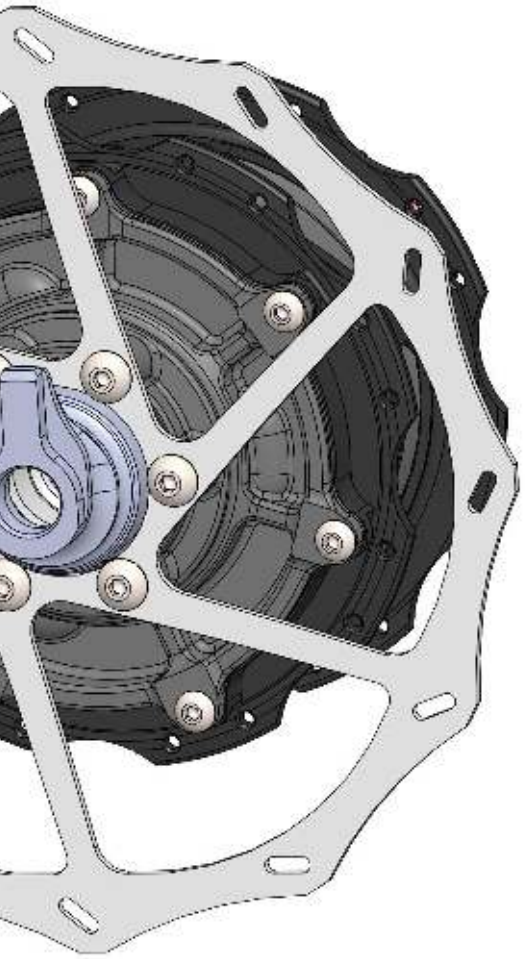


KINDERNAY

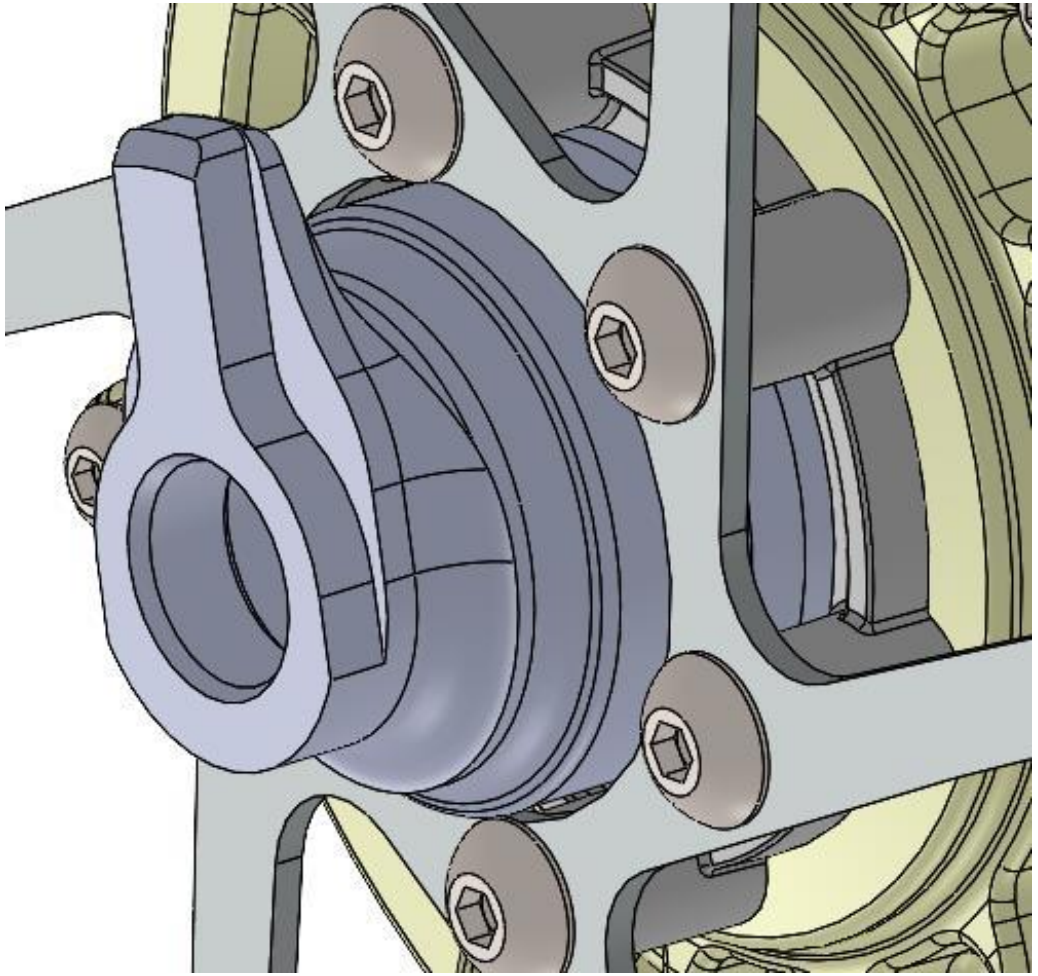
VII CNC2 428 (IS 6-bolt)

