#MANUAL4SPEED SCOTT PLASMA 5

Text: NoPain (proofread by Josh Hayes) Photos: NoSane

Photo Series: Custom built SCOTT Plasma 5 in words and pictures. With integrated direct-mount brakes, Profile TT aerobar, Shimano Dura-Ace Di2, Berner derailleur cage, Rotor 3D+ with Power2Max and ZIPP wheels.

Take the new Plasma 5 TT frameset by SCOTT, a Shimano Dura-Ace Di2 groupset, ZIPP wheels and a power2max Type S Rotor 3D+ power meter, then pay a visit to a mechanic you can trust. In our case, this would be Lars Teutenberg, SCOTT's ProTeam technics guru. Within only a few hours, he built our long-term test-bike to measure and gave us practical hints & tips.

Aside from aerodynamics, the engineers also paid special attention to critical areas such as ergonomics, adjustability, equipment compatibility, fuel storage (tri bike built) and suitability for everyday use - as you'll see on the following 170 workshop photos.

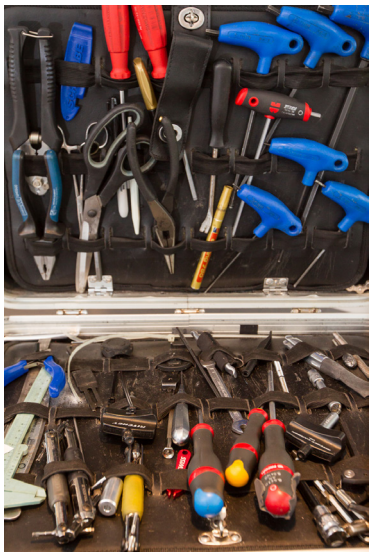
Lars Teutenberg,

SCOTT Technical Race Support Road

STEP 1: DRY RUN

Before you start assembling the bike, we recommend doing an inventory check of all parts (components, cables, wires, junctions, etc.), as well as a brief function test of the electronic Dura-Ace Di2 groupset. To do this you'll need either the Shimano PC interface (SM-PCE1) or the Di2 charger (SM-BCR2), and a PC with Shimano e-Tube Project software installed, which is available for free download. Put all electronic parts together according to the wiring diagram, upgrade their firmware and then test the shifters, front and rear derailleur. With all the components located outside the handlebar and the frame, it's significantly easier to find any faults in the electronic system.

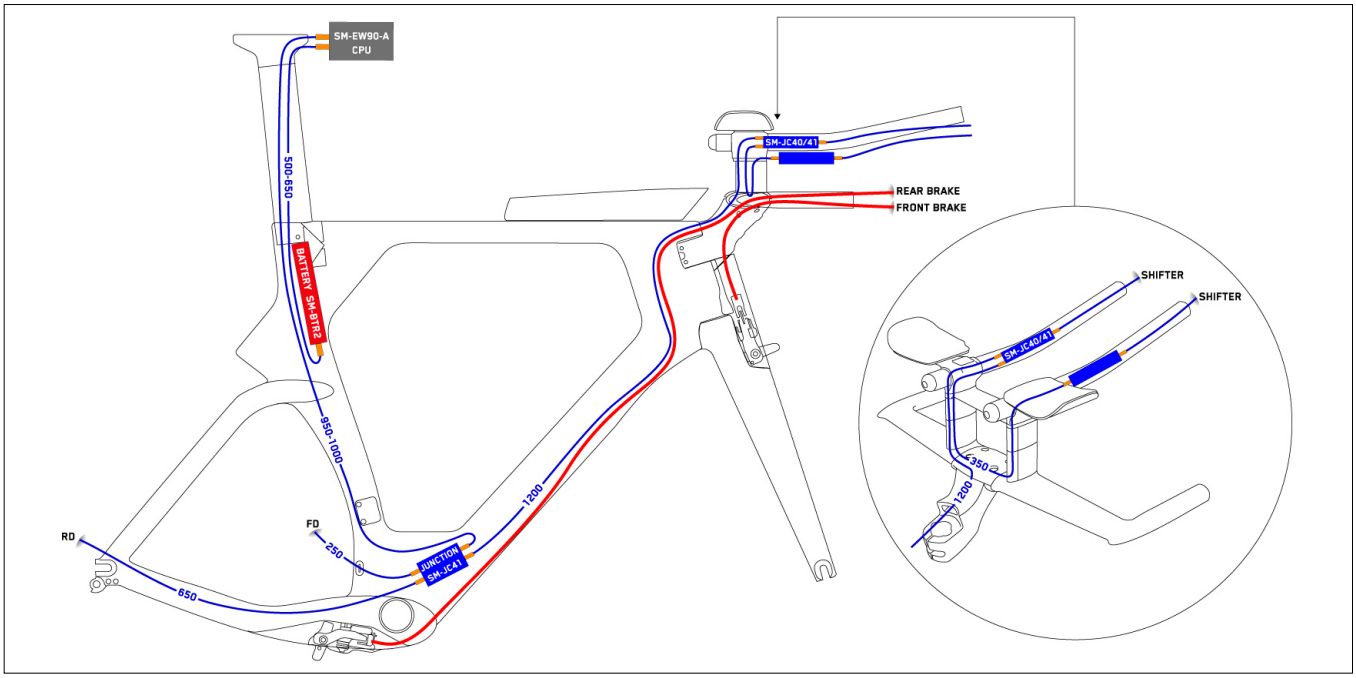
Note: Always wait until the "firmware update complete" window is displayed. While the firmware update is in progress, make sure that the PC does not switch to standby mode and that you don't accidentally disconnect the USB cable or an electric wire. If the firmware, which has been paired to a unit, becomes corrupted the unit will not operate correctly.



