



NYTRO

WHITE PAPER 1.0



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1. DEDICATED COMPETITION GEOMETRY

Pinarello's racing DNA inspired us to reimagine what it means to make an e-bike. We're proud to have 70 years of experience in creating the most successful bikes on the market, and all of our know-how has been applied to these new models which have truly unique handling and road feel. We wanted to create something that made cycling accessible, but it had to be a true Pinarello, so as always, this project began with the frame geometry. For Nytro Road and Nytro Gravel, we have developed two dedicated geometries for the two different types of riding. The Nytro ROAD keeps the responsiveness that characterises our racing frames, blended with a more comfortable riding position. Its design is unmistakably Pinarello, and it's also the lightest E-Road bike on the market. For the Nytro GRAVEL, we've created a geometry that feels good on tarmac, but comes into its own when the rider wants to explore off-road and enjoy long-distance adventures. With both bikes, the goal was clear: Extend the experience of riding a Pinarello and allow people to ride longer, ride further and climb higher. And thanks to the 6 different sizes it is easy to find the perfect bike for every rider.

ROAD

CE	CC	L	A [°]	B [°]	P	T	D	R	G	REACH	STACK
450	460	515	74,50	71,75	420	130	72	47	373	358,4	545,4
488	500	532	74,00	72,00	420	140	72	47	373	369,7	555,8
510	530	545	73,70	72,25	420	151	72	47	373	377,5	567,2
535	550	560	73,40	72,50	420	170	72	47	373	384,2	586,2
555	575	580	73,00	72,75	420	200	72	47	373	391,4	615,8
575	600	595	72,90	73,00	420	225	72	47	373	398,0	640,6

GRAVEL / ALL-ROAD

CE	CC	L	A [°]	B [°]	P	T	D	R	G	REACH	STACK
440	460	523	74,50	69,75	437	125	78	50	395	357,4	558,9
480	500	535	74,00	70,00	437	137	78	50	395	364,2	571,2
510	530	550	73,75	70,25	437	155	78	50	395	372,9	589,1
530	550	564	73,50	71,00	437	170	78	50	395	380,6	606,3
565	575	581	73,00	71,25	437	190	74	50	395	388,3	622,3
590	600	597	72,75	71,50	437	210	74	50	395	395,9	642,3

CE: SEAT TUBE Centre - END | CC: SEAT TUBE Centre - Centre | L: TOP TUBE Centre - Centre | A [°]: SEAT TUBE ANGLE
B [°]: HEADTUBE ANGLE | P: CHAINSTAY | T: HEADTUBE | D: BB DROP | R: FORK RAKE | G: FORK HEIGHT | REACH | STACK



On this project, the Pinarello Lab's detailed areas of focus were:



- 1. CARBON LAYUP:** T600 is the carbon fibre we chose from our one-and-only carbon supplier Toray, the best-in-class carbon supplier from Japan. This choice perfectly balances the idea to get a performance bike built to last hours of riding, offering comfort and performance. The right match for an endurance bike.
- 2. FORK:** Following the needs of two different riding styles, we have developed two dedicated forks. ROAD: 440g (raw) with 47mm rake. GRAVEL: 460g (raw) with 50mm rake. It was the best solution to take full advantage of the true potential of these two unique frames.
- 3. FRAMES:** We have kept the weight as low as possible. Lightness and reliability are the founding principles of these frames, each designed to its own specifications: 1130g (raw) for Road and 1250g (raw) for Gravel.
- 4. SEAT POST:** For the Nytro ROAD, a full carbon aero seatpost based on the Dogma F. For the Nytro GRAVEL, a round seatpost (Ø31,6mm) to be compatible with the most popular dropper posts currently on the market.

2. THE OPTIMAL E-BIKE SYSTEM FOR THE USE

The new TQ-HPR50 motor has been designed to offer natural and constant support – even at cadences above 65 per minute. Combined with the motor's extreme silence, the Nytro E can provide support when you need it most, even on the steepest climbs, without giving the sensation of an unnatural push. And with a range of up to 100km (140km with range extender), it's the perfect power/weight ratio to offer all-day fun no matter what kind of ride you have planned.

TQ's innovative e-bike system consists of a TQ-HPR50 drive unit and their patented harmonic pin-ring transmission, which is the heart of the whole system.

What makes the new TQ-HPR50 the perfect drive unit for Pinarello? Easy:

WEIGHT: When called upon, the TQ-HPR50 motor delivers up to 50 Nm of torque and 300 Watts of peak power in a compact package that's also very lightweight at just 1,850g for the motor and 3,900g in total when paired to its 360Wh battery and fully integrated 2" display.

COMPACT DIMENSIONS: And not only is it the lightest e-bike system in its class, its compact size means that it fits discreetly into the frame and provides a Q-factor of 135mm, giving the same naturally efficient pedal stroke as an analogue bike.