PRODUCT SPECIFICATION

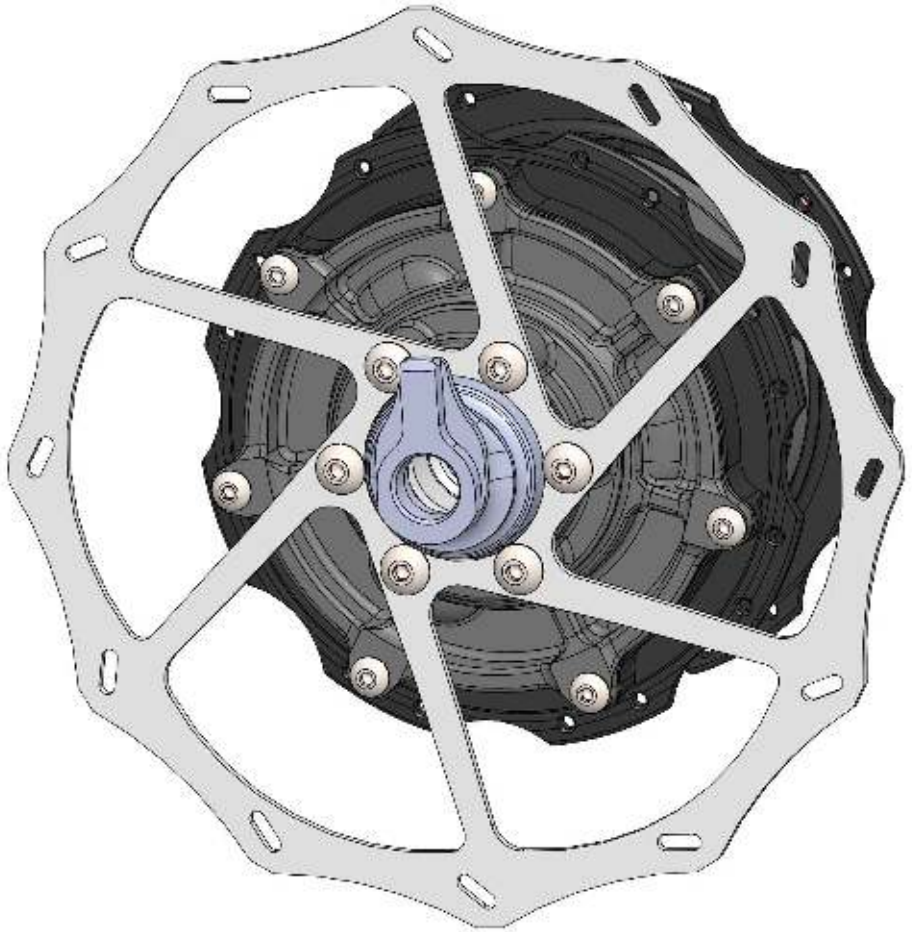
SCOPE

This guide is intented for bicycle and frame manufacturers to..

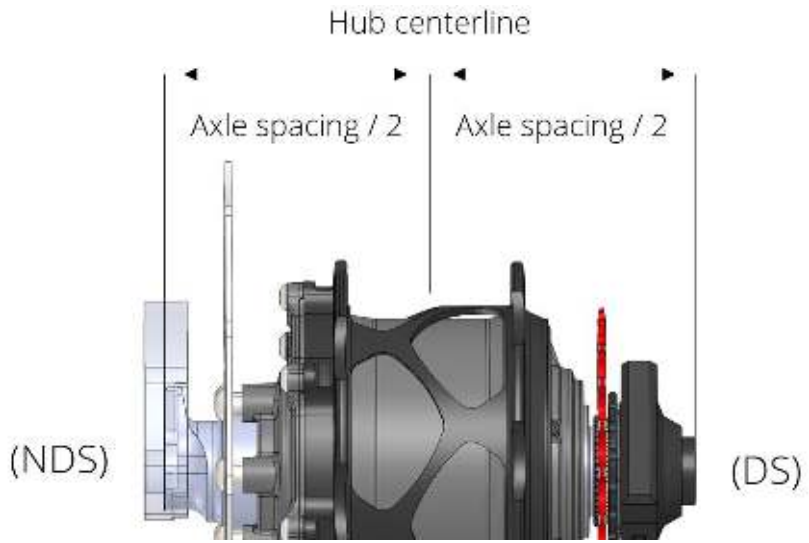
- Get an overview of the different torque arm options for Kindernay VII CNC2 series
- Find the correct CAD-models and drawings for the desired torque arm solution
- Calculate gear ratio and sprocket combinations
- Find chain- and beltline specifications



CONTENTS



INTRODUCTION



The Kindernay VII gearhub supports the most popular thru-axle standards without requiring frame-specific adaptors.