Tools

Puzzle for grown-ups.

Workbench.



Wiring diagram: the Di2 cable routing inside the handlebar is particularly difficult (the electric wires of the Shimano Di2 TT Brake Levers are missing in this image).

1 We put all parts together temporarily...

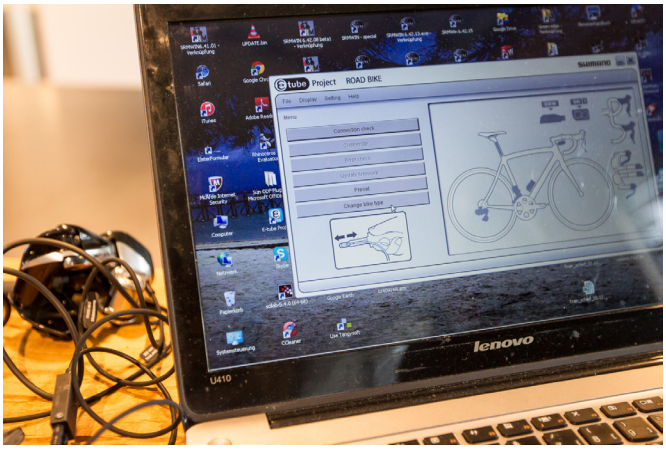
2 ... and made sure they were working properly.

3 You can connect either the Shimano PC interface (SM-PCE1) or the Di2 charger (SM-BCR2) to the junction kit (SM-EW90-A/B) and the PC...

4 ... select the units to have their firmware updated. Then select the firmware versions you want to use...

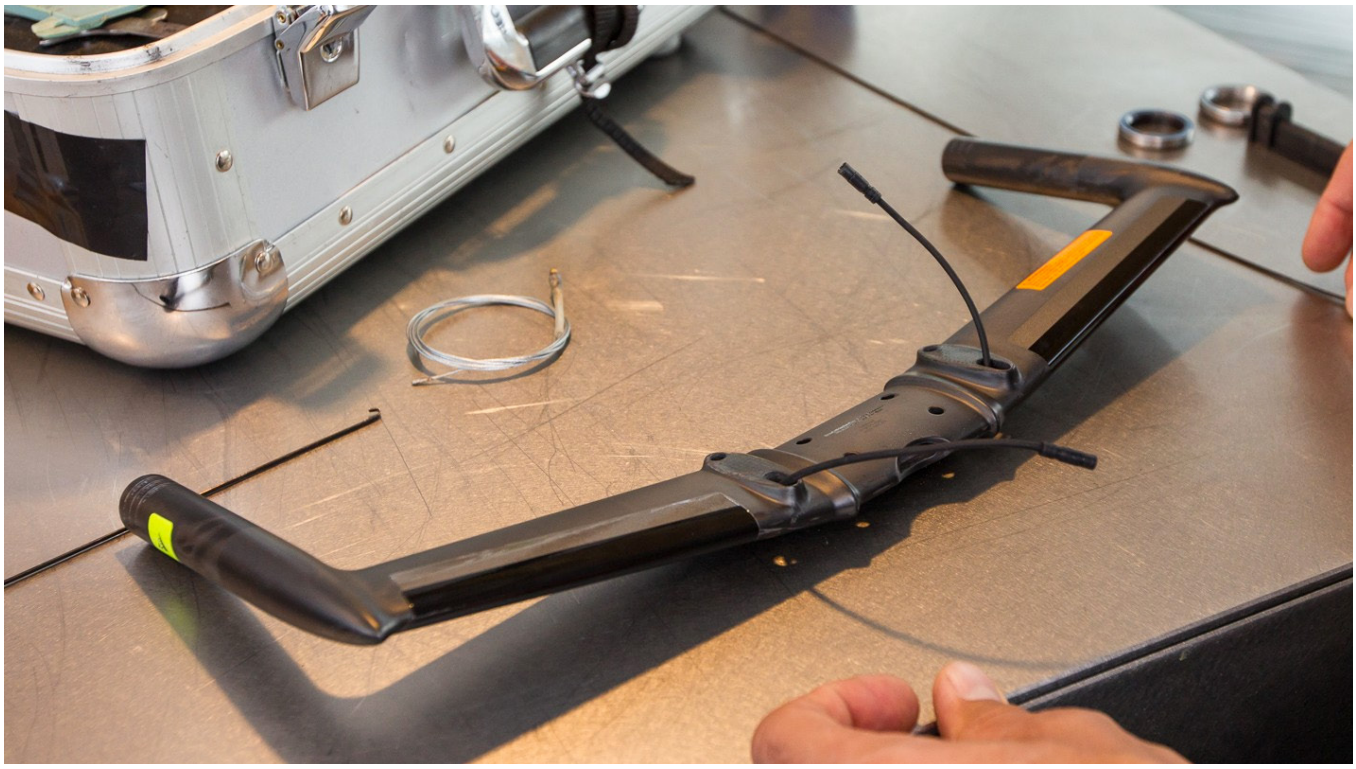
5 ... then click [Update] to begin updating the firmware (note: make sure your PC does not switch into standby mode, don't disconnect the USB cable or the electric wires, and don't remove the battery or turn off the power of the PC while the update is in progress).

