

ALTITUDE POWER PLAY



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FRAME ASSEMBLY

Main Pivot Bearing Installation

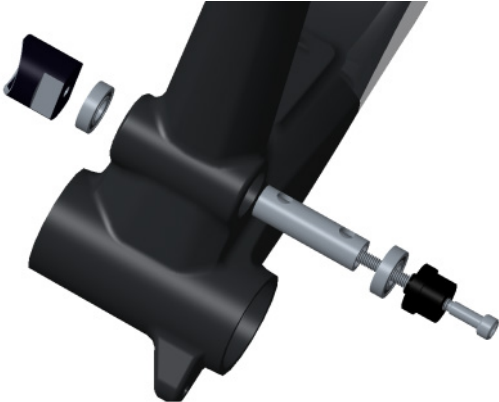
PARTS NEEDED

Qty	Item	Part No.	Revision	Description
2	BEARING	1807042	NIL	ENDURO BEARING 6900 2RS MAX TYPE, 22x10x6 SIZE
1	SPACER, MP	1807038	B	MAIN PIVOT CENTER SPACER, ID:10, L:48

TOOLS NEEDED

- 1. 6900 Bearing Press or suitable Arbor Press

ASSEMBLY



1. Using 6900 Bearing Press, install non-drive-side Enduro 6900 2RS MAX (1807042) Bearing.	2. Slide Main Pivot Spacer (1807038), slide into main pivot.
3. Using 6900 Bearing Press, install drive-side Enduro 6900 2RS Max Bearing.	4. Inspect bearings for proper seating against frame.

Chain Stay Bearing Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	BEARING	1807042	NIL	ENDURO BEARING 6900 2RS MAX TYPE, 22x10x6 SIZE
1	CHAINSTAY	1057400CBN/ 1057410	D	E-ALT CARBON/ALUMINUM CHAINSTAY

TOOLS NEEDED

1. 6900 bearing press or suitable arbor press

Link Bearing Installation

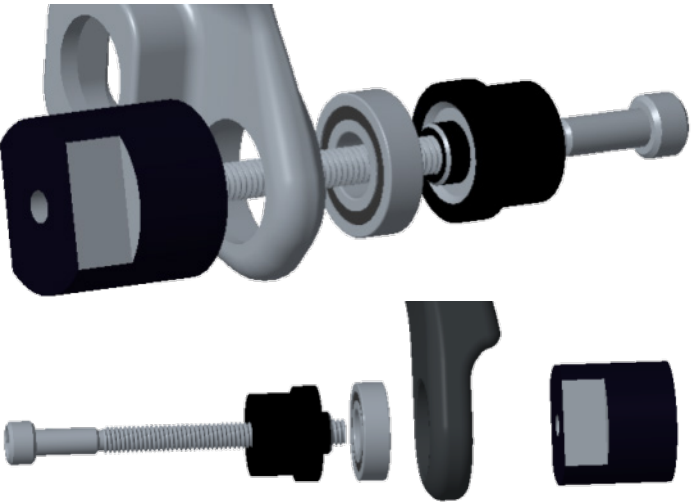
PARTS NEEDED

Qty	Item	Part No.	Revision	Description
4	BEARING	1807042	NIL	ENDURO BEARING 6900 2RS MAX TYPE, 22x10x6 SIZE
1	LINK	1097182	A	ALTITUDE LINK, 85MM LONG, RIDE9, AL7075-T6, HARD BLACK ANO

TOOLS NEEDED

- 6900 bearing press or suitable arbor press
- Grease

INSTALLATION



1. a. Grease top link bearing bores. b. Do not grease chain stay bearing bores.	2. Using 6900 Bearing Press, install Enduro 6900 2RS MAX (1807042) Bearings into each pivot. Note: Bearings press into chain stay from inboard side.	3. Inspect bearings for proper seating against component.
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Chain Stay Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	AXLE, MP	1807029	A	SLAYER MP AXLE, M10x1.25, L:84MM, AL7075-T6 HARD BLACK ANO

TOOLS NEEDED

- Hex Keys
- Loctite

ASSEMBLY



<div>1. a. Grease outside of main pivot bearing inner races, and outer surface of Main Pivot Bolt (1807029).</div> <div> b. Apply Loctite 243 (blue) to female threads on the drive-side of the chain stay yoke.</div>	<div>2. Slide chain stay over front triangle main pivot.</div>	<div>3. a. Install Main Pivot Bolt.</div> <div> b. Torque to 17 Nm.</div>
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Link Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	BOLT	1807060	NIL	BOLT, 10MM x 54MM, M6x1 INT., AL 7075-T6, HARD BLACK ANO
1	LINK	1097182	A	ALTITUDE LINK, 85MM LONG, RIDE9, AL7075-T6, HARD BLACK ANO
2	BEARING SPACER	1807044	NIL	6900 BEARING SPACER
1	BEARING CAP	1807043	NIL	6900 BEARING CAP, AL 7075 T-6, HARD BACK ANO
1	SCREW M6x12	180566-012 FBY	NIL	FLAT HEAD C'SUNK SOCKET SCREW, M6-1.0 x 12MM, A4/316 SS, 55060.060.012

TOOLS NEEDED

- Hex Keys
- Loctite 243
- Grease

INSTALLATION

	
1. a. Grease outside of TL-FT Pivot Bolt (1807060), small faces of 6900 Bearing Spacers (1807044), and small inner face of 6900 Bearing Cap (1807043). b. Apply Loctite 243 (blue) to M6-1.0 x 12mm SS Screw (180566-012 FBY) threads.	2. Insert 6900 Bearing Spacers so that small faces contact the inboard inner races of the top link bearings.
3. Slide top link and 6900 Bearing Spacers over front triangle. Install TL-FT Pivot Bolt.	4. a. Pass M6-1.0 x 12mm SS Screw through 6900 Bearing Cap, and thread into TL-FT Pivot Bolt. b. Torque to 8 Nm.

Seat Stay Installation



PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	BOLT, M10x78	1807061	NIL	BOLT, 10MM x 78MM, M6x1 INT., AL 7075 T-6, HARD BLACK ANO
2	BOLT	1807046	NIL	BOLT, 10MM x 15MM, M10x1 EXT., AL 7075 T-6 HARD BLACK ANO
2	BEARING SPACER	1807044	NIL	6900 BEARING SPACER
1	BEARING CAP	1807043	NIL	6900 BEARING CAP, AL 7075 T-6, HARD BLACK ANO
1	SCREW M6x12	180566-012 FBY	NIL	FLAT HEAD C'SUNK SOCKET SCREW, M6-1.0 x 12MM, A4/316 SS, 55060.060.012
1	SEATSTAY	1057401CBN/	NIL	E-ALTITUDE CARBON/ALUMINUM SEATSTAY

TOOLS NEEDED

- Hex Keys
- Loctite 243
- Grease

INSTALLATION

	
<div>1. a. Grease outside of TL-SS Pivot Bolt (1807061), small faces of 6900 Bearing Spacers (1807044), and small inner face of 6900 Bearing Cap (1807043).</div> <div> b. Apply Loctite 243 (blue) to M6-1.0 x 12mm SS Screw (180566-012 FBY) threads.</div>	<div>2. Insert 6900 Bearing Spacers so that small faces contact the inboard inner races of the top link bearings.</div>
<div>3. Slide seat stay around the seat tube, and into top link. Install TL-SS Pivot Bolt.</div>	<div>4. a. Pass M6-1.0 x 12mm SS Screw through 6900 Bearing Cap, and thread into TL-SS Pivot Bolt.</div> <div> b. Torque to 8 Nm.</div>
	
<div>5. Apply Loctite 243 (blue) to inside of threaded seat stay inserts.</div>	<div>6. a. Pass Dropout Pivot Screws (1807046) through chain stay bearings, and thread into seat stay.</div> <div> b. Torque to 17 Nm.</div>


Shock Installation

PARTS NEEDED

TOOLS NEEDED

- Hex keys
- 2x 4mm Hex key
- Grease
- Blue Loctite

SHOCK INSTALLATION

	
<div>1. a. Grease outside of Link (1807049) and FT (1807062) Shock Bolts, Bearing Spacers (1807099), and the outside of Outer (1807003) and Inner (1807004) Ride-9 Chips.</div> <div> b. Apply Loctite 243 (blue) to M6-1.0 x 16mm (180566-016 FBY) and M6-1.0 x 12mm (180566-012 FBY) SS Screw threads.</div>	<div>2. Slide shock, with correct hardware (see exploded diagram) into front triangle, slide in FT Shock Bolt from the drive-side.</div>
<div>3. Select Ride-9 Position using the Outer and Inner Ride-9 Chips.</div>	<div>4. a. Seat bearing spacers with narrow inner faces against bearings, and slide shock into link.</div> <div> a. Pass Link Shock Bolt through Ride-9 Chips, top link, and shock from the drive-side.</div> <div> Note: If the shock is a tight fit, loosen the TL-SS and TL – FT Pivot Bolts prior to inserting the shock. Re-torque the Pivot Bolts after installing the shock.</div>
<div>5. a. Pass M6-1.0 x 16mm SS Screw through M6 Counter-Sunk Washer (1807064), and thread into FT Shock Bolt.</div> <div> b. Torque to 8 Nm.</div>	<div>6. a. Pass M6-1.0 x 16mm SS Screw through non-drive-side Ride-9 Chip, and thread into Link Shock Bolt.</div> <div> b. Torque to 8 Nm.</div>

POWERPLAY ASSEMBLY

Bottom Bracket Installation 24mm

PARTS NEEDED

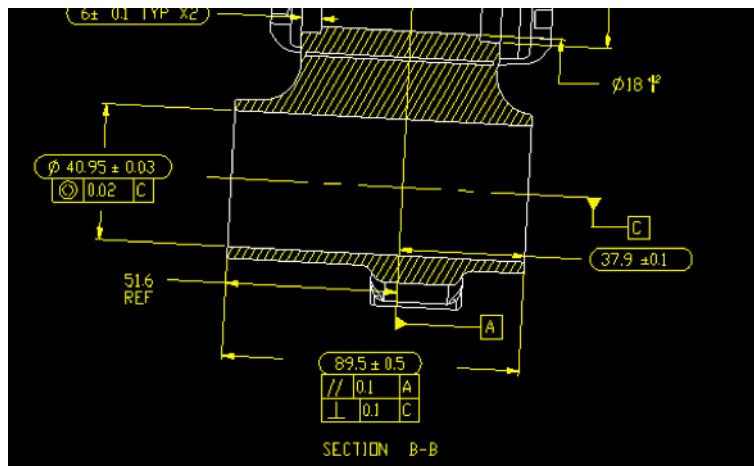
Qty	Item	Part No.	Revision	Description
1	BB	NIL	N/A	RACE FACE 24MM BB

TOOLS NEEDED

- BB press suitable for 89.5mm shell and 24mm Bearing ID
- Grease

INSTALLATION

1. Ensure the outer faces of the BB shell are free from Paint and faced perpendicular to the cylinder.
2. The BB width should be 89.5mm, and the drive side face is 37.9mm from the frame centre line.



3. On the Race face 24mm BB, remove the red anodized 2.5mm spacer from the plastic centre sleeve assembly.
4. Press BB in as per Race Face instructions, ensuring that it is flush with the outer faces of the BB shell.

Bottom Bracket Installation 30mm

PARTS NEEDED

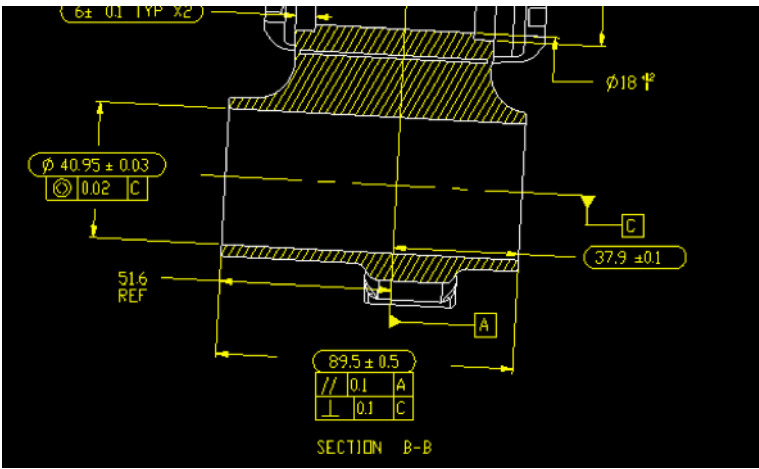
Qty	Item	Part No.	Revision	Description
1	BB	N/A	NIL	RACE FACE 30MM BB

TOOLS NEEDED

- BB press suitable for 89.5mm shell and 30mm bearing ID
- Grease

INSTALLATION

1. Ensure the outer faces of the BB shell are free from Paint and faced perpendicular to the cylinder.
2. The BB width should be 89.5mm, and the drive side face is 37.9mm from the frame centre line.



3. On the Race face 24mm BB, remove the red anodized 2.5mm spacer from the plastic centre sleeve assembly.
4. Press BB in as per Race Face instructions, ensuring that it is flush with the outer faces of the BB shell.

Spider Removal

1. Remove cranks as per manufacturers instructions.
2. Using a 16 notch external bottom bracket cup tool, remove the clutch bearing lock ring from the drive side crank arm.



3. Remove the clutch bearing and spider from the drive side crank arm's splines.

Crank and Spider Installation Aeffect

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	CRANKSET	N/A	NIL	RACE FACE AEFFECT CRANK SET
1	CLUTCH BEARING	N/A	A	CLUTCH BEARING SPIDER ASSEMBLY WITH 34T RING
1	CLUTCH BEARING LOCK RING	1347010	A	LOCKRING CLUTCH 24MM

TOOLS NEEDED

- Grease
- Shimano bb cup tool
- Vise

ASSEMBLY

1. Place BB cup tool in the vise and secure tightly.
2. Liberally apply grease to the inside of the spline pattern on the clutch bearing/spider assembly.



3. Install the clutch bearing/spider onto the spline of the drive side Aeffect arm.

- 4. Thread in the clutch bearing lock ring to the drive side Aeffect arm.
- 5. Torque to 40Nm.



Crank and Spider Installation Turbine

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	CRANKSET	N/A	NIL	RACE FACE TURBINE CRANK SET
1	CLUTCH BEARING	N/A	A	CLUTCH BEARING SPIDER ASSEMBLY WITH 34T RING
1	CLUTCH BEARING LOCK RING	1347006	A	LOCKRING CLUTCH 30MM

TOOLS NEEDED

- Grease
- Shimano bb cup tool
- Vise

ASSEMBLY

1. Place BB cup tool in the vise and secure tightly.
2. Liberally apply grease to the inside of the spline pattern on the clutch bearing/spider assembly.



3. Install the clutch bearing/spider onto the spline of the drive side Turbine arm.
4. Thread in the clutch bearing lock ring to the drive side Turbine arm.
5. Torque to 40Nm.