No matter the configuration, the hub is always centered in the frame. The axle width spacing is taken up both sides of the gearhub:

- Drive side (DS): By using different HYSEQ actuator adaptors (135x10, 142x12 or 148x12 mm)
- Non-drive side (NDS): By using different end caps on the hub (shown in next slides)

HYSEQ actuator adaptors

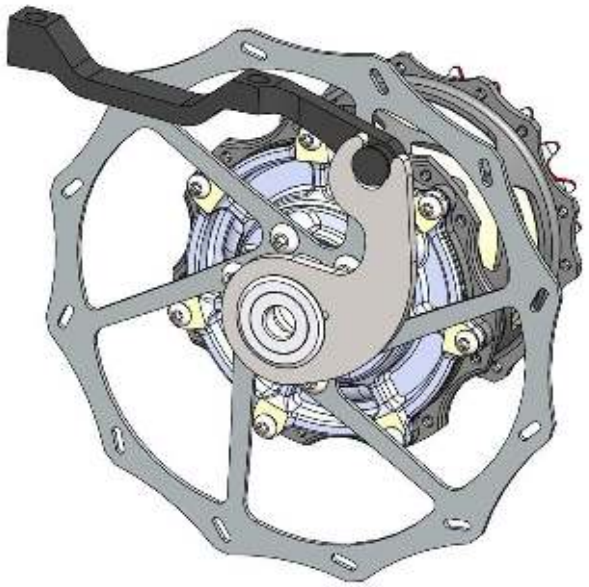
Hence, a combination of correct HYSEQ actuator adaptor and hub end cap MUST be used for the hub to be centered in the frame.

The options for the hub end caps and torque arms on NDS will be discussed next.

TWO CATEGORIES – UNIVERSAL VS. INTEGRATED

The VII CNC2 is available with several torque arm / end cap options, depending on frame dropout design and axle width.

There are two main categories:

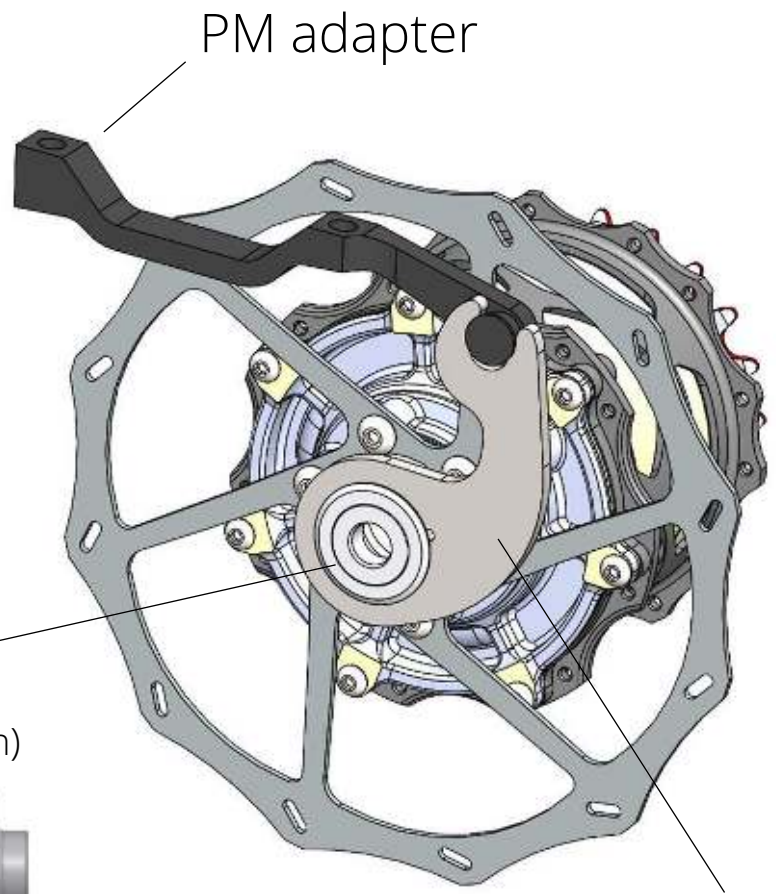


UNIVERSAL TORQUE ARM

INTEGRATED TORQUE ARM

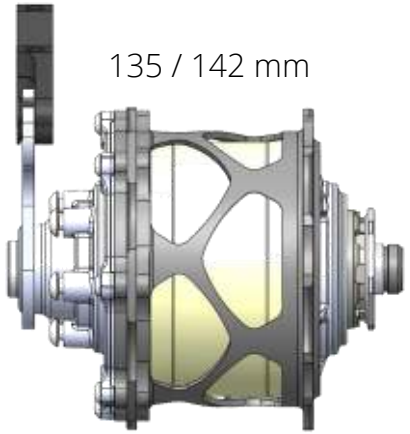
UNIVERSAL TORQUE ARM – OVERVIEW

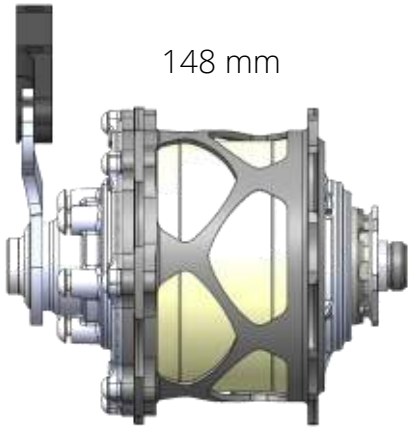
- User replaceable torque arm
  - Two different geometries to suit various dropouts
  - Can be custom-made to fit specific frames
- User replaceable match caps
  - 135x10, 142x12 and 148x12 mm
- PM mounted torque retainer
  - Adds 20 mm to original frame rotor size
- Works with most frame dropouts
  - No modification required



