

APRIL 2021

enviolo

Technical Manual
CY 2021



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Envisioned future

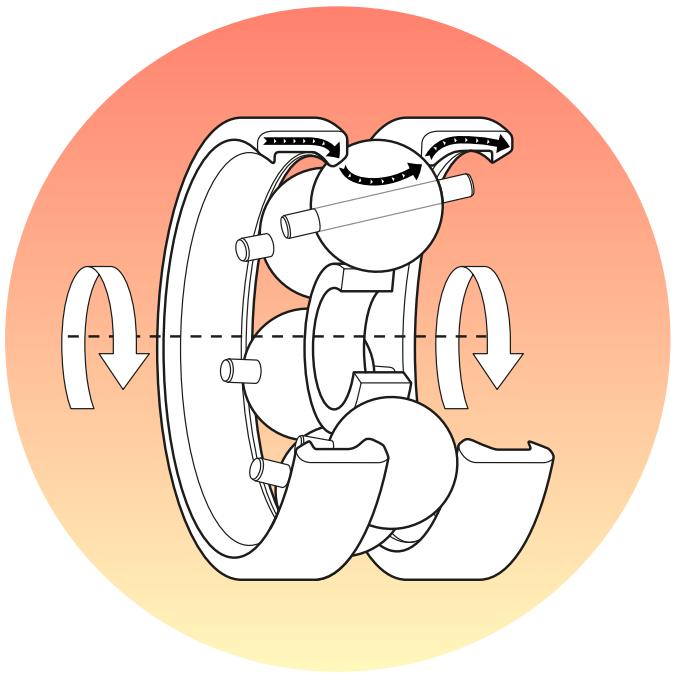
You will see enviolo products in every city, every day.

Our products and services will empower bike makers to build personal mobility vehicles for great multitudes of urban dwellers. These bikes will change their riders' lifestyles, have a wide variety of uses, and solve problems in traditionally car-centered societies.

They will be available in many ways, so every person can afford them. We will maintain loyal business relationships to build a culture of authenticity and honesty with all stakeholders. These relationships will be a beacon of change in creating urban communities focused on sustainable, healthy, socially-responsible lifestyles. Soon, you will see enviolo products in every city, every day.

Stepless manual and automatic shifting

- | | | | |
|--|-------------------------------------|--|--|
| | Near silent | | Comfortable pedaling at desired preset cadence |
| | Stepless shifting | | Automatic shifting |
| | Effortless shifting even under load | | Wireless connection |
| | Greater gear ratio range | | No additional shifter |
| | Maintenance free | | Extended product lifetime |
| | Mobile app customization | | Stoplight setting |



Stepless Manual Shifting: As simple as adjusting the volume on a radio.

With our stepless manual technology, riders can effortlessly change their gear ratio, even under load. Thus we enable them to focus on the important aspects of their ride such as traffic or scenery. No more step changes, locked gears, empty pedaling, or creaking, just a unique ride feel created by the technology's ease of use.

The system enables low maintenance, long-lasting bikes, especially in a combination with a belt drive, the perfect fit for the new rider generation, focused on simplicity and comfort. Moreover, the technology can also be merged with powerful e-bike systems. The enviolo stepless manual technology was created based on use cases to serve specific rider needs, and consists of specifically designed internal gear hubs and matching controllers.

Stepless Automatic Shifting: Why bother switching gears manually?

The stepless automatic technology takes the ride experience to the next level with its 'set it and forget it' approach. Cyclists only need to set up their desired cadence, and the stepless automatic technology will adjust the enviolo system so that they can always pedal at the same pace, even up or down hill.

To be in line with the trend of 'integrated systems', the technology can also be merged into the e-bike's control unit, thus cleaning up the handlebar and simplifying the ride experience.

Product Overview

Hub



City



Trekking



Heavy Duty

Controller



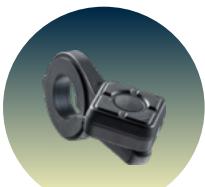
Twist Pure
& Pro



Twist Display Pure
& Pro



CliQ Pure



CliQ Plus



CliQ Pro

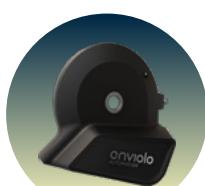
Interface



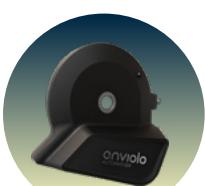
Manual
40T



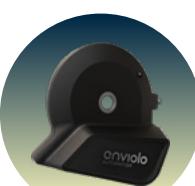
Manual
44T



AutomatiQ
Pure 44T



AutomatiQ
Pro 40T



AutomatiQ
Pro 44T

Component Specifications

Our high-tech components, designed specifically for their use cases, offer unrivaled possibilities.

Internal Gear Hubs



City



Trekking



Heavy Duty

Color	Matt black	Matt black	Matt black
Spline type	44T	44T	40T
Weight	2.450 g	2.450 g	2.450 g
Max. speed RPM	800 RPM	800 RPM	800 RPM
Nominal ratio range	310% (0.55 - 1.7)	380% (0.5 - 1.90)	380% (0.5 - 1.90)
Lifetime	20,000 km	20,000 km	20,000 km
IP classification	Hub = IP65, freewheel = IP54, hub interface = IP54	Hub = IP65, freewheel = IP54, hub interface = IP54	Hub = IP65, freewheel = IP54, hub interface = IP54
Temperature range	-20°C to 48°C	-20°C to 48°C	-20°C to 48°C
Brake options	6-bolt disc/rim/roller	6-bolt disc/rim/roller	6-bolt disc/rim
Max. brake disc rotor	180 mm	180 mm	203 mm
Disc brake screw length requirements	10 - 17 mm	10 - 17 mm	10 - 17 mm
Max. disc brake screw torque	Use disc brake manufacturers recommendation, but don't exceed 6.2 Nm	Use disc brake manufacturers recommendation, but don't exceed 6.2 Nm	Use disc brake manufacturers recommendation, but don't exceed 6.2 Nm
Spoke options	36	32 and 36	32 and 36
Spoke size	2 mm - 2.34 mm	2 mm - 2.34 mm	2 mm - 2.34 mm
Spoke flange diameter	125 mm	125 mm	125 mm
Spoke hole diameter	2.9 mm	2.9 mm	2.9 mm
Wheel size	Minimum 16"	Minimum 16"	Minimum 16"
Axle threads	M10 x 1	M10 x 1	M10 x 1 M12 x 1 tapered (Syntace) M12 x 1 flat (DT swiss) M12 x 1.5 (E-Thru) M12 x 1.75 (Maxle)
Dropout width	135 mm	135 mm	135 and 148 mm
Dropout thickness	6 - 10 mm	6 - 10 mm	6 - 10 mm
Dropout length for no-turn washer engagement (measured from axle center)	Recommended 14 mm, minimum 10 mm	Recommended 14 mm, minimum 10 mm	Recommended 14 mm, minimum 10 mm
Total axle width (without acorn nuts)	183 mm	183 mm	183 mm

Internal Gear Hubs



City



Trekking



Heavy Duty

Chainline	49.0 +/- 0.5 mm	49.0 +/- 0.5 mm	49.0 +/- 0.5 mm for 135 mm and 52+/- 0.5 mm for 148 mm dropouts
Beltline (Gates)	45.5 +/- 0.5 mm	45.5 +/- 0.5 mm	45.5 +/- 0.5 mm for 135 mm and 48.7 +/- 0.5 mm for 148 mm dropouts
Sprocket thickness (chain)	2.3 mm	2.3 mm	2.3 mm
Sprocket thickness (belt)	4.3 mm	4.3 mm	4.3 mm
Sprocket sizes (chain)	16 - 22 T	16 - 22 T	16 - 22 T
Sprocket sizes (belt)	20 - 28 T	20 - 28 T	20 - 28 T
Sprocket type	9-spline, one side flat	9-spline, one side flat	9-spline, one side flat
Chain type	3/32", 1/8" with 3 mm offset cog	3/32", 1/8" with 3 mm offset cog	3/32", 1/8" with 3 mm offset cog
Recommended lacing patterns	2-cross for 26" or larger, 1-cross for 24" or smaller, radial spoking is not allowed	2-cross for 26" or larger, 1-cross for 24" or smaller, radial spoking is not allowed	2-cross for 26" or larger, 1-cross for 24" or smaller, radial spoking is not allowed
Speed pedelec compatible	No	No	Yes

Power Limits

enviolo requires the use of a sprocket ratio of minimally 2.0

Nominal Power

250 W*

	120 kg	130 kg	140 kg	150 kg	160 kg	170 kg	180 kg	190 kg	200 kg	210 kg	220 kg	230 kg	240 kg	250 kg
50 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
55 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
60 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
65 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
70 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
75 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
80 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
85 Nm	●	●	●	●	●	●	●	●	●	●	●	●	●	●
90 Nm	●	●	●	●	●									
95 Nm	●	●	●	●	●									
100 Nm	●	●	●	●	●									

* Only the Heavy Duty hub is allowed on Speed Pedelecs.

Nominal Power

350 W

	120 kg	130 kg	140 kg	150 kg	160 kg
50 Nm	●	●	●	●	●
55 Nm	●	●	●	●	●
60 Nm	●	●	●	●	●
65 Nm	●	●	●	●	●
70 Nm	●	●	●	●	●
75 Nm	●	●	●	●	●
80 Nm	●	●	●	●	●
85 Nm	●	●	●	●	●

Nominal Power

500 W

	120 kg	130 kg	140 kg	150 kg	160 kg
50 Nm	●	●	●	●	●
55 Nm	●	●	●	●	●
60 Nm	●	●	●	●	●
65 Nm	●	●	●	●	●

AUTOMATiQ

Hub

Interfaces



Pure



Pro

Hub compatibility	City, Trekking	City, Trekking, Heavy Duty
Spline	44T	40T and 44T
IP classification	IP54	IP54

Electrical specifications:

Nominal voltage range	18 V - 55 V	18 V - 55 V
Peak voltage	60 V	60 V
Min. voltage	18 V	18 V
Built-in fuse protection	3A	3A
Average power consumption while shifting	(2Nm X 2.5W) = 5W	(8Nm X 2.5W) = 20W
Peak power consumption	10.5W < 3s	48W < 3s
Shut-down protection	Data is saved at shutdown	Data is saved at shutdown
Sleep mode	Time can be pre-set using app	Time can be pre-set using app
Power consumption Sleep mode	0.5W	0.5W
Power consumption Non-shifting	0.5W	0.5W

Wiring:

Wire diameter	I-Harness = 3.7mm	I-Harness = 3.7mm
Connector Ø on AHI	4-pin = 9mm	4-pin = 9mm
Connector Ø to power source	10.2 X 14.2 mm	10.2 X 14.2 mm

Manual Controller



Twist



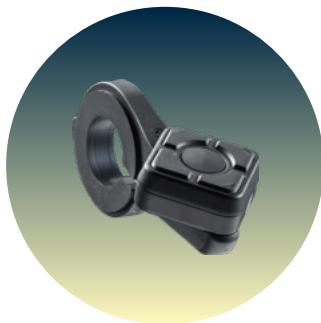
Twist Display

Type	Pure or Pro	Pure or Pro
Shift cable length	2,200 mm	2,200 mm
Grip rotation options	Multi-turn	Multi-turn
Handlebar diameter	22.2 mm	22.2 mm
Cable housing	Full cable housing recommended, dual cable route	Full cable housing recommended, dual cable route
Shift cable diameter	1.1 - 1.2 mm (original 1.2 mm)	1.1 - 1.2 mm (original 1.1 mm)
Compatible with all CVPs	Yes	Yes
IP classification	IP54	IP54
Grip material	Extended Durability	Extended Durability
Over-torque protection	Plastic (Pure) or Aluminum (Pro)	Plastic (Pure) or Aluminum (Pro)

AUTOMATiQ Controller



CliQ Pure



CliQ Plus



CliQ Pro

Connection	Wireless	Wireless	Wireless
Handlebar diameter	22.2mm	22.2mm	22.2mm
Compatible with all CVPs	Yes	Yes	Yes
IP classification	IP54	IP54	IP54
Battery life	12 month	12 month	24 month

