
Hex wrench set: 2mm, 5mm, 3mm	Park AWS-3
Fourth hand cable stretcher	Park BT-2
Chain checker	Park CC-2C
Chain breaker (screw type)	Park CT-3
Crank wrench	Park CCW-14R
Cable and housing cutter	Park CN-4C
Gearclean brush	Park GSC-1
32mm & 36mm head wrench	Park HCW-15
Pedal wrench	Park PW-3
Spoke wrench (black)	Park SW-0
Spoke wrench (red)	Park SW-2
Tire lever set	Park TL-1C
Freewheel tool	Park Tool FR-1
Bottom-bracket-cartridge tool	Park Tool BBT-2

Chapter Two

SPECIFICATIONS

Table 1: Mechanical Specifications

Component	Specification
Headset	
Stack height	33 mm (1.30 in.)
Dimensions	25.4 mm x 34 mm x 30 mm w/seal
Fork	
Type	PU Allen key adjustable
Steerer tube	1-1/8 in.
Travel	65 mm
Stem 1	
Std. model	17 degrees, 110 mm extension
C & T models	40 degrees, 110 mm extension
Stem 2	28.6 mm x 25.4 mm x 150 mm with quill
Handlebar	
Std model	
Rise	30 mm, 10 degrees
Width	620 mm
Handle	200 mm
Seat post	
Std model	300 mm x 30.0 mm O.D.
Seat post spacer	100 mm x 30.1 mm ID x 34.9 mm O.D.
Seat post, suspension	
C & T models	350 mm x 27.2 mm O.D.
Seat post spacer	100 mm x 27.3 I.D. x 34.9 mm O.D.
Tires	
Std & C models	26 x 1.95 in., black
T model	26 x 1.95 in., Skinwall black
Rims	26 x 1.5 in., 14G x 36H, double wall
Spokes	
Front	266 mm, 14G stainless with brass nipples
Rear	216 mm & 219 mm, 14G stainless with brass nipples
Bottom bracket (B/B)	127 mm cartridge
Freewheel	14-28 T, 7-speed
Chainring	33 T
Chainring clearance	16~17 mm (0.63~0.67 in.)
Crankarm	170 mm (6.7 in.)
Chain	1/2 x 3/32 x 110 L

Table 2: Gear Ratios

Chainring	Freewheel	Gear Inches	Ratio
33T	14T	61.3	0.42 (14/33)
33T	16T	53.6	0.48 (16/33)
33T	18T	47.7	0.55 (18/33)
33T	20T	42.9	0.61 (20/33)
33T	22T	39.0	0.67 (22/33)
33T	24T	35.8	0.73 (24/33)
33T	28T	30.6	0.85 (28/33)

Table 3: Electrical Specifications

Component	Specification
Battery (WP12-12)	2 in series
Type	Deep discharge, sealed AGM lead-acid
Capacity	12 volts, 12 amp hours.
Charger	
Input	115 VAC, 60/50 Hz, 2 amps
Output	24 VDC, 3 amps
Charger cord	
Length	1.2 m (4 ft.)
Wire	18 AWG, 2-wire with ground

Table 4: Torque Specifications

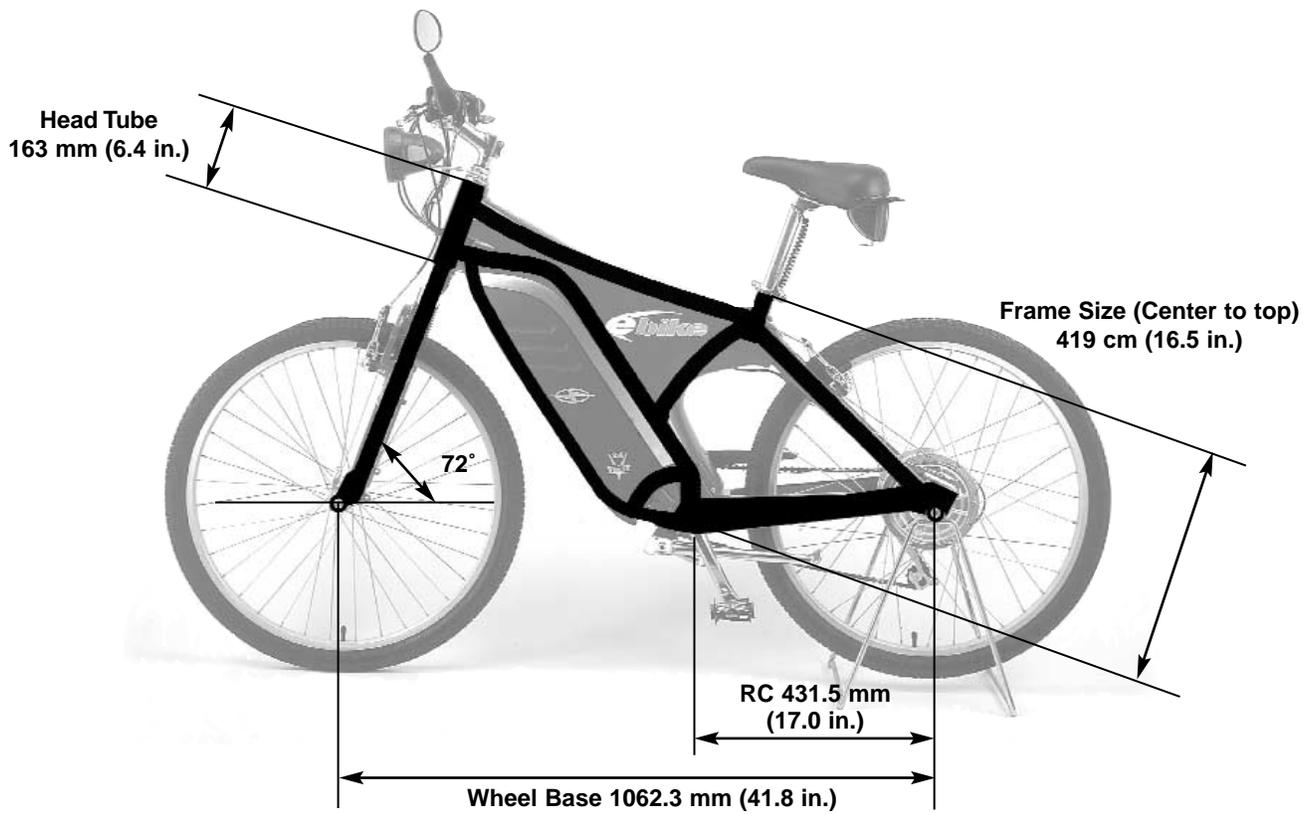
Item	kg-cm	in.-lb.	ft.-lb.	Special Instructions
Handlebar-binder bolt	140~200	-	10~15	Apply Loctite
Handlebar-arm clamp bolts	140~200	-	10~15	Apply Loctite
Stem-binder bolt (stem-2 quill bolt)	180~250	-	13~18	
Headset locknut	40~50	34.7~43.4		
Accessory control clamp bolt	30~40	26.5~34.7	-	
Throttle-control clamp bolt	30~40	26.5~34.7	-	
Controller mounting screw	15	13.0	-	
Brake-lever clamp bolt	30~40	26.5~34.7	-	
Brake-caliper pinch bolt	140~200	-	10~15	Apply Loctite
Brake-pad nut	63.6~85.2	53~71	-	
Caliper pivot bolt	85.2~106.8	71~89	-	Apply Loctite
Left-side-cover mounting screws	10	8.6	-	Apply Loctite
Right-side-cover mounting screws	10	8.6	-	Apply Loctite
Battery-terminal-block mounting screw	10	8.3	-	
Battery compartment mounting screw	10	8.3	-	
Battery pack handle	15	13.0	-	
Battery cover screw	20~30	17.4~26.5		Apply Loctite
Charger-board mounting screw	10	8.6	-	
Derailleur mounting bolt	84	70	-	
Derailleur pinch-mechanism nut	42	36.5	-	
Shifter clamp bolt	30~40	26.5~34.7	-	
Mirror-mounting screw	30~40	26.5~34.7	-	
Chain guard screws	15	13.0	-	Apply Loctite
Left bottom-bracket cover screws	20~30	17.4~26.5	-	Apply Loctite
Crank-arm mounting bolt	200~250	-	14.4~18.1	Apply grease to the bolt threads
Pedal	30~50	26.5~43.4	-	Apply grease to the stud threads
Bottom-bracket cartridge adapter ring	300~400	-	21.7~28.9	Apply grease to the threads
Chainring bolt	350~450	-	25~32	Apply oil to the bolt threads
Motor torque arm	15	13.0	-	Apply Loctite
Headlight mount	15	13.0	-	
Taillight mounting nut	20	17.4		
Horn mounting nut	15	13.0	-	
Cord access cover	5	4.2	-	
Frame mounted connector	10	8.6	-	Apply Loctite
Front fender	15	13.0	-	
Rear fender	15	13.0	-	

Table 5: Performance Specifications*

Item	Specification
Top speed	13.5-14.0 mph
Range (E mode, flat, no wind)	18-20 miles
Maximum gradeability	11% grade, 6 mph
Acceleration	0-10 mph in 5.3 seconds

*200-pound rider with tires inflated to 60 psi.

Frame Specifications



Chapter Three

BATTERY PACK

CHARGING THE BATTERIES

The E-Bike™ includes a charger that is an integral part of the battery pack. Batteries can be charged when the battery pack is on-board the E-bike™ or when the battery pack is removed for remote charging.

To assure maximum battery life, always fully recharge the battery after each ride. If the E-Bike™ will not be used for more than one week, remove the battery pack from the E-Bike™ and store it in a cool, dry place. The controller uses a small amount of power whenever the battery pack is installed in the E-Bike™. Consequently, the batteries slowly discharge whenever the battery pack is in place, even if the power knob is OFF. To prevent total battery discharge during extended periods of non-use, remove the battery pack and store it in a cool, dry place. A stored battery should be recharged at least every three months to help maintain performance and quality.

On-board Charging

1. Be sure the power knob is turned OFF.
2. Turn the battery-compartment latches clockwise, and open the door.
3. Retrieve the charging cord from the compartment above the bottom bracket.
4. Plug the female end of the charging cord into the receptacle on the battery charger. **(Figure 1)**



FIG.1

WARNING

The charger is equipped with a cooling fan. If the cooling fan does not operate when the charging cord is plugged in and the red LED is on, unplug the charger from the electrical outlet immediately. Determine why the fan is not operating before charging the battery pack. Replace the charger if necessary.

5. Plug the male end of the charging cord into a standard 110V/60 cycle electrical outlet. The red LED on the charger and the cooling fan will automatically turn on. The LED switches to green and the cooling fan turns off when the battery pack is fully charged.

Remote Charging

1. Remove the battery pack from the E-Bike™.
2. Set the battery pack on its side so the battery-pack cover faces up and the handle is to the side.

3. Retrieve the charging cord from the compartment above the bottom bracket.
4. Plug the female end of the charging cord into the receptacle on the battery charger.

WARNING

The charger is equipped with a cooling fan. If the cooling fan does not operate when the charging cord is plugged in and the red LED is on, unplug the charger from the electrical outlet immediately. Determine why the fan is not operating before charging the battery pack. Replace the charger if necessary.

5. Plug the male end of the charging cord into a standard 110V/60 cycle electrical outlet. The red LED on the charger and the cooling fan will automatically turn on. The LED switches to green and the cooling fan turns off when the battery pack is fully charged.

REPLACING THE BATTERIES

The battery pack contains two sealed lead-acid batteries that are connected in series. The following procedure describes how to remove and replace the two batteries.

CAUTION

Always replace both batteries as a set. Do not mix old batteries with new batteries, and do not mix different brands of batteries.

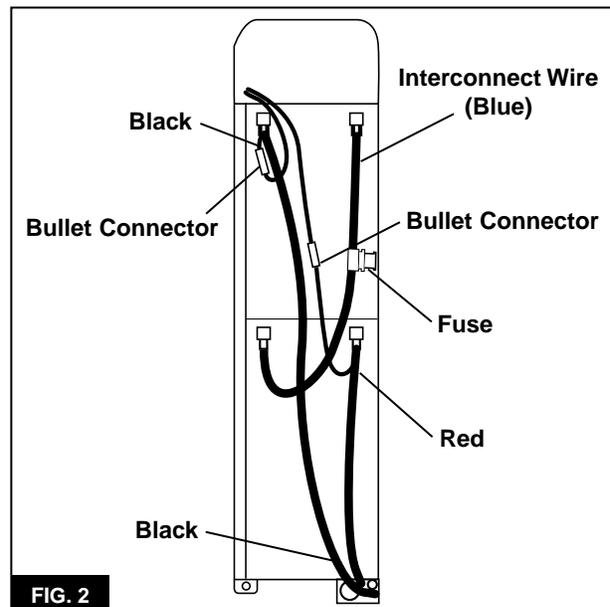
WARNING

Never use a battery that is cracked or broken. Battery acid is highly corrosive and can cause severe burns if it comes in contact with your eyes or skin.

Removal

1. Remove the battery pack from the E-Bike™.
2. Remove the two cover screws from the battery pack, and remove the cover.
3. Disconnect and remove the blue interconnect wire that connects the two batteries to each other in series. Note the fuse on the interconnect cable (**Figure 2**).
4. Disconnect the battery-pack leads (black and red) from the spade connectors on each battery.

5. Invert the battery case. Tap the case against the bench or floor to dislodge the batteries from the battery pack.
6. Remove each battery and its damper strap (**Figure 3**).

**FIG. 2****NOTE**

Contact your state or local agency for information on proper battery disposal.

7. Properly dispose of the old batteries.

Installation

1. Wrap the damper strap around the first battery (**Figure 3**).

**FIG. 3**

2. Set the battery into the compartment so the end with the spade connectors faces the charger. Press the battery into the compartment until it bottoms.

3. Repeat for the second battery.
4. Inspect the fuse on the blue interconnect wire. Replace the fuse as necessary.
5. Connect the blue interconnect wire to the upper battery's positive terminal and to the lower battery's negative terminal.
6. Connect the red lead from the battery pack to the positive terminal on the lower battery.
7. Connect the black lead from the battery pack to the negative terminal on the upper battery.
8. Fit the cover onto the battery pack. Be sure no wire is pinched beneath the cover.
9. Apply Loctite 242 (blue) to the threads of the two cover screws, and secure the cover in place.

REPLACING THE CHARGER

Removal

WARNING

Make sure the charger is not plugged in during service.

1. Remove the batteries from the battery pack.
2. Remove the three charger-cover screws that secure the cover to the vent (A, Figure 4).
3. Lift the cover from the charger, and disconnect the three electrical connectors from the charger board.
4. Remove the screw that secures the charger board to the bracket (B, Figure 4).

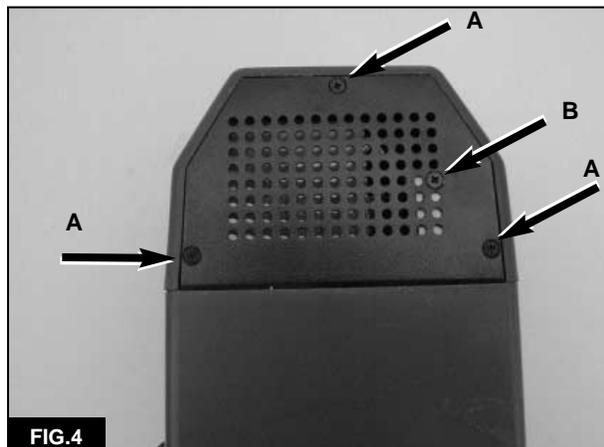
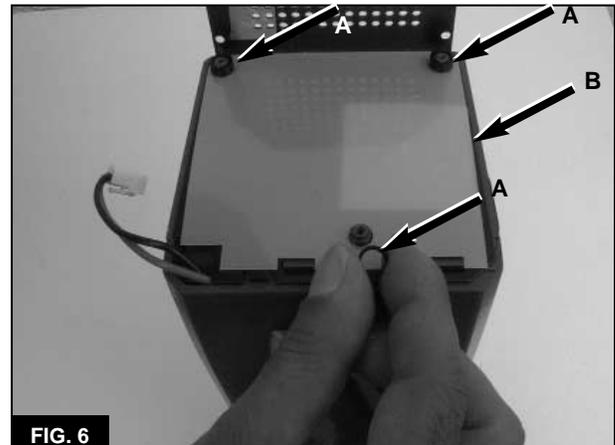
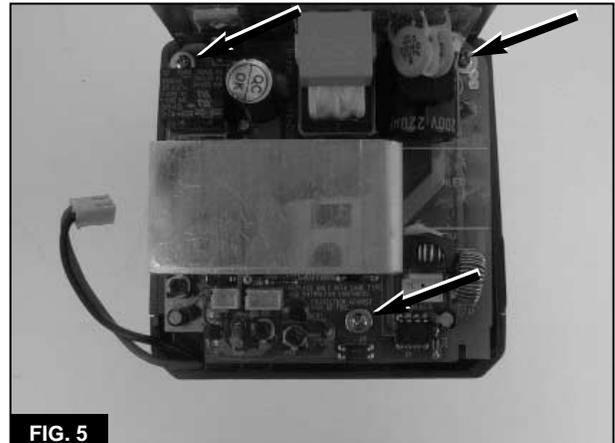


FIG.4

5. Remove the three charger-board mounting screws (Figure 5), and remove the charger board. Do not lose the spacer (A, Figure 6) from each mounting stud.