6 After the update is finished you can customize the gear shifting system (assignment of keys, shifting speed etc.) to suit individual needs. Before disconnecting the Di2, press the "Complete Setup" button.



7 Now you can close the E-tube Project application.

STEP 2: BASE BAR



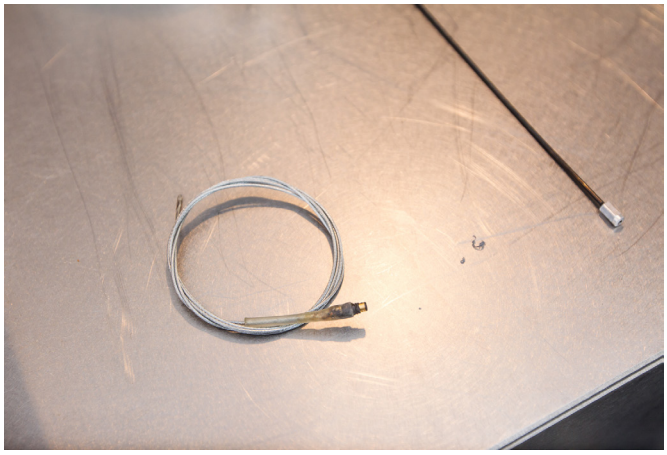
To facilitate the internal routing of the Di2 wires and brake cables, Lars always starts with the un-mounted aero base bar. This allows you to make much faster progress than with a bar that has already been mounted to the stem.

SCOTT offers three versions of the bar - a 420mm flat bar, a 420mm bar with 30mm of rise, and a 400mm bar with a 30mm drop. The spacers and extension brackets allow for a rise up to 75mm. Brake cables and electronic wires are fully integrated.

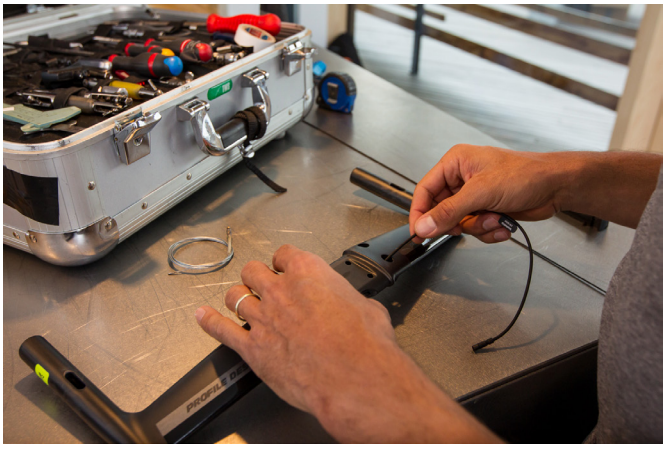
1 This method is not officially recommended, but very useful according to Lars.

2 He carefully removes sharp edges on the wire routing channels using a soft wire brush. This is to protect the cables against potential damage when routing them through the bars.

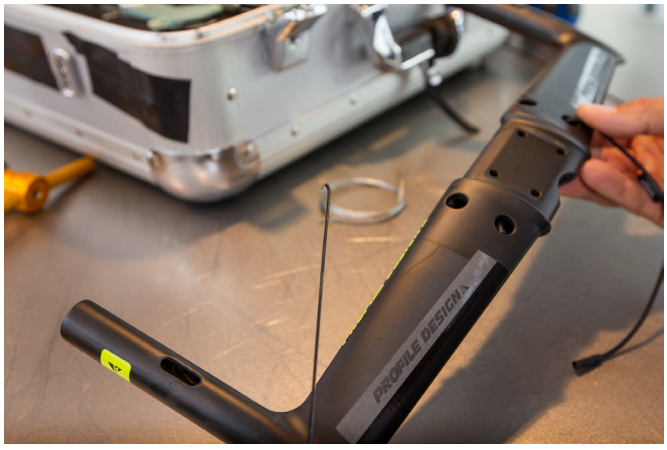
3 Also, it speeds up the internal routing of electric wires and brake cables/housing.



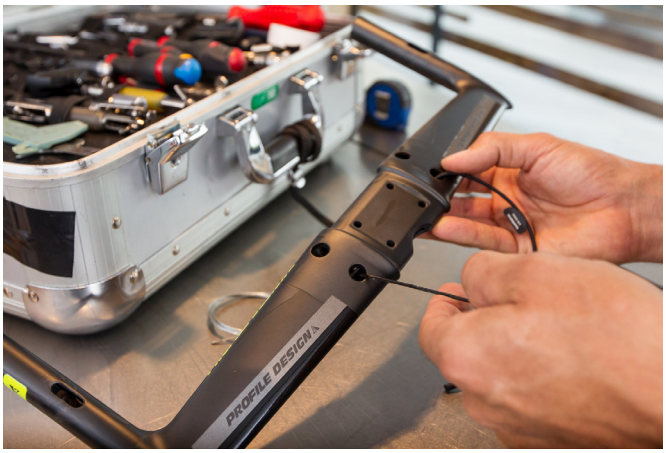
4 Self-made internal cable routing kit for electric wires. Also available from Park Tool (IR-1)