Compatibility Matrix



City



Trekking



Heavy Duty

Twist



Twist
Display



Manual
40T



Manual
44T



CliQ
Pure



CliQ
Plus



CliQ
Pro



AutomatiQ
Pure 44T



AutomatiQ
Pro 40T



AutomatiQ
Pro 44T

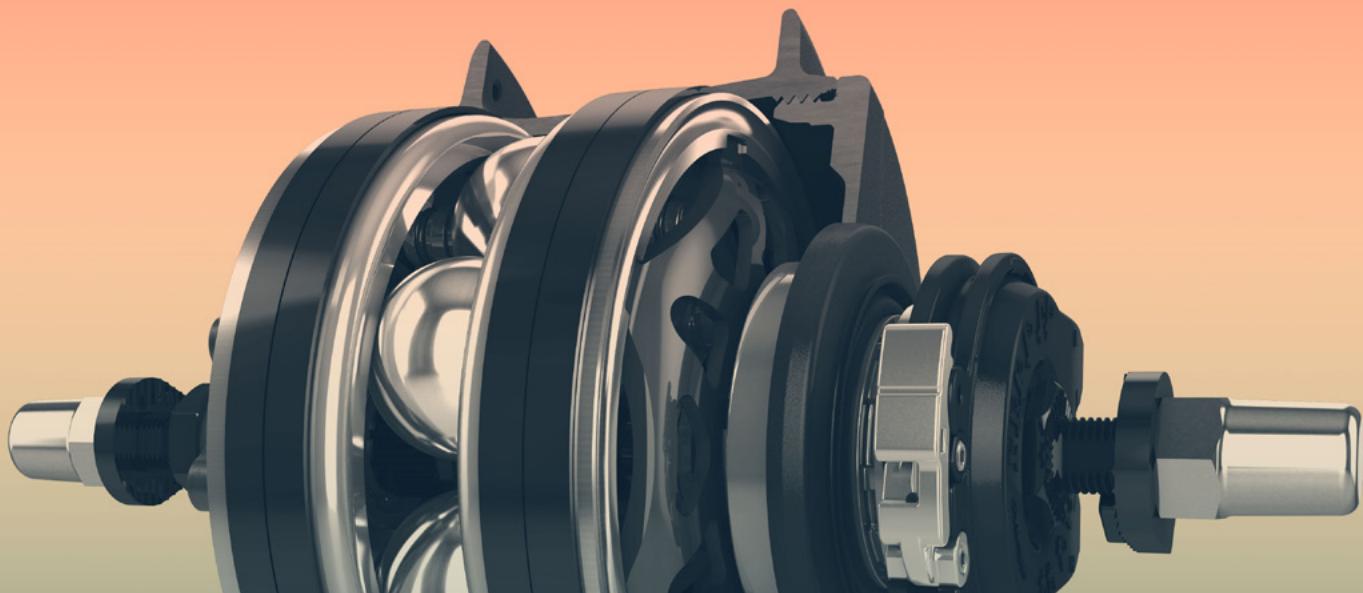


Frame Requirements

To assist you in designing your frames to be compatible with our products (e.g. sufficient clearance to chainstay/chain case) we have compiled an overview of our components with system measurements.

For 3D data please reach out to your responsible contact.

Mechanical Frame Requirements



Vertical dropout

Using a vertical dropout requires a secondary chain tension adjustment option (e.g. eccentric bottom bracket or chain tensioner). The advantage of vertical dropouts is that once the tension is set, the rear wheel can be reinstalled without readjusting the tension.

Horizontal dropout

Horizontal dropouts are preferable for enviolo hubs, because they allow easy chain tension adjustment.

Mechanical cable routing

As in any other cable system, the number and sharpness of bends influences the ease of shifting. We recommend that you consider this in your cable routing to limit required shift effort.

148 mm dropout configurations

On 148 mm dropouts, where you plan to use the AUTOMATiQ system, you require a sliding dropout, since the AHI is likely to interfere with derailleur hangers.

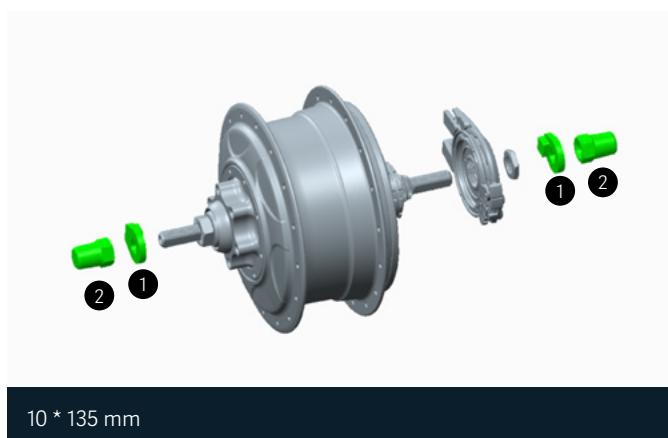
Mechanical Frame Requirements

enviolo
MANUAL

Mounting hardware customization opportunities:

For OEMs that desire to design & use their own mounting hardware for our CVPs, this section will outline requirements, such as axial and radial restraint of the CVP and hub interface, as well as the torque reaction via a no-turn feature. These aspects have to be considered and validated by the OEM to avoid interferences or incorrect installation and function of our CVP.

On top the industry standards ISO4210 and EN15194 have to be ensured as well.



10 * 135 mm

For all 135mm versions the mounting hardware consists of no-turn washers and acorn nuts that affix the CVP to the bicycle dropout/frame.

Specific requirements for these are:

1. Minimum non-torque capability required through this part: 100 Nm
2. Thread size of the acorn nut interface thread: M10 * 1

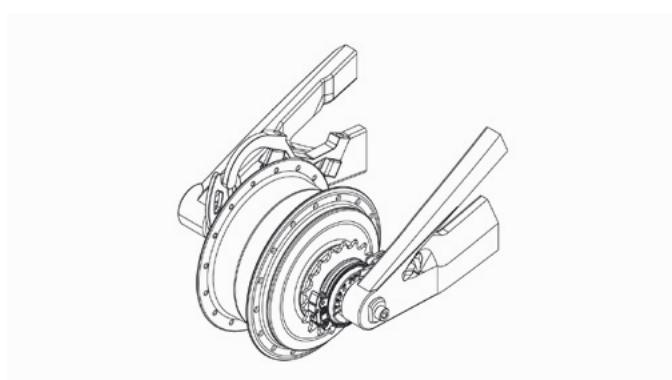
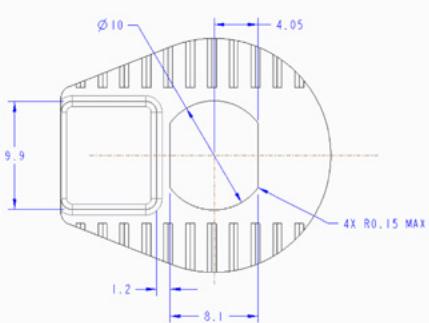


12 * 148 mm

For all 148mm versions the mounting hardware consists of a variety of hardware components (Syntace, E-Thru, DT Swiss, Maxle) that affix the CVP to the bicycle dropout/frame. Separate brake caliper mounts are available as IS or PM options.

Specific requirements for these are:

3. Minimum non-torque capability required through this part: 200 Nm
4. Minimum # of screw holes to utilize: 7
5. Internal mainshaft interface thread: M6 * 1
6. No-turn adapter screw interface thread: M4 * 0.7
7. Frame adapter interface thread: M10 * 1

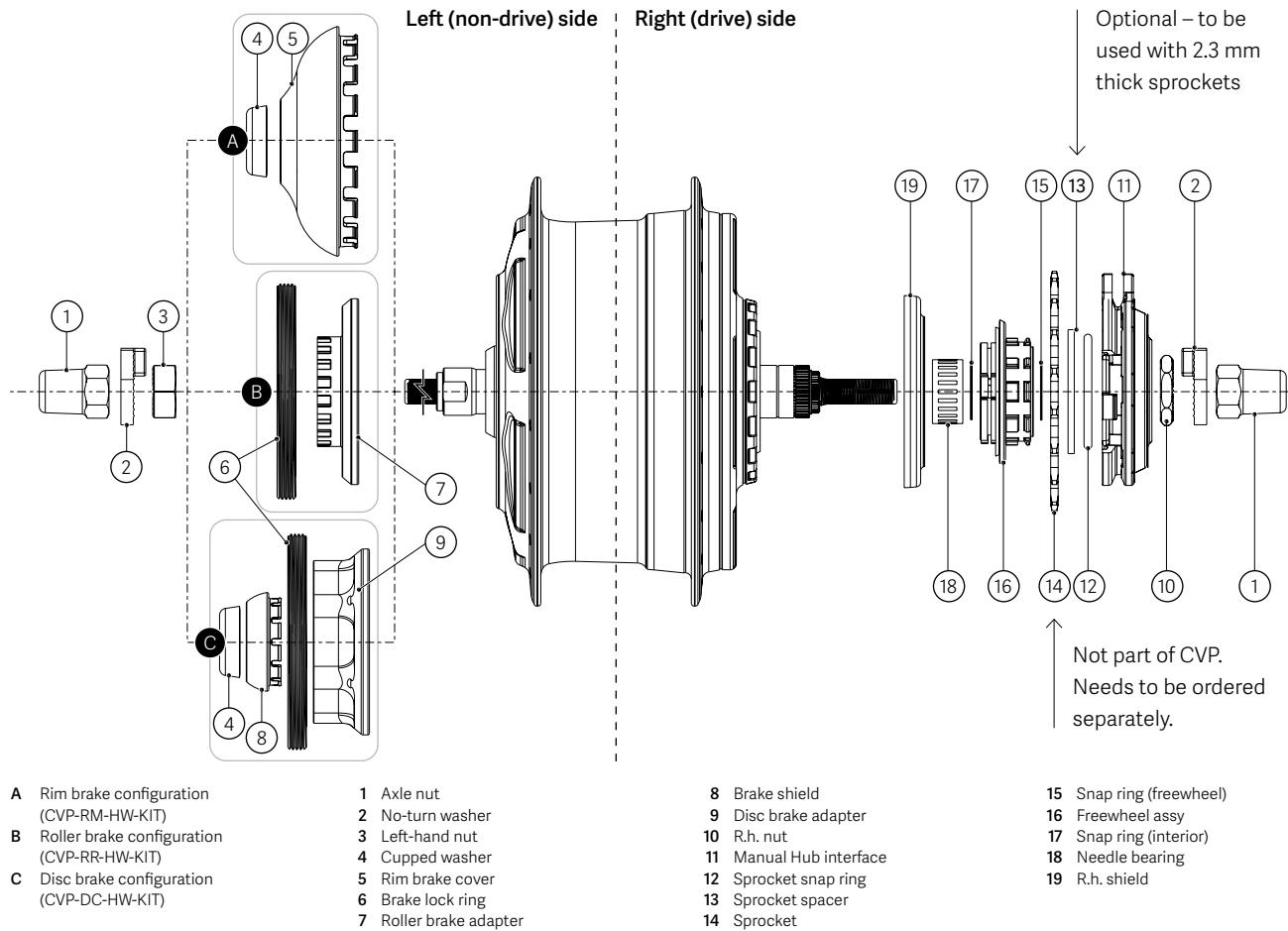


Grey parts can not be customized. Highlighted parts can be customized, but are required to be manufactured & validated by the OEM.