Installation

1. Be sure the insulator (B, Figure 6) is in place in the battery pack.
2. If removed, install the spacer (A, Figure 6) onto each mounting stud in the battery pack.
3. Set the charger board into place on the mounting studs. Secure the board in place with the charger-board mounting screws and washer (Figure 5).



4. Secure the board to the bracket with the mounting screw (B, Figure 4).
5. Plug the connectors from the cover into their mates in the charger board.
6. Fit the cover in place over the charger board. Be sure the two charger wires are not pinched under the cover.
7. Secure the cover in place with the three charger-cover screws (A, Figure 4).
8. Reinstall the batteries and the battery-pack cover.

BATTERY PACK

Removal

1. Turn the power knob OFF.
2. Open the battery compartment door.
3. Release the gate latch, and open the battery gate.
4. Use the handle to pull the battery pack from the compartment. Be sure to support the bottom of the battery pack with your free hand.

Installation

1. Set the lower end of the battery pack into the battery compartment, and tilt the battery into place.

NOTE

The E-Bike™ beeps the OK (_ _ _ _ • _) whenever the battery pack is reinstalled and good contact exists between the battery pack and terminal block in the E-Bike™.

2. Close the gate over the battery, and secure the gate latch.
3. Close the battery compartment door, and turn the latches counterclockwise.

BATTERY PACK TEST

Charger operation test

1. Plug the female end of the charging cord into the port on the charger.
2. Plug the male end into a 110-volt outlet.
3. Watch the battery charger LED and perform the indicated procedure.
 - a. If the battery charger LED does not illuminate, the charger is faulty and should be replaced. Unplug the charging cord, and check the battery voltage (before charging) as described below.

- b. If the battery charger LED turns to red and the cooling fan is not operating, the charger is faulty and should be replaced. Unplug the charger, and check the battery voltage (before charging) as described below.
- c. If the battery charger LED turns red and the cooling fan operates, perform the charger output test described below.
- d. If the battery charger LED turns green, perform the charger output test described below.

Charger Output Test

1. Remove the cover from the battery pack.
2. Connect a voltmeter's positive (+) test probe to the positive (+) battery terminal, and connect the voltmeter's negative (-) test probe to the battery negative terminal as shown in **Figure 7**. Note the reading on the voltmeter.
3. With the voltmeter still connected as described in step 2, plug the charger into a 110-volt outlet. Note the reading on the voltmeter.
4. Compare the two readings.
 - a. If the reading is higher when the charger is plugged in, the charger is operating properly. Perform the battery voltage test (before charging).
 - b. If the two readings are the same, the charger has failed and should be replaced.

Battery Voltage Test, Before Charging

1. Let the battery stand for one hour.
2. Remove the cover from the battery pack.
3. Connect a voltmeter's positive (+) test probe to the positive (+) battery terminal, and connect the voltmeter's negative (-) test probe to the battery negative terminal as shown in **Figure 7**.
4. Note the reading on the voltmeter.
5. If the reading is less than 12 volts, the battery is faulty and should be replaced.

Battery Voltage Test, After Charging

NOTE

The charger must be operational for this test to be valid. Perform the charger output test before performing this test.

1. Charge the battery as described in this chapter.
2. Unplug the charger, and let the battery stand for one hour.
3. Remove the cover from the battery pack.
4. Connect a voltmeter's positive (+) test probe to the positive (+) battery terminal, and connect the voltmeter's negative (-) test probe to the battery negative terminal as shown in **Figure 7**.
5. Note the reading on the voltmeter.
6. The reading should be 12.5 volts or greater. If the reading is less than 12.5 volts, the battery is faulty and should be replaced.

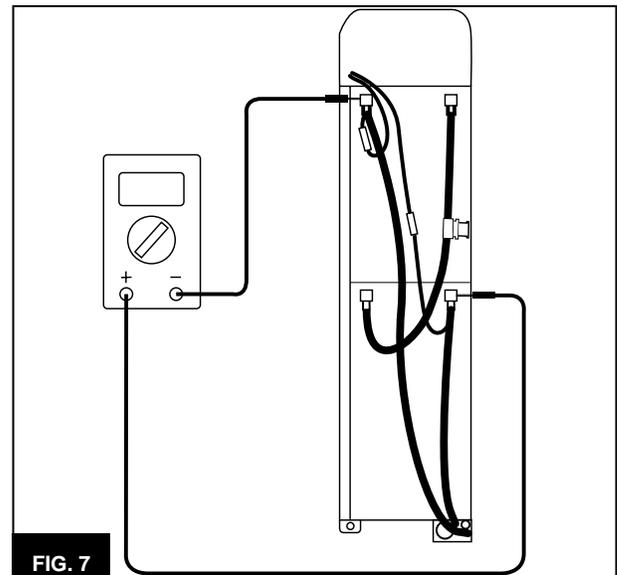


FIG. 7

Chapter Four

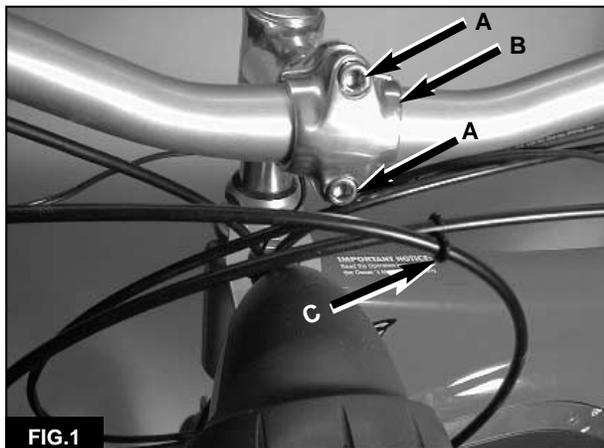
HANDLEBAR and CONTROLS

HANDLEBAR POSITION

NOTE

The handlebar may be adjusted to suit the rider's preference. The following procedure describes how to set the handlebar to the stock position.

1. Loosen the handlebar-binder bolts (A, Figure 1).

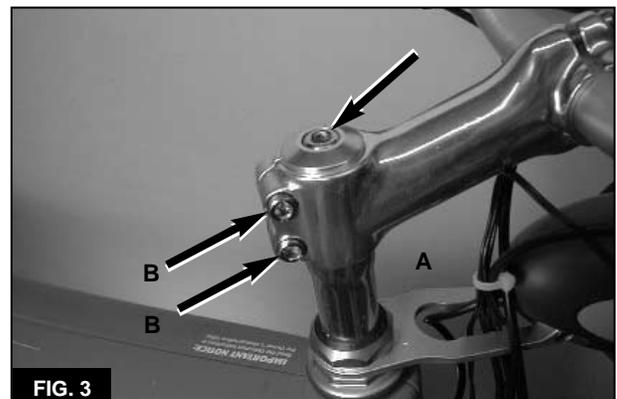
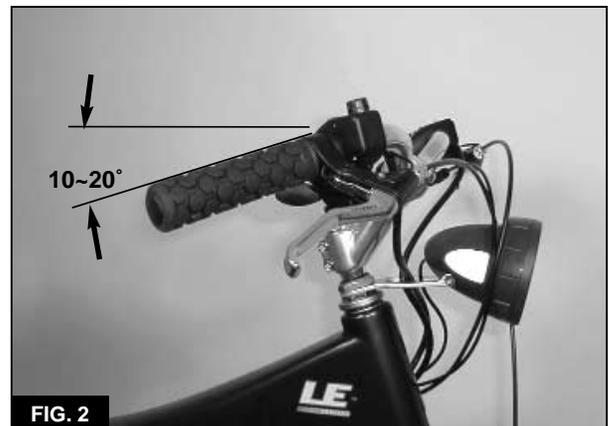


2. Position the handlebar so the ends point down slightly. The handlebar grips should form a 10-20° angle with a line that parallels the floor. See Figure 2.

3. Be sure the knurled portion of the handlebar is centered within the handlebar binder.
4. Tighten the handlebar-binder bolts to the torque specification in Table 4.

HANDLEBAR HEIGHT ADJUSTMENT

1. Loosen the stem-binder bolt three or four turns counterclockwise (A, Figure 3). If the bolt rises from the steering stem, strike the bolt with a plastic mallet to force the stem wedge down.



CAUTION

The "Minimum Insert" mark on the handlebar stem must not sit above the top of the headset.

2. Raise or lower the stem within the head tube until the handlebar is at the desired height.
3. Rotate the handlebar from side to side, and align the handlebar with the wheel or fork dropouts.
4. Tighten the stem-binder bolt to the torque specification in Table 4.

HANDLEBAR REPLACEMENT**Removal**

1. Note how the brake cables, shifter cable, and electrical wires are routed around the headlight. They will have to be rerouted along the same path during installation.
2. Remove the following components from the right handlebar:
 - a. The handlebar grip.
 - b. The brake-lever housing
 - c. The throttle control and throttle stop.
3. Remove the following from the left handlebar:
 - a. The mirror.
 - b. The handlebar grip
 - c. The shifter.
 - d. The brake-lever housing.
 - e. The accessory control.
4. Remove the two handlebar-binder bolts (A, **Figure 1**).
5. Remove the handlebar clamp (B, **Figure 1**) and the handlebar.

Installation

1. Fit the handlebar into place in the binder on the handlebar arm. Be sure the knurled portion of the handlebar is centered in the binder.
2. Fit the handlebar clamp into place around the handlebar.
3. Apply Loctite 242 (blue) to the threads of the handlebar-binder bolts, and install the bolts finger tight.
4. Position the handlebar as described in this chapter, and tighten the handlebar-binder bolts to the torque specification in Table 4.
5. Install the throttle control as described in this chapter.

6. Install the accessory control as described in this chapter.

THROTTLE CONTROL (RIGHT SIDE)**Removal**

1. Remove the battery from the battery compartment.
2. Remove the right side cover from the E-Bike™.
3. Pull the cable inlet cover around the head tube, and remove the cable inlet cover from the left side cover.
4. Disconnect the throttle control connector (F, **Figure 4**) from the controller board. Note how the throttle control wire is routed through the frame. The new wire will have to be rerouted along the same path.

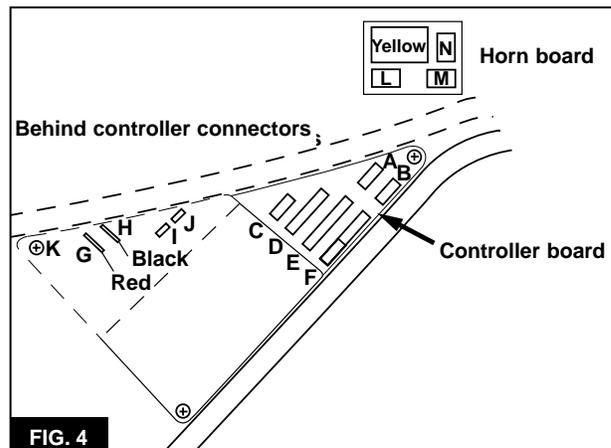


FIG. 4

5. Pull the wire so the connector passes through the frame and emerges at the cable inlet in the left side cover (**Figure 5**).



FIG. 5

6. Twist and remove the right handlebar grip from the handlebar.
7. Disconnect the front brake cable from the S-hook (C, **Figure 1**). Note how the front brake cable is routed around the headlight. It will have to be routed along the same path during assembly.
8. Loosen the right-brake-lever clamp bolt, and slide the brake lever body from the right handlebar. Guide the front brake cable around the headlight as you remove the brake lever.
9. Lay the brake lever over the frame top tube so it is out of the way. Do not severely bend or kink the cable.
10. Loosen the set bolt on the throttle control.
11. Slide the throttle control and throttle stop off the handlebar. Pull its wire free of the headlight bracket.

Installation

1. Fit the throttle stop onto the bottom of the throttle control (**Figure 6**).
2. Slide the throttle control and the throttle stop onto the right handlebar.



3. Feed the connector end of the throttle control wire through the cutout in the headlight bracket (**Figure 7**).
4. Feed the cable around the head tube, through the cable inlet in the left side cover, and plug the connector into position (F, **Figure 4**) on the controller panel.
5. Slide the right-brake-lever body onto the right handlebar. Guide the front brake cable around the headlight as you install the brake lever body.

6. Finger tighten the clamp bolt to hold brake body in place. Use the S-hook to secure the front brake cable to the shifter cable (C, **Figure 1**).
7. Twist the right handlebar grip onto the handlebar until the grip is flush with the end of the handlebar.
8. Slide the brake lever body against the handlebar grip. Position the brake lever as described in Chapter Five, and torque the clamp bolt to the specification in Table 4.
9. Slide the throttle control/throttle stop assembly against the brake lever. Rotate the throttle control so the LEDs point to the rider's eyes. Tighten the clamp bolt so there is enough friction to hold it in place. Do not over tighten the clamp bolt.
10. Reinstall the right side cover.



ACCESSORY CONTROL (LEFT SIDE)

Removal

1. Remove the battery from the battery compartment.
2. Remove the right side cover from the E-Bike™.
3. Pull the cable inlet cover around the head tube, and remove the cable inlet cover from the left side cover.
4. Disconnect the accessory control connector (E, **Figure 4**) from the controller board. Note how the accessory control wire is routed through the frame. The new wire will have to be rerouted along the same path.
5. Pull the wire so the connector passes through the frame and emerges at cable inlet in the left side cover (**Figure 5**).

6. Loosen the mirror-mounting bolt (**Figure 8**), and remove the mirror from the handlebar end.



FIG. 8

7. Twist the left handlebar grip from the handlebar. Do not lose the shim that sits between the handlebar grip and the shifter body.
 8. Disconnect the shifter cable from the S-hook (**C**, **Figure 1**). Note how the cable is routed around the headlight. It will have to be routed along the same path during assembly.
 9. Loosen the shifter clamp bolt, and slide the shifter body from the handlebar (**Figure 9**).



FIG. 9

Guide the shifter cable around the headlight as you remove the shifter. Lay the shifter over the frame top tube so it is out of the way. Do not severely bend or kink the cable.

10. Loosen the clamp bolt on the brake-lever body (**Figure 10**), and remove the body from the handlebar. Guide the brake cable around the headlight as you remove the lever body. Lay the lever body over the frame top tube so it is out of the way.

11. Loosen the set bolt on the accessory control. Slide the housing off the handlebar. Pull its wire free of the headlight bracket.



FIG.10

Installation

1. Slide the accessory control onto the left handlebar.
2. Feed the connector end of the accessory control wire through the cutout in the headlight bracket (**Figure 7**).
3. Feed the wire around the head tube, through the cable inlet in the left side cover, and plug the connector into position (**E**, **Figure 4**) on the controller panel.
4. Slide the rear-brake-lever body onto the left handlebar. Take care to guide the rear brake cable around the headlight.
5. Slide the shifter body onto the left handlebar. Guide the shifter cable around the headlight.
6. Slide the shim onto the handlebar. Twist the handlebar grip onto the handlebar until the grip is flush with the handlebar end.
7. Slide the shifter against the handlebar grip/shim.
8. Position the shifter body as described in Chapter Six, and tighten the shifter-body clamp bolt to the torque specification in Table 4.
9. Slide the brake-lever body against the shifter. Position the brake lever as described in Chapter Five, and torque the brake-lever clamp bolt to the specification in Table 4.
10. Fit the mirror mount into the handlebar end (**Figure 8**). Position the mirror, and tighten the mirror mounting bolt to the torque specification in Table 4.
11. Slide the accessory control against the brake lever. Rotate the accessory control on the handlebar to the same relative position as the throttle control housing. Tighten the clamp bolt so there is enough friction to hold it in place. Do not over tighten the clamp bolt.
12. Use the S-hook to secure the shifter cable to the front brake cable (**C**, **Figure 1**).

13. Reinstall the cable inlet cover and right side cover.

HEADSET

A 36-mm spanner (Park Tool HCW-15) is required for servicing the headset.

Disassembly

1. Remove the front wheel.
2. Mark the stem height with tape so it can be easily reset to the correct height during assembly.
3. Break the stem-binder bolt (A, **Figure 3**) loose while the handlebar/arm assembly is still attached to the stem.
4. Loosen the handlebar-arm clamp bolts (B, **Figure 3**), and remove the handlebar/arm assembly from the stem.
5. Use a bungee cord or wire to suspend the handlebar assembly from the frame.
6. Remove the stem from the fork column.
7. Visually inspect the position of cone in the adjustable race and in the fork crown. Note how far the cone protrudes from its respective cup (**Figure 11**). This will help during assembly.
8. Remove the headset locknut with the Park 36 mm wrench (**Figure 12**).
9. Remove the washer and the headlight

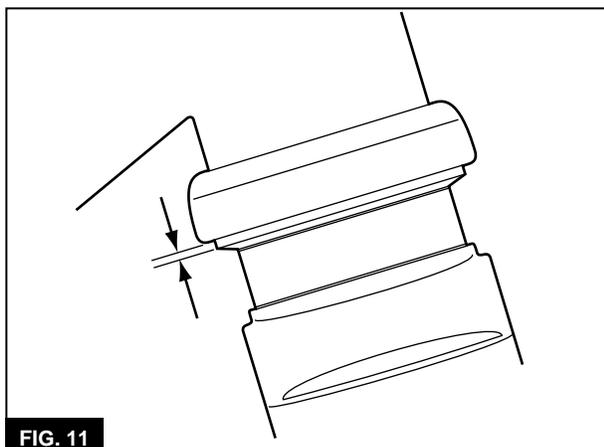


FIG. 11

- bracket from the fork column.
10. Support the forks, and remove the adjustable race from the fork column.

