

***DT*** SWISS

**THREE PAWL HUBS**  
TECHNICAL MANUAL

V2020.09

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# 1. GENERAL

## 1.1 VALIDITY

This manual describes the component specified on the front page and the footer. This manual is valid for the design of the product as of 21.09.20. Deviations are possible and all items are subject to technical changes.

## 1.2 SAFETY

The safety instructions are classified as follows:



### DANGER

...indicates a hazardous situation that, if not avoided, will result in death or serious injury.



### CAUTION

... indicates a hazard with a medium level of risk which, if not avoided, may result in minor or moderate injury.



### NOTICE

... indicates a potentially hazardous situation that may result in damage to property.

## 1.3 TARGET GROUP

This manual is intended for the user of the component and dealers. This manual offers the experienced user the possibility to carry out minor service work himself. If you have any doubts about your own abilities, you should definitely contact a specialist or a DT Swiss Service Center.

Any warranty claims will lapse if work is not carried out properly.

## 1.4 LAYOUT

The cover page and the footing provide information about the type of product and manual as well as the version of the manual. The DT Swiss contact details can be found on the back. A list of all DT Swiss service centers can be found at [www.dtswiss.com](http://www.dtswiss.com).

This manual is intended for being printed as an A5 booklet. Only print this manual if electronic usage is not possible.

## 1.5 DT SWISS MANUAL CONCEPT

The DT Swiss manuals are split into the following types of manuals:

- User Manual: Information for the end user on how to install and use the component.
- Technical Manual: Detailed information for the end user and the dealer on how to maintain the component, spare parts and technical data.

## 1.6 HOW TO USE THE MANUAL

The steps described in this manual must be carried out in the order they are shown. If steps are ignored or executed in a wrong order, the function of the component cannot be guaranteed.

## 1.7 GENERAL MAINTENANCE INFORMATION

Unless otherwise specified, moving parts, threads, O-rings and seals must be greased before assembly.

### CLEANING

For an optimal result of the maintenance works, every component that will be disassembled must be cleaned. Only use cleaners which do not damage the components. Especially the cleaning of O-rings and seals requires mild cleaners. Observe the instructions for use of the respective cleaner.

DT Swiss recommends the following cleaners:

- Motorex Rex
- Motorex Swissclean
- Motorex OPAL 2400, 3000 OPAL, OPAL 5000

Use soap water or similar mild cleaners for external cleaning.

### TOOLS

To ensure a damage-free mounting and dismantling of the components, only use the tools which are mentioned in this manual. Special tools are indicated at the beginning of a chapter in the table "Required material".

The use of different tools is at the discretion of the user. If components are damaged by the usage of differing tools, the user is liable.

DT Swiss special tools are precision tools. Damage-free mounting and dismantling of the components can only be ensured if the tools are working properly and if the condition of the tools are perfect. Always keep the tools in their original packaging or adequate devices to prevent damage.

### SPARE PARTS

Only original or DT Swiss approved spare parts may be used.

## 1.8 ENVIRONMENTAL PROTECTION

The statutory regulations shall apply. Whenever possible, avoid creating waste. Waste, especially carbon, lubricants, cleaners and any other fluids must be disposed in an environmentally compatible manner. Only print this manual if electronic usage is not possible.

## 1.9 EXCLUSION OF LIABILITY

The activities listed in this manual may only be carried out by persons with sufficient specialist knowledge. The user is liable for any damage or consequential damage caused by wrongly maintained or installed components. If you have doubts, please contact your region's DT Swiss pro level service center.

