

# RATCHET DEG

TECHNICAL MANUAL

***DT SWISS***

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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 17.04.24. 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.



### NOTE

... 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 an expert 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 GENERAL MAINTENANCE INFORMATION**

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

### **CLEANING**

For an optimal result of the maintenance work, every component that will be disassembled must be cleaned. Only use cleaners and degreasers which do not damage the components. Especially the cleaning of O-rings and sealings 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 dismounting 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 dismounting 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.

## **1.7 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.

## **1.8 EXCLUSION OF LIABILITY**

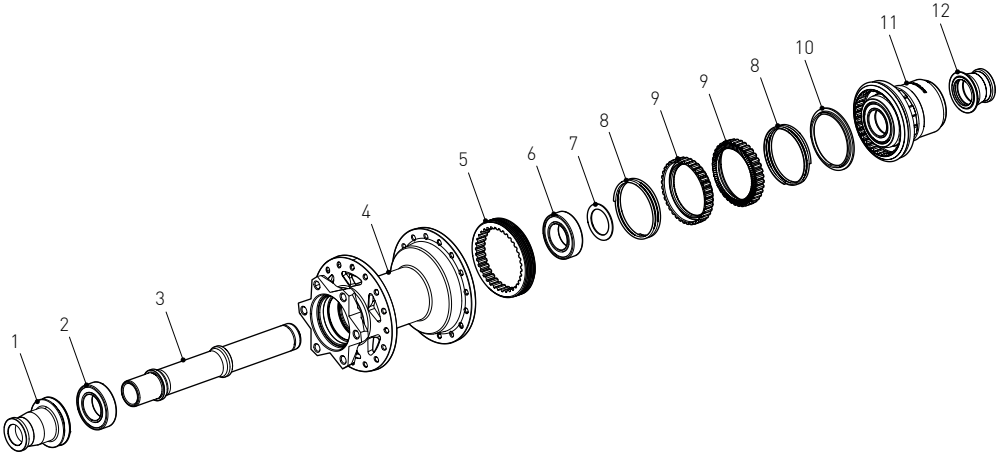
The activities listed in this manual may only be carried out by persons with sufficient specialist knowledge. The user is liable for any damage or consequential damage caused by wrongly maintained or installed components. If you have doubts, please contact an expert or your region's DT Swiss pro level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

## **1.9 WARRANTY**

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

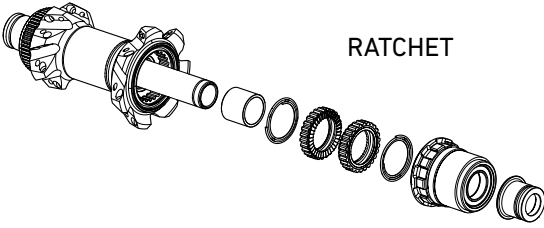
## 2. MAINTENANCE OF THE REAR WHEEL HUB WITH RATCHET DEG SYSTEM

### 2.1 OVERVIEW



1	end cap non drive side	5	ring nut	9	ratchet
2	ball bearing non drive side	6	ball bearing drive side	10	washer
3	axle	7	shim ring	11	freewheel body
4	hub shell	8	spring	12	end cap drive side

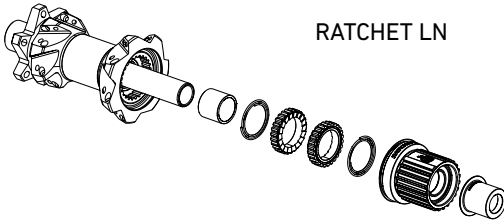
ATTENTION: There are three different types of DT Swiss hubs with ratchet freewheel. The hub types essentially differ in the following features:



**RATCHET**

The **Ratchet** system is essentially characterized by two loose ratchets. The seal between the hub and freewheel body is located on the hub.

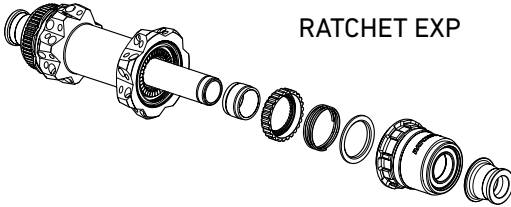
All maintenance activities for this hub can be found in the technical manual at [www.dtswiss.com](http://www.dtswiss.com).



**RATCHET LN**

The **Ratchet LN** system is essentially characterized by two loose ratchets. The seal between the hub and freewheel body is located on the freewheel body.