Battery Case Assembly

PARTS NEEDED

Refer to the Battery BOM for all parts:

Qty	Item	Part No.	Revision	Description
1	BATTERY	1977060CPS	NIL	BATTERY, 634W, 48V, LI-ION WITH BALANCING PCM
1	BATTERY, CAP	1997063	C	BATTERY CAP
1	BATTERY, COVER LT	1997060	A	BATTERY COVER, LEFT
1	BATTERY, COVER RT	1997061	A	BATTERY COVER, RIGHT
1	BATTERY, PIN	1997062	NIL	BATTERY PIN, 68MM, 6061-T6, HARD BLACK ANODIZE
1	BOLT, SLEEVE 56	1807139	A	SLEEVE BOLT, M8 X 56MM ALLOY 7075-T6.
1	BOLT, SLEEVE 70	1807141	NIL	SLEEVE BOLT, M8 X 70MM. ALLOY 7075-T6.
1	PLATE, BATTERY	1997067	NIL	BATTERY STEEL PLATE
2	SCREW	180191FBY-016	NIL	FLAT HEAD C'SUNK SOCKET SCREW, M6-1.0 x 16MM, A4/316 STAINLESS STEEL
1	SPACER, BATTERY	1997064	NIL	BATTERY SLEEVE SPACER, 44MM, 6061-T6, HARD BLACK A NODIZE

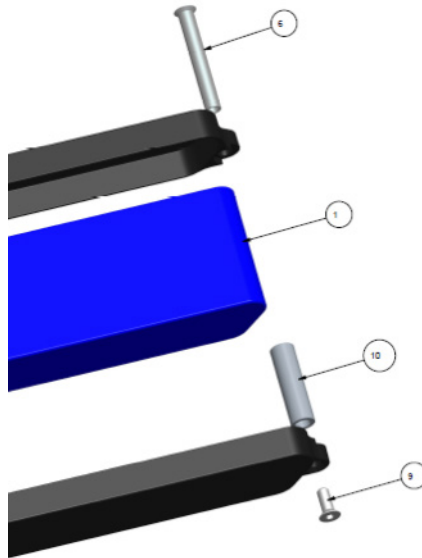
TOOLS NEEDED

- Hex Key set
- [Double sided adhesive tape](#) (VHB 5952???)

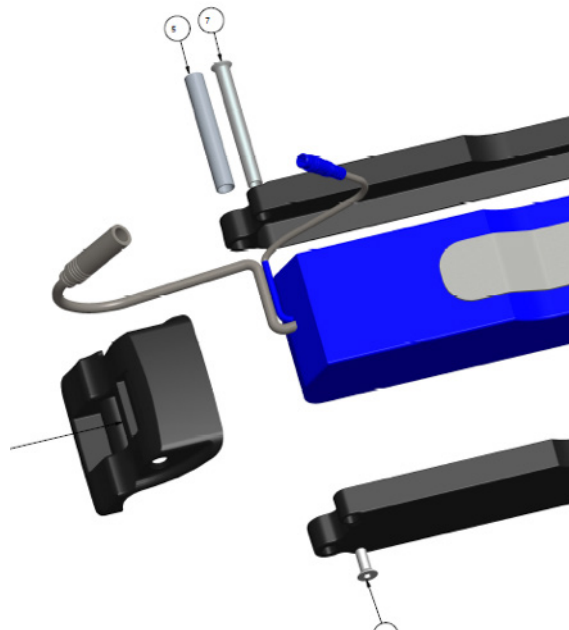
ASSEMBLY

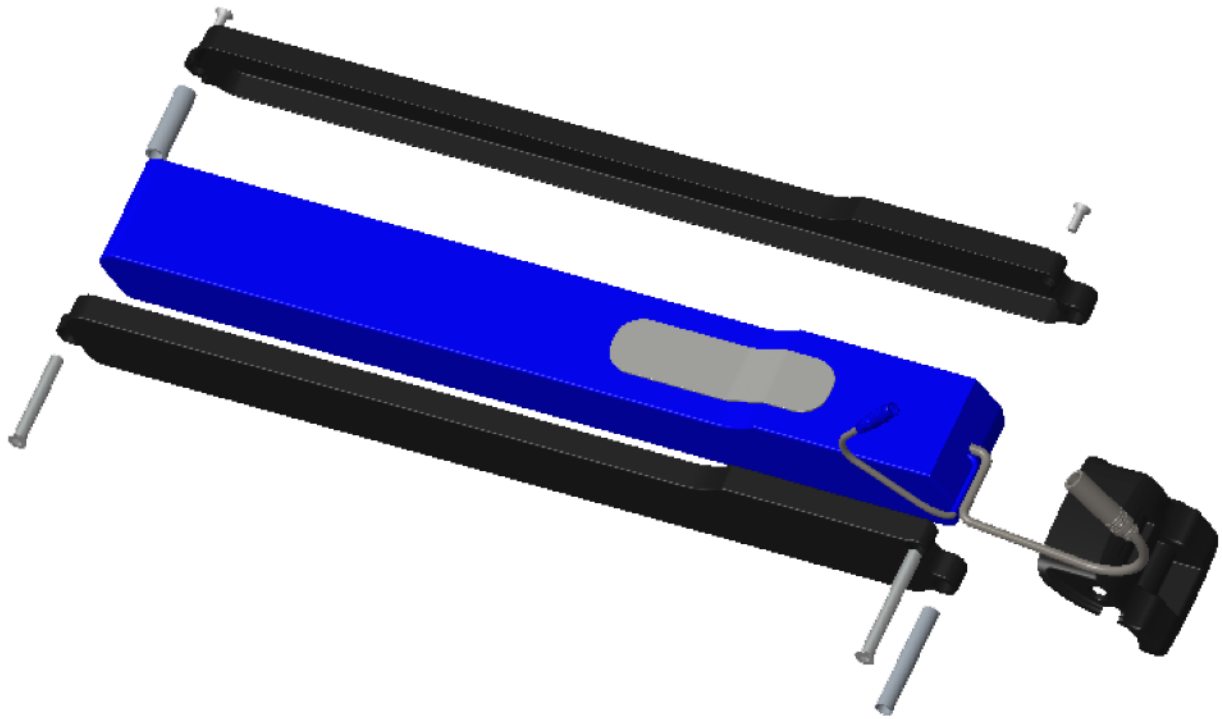
1. Locate the two side covers on both sides of the battery. As per the BOM diagram.
2. Locate the end cap in place at the lower end of the battery, ensuring the cable comes out and goes out the relief in the left side of the cap.
3. Slide the battery pin through the assembly to locate the end cap to the side plates.

4. Secure the top end of the battery using the spacer (1997064), 56mm bolt (1807139), and a M6 Screw.



5. Secure the bottom end of the battery with the 72mm bolt, and a M6 Screw.





6. Torque the M6 screws to 4Nm.
7. Place the steel plate on the top of the battery as shown using double sided adhesive, ensuring that it is centered and firmly pressed down.

Battery Case Removal

TOOLS NEEDED

- Hex Key set

REMOVAL

1. Remove Powerplay Drive (See section *Powerplay Drive Removal*).
2. Unscrew grub screw between bottle bosses on down tube.



3. Unscrew M6 screw and remove battery pin from down tube.



4. Slide battery out of down tube.

Battery Case Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	BOLT, BATTERY 81MM	1807127	NIL	E-MTB BATTERY BOLT, 8MM OD x 81MML. AL7075-T6 HARD BLACK ANO
1	SCREW, M6x12	180566-012 FBV	NIL	FLAT HEAD C'SUNK SOCKET SCREW, M6-1.0 x 12MM, A4/316 SS, 55060.060.012
1	WASHER	1807064	NIL	C'SUNK WASHER: (FOR M6 SCREW) ID:6 X OD: 14.6 x 3.25MM THK.
1	SET SCREW, M5x20	1808024	NIL	SET SCR., FLT. PT., M5 x 0.8 x 20MML. ZINC PLATED. 07860.040.020
1	BATTERY ASSEMBLY	N/A	NIL	BATTERY ASSEMBLY

TOOLS NEEDED

- Hex Key set

ASSEMBLY

1. Slide the battery up the downtube until the plastic end cap aligns with the lower portion of the carbon on the down tube.
2. Insert the battery bolt through the frame.
3. Install the M6 screw and washer.
4. Torque to 4Nm.
5. Install the M5 x 20mm set screw in the middle downtube riv-nut, Torque to 2Nm.



Charge Port Installation

PARTS NEEDED

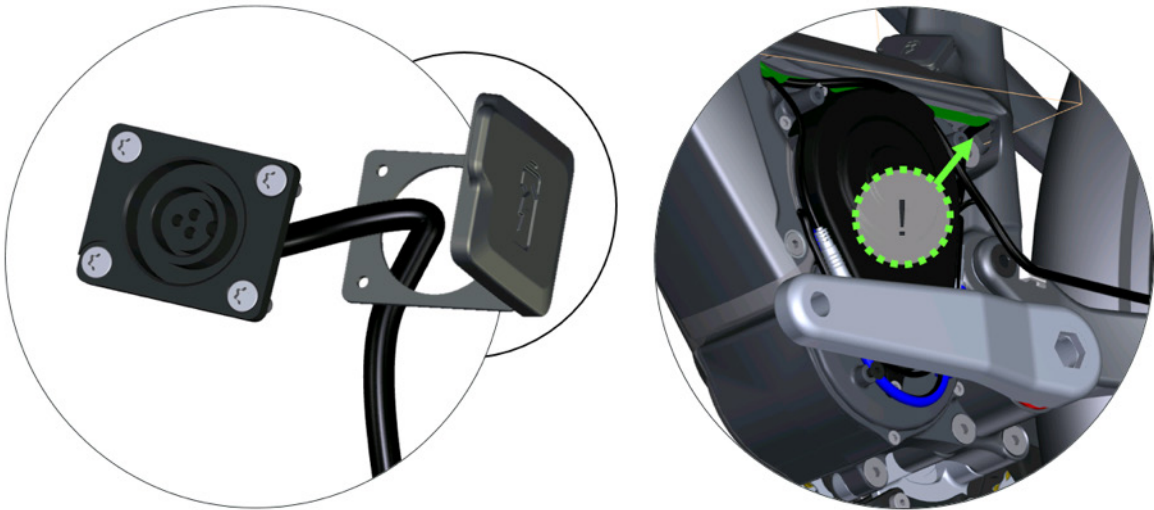
Qty	Item	Part No.	Revision	Description
1	CHARGE PORT	1977005	NIL	CHARGE PORT
4	SCREW, M3x12 TORX	1807117	NIL	C'SUNK SOCKET SCREW, M3-0.5 x 12MM TORX, STAINLESS STEEL W/BUE LOCTITE
1	CHARGE PORT COVER	1997079	B	CHARGE PORT RUBBER CAP, BLACK RUBBER

TOOLS NEEDED

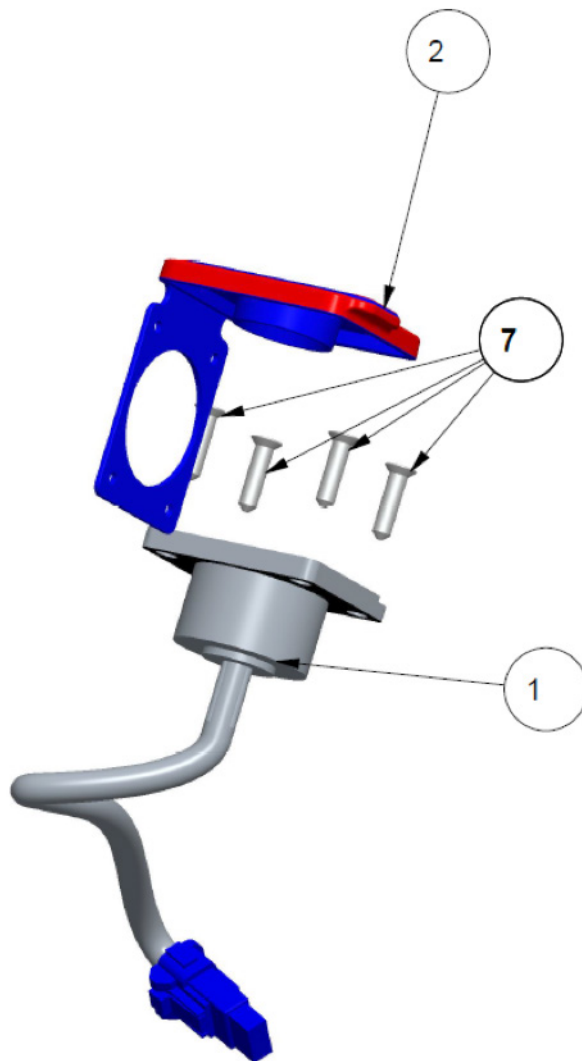
- Hex Keys

ASSEMBLY

1. Locate the rubber cap onto the charge port cable assembly by feeding the wire through the hole.
2. Feed the Battery charge port 2 pin connector down the seat tube, and out the port near the upper rear motor mount location.



3. Making sure the rubber flap is aligned with the holes, insert the M3 torx screws into their locations.



4. Torque M3 bolts to 2Nm.
5. Make sure the rubber cap stays in the closed position, protecting the charge port.

Frame Cabling

PARTS NEEDED

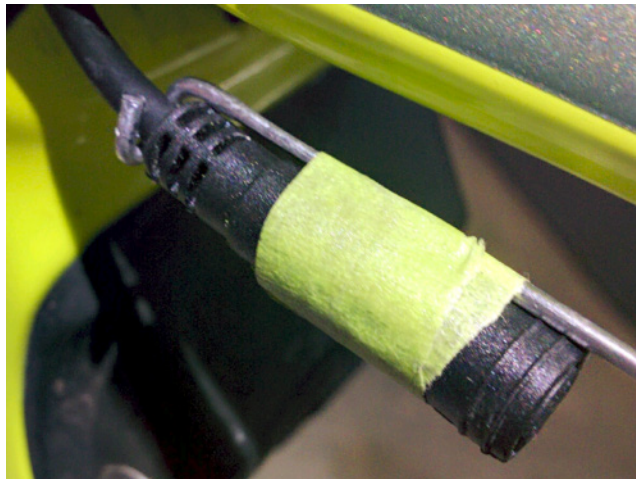
Qty	Item	Part No.	Revision	Description
1	CONNECTOR CABLE	1977012	NIL	DOWN TUBE CABLE JOYSTICK
1	REAR BRAKE	N/A	NIL	REAR BRAKE WITH ASSOCIATED HYDRAULIC HOSE AND FITTINGS
1	SHIFT CABLE HOUSING	N/A	NIL	SHIFT CABLE HOUSING FOR REAR DERAILLEUR
1	DROPPER CABLE HOUSING	N/A	NIL	DROPPER POST CABLE HOUSING

TOOLS NEEDED

- Wire feed tool
- Wire collecting tool (spoke)
- Flashlight

JOYSTICK HIGO CABLE

1. This cable should be installed first, from Head tube to Left forward motor mount port, being pulled through with a wire feed tool, as shown below:
 - a. Ensure female end of Higo cable goes towards the motor

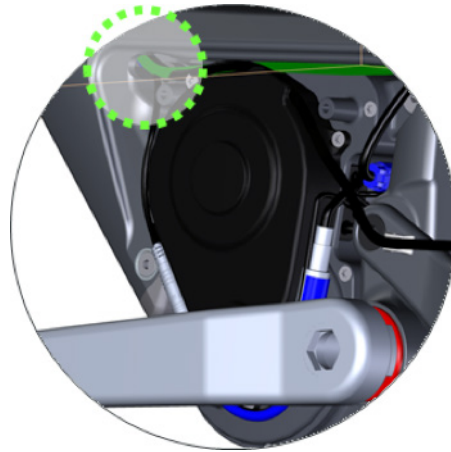


REAR BRAKE HOSE

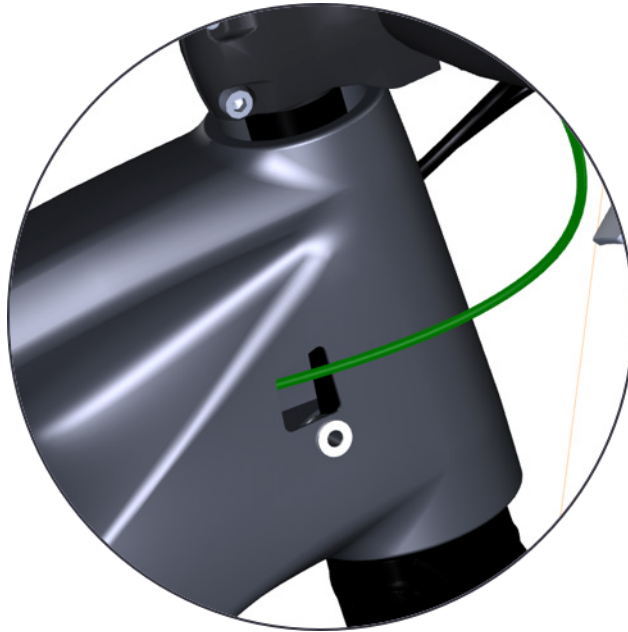
1. Install the rear brake on the seat stay.
2. Loosely cable tie the hose to the Left side of the chain stay (x3).
3. Do not place the forward-most cable tie at the main pivot.
4. Insert the hose up the Left forward motor mount port to the Left Head tube port.
5. Retrieve the hose end from the head tube port using the J-bend of a spoke.
6. Pull the hose through.
7. Place the rubber cover, olive, and end fitting on the hose. Insert end fitting if needed (Sram).
8. Connect the rear brake lever to the hose as per manufacturer's instructions.
9. Bleed brake as per manufacturer's instructions.