## 1.10 WARRANTY

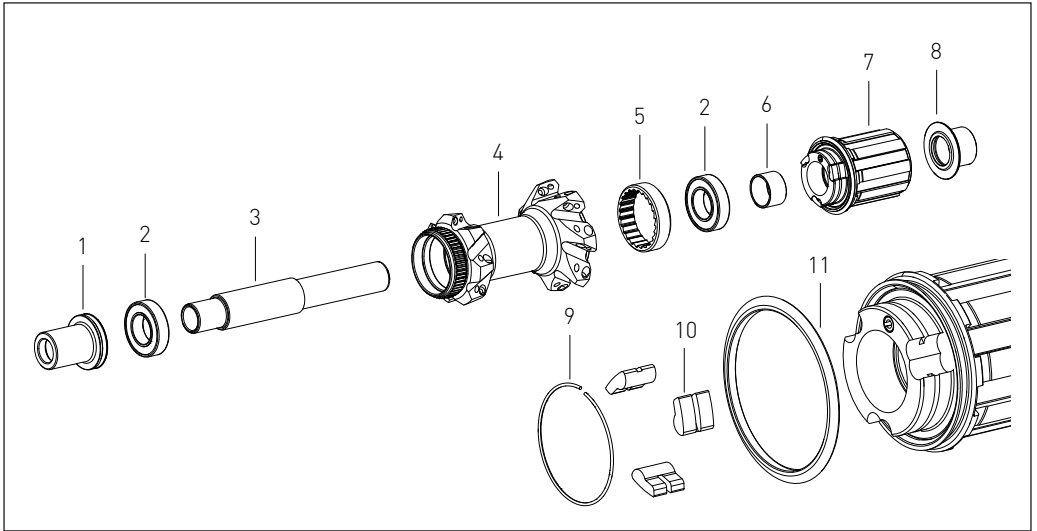
Warranty conditions, see [www.dtswiss.com](http://www.dtswiss.com)

## 2. MAINTENANCE OF THE REAR HUB WITH THREE PAWL SYSTEM

### 2.1 SERVICE INTERVALS

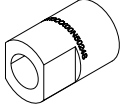
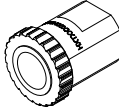
Task	Interval
Replacing the pawls and pawl spring	Under normal operating conditions: 12 months In case of extreme operating conditions (regular rides in dust, rain, snow, or in case of frequent transport while raining) 3 months
Cleaning and greasing the freewheel system	
Replacing the ball bearings	in case of malfunctions (see "3. Trouble Shooting" on page 19)
Replacing the spacer	in case of malfunctions (see "3. Trouble Shooting" on page 19)
Replacing the dust seal	in case of wear and tear or damage

### 2.2 OVERVIEW





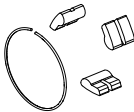


1	end cap non drive side	5	ring nut	9	pawl spring
2	ball bearing	6	spacer	10	pawl
3	axle	7	freewheel body	11	dust seal
4	hub shell	8	end cap drive side		

### 2.3 REQUIRED TOOLS

Tools	Specification	Quantity	Article number
installation cylinder Ø15 x 28 x 35 mm		2	HXTXXX00N5024S
tool for ring nut		1	HXTXXX00N5266S
plastic hammer		1	

### 2.4 REQUIRED WEARING PARTS AND MATERIALS

Wearing parts / Materials	Specification	Quantity	Article number
DT Swiss universal grease (only required if service kit 3 Pawl is not used)		20 g	HXTXXX00NMG20S
ball bearing Ø15 x 28 x 7 mm		2	HSBXXX00N1468S
ring nut M34 x1		1	HCDXXX00N6137S
spacer steel 10.1 mm		1	HCDXXX00S4190S
dust seal		1	HSOXXX00N4083S
service kit 3 Pawl system, consisting of: <ul style="list-style-type: none"> <li>• 3x pawl</li> <li>• 1x pawl spring</li> <li>• DT Swiss universal grease</li> </ul>		1	HWTXXX00NSK3PS

## 2.5 REMOVE END CAPS, FREEWHEEL BODY AND SPACER

1. Clamp the right end cap into a vice.
2. Pull off the wheel, respectively the hub.
  - Make sure that the freewheel body does not fall off when pulling off.
3. Clamp the left end cap into a vice.
4. Pull off the wheel, respectively the hub.



5. Remove the freewheel body from the hub.



6. Pull the spacer off the axle.



## 2.6 REMOVING PAWLS, PAWL SPRING AND DUST SEAL

1. Remove the pawl spring with a small screwdriver.
2. Remove the pawls.



3. Remove the dust seal.





## 2.7 DISMOUNTING THE RING NUT

The ring nut must only be removed if it is damaged or if the ball bearing at the drive side has to be replaced.

Due to the torque acting on the ring nut during pedaling, the ring tightens while riding. We recommend loosening the ring nut only when the wheel is complete as the lever is much larger.

1. Clamp the ring nut tool into a vice in the high position.
2. Push the drive side of the hub onto the tool.
3. Turn the hub counterclockwise.



4. Remove the ring nut from the tool.
5. Remove the tool from the vice.



## 2.8 DISMOUNTING THE BALL BEARING

The ball bearings only need to be dismantled if there is a malfunction.