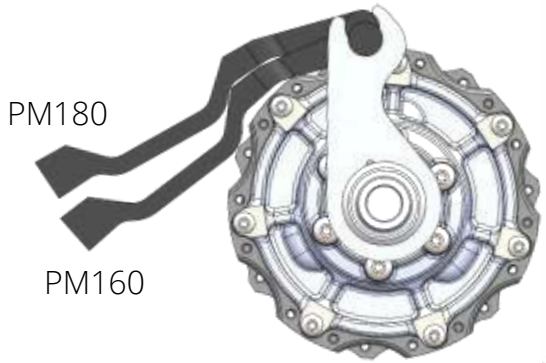
UNIVERSAL TORQUE ARM – VARIANTS

- The universal torque arm comes in 4 different variants.
  - PM 160/180 135/142
  - PM 160/180 148 mm Boost
  - PM 200/203 135/142
  - PM 200/203 148 mm Boost
- All torque arms use the same PM torque retainer





For Boost 148 mm hubs, the torque arms is offset 3 mm outwards.

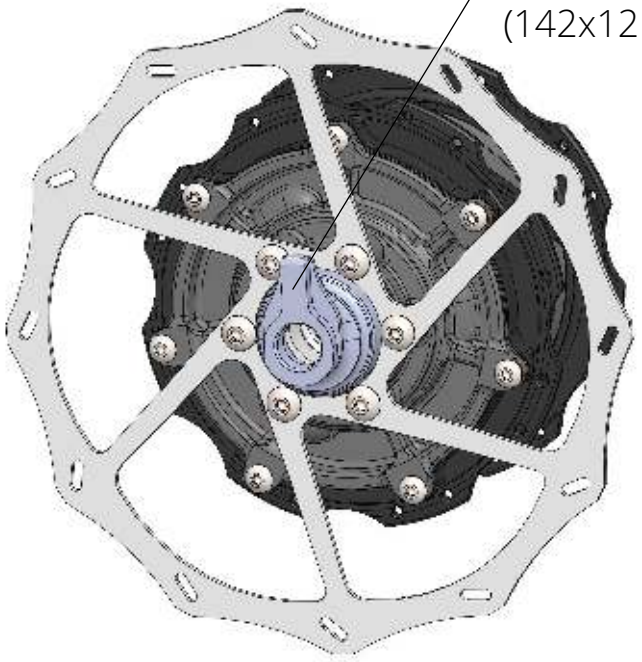


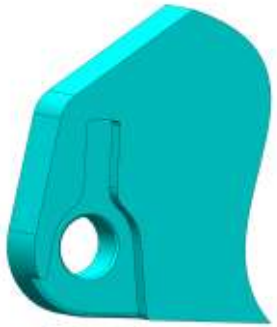
PM160/180 frames use the same torque arm length, as the «bone» rotates downwards.

PM200/203 frames use a longer torque arm, with the same PM torque retainer

INTEGRATED TORQUE ARM – OVERVIEW

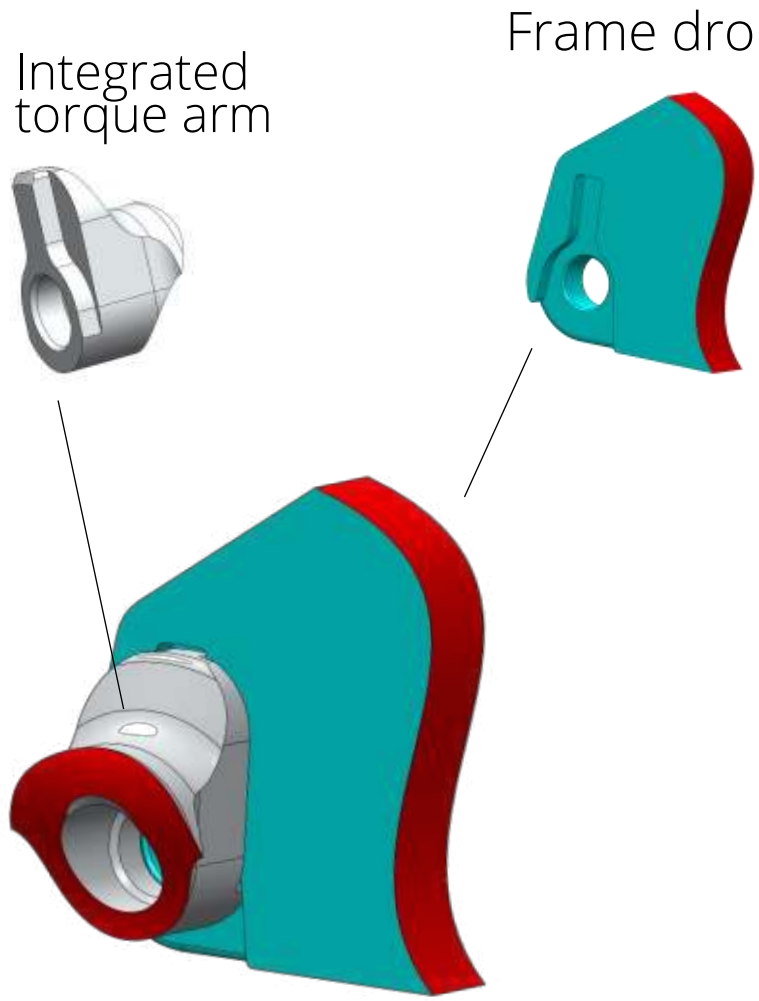
- Integrated torque arm and match cap
- Prevents incorrect mounting of wheel
- Built to order – three versions
  - 135x10, 142x12 and 148x12 mm
- Not user replaceable
  - Gearhub must be rebuilt to change torque arm and axle width
- Requires optimized frame dropout
  - Two designs – 135x10 or 142/148x12
  - Optimized dropout is backwards compatible with regular hubs