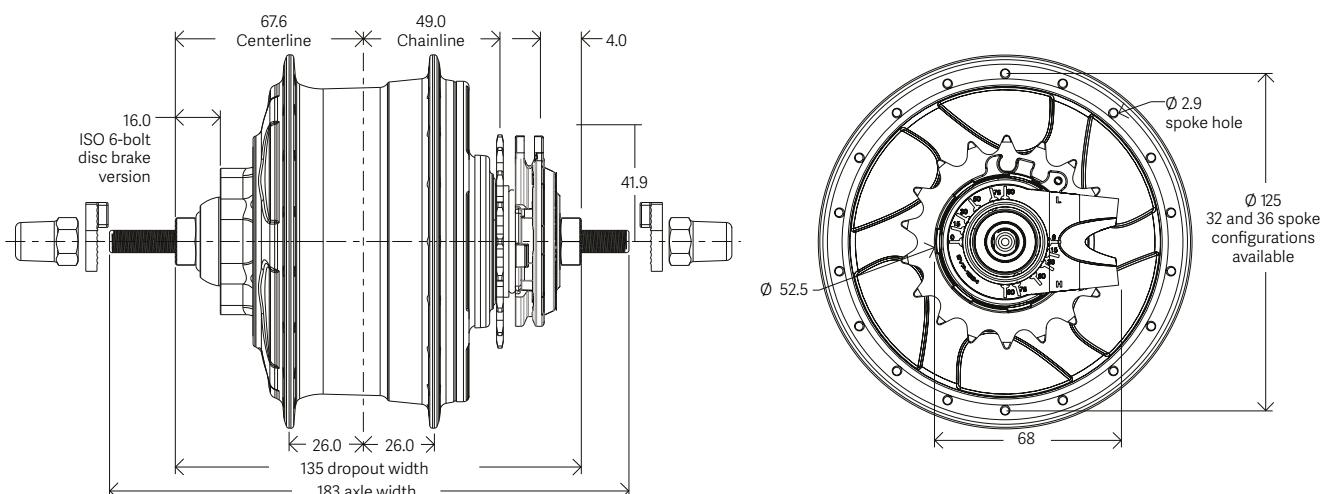
Required Package Space City, Trekking

enviolo
MANUAL

Components of Assembly



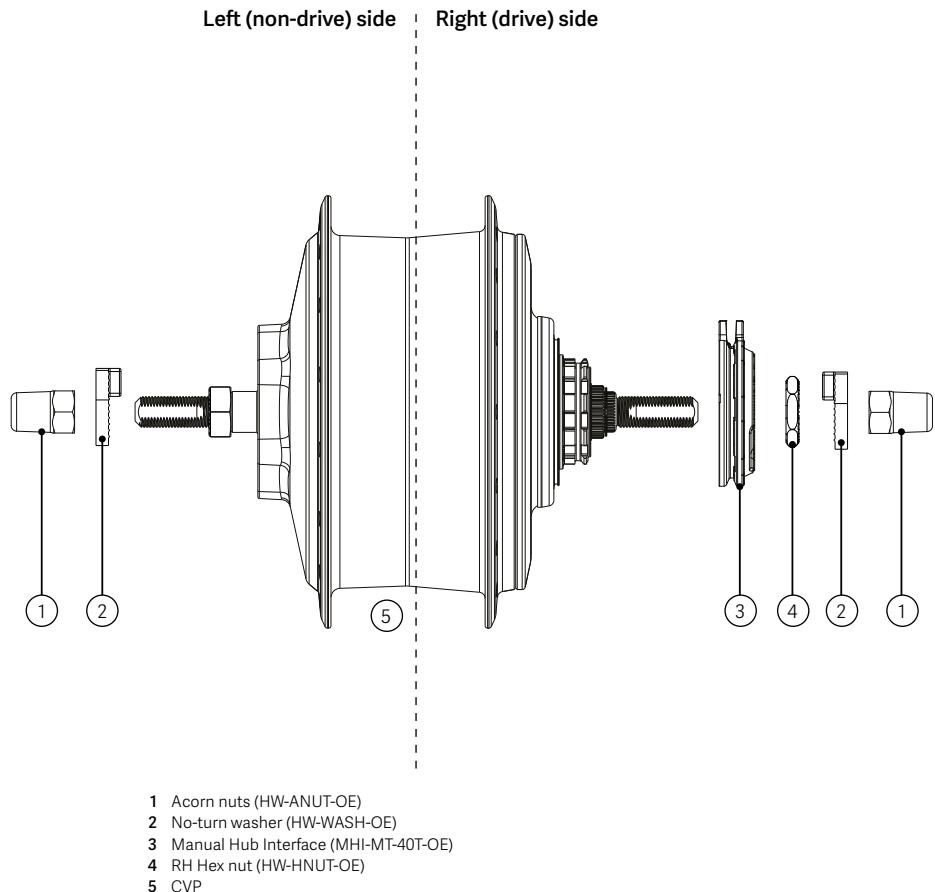
CVP with Manual Hub Interface



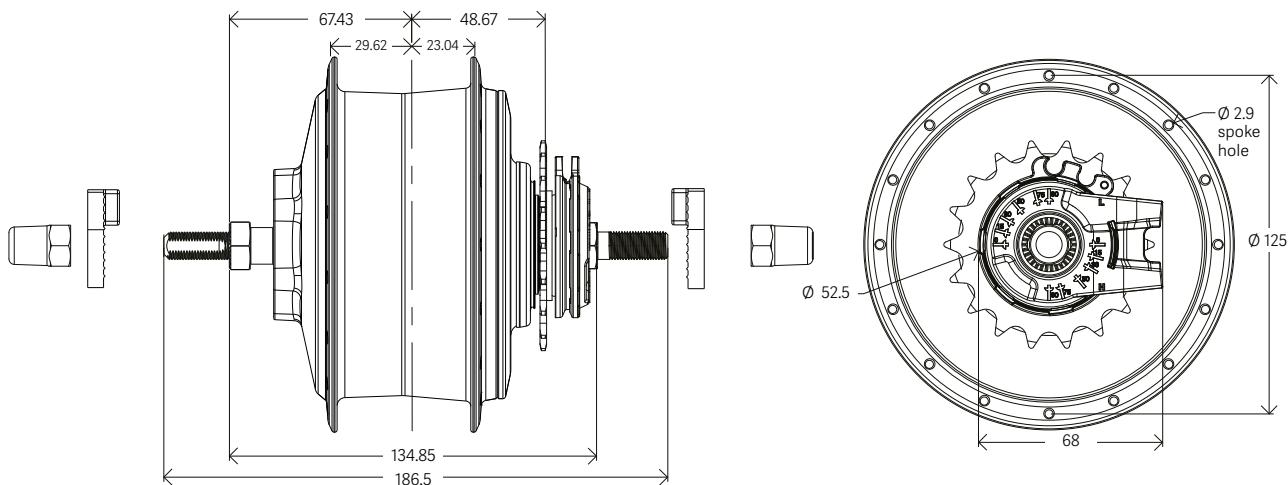
Required Package Space Heavy Duty (135 mm)

enviolo
MANUAL

Components of Assembly

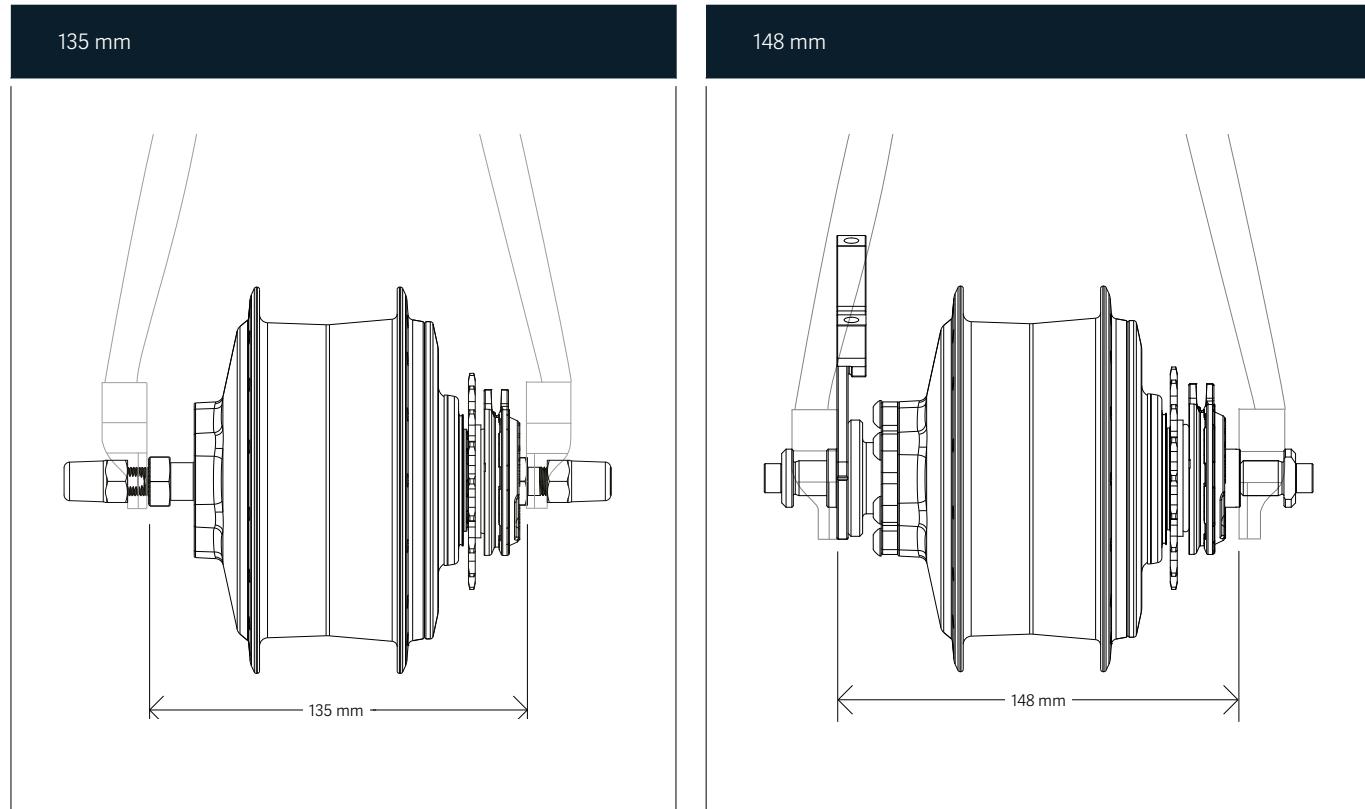


CVP with Manual Hub Interface



Heavy Duty Dropout Options

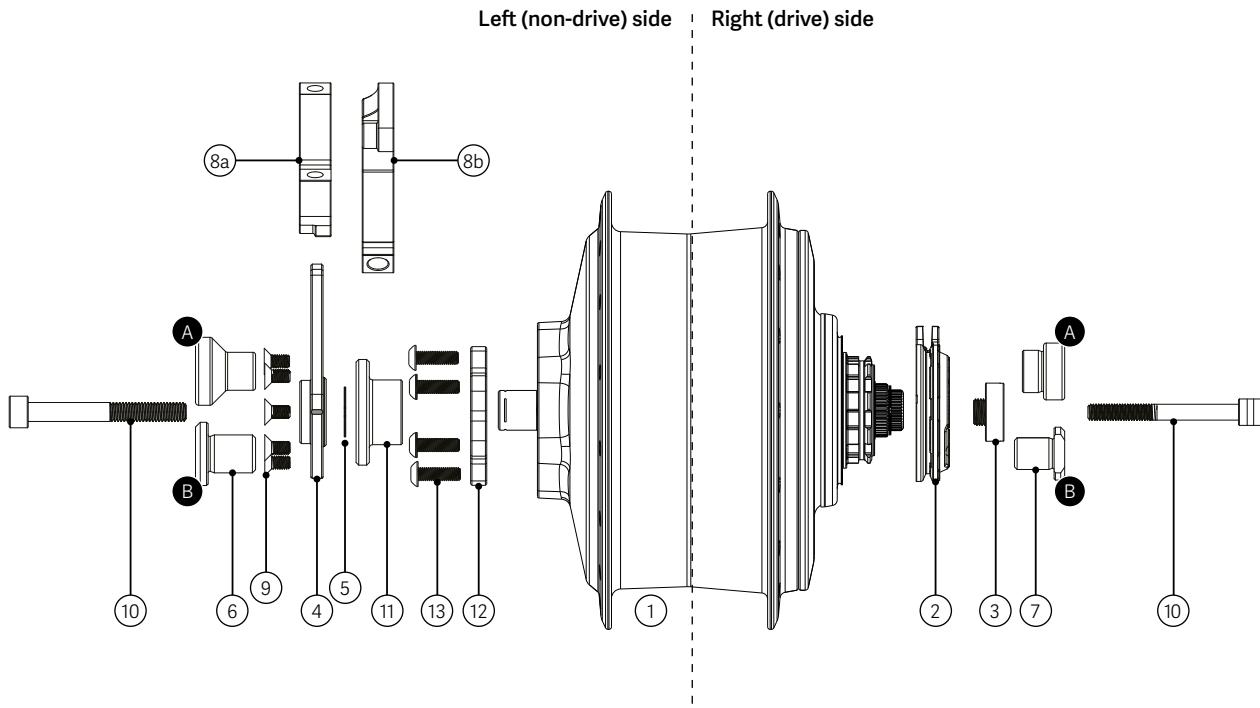
enviolo
MANUAL



Required Package Space Heavy Duty (148 mm)