NOTE

The bearing must be reinstalled with the proper orientation during assembly. Look for the lower bearing when removing the forks. The bearing may come out with the fork-crown race or it could remain behind in the head tube.



FIG. 12

11. Carefully lower the forks from the head tube.
12. Remove the lower bearing (A, **Figure 13**). Note how the bearing is oriented (the closed side of the retainer facing up toward lower head-tube race). The bearing will have to be installed in this position during assembly.
13. Remove the rubber seal (B, **Figure 13**) from the fork-crown race. Note how the seal is oriented. It will have to be installed in this position during assembly.
14. Remove the upper bearing from the head tube. Note how the bearing is oriented (the closed side of the retainer facing down toward the upper head-tube race). The bearing will have to be installed in this position during assembly.

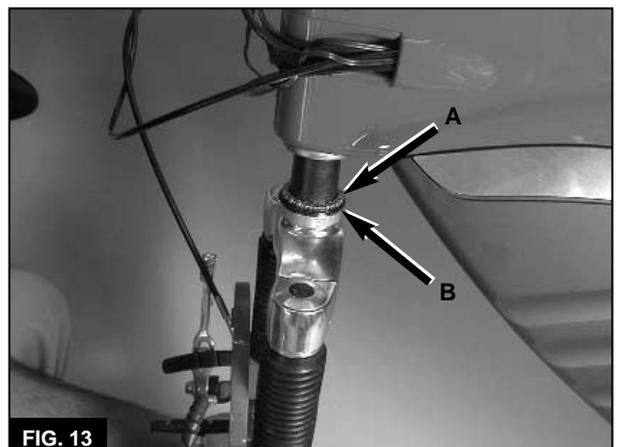


FIG. 13

Assembly

1. Clean the bearings, head-tube races, fork-crown race, and adjustable race with solvent.
2. Lightly coat the upper head-tube race and the lower head-tube race with grease. A 1-mm bead in each race should be sufficient.
3. Pack the bearings with grease.

NOTE

The grease in the lower head-tube race should hold the bearing in place during assembly.

4. Press each bearing into the grease in the head-tube. Be sure the closed side of each bearing faces the race in the head tube (**Figure 14**).

**FIG. 14**

5. Set the seal in place on the fork-crown race. Be sure the seal is oriented in the same direction you noted during removal.
6. Apply grease to the threads of the fork column.
7. Fit the fork column up into the head tube.
8. Thread the adjustable race (**A**, **Figure 15**) onto the fork column.

**FIG. 15**

9. Let the forks drop down so the forks are supported by the adjustable race.
10. Turn the adjustable race until the forks are drawn up into the head tube.
11. Inspect the position of each cone relative to its race. Each cone should be in the position you noted during removal.

12. Fit the headlight bracket and washer on the fork column. Be sure their notches engage the slot in the column (**B**, **Figure 15**).

13. Thread the headset locknut onto the fork column.

14. Install the wheel onto the forks. Torque the headset locknut to the specification in Table 4.

15. Check the headset free play by performing the following.

NOTE

Do not check for headset free play by grasping the bottom of the forks. Normal movement in the suspension could be misinterpreted as bearing free play.

- a. Grasp the fork crown with one hand (the upper stanchions above the fork boots) and grasp the lower fork tube with the other.
 - b. Try to move the forks back and forth. You should not notice any play in the head set.
 - c. If free play is noticed, adjust the headset by tightening the adjustable race.
 - d. If looseness cannot be eliminated without the bearings becoming excessively tight, the headset must be overhauled.
16. Reinstall the stem into the fork column. Set the stem to the height you noted during disassembly. Torque the stem-binder bolt to the specification in Table 4.
 17. Slide the handlebar assembly onto the stem. Be sure the top of the arm is below the stem crown.
 18. Tighten the handlebar-arm clamp bolts to the specification in Table 4
 19. Check for tight bearings by performing the following.
 - a. Turn the handlebars from side to side. The forks should turn smoothly with no binding. The bearings are too tight if you feel jerky, incremental movement instead of a smooth, fluid motion.
 - b. Lift the E-Bike™ by the top frame tube, and watch the front wheel. It should freely rotate to one side or the other. The bearings are too tight if the wheel does not fall to one side when you lift the E-Bike™.
 - c. If necessary, adjust the headset by loosening the adjustable race.

Chapter Five

BRAKES

V-BRAKES

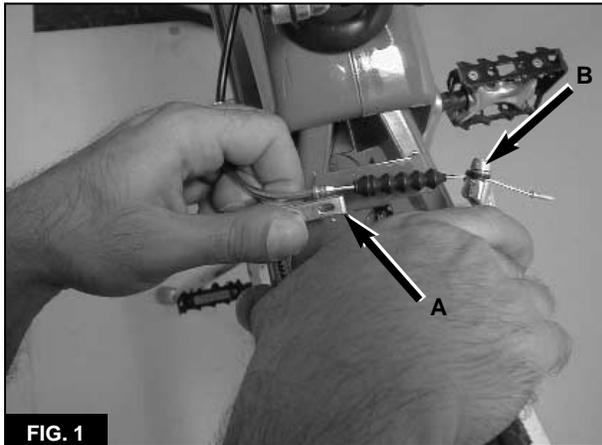
NOTE

When working on the brake calipers and pads, the terms "left" and "right" refer to the technician's point of view when standing in front of the E-Bike™ and looking at the front brake caliper or when standing behind the E-Bike™ and looking at the rear brake caliper.

BRAKE CABLE REPLACEMENT

Removal

1. Squeeze the caliper arms together, and disconnect the cable guide from the bracket on the left caliper arm (A, **Figure 1**).



2. Loosen the caliper pinch bolt (B, **Figure 1**), and free the brake-cable inner wire from the pinch mechanism.

3. Loosen the adjuster locknut at the brake lever.

4. Turn the barrel adjuster and the adjuster locknut until their slots align with the slot in the brake lever body.

5. Pull the cable housing from the adjusting barrel, and slide the inner cable through the slots in the brake lever, adjusting barrel, and adjuster locknut (**Figure 2**).



6. Pull the brake lever toward the handlebar, and disconnect the inner-cable barrel (**Figure 3**) from the cable anchor on the lever.



NOTE

If the cable housing is not damaged, the rear-brake inner wire can be removed and replaced without removing the cable housing or the left side cover.

7. Remove the brake cable. If you are replacing the rear brake cable, remove the left side cover, and remove the cable from the rear inlet on the side cover.

Installation

1. At the brake lever, align the slots in the brake lever, barrel adjuster, and the barrel locknut.
2. Pull the brake lever to the handlebar, and fit the inner cable barrel into the cable anchor in the brake lever (**Figure 3**).
3. Slide the inner cable through the slots in the brake lever, barrel adjuster, and the barrel locknut (**Figure 2**).
4. Turn the barrel adjuster three full turns out from its fully-in position.
Turn the barrel adjuster and locknut so their slots do not align with the slot in the brake lever.
5. If necessary, align the brake pads as described in this chapter.
6. Route the cable to the caliper. If you are replacing a rear brake cable, route the cable through the rear cable inlet in the left side cover.
7. Fit the cable guide into the bracket on the left caliper arm (**A, Figure 1**).
8. Squeeze the caliper arms together, and connect the cable guide to the bracket on the left caliper arm.
9. Secure the inner wire in the brake-caliper pinch mechanism by performing the following:
 - a. Feed the brake cable inner wire through the slot in the pinch mechanism.
 - b. Use the fourth-hand cable stretcher (Park Tool BT-2) to pull the inner wire until the combined clearance between each brake pad and the rim equals 2 mm (0.08 in.).
 - c. Tighten the pinch bolt (**B, Figure 1**) to the specification in Table 4.
 - d. Crimp a new end cap onto the end of the inner wire.
10. Depress and release the brake lever several times, and check the caliper arm balance.
 - a. The brake pads should contact the rim at the same time when the brakes are applied.
 - b. The gap between each pad and the rim should equal 1 mm (0.04 in.) when the brake lever is released.

CAUTION

Do not set the caliper-arm spring tension too high.

- c. If necessary, balance the caliper arms by turning the spring-tension adjuster (**B, Figure 4**) on either arm.

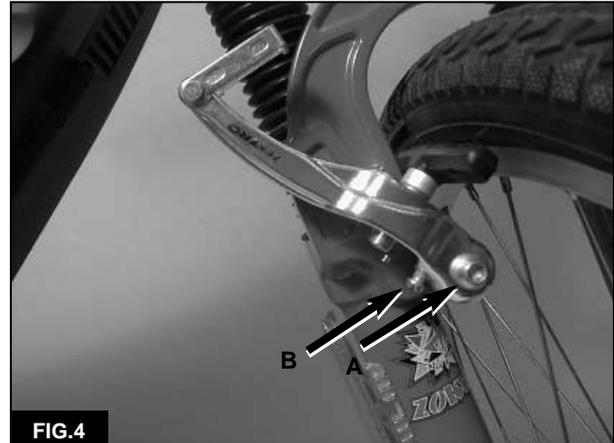


FIG.4

11. Adjust the brake lever free play as described in this chapter.

BRAKE LEVER

Removal

1. Remove the handlebar grip from the handlebar.
2. If removing the left brake lever, perform the following:
 - a. Loosen the mounting screw, and remove the mirror from the left-end of the handlebar (**Figure 5**).



FIG. 5

- b. Loosen the set screw on the shifter, and remove the shifter from the handlebar. Lay the shifter over the handlebar so it is out of the way.

3. Squeeze the caliper arms together, and disconnect the cable guide from the bracket on the left caliper arm (A, **Figure 1**).
4. Loosen the adjuster locknut at the brake lever.
5. Turn the barrel adjuster and the adjuster locknut until their slots align with the slot in the brake lever body.
6. Pull the inner cable from the adjusting barrel, and slide the inner cable through the slots in the brake lever, adjusting barrel, and adjuster locknut (**Figure 2**).
7. Disconnect the cable end from the cable anchor in the brake lever (**Figure 3**).
8. Loosen the brake-lever clamp bolt (**Figure 6**), and slide the brake lever body from the handlebar.



FIG.6

Installation

1. Fit a new brake-lever body onto the handlebar, and slide the brake-lever body against the throttle control.
2. Turn the barrel adjuster and the adjuster locknut until their slots align with the slot in the brake lever body.
3. Connect the end of the brake-cable inner wire to cable anchor in the brake lever (**Figure 3**).
4. Slide the inner cable through the slots in the brake lever, adjuster barrel and adjuster locknut (**Figure 2**). Fit the cable into barrel adjuster.
5. Turn the barrel adjuster and adjuster locknut so their slots do not align with the slot in the brake lever.
6. Squeeze the caliper arms together, and fit the cable guide into the bracket on the left caliper arm (A, **Figure 1**). Be sure the guide end is completely seated in the bracket.
- 7A. When installing the right brake lever, install

the handlebar grip so it is flush with the handlebar end.

7B. When installing the left brake lever, install the shifter onto the handlebar as described in Chapter Six.

8. Set the brake lever to a 25~35° angle by performing the following:

- a. Set the E-Bike™ in an upright position on a level surface.
- b. Slide the brake-lever body against the shifter (left brake lever) or against the handlebar grip (right brake lever).
- c. Rotate the brake lever so it forms a 25~35° angle with a line that parallels the floor (**Figure 7**).
- d. Tighten the brake lever clamp bolt to the torque specification in Table 4.

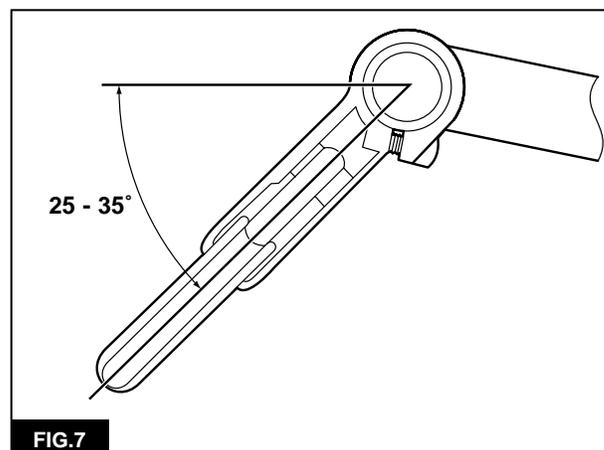


FIG.7

9. Adjust the brake lever free play as described in this chapter.

BRAKE LEVER FREE PLAY ADJUSTMENT

1. Pull the brake lever to simulate a panic stop, and then release the brake lever. Repeat this at least ten times. This assures that all components are properly installed and seated.
2. Pull the brake lever until the brake pads just touch the rim.
3. Measure the clearance between the brake lever and the handlebar grip. This distance should be 25 mm (0.98 in.).
4. Turn the barrel adjuster as necessary to adjust clearance to within specification. (Turning the adjuster out tightens the inner wire; turning the adjuster in loosens the wire.) When the brake lever is within specification, tighten the adjuster locknut.
5. Squeeze the caliper arms together, and remove the cable guide from the bracket on the left caliper arm (A, **Figure 1**). The brake-

lever free play is properly adjusted if the cable guide can be easily removed from the bracket.

6. If you cannot easily release the cable guide from the bracket, perform the following:

- a. Turn the adjusting barrel at the brake lever in (clockwise) one full turn. Try to remove the cable guide again.
- b. If you still cannot release the cable guide, turn the adjusting barrel in an additional turn.
- c. If the cable guide still does not release, loosen the pinch bolt (B, **Figure 1**) and release 2-3 mm (0.079-0.118 in.) of inner wire from the pinch mechanism.
- d. Repeat the adjusting procedure.

BRAKE PAD

The brake pads in the E-Bike™ use a threaded-stud/curved-washer system (**Figure 8**). Convex and concave washers on each side of the brake caliper arm control how the pad is positioned against the wheel.

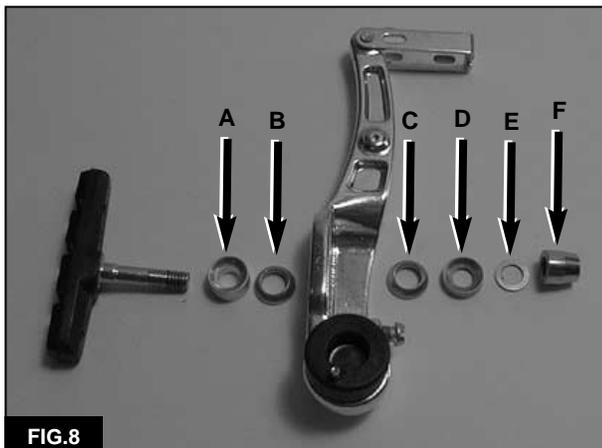


FIG.8

Removal

NOTE

Do not mix the parts during disassembly. The convex and concave washers become mated through use, and they must be reinstalled in the same position during assembly.

1. Squeeze the caliper arms together, and disconnect the cable guide from the bracket (A, **Figure 1**) on the left caliper arm.
2. Remove the brake pad nut from the pad stud (F, **Figure 8**).
3. Remove the plain washer (E, **Figure 8**), the concave washer (D, **Figure 8**), and the convex washer (C, **Figure 8**) from the pad stud.

4. Remove the brake pad from the caliper arm.
5. Remove the convex (B, **Figure 8**) and concave washers (A, **Figure 8**) from the brake pad. Discard the old pad. Do not mix the inboard and the outboard parts.

Installation

Brake pads on the E-Bike™ are not interchangeable. The pads are marked left ("L") and right ("R"). Be sure to install a left pad on a left caliper arm and a right pad on a right arm.

1. Find the left ("L") or right ("R") marking on the new brake pad. Be sure to install the correct pad onto the caliper arm.
2. Install the inboard concave washer (A, **Figure 8**) onto the stud of the new brake pad. The flat side of the washer must face the brake pad.
3. Install the inboard convex washer (B, **Figure 8**) onto the pad stud so the convex side faces the concave washer.
4. Fit the brake-pad stud through the cutout in the caliper arm.
5. Slide the convex washer (C, **Figure 8**) onto the pad stud so the convex side faces out.
6. Install the concave washer (D, **Figure 8**) so the flat side of the washer faces out.
7. Install the plain washer (E, **Figure 8**).
8. Apply Loctite to the threads of the pad stud, and install the brake pad nut (F, **Figure 8**). Tighten the nut to the torque specification in Table 4.
9. Align the brake pads as described in this chapter.

BRAKE PAD ALIGNMENT

Brake efficiency is affected by four parameters: toe, vertical-angle, tangent, and height.

Toe alignment determines how the brake-pad face sits against the brake surface of the rim. When properly adjusted, a pad's trailing end (the end facing the front) should reach the rim before the leading end (**Figure 9**).

Vertical alignment sets the position of the pad's vertical plane relative to the brake surface of the rim (**Figure 10**). The pad's vertical plane should parallel the vertical plane of the brake surface of the rim.