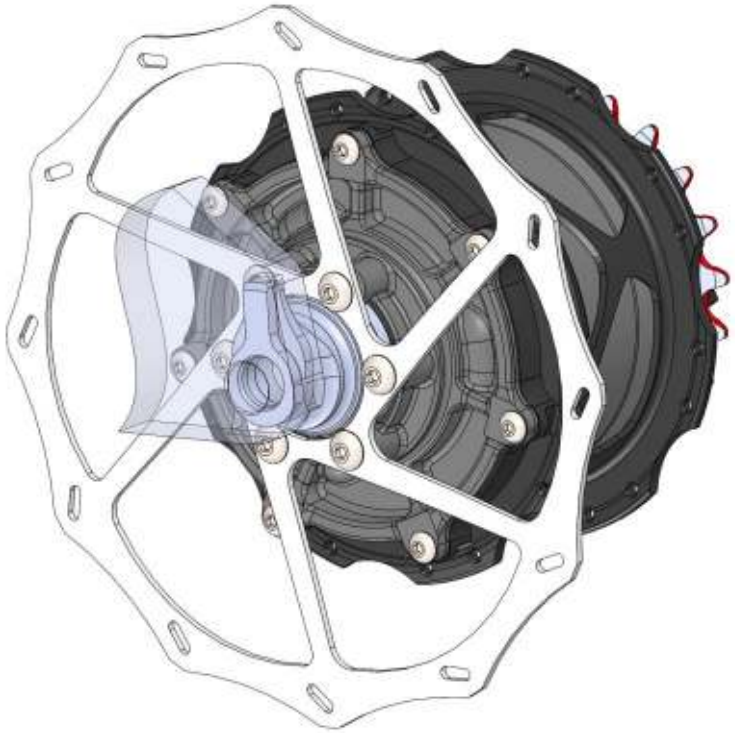
INTEGRATED TORQUE ARM
142 / 148 X 12 mm dropout

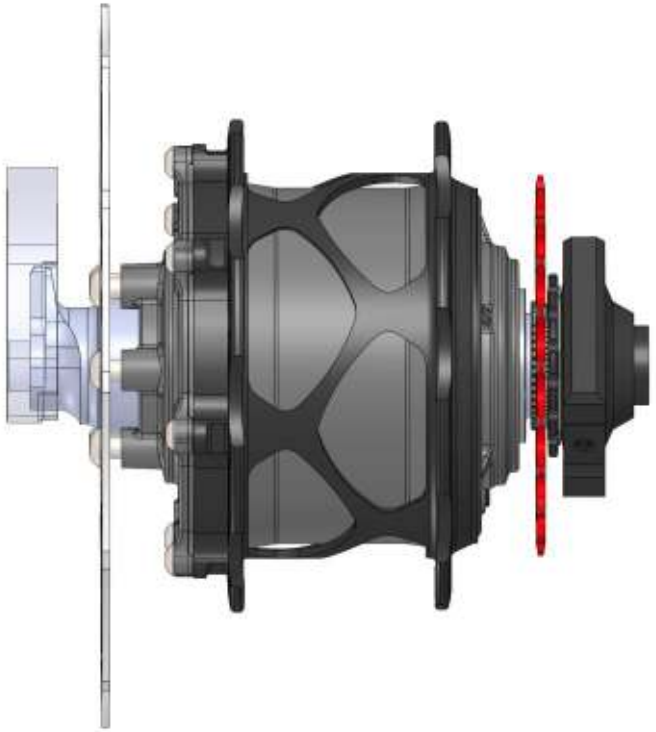
- One dropout for 142/148 x 12 – the spacing is accounted for in the frame, like regular dropouts
- Backwards compatible with regular 142 / 148 mm hubs
- Slot should be vertical, such that the torque arm points upwards during installation
  - Vertical slot will ease mounting of wheel
- Drawing/.step: Link
  - Password: shifthappens