enviolo
MANUAL

Components of Assembly

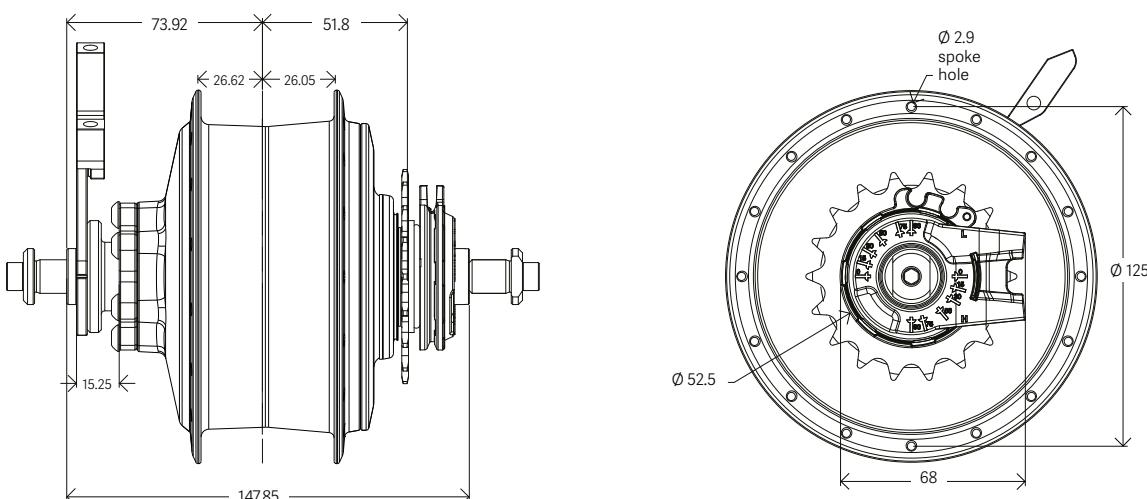


A Syntace
(HW-SPCR-LHSYN-OE)
B DT Swiss, Maxle, E-Thru
(HW-SPCR-LH-OE)

1 Heavy Duty CVP
2 Manual Hub Interface
(MHI-MT-40T-OE)
3 Adapter, lock nut, 12 x 148 compatible
(HW-LNUT-OE)
4 Axle plate, 142 / 148 mm compatible
(HW-AXPL-LG-OE)
5 Retaining ring
(HW-RRING-13MM-OE)

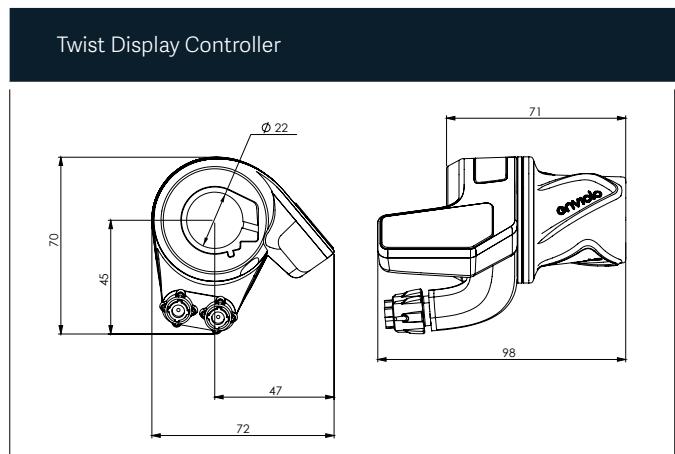
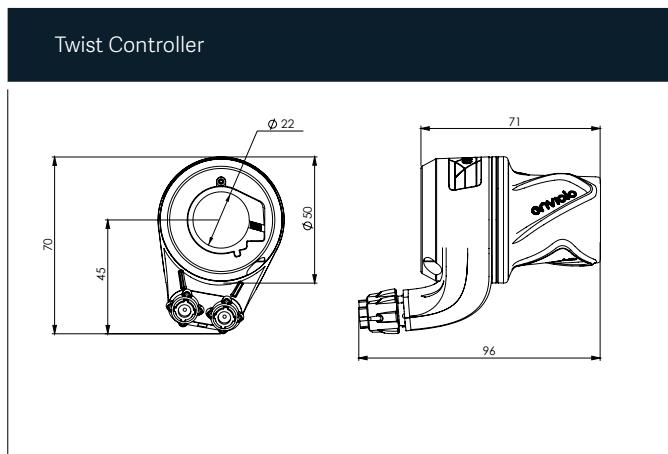
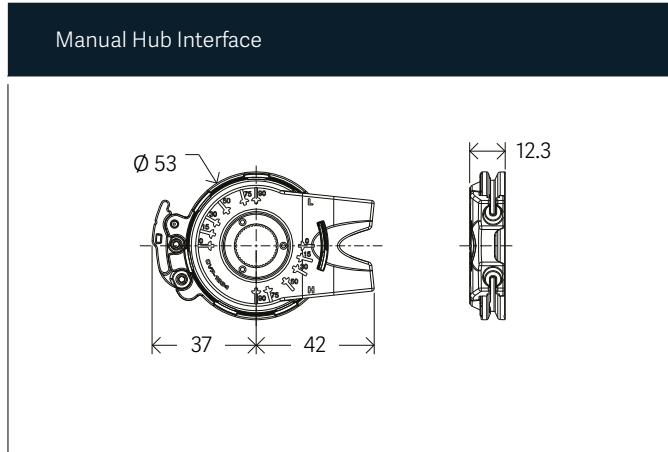
6 Spacer, LH
7 Spacer, RH
8a Brake caliper mount IS to PM
or
8b Brake caliper mount PM to PM
9 Bolt, countersunk, Torx, M4 x 0.7 x 8
(HW-CSB-M4X.7X8-OE)
10 Socket head cap screw, M6
(HW-SHCS-M6X1X60-OE)
11 Adapter, Torque Reaction
(HW-TORQ-WIDE-OE)
12 Spacer, disc brake, 12 x 148
(HW-DC-SPCR-OE)
13 Screw, button head,
M5 x 0.8 x 16L, alloy
(HW-BHS-M5X.8X16-OE)