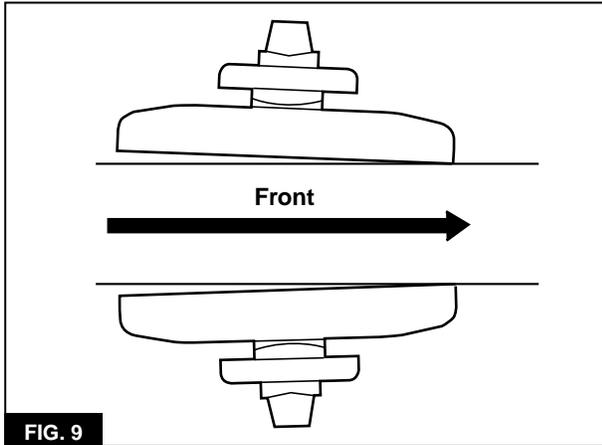


FIG. 9

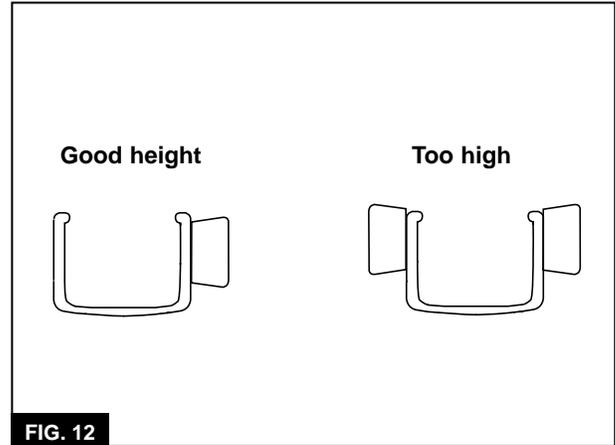


FIG. 12

Toe, vertical alignment, tangent, and height must be set whenever the brake pads, caliper arms, or wheels are replaced.

Toe and Vertical Alignment

Toe can be set by manually manipulating the pad or by using a spacer. Both methods are described below.

Manual Method

1. Loosen the pad mounting nut just enough so the pad can be manipulated by hand.
2. Adjust the brake cable so the face of the pad almost touches the rim.
3. Manually set the toe by pulling the leading edge of the pad (rear side) away from the rim while pressing the trailing edge (front side) to the rim.
4. Tighten the pad mounting nut enough to hold the pad in position.
5. Visually inspect the pad for vertical-angle alignment. If necessary, manipulate the pad so the pad face parallels the surface of the rim (**Figure 10**).

Spacer Method

1. Loosen the pad mounting nut just enough so the pad can be manipulated by hand.
2. Put a spacer between the leading edge (rear edge) of the pad and the rim.
3. Adjust the brake cable so the face of the trailing edge (front edge) of the pad touches the rim.
4. Tighten the pad mounting nut enough to hold the pad in position.

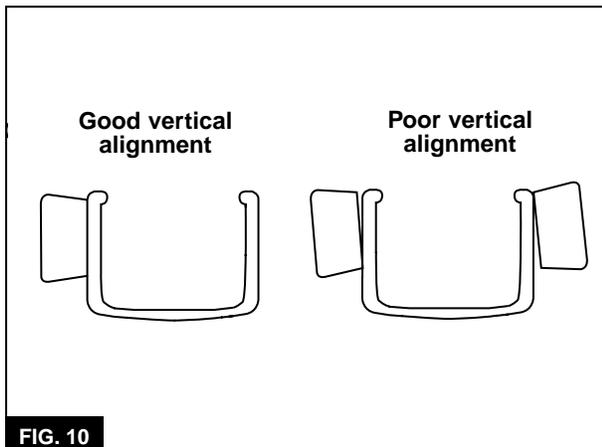


FIG. 10

Tangent alignment sets the position of the horizontal axis of the pad relative to the wheel rim. The distance between the top of the wheel rim and the top of the pad should be the same at each end of the pad. (**Figure 11**)

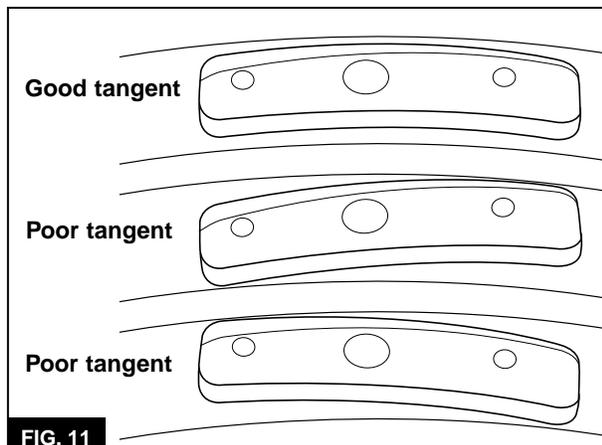


FIG. 11

Height adjustment locates the brake pad in the rim brake surface. When height is properly adjusted, the pad will press as near to the top of the rim as possible without interfering with the tire (**Figure 12**). Pad alignment procedure is described below.

5. Visually inspect the pad for vertical-angle alignment. If necessary, manipulate the pad so the face of the pad parallels the rim (**Figure 10**).

Tangent Alignment

1. Look at each pad from the side, and note the position of the top of the pad relative to the rim. The distance from the top of the pad to the top of the rim should be the same at each end of the pad (**Figure 11**).

2. If one end of the pad is closer to the rim than the other, rotate the pad around the shoe stud to adjust tangent alignment.

Pad Height

1. Look at each pad from the side, and note where the pad engages the brake surface of the rim. (**Figure 12**).

2. To adjust the height, move the brake stud up or down in the caliper slot. Adjust height so the pad presses against the top of the rim without interfering with the tire. The top of the pad should be 1 mm (0.04 in.) below the top of the rim.

3. If pad height cannot be adjusted without affecting vertical alignment, correctly set the pad height.

4. Torque the pad mounting nut to the specification in Table 4.

5. If removed, reconnect the cable guide to the bracket in the left caliper arm.

CALIPER ARM

Removal

1. Squeeze the caliper arms together, and disconnect the cable guide from the bracket on the left caliper arm (A, **Figure 1**).

2. Loosen and unthread the caliper pivot bolt. (A, **Figure 4**)

3. Remove the caliper arm. Do not lose the washer that sits behind the caliper pivot bolt.

4. Inspect the caliper-mounting boss in the frame.

a. Be sure the threads of the caliper-mounting boss are clean.

b. The mating surface caliper-mounting boss should also be clean. Dress the area with emery cloth if necessary.

c. Inspect the caliper-mounting boss for cracks or other signs of wear.

Installation

1. Check that the washer is in place on the caliper-arm pivot bolt (**Figure 13**).



FIG. 13

2. Apply Loctite 242 (blue) to the threads of the caliper pivot bolt.

3. Align the pin on the caliper bushing with the indexing hole in the caliper-mount boss (**Figure 14**).



FIG. 14

4. Thread the caliper-pivot bolt into the caliper-mounting boss. As you tighten the pivot bolt, be sure the pin engages then indexing hole in the boss.
5. Torque the caliper pivot bolt to the specification in Table 4.
6. Align the brake pads as described in this chapter.
7. Squeeze the caliper arms together, and connect the cable guide to the bracket on the left caliper arm (A, **Figure 1**).
8. Secure the inner wire in the brake-caliper pinch mechanism by performing the following:
 - a. Feed the brake cable inner wire through the slot in the pinch mechanism.
 - b. Use the fourth-hand cable stretcher (Park Tool BT-2) to pull the inner wire until the combined clearance between each brake pad and the rim equals 2 mm (0.08 in.).
 - c. Tighten the pinch bolt (B, **Figure 1**) to the specification in Table 4.
 - d. Crimp a new end cap onto the end of the inner wire.
9. Depress and release the brake lever several times, and check the caliper arm balance.
 - a. The brake pads should contact the rim at the same time when the brakes are applied.
 - b. The gap between each pad and the rim should equal 1 mm (0.04 in.) when the brake lever is released.

CAUTION _____
 Do not set the caliper-arm spring tension too high.

- c. If necessary, balance the caliper arms by turning the spring-tension adjuster (B, **Figure 4**) on either arm.
10. Adjust the brake lever free play as described in this chapter.

DISC BRAKE

Brake Pad Clearance Adjustment

1. Hold the adjuster (A, **Figure 15**) with an Allen wrench, and loosen the adjuster locknut (B, **Figure 15**).

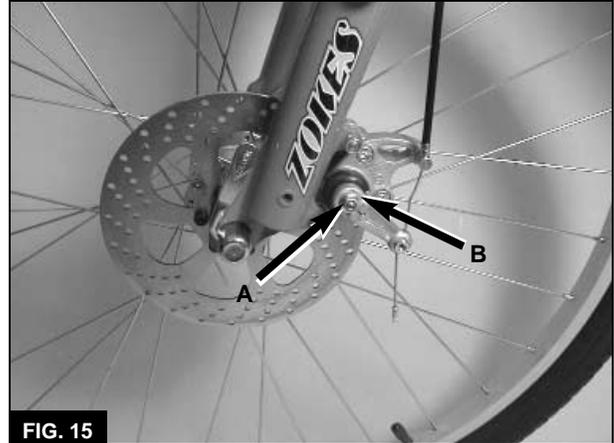


FIG. 15

2. Spin the wheel and turn the adjuster clockwise until the brake pads barely scrape against the brake disc.
3. Back out the adjuster 1/2 turn (counterclockwise).
4. Hold the adjuster with an Allen wrench, and tighten the locknut (B, **Figure 15**) securely.
5. Set the pads by sharply apply the brakes four or five times.

NOTE: _____
 A slight amount of pad scraping is normal, especially with new brakes or new brake pads.

6. Spin the wheel and check for brake pad/disc scraping. Repeat the adjustment procedure if scraping is noted.

Chapter Six

SHIFTER and DERAILLEUR

SHIFTER

Removal

1. Remove the shift cable from the S-hook (**Figure 1**) that holds the cable to the front brake cable.



FIG. 1



FIG. 2

2. Loosen the mounting screw in the mirror housing, and remove the mirror from the end of the handlebar **Figure 2**.

3. Remove the handlebar grip from the left end of the handlebar. Do not lose the shim between the grip and the shifter housing.

4. Loosen the shifter clamp bolt, and slide the shifter housing from the handlebar (**Figure 3**). Guide the shifter cable around the headlight as you remove the shifter housing.



FIG. 3

5. If you are not servicing the shifter or the cable, lay the shifter over the top tube. Secure it in place so it will remain out of the way. Do not severely bend or kink the cable.

Installation

1. Slide the shifter housing onto the left end of the handlebar (**Figure 3**).

2. Gently route the shifter cable over and behind the headlight as you slide the shifter housing against the brake-lever body.

3. Slide the shim onto the handlebar. Install the handlebar grip so the grip end is flush with the handlebar end.
4. Slide the shifter body against the grip shim.
5. Rotate the shifter body so the barrel adjuster is below the brake lever. Tighten the shifter clamp bolt to the specification in Table 4.
6. Check the operation of the brake lever. Reposition the shifter body as necessary.
7. Secure the shift cable to the front brake cable with the S-hook (**Figure 1**). Be sure the rear brake cable is position behind the S-hook.
8. Fit the mirror housing into the handlebar end (**Figure 2**). Tighten the mirror mounting screw to the specification in Table 4.

SHIFTER CABLE

Removal

NOTE

Before removing the shifter cable, note how the cable is routed along the frame. The new cable will have to be routed along the same path.

1. Operate the shifter and move the chain to the outermost cog.
2. Remove the right side cover from the E-Bike™.
3. Note how the shifter cable is routed along the top tube and the right seat stay. The cable will have to be rerouted along the same path.
4. At the derailleur, remove the end cap (**A**, **Figure 4**) from the end of the inner wire.
5. Loosen the pinch-mechanism nut (**B**, **Figure**

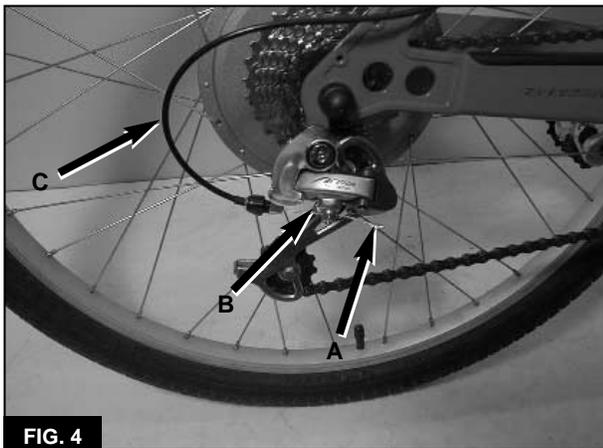


FIG. 4

- 4). Pull the shifter cable from the derailleur pinch mechanism and out of the barrel adjuster.

6. Slide the lower cable housing (**C**, **Figure 4**) off the inner wire. Do not lose the ferrule from either end of the lower cable housing.
7. Release the inner wire from the two housing stops on the right seat stay (**A**, **Figure 5**).
8. Slide the tube (**B**, **Figure 5**) that sits between the two housing stops off the inner wire.

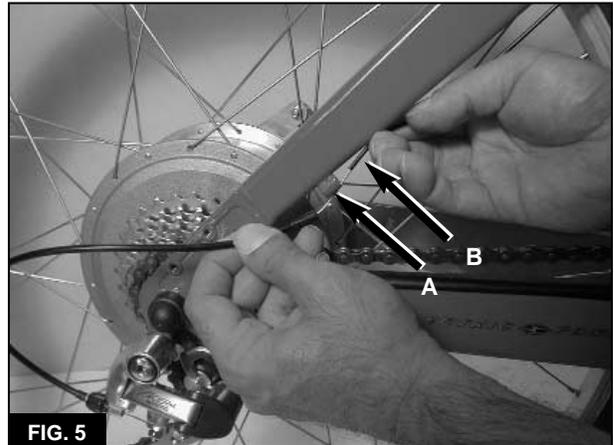


FIG. 5

9. Pull the shifter cable from the cable inlet in the right side cover.
10. Slide the upper cable housing from the inner wire (**Figure 6**). Do not lose the ferrule from either end of the upper cable housing.



FIG. 6

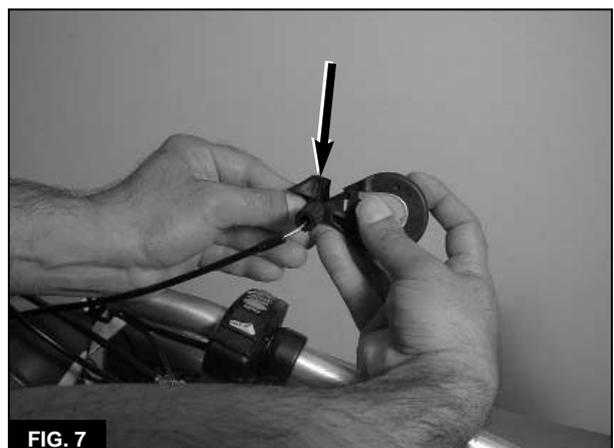


FIG. 7

11. Remove the shifter from the handlebar as described in this chapter.
12. Gently pry the cover plate from the inside face of the shifter housing (**Figure 7**).
13. Pull the twist unit from the shifter housing. Slide the shifter housing down the inner wire and remove it.
14. Push the inner wire into the twister unit until the barrel end of the inner wire emerges from the socket in the twister unit (**Figure 8**).
15. Pull the inner wire from the twister unit.



FIG. 8

NOTE

The shifter inner wire can be removed and replaced without removing the cable housings.

Installation

A fourth-hand tool (Park Tool BT-2) is required to perform this procedure

CAUTION

Do not use solvent to clean the shifter housing and twist unit. The solvent could attack the plastic in these parts.

1. Clean the shifter housing and twist unit with soap and water. Dry them thoroughly before proceeding.
2. Preset the derailleur adjustment screws before installing the cable.
 - a. Stand behind the E-Bike™, and check the position of the derailleur. The guide pulley should align with the outermost cog as shown in **Figure 9**.
 - b. If necessary, adjust the outward limit by turning the H-screw. Tighten the H-screw to adjust the guide pulley inward. Loosen the H-screw to adjust the derailleur outward.

- c. Use your hand to move the derailleur to its innermost position.
- d. Hold the derailleur against the stop and check the guide-pulley alignment.
- e. The guide pulley should align with the innermost cog as shown in **Figure 10**.
- f. If necessary, adjust the inward limit by turning the L-screw. Tighten the L-screw to move the derailleur outward. Loosen the L-screw to move the derailleur inward.

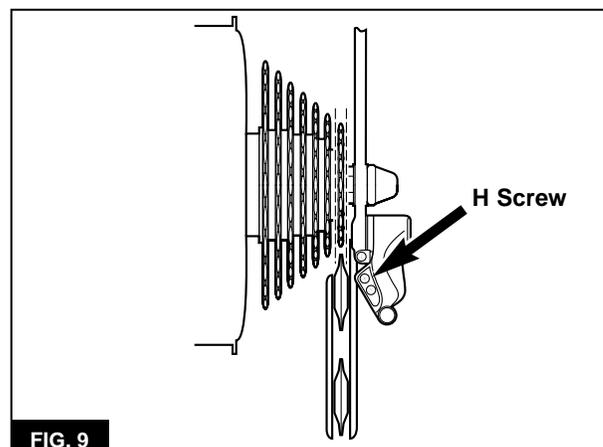


FIG. 9

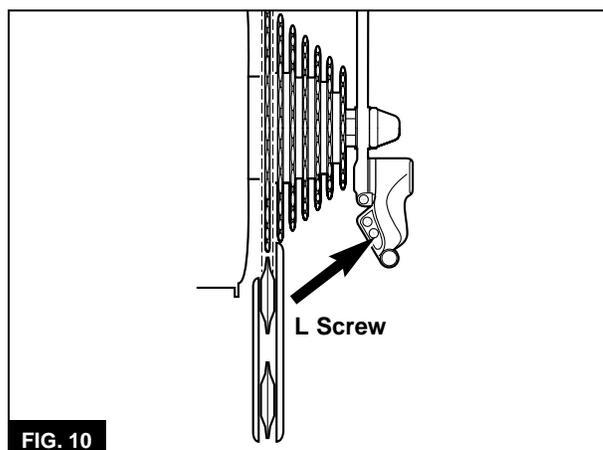


FIG. 10

CAUTION

Lubricate the shifter and cable with Grip Shift Jonnisnot grease or petroleum jelly. No other lubricant is suitable for the shifter.