NATURAL RIDE FEELING: Ride fast everywhere in the most natural and silent way possible thanks to the latest motor technology. Offering a true pedalling experience, The Nytro E feels just like cycling always has, but on the fittest day of your life. It's you, but with 300W more in your legs.

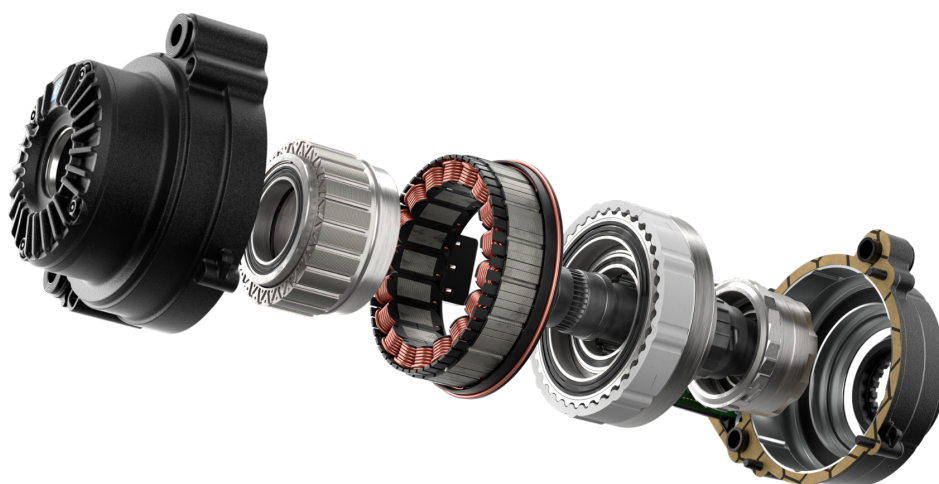
NOISELESS: It's the quietest motor currently on the market, too, thanks to the new patented harmonic pin-ring transmission that does away with the unnatural noise associated with conventional gear or belt drive systems.

CUSTOMISABLE MOTOR MAPPING: With the TQ-HPR50, you can gain a next level control over your workouts thanks to a selection of totally customisable riding modes that you can tweak via the TQ app. Fine-tune your ride by setting max power and assist levels to maximise range, or take it easy with an extra boost after a long, hard day.

MORE ABOUT THE DRIVE UNIT SYSTEM: INSIDE THE ELECTRONICS SPECIFICALLY MADE FOR CYCLING

The heart of the system – the TQ-HPR50 drive unit – is completely made in Germany and not only developed but also assembled at TQ's factory in Inning am Ammersee, Southern Bavaria.

Thanks to TQ's heritage and market leading competence in the electronical industry, the development of the electronics and the sensors in the drive unit and battery has all been done in house by a team of 20+ engineers, developing cutting-edge technology that's solely focused on one use case: Cycling.



The sensation of the TQ-HPR50 when integrated in the new Pinarello Nytro series is like riding with a tail wind. When using hub motors, the technology and the positioning in the rear hub of the wheel creates a delay in time causing feeling of being pushed forward, which might seem unnatural to many riders. By using a mid-motor sitting directly around the bottom bracket the e-machine is positioned in close proximity to the rider and the gearing of the bicycle creating a seamlessly functioning link. The additional power feels like watts coming straight from the rider's legs, and not coming from the actual system.

The bike and the cyclists are working in absolute symbiosis with the e-machine without any delay in power input or output. TQ's specifically engineered electric motor in combination with low gearing ratio in the drive unit itself creates a natural and quiet feeling when the rider first pushes into the pedals. The technology is working together with the power input of the rider without unnaturally pushing them forward. The specifically for TQ-HPR50 developed sensors are measuring each side of the motor a power input of each leg, creating a precisely responsive support.

The peak power output of the TQ-HPR50 drive unit is additional 300 W which can be adjusted by the TQ App to every rider's preference. Specifically for road bike use, the riders should slow down the pedal response, to create a smooth feeling when riding at a steady cadence. This is a very important but small adjustment which is to be recommended when riding on smooth tarmac or gravel roads compared to the opposite when riding rough trails, where riders cadence usually fluctuate more.

The development team around the TQ-HPR50 e-bike system is filled with passionate road cyclists, who understand the tiniest details of a rider's emotion. For TQ, it has always been about more than just developing the most advanced technology, it's about understanding their own wants and needs as cyclists and translating them into a technological solution.

3. TIRE CLEARANCE

Different riding types require different tyre dimensions. For this reason, we have designed the road bike frame to be compatible with a maximum tire dimension of 32mm. Our gravel models will take tyres up to 50mm, to meet the needs of even the most adventurous rider.