CVP with Manual Hub Interface



Individual Components

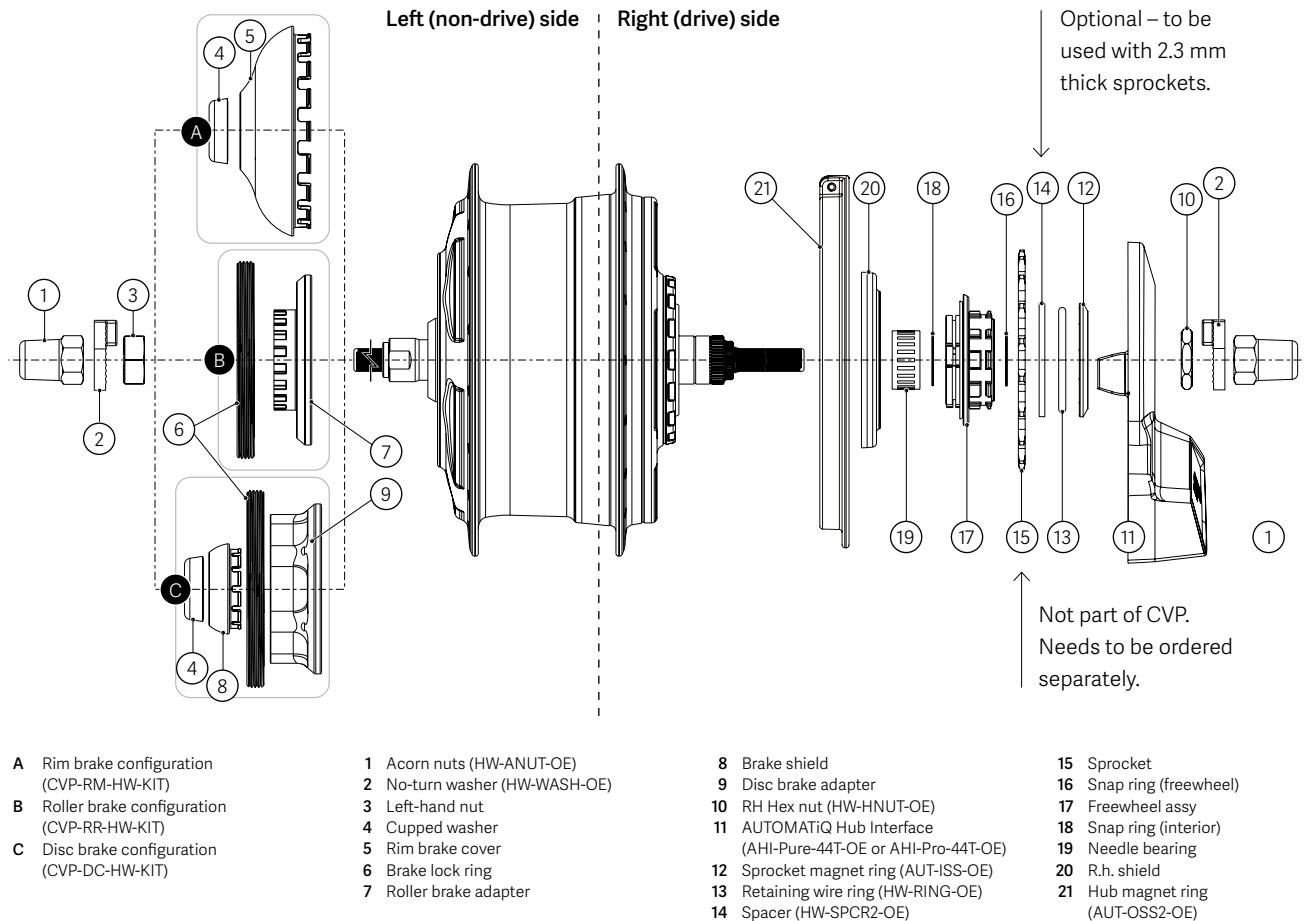
enviolo
MANUAL



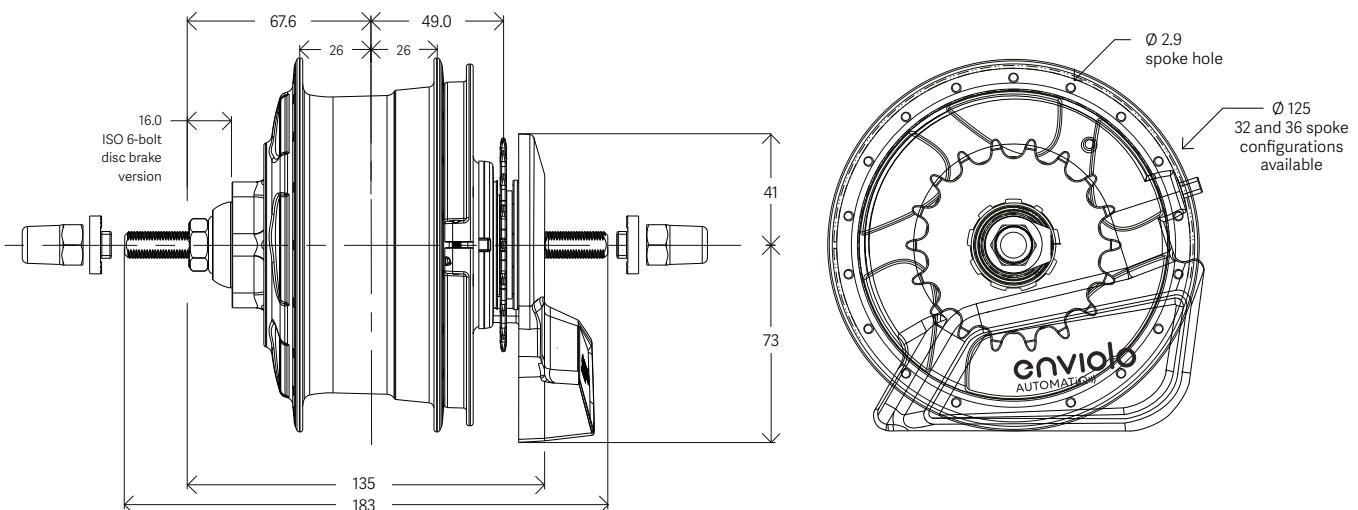
Required Package Space City, Trekking

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Components of Assembly



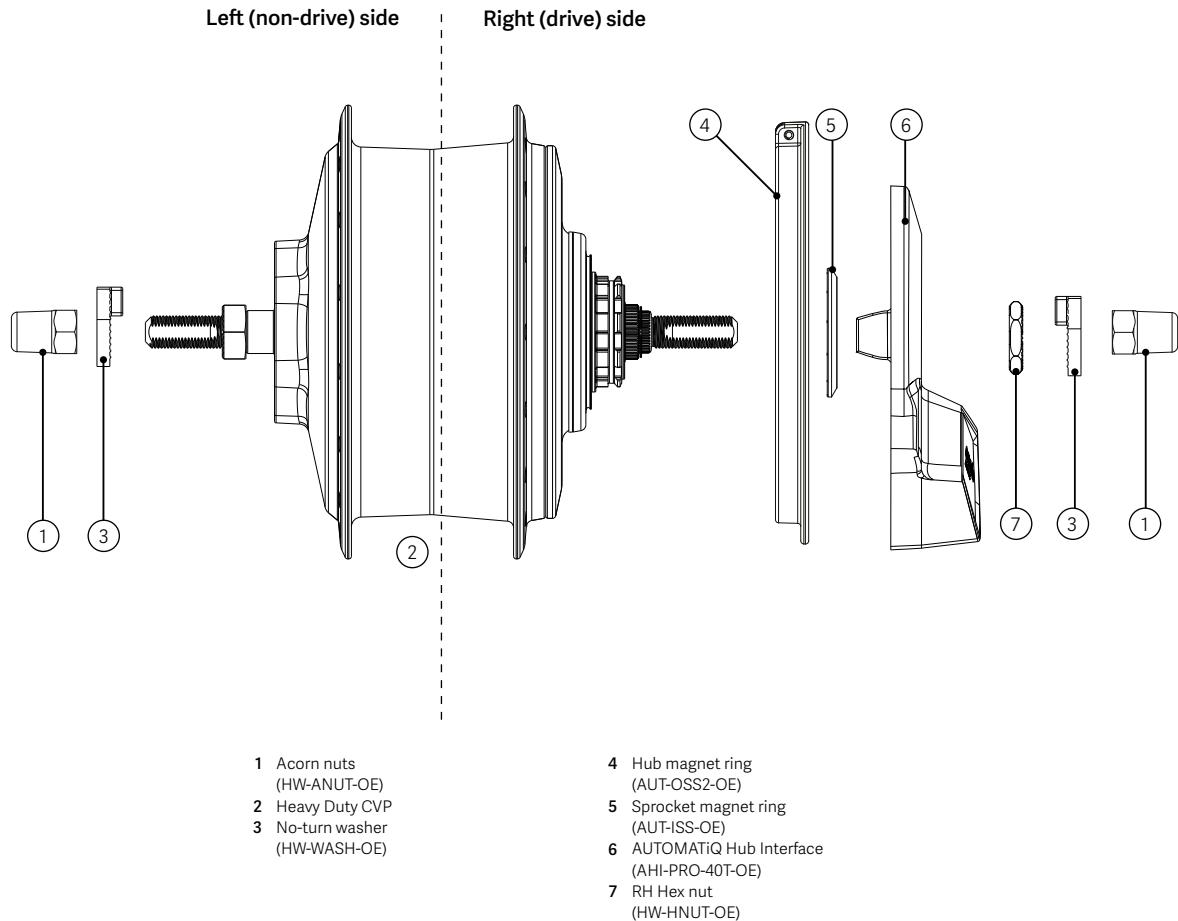
CVP with AUTOMATiQ Hub Interface



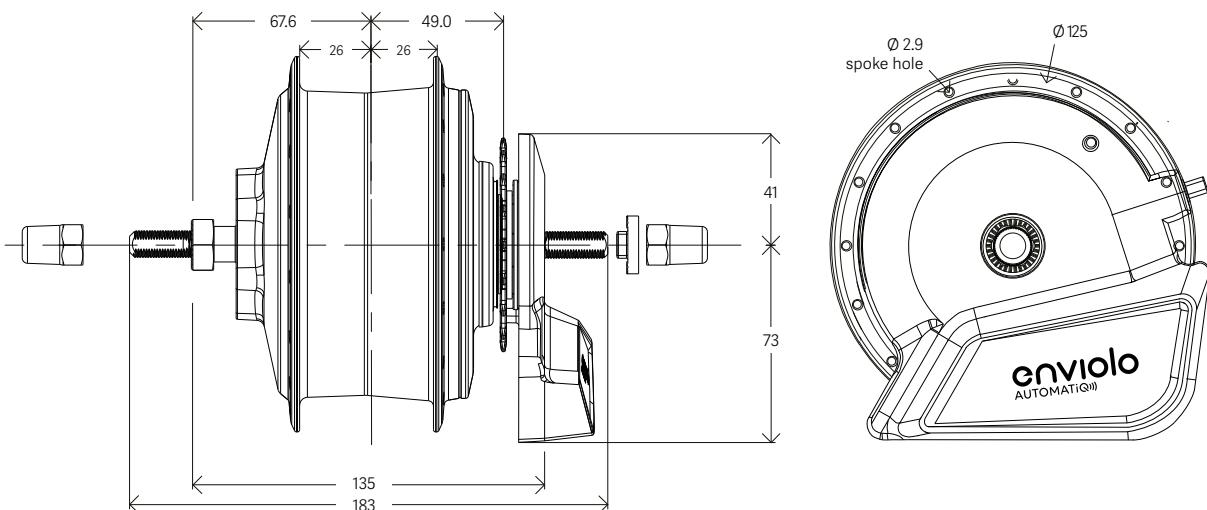
Required Package Space Heavy Duty (135 mm)

enviolo
AUTOMATiQ®

Components of Assembly



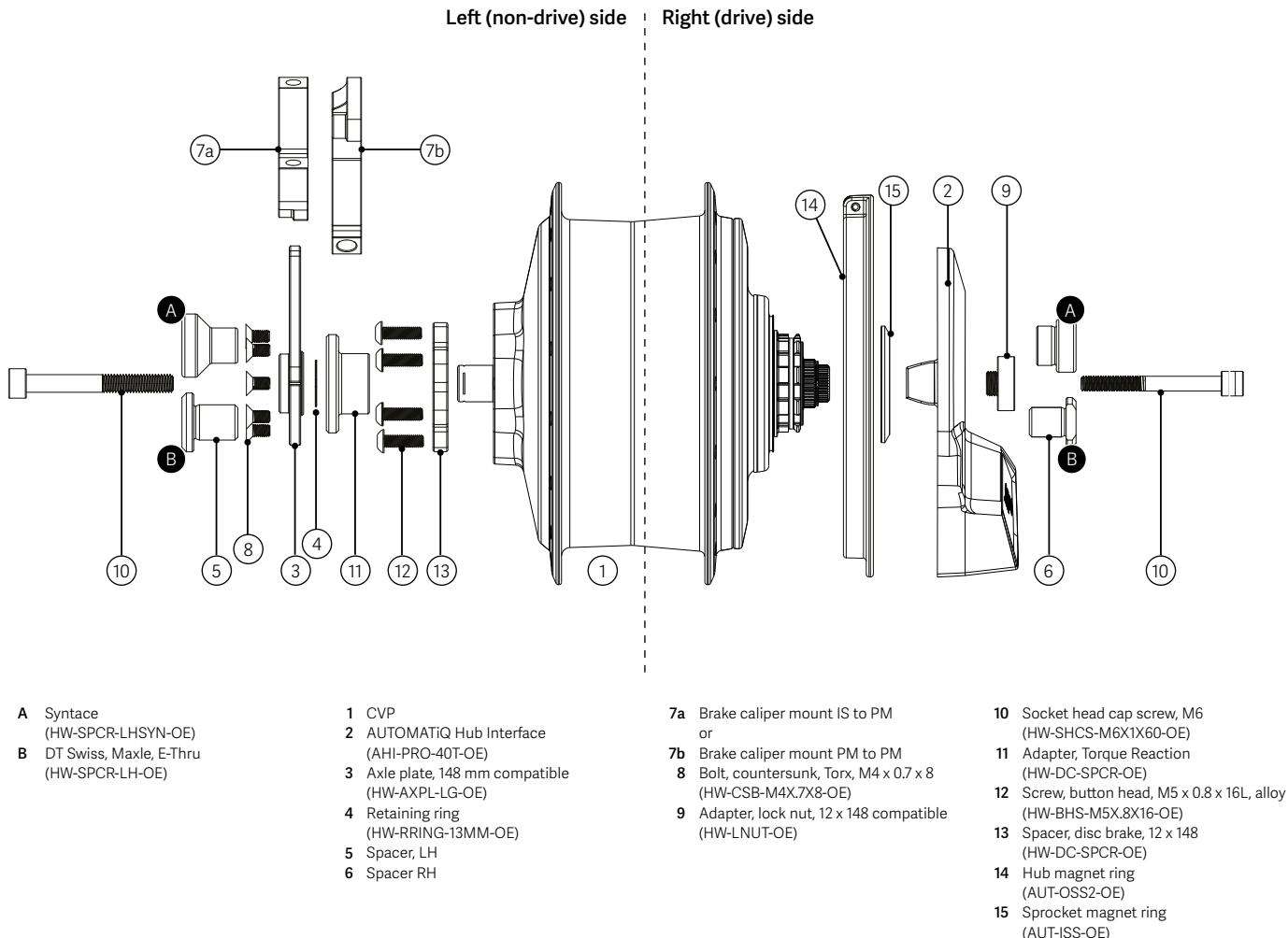
CVP with AUTOMATiQ Hub Interface



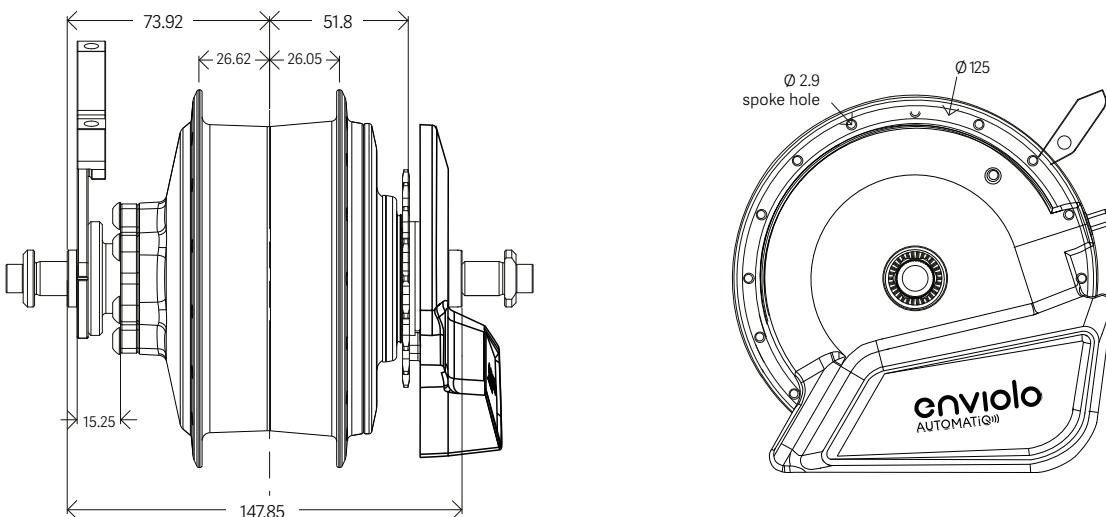
Required Package Space Heavy Duty (148 mm)