5 We insert the interconnecting wire through a lower (bigger) one of the base bar holes...



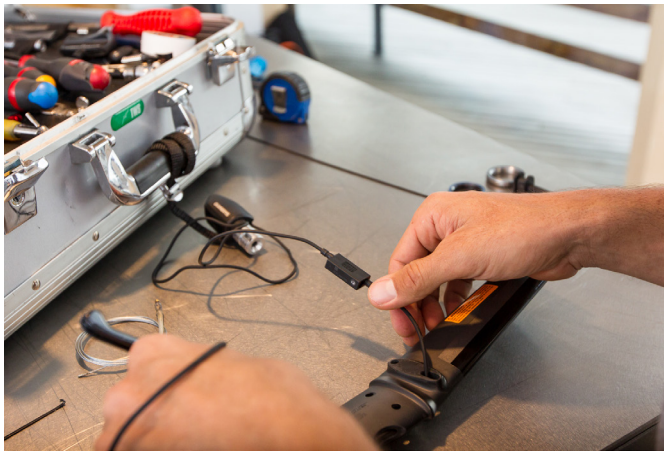
6 ... and pull it out of the other lower hole using a bent spoke.



7 We recommend using the Park Tool Utility Pick Set (UP-SET).

8 Now Lars routes both wires through the smaller holes on the opposite side of the base bar.

9 The first step has been taken.



10 Employing a SM-JC41 Junction Box, the wires are provisionally secured.

11 This is followed by the wiring of the Shimano Di2 TT Brake Levers.

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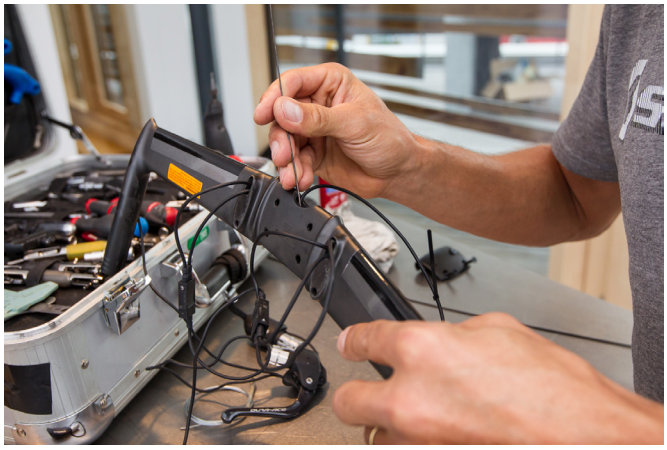
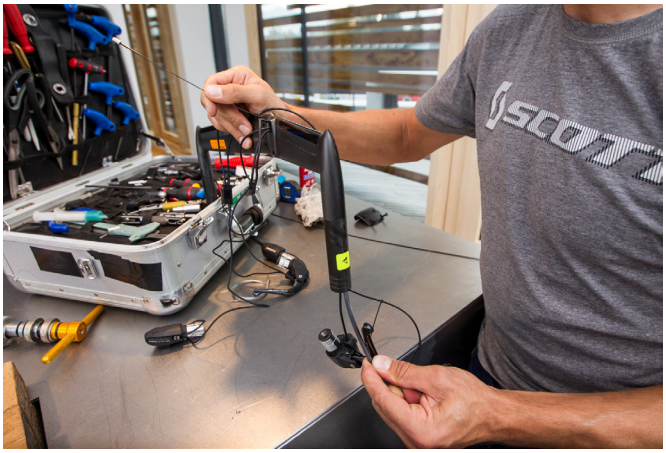
14 It doesn't really matter in which order you install the wires and cables, but it would be smarter to begin with the thin and flexible electric wires, followed by the considerably thicker brake cables.

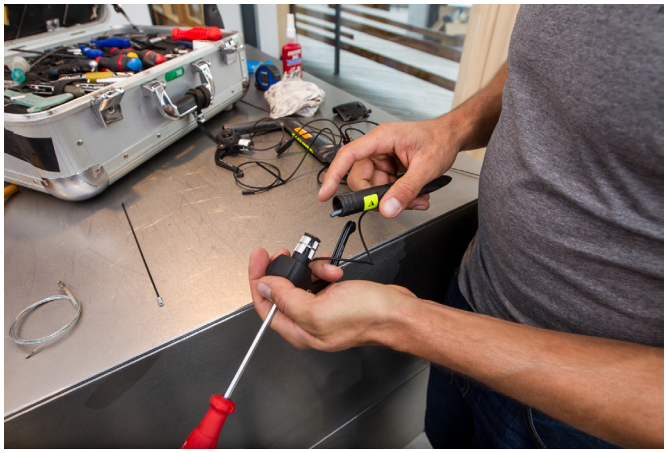
15 The nerve-wracking waiting game of "threading the brake cable": The easiest way to do this is to insert the housing along with the inner cable through the handlebar grip until hitting the back wall. Then route the wire around the corner...