All maintenance activities for this hub can be found in the technical manual at [www.dtswiss.com](http://www.dtswiss.com).

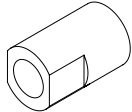



**RATCHET EXP**








The **Ratchet EXP** system is essentially characterized by one loose and one threaded ratchet.

All maintenance activities for this hub can be found in the technical manual at [www.dtswiss.com](http://www.dtswiss.com).

## 2.2 REQUIRED TOOLS

Tools	Specification	Quantity	Article number
installation cylinder Ø15 / 26 x 40 mm		2	HXTXXX00N5314S
tool for ring nut		1	HXTXXX00N2612S

### 2.3 REQUIRED WEARING PARTS AND MATERIALS

Wearing parts / Materials	Specification	Quantity	Article number
DT Swiss universal grease		20 g	HXTXXX00NMG20S
DT Swiss special grease		20 g	HXT10032508S
ball bearing 1526 Ø15 x 26 x 7 mm		2	HSBXXX00N3741S
service kit Ratchet DEG 90T 2x ratchet, 2x spring, washer, DT Swiss special grease		1	HWYXXX00N2504S
ring nut M45X2 mm, steel		1	HXDXXX00N9037S
shim ring DIN988 Ø15/Ø21/0.5 mm		1	HSDXXX00N8101S
washer Ø35.8/30.1X2.5 mm		1	HCD14200N6000S
spring		2	HXDXXX00N6775S

At <https://www.dtswiss.com/en/support/product-support> you will find all suitable spare parts after selecting your components.

## 2.4 IDENTIFICATION OF YOUR WHEEL/HUB

### IDENTIFICATION OF YOUR WHEEL

The DT Swiss ID can be used to uniquely identify your wheel and thus the spare parts for your hub. The sticker with the ID is located either between the spokes, in the rim well or on the tubeless tape.



### IDENTIFICATION OF YOUR HUB

Every DT Swiss hub has a unique serial number. Note the number and contact a service center for further information.





## 2.5 REMOVING END CAPS, FREEWHEEL BODY AND FREEWHEEL SYSTEM

1. Pull off both end caps by hand.

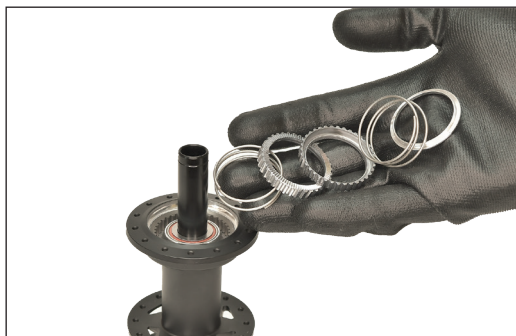
If the end caps cannot be pulled off by hand, clamp the end caps carefully into a vise with ground clamping jaws and pull the hub / wheel upwards.



2. Pull the freewheel body off the hub.



3. Remove the springs, ratchets and washer from the hub.



4. Remove the shim ring.



## 2.6 DISMOUNTING THE RING NUT

The ring nut only needs to be removed if it is damaged. The ring nut is only subject to slight wear and does not need to be replaced during the service life of the hub.

Due to the torque acting on the ring nut during pedaling, the ring tightens while riding. Therefore, loosening the ring nut requires a high force. The ring nut can only be loosened, when the wheel is complete as the lever is much larger.

1. Clamp the tool for the ring nut in the vise.
2. Push the hub onto the tool with the drive side first.



3. Loosen the ring nut by turning the wheel counterclockwise.



4. Remove the hub from the tool.



5. Remove the ring nut.

## 2.7 DISMOUNTING THE BALL BEARING ON THE NON DRIVE SIDE

1. Tap out the ball bearing on the non drive side with slight hammer strokes onto the axle.



2. Remove the ball bearing from the axle.



## 2.8 DISMOUNTING THE BALL BEARING AT THE DRIVE SIDE

1. Insert the short side of the axle through the second ball bearing on the drive side.
2. Put the installation cylinder onto the axle.  
→ By using the installation cylinder, the ball bearing cannot tilt during disassembly. Damage to the bearing seat is not possible.
3. Tap out the ball bearing with slight hammer strokes on the axle.
4. Remove the installation cylinder from the hub.