enviolo
AUTOMATiQ®

Components of Assembly



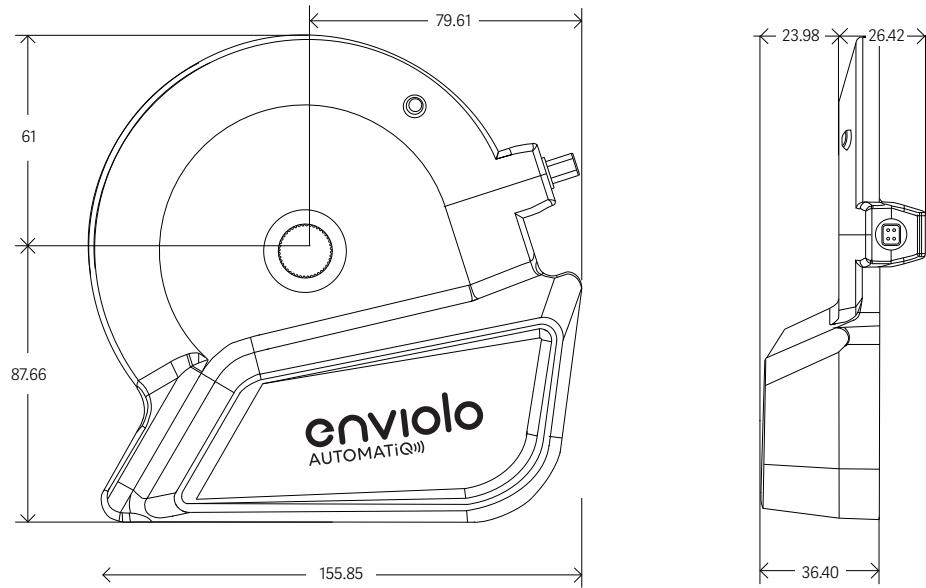
CVP with AUTOMATiQ Hub Interface



Individual Components

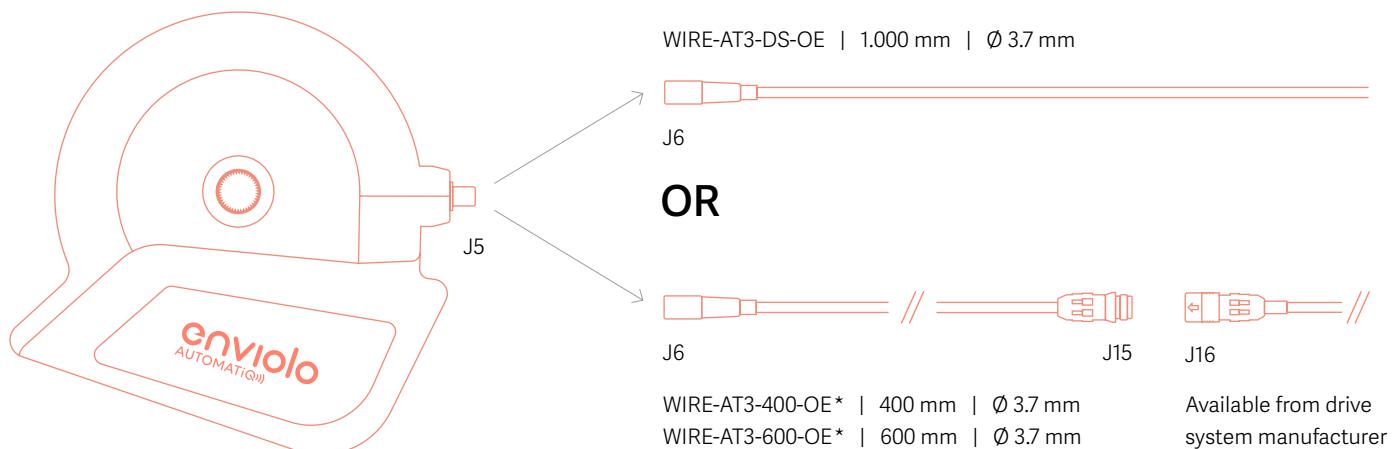
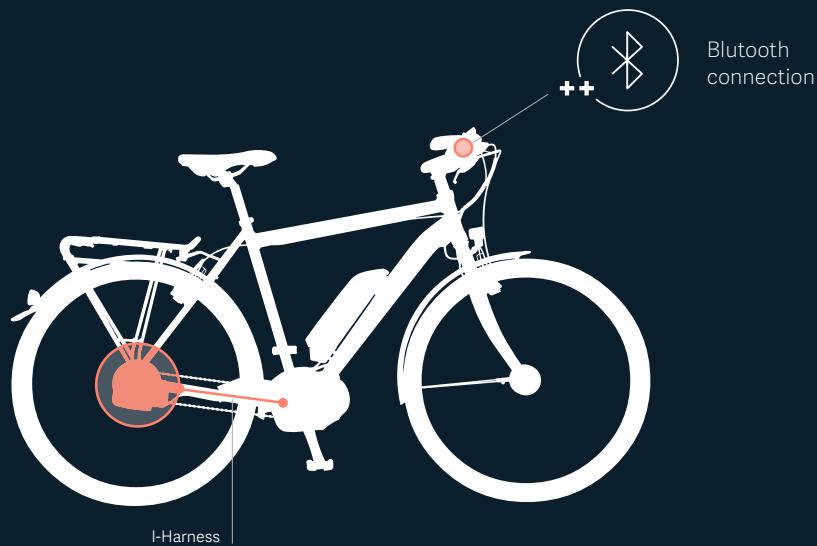
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AUTOMATiQ®

AUTOMATiQ Hub Interface



AUTOMATIQ Wire Harness

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AUTOMATIQ®



Note: Pin numbering on AHI-side is different from pin numbering on cable-side

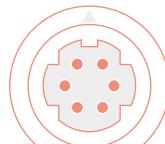
* This connector is only required if the counterplug is not provided by the drive system manufacturer. Please contact the drive system manufacturer for further information. For Yamaha we offer an alternative cable. Please contact the sales team for further information.



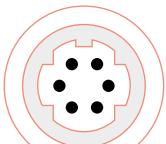
J5



J6



J15 Hirose



J15 Hirose

1	V_BAT	2
2	GND	3
3	CAN_L	4
4	CAN_H	1

Further Information

System efficiency



Besides the components themselves several other factors influence the battery range:

- Type of tires
- Tire pressure
- Riding at high assistance levels
- Rider and vehicle weight
- High carry-on weight
- Straight sitting position
- Headwind
- Topography
- Frequent starting and stopping
- Frequent riding under 20 km/h
- Frequent riding under 50 RPM
- Low pedaling force by rider
- Low outside temperatures
- Rider cadence

Service Tools

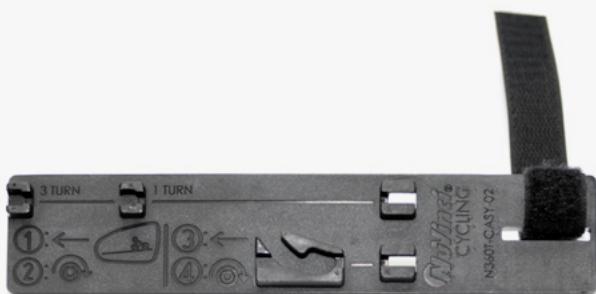
To support your assembly and maintenance of our products we offer four simple service tools:



BK-ADPT-TOOL
Brake adapter / disc assembly



HW-SNUT-TOOL
Spline nut tool



CE-HW-TOOL-SM-MLD
Cable hardware installation tool

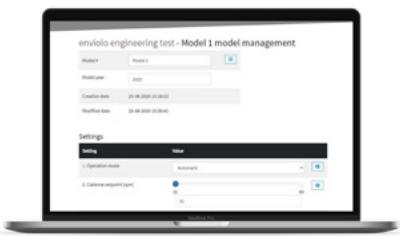


CE-HW-TOOL-LG-CNC
Cable hardware installation tool

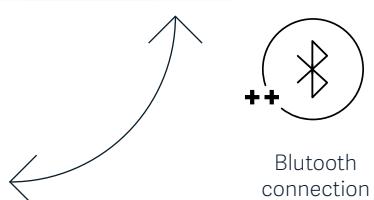
AUTOMATiQ App



If the customer allows for a data transfer all system data incl. km ridden and selected ride characteristics will be uploaded to our cloud, which will also speed up any potential warranty processing.



In addition OEMs have access to a backend (www.AUTOMATiQ.enviolo.com), which enables them to have a simplified mass production bike setup, which in addition will then also speed up the assembly line efforts tremendously.



Our new AUTOMATiQ system offers a bluetooth connection, which allows easy setup, customization and firmware updates via a mobile phone or tablet.



The app is offered in different hierarchy levels in order to grant the proper access to the according audience. To get access to the proper layer, simply register in the app.

Assembly

Torque Specifications

City, Trekking, Heavy Duty (135 mm solid axle)

Acorn nut (HW-ANUT-OE)	30 - 40 Nm
Brake adapter + Loctite® 277 or similar	55 - 65 Nm
RH Hex nut (HW-HNUT-OE)	8 - 10 Nm
LH hex nut 20 - 27 Nm (HW-SNUT-OE)	7 - 9 Nm

Heavy Duty (148 mm)

Screw, button head, M5 x 0.8 x 16L, alloy (HW-BHS-M5X.8X16-OE)	5.5 - 6.2 Nm
Right side spacer (not threaded in all cases)	5 - 10 Nm
Axle bolts (HW-SHCS-M6X1X60-OE / HW-SHCS-M6X1X60-OE)	10 - 15 Nm
Adapter locknut (HW-LNUT-OE)	5 - 7 Nm

Other Parts

Cable hardware	1.5 - 2.0 Nm
Controller	2.0 - 2.5 Nm
Hub magnet ring (AUT-OSS2-OE)	1.0 Nm
Controller cable cover screw	0.2 - 0.3 Nm (handtight)

Quality & Validation



Before we release our products to the market they have to run through a severe testing cycle, which is derived from automotive standards and includes an FMEA and functional safety analysis.

In addition all our products complete an extensive end-of-line testing and validation process.

Build quality

- Ride audit (quantity & quality)
- Ratio range
- R&D function
- Assembly tolerances

Durability / fatigue tests

- Distributed fixed-ratio test (DFRT)
- Dynamic shift test (DST)
- Coasting test
- Canted wheel bump test
- Hub shell & cover fatigue test
- Spoke flange fatigue test
- Brake ultimate load & fatigue test
- Shifter system life test

Design & overload tests

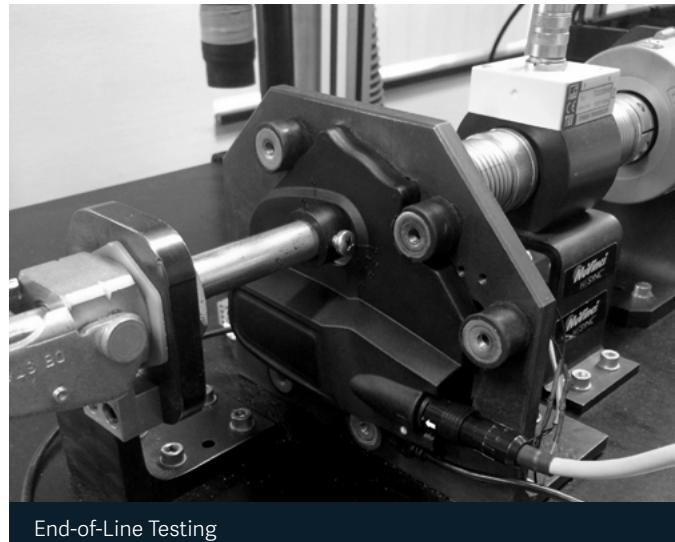
- Cold temperature operation test
- Torsional stress (DIN) test
- Wheel retention test
- Spoke flange ultimate load test
- Pedal drag test

Environmental tests

- Corrosion (salt spray) test
- UV test
- Environmental intrusion test
- Durability



Production Line Testing



End-of-Line Testing

Warranty Information

Warranty, Misuse and Exclusion of Liability

enviolo

Basic Repair Work

Please check before every ride that all parts are not damaged, properly connected and correctly tightened with the recommended torque including axle nuts, hub interfaces controllers and brake discs.