3. Thoroughly lubricate the shifter-housing barrel, spring, cable groove, shifter-housing clip, and the twist unit with Grip Shift Jonnisnot grease or petroleum jelly.
4. Feed the free end of the inner wire through the socket in the twist unit until the barrel end of the wire is seated in the socket (**Figure 11**).



FIG. 11

5. Feed the inner wire along the cable groove (**Figure 12**) in the shifter housing and out through the barrel adjuster.



FIG. 12

6. Fit the twist unit into the shifter housing. Pull firmly on the inner wire while pressing the twist unit into the shifter housing. Be sure the end of the twist unit engages the clip in the shifter housing (**Figure 13**).



FIG. 13

7. Check that the cable is still seated in the groove in the shifter housing, and install the cover plate (**Figure 7**).

8. Check the operation of the shifter. Pull the inner wire while you operate the shifter. The inner wire should move in and out, and the shifter should click along its detents.

9. Slip the shifter onto the handlebar.

10. Lubricate the upper cable housing with oil, and slide the inner wire through the upper cable housing. Be sure the inner wire passes through the ferrule at each end of the cable. Slide the upper cable along the inner wire until the ferrule is seated inside the barrel adjuster at the shifter housing.

11. Route the shift cable around the headlight, through the cable inlet in the right side cover, and along the top tube.

12. Slide the tube (**B, Figure 5**) over the free end of the inner wire and up to the cable housing.

13. Fit the inner wire through the two housing stops on the right seat stay (**A, Figure 5**). Be sure the ferrule from the upper cable housing fits into the upper housing stop and that the tube is secure between both housing stops.

14. Lubricate the lower cable housing with oil. Be sure a ferrule is in place on each end of the lower cable housing, and install the inner wire through the lower cable housing (**C, Figure 4**). Fit the upper ferrule into the seat in the lower housing stop.

15. Feed the inner wire through the barrel adjuster on the derailleur and through the pinch mechanism. The lower-housing ferrule should be seated in the barrel adjuster, and the inner wire should be properly routed through the pinch mechanism.

16. Finger tighten the pinch-mechanism nut so the inner wire is held securely in the pinch-plate groove, and check the following:

- a. The inner wire should follow the groove in the pinch plate.
- b. When looking directly at the pinch mechanism stud, the tab on the pinch plate should be on the outboard side of the inner wire (**Figure 14**).

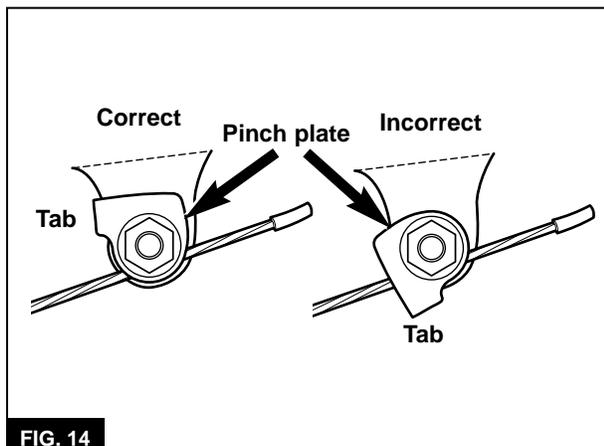


FIG. 14

17. Loosen the pinch-mechanism nut, and use the fourth-hand tool to pull the slack from the inner wire.

18. Torque the pinch-mechanism nut (B, **Figure 4**) to the specification in Table 4. Check that the inner cable is still contained within the groove in the pinch-mechanism plate.

19. Fit an end cap (A, **Figure 4**) over the end of the inner wire, and crimp it onto the wire.

20. Install the shifter onto the left handlebar as described in this chapter.

21. Adjust the derailleur as described in this chapter.

22. Set the cable tension as described in this chapter.

DERAILLEUR

Derailleur Lubrication

Apply lubricant to the following points on the derailleur. See **Figure 15**.

1. Each edge of the pulley-wheel dust cap.
2. Both ends of each pivot on the parallelogram.
3. Threads of the mounting bolt.
4. Threads of the barrel adjuster.
5. Threads of the pinch-mechanism.

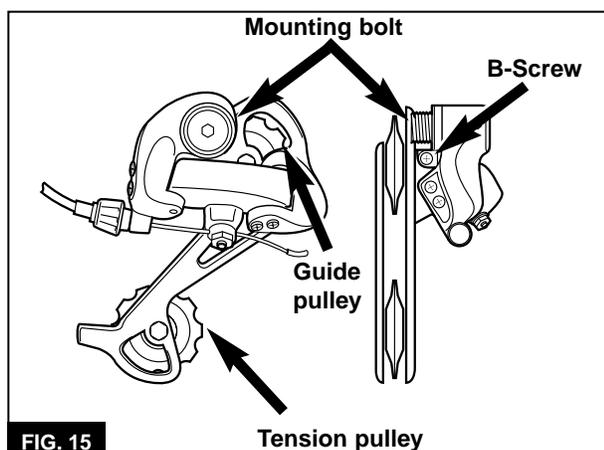


FIG. 15

Derailleur Adjustment

Three screws, the H-, L-, and B-screws, are used to adjust the derailleur. The H-screw sets the outward limit of the derailleur's movement. The L-screw sets its inward limit. The B-screw adjusts the distance between the bottom of the cogset and the derailleur's guide pulley.

A fourth-hand tool (Park Tool BT-2) is required to perform this procedure

1. Check the cable attachment to the derailleur pinch mechanism.

- a. Inspect the position of the inner wire in the pinch-mechanism. The inner wire should follow the groove in the pinch plate, and the tab on the pinch plate should be on the outboard side of the cable when you look directly at the pinch-mechanism stud (**Figure 14**).

- b. Loosen the pinch-mechanism nut. Use the forth-tool to pull the slack from the inner wire.

- c. Torque the pinch-mechanism nut to the specification in Table 4.

- d. Check that the inner cable is still contained within the groove in the pinch-mechanism plate.

2. Set the derailleur as close as possible to the cogset by performing the following.

- a. Shift the chain to the innermost cog.

- b. Completely loosen the B-screw.

- c. Back-pedal, and check for bouncing at the guide pulley (**Figure 16**). The B-screw is too loose if bouncing is noticed.

- d. Tighten the B-screw one turn, and repeat the bounce check.

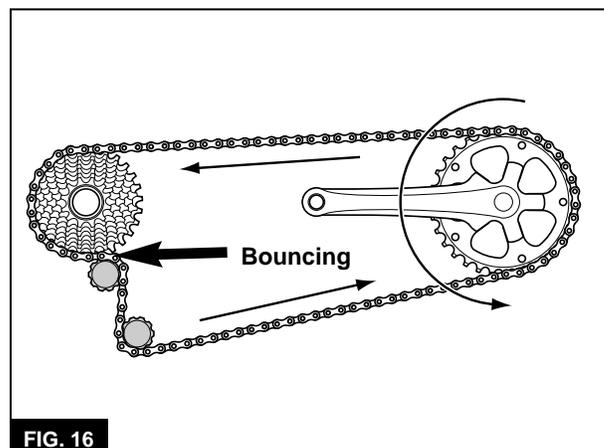


FIG. 16

3. Set the derailleur's outward limit by performing the following.
 - a. Shift the derailleur so the chain is on the outermost cog.
 - b. Stand behind the E-Bike™, and check the position of the derailleur. The guide pulley should align with the outermost cog as shown in **Figure 9**.
 - c. If necessary, adjust the outward limit by turning the H-screw. Tighten the H-screw to adjust the guide pulley inward. Loosen the H-screw to adjust the derailleur outward.
4. Set the derailleur's inward limit by performing the following.
 - a. Shift the derailleur so the chain rests on the innermost cog.
 - b. Stand behind the E-Bike™, and check the position of the derailleur. The guide pulley should align with the innermost cog as shown in **Figure 10**.
 - c. If necessary, adjust the inward limit by turning the L-screw. Tighten the L-screw to move the derailleur outward. Loosen the L-screw to move the derailleur inward.

Setting Cable Tension

A fourth-hand tool (Park Tool BT-2) is required to perform this procedure.

1. Loosen the nut on the derailleur pinch mechanism.
2. Turn the derailleur barrel adjuster to its full-in position, and then back out the adjuster three full turns.

3. Turn the shifter barrel adjuster to its fully-in position, and then back out the adjuster one full turn.

NOTE

Do not pull the inner wire so much that the derailleur begins to move.

4. Use a fourth-hand tool to pull the slack out of the inner wire.
5. Torque the pinch-mechanism nut to the specification in Table 4. Check that the inner wire is still positioned within the pinch-mechanism groove.

Derailleur Installation

1. Lubricate the derailleur as described above.
2. Align the mounting bolt with the hole in the hanger.
3. Rotate the derailleur clockwise so the stop tab on the derailleur mounting plate (or the end of the B-screw) is forward (clockwise) of the stop tab on the derailleur hanger.
4. Thread the mounting bolt into the hanger but do not completely secure the bolt at this time.
5. Rotate the derailleur counterclockwise until the derailleur stop tab presses against the stop tab on the hanger.
6. Tight the mounting bolt to the torque specification in Table 4.

Chapter Seven

CHAIN and CRANKSET

CHAIN

Inspection

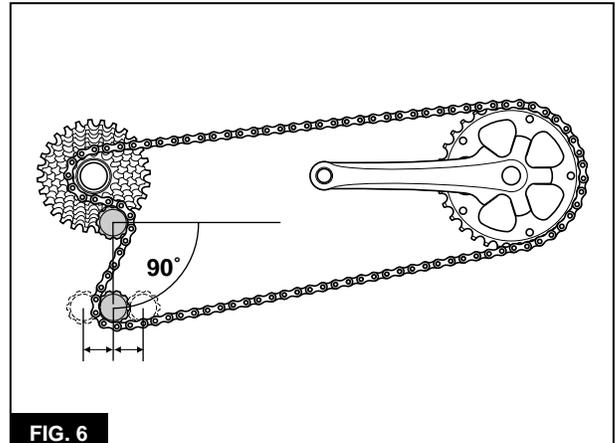
The chain inspection tool (Part Tool CC-2C) is required for this service.

1. Install the chain inspection tool onto the chain according to the manufacturer's instructions. Be sure both of the tool's pegs are inside a chain link.
2. Rotate the tool's dial so the pegs press against the inside of the chain rollers.
3. Read the number opposite the V-notch on the dial.
 - a. 0-1 indicates the chain is in good condition.
 - b. 1-2 indicates the chain is moderately worn.
 - c. 2-3 indicates the chain is approaching the wear limit.
 - d. 3 or more indicates the chain is worn beyond the wear limit.

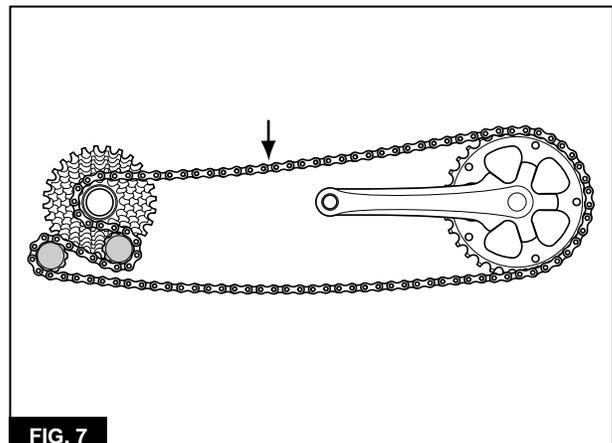
Checking Chain Length

1. Secure the E-bike™ in the stand so the E-Bike™ is at an angle it would be in if it were upright on level ground.
2. Shift the derailleur so the chain rides on the outermost cog.
3. Examine angle formed by a line through the center of the two derailleur pulleys and the ground or floor.
 - a. The chain length is perfect if this line is perpendicular (90 degrees) to the ground (**Figure 1**).

- b. Chain length is acceptable if the tension pulley is 1.75 in. or less forward or rearward of the guide pulley.



4. Examine the chain.
 - a. The chain is too long if it sags in the upper chain run as shown in **Figure 2**.
 - b. The chain is too long if the chain contacts itself or any part of the derailleur after the chain leaves the tensioner pulley (**Figure 3**).



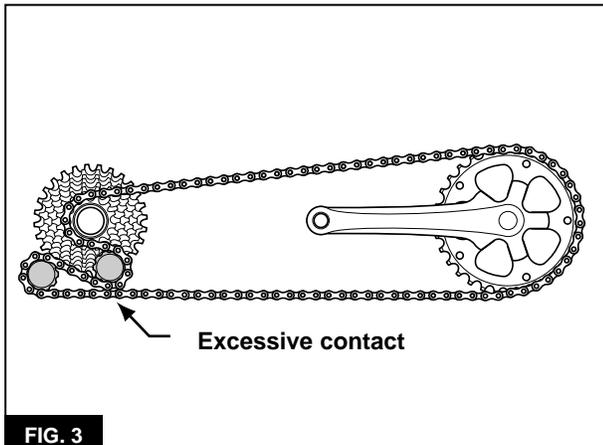


FIG. 3

5. Shift the derailleur so the chain rides on the innermost cog.
6. Examine the chain as it passes through the derailleur.
 - a. If the chain passes through the derailleur without bending twice, the chain is too short. See **Figure 4**.

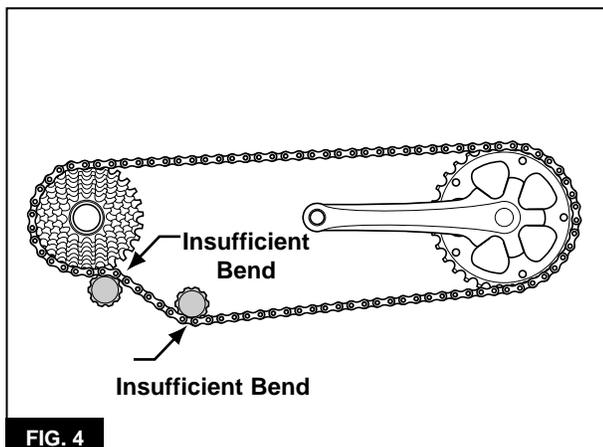


FIG. 4

Removal

A chain breaker (Park CT-3) is required for removing and installing the chain.

1. Shift the chain to the outermost cog.
2. Inspect the driving pin of the chain breaker. Replace the tool if the pin is not straight.

CAUTION

Some chain breakers have two cradles. The cradle furthest from the guide pin is for removing/installing the chain. The cradle closest to the guide pin is for adjusting a tight link. Be sure to use the correct cradle for the task.

3. Fit the chain breaker onto a link in the chain's lower run. Be sure the chain rollers are fully seated in the tool's cradle and that the driving pin is centered on the chain rivet.
4. Turn the tool handle until the driving pin just touches the rivet.

NOTE

*The rivet should be pressed the minimum distance necessary to separate the chain and no more. Do not drive the rivet completely from the inner plate on the inboard side of the chain. The chain can be separated once the rivet extends 0.5 to 1.0 mm into the inside of the inner chain plate. See **Figure 5**.*

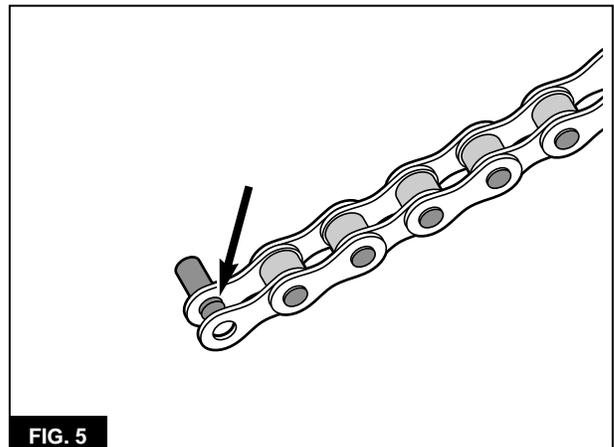


FIG. 5

5. Turn the tool handle five full turns, but no more.
6. Remove the tool from the chain.
7. Flex the chain laterally, and separate the chain.
8. Remove the chain from the E-Bike™.

Cleaning

1. Immerse the chain in solvent.
2. Use a stiff brush to clean the both sides of the chain.
3. Use the brush carefully when cleaning the rollers. Take special care to see that the rollers are completely clean.
4. Rinse the chain in clean solvent.
5. Dry the chain with compressed air.

Installation

1. If necessary, move the derailleur so it is under the outermost cog.

2. Take the non-riveted end of the chain and feed it under and around the rear of the tension pulley on the derailleur. Following the derailleur cage, route the chain up the front and over the top of the guide pulley. Once the chain emerges from the derailleur cage, route it under and around the outermost cog.
3. Next route the chain around the chainring.
4. Move the chain so the two free ends meet at the middle of the lower chain run.
5. Join the two ends together by slipping the end of the inner plate under the rivet protruding inward from the outer plate.
6. Fit the chain tool onto the chain. Pay attention to the following:
 - a. If the tool has two cradles, fit the chain over the cradle furthest away from the tool handle.
 - b. Be sure the rollers are fully seated on the tool cradle.
 - c. Turn the tool handle so the drive pin is centered on the rivet.
 - d. Check that the side plates are properly aligned.
7. Turn the tool handle, and drive the rivet through the chain until the rivet is centered within the link. The rivet is properly installed when an equal amount of rivet protrudes from the outside of each outer side plate (**Figure 6**).