5. Remove the ball bearing from the axle.



## 2.9 CLEANING AND CHECKING ALL PARTS

1. Thoroughly clean all parts of the hub. The existing grease must be completely removed from the hub body and from the ratchets.
2. Check the ratchets for wear.

The wear of the ratchets usually starts at the outer circumference and shows itself by strongly flattened edges with uneven wear.

In case of heavy wear, the ratchets must be changed immediately.



3. Check the freewheel body for damage such as cracks.  
→ Grooves from the cassette are no damages. These are normal signs of usage.
4. Remove bad notches on the freewheel body using a file.
5. Clean the freewheel body. Metal chips and metal particles must be removed completely.

## 2.10 MOUNTING THE BALL BEARING AT THE DRIVE SIDE

Always mount the ball bearing on the drive side first.

1. Grease the bearing seat with universal grease.  
→ When the ring nut is fitted, no grease must get onto the tooting of the ring nut!



2. Put the installation cylinder into the vise.
3. Insert the long side of the axle into the installation cylinder.
4. Place the hub shell onto the tool and the axle.
5. Push a new bearing on the hub shell with the colored side facing outwards.



6. Put the second installation cylinder onto the bearing.
7. Tap in the ball bearing carefully with slight hammer strokes.
8. Remove the installation cylinder and the axle from the hub.



9. Remove the wheel from the installation cylinder in the vise and tap the bearing with a installation cylinder and the axle as a guide until stop (approx. 0.2 mm).



## 2.11 MOUNTING THE BALL BEARING AT THE NON DRIVE SIDE

1. Grease the bearing seat with universal grease.



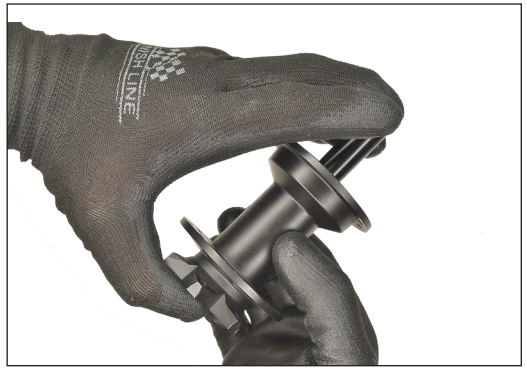
2. Put the installation cylinder into the vise.
3. Place the hub / wheel with the drive side on the installation cylinder.
4. Push the axle with the long side first into the ball bearing on the drive side.
5. Put on a new bearing on the non drive side with the colored side facing outwards.



6. Put the installation cylinder onto the bearing.
7. Tap in the ball bearing carefully with slight hammer strokes.

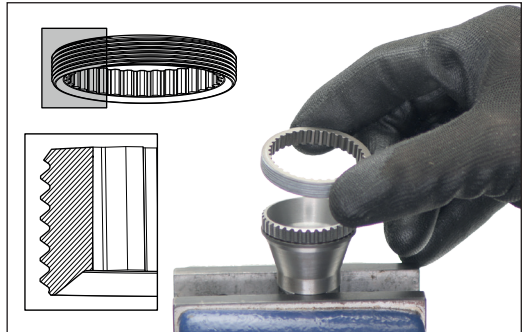


8. Check the ball bearings.
  - The hub must turn smoothly.
  - The hub must not have axial play.
9. If necessary, drive in the bearing on the non drive side or loosen the bearing.
10. Repeat previous steps until the hub is turning smoothly.



## 2.12 MOUNTING THE RING NUT

1. Clamp the tool for the ring nut in the vise.
2. Slide the ring nut onto the tool with the chamfer facing downwards.



3. Place the hub on the ring nut and the tool.
4. Turn the hub a little bit counterclockwise and then carefully clockwise.
  - While screwing in, make sure that the ring nut is screwed in straight and does not cant!
  - The ring nut must be able to be screwed in freely. As soon as greater resistance occurs, stop screwing in immediately.





5. Tighten the ring nut as firmly as possible by hand.



## 2.13 MOUNTING THE FREEWHEEL SYSTEM



### DANGER

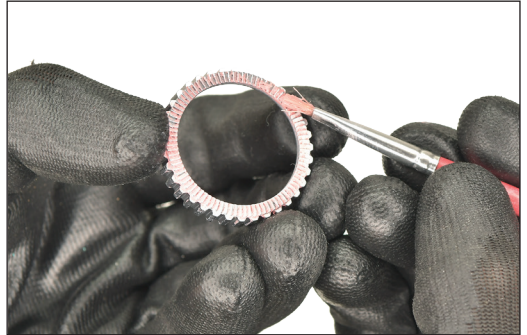
#### RISK OF INJURY DUE TO LIMITED FREEWHEEL FUNCTION DUE TO INCORRECT LUBRICATION!