Shift cables, cable housing, handlebar grips, sprockets, and bike chains are wear parts. Please check these parts regularly and replace them as necessary.

Only a qualified bike retailer should perform any necessary work on the enviolo manual and automatic systems. Unauthorized work on your enviolo systems could endanger you and your warranty may become void.

Please contact your qualified retailer regarding any question or problem you may have.

In case of disposal, please note that all components, accessories and packaging should be disposed of in an environmentally correct manner and not into household waste.

- According to the European guideline 2012/19/EU, electrical components that are no longer usable must be collected separately.

Refer to our website for additional service information at www.support.enviolo.com

Failure to use your enviolo shift solution as intended or to follow safety-relevant instructions can lead to an exclusion of liability for any material defects. Any misuse must therefore be avoided! Warranty will therefore not be covered if ...



... a product has been modified or where the serial # or date codes have been altered, defaced or removed.



... our city and trekking hubs are not to be used for commercial purposes without written pre-authorization from enviolo. Only specifically approved enviolo hubs may be used for reasonable commercial purposes and this warranty will be limited to one (1) year for such reasonable commercial use.



... damage to the product occurs:

- determined by enviolo to be caused by crash, impact, or abuse of the product;
- resulting from use of the product in what enviolo, in its sole discretion, considers extreme applications such as, but not limited to, downhill, freeride, "North Shore" style, and BMX;
- resulting from powering of the enviolo city or trekking hubs with electric motors rated over 250W, or any powering of the product with internal combustion engines;
- resulting from running of the hubs with electric motors at continuous torques at the bottom bracket over the defined limits in the table on page 9;
- during the shipment of the product;

- resulting from use of total weight (rider, cargo, and bike higher than 160kg for the enviolo city hub, 180kg for the enviolo trekking hub, and defined limits in the table on page 9 for enviolo heavy duty);
- resulting from use of the product outside the defined cog ratio limits at 1.8 to 1 on standard bikes and minimum 2.0 on eBikes;
- resulting from use of the product at nominal voltages of over 48V or peak voltages of over 60V;
- caused by the use of parts that are not compatible, suitable and/or authorized by enviolo for use with the product;
- caused by the product not being used as intended, e.g. as a gearbox or as part of a wheel that does not use the standard 32 or 36 hole configuration



Do not make any modifications (including software) to your enviolo system, which could lead to an increased performance of your bike or eBike.



Please observe all national regulations on registering and using bikes and eBikes.

Warranty, Misuse and Exclusion of Liability



Warranty

The following warranty is a voluntary two-year limited warranty offered by enviolo. It is offered to all purchasers of the enviolo city, trekking and heavy duty (collectively, the "enviolo products").

Under the laws in certain countries (for example, Germany, and the Netherlands), a purchaser is entitled to statutory rights with respect to products that are defective or do not conform with the contract of sale. These rights allow a purchaser to demand, free of charge, repair, replacement, or under certain conditions, discount or refund by the seller of such products. This voluntary warranty does not affect your statutory rights. If you live in one of these countries, when you purchase enviolo products, in addition to your statutory rights, you are also entitled to claims out of enviolo's limited warranty described below. These claims exist concurrently with your statutory rights so that, should your product be defective or if it does not conform with the contract of sale, while the limited warranty is in place, you can choose to make a claim under your country's law or enviolo's limited warranty.

What does this warranty cover?

enviolo warrants any enviolo product that is defective in materials or workmanship. This warranty only extends to the original purchaser and is not transferable. (Some states or countries do not allow restriction of warranty coverage to the original buyer, so this restriction may not apply to you). If you purchased your enviolo product as part of another product, this warranty in no way replaces or is an extension of the warranty of the manufacturer of that product, which warranty is the sole responsibility of that product's manufacturer.

How long does this warranty last?

The warranty period lasts two years from the date of original purchase.

What will enviolo do?

enviolo will, at enviolo's sole option, repair, replace or refund the cost of the defective unit.

What does this warranty not cover?

This warranty does not apply to any of the following:

- Normal wear and tear to components subject to wear, such as, for example, rubber seals and rings, jockey wheels on chain tensioner (if applicable), twist grip rubber, and shifter cables.

- Damage to parts not manufactured by enviolo or its related entities (such as dropouts and chains).
- Labor required to remove, re-fit or re-adjust the product within the bicycle assembly.
- A product used in any installation other than a single rider bicycle. Tandems are not covered unless expressly allowed under a specific enviolo product owner's manual.
- A product that has been incorrectly installed and/or not adjusted according to the enviolo product owner's or technical manual, which can be found at www.support.enviolo.com.
- A product that has been disassembled into its components beyond the scope of service documentation (Owner's Manuals for enviolo internal gear hub with enviolo manual or AUTOMATiQ systems).

How to get warranty service?

Claims under this warranty must be made through the retailer where the vehicle or the enviolo component was purchased, or through an authorized retailer of enviolo components. Please return the enviolo component to the retailer together with the original, dated invoice or receipt. The retailer will contact enviolo customer service to handle your warranty claim. Retailers requesting a warranty claim should contact enviolo customer service to obtain a Warranty Return Authorization. The retailer will then need to return the product to enviolo together with satisfactory proof of the date of purchase.

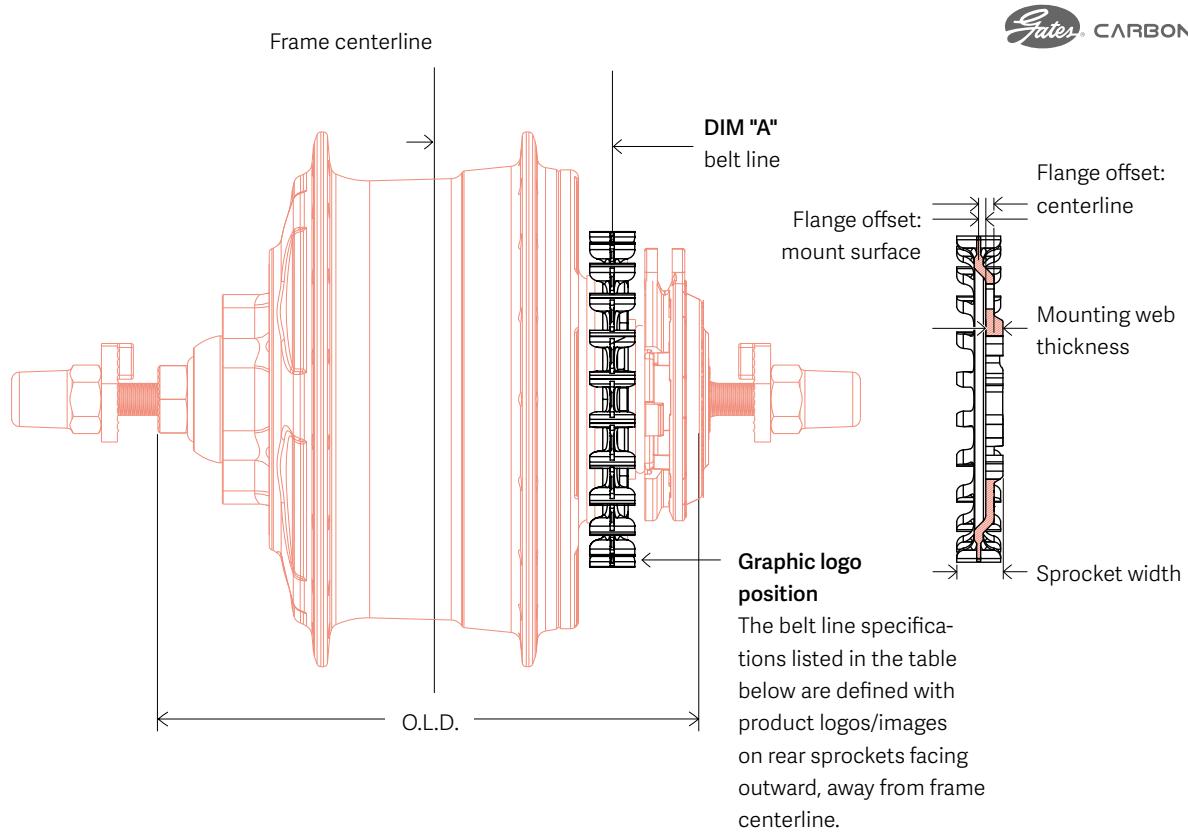
This limited warranty is the sole and exclusive warranty made by enviolo with respect to the product and is given in lieu of any other warranty. To the extent allowed by applicable law, and all express or implied warranties not set forth herein are waived and disclaimed, including any implied warranty of merchantability or fitness for a particular use. enviolo liability under this limited warranty is limited solely to those liabilities set forth above. In the event that any provision of this limited warranty should be or become invalid or unenforceable under applicable law, the remaining terms and conditions hereof shall remain in full force and effect and such invalid or unenforceable provision shall be construed in such a manner as to be valid and enforceable.

enviolo reserves the right to revise this limited warranty without notice.

Cooperation Partners

Gates CDX Beltline Specifications

enviolo



City, Trekking, Heavy Duty (135 mm solid axle)

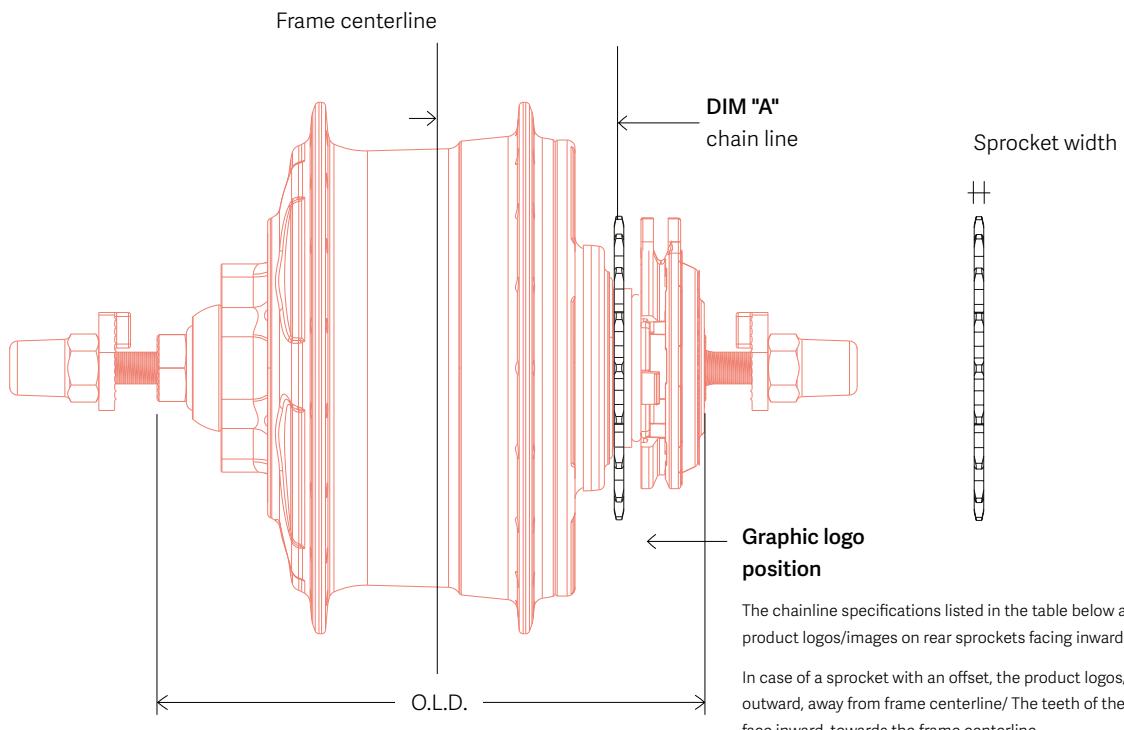
Teeth	DIM "A" belt line	Tooth outer diameter	Sprocket width	Mounting web thickness	Article number
22	45.5 mm	75.33 mm	11.6 mm	4.3 mm	CT1122VMN
24	45.5 mm	82.26 mm	11.6 mm	4.3 mm	CT1124VMN
26	45.5 mm	89.31 mm	11.6 mm	4.3 mm	CT1126VMN
28	45.5 mm	96.31 mm	11.6 mm	4.3 mm	CT1128VMN