DROPPER POST CABLE

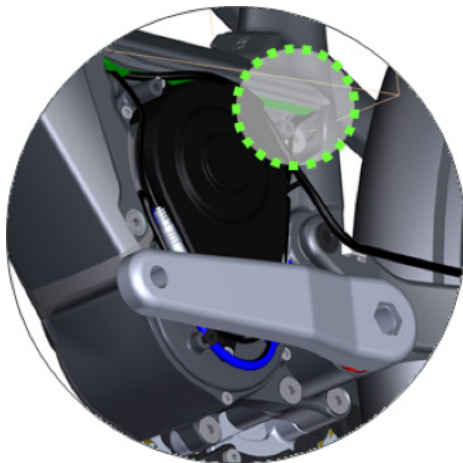
1. Insert the housing up the Left forward motor mount port to the Right Head tube port.



2. Retrieve the housing end from the head tube port using the J-bend of a spoke.



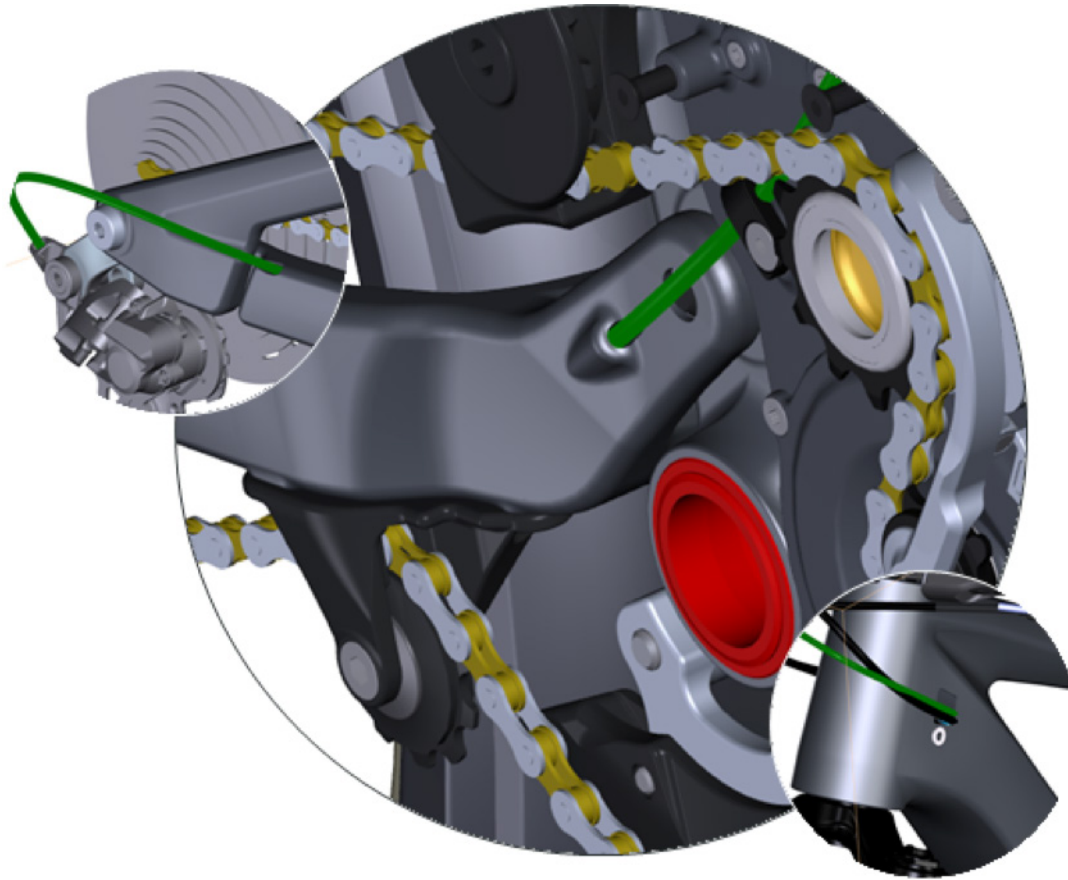
3. Pull the housing through.
4. Insert the other end up the Left rear motor mount port at the seat tube:



- a. Feed it up until it appears at the seat collar.
- b. Making sure a seat collar has been placed on the frame, install dropper post as per manufacturer's instructions.

REAR DERAILLEUR CABLE

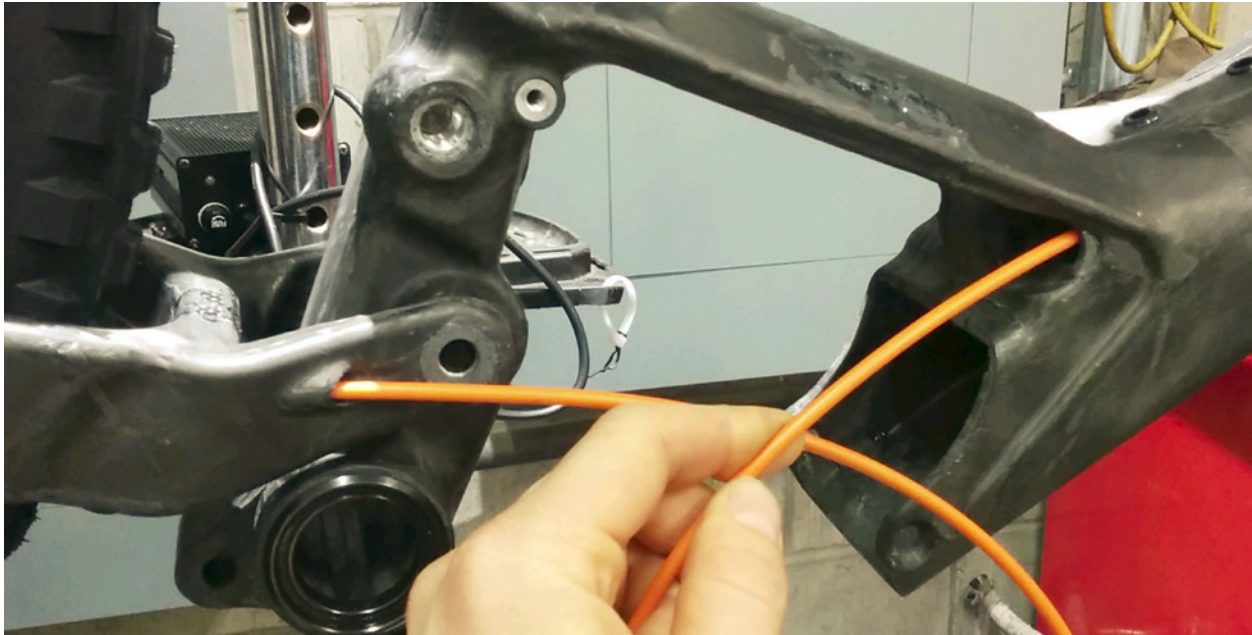
1. Route the derailleur housing into the Right side of the chain stay near the main pivot.



2. This housing should slide through a tunnel in the carbon.



3. Feed the other end up the right forward motor mount port up to the Left Head tube port.



4. Retrieve the housing end from the head tube port using the J-bend of a spoke.
5. The rear derailleur and shifter installation is as per manufacturer's instruction.

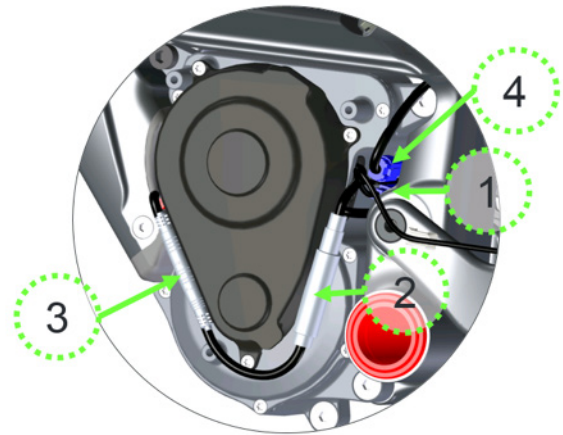
Powerplay Drive Removal

TOOLS NEEDED

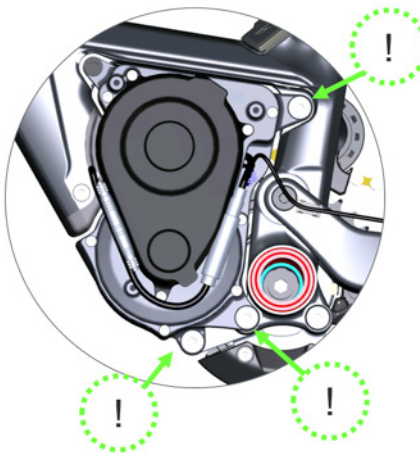
REMOVAL

1. Disconnect all 4 electrical cables:

1. Speed sensor connector
2. Battery connector
3. iWoc connector
4. Charge port connector



2. Remove torque arm (see section Torque Arm Removal).
3. Remove lower bash bracket countersunk & upper rear motor mount M8 screws.



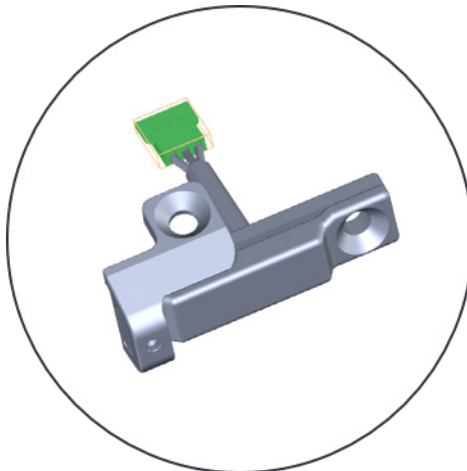
4. Slide motor out the left side of the bicycle.

Torque Replacement Sensor

1. Remove Powerplay drive.
2. Unscrew 2x M4 screws holding sensor bracket in place.



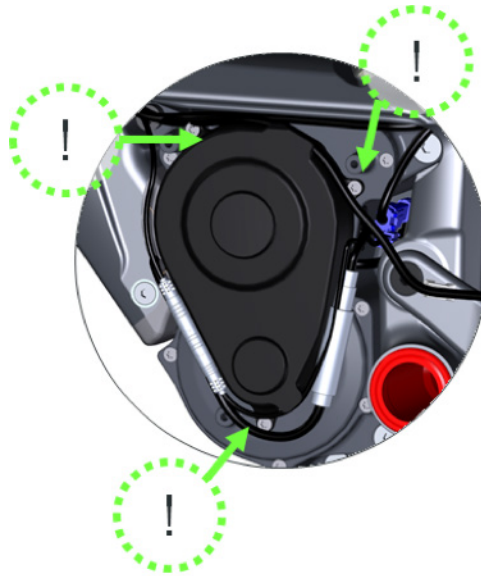
3. Gently pull sensor bracket away from Powerplay drive case.
4. Disconnect 3 pin connector on sensor from drive.
5. Separate sensor from sensor bracket by loosening grub screw (fig 10) and prying apart.
6. With new sensor connect 3 pin connector.



7. Gently feed connector into slot in Powerplay drive case.
8. Apply hot glue to underside of sensor tray and place in position on Powerplay drive case.
9. Install 2x M4 screws and torque to 3Nm.

Powerplay Chain Replacement

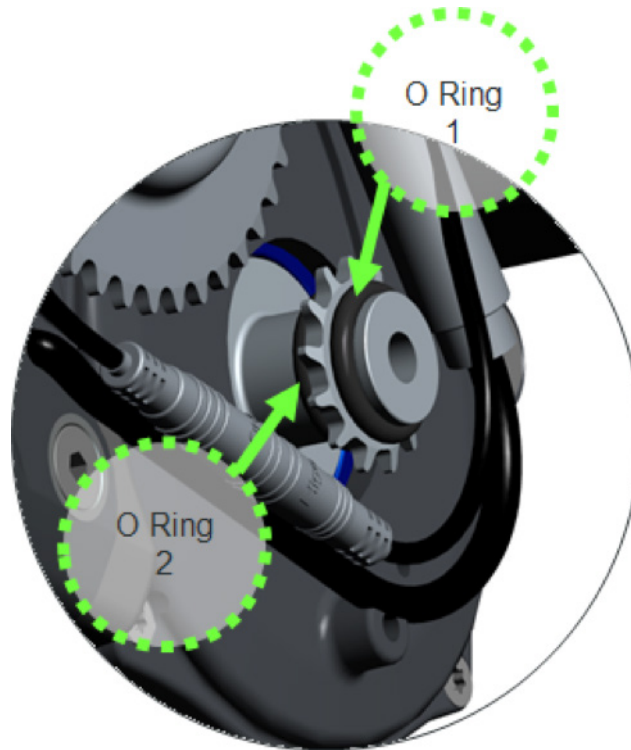
1. On left side of drive, with the motor cover removed, unscrew three M4 screws securing transfer chain cover & remove cover.