INTEGRATED TORQUE ARM
142 / 148 X 12 mm dropout

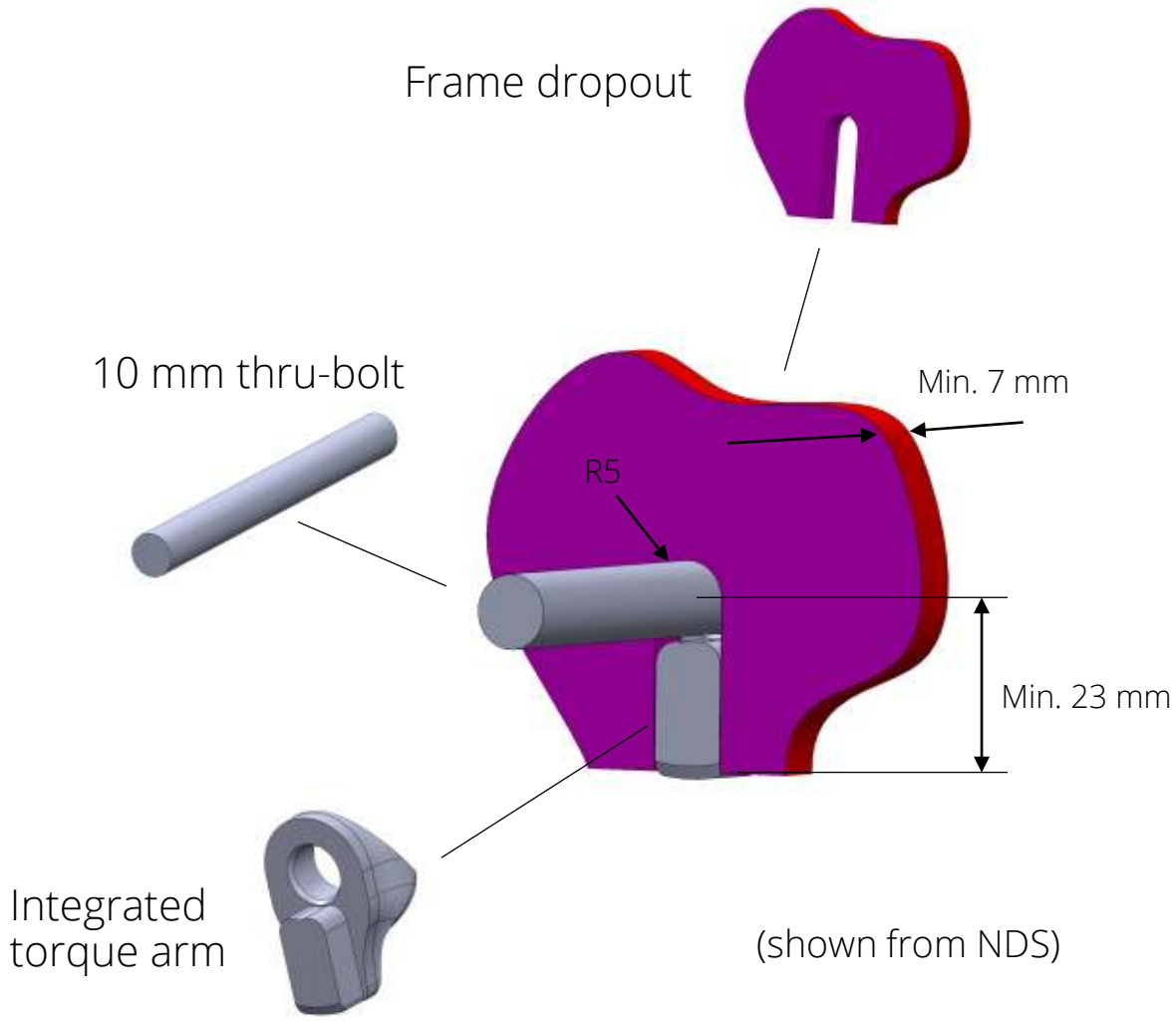
- Dropout shown with gearhub (148 mm):





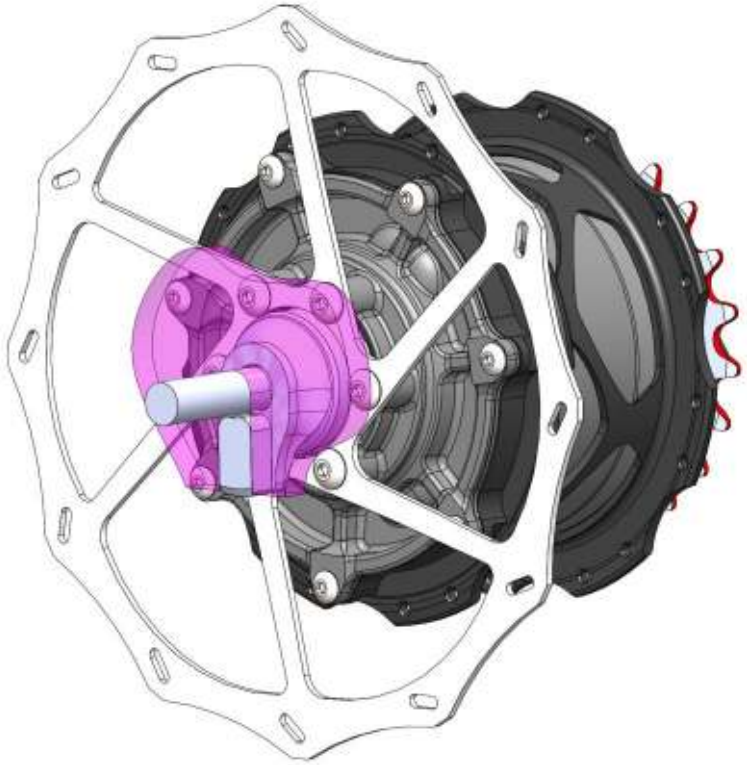
INTEGRATED TORQUE ARM
135 X 10 mm dropout