16 ... and pull it out of the appropriate hole using a bent spoke or a picker tool.



17 At last you can easily slide the housing through the handlebar.



18 Now the electronic Dura Ace Di2 dual control levers can be installed.

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20 Note: don't use an Allen key with a ball head, because the clamping bolt is made of aluminum and can break easily.

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22 Use the same procedure again for the second lever.

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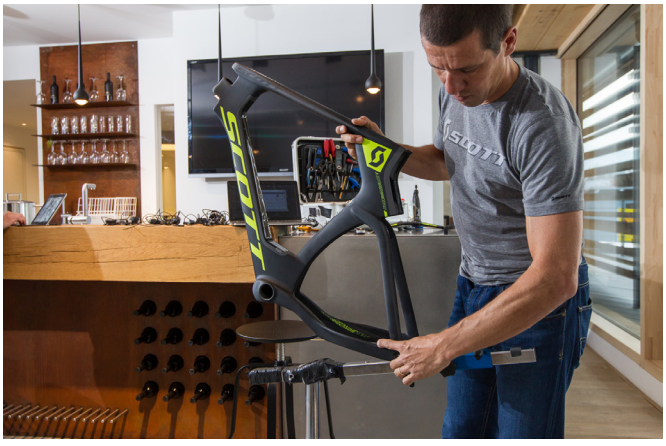
STEP 3: FORK & STEM

The Plasma 5 has two stem options – our choice was the TT version, which stays in line with the top tube and allows for a very low position. However, Profile Design's aero drink cannot be installed. The upper part of the stem allows for internal cable routing. The rear brake cable housing and one electric wire are led through the stem into the frame's downtube. The front brake cable goes in through the stem and from there directly into the housing stop of the front brake.

Thanks to the standard inner steer tube construction with maximized distance between the upper and lower bearing (they are positioned at both ends of the headtube), the stem and frame are directly linked, which substantially increases the head tube's torsional stiffness.



1 Lars works with a modified (in other words: battered) Park Tool PRS-20 Team Race Stand.

2 Again he removes sharp edges on the routing holes using his soft wire brush.

3 Before fitting the bearings, lightly grease the bearing carrier.

4 First the upper bearing is inserted into the head tube.

5 Slide the lower bearing directly onto the fork carbon crown. There is no additional crown race needed, but grease in between is a must.

6 As Lars installs the fork from below the head tube, he slides the TT stem onto the steer-tube at the same time. The inner surface of the clamping area has been treated with the red Dynamic fitting grease for carbon.

7 Apply a thin layer of medium strength Loctite to the screw of the inner compression cap. Note: do not use just any kind of grease, otherwise the headset could get loose.

8 To adjust the headset, turn the top cap bolt clockwise until any free play is gone and the fork still turns freely.

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10 Pass the brake cable housings of the front brake through the stem. Then route the rear cable housing through the down tube of the frame.

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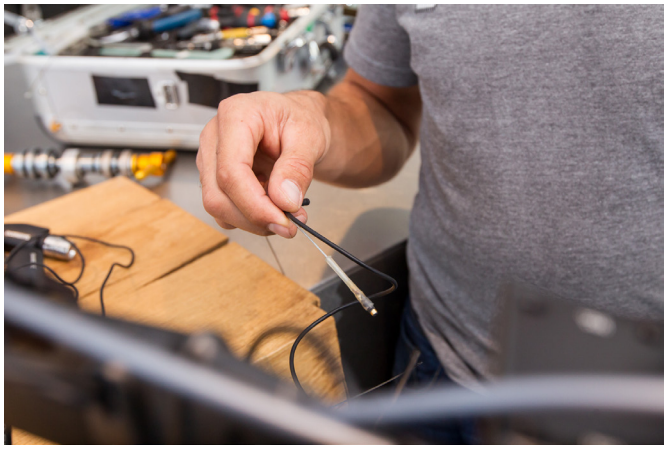

16 For the electric Di2 wire you'll need the internal cable routing kit again.

17 Either out-of-the-box from Park Tool, or you can attach an old shifting cable with duct tape to the Di2 wire.

18 In both cases, you guide the routing wire through the stem, then down the downtube and to the bottom bracket...

19 ... and use it to pull the electric wire through the frame.

20 Secure the wire with a junction. Shortly afterwards the front derailleur, rear derailleur and the large SM-EW90 junction box along with the battery will be connected as well.

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23 Provisionally secure the base bar with at least one screw.

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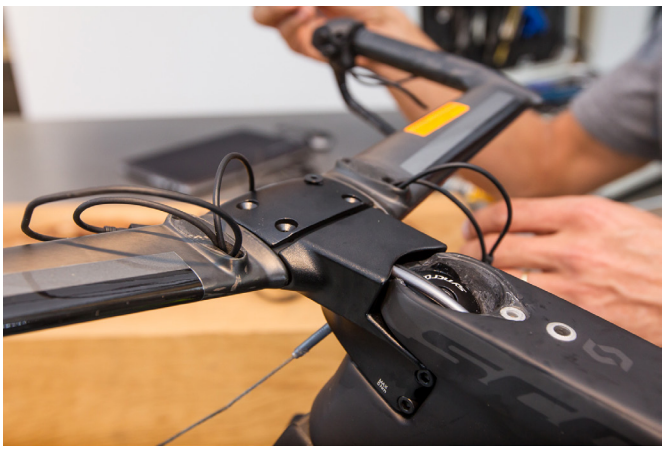
25 Adjust and fasten the Shimano Di2 TT Brake Levers before finally inserting the brake cables.