1. Tap out the ball bearing on the non drive side with a plastic hammer.



2. Remove the bearing from the axle.



3. Turn the axle 180° and insert it through the hub and ball bearing on the drive side.



5. Remove the bearing from the axle.



## 2.9 CLEANING AND CHECKING ALL PARTS

1. Clean and check all parts of the hub.
  - Check the ring nut for wear and damages.
  - Check the dust seal for damages.
  - Check the spacer.
2. Replace damaged or worn parts.
3. Disassembled ball bearings should be replaced.



## 2.10 MOUNTING THE BALL BEARING AT THE DRIVE SIDE

1. Grease the bearing seat and the thread for the ring nut with universal grease.



2. Put the installation cylinder into the vice.
3. Insert the axle into the installation cylinder with the long side down.
4. Push the hub shell onto the installation cylinder with the drive side facing upwards.
5. Push a new bearing onto the axle with the colored side facing outwards.



6. Push the second installation cylinder onto the non drive side of the hub shell.
7. Carefully tap the ball bearing into the hub shell with a plastic hammer.
8. Remove the hub shell from the installation cylinder.
9. Remove the installation cylinder from the vice.



## 2.11 MOUNTING THE RING NUT

1. Clamp the ring nut tool in the deep position in the vice.
2. Slide the ring nut onto the tool with the chamfered side down.



3. Insert the axle with the long side down through the ring nut tool.
4. Push on the hub shell.



5. Push the installation cylinder from above onto the hub shell.  
→ The use of the installation cylinder prevents the ring nut from jamming during screwing in.



6. Screw in the ring nut approx. 2 turns.

To avoid damages to the hub shell, the ring nut must not be screwed into the hub shell by more than 2 turns while the ring nut tool is clamped in the deep position in the vice!

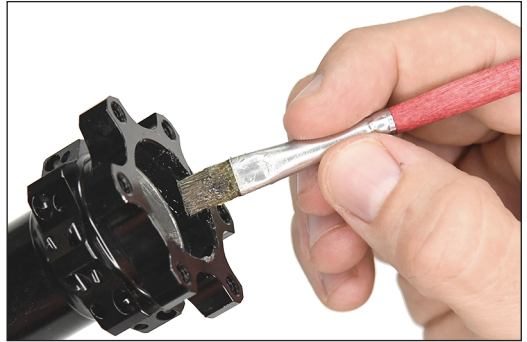


7. Unclamp the ring nut tool, turn it 90° and clamp it back into the vice in the high position.
8. Place the hub shell with the ring nut back on the tool and tighten the ring nut by hand as tight as possible.



## 2.12 MOUNTING THE BEARING ON THE NON DRIVE SIDE

1. Grease the bearing seat on the non drive side with universal grease.



2. Clamp the ring nut tool in the high position in the vice.
3. Push the hub shell onto the ring nut tool.



4. Insert the axle with the long side first through the hub shell into the ring nut tool.



5. Put on a new bearing on the non drive side with the colored side facing outwards.



6. Put the installation cylinder onto the bearing.  
7. Tap in the ball bearing with a plastic hammer.

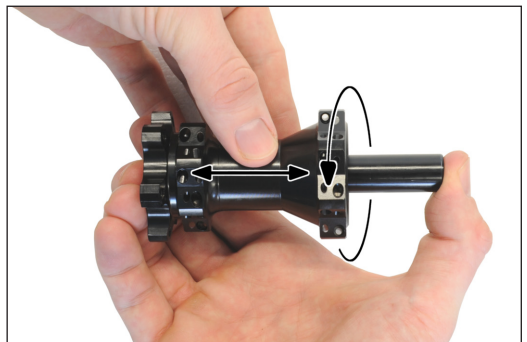


8. Check the play of the hub. To do this, hold the axle firmly and move the hub axially.

- The hub must not have any play!
- If play is noticeable, tap in the ball bearing on the non drive side.

9. Check the running of the ball bearings. To do this, hold the axle firmly and turn the hub shell.

- The hub must turn smoothly.
- If the hub runs stiffly, tap out the ball bearing on the non drive side and reassemble it.