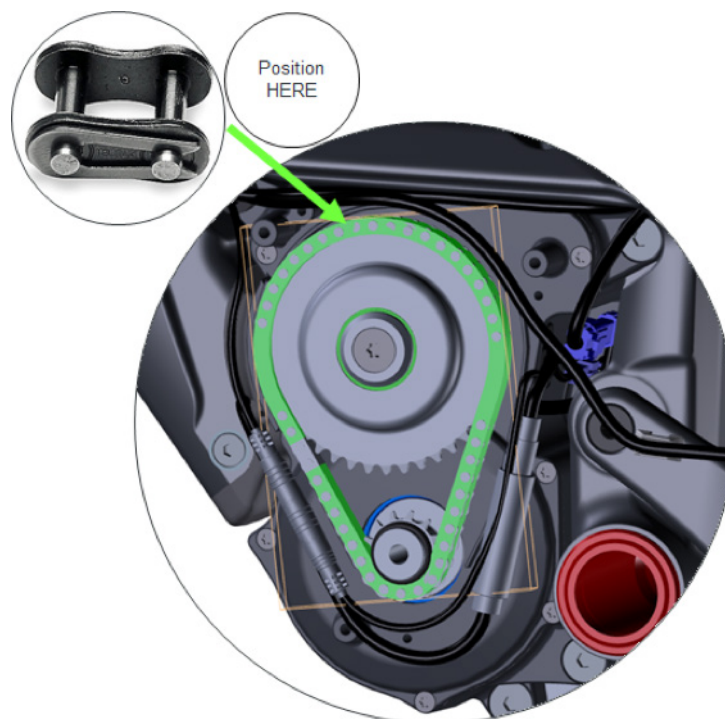
2. Locate master link on chain, clean grease off.
3. Using needle nosed pliers, carefully leverage the master link clip off the pins of the master link and remove link.



4. Remove chain.
5. Remove O-rings from motor drive pinon using a pick, and replace with new.

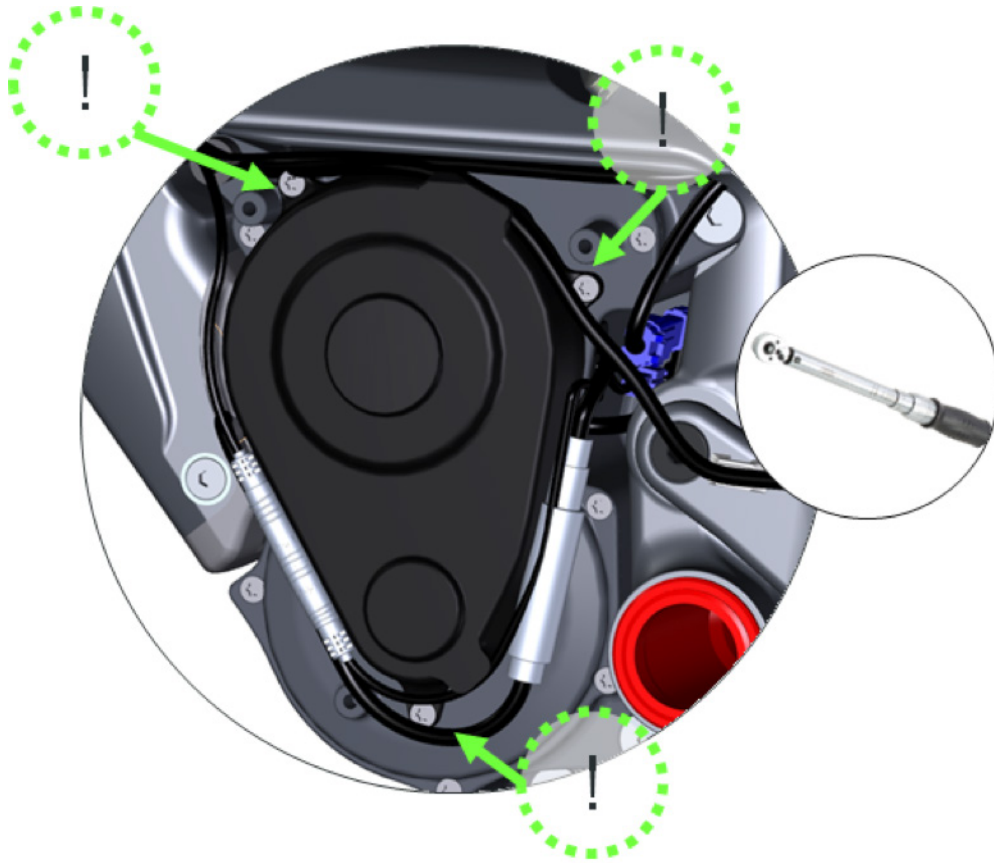


6. Install new chain by wrapping it around motor pinion then the driven gear, so that the two ends meet at the centre of the driven gear.



7. Using needle nosed pliers, carefully install the master link, from the backside, so the master link clip is accessible.
8. Cover transfer chain with grease.

9. Install transfer chain cover.
10. Install three M4 screws and torque to 2Nm.



Powerplay Installation Preparation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	COG, 12T	1347016	A	TRANSFER DRIVEN COG, 12T, MR.CONTROL P/N: TRSK-TY (WITH FLANGER)
1	LOCKRING, 12T	1347008	A	CASSETTE LOCKRING, FOR 12T COG. MR CONTROL P/N: M-HUB-12T
1	CLAMP	1997081	A	CABLE CLAMP, M5 CSUNK. AL6061-T6, HARD BLACK ANO.
1	SCREW, M5x10	180475-010	NIL	C'SUNK SOCKET SCREW, M5-0.8x10MM. ZINC PLATED 10.9 STEEL

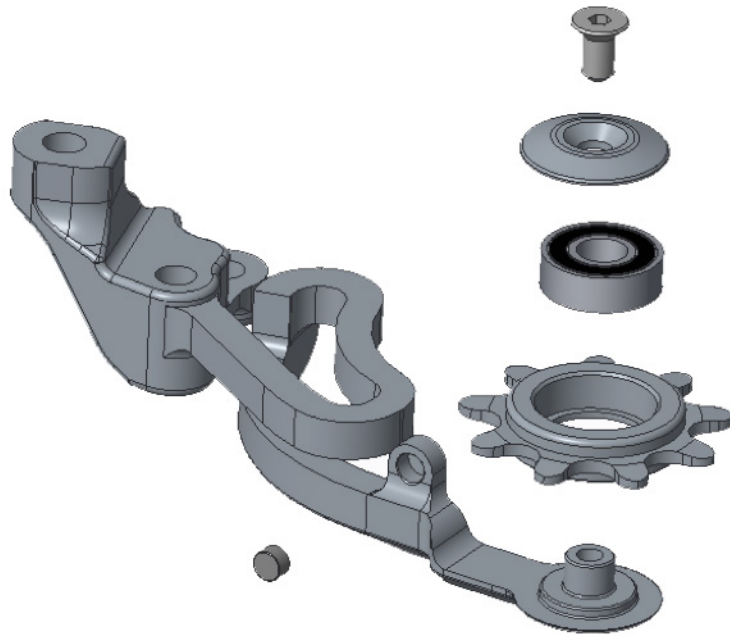
TOOLS NEEDED

- Chain whip
- Shimano Splined lock ring tool
- Arbor press
- Hex keys
- Blue Loctite

TORQUE ARM ASSEMBLY

1. Press the bearing into the 9T cog using an arbor press or vise.
2. Press the Magnet into torque arm, being wary of magnetic field orientation.

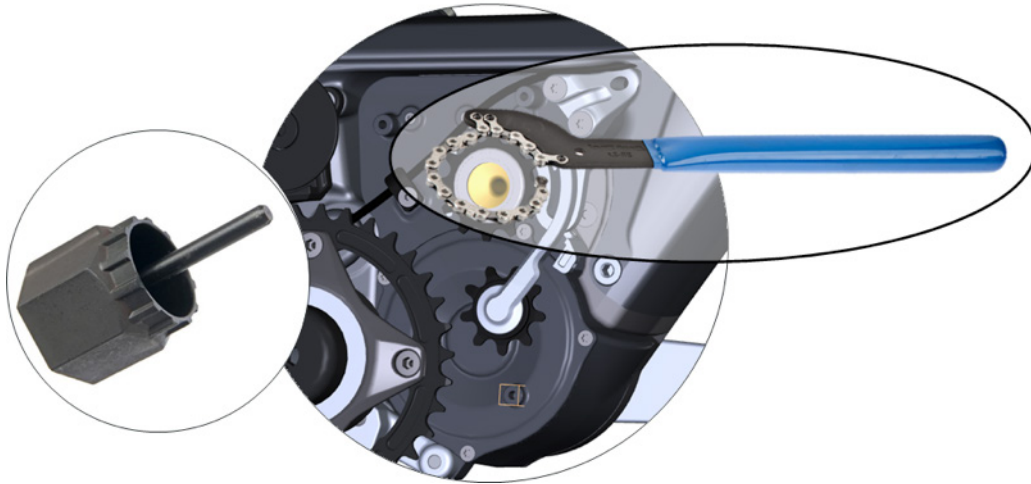
NOTE: Use a known good torque arm to gauge which orientation the magnet should go. It is helpful to use felt tipped marker to colour the outward facing end of the magnet during this process.



3. Install the 9T cog on the Torque arm in the orientation shown above.
4. Use blue Loctite on the M5 bolt, and torque to 6Nm.

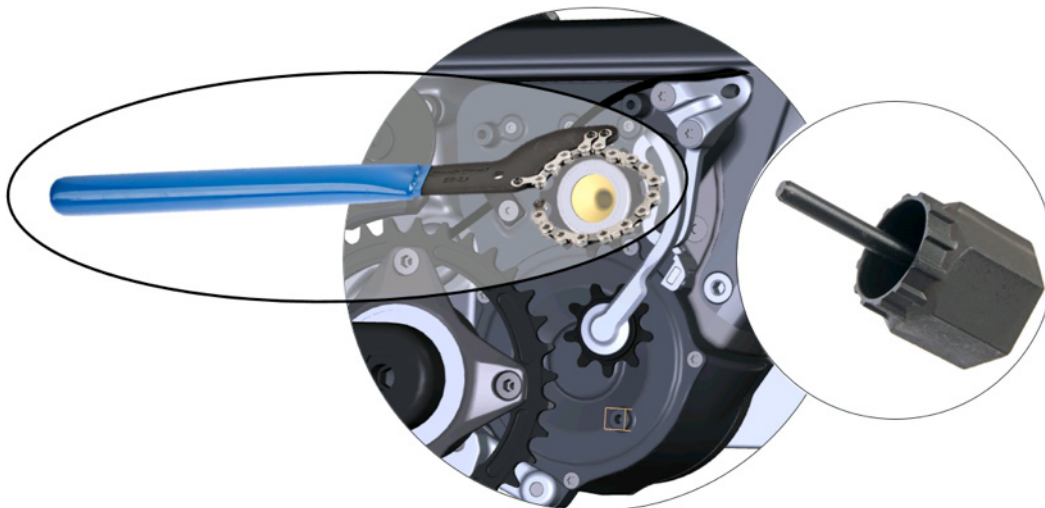
DRIVE COG REMOVAL

1. Using the Shimano splined tool, and chain whip, remove lock ring



DRIVE COG INSTALLATION

1. Locate the 12T cog on the Powerplay motor output shaft spline, making sure the shoulder is inboard, and bottomed out on the spline shoulder
2. Apply a small amount of grease to the lock ring threads.
3. Using the Shimano splined tool, and chain whip, torque the drive cog to 40 Nm.



Powerplay Drive Installation

PARTS NEEDED

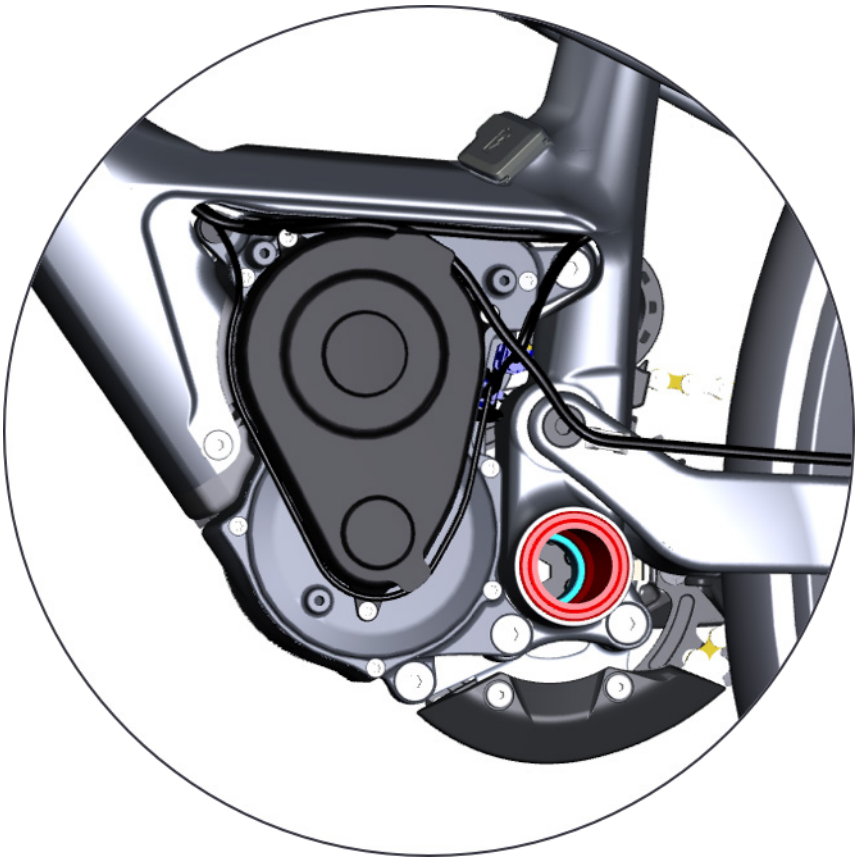
Qty	Item	Part No.	Revision	Description
1	SCREW, M8x30	1807121OVT	NIL	C'SUNK SOCKET SCREW, M8-1.25x30MM, STAINLESS STEEL

TOOLS NEEDED

- Hex keys
- Loctite

ASSEMBLY

1. The motor is installed on the left side of the bicycle.
2. Hold the base of the motor in the palm of your hand, and locate it towards the motor mounts of the bicycle.
3. Pull the rear brake hose, and dropper housing out of the way, and insert the motor into position.
4. Apply blue Loctite to the motor mount bolt.



5. Insert the upper rear motor mount bolt first and hand tighten it to hold the motor in position.

NOTE: Final torquing steps to follow in section *Motor Case Final Torqueing* on page 45.