26 Once the brake cables are installed, you cannot reach the brake levers' clamping bolts anymore.

27 Align the "free floating" stem in a straight position. Center it in between the headset and tighten the bolts with a maximum torque of 5 Nm.

STEP 4: FRONT & REAR DERAILLEURS

Work-to-rule: Installation and adjustments of both derailleurs are made in accordance with Shimano's instructions.

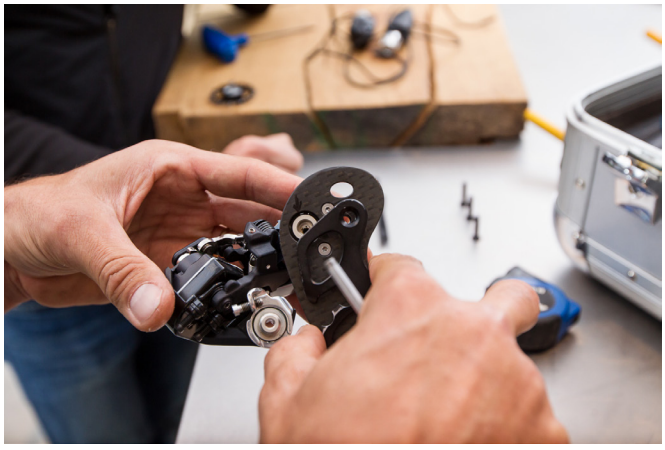
1 Pull the rubber grommet over the front derailleur wire and insert it into the seat tube opening.

2 Install the front derailleur on the direct mount adapter and connect the wire to the derailleur and the junction.

3 Route the rear derailleur wire through the dropout and chainstay...

4 ... and connect it to the junction inside the bottom bracket as well.

5 Berner Ceramic Cage for Shimano Dura-Ace 11s



6 In an intermediate step we pimp the Shimano Di2 rear derailleur with the Berner Ceramic Cage.

7 The Berner Cage replaces the original one.

8 Apply a medium-strength Loctite to the pulley bolts.

9 Tighten the pulley bolts according to the recommended torque of 2.94 - 3.92 Nm. It's better if you use a torque wrench or do it carefully by touch.

10 Preloading the spring requires the infamous third hand.

11 Before installing the rear derailleur, align the hanger first and apply some grease to the mounting bolt, then thread it part way into the derailleur hanger and rotate it clockwise to make sure the b-screw or tab is sitting behind the flat on the back of the hanger. Tighten the mounting bolt.

STEP 5: SEATPOST & Di2 BATTERY

Compared to the Plasma 3, the Plasma 5's seat post is not in line with the seat tube but rather at an angle. The resulting saddle clamp adjustment range remains almost identical regardless of the saddle's height.

Before wiring, check the seat post insertion distance with your saddle and the mounted battery based on your individual seat height. It might be necessary to cut the seatpost on its downside, especially when using small frame sizes (in our case: small).

Important: Please note that switching to another saddle or pedal model might have a big influence on the seatpost's length!

A note on the Di2 junction box: ideally, the button and the charging port are easily accessible and the LED function is clearly visible. This is the reason why we put the junction box below the saddle and not inside the frame. The required cable openings on the seatpost are provided from the factory.

1 ISM Podium Attack and Shimano SM-BTR2 Di2 battery pack.

2 We had to cut 3 centimeters off the seatpost to acquire a sufficient insertion distance.

3 We mark both positions of the new mounting holes which are required for the flexible battery bracket...

4 ... drill holes with the same diameter...

5 ... and deburr them.

6 The wires of the junction box and the battery pack are routed from the top through the seat post.

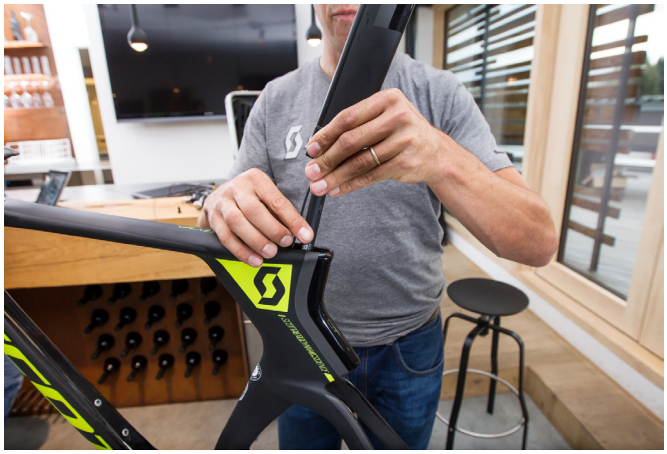
7 Put the battery pack into Scott's special battery bracket...

8 ... and connect the battery with the correct wire. Note: Make sure of clean and proper plug connections!

9 Install the battery bracket with the battery pack into the previously drilled holes.

10 If you are unable to smoothly insert the seatpost into the seat tube, it is sometimes necessary to sand down the battery bracket with fine emery paper.