## 2.13 MOUNTING PAWLS, PAWL SPRING AND DUST SEAL

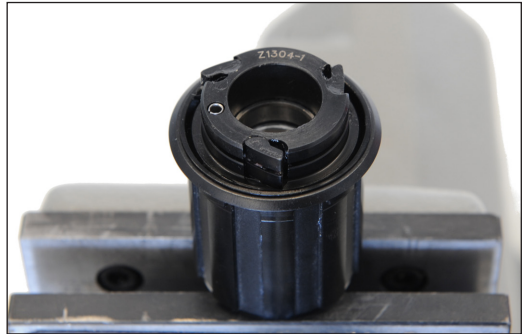
1. Put on the dust seal.



2. Slightly grease the freewheel body and the dust seal with universal grease.

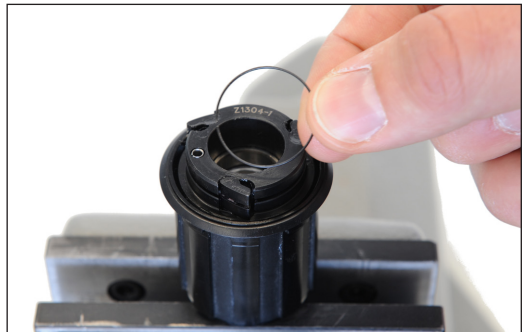


3. Attach the pawls.



4. Attach the pawl spring.

→ The open end of the spring must be positioned at the pin.





## 2.14 ATTACHING THE SPACER, THE FREEWHEEL BODY AND THE END CAPS

1. Grease the ring nut with universal grease.



2. Slightly grease the axle with universal grease and slide the spacer onto the axle.



3. Push the freewheel body onto the hub with a slight turning movement.

4. Check whether the freewheel body can be turned and the pawls engage.

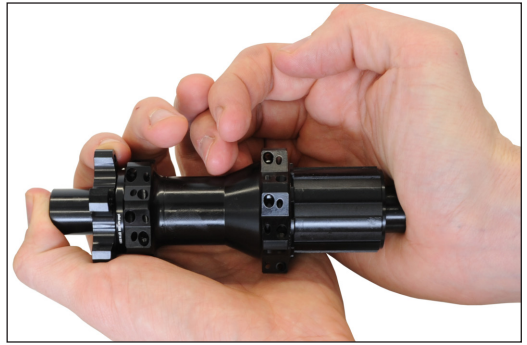


5. Grease the exposed hub sides and inside of both end caps.



6. Put on both end caps by hand.

Caution: The shorter end cap must be placed on the drive side.



## 2.15 CHECK THE FUNCTIONALITY

1. Turn the freewheel body in both directions.
  - The freewheel body can be turned counterclockwise easily. The pawls engage audibly and perceptibly.
  - The freewheel body cannot be turned clockwise.
2. Check tightness of the end caps.
  - The end caps are firmly seated on the axle and are fully pushed on.



### 3. TROUBLE SHOOTING

Issue	Reason	Solution
Freewheel is blocked	Spacer was forgotten during assembly.	Check correct assembly.
	Spacer was compressed by overtightening the thru axle.	Measure the length of the spacer. If the spacer is shorter than 10.1 mm, it must be replaced.
Freewheel does not engage / slips	Pawls are mounted incorrectly.	Check correct assembly.
	Too much or wrong grease on the pawls.	Clean and grease pawls.
	Pawls are worn out.	Replace pawls.
	Ring nut is damaged.	Replace ring nut.
Hub has axial play	Ball bearings were not mounted correctly.	Check correct assembly.
	Ball bearings are worn out.	Replace ball bearings.
Hub rotates stiffly	Ball bearings are worn out.	Replace ball bearings.
	Ball bearing non drive side too tight.	Check correct assembly.
	Mounting sequence of the ball bearings not observed.	
Hub makes noise	Ball bearings are worn out.	Replace ball bearings.
Notches from the cassette on the freewheel body.	The steel cassette works itself into the aluminium web of the freewheel body.	Remove bad notches from the rotor using a file.
Freewheel body rotates with difficulty.	Ball bearings in the freewheel body are worn out.	Replace freewheel body.
Freewheel is too noisy / too quiet.	The perception of the freewheel sound is very subjective. While some riders prefer a loud freewheel sound, other riders want a quiet freewheel. In principle, the freewheeling sound can be influenced by the amount of grease on the pawls. Less grease increases the freewheeling sound, but at the same time leads to higher wear. Too much grease can cause the freewheel to stick.	

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