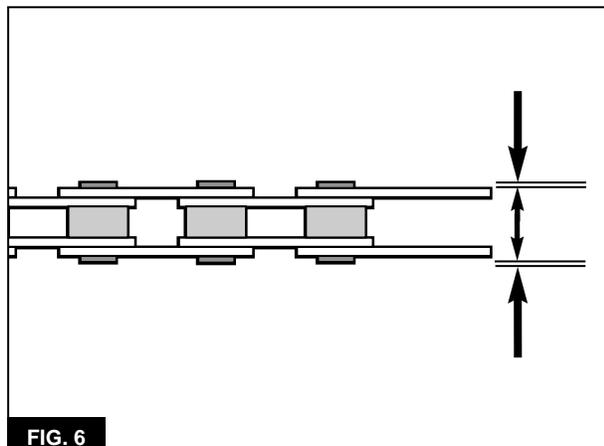


FIG. 6

Lubrication

NOTE

Do not apply excessive amounts of oil to the chain. Excessive lubrication promotes the accumulation of dirt, which accelerates chain wear.

CAUTION

Use oil designed for bicycles. Automotive and household oils are unsuitable for the E-Bike™ chain.

1. Oil the contact areas between the inner and outer side plates on each link (**A, Figure 7**) as well as the contact areas between the inner side plates and each end of the rollers (**B, Figure 7**).

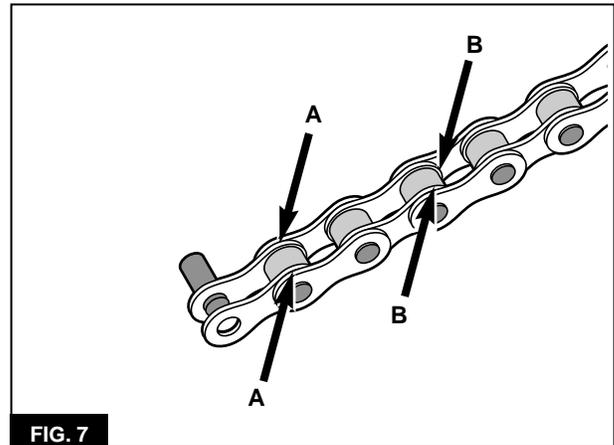


FIG. 7

2. If the chain is installed on the E-Bike™, back pedal for 30 seconds. If the chain is not installed, wiggle the chain for 30 seconds. This helps the lubricant penetrate the crevices in the chain.
3. Use a clean cloth to wipe excess lubricant from the chain.

CRANK ARM

Removal

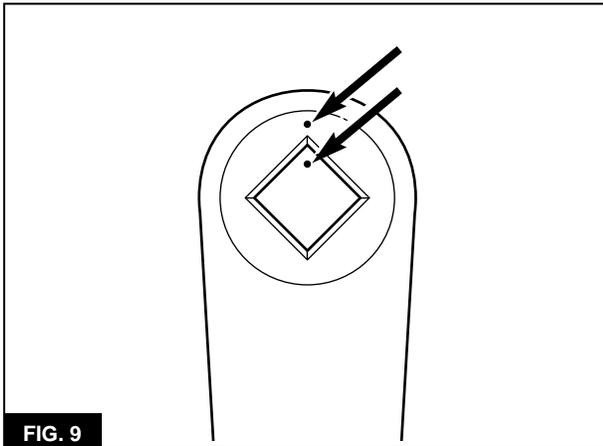
A cotterless crank wrench (Park Tool CCW-14R) is required for this service.

1. If the pedal will also be serviced, remove the pedal from the crank arm.
2. Measure the clearance between the outside face of the chainring and the right chain stay.
 - a. Check the clearance on the rear side of the chainring.
 - b. Check the chainring clearance at several places, and write down the smallest value.
 - c. Compare this value to the specification in Table 1.
 - d. The chainring and/or chain stay is damaged if the measurement is not within the specified range.
3. Loosen and remove the crank-arm mount ing bolt (**Figure 8**).



4. Inspect the position of the spindle end. The end of the spindle should be recessed within the crank-arm square hole. If the spindle end is flush with the surface of the crank-arm square hole, the crank arm is excessively worn and must be replaced.

5. If you intend to reinstall the crank arm, mark one corner of the spindle end and a corresponding mark on the crank arm (**Figure 9**). The marks will facilitate assembly.



6. Carefully thread the crank wrench onto the crank arm. Finger tighten the wrench until it bottoms in the crank arm, and then snug it in place with an adjustable wrench. When properly installed, you should be able to turn the crank wrench handle with your fingers. (**Figure 10**)

CAUTION

If the crank wrench body starts to rotate or if the body appears to pull from the crank arm when you tighten the crank wrench, remove the crank wrench body and identify the problem. The crank wrench threads may be damaged. Correct the problem before proceeding.

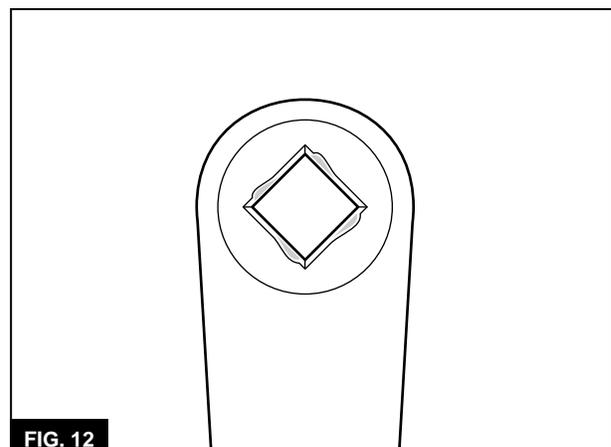
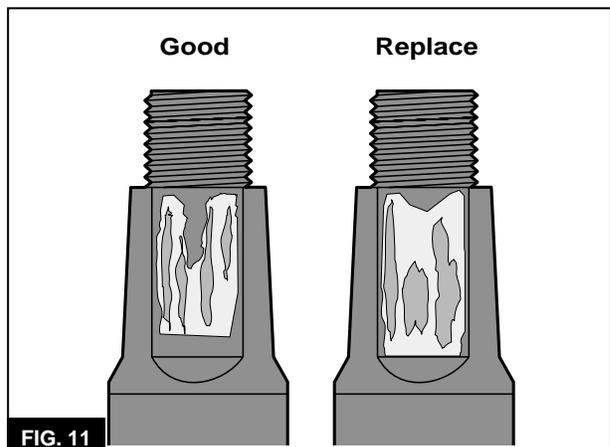


7. Turn the crank wrench handle clockwise, and press the crank arm off the spindle.

8. If you are removing the right arm, remove the chainring from the chain, and suspend the chain from the frame with a bungee cord.

Inspection

1. Inspect the spindle flats for signs of a loose or worn crank arm. The crank-arm marks on the spindle flats should not extend along the entire surface of the flat (**Figure 11**). If they do, the crank arm is worn and must be replaced.



2. Inspect the square hole in the crank arm (**Figure 12**). The flats of the hole should be straight and even. Replace the crank arm if its square hole shows signs of wear or damage.
3. Inspect the crank arm for cracks or other signs of wear. Pay particular attention to the area around the mounting holes at either end of the crank arm. Replace the crank arm if it is worn.
4. Inspect the spider arms (the crank-arm spokes) on the right crank arm. Replace the crank arm if any spider arm is cracked or shows other signs of damage.

Installation

When installing both crank arms, install the right crank arm first, and then install the left crank arm so it is oriented 180° from the right arm.

1. If you are installing a new right crank arm or a new chainring, check chainring wobble as described below.
2. Clean the flats of the spindle with acetone or alcohol.
- 3A. If you are reinstalling the old crank arm, fit the crank arm onto the spindle so the mark you made on the crank arm aligns with the mark on the spindle end. (**Figure 9**) Tap the crank arm onto the spindle with a plastic mallet.
- 3B. If installing a new right crank arm and/or new chainring, perform the following:
 - a. Rotate the spindle so the reference mark (from the chainring wobble test) is at the position that produced the least amount of wobble.
 - b. Fit the chainring into the chain.
 - c. Rotate the derailleur forward, and fit the crank arm onto the spindle so that the arm is at 6 o'clock.
 - d. Tap the crank arm onto the spindle with a plastic mallet.
4. Apply grease to the crank-arm mounting bolt.
5. Install the crank-arm mounting bolt, and torque it to the specification in Table 4.
6. Repeat for the left crank arm if necessary. Be sure the left crank arm is 180° opposite the right crank arm.

CHAINRING

Removal

1. Remove the right crank arm as described in this chapter.

2. Examine the inboard side of the crank-arm/chainring. Note that the chainring is mounted so the cutout with the tab aligns with the crank arm (**Figure 13**). The chainring will have to be mounted in this position during installation.

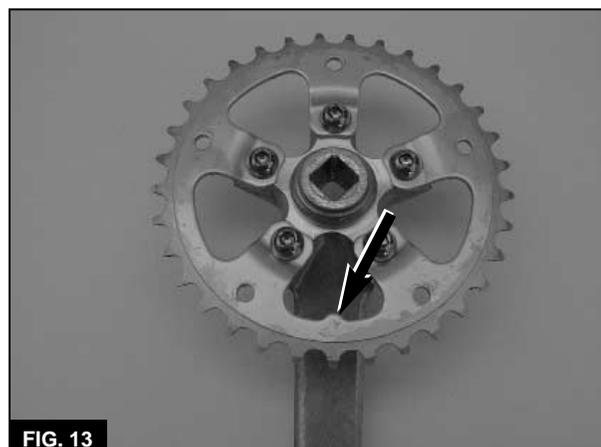


FIG. 13

3. Remove the five chainring bolts, and remove the chainring from the crank arm.

Installation

1. Fit the chainring onto the spider (the crank-arm spokes) so the chainring mounting holes align with the threaded hole on the spider.
2. Be sure the cutout with the tab (**Figure 13**) aligns with the crank arm.
3. Apply oil to the threads of the chainring bolts.
4. Finger tighten all five chainring bolts, and then torque the bolts to the specification in Table 4.

Chainring Wobble Check

When installing a new right crank arm or reinstalling a right crank arm with a new chainring, you must install the crank arm in the position that produces the least amount of chainring wobble. Perform the following to determine that position.

1. Place a reference mark in one corner of the end of right spindle.
2. Rotate the spindle so the reference mark is at 12 o'clock.
3. Fit the right crank arm onto the spindle so the arm points to 6 o'clock.
4. Strike the arm with a rubber mallet so the arm is securely seated on the spindle.



FIG. 14

5. Set your hand against the frame down tube with the end of your forefinger touching the inside of the chainring (**Figure 14**).
6. Rotate the crank arm and note the amount of wobble in the chainring.
7. Remove the crank arm by striking the arm with the rubber mallet.
8. Rotate the spindle so the reference mark is now at 3 o'clock, and repeat steps 3-7.
9. Rotate the spindle so the reference mark is at 6 o'clock, and repeat steps 3-7.
10. Rotate the spindle so the reference mark is at 9 o'clock, and repeat steps 3-7.
11. Note the position that produces the least amount of chainring wobble. Install the crank arm with the reference mark in that position.

PEDAL

The pedal on the right side has right-hand threads. The pedal on the left side has left-hand threads. Keep this in mind when removing and installing pedals onto the crank arms.

Removal

1. Rotate the crank so the arm with the pedal being removed points towards the rear of the E-bike™.
2. Place a wrench onto the pedal flats so the shaft of the wrench is horizontal and pointing forward.
3. Break the pedal loose.
4. While facing the crank, hold the pedal with one hand and the wrench with the other. Rotate the pedal forward (normal pedaling motion) and remove the pedal.
5. Repeat this procedure for the opposite pedal.

Installation

1. Inspect the ends of the pedal stud. Each pedal is identified by an "L" or "R" stamped on the stud.
2. Grease the threads of the pedal stud.
3. Thread the left pedal onto the left crank arm. Tighten the pedal stud as far as possible by hand.
4. Face the pedal, and fit a wrench onto the pedal flats. Hold the pedal with one hand and hold the wrench with the other (**Figure 15**).
5. Rotate the crank arm rearward (opposite the



FIG. 15

- direction of normal pedal rotation) until the pedal is snug.
6. Tighten the pedal to the torque specification in Table 4.

CAUTION

Metal burrs are often created when the pedal is tightened against the crank arm. Use a rag to wipe up excess grease so you will not have to deburr your finger.

7. Use a rag to wipe excess grease from the crank arm.
8. Repeat this procedure for the right pedal.

BOTTOM-BRACKET CARTRIDGE

The E-Bike™ uses a Chnhaur CH52-73 bottom-bracket cartridge. This cartridge threads into the right side of the bottom bracket. Its adapter ring threads into the left side of the bottom bracket.

The adapter ring on this cartridge has standard right-hand threads. The main body, however, has left-hand threads.

A bottom-bracket-cartridge tool (Park Tool BBT-2) is required for removing and installing the bottom-bracket cartridge.

Removal

1. Remove both crank arms.
2. Remove the left bottom-bracket cover (**Figure 16**).



FIG. 16

3. Install the bottom-bracket cartridge tool onto the adapter ring, and remove the ring from the left side of the bottom-bracket shell (**Figure 17**).

NOTE

The main body of the cartridge has left-hand threads. Turn the cartridge clockwise to remove it.

4. Install the bottom-bracket cartridge tool onto the main body of the cartridge, and remove the cartridge from the right side of the bottom bracket.



FIG. 17

Installation

NOTE

The bottom-bracket cartridge has very fine threads that are easily damaged. Check the threads in the bottom-bracket shell before installation. Dress or tap the threads as necessary.

1. Apply grease to the threads of the cartridge main body.

NOTE

The main body uses left-hand threads.

2. Carefully thread the cartridge into the right side of the bottom-bracket shell. Turn the main body counterclockwise until the cartridge is snug in the bottom-bracket shell.
3. Apply grease to the threads of the adapter ring.
4. Carefully thread the adapter ring into the left side of the bottom-bracket shell.
5. Fit the bottom-bracket-cartridge tool onto the adapter ring, and torque the ring to the specification in Table 4 (**Figure 17**).
6. Install the left bottom-bracket cover (**Figure 16**). Apply Loctite (red) to the threads of the bottom-bracket-cover screws, and torque the screws the specification in Table 4.

Chapter Eight

ELECTRICAL

CONNECTOR IDENTIFICATION

All electrical components in the E-Bike™ are connected to the controller, which is mounted between the side covers. Refer to **Figure 1**. Except for the brake sensor connectors, which are interchangeable, each component's connector is mated. It can only be connected to its proper place in the E-Bike™.

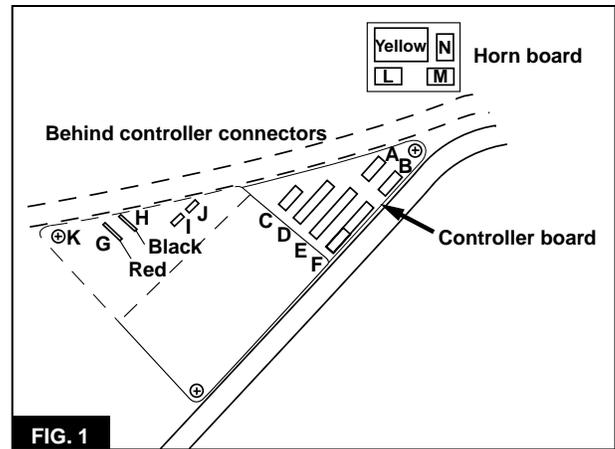


FIG. 1

Controller Board Connectors

Reference Number	Component/Function	Connector Type
A	Brake sensor, left	2-pin
B	Brake sensor, right	2-pin
C	Headlight	3-pin
D	Taillight/Brake light	6-pin
E	Accessory control	7-pin
F	Throttle control	7-pin

Behind Controller Connectors

Reference Number	Component/Function	Connector Type
G	Power (red, from battery terminal block)	Spade
H	Power (black, from battery terminal block)	Spade
I	Motor temperature sensor (2 black wires)	2-pin
J	Horn board (yellow and white wires)	2-pin

Horn Board Connectors

Reference Number	Component/Function	Connector Type
L	Controller (yellow and white wires)	2-pin
M	Horn (red and white wires)	2-pin
N	Power (red and black wires from battery terminal block)	2-pin

RIGHT SIDE COVER

Removal

1. Open the door to the battery compartment.
2. Remove the three rubber plugs from the right side cover holes. Note that the small plug goes in the lower hole.
3. Remove the three side cover screws. The screw from the lower hole is smaller than the two upper screws. It will have to be reinstalled in the same location.
4. Lift the side cover from the E-Bike™.
5. If necessary, remove the cable inlet cover from the left side cover. Pull the cable inlet cover forward and around the head tube until the tabs clear the left side cover (**Figure 2**).



FIG. 2

Installation

1. If removed, install the cable inlet cover into the left side cover. Slide the tabs of the inlet cover onto the tongues of the side cover (**Figure 2**). Gently push the cable inlet cover so it follows the side-cover contour around the head tube and rests in place in the left side cover.
2. Fit the right side cover into place on the E-Bike™. Be sure no cables or wires are pinched between the side cover and the frame.
3. Apply Loctite 242 (blue) to the threads of the side cover mounting screws.
4. Install the screws. Be sure the short screw is installed in the lower hole. Torque the side cover mounting screws to the specification in Table 4.
5. Close and secure the battery compartment door.