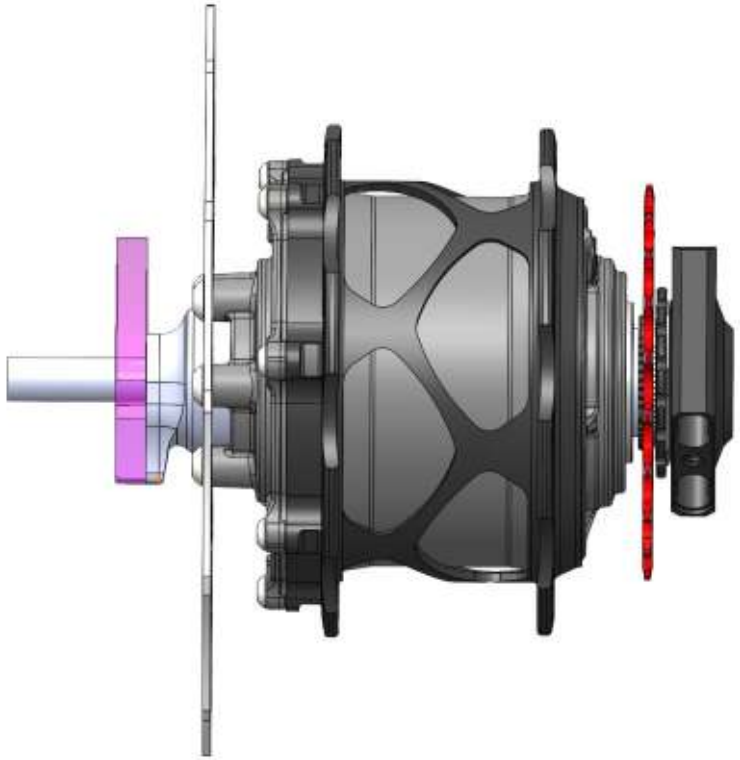
- Specific dropout for 135x10 mm thru-bolt
- Backwards compatible with regular 135 mm hubs
- WARNING: When designing the dropout solution, measures must be taken to avoid the hub loosening during braking
- The torque arm points downwards during installation
- Dropout slot requirements
  - Minimum length: 23 mm from bolt center
  - Minimum thickness: 7 mm
- Drawing/.step: Link
  - Password: shifthappens



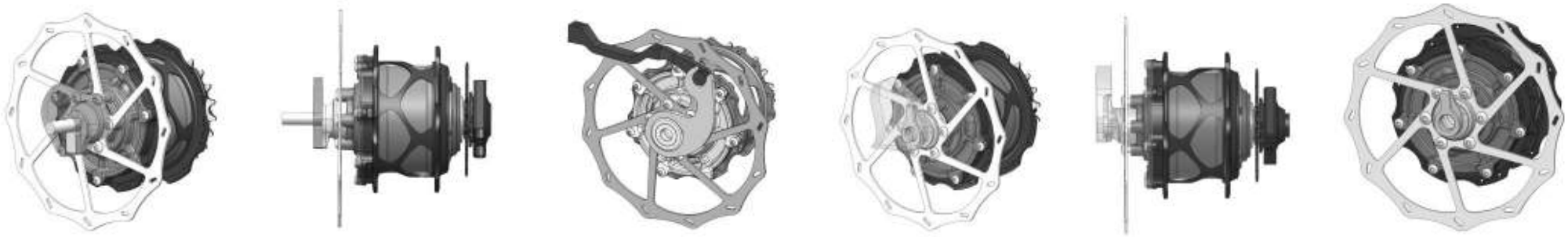
INTEGRATED TORQUE ARM
135 X 10 mm dropout

- Dropout shown with gearhub:





3D-MODELS



- Shell-models for the CNC2 integrated torque arm hubs can be found here:
  - VII CNC2 135 x 10 mm: Link
  - VII CNC2 142 x 12 mm: Link
  - VII CNC2 148 x 12 mm: Link
- Password for all parts: shifthappens

GEAR RATIO

Gear no.	Gear ratio
1	0,484
2	0,616
3	0,785
4	1,000
5	1,274
6	1,623
7	2,068

- The VII has 428% range and even 28% gear steps
- Because of the larger gear steps, it is especially important to specify a suitable sprocket/chainring combination for the intended use case
- For most e-bikes we recommend optimizing the gear ratio to have a comfortable cadence in 6th gear at 25km/h
- Gear ratio calculator: Link
  - Password: shifthappens
  - (Download spreadsheet to edit)
- Gates Carbon Drive Calculator: Link

NOTE!