Lower Bash Bracket Assembly

PARTS NEEDED

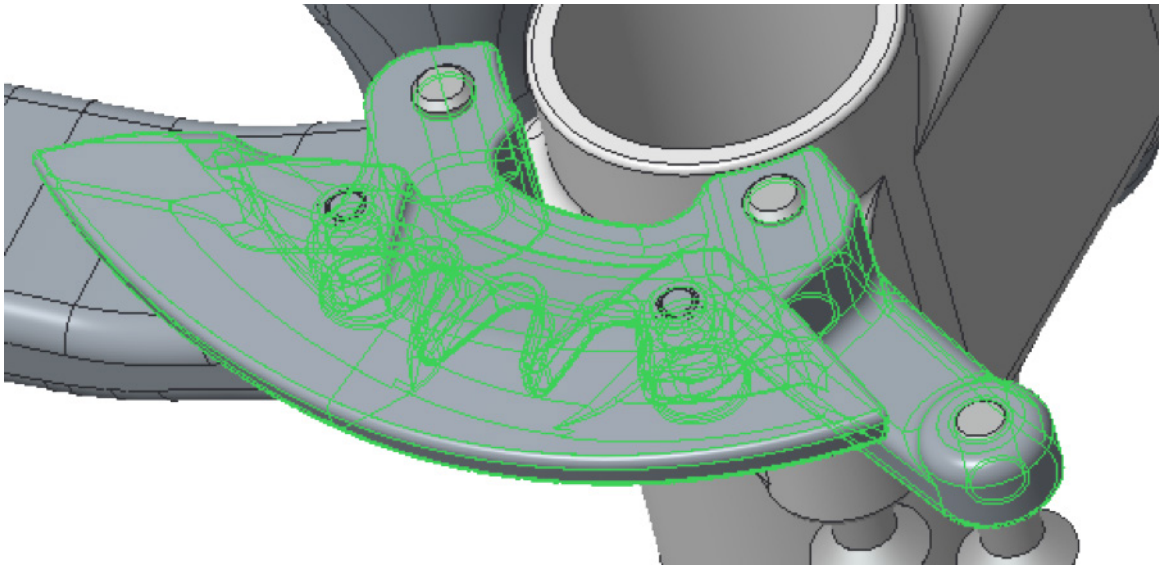
Qty	Item	Part No.	Revision	Description
1	BRACE, MOTOR	1997021	NIL	DYNAME LOWER MOTOR BRACE AND BASH MOUNT. AL6061-T6 HARD BLACK ANO.
1	BASH GUARD	1997058	A	RMB BASH GUARD
2	SCREW, SHOULDER M5 6x8	1807125	NIL	CUSTOM HEX SOC. HD. SHLD. SCR., 303 SS, M5 6x8

TOOLS NEEDED

- Hex keys

ASSEMBLY

1. Locate the Bash Guard on the bracket fingers.



2. Insert the custom Hex SS M5 screws and torque to 6Nm.

Lower Bash Installation

PARTS NEEDED

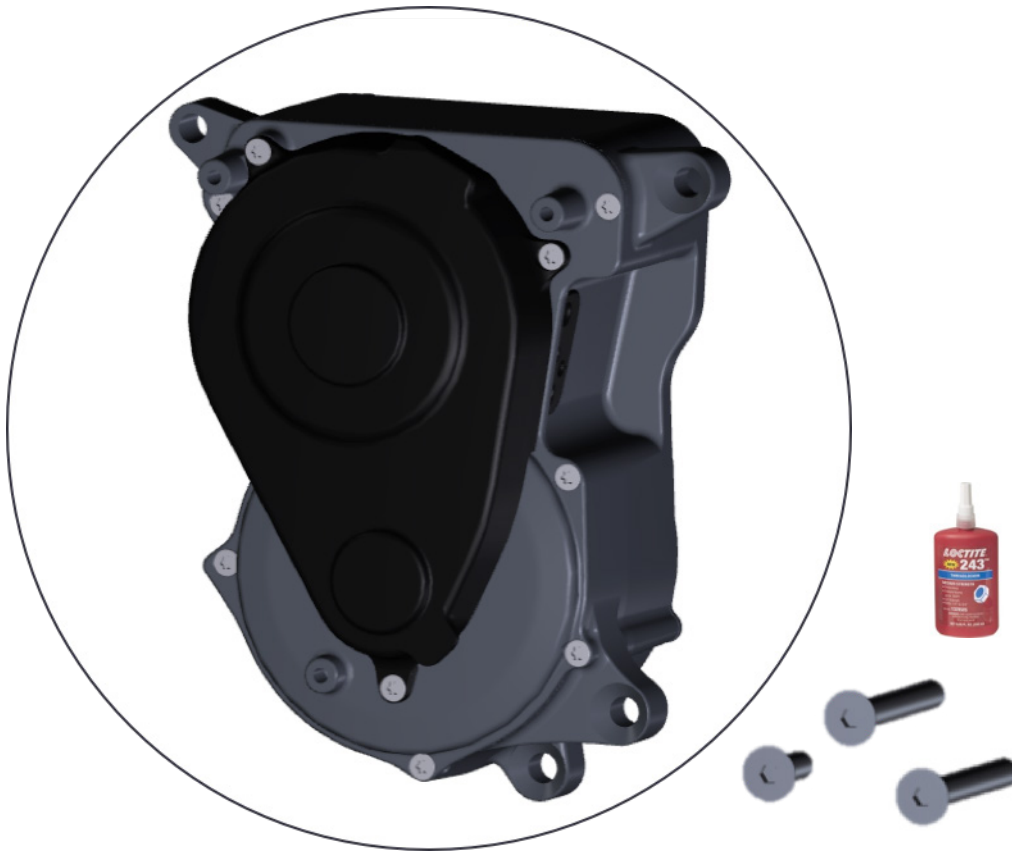
Qty	Item	Part No.	Revision	Description
1	SCREW, M8x25	1807123OVT	NIL	C'SUNK SOCKET SCREW, M8-1.25x25MM, STAINLESS STEEL
1	SCREW, M8x65	1807122OVT	A	C'SUNK SOCKET SCREW, M8-1.25x65MM, STAINLESS STEEL
1	SCREW, M8x50	1807124OVT	NIL	C'SUNK SOCKET SCREW, M8-1.25x50MM, STAINLESS STEEL
1	LOWER BASH BRACKET	N/A	NIL	LOWER BASH BRACKET ASSEMBLY

TOOLS NEEDED

- Hex keys
- Loctite 243

INSTALLATION

1. Apply blue Loctite to the three countersunk M8.



2. Locate the bash bracket assembly below the Powerplay Motor casing.



3. Insert the 30mm M8 countersunk bolt through the forward most hole.
4. Hand tighten the bolt to hold the bracket in position for the remaining two bolts.
5. Insert the 50mm bolt in the rearmost position on the bracket, hand tighten.
6. Insert the 65mm bolt in the middle position on the bracket, hand tighten.

NOTE: Final torquing steps to follow in section *Motor Case Final Torqueing* on page 45.

TORQUE ARM REMOVAL**TOOLS NEEDED**

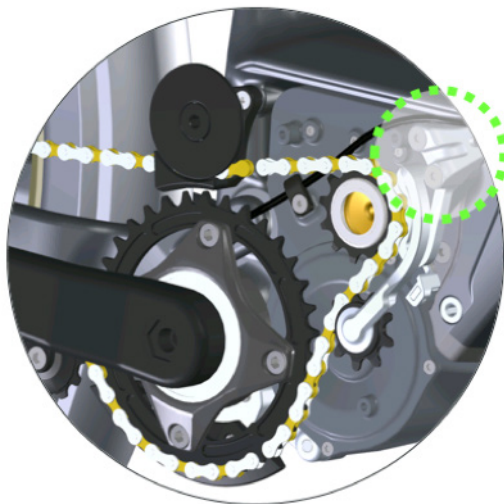
- Hex keys

REMOVAL

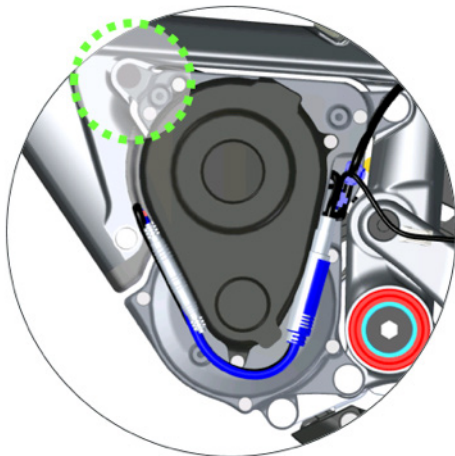
1. Unscrew 3x countersunk screws and remove drive side motor cover.
2. Disconnect chain quick link and remove chain, or move chain off drive pinion.
3. Unscrew derailleur cable hold down clamp, and move cable up and out of the way.



4. Unscrew 2x screws on torque arm.



5. Unscrew 3x countersunk screws and remove non drive side motor cover.
6. Unscrew forward motor mount bolt so it is clear of torque arm, but drive stays installed.



7. Rotate the torque arm forwards to clear the drive pinion, and pull away from motor.

Torque Arm Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	TORQUE ARM ASSEMBLY	19970203	NIL	TORQUE ARM ASSEMBLY-DYNAME 3
1	SCREW, M6x30	180359FBY-030	NIL	C'SUNK SOCKET SCREW, M6-1.0 x 30MM, STAINLESS STEEL W/BBLUE LOCTITE
1	SCREW, M6x16	180566FBY-016	NIL	FLAT HEAD C'SUNK SOCKET SCREW, M6-1.0 x 16MM, A4/316 STAINLESS STEEL
1	M8x60 BOLT	1808023OVT	NIL	SOCKET HEAD CAP SCREW; M8x60, STAINLESS STEEL

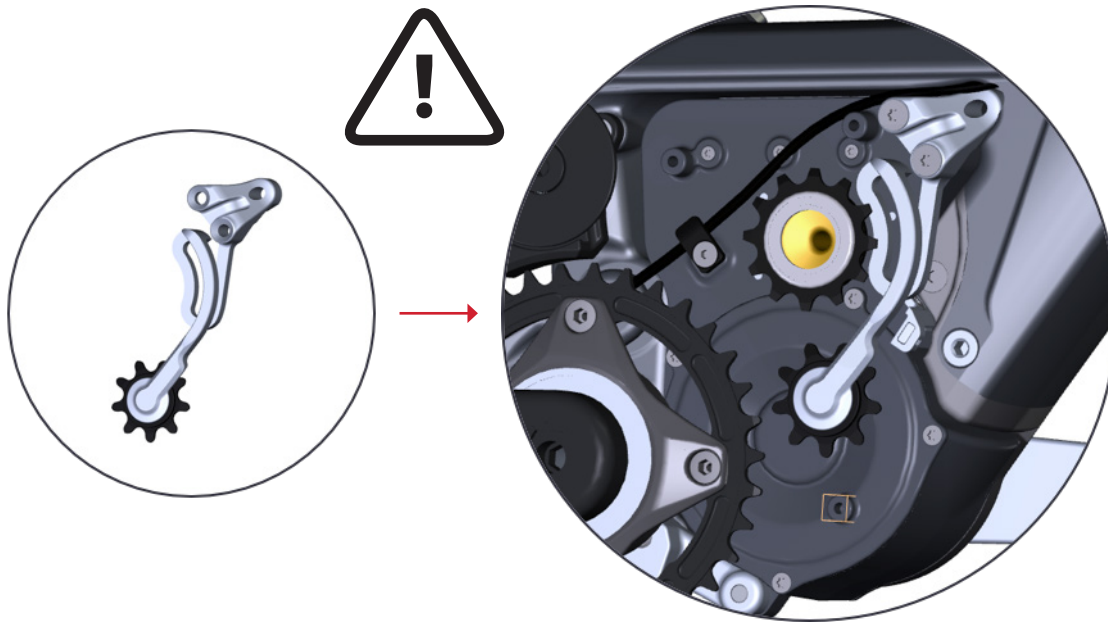
TOOLS NEEDED

- Loctite
- Hex keys

INSTALLATION

CAUTION: Ensure Powerplay drive power is OFF

1. Locate the torque arm in position against the right side of the motor, moving the rear derailleur cable out of the way if needed. The spring portion of the arm must be tucked behind the teeth of the 12T cog



2. Apply Loctite to the two M6 bolts.
3. Place the two bolts and hand tighten with an Hex key while pressing down on the torque arm lightly
4. Apply Loctite to the socket head shoulder screw.
5. Carefully feed the screw past the brake, dropper and Higo cables, and into the upper front motor mount location on the left side of the front triangle.
6. Hand tighten with a 6mm hex key

NOTE: Final torquing steps to follow in section *Motor Case Final Torqueing* on page 45.

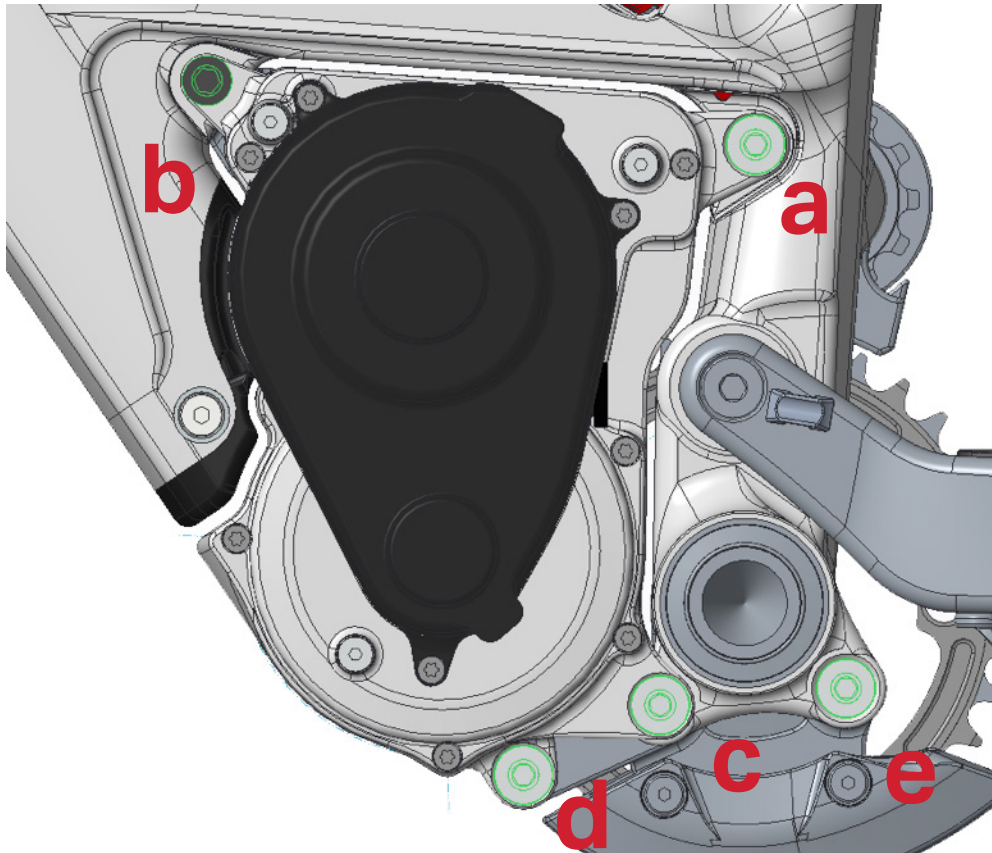
Motor Case Final Torqueing

TOOLS NEEDED

- 4, 5, 6 mm Hex Key
- Torque wrench with 4, 5 and 6mm bits

PROCEDURE

1. Once all five M8 motor bolts are in place, the final torqueing can occur.
2. First, torque the two torque arm M6 counter sunk bolts to 10Nm while pushing down on torque arm.