LEFT SIDE COVER

Removal

1. Be sure the power knob is OFF, and remove the battery from the battery compartment.
2. Remove the right side cover from the E-Bike™.
3. Remove the cable inlet cover from the left side cover.
4. Remove the three battery-compartment screws (**Figure 3**) at the front of the battery compartment.
5. Remove the upper right controller screw (A, **Figure 4**). Do not lose the washer behind this screw.
6. Remove the three left-side-cover screws. One is located behind the controller (D, **Figure 4**), one is behind the steering head, and the third is above the bottom bracket.



FIG. 3

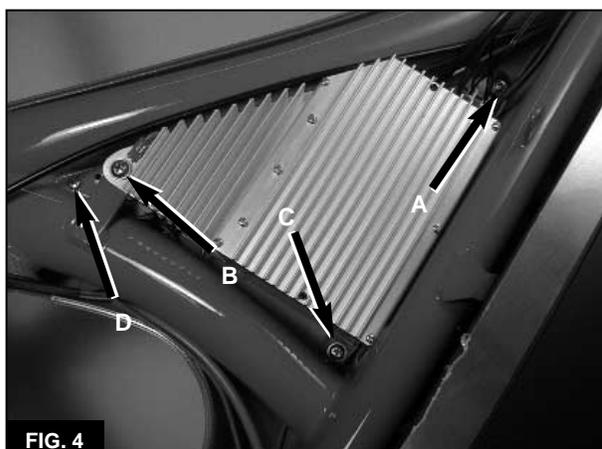


FIG. 4

7. Carefully, pivot the right side cover away from the E-Bike™ until the battery-compartment passes between the front wheel and forward down tube.

8A. If you do not need to completely remove the left side cover from the E-Bike™, use a wire or bungee cord to suspend the side cover from the seat.

8B. If the side cover must be completely removed, perform the following:

- a. Squeeze the arms of the rear-brake caliper together, and disconnect the rear-brake cable guide from the bracket on the left caliper arm (A, **Figure 5**).
- b. Loosen the brake-cable pinch bolt (B, **Figure 5**), and release the inner cable end from the pinch mechanism.
- c. Carefully pull the brake cable from the rear inlet in the left side cover.

Installation

1. If removed, route the rear brake cable through the rear inlet in the left side cover.
2. Pivot the side cover into place. Carefully fit the battery compartment door between the

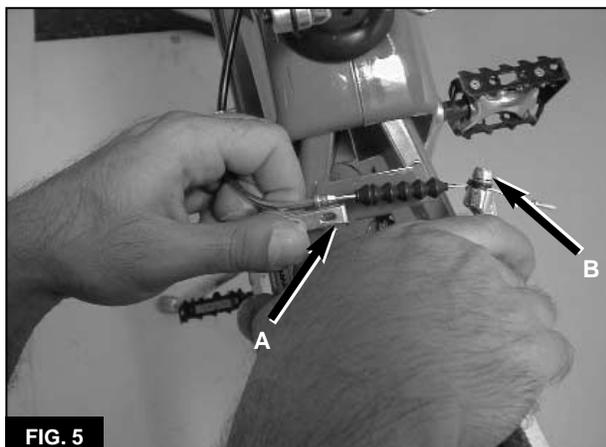


FIG. 5

front wheel and the forward down tube, and fit the side cover onto the left side of the E-Bike™. Be sure all electrical wires and cables fit into the cable inlet at the front of the left side cover.

3. Install the three battery-compartment screws (**Figure 3**) finger tight.
4. Apply Loctite 242 (blue) to the threads of each left-side-cover mounting screw, and install each screw finger tight.
5. Install the upper right controller mounting screw (A, **Figure 4**) along with the washer. Apply Loctite 242 (blue) to the threads of the screw and finger tighten the screw.
6. Torque the controller mounting screw and the three side-cover mounting screws to the specifications in Table 4.

7. If the brake cable was disconnected from the rear brake, perform the following:

- a. Feed the end of the brake cable inner wire through the pinch mechanism.
- b. Tighten the brake-caliper pinch bolt (B, **Figure 5**) to the specification in Table 4.
- c. Squeeze the arms of the rear-brake caliper together, and connect the cable guide to the bracket on the left caliper arm (A, **Figure 5**).
- d. If necessary, adjust the brakes.

CONTROLLER

Removal

1. Be sure the power knob is OFF, and remove the battery from the battery compartment.
2. Remove the right side cover from the E-Bike™.
3. Disconnect all the connectors (A-F, **Figure 1**) from the controller board.

NOTE

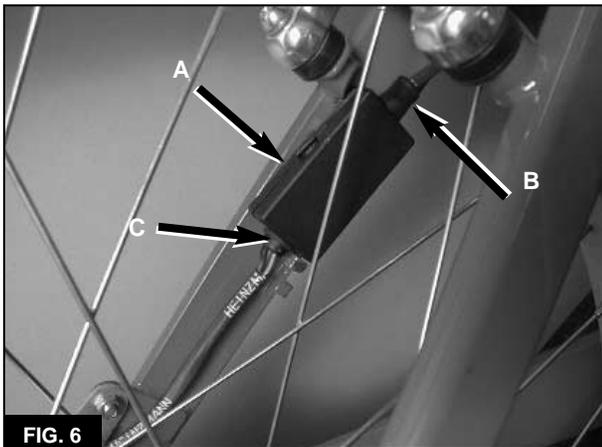
*On early-production models, the blue ground wire is secured to the controller heat sink by the rear controller mounting screw (B, **Figure 4**). On later-production models, this wire is secured by a separate ground screw that mounts to the heat sink just above the rear controller mounting screw (B, **Figure 4**).*

4. On later-production models, remove the ground screw and disconnect the blue ground wire from the heat sink.
5. Hold the controller in place, and remove the three controller mounting screws (A, B, & C, **Figure 4**). When removing the rear controller-mounting screw (B, **Figure 4**), note the two stepped washers that sit on either side of the hole in the heat sink. They must be reinstalled in the same positions during assembly.
6. Lift the controller from the E-bike™, disconnect the four connectors (G-J, **Figure 1**) from behind the controller, and then remove the controller.

Installation

1. Apply Loctite 242 (blue) to the threads of the controller-mounting screws.
2. Attach the following connectors to their mates on the back of the controller:
 - a. The red power connector (G, **Figure 1**).

- b. The black power connector (H, **Figure 1**).
 - c. The motor connector (I, **Figure 1**)
 - d. The horn-board connector (J, **Figure 1**).
3. Fit the controller into place in the E-Bike™, and install the three controller mounting screws (A, B, & C, **Figure 4**). Finger tighten the screws at this point. When installing the rear mounting screw (B, **Figure 4**), be sure a stepped washer fits into each side of the mounting hole on the heat sink.
- 4A. On early-production models, be sure the blue motor ground wire from the motor harness is installed under the rear controller-mounting screw (B, **Figure 4**).
- 4B. On later-production models, use the ground screw to secure the blue ground wire to the controller heat sink. This screw mounts to the threaded hole above the rear controller mounting screw (B, **Figure 4**).
5. Torque the three controller-mounting screws to the specification in Table 4.
6. Connect the following connectors to their mates on the controller board:
- a. Brake-sensor connectors (A and B, **Figure 1**).
 - b. Headlight connector (C, **Figure 1**).
 - c. Taillight/brake-light connector (D, **Figure 1**).
 - d. Accessory control connector (E, **Figure 1**).
 - e. Throttle control connector (F, **Figure 1**).
7. Install the right side cover.

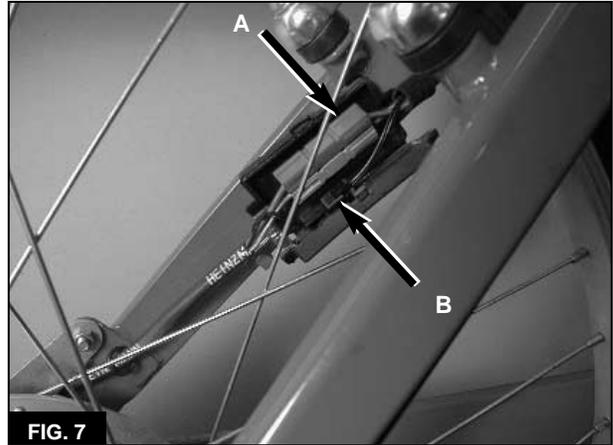


QUICK-RELEASE (QR) CONNECTOR

The QR connector is the electrical connection where the motor connects to the controller. The QR connector sits inside the QR housing, which is affixed to the left chain stay (A, **Figure 6**).

QR Housing Disassembly.

1. Roll the seal off the upper cable port (B, **Figure 6**) on the housing.
2. Roll the O-ring off the lower cable port (C, **Figure 6**) on the housing.
3. Release the latch, and open the housing.
4. Disconnect the QR connector (A, **Figure 7**). This is a red and blue connector on some models, red and black on others.
5. Disconnect the temperature-sensor connector (B, **Figure 7**).



QR Housing Assembly

1. Connect the temperature-sensor connector from the controller to its mate from the motor.
2. Connect the QR connector from the controller to its mate from the motor.
3. Fit the QR connector into place in the QR housing. Be sure the connection engages the locating dot in the housing.
4. Fit the temperature-sensor connector into the housing.
5. Route the motor and controller wires out the respective ports in the housing.
6. Close the housing lid, and secure the latch. Be sure the motor and controller wires are not pinched in the housing or the cable ports when you close the lid.

CAUTION

The O-ring and seal must properly installed on the upper and lower cable ports. They help keep water out of the QR housing.

6. Roll the O-ring up the motor wire and over the lower cable port (C, **Figure 6**) until the O-ring rests against the QR housing.

- Fit the seal (B, **Figure 6**) over the upper cable port until its rolled end rests against the QR housing.
- Use a cable tie to secure the QR housing to the left chain stay.

MOTOR

Removal

The motor is an integral part of the rear hub. Removing the motor consists of disconnecting the motor at the motor junction, and then removing the rear wheel. The procedure is described below.

- Shift the chain to the outermost rear cog on the freewheel.
- Squeeze the top of rear brake arms together and free the rear brake cable from the bracket on the left arm (A, **Figure 5**).



FIG. 8

- Disconnect the motor from the controller by disassembling the QR housing as described above.
- Remove the hardware that secures the motor torque arm to the left chain stay (**Figure 8**).
- Remove the axle cover from each end of the axle.
- Remove the axle nut and washer on each side of the hub. If necessary, hold one nut tight while you break the other loose.
- Rotate the derailleur clockwise (rearward) around its mounting bolt and lower the wheel from the frame until the rear cogs clear the derailleur.
- Remove the wheel from the left side of the E-Bike™.

Installation

- Apply grease to the axle threads.
- From the left side of the E-Bike™, position the wheel so the outmost cog is between the upper and lower chain runs.
- Rotate the derailleur rearward so the outmost cog engages the upper chain run.



FIG. 9

- Lift the wheel rearward and up into the axle slots in the dropouts. Be sure the outmost cog remains engaged with the top chain run.
- When the wheel is properly installed, the washer and nut will be outboard of the dropout. (**Figure 9**)
- If removed, loosely reinstall the axle nuts and washers. Be sure the textured side of the washers faces inward toward the hub.
- Finger tighten the axle nuts.
- Secure the motor torque arm to the frame seat stay. Apply Loctite 242 (blue) to the threads of the mounting bolt, and tighten the nut securely (**Figure 8**).
- Assemble the QR housing as described above.
- Reconnect the rear brake cable to the bracket on the left caliper arm (A, **Figure 5**).
- Center the wheel between the chain and seat stays. Move the axle as necessary within the dropout so the wheel is centered. This is critical. Take the time to assure that the wheel is properly centered between the chain stays and between the seat stays.
- Also operate the brake to assure that the rim is centered between the brake pads.
- Once the wheel is centered, torque the axle nuts to the specification in Table 4.

HEADLIGHT

Disassembly

1. Unscrew the bezel (A, **Figure 10**) from the headlight housing.
2. Remove the bezel and lens (B, **Figure 10**).
3. Remove the headlight reflector (A, **Figure 11**) from the housing.
4. Loosen the set screw (B, **Figure 11**), and remove the bulb socket from the headlight reflector.

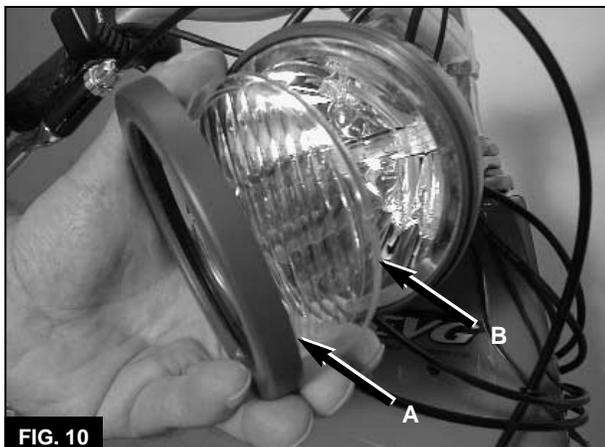


FIG. 10

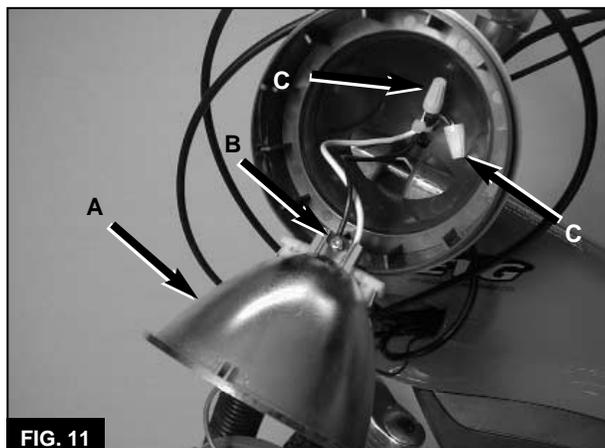


FIG. 11

Assembly

1. Slide the socket into the headlight reflector, and secure the socket in place with the set screw (B, **Figure 11**).
2. Fit the reflector (A, **Figure 11**) into the headlight housing. Be sure the cutouts in the reflector engage the tabs in the housing.
3. Install the lens (B, **Figure 10**) so the cutouts engage the tabs in the headlight housing.
4. Screw the bezel (A, **Figure 10**) in place. Do not over tighten the plastic threads.

Headlight Bulb Replacement

1. Disassemble the headlight as described above in this chapter.
2. Squeeze the bulb socket contacts together, and unhook the bulb from the headlight socket.
3. Hook a new bulb onto the socket contacts. Be sure there are good connections between the bulb hooks and socket contacts.
4. Fit the socket into the headlight reflector, and secure the socket in place with the set screw.
5. Assemble the headlight as described above.

Headlight Adjustment

Adjust the headlight according to Department of Motor Vehicle regulations in your state.

1. Set the E-Bike™ on a level surface approximately 25 feet from a wall.
2. Have a friend sit on the bike and hold it vertically. Be sure the tires are inflated to the proper inflation pressure when adjusting the headlight.
3. Draw a horizontal line on the wall that is 35 inches above the floor/ground.
4. Turn the headlight on.
5. The main beam of light should be centered on the horizontal line. That is, there should be an equal amount of light above and below the line. If necessary, adjust the headlight by performing the following:
 - a. Loosen the headlight locknut (**Figure 12**) behind the headlight housing.
 - b. Tilt the headlight housing up or down until the beam is centered on the horizontal line.
 - c. Tighten the locknut. Torque the headlight locknut to the specification in Table 4.



FIG. 12

TAILLIGHT

Replacement

The LEDs in the taillight cannot be replaced. If the taillight LEDs burn out, install a new taillight assembly.

1. Be sure the power knob is OFF, and remove the battery from the compartment.
2. Disconnect the taillight/brake light connector under the seat (**Figure 13**).



FIG. 13

3. Remove the two taillight mounting nuts (**Figure 14**), and remove the taillight assembly from the seat bracket.

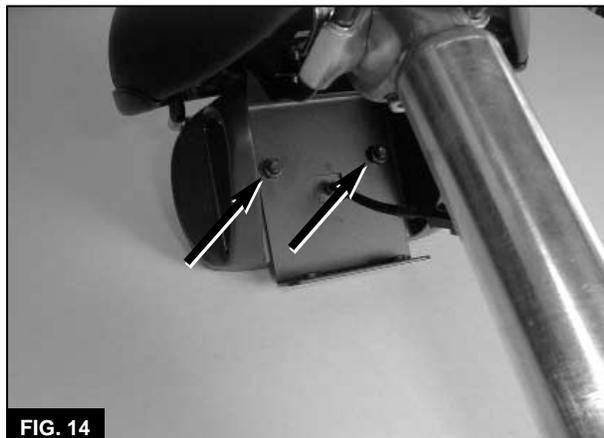


FIG. 14

4. Fit a new taillight assembly in place, and secure it with the two taillight mounting nuts. Torque the nuts to the specification in Table 4.
5. Connect the taillight/brake light connector (**Figure 13**).

TROUBLESHOOTING

General instructions

Find the symptom that describes the condition you are trying to correct. Follow that troubleshooting procedure step-by-step until the problem is corrected. Perform the troubleshooting procedures in the indicated order unless instructed to proceed to another step. Before moving on to a next step, reconnect any part that had been disconnected unless instructed otherwise.