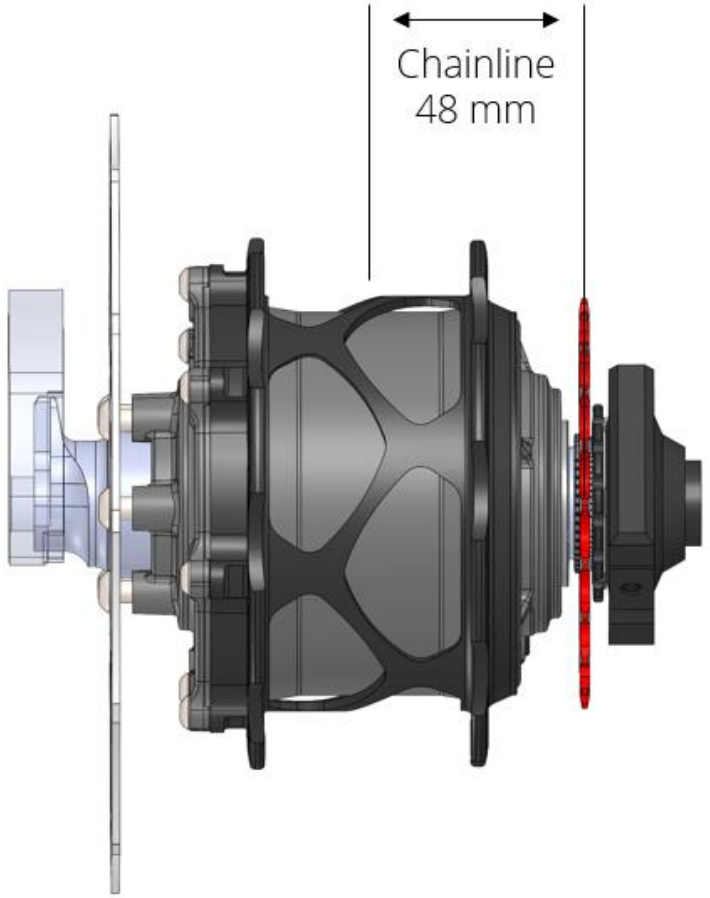
The minimum sprocket ratio of the VII is 1.6. The minimum front chainring is 32T on E-bike and 30T on a non-assisted bike. Using a lower sprocket ratio or front chainring will void the hub warranty.

The sprocket ratio is determined as follows:

$$r_{sprocket} = \frac{Front\ chainring\ tooth\ count}{Hub\ sprocket\ tooth\ count}$$

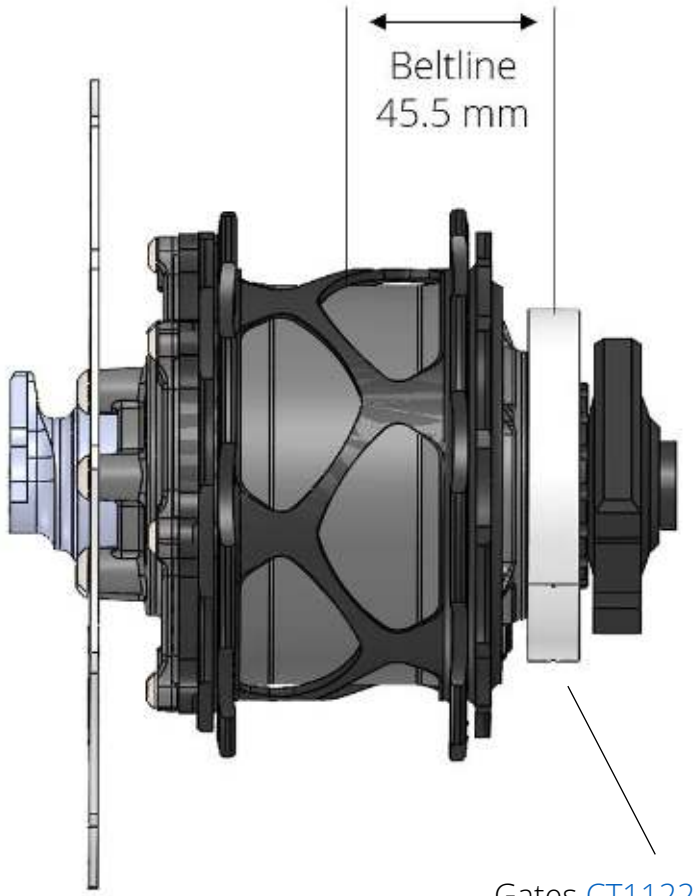
CHAINLINE

- VII chainline: 48 mm
- We specify a minimum gear ratio of 1.6
- For a complete list of gear ratios, check the following spreadsheet: Link
  - Password: shifthappens



BELTLINE

- The VII is compatible with offset Gates HG HMN sprockets
  - Link
- The beltline using the above sprocket is 45.5 mm
- For a complete list of gear ratios, check the following spreadsheet: Link
  - Password: shifthappens



Gates CT1122HMN shown

Need support?

Contact our engineering team directly at
engineering@kindernay.com