3. Torque the bolts first to 10Nm, then to 14Nm in the following sequence:
 - a. Upper rear
 - b. Upper front
 - c. Bb front (middle bash bracket)
 - d. Front bash bracket
 - e. Rear bash bracket

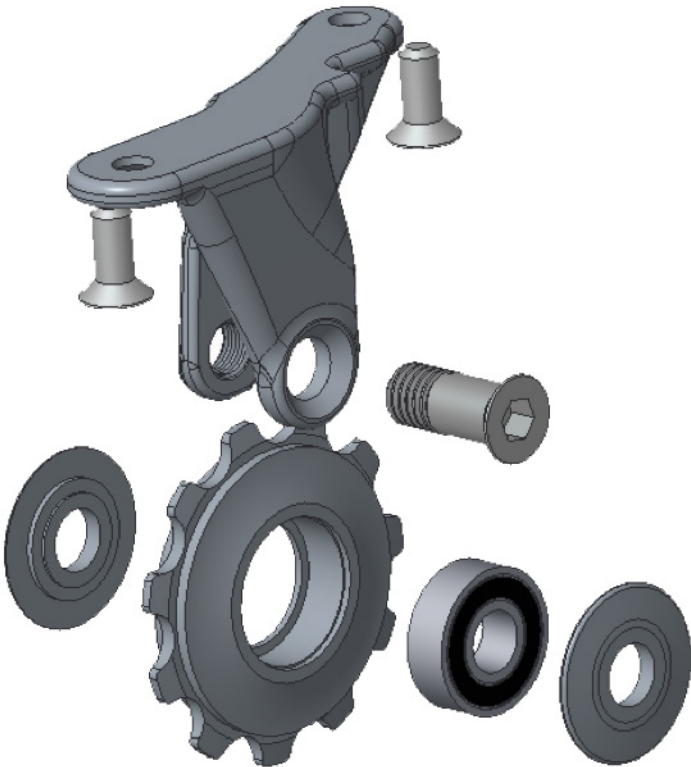
Chainstay Pulley Assembly

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	11T COG	1347012	NIL	11T COG, FOR 19MM BEARING
1	BEARING, 698	1807036	NIL	ENDURO 698 LLU 19X8X6
1	BOLT, M8x18	1807126	NIL	BOLT M8x18MM CUSTOM 6061 HARD BLACK ANO.
1	CHAIN GUIDE ARM	1397004	B	E-ALTITUDE CHAINSTAY PULLEY GUIDE
2	SCREW, M5x12	1807152	NIL	C'SUNK SOCKET SCREW, M5-0.8x12MM STAINLESS STEEL
2	SPACER, PULLEY GUIDE	1347013	A	CHAINSTAY PULLEY GUIDE SPACER

TOOLS NEEDED

- Arbor press
- Loctite
- Hex Keys



ASSEMBLY

- 1. Install the bearing in the 11T pulley using an arbor press.
- 2. Locate the pulley and spacers within the bracket and align all bores concentrically.
- 3. Apply blue Loctite to the Axle bolt.
- 4. Install axle bolt through assembly and tighten to 12Nm.

Chainstay Pulley Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	LOWER IDLER ASSEMBLY	N/A	NIL	LOWER IDLER ASSEMBLY
2	SCREW, M5x12	1807152	NIL	C'SUNK SOCKET SCREW, M5-0.8x12MM. STAINLESS STEEL

TOOLS NEEDED

- Loctite
- Hex Keys

ASSEMBLY

1. Locate the chain stay pulley assembly underneath the right side of the chain stay.
2. Install screws with Loctite and hand tighten both.
3. Torque both screws to 6Nm.

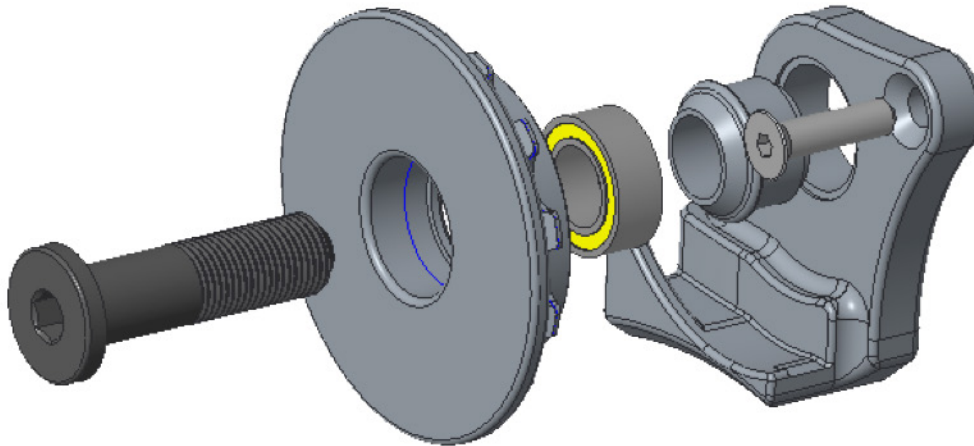
Mid Drive Pulley Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	AXLE, MID DRIVE	1457014	A	MID DRIVE PULLEY AXLE, M11x1MM 40MM, AL7075-T6 HARD BLACK ANO
1	BEARING, DR 11197	1807034	NIL	SLAYER REAR PIVOTS BEARING, DR 11197 LLU MAX, ENDURO
1	PULLEY BRACKET	1997059	A	MID DRIVE PULLEY PLATE AND GUIDE
1	PULLEY, MID-DRIVE	1347014	A	MID DRIVE PULLEY, 12T, BLACK DELRIN PLASTIC
1	SCREW, M5x20	1807151	NIL	C`SUNK SOCKET SCREW, M5-0.8x20MM. A2 SS.
1	SPACER	1808022	NIL	MID-DRIVE PULLEY SPACER. 6061-T6. HARD BLACK ANO

TOOLS NEEDED

- Loctite
- Hex Keys



INSTALLATION

1. Press the DR11197 bearing into the mid drive pulley.
2. Press the spacer into the mid drive pulley bracket.
3. Locate the mid drive pulley bracket upon its support on the Front triangle.
4. Install the countersunk M5 bolt in the upper corner of the bracket to hold it in place. Hand tighten so the bracket can still be aligned.
5. Apply grease to the M11x1 threads of mid drive pulley axle.
6. Install M11 bolt without the pulley, and ensure the bracket and Front triangle bore are aligned.
7. Torque the M5 countersunk bolt to 4Nm.
8. Remove the M11 bolt.
9. Place the pulley in location on the bracket, concentric with the pulley spacer.
10. Install the M11 bolt and torque to 10Nm.

Rear Wheel Assembly

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	MAGNET	1997068	NIL	SPEED SENSOR MAGNET
1	SPEED SENSOR	1977007	NIL	SPEED SENSOR CBLE R WHEEL D3
1	SPEED SENSOR	1997069	A	SPEED SENSOR MAGNET HOLDER
1	SCREW	1808028	NIL	DOME HEAD SCREW, M5x12MM, GRADE 10.9 STEEL, BLACK OXIDE, TORX

TOOLS NEEDED

- Arbor press
- T25 Torx driver

INSTALLATION

1. Install Magnet into magnet holder using an arbor press.
2. Install rotor as per manufacturer's instructions, Magnet orientation is not critical.
3. Make sure to use the two longer 12mm screws to go through the speed sensor holder.

Cassette Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	CASSETTE	N/A	NIL	SRAM EX1 CASSETTE

TOOLS NEEDED

- Vise
- Shimano spline Lock-ring tool

INSTALLATION

1. Apply grease to lock ring threads.
2. Torque no less than manufacturers suggestion of 40Nm.

Rear Axle & Rear Derailleur Hanger

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	AXLE WASHER	3227006	B	WASHER, 12x19x0.5MM, 304 SS
1	AXLE, 12MM x 173MM	3227009	B	2017 ELEMENT REAR AXLE 12MM x 173MM, HARD BLACK ANO
1	HANGER	1097132	A	REAR DER. HANGER, INT. LH THREAD, STANDARD MOUNT (USE FOR SRAM)
1	HANGER	3227002	F	REAR DER. HANGER, INT. LH THREAD, SHIMANO DIRECT MOUNT (SHOWN)
1	HANGER BOLT	3227001	E	HANGER BOLT, EXT 16MM LH THREAD, AL6061-T6, HARD BLACK ANO.

TOOLS NEEDED

- Loctite 243
- 6mm Hex key

	
1. Apply Loctite 243 (blue) to Hanger Bolt threads. Note: Axle Nut and derailleur hanger are left hand (reverse) threaded! Turn counter-clockwise to tighten.	2. a. Pass Hanger bolt through seat stay, and thread into derailleur hanger, turning counter clockwise b. Torque to 20 Nm.
3. Grease Rear Axle (3227009) body and threads.	4. a. Pass Rear Axle through Stainless Steel Washer, left seat stay, hub, and thread into the hanger bolt. b. With hub installed, torque to 10 Nm.

Rear Derailleur Installation

PARTS NEEDED

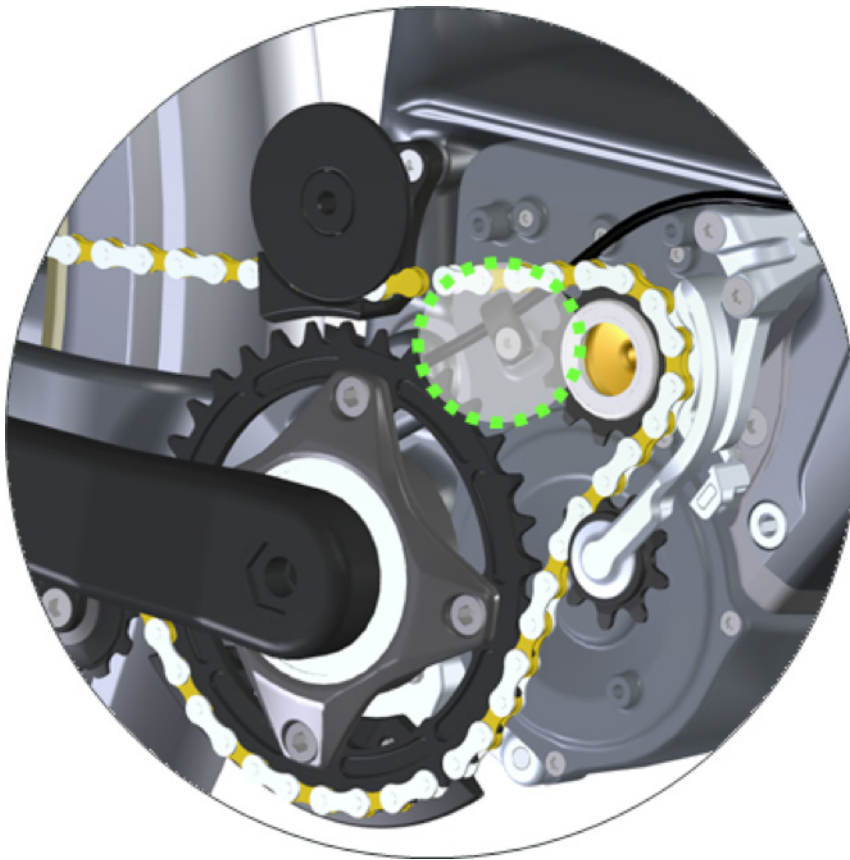
Qty	Item	Part No.	Revision	Description
1	SCREW, M5x10	180475-010	NIL	C'SUNK SOCKET SCREW, M5-0.8x10MM. ZINC PLATED 10.9 STEEL
1	CLAMP	1997081	A	CABLE CLAMP, M5 CSUNK. AL6061-T6, HARD BLACK ANO.
1	REAR DERAILLEUR	1807125	NIL	SRAM EX1
1	HOUSING	N/A	NIL	4MM SHIFT HOUSING, WITH END FERRULES, ____CM
2	CABLE TIES	N/A	NIL	BLACK

TOOLS NEEDED

- Hex keys

INSTALLATION

1. With the motor in place on the front triangle, and the rear derailleur cable passed through the Chain stay and the front triangle, observe the small M5 tapped hole on the right side of the motor case.
2. Install a cable retainer clip on this location with an M5 countersunk screw.
3. Torque to 4Nm.



Chain Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	CHAIN	N/A	NIL	SRAM EX1 CHAIN, 62 COMPLETE LINKS, INCLUDING QUICK LINK

TOOLS NEEDED

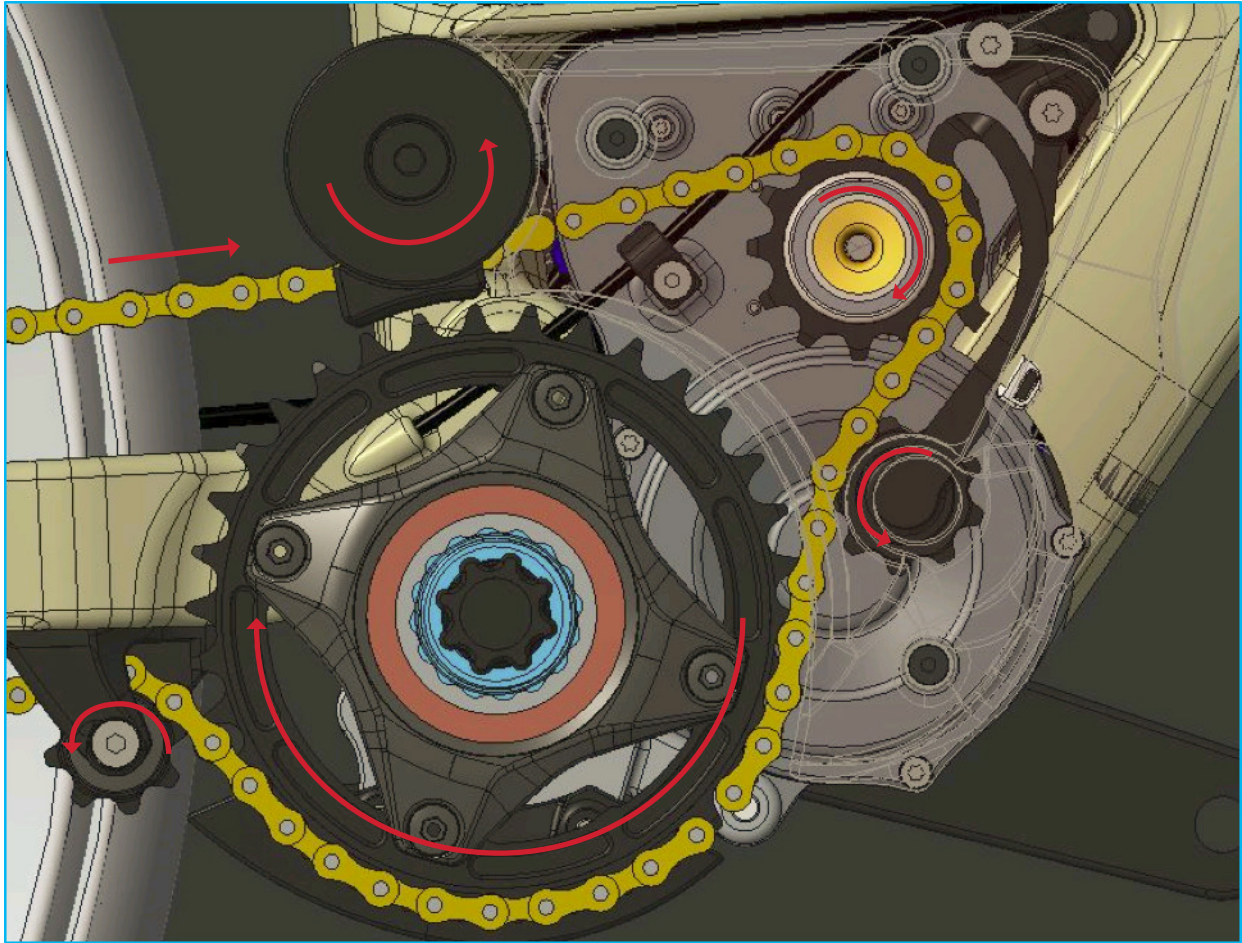
- No tools required.

INSTALLATION

CAUTION: Verify on iWoc remote that Powerplay drive is OFF



- Route the chain in the following order:
 - Under the Mid drive Pulley, through its guide
 - Over the Drive sprocket
 - Over the torque arm sprocket
 - Under the chain ring, ensuring that the narrow and wide teeth align with the chain
 - Over the lower chain stay pulley



2. Leave a length of chain hanging from the lower chain stay pulley (approx. 5 complete links).
3. Route the other end of the chain over the smallest cassette cog, then through the derailleur cage.
4. Once the chain is hanging through the derailleur cage, the ends can be connected.
5. Using an appropriate quick link, join the chain.
6. Rotate the cranks forward, so the quick link is on the top (tension side) of the chain.
7. Use the crank arm to lock the quick link in its extended/closed position.