A. The battery does not beep OK when you secure the battery in the battery compartment.

1. Turn the headlight on. If the light turns on, the battery and the connection are fine. Proceed to step 3.
2. If the headlight does not turn on, push the bottom of the battery into the battery compartment with your hand. The problem is solved if the E-Bike™ beeps OK.
3. If the headlight does not come on, check the battery voltage. Recharge the battery if necessary.
4. Replace the controller.

B. The system beeps GO when the power knob is turned ON, but the motor does not operate.

1. Check the operation of the brake sensors by operating each brake lever. The brake light should turn on when a brake lever is pulled. The brake light should also turn off when a brake lever is released. If the brake light operates properly when each brake lever is pulled and released, proceed to step 5.
2. Check the brake sensor connectors at the controller board (A & B, **Figure 1**). Be sure each connector securely engages its mate in the board.
3. Operate each brake lever again. If the brake light operates properly when each brake lever is pulled and released, reset the unit by turning the power knob ON and then OFF. Turn the power knob ON, and check the operation of the motor. If the motor does not operate, proceed to step 5.

4. If the brake light does not operate properly when a brake lever is pulled and released or if the brake light is always on, a brake sensor has failed. Replace the brake lever body with the defective sensor.
5. Check the throttle control connector (F, **Figure 1**). Be sure the connector is securely connected to the controller.
6. Check the resistance of the throttle.
 - a. Turn the power knob OFF, and remove the battery from the battery compartment.
 - b. Disconnect the throttle control connector (F, **Figure 1**) from the controller board.
 - c. Measure the resistance between the black and red terminals in the connector when the throttle is not applied and when it is fully applied.

Throttle resistance (black to red terminals):

No throttle: $10K \pm 1K$ ohms
Full throttle: $10K \pm 1K$ ohms

- d. Check the resistance between black and brown terminals when the throttle is not applied and when it is fully applied.

Throttle resistance (black to brown terminals):

No throttle: 500 ± 500 ohms
Full throttle: 5000 ± 500 ohms

- e. If any resistance is outside of the specified range, replace the throttle control.
7. Check the output of the controller by performing the following:
 - a. Attach the positive probe of the voltmeter to the positive battery terminal (G, **Figure 1**) on the controller.
 - b. Connect the negative probe to the heat sink on the controller.
 - c. Turn the power knob ON. The voltage should read zero. Operate the throttle and watch the meter. The voltage should jump to 24 volts. If either reading is outside the specification, replace the controller.

NOTE:

*The QR connector (A, **Figure 7**) is red and blue in some models but red and black in others.*

8. Check the connections at the QR connector.
 - a. Open the QR housing on the left chain stay (A, **Figure 6**).
 - b. Check QR connector (A, **Figure 7**) and the temperature-sensor connector (B, **Figure 7**). The connector from the motor must securely engage its mate from the harness. If the connector is loose, press it together.
 - c. Install the battery, turn the power knob ON, and operate the throttle. If the motor operates, the connection was the problem. Close the QR housing. If necessary, secure the housing to the left chain stay with a cable tie.
9. Check the voltage at the QR connection.
 - a. Disconnect the QR connector at the QR housing (A, **Figure 7**).
 - b. Connect the probes of a voltmeter to the red (+) and blue (-) terminals on the harness side of the connection.
 - c. Turn the power knob ON and operate the throttle. There should be 24 volts at the harness side of the connector when the throttle is operated. If the voltage is within specification, replace the motor. If not, replace the wiring between the QR connector and the controller.

C. The unit does not beep GO when the power knob is turned ON.

1. Charge the battery. Turn the power knob ON. If the system beeps GO, the problem is resolved.
2. Check the operation of the power switch.
 - a. Turn the power knob OFF, and remove the battery from the battery compartment.
 - b. Disconnect the throttle control connector (F, **Figure 1**) from the controller board.
 - c. Connect an ohmmeter to the red and orange terminals in the throttle control connector.
 - d. Check the continuity when the power knob is OFF and when it is ON. There should be no continuity when the switch is OFF. There should be continuity when the switch is ON. Replace the throttle control if it fails either continuity test.

3. Check the temperature-sensor connection behind the controller (I, **Figure 1**). Be sure the connector is secure. Install the battery, and turn the power knob ON. If the system beeps GO, you have corrected the problem.

4. Check the temperature-sensor connection in the QR housing.

a. Open the QR housing, and check that the temperature-sensor connector is secure (B, **Figure 7**).

b. Check system operation by turning the power knob OFF and then ON. If the system beep GO, you have corrected the problem.

5. Check the temperature sensor by performing the following.

a. Disconnect the temperature-sensor connector (B, **Figure 7**) in the QR housing.

b. Connect a jumper across the terminals in the harness side of the connector. (The 24-gauge black wires.)

c. Turn the switch ON. The temperature sensor is bad if the unit beeps GO.

d. If the system does not beep GO, perform this test at the temperature-sensor connector on the controller (I, **Figure 1**). Jump the connector. If the system beeps GO, the problem is in the wire. Replace it. If the system does not beep GO, replace the controller.

D. The headlight does not operate when the switch is turned on.

1. Turn on the headlight switch and check the operation of the taillight. Press the horn button and check the operation of the horn. If the horn, headlight, and taillight do not operate, check the three-amp fuse (F3 in the schematic) inside the controller.

a. Remove the controller, open the controller lid, and inspect the fuse LED.

b. If the LED is on, replace the three-amp fuse (F3).

c. If the LED is not on, check the fuse (F1) on the controller fuse module. If you find a 16-amp fuse, replace it with a 25-amp fuse. If you find a blown 25-amp fuse, replace the controller.

2. Check the power by operating the horn. If it does not sound, charge the battery, and retest the horn. If the horn sounds, continue with step 3.

3. Check the headlight bulb. Replace the bulb if it is burned out.

4. Check the headlight connector (C, **Figure 1**).

5. Check the continuity of the headlight switch.

a. Turn the power knob OFF, and remove the battery from the battery compartment.

b. Disconnect the accessory control connector (E, **Figure 1**) from the controller board.

c. Connect an ohmmeter between the blue and white terminals in the connector.

d. Check the continuity when the headlight switch is turned OFF and turned ON.

e. There should be no continuity when the headlight switch is OFF. There should be continuity when the headlight switch is ON. Replace the accessory control if it fails either of these tests.

6. Check the voltage at the bulb socket.

a. Reinstall the battery.

b. Remove the bulb socket from the headlight reflector.

c. Connect a voltmeter's positive lead to the socket contact with the black wire. Connect the voltmeter's negative lead to the socket contact with the white wire.

d. Turn the headlight switch ON, and measure the voltage between the contacts. Voltage should read 24 volts DC. If the voltage reading is 24 VDC, replace the bulb or the socket. If the voltage is not 24 volts DC, proceed to step 7.

7. Check the voltage at the headlight wire.

a. Be sure the headlight switch is OFF.

b. Disconnect the headlight socket wires from the two leads from the headlight wire.

c. Turn the headlight switch ON, and check voltage between the white (-) and black (+) leads of the headlight wire. Voltage should read 24 volts DC. If voltage is 24 VDC, replace the bulb socket. If the voltage is not 24 VDC, proceed to step 8.

8. Check the continuity of the headlight wire.

a. Be sure the power knob is OFF, and remove the battery from the battery compartment.

b. Disconnect the headlight connector (C, **Figure 1**) from the controller board.

c. Remove the headlight reflector as described in this chapter.

- d. Twist the ends of the headlight wire together (black and white), and check the continuity across the black and white terminals in the headlight connector (**C**, **Figure 1**). If there is no continuity, replace the headlight wire.

E. The horn does not sound when the button is pressed.

1. Turn on the headlight switch and check the operation of the taillight. Press the horn button and check the operation of the horn. If the horn, headlight, and taillight do not operate, check the three-amp fuse (F3 in the schematic) inside the controller.
 - a. Remove the controller, open the controller lid, and inspect the fuse LED.
 - b. If the LED is on, replace the three-amp fuse (F3).
 - c. If the LED is not on, check the fuse (F1) on the controller fuse module. If you find a 16-amp fuse replace it with a 25-amp fuse. If you find a blown 25-amp fuse, replace the controller.
2. Check the power supply by turning on the headlight. If the light does not operate, charge the battery.
3. Check the horn switch by performing the following:
 - a. Turn the headlight on. The headlight indicator should light.
 - b. Press the horn switch. If the indicator light goes off, the horn switch is okay. If the indicator does not go off, replace the accessory control.
4. Check the voltage at the horn.
 - a. Remove the left side cover.
 - b. Disconnect the spade connectors from the back of the horn.
 - c. Connect a voltmeter's positive lead to the red terminal. Connect the voltmeter's negative lead to the white terminal.
 - d. Press the horn button, and measure the voltage. If the voltage is 24 volts DC, replace the horn. If the voltage is not 24 volts DC, proceed to step 5.
5. Check the voltage at the horn-board-power connector.
 - a. Disconnect the horn-board-power connector (**N**, **Figure 1**) from the horn board.

CAUTION

The red and black leads from connector N connect directly to the battery. Power is applied to this connector whenever the battery is in the battery compartment.

- b. Install the battery into the battery compartment.
 - c. Check the voltage at the red (+) and black (-) terminals on the connector.
 - d. If the voltage is 24 volts DC, proceed to step 6. If the voltage is not 24 volts DC, replace the horn-board-power connector and wires.
6. Check the voltage from the controller to the horn board.
- a. Disconnect connector L (**Figure 1**) from the horn board.
 - b. Connect a voltmeter to the white (+) and yellow (-) terminals of connector L.
 - c. Install the battery if you have not already done so.
 - d. Press the button, and check the voltage. If the voltage reads 24 volts DC, replace the horn board.

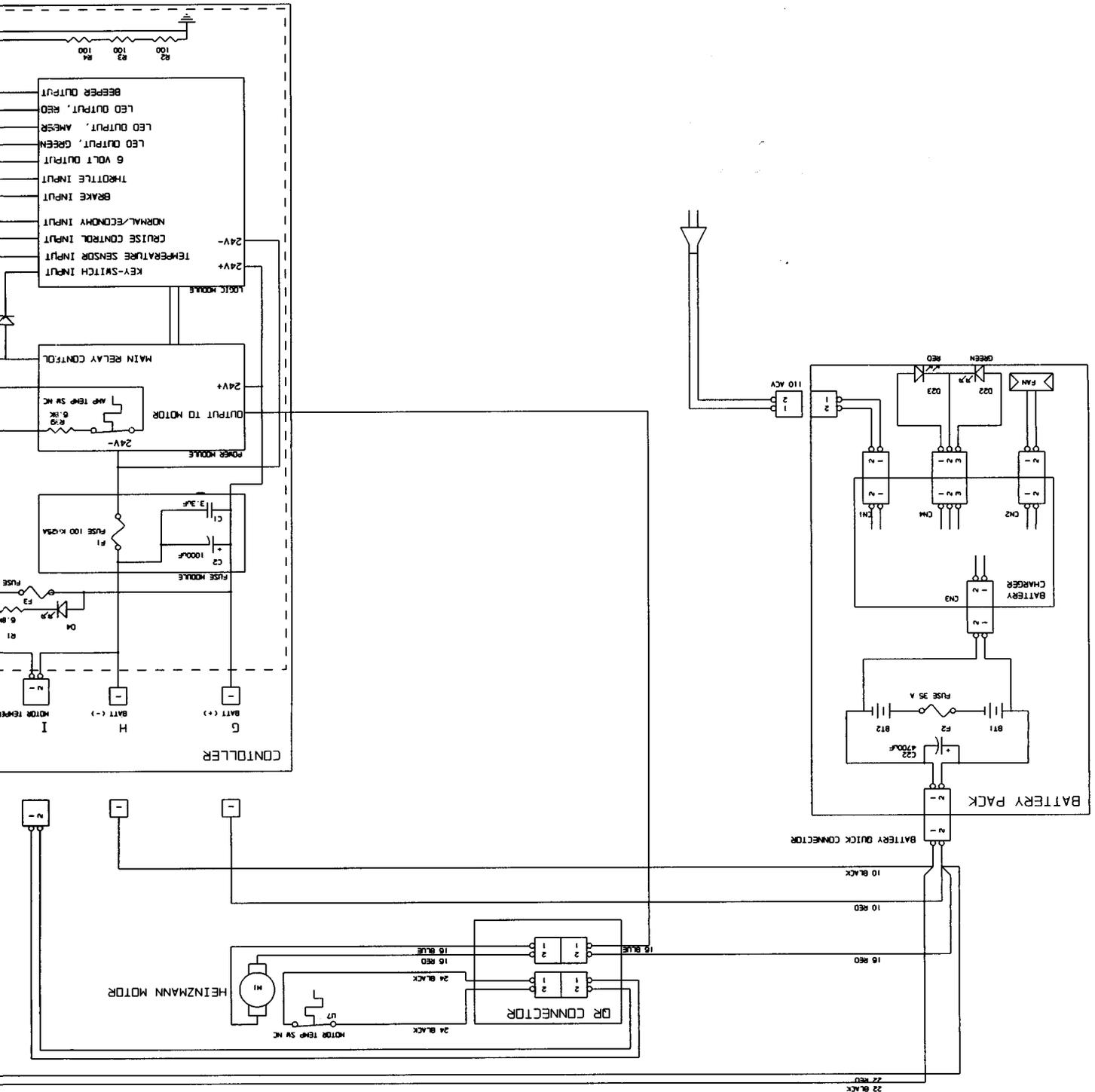
F. The taillight does not turn on when the headlight switch is ON.

1. Turn on the headlight switch and check the operation of the taillight. Press the horn button and check the operation of the horn. If the horn, headlight, and taillight do not operate, check the three-amp fuse (F3 in the schematic) inside the controller.
 - a. Remove the controller, open the controller lid, and inspect the fuse LED.
 - b. If the LED is on, replace the three-amp fuse (F3).
 - c. If the LED is not on, check the fuse (F1) on the controller fuse module. If you find a 16-amp fuse replace it with a 25-amp fuse. If you find a blown 25-amp fuse, replace the controller.
2. Press the horn button to check power flow. If the horn sounds, continue. If not, charge the battery.
3. Check the taillight/brake light connector (**D**, **Figure 1**) at the controller board. Be sure it is securely connected to the board.
4. Check the taillight switch by performing the following.
 - a. Turn the headlight switch on and check the headlight LED.

- b. If the LED turns on, the switch is fine. If it does not operate, replace the accessory control.
5. Check the voltage at the taillight/brake light connector.
 - a. Disconnect the taillight/brake light connector (**Figure 13**) under the seat.
 - b. Install the battery into the battery compartment if you have not already done so.
 - c. Connect a voltmeter to the brown (-) and black (+) terminals on the controller side of the connector.
 - d. Turn the headlight switch ON, and check the voltage at the connector. If the voltage is 24 volts DC, replace the taillight/brake light assembly. If the voltage is not 24 volts DC, proceed to step 6.
6. Check the continuity of the controller-to-taillight/brake light wire.
 - a. Be sure the power knob is off, and remove the battery from the battery compartment.
 - b. Disconnect the taillight/brake light connector (**Figure 13**) under the seat.
 - c. Disconnect the taillight/brake light connector (D, **Figure 1**) from the controller board.
 - d. Place a jumper across the brown and black terminals in the connector at the controller end of the wire.
 - e. Connect an ohmmeter to the brown and black terminals at the taillight/brake light end of the wire, and check the continuity of the wire.
 - f. If there is no continuity, replace the taillight/brake-light-to-controller wire.
2. Turn the headlight on to check the power. If the light does not operate, charge the battery.
3. Check the brake sensor connectors (A and B, **Figure 1**) at the controller board. Each should be secure.
4. Check the output from the brake sensor.
 - a. Disconnect one of the brake-sensor connectors from the controller.
 - b. Connect an ohmmeter to the terminals in the connector.
 - c. Operate the brake lever for that side, and check the continuity.
 - d. There should be continuity when the brake lever is applied but no continuity when the lever is released.
 - e. Replace the brake lever body if the brake sensor fails either of these tests. Proceed to step 6 if the brake sensor passes both tests.
5. Perform this test on the other brake sensor.
6. Check the voltage at the taillight/brake light connector.
 - a. Disconnect the taillight/brake light connector (**Figure 13**) under the seat.
 - b. Install the battery into the battery compartment if you have not already done so.
 - c. Connect a voltmeter to the black (+) and yellow (-) terminals on the controller side of the connector.
 - d. Operate a brake lever, and check the voltage at the connector. If the voltage is 24 volts DC, replace the taillight/brake light assembly.

G. The brake light does not operate.

1. Turn on the headlight switch and check the operation of the taillight. Press the horn button and check the operation of the horn. If the horn, headlight, and taillight do not operate, check the three-amp fuse (F3 in the schematic) inside the controller.
 - a. Remove the controller, open the controller lid, and inspect the fuse LED.
 - b. If the LED is on, replace the three-amp fuse (F3).
 - c. If the LED is not on, check the fuse (F1) on the controller fuse module. If you find a 16-amp fuse, replace it with a 25-amp fuse. If you find a blown 25-amp fuse, replace the controller.



EV Global Motors Company

10900 Wilshire Blvd. Suite 310

Los Angeles, California 90024

USA

310-208-7076 tel / 310-208-2444 fax

www.ebike.com

P/N: LIT-82001-00-00