11 Use a routing cable again to guide the second wire through the seat tube and into the bottom bracket.



12 Simultaneously insert the seatpost along with the battery pack.

13 Plug the wire into the junction inside the bottom bracket.

14 Mount the saddle.

15 The clamp works with round and oval saddle rails.

16 Adjust the seat slider as well as the saddle position and tighten the Allen bolt with a maximum torque of 12 Nm.

17 Attach the Di2 junction box below the saddle. This can either be done directly on the seatpost (with Loctite) or on the saddle rails (with cable ties).

18 Our ISM saddle offers sufficient space to attach the junction directly on its rails.

19 Treat clamping parts of metal with standard grease. Carbon surfaces in the seattube and on the seatpost require Dynamic's red fitting grease for carbon.

20 Adjust your seat height.

21 Tighten the integrated seatpost clamp with a minimum of 8 Nm and check the function after a short test run.

STEP 6: BRAKES

SCOTT's engineers chose a standard Shimano direct-mount rear brake as it offered the best performance while matching the construction of the Plasma 5.

The front brake was developed in collaboration with the brake manufacturer Tektro. While the aerodynamic performance of this construction is beyond doubt, the braking performance has been improved drastically: improved leverage ratio due to increased length of the lever arms and stiffer construction thanks to a brake booster. A lower building construction creates space for the brake cover.

The front brake mount is designed to fit the latest Shimano Direct Mount interface, meaning that any direct mount brake can be assembled on the new Plasma 5.

1 Scott's high-performance brake caliper follows Shimano's direct-mount standard.

2 The supplied assembly guide simplifies installation and holds the spring safely in place...

3 ... but you can do without it.

4 Cut the outer casing to the right length and insert it securely into the cable adjusting bolt unit.

5 Grease the thread of the cable, adjusting bolt..

6 ... and screw it clockwise into the corresponding thread on the bottom of the stem.

7 Pass the inner cable through the housing and then through the cable-adjusting bolt. Afterwards, open the cable fixing bolt unit.

8 Now pass the inner cable through the bushing of the cable fixing bolt unit (Note: no grease here)...

9 ... and tighten the setscrew with a maximum torque of 2.5 Nm.

10 If the brake cable is coated, you'll have to remove the coating in the clamping area of the setscrew to prevent the brake cable from slipping.

11 Fine tuning of the brake caliper: width, spacers and alignment of the brake shoes.

12 Adjust the spring preload and center the calipers by fine-tuning the lateral setscrews.

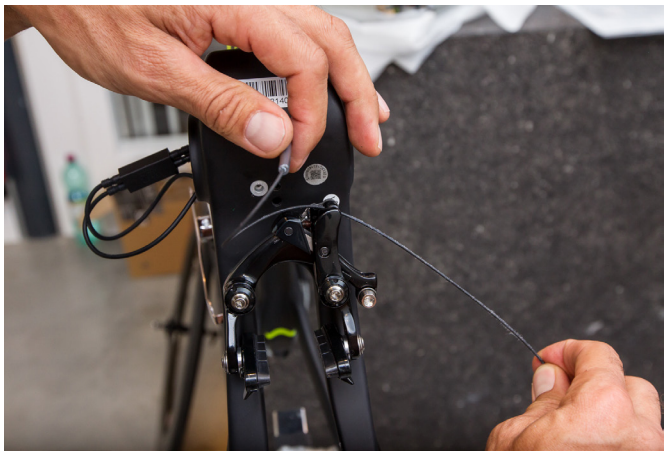
13 Note: always use officially released brake pads for aluminum, carbon, or extra-wide rim profiles.

14 Attach the aero brake cover and tighten the screw with an Allen key of 2 mm and a maximum torque of 1 Nm. Note: not all multi tools include an Allen key of 2 mm.

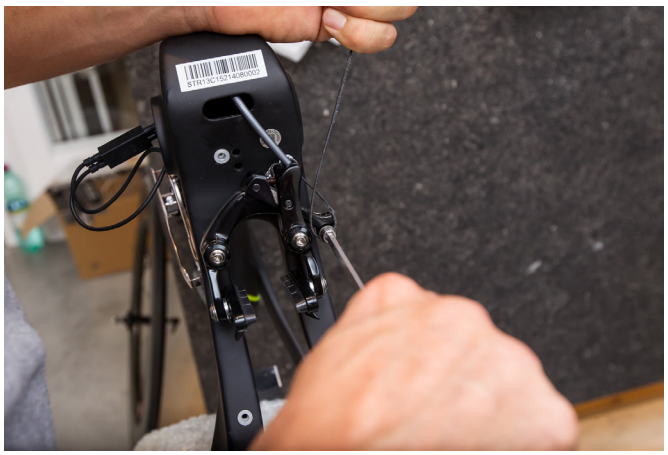
15 Install the rear direct-mount brake according to Shimano's instructions.

16 Shimano supplies an optional assembly jig for the installation.

17 Cut the outer casing to the required length.



18 Pass the inner cable through the outer casing and through the recess below the inner cable fixing bolt...



19 ... then tighten the fixing bolt according to Shimano's instructions.

20 Install the rear wheel for testing purposes...

21 ... and align it concentrically by fine-tuning the adjustable stops inside both rear dropouts.