Speed Sensor Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	CLAMP	1997081	A	CABLE CLAMP, M5 CSUNK. AL6061-T6, HARD BLACK ANO.
1	SPEED SENSOR	1977007	NIL	SPEED SENSOR, CABLE, 2 PIN CONNECTOR
2	SCREW, M5x10	180475-010	NIL	C'SUNK SOCKET SCREW, M5-0.8 x 10MM. ZINC PLATED 10.9 STEEL

TOOLS NEEDED

- Hex keys



ASSEMBLY

1. Locate the speed sensor in the cradle.
2. Install M5x10 counter sunk screw with blue Loctite, Torque to 4Nm.

Other Bicycle Components

These parts are OEM components and are installed using traditional methods. This section is intended as a guide to show how Altitude Powerplay assembly differs from that of a regular bicycle

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
2	SCREW, M5x16	1806009	NIL	FLAT HEAD C'SUNK SOCKET SCREW, M5-0.8 x 16MM, ALUMINIUM
1	HT PANEL LEFT	1097136	C	HT PORT PANEL, LEFT
2	HT PANEL RIGHT	1097140	C	HT PORT PANEL, RIGHT
1	USB HOLDER	1998015	NIL	E-ALTITUDE USB HOLDER BRACKET
1	IWOC REMOTE	1977011	NIL	IWOC REMOTE WITH USB PORT
1	FORK	N/A	NIL	SUSPENSION FORK
1	HEADSET	N/A	NIL	FSA KNOCK BLOCK HEADSET
1	STEM	N/A	NIL	STEM
1	BAR	N/A	NIL	HANDLE BAR
	CABLE TIE	N/A	NIL	CABLE TIES

Headset Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	HEADSET	N/A	NIL	FSA KNOCK BLOCK HEADSET

TOOLS NEEDED

- Headset press
- Appropriate adapter to allow upper headset cup to be pressed
- Hex Keys

INSTALLATION

1. Grease the outside of the upper headset cup.
2. Align the laser etched line on the upper head set cup at the very front of the bike.
3. Use the adapter to align the cup with the headset press in place.
4. Carefully compress the cup into position.
5. Install the lower cup normally.

Fork Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	FORK	N/A	NIL	SUSPENSION FORK
1	STEM	N/A	B	STEM
1	HANDLE BAR	N/A	NIL	HANDLEBAR
1	USB HOLDER	1998015	NIL	E-ALTITUDE USB HOLDER BRACKET
1	HEADSET	N/A	NIL	FSA KNOCK BLOCK HEADSET

- Install the fork as per headset manufacturer's instruction.
- If using an FSA HBS headset, be sure to clamp the upper clamp of the headset with the fork aligned straight.
- Install one spacer on the upper clamp.
- Place the USB-on-wire bracket on the steerer tube.
- Install one more spacer on the USB-on-wire bracket.
- Install the Stem on the steerer tube.
- Install remaining spacers and compression cap.

iWoc Remote Installation

PARTS NEEDED

Qty	Item	Part No.	Revision	Description
1	JOYSTICK	1977011	NIL	JOYSTICK WITH USB PORT
1	USB HOLDER	1998015	B	E-ALTITUDE USB HOLDER BRACKET
2	CABLE TIES	N/A	NIL	4MM CABLE TIES

TOOLS NEEDED

- Wire cutters

ASSEMBLY



1. Route cable tie UP through the two holes, and beside the stem during placement.
2. Once USB-on-Wire is placed in the cradle, rotate the zip ties back towards the front, then around the plastic part.
3. Pull the zip ties snug, and clip the wires.

Wire Connections

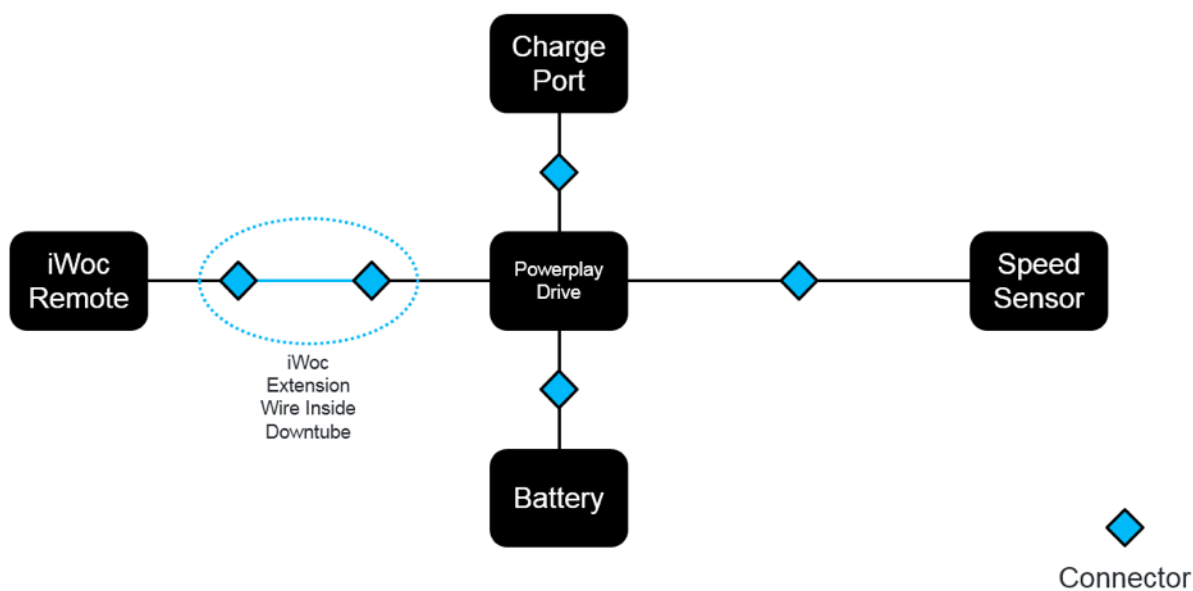
PARTS NEEDED

Qty	Item	Part No.	Revision	Description
X	CABLE TIE	N/A	NIL	4MM CABLE TIES

TOOLS NEEDED

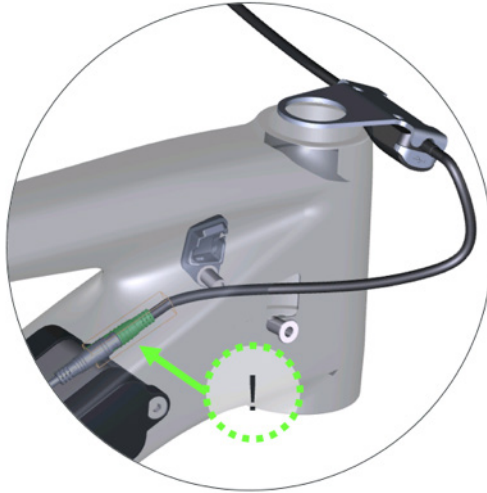
- Wire cutters

BLOCK DIAGRAM

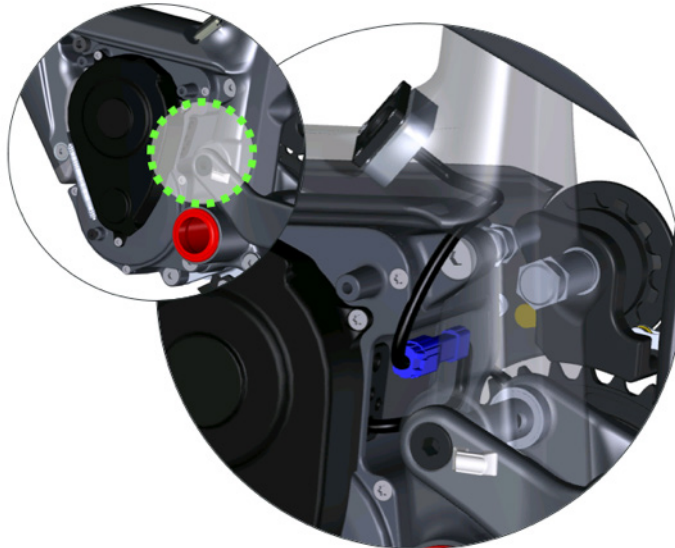


ASSEMBLY

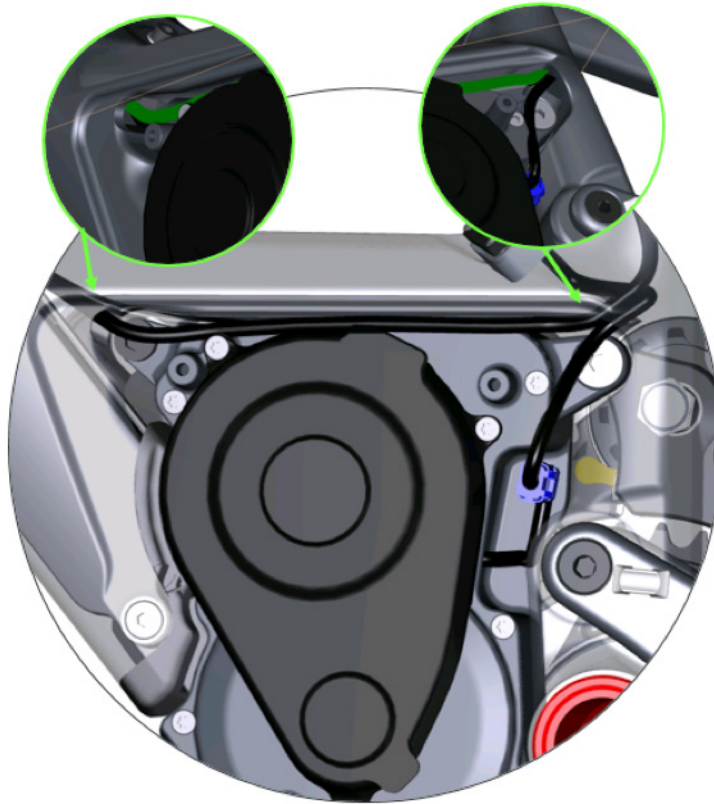
1. Connect the iWoc remote to the Higo extension cable



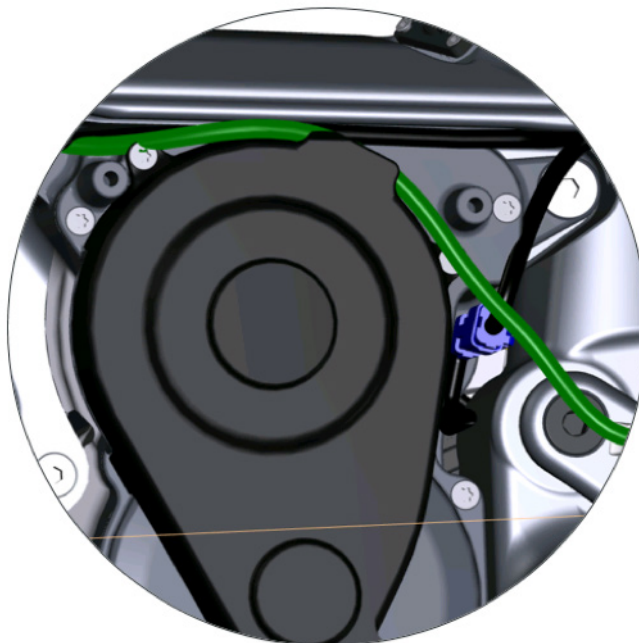
2. With Powerplay drive installed in front triangle, and working on the left side of the bicycle:
 - a. Connect charge port 2 Pin connector, push joined connector in cavity behind Powerplay drive.



- b. Push dropper post housing into cavity above Powerplay drive.



- c. Push Rear brake hose into cavity above Powerplay drive.



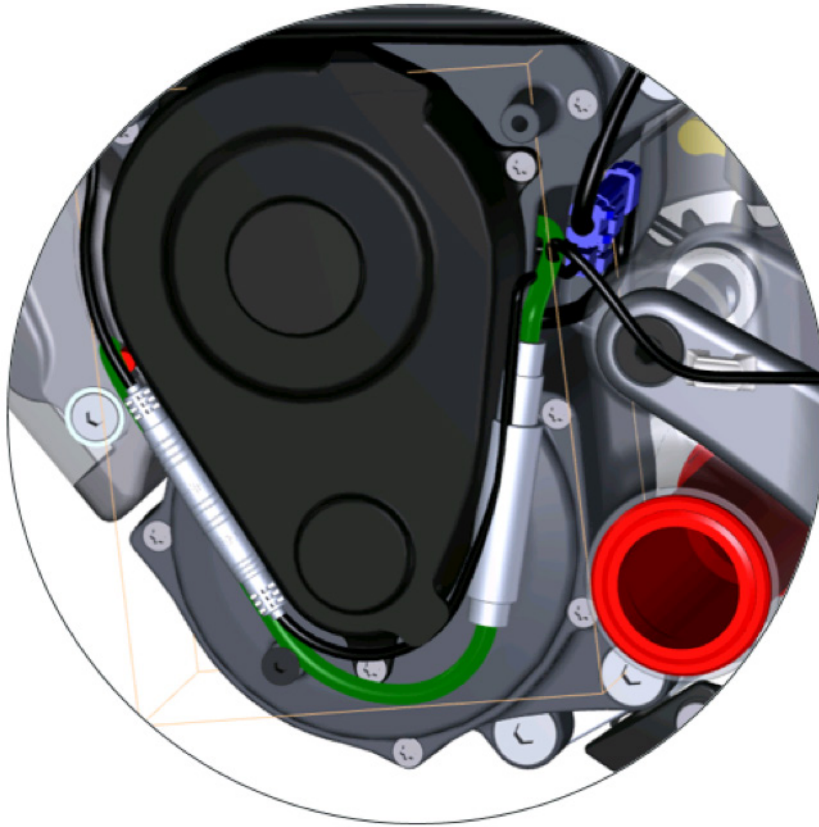
- d. Connect 5 pin iWoc extension cable and place it next to transfer chain cover. Pull extension cable taut by feeding it back into downtube.



- e. Connect 2 pin Speed Sensor connector, and place it in the cavity behind Powerplay drive. Leave wire accessible.



- f. Connect 3-Pin Battery connector, and place it next to transfer chain cover.