Heavy Duty (148 mm)

22	48.7 mm	75.33 mm	11.6 mm	4.3 mm	CT1122VMN
24	48.7 mm	82.26 mm	11.6 mm	4.3 mm	CT1124VMN
26	48.7 mm	89.31 mm	11.6 mm	4.3 mm	CT1126VMN
28	48.7 mm	96.31 mm	11.6 mm	4.3 mm	CT1128VMN

KMC Chainline Specifications

enviolo



City, Trekking, Heavy Duty

Teeth	DIM "A" chainline 135-142mm	DIM "A" chainline 148mm	Tooth outer Diam.	Sprocket width	Offset	Chain	KMC Article number
16	49 mm	52 mm	71.0 mm	2.2 mm	0 mm	1/2x3/32"	SRN50016
17	49 mm	52 mm	75.0 mm	2.2 mm	0 mm	1/2x3/32"	SRN50017
18	49 mm	52 mm	79.4 mm	2.2 mm	0 mm	1/2x3/32"	SRN50018
19	49 mm	52 mm	82.0 mm	2.2 mm	0 mm	1/2x3/32"	SRN50019
20	49 mm	52 mm	87.0 mm	2.2 mm	0 mm	1/2x3/32"	SRN50020
20	46 mm	52 mm	87.0 mm	2.2 mm	3 mm	1/2x3/32"	SRN51020*
21	49 mm	52 mm	91.0 mm	2.2 mm	0 mm	1/2x3/32"	SRN50021
22	49 mm	52 mm	95.0 mm	2.2 mm	0 mm	1/2x3/32"	SRN50022
17	49 mm	52 mm	75.0 mm	3.0 mm	0 mm	1/2x1/8"	SRN51817**
18	49 mm	52 mm	79.4 mm	3.0 mm	0 mm	1/2x1/8"	SRN51818
19	49 mm	52 mm	82.0 mm	3.0 mm	0 mm	1/2x1/8"	SRN51819
20	49 mm	52 mm	87.0 mm	3.0 mm	0 mm	1/2x1/8"	SRN51820
20	46 mm	52 mm	87.0 mm	3.0 mm	3 mm	1/2x1/8"	SRN50N20*
21	49 mm	52 mm	91.0 mm	3.0 mm	0 mm	1/2x1/8"	SRN50021
22	49 mm	52 mm	95.0 mm	3.0 mm	0 mm	1/2x1/8"	SRN51822

* Sprockets with offset only on special request
** SRN51817: only for KMC e101 and X101 chains.

Note 1

If you are using the 16T sprocket, please make sure to use 1mm spacers on each side of the sprocket.

Note 2

Wide sprockets for 1/2x1/8" chains require a thinner spacer. Spacers of 1.2 mm are available from KMC, Art. No. SRNRING12.

Compatible Chain Cases

Hebie Chain Case

enviolo



350R N16



350R NV16

Chainglider

Compatible systems	Front part	Rear part	Chainstay length	Compatible sprocket size
Manual	350F 38 / 42 / 44 / 48	350R NV16	445 - 475mm	16 - 22
Manual	350F 38L / 42L / 44L / 48L	350R NV16	530 mm	16 - 22

* AUTOMATiQ option in evaluation.



Finura

Compatible systems	Chainstay length	Compatible front sprocket size	Compatible rear sprocket size
Manual and AUTOMATiQ	450 - 490 mm	38	18 - 22

Compatible Bicycle Trailers

Bike Trailer Adapters for City, Trekking, Heavy Duty

enviolo

BURLEY

Trailer

Adapter

Minnow, Bee,
Honey Bee,
Encore, Solo,
Cub, D'Lite,
Nomad, Flatbed,
Tail Wagon



Art. No. 960038

CROOZER[®]
The bicycle trailer

Trailer

Adapter

Croozer Kid
Croozer Kid Plus
Croozer Cargo
Croozer Dog



Art. No. 122003516



XL: + 10 mm
Art. No. 122003716



Art. No. 122000715



Croozer axle nut adapter
with Thule coupling

THULE[®]
SWEDEN

Trailer

Adapter

Thule Chariot Lite
Thule Chariot Cab
Thule Chariot Cross
Thule Chariot Sport
Thule Coaster XT



Art. No. 20100798

Use of third party adapters has not been tested by enviolo and therefore we cannot guarantee their performance or safety and hereby disclaim any liability resulting from their use. Please carefully follow all installation instructions provided by third party product producers for the installation and maintenance of such products.

Certificates & Declarations



Test Report

enviolo

Test:	European Bicycle Standards (Rear Hub Durability and Strength Criteria)
Test Articles:	CVP's: enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP Shifters: enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP
Date:	5 DEC 2017
Reference:	ISO 4210:2014(E) which supersedes: <ul style="list-style-type: none">• EN 14764:2005• EN 14766:2005• CEN/TC 333 N.96:2002• DIN 79100-2:1999 ISO 8098:2014(E), US CPSC 16 CFR Part 1512
Test Method:	Reference standard tests specific to rear hub durability and strength criteria
Test Location:	Fallbrook Technologies Inc., Cedar Park, TX

Test Results:

The enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP are tested to industry standards for internal hubs, as well as proprietary additional tests specific to NuVinci technology in use with traditional, as well as electric-assist bicycles (eBikes or pedelecs) up to 250W (rated) power for the enviolo CT, enviolo CO, enviolo TR and up to 500W (rated) power for the enviolo CA, enviolo SP.

Specifically, the enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP meet rear hub durability and strength criteria for bicycle standard ISO 4210:2014(E) and ISO 8098:2014(E). The enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP shifters comply with requirements set forth in ISO 4210:2014(E) and ISO 8098:2014(E). In addition, the enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP hubs and enviolo CT, enviolo CO, enviolo TR, enviolo CA, enviolo SP shifters meet US CPSC 16 CFR Part 1512.

Proprietary Fallbrook Technologies Inc. testing that exceeds industry standards include:

- Durability (simulating 18,000 km of use at extreme conditions)
- Dynamic Shift Test
- Canted Wheel Bump Fatigue Test
- Coasting Fatigue Test
- Hub Shell and Cover Axial Fatigue Test
- Hub Shell spoke Flange Fatigue and Ultimate Tests
- Brake Fatigue Test
- Shifter System Durability Test
- Corrosion Resistance Test
- Weatherability / UV Test
- Environmental Intrusion Test
- Ride Audit Test (including cold weather testing)
- End of Line Efficiency, Ratio Range, and Leak Tests

Rev C

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Certificate of Compliance – RoHS Declaration

enviolo

Fallbrook Technologies Inc.
505 Cypress Creek Road, Suite L
Cedar Park, TX 78613

12/05/17

Fallbrook Technologies certifies product compliance to the European Union Directive 2011/65/EU on the Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS).

All enviolo automatic brand system components comply with the stated substances and maximum concentration values tolerated by weight in homogeneous materials.

Lead (0,1 %)
Mercury (0,1 %)
Cadmium (0,01 %)
Hexavalent chromium (0,1 %)
Polybrominated biphenyls (PBB) (0,1 %)
Polybrominated diphenyl ethers (PBDE) (0,1 %)

Fallbrook Technologies relies on its supply chain partners to ensure daily compliance.

Two handwritten signatures are shown side-by-side. The signature on the left is a cursive 'Brian' and the signature on the right is a cursive 'C.'

VP of Operations

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Declaration of Conformity

enviolo

Manufacturer:

Fallbrook Technologies Inc.
505 Cypress Creek Road, Suite L
Cedar Park, TX 78613

Authorized Representative:

Richard Hilgart
Fallbrook Technologies Inc.
Technical Product Manager
Popovstraat 12
8013 RK Zwolle, The Netherlands

Product Name: enviolo Automatic and Automatic + Shifting System with belt drive compatibility. The enviolo Automatic and Automatic + Shifting System with belt drive compatibility consists of the following components:

(1) enviolo AUTOMATiQ Hub Interface ("AHI-AUT"), enviolo Automatic + Hub Interface ("AHI-AUTI"); (2) "Y" or "i" Harness, and (3) may include Grip shifter Controller ("ARC") or 3-button controller. A picture of the enviolo Automatic Shifting System is attached as Exhibit A.

The object of declaration described above is in conformity with Directive 2004/108/EC of the European Parliament and the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Testing Body: VDE Testing Certification Institute
Merianstrasse 28
63069 Offenbach
Notified Body No.: 0366

Date of Conformity: 1 September 2016

This declaration is issued under the sole responsibility of the Manufacturer and Authorized Representative described above.

Signed for on behalf of Fallbrook Technologies Inc.:

A handwritten signature in black ink, appearing to read "RH".

Richard Hilgart
Technical Product Manager



B35H-HARM-06 | Rev C

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Declaration of Conformity

Manufacturer:

enviolo
Vijzelstraat 68-72
1017 HL Amsterdam

Authorized representative:

Peter Kreuder
enviolo
Director of Product Management
Vijzelstraat 68-72
1017 HL Amsterdam

Product Name: enviolo AUTOMATiQ shifting system with belt drive compatibility. The enviolo AUTOMATiQ shifting system with belt drive compatibility consists of the following components:

(1) enviolo AUTOMATiQ Hub Interface (“AHI-CT/AHI-CO/AHI-TR/AHI-CA/AHI/SP”), (2) enviolo AUTOMATiQ “i” Harness, and (3) may include 3-button controller (“ARC”). A picture of the enviolo AUTOMATiQ Shifting System is attached as Exhibit A.

The object of declaration described above is in conformity with Directive 2004/108/EC of the European Parliament and the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Testing Body:

DEKRA Certification B.V.
Meander 1051
6825 MJ Arnhem
Company registration: 09085396
Date of Conformity: 1 September 2019

This declaration is issued under the sole responsibility of the Manufacturer and is signed by its Authorized Representative described above.

Signed for on behalf of enviolo:

P. Kreuder



Peter Kreuder
Director of Product Management

Exhibit A

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REACH (Regulation, Evaluation, and Authorization of Chemicals) Declaration:

enviolo

Fallbrook Technologies Inc.
505 Cypress Creek Road, Suite L
Cedar Park, TX 78613

Effective Date: October 20, 2015

Supplier Declaration for Articles Provided

We declare that this information is true and complete to the best of our knowledge and that the articles we provide are compliant with restrictions on substances listed in Annex XVII of REACH regulations (15.06.2015). As a Non-EU company, we do not have a direct REACH obligation but we do verify compliance with Annex XVII to allow our customers to fulfill their REACH obligations. Fallbrook Technologies does not manufacture "substances" or "preparations" nor do we provide articles that involve the "intentional release of substances" per the definitions in Regulation (EC) No 1907/2006 – REACH.

Two handwritten signatures are shown side-by-side. The signature on the left appears to be "Brian" and the signature on the right appears to be "Curn". They are written in black ink on a white background.

VP of Operations

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Support & Service

enviolo

support.enviolo.com

university.enviolo.com

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