22 Take care to leave sufficient clearance between the tire and the seat tube.

23 Now carry out the fine tuning of the rear brake shoes and then attach the end cap to the cable.

24 Finally attach the rear aero brake cover. Depending on the frame's evolution stage, it will be mounted with two or four screws on the bottom of the frame.

STEP 7: DRIVERTRAIN

The Plasma 5 frame has a massive Oversize-BB86 Pressfit bottom bracket (86.5 x 41 mm) that is fully compatible with most popular cranks and performance measurement systems: Hollowtech II cranks with a 24 mm diameter spindle (Shimano Pressfit 86), SRAM GXP (Truvativ Pressfit GXP) or BB386Evo cranks with a 30 mm spindle (Rotor PressFit 4130).

Note: When installing bottom brackets without a one-piece sleeve, you'll have to protect the wires and the junction from the rotating axle.

1 To prevent junction and wires from chafing against the axle, we glue them to the inside of the frame using Loctite.

2 Grease the frame's bottom bracket area with standard grease, Dynamic fitting grease for carbon or special glue. For most people this is a matter of faith, for others it depends on the installation procedure's frictional resistance.

3 Press in the Rotor 4130 bottom bracket.

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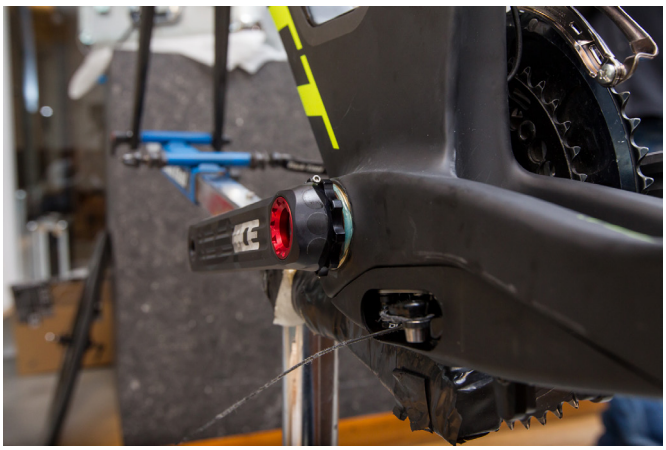
5 Recommendation for our special Rotor 4130 bottom bracket solution: to avoid rattling and chafing of wires against the axle, Lars inserts a small piece of foam into the down tube. In case of Shimano's and SRAM's press-fit bottom brackets this is not necessary, because they feature a one-piece protective sleeve.

6 Install the Rotor 3D+ crankset.

7 Adhere to the tightening torques according to Rotor's instructions.



8 Adjust the preload on the non-drive side for smooth running and free clearance.

9 Install the cassette.

10 Insert the rear wheel.

11 Close the quick release with standard hand force.

12 Install the chain.

13 Determine the optimal length of the chain. (Note: the longer the better)

14 The chain has to be closed with a special joining link or a chain-riveting tool.

15 Install the pedals.

16 Mounted pedals simplify the rotation of the crank arms while adjusting the gears.

17 Set the height of the front derailleur so that there is a clearance of 1 - 3 mm between the chain guide outer plate and the largest chainring. Use a 5 mm Allen key to secure the chain guide's outer plate so that the flat part of the plate is directly above the largest chainring and the chain guide's rear edge is within 0.5 - 1.0 mm from the front edge of the chain guide. Use a 2 mm Allen key to turn the support bolt in order to adjust the position of the front derailleur, so that the flat part of the chain guide outer plate is parallel to the largest chainring. Adjust the inner and outer end stops of the front derailleur.

18 Finally, adjust the inner and outer end stops of the rear derailleur and fine-tune the Di2 gearing system in accordance with common practice and Shimano's instructions.

STEP 8: COCKPIT

Spacer and extension brackets have been designed specifically for the Plasma 5 and allow for height adjustment of up to 75mm for armrests and extensions.

The extension clamping system features a 22.2 mm clamping standard to maintain interchangeability with all of the available extension from Profile Design and most other brands.

The sweep bend extension is angled at its end in order to provide an ergonomic but more aerodynamic hand position due to the reduction of the gap between extension and forearm. The new pad construction features a narrower mounting option and a lower pad design.

1 The last step involves the installation of spacers, armpads, and extensions.

2 All spacers and covers shown here are included in delivery, as well as screw sets in different lengths for all feasible variants.

3 Pass the extension bracket screws from bottom to top into the basebar.

4 Note: The correct length of the screws has to be selected depending on the total height of all spacers.

5 Begin with the rear screws...

6 ... and take care not to clamp the wires.

7 The trailing edge of the spacer features a removable cover...

8 ... that provides easy access to the internal channel where the electronic shifting cables are routed.

9 Installation and wiring of the extension bracket.

10 Determine the required length of the extensions...

11 ... and cut them on the front or rear. Note: Do not notch the Di2 openings on the underside of the extensions.

12 Pass the shifting wires through the extensions.

13 Install the shifters in the extension and adjust them to the desired angle.

14 Fasten the arm-rests in the desired position using two bolts and washers for each.

15 A rubber grommet protects the cables and keeps them in position.

16 Do the same on the other side.

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21 Finally, mount the cover of the headset and tighten it.

SHOWROOM