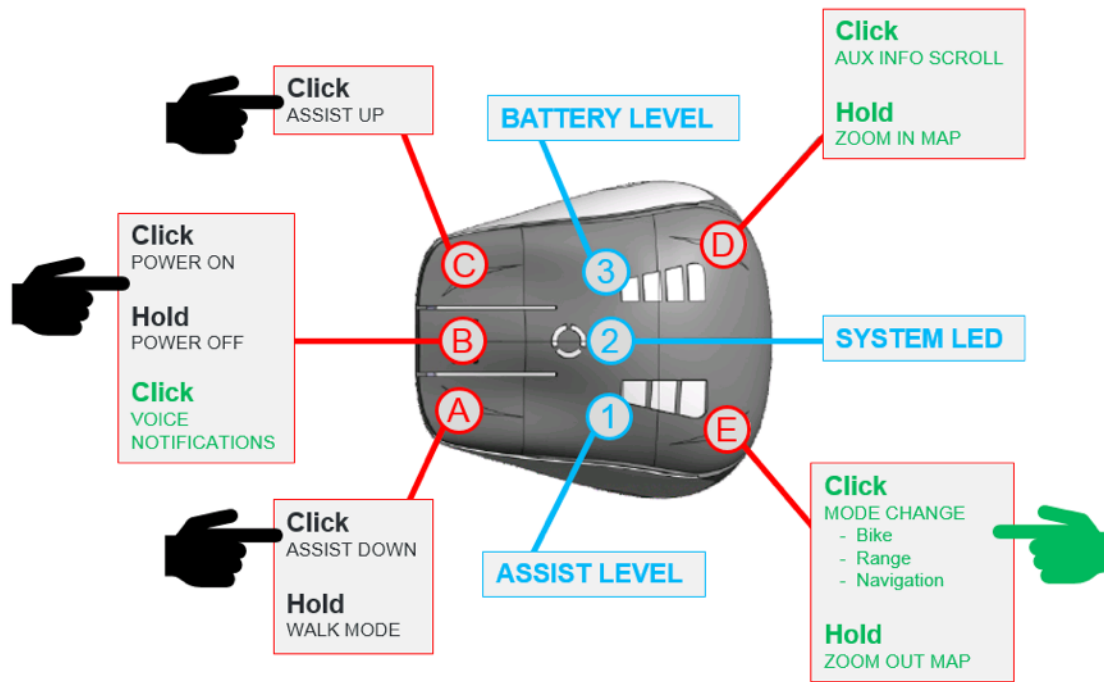


CAUTION: The bike power is now live

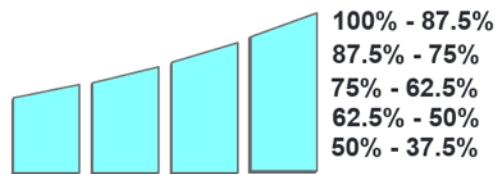


3. Verify iWoc and motor functionality (see section *Functional Check* on page 66).

IWOC FUNCTIONALITY

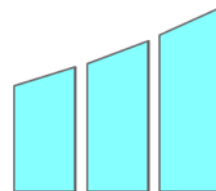


Battery Level



Each change of state = 12.5% Drop

Assistance Level



On / OK / Incoming Call



Off / Error



Bluetooth Functions

Functional Check

WARNING

If bicycle is in stand, ensure rear wheel and cranks are clear to move.



INSTRUCTIONS

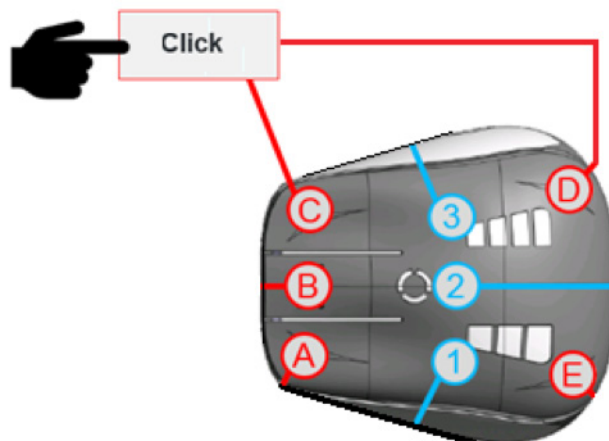
1. With complete bicycle, power up the iWoc remote. Ensure boot up sequence happens on LEDs.
2. Perform zero calibration (see section *Torque Sensor Calibration*).
3. Press the power down button, ensure walk mode engages.

Torque Sensor Calibration

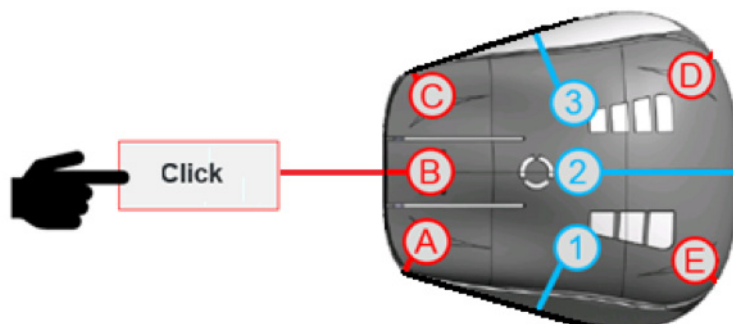
CAUTION: Ensure bike is static on the ground, with NO RIDER WEIGHT on the bike. You may perform this operation STRADDLING the bicycle.



1. Rotate the cranks and shift the bike into the largest rear cassette cog
2. Press the two top buttons (BUTTONS C AND D) on the joystick at the same time to start the calibration. You will see the power LED flash red



3. Gently tap the pedal with little force to ensure that the torque sensor resets itself to 'zero' by the derailleur tension.
4. With both feet on the ground and no mass on the pedals, Press the BUTTON B to enter this value

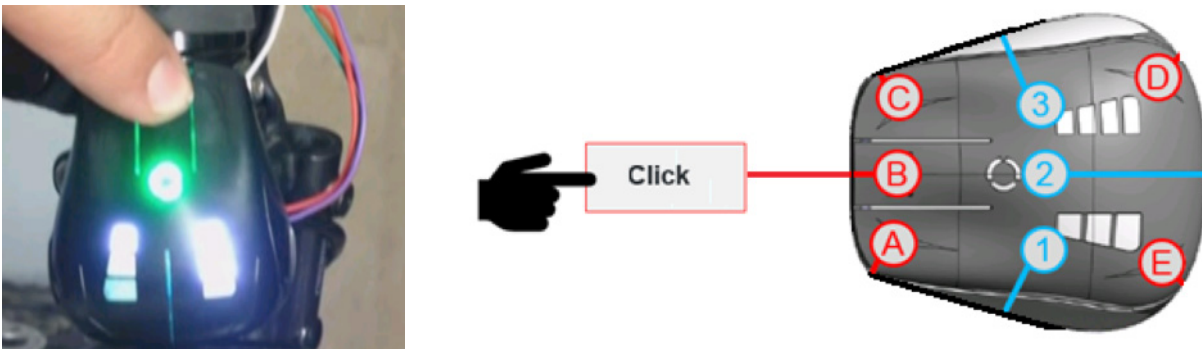


5. The LED will now flash 2x alternating RED/YELLOW before exiting calibration and returning to regular use mode:

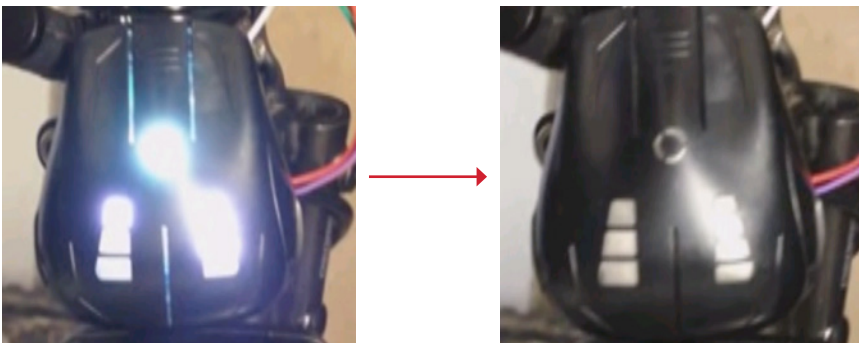


To save the calibration, the Joystick must now be reset.

6. Press BUTTON B for 2 seconds to turn off the power. The Joystick will cycle colours on the LED and shut down.



7. Green – blue – green – red – WHITE – OFF.



9. Press BUTTON B to turn the unit back on and run its boot up sequence, the calibration is now ready.

Cover Installation

CAUTION: Verify on iWoc remote that Powerplay drive is OFF.

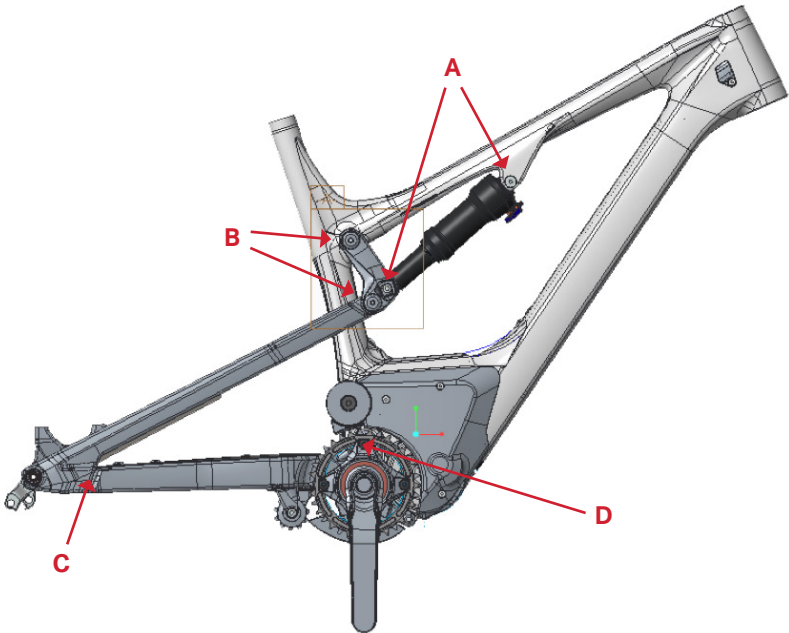


1. Install Left motor cover by first feeding rear brake hose and speed sensor wire through open slot.
2. Install two M5x22 alloy bolts on top two holes, and one M5x12 alloy bolt in bottom hole.
3. Torque hand tight
4. Install Right motor cover over torque arm assembly
5. Install two M5x22 alloy bolts on top two holes, and one M5x12 alloy bolt in bottom hole.
6. Torque hand tight

SUSPENSION PIVOT TORQUE GUIDE

Note: All Torque values are +/- 10%

Description		Part No.	Location	Tool	Torque			Notes
					kg-cm	Nm	lb-in	
A	SHOCK BOLTS & SCREWS	1807049 & 180566-016 FBY	Top Link	5mm & 4mm Hex Keys	80	8	70	Torque only with correct shock and hardware installed. Apply grease to shock bolts, and Loctite 243 (blue) to screw threads.
		1807062 & 180566-012 FBY	Front Triangle	Two 4mm Hex Keys				
B	TOP LINK BOLTS & SCREWS	1807060 & 180566-012 FBY	FT-TL Pivot	6mm & 4mm Hex Key	80	8	70	Apply grease to pivot bolts, and Loctite 243 (blue) to screw threads.
		1807061 & 180566-012 FBY	SS-TL Pivot					
C	DROPOUT PIVOT SCREWS	1807046	Dropouts	6mm Hex Key	175	17	152	Apply Loctite 243 to female seat stay threads.
D	MAIN PIVOT BOLT	1807029	Main Pivot	6mm Hex Key	175	17	152	Apply grease to inner bearing races and Loctite 243 to female chain stay threads.



POWERPLAY TORQUE VALUES, 1 OF 3**Note:** All Torque values are +/- 10%

Description	Part No.	Location	Tool	Torque			Notes
				kg-cm	Nm	lb-in	
BATTERY CASE SCREW, M6x12	180566-012	Battery	4mm hex	40.79	4	35.4	Secures 56, 70 and 81mm battery case bolts, blue loctite
SET SCREW, M5x20	1808024	Down tube	2.5mm hex	20.395	2	17.7	Ensure set screw bottoms on battery plate
SCREW, M3x12 TORX	1807117	Charge port	2.5mm hex	20.395	2	17.7	Tighten four screws evenly
SCREW, M5x10	180475-010	Torque arm pulley	3mm hex	61.185	6	53.1	Blue loctite
LOCKRING, 12T	1347008	12T drive pinion	Shimano splined cassette locking tool	407.9	40	354	Grease on threads
SCREW, SHOULDER M5x6x8	1807125	Bash guard	3mm hex	61.185	6	53.1	Grease or loctite
SCREW, M6x30	180359FBY-030	Torque arm	4mm hex	101.975	10	88.5	Loctite, push down on torque arm while tightening
SCREW, M6x16	180566FBY-016	Torque arm	4mm hex	101.975	10	88.5	Loctite, push down on torque arm while tightening
SCREW, M8x30	1807121OVT	Powerplay upper rear frame mount	5mm hex	142.765	14	123.9	Loctite, tighten first to 10Nm in sequence, then 14Nm final
M8x60 BOLT	1808023OVT	Powerplay upper front frame mount and torque arm	6mm hex	142.765	14	123.9	Loctite, tighten first to 10Nm in sequence, then 14Nm final

POWERPLAY TORQUE VALUES, 2 OF 3**Note:** All Torque values are +/- 10%

Description	Part No.	Location	Tool	Torque			Notes
				kg-cm	Nm	lb-in	
SCREW, M8x25	1807123OVT	Powerplay bash bracket	5mm hex	142.765	14	123.9	Loctite, tighten first to 10Nm in sequence, then 14Nm final
SCREW, M8x65	1807122OVT	Powerplay bash bracket	5mm hex	142.765	14	123.9	Loctite, tighten first to 10Nm in sequence, then 14Nm final
SCREW, M8x50	1807124OVT	Powerplay bash bracket	5mm hex	142.765	14	123.9	Loctite, tighten first to 10Nm in sequence, then 14Nm final
BOLT, M8x18	1807126	Chainstay pulley axle	6mm hex	81.58	8	70.8	Loctite, ensure no play and pulley spins freely
SCREW, M5x12	1807152	Chainstay pulley bracket	3mm hex	61.185	6	53.1	Loctite
SCREW, M5x20	1807151	Mid drive pully bracket	3mm hex	30.5925	3	26.55	Loctite, align part with shaft spacer before torquing
AXLE, MID DRIVE	1457014	Mid drive pully axle	6mm hex	101.975	10	88.5	Loctite, ensure no play and pulley spins freely
CLUTCH BEARING LOCK RING 24MM	1347010	Aeffect crank	16 notch external bb cup tool	407.9	40	354	Apply grease to entire clutch bearing spline and threads
CLUTCH BEARING LOCK RING 30MM	1347006	Turbine crank	16 notch external bb cup tool	407.9	40	354	Apply grease to entire clutch bearing spline and threads
SCREW, M5x10	180475-010	Speed sensor and derailleur housing hold down clamp	3mm hex	40.79	4	35.4	

POWERPLAY TORQUE VALUES, 3 OF 3**Note:** All Torque values are +/- 10%

Description	Part No.	Location	Tool	Torque			Notes
				<i>kg-cm</i>	<i>Nm</i>	<i>lb-in</i>	
TORX SCREW, M5x12	1808028	Brake rotor	T25 Torx driver	63.2245	6.2	54.87	Loctite, torque rotor as per manufacturers instructions
CASSETTE LOCK RING	N/A	Cassette	Shimano splined cassette locking tool	407.9	40	354	Manufacturer specification
HANGER BOLT	3227001	Derailleur hanger	6mm hex	203.95	20	177	Loctite, left hand thread
AXLE, 12MMx173MM	3227009	Rear axle	6mm hex	101.975	10	88.5	Grease threads and axle shaft
SCREW, M5x16	1806009	Head tube panel	3mm hex	15.29625	1.5	13.275	Grease, do not over tighten
SCREW, M5x22	1808037OVT	Drive cover, top	3mm hex	15.29625	1.5	13.275	Grease, do not over tighten
SCREW, M5x12	1808036OVT	Drive cover, bottom	3mm hex	15.29625	1.5	13.275	Grease, do not over tighten



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