4. FRAME DESIGN

A. CHAIN STAY DESIGN

Asymmetry is always the centre of every R&D concept. Even for E-Bikes, we push to have an asymmetric chain stay design, to better guarantee lateral stiffness, considering not only the power of the rider but also of the motor.

B. SEAT STAY DESIGN

As per the chain stay, also the asymmetry of the seat stay plays a fundamental role in the bike lateral stiffness. For this reason, inspired by the F-series for the E-road frame and the X-series for the E-Gravel frame, we have designed dedicated seat stays for the two different models, to guarantee the optimal behaviour on any terrain.

C. HEAD TUBE DESIGN

Inspired from our most successful racing bike, we have designed the headtubes of the two frames with aerodynamics in mind, and with the upper headset bearing to 1.5" we have implemented our TiCR system for a cleaner design.

D. DOWNTUBE

Designing the downtube we have considering 3 different factor:

Asymmetry: When your legs are pushing on the pedals, since the chain is on the right side, you need to counter balance with an asymmetric design in the areas where we need to re-balance the frame behavior.

Aerodynamic: As per the headtube, we have considered also the aerodynamic impact of the downtube, and, for this reason, we have chosen to reduce at minimum the section and give it a precise shape to reduce the friction with air.

Battery: The battery of the system is completely integrated inside the frame and the shape of the tube envelops it keeping the fantastic characteristic Pinarello design.



5. SEATPOST AREA

A. SEATPOST CLAMP

The Nytro E comes with a totally redesigned seatpost area, featuring a new seatpost clamp that is completely embedded into the frame, allowing us to shave off 36g compared to previous models, and also reduce the area's total volume, improving aerodynamics.

B. SEATPOST

The E-road frames come with our proven Dogma F seatpost, while the E-gravel models will be fitted with a traditional seatpost to allow for compatibility with most dropper posts currently on the market.





6. MATERIAL CHOICE

For the choice of materials, as always, we relied on our partner Toray, a global leader in top-of-the-range carbon fibre. Carbon Reinforced Polymer (CFRP), can be used to optimize every single section of the frame to achieve the desired stiffness and lightness. For example, in areas where the stiffness must be favoured, a high modulus fibre (HM) can be used, while where the strength is primary, a high strength fibre (HT) is preferred.

For the Nytro E models we used our T900 and T700 layups.

T900: the ultimate in terms of stiffness and vibration absorption, for the Nytro and Nytro Gravel E9/E7

T700: the perfect balance between performance and bump absorption, for the Nytro and Nytro Gravel E5

7. AERODYNAMICS

The Nytro E is made to fly. The head tube, down tube, and rear stays have been designed to obtain maximum aerodynamic performance.

1. TICR our integrated cable routing system maximises the reduction of drag coefficient and provides a cleaner design.

2. AERO FRAME SECTIONS on both frames we have studied the section of every tube to reduce as much as possible the aerodynamic impact. The only exception is the round seatpost for gravel which allows for the use of a dropper post.

GEOMETRIES AND SIZES

Every single size of the frame has been designed on its own, adjusting the length and the angles of each tube in order ensure perfect performance in every size. With both models, the goal was clear: Extend the experience of riding a Pinarello and allow people to ride longer, ride further and climb higher. And thanks to the 6 different sizes it is easy to find the perfect fit.



8. SPECIFIC PINARELLO E FEATURES

NYTRO E-ROAD

- Carbon T900/T700
- Asymmetric frame
- Dedicated Road Onda fork
- Dedicated FSC Frontal seat clamp, integrated and aerodynamic
- Think 2, to fit electronical groupsets or mechanical Shimano and SRAM groupset
- TiCR internal cable routing
- TiCR integrated headset (1.5 upper and 1.5 lower)
- Flatback profiles
- Fork Flap
- Max Tire: 700c x 32 mm
- RAD SYSTEM disc brakes
- Disc Flat Mount Ø160 mm
- Front Axle Ø12 x 100 mm Shimano®
- Rear Axle Ø12 x 142 mm Shimano®

NYTRO E-GRAVEL

- Carbon T900/T700
- Asymmetric frame
- Dedicated Gravel Onda fork
- Dedicated FSC Frontal seat clamp, integrated for round seatpost
- Think 2, to fit electronical groupsets or mechanical Shimano and SRAM groupset
- TiCR internal cable routing
- TiCR integrated headset (1.5 upper and 1.5 lower)
- Flatback profiles
- Fork Flap
- Max Tire: 700c x 50 mm
- RAD SYSTEM disc brakes
- Disc Flat Mount Ø160 mm
- Front Axle Ø12 x 100 mm Shimano®
- Rear Axle Ø12 x 142 mm Shimano®
- Rear carrier and mudguard predisposition



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