If too much grease is applied on the ratchets, the actuation of the ratchets may not work. The ratchets may slip during pedaling.

- Only apply a thin, even layer of grease.
- Only use the red DT Swiss special grease.

1. Apply DT Swiss special grease evenly to the outer and the inner tothing of the ratchets using a fine brush.

→ For an optimal functionality of the freewheel system, a thin layer of grease is sufficient.



2. Lightly grease the teeth of the freewheel body with DT Swiss special grease.

→ Excess grease in the recesses of the tothing should be removed with a brush.

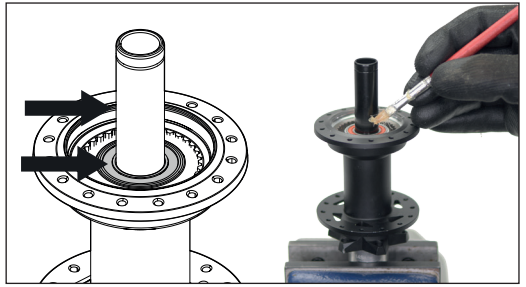


3. Lightly grease the teeth of the ring nut with DT Swiss special grease.

→ Excess grease in the recesses of the tothing should be removed with a brush.



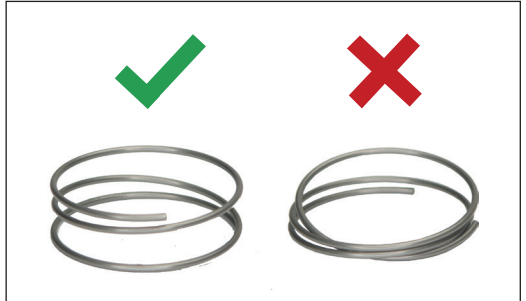
4. Grease the outer surface of the ball bearing and the sealing surface of the rotor seal on the hub with universal grease.



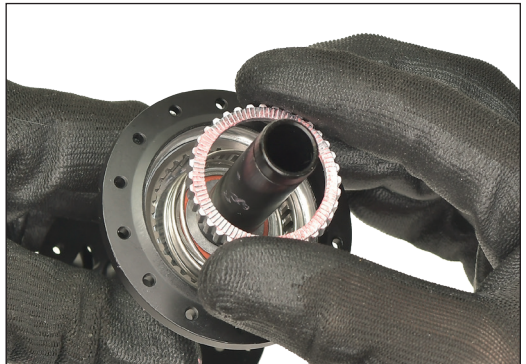
5. Place the shim ring on the axle.



6. Make sure that both springs are not twisted.



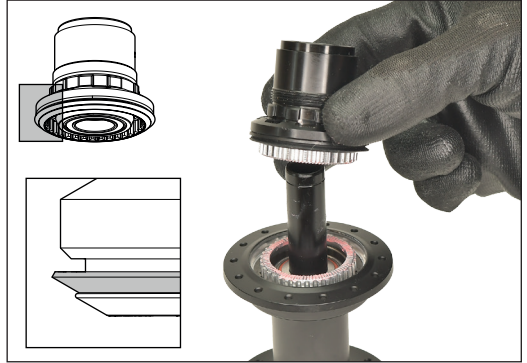
7. Fit the first ratchet and the first spring.



8. Insert the second ratchet and the second spring with washer into the freewheel body.



9. Put the freewheel body onto the hub.  
→ Make sure that the seal on the freewheel body is fitted the right way round and is not twisted.
10. Check if the freewheel body can be turned and if the ratchets are engaging.



## 2.14 PUTTING ON THE END CAPS

1. Grease both ball bearings and the inside of the end caps with universal grease.



2. Put on the left and the right end cap.  
→ The shorter end cap must be placed on the drive side.
3. Push in end caps by hand.



## 2.15 CHECK THE FUNCTIONALITY

1. Turn the freewheel body in both directions.  
→ The freewheel body can be turned counterclockwise easily.  
The ratchets engage audibly and perceptibly.  
→ The freewheel body cannot be turned clockwise.
2. Check the tight fit 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 jammed / blocked	Shim was forgotten during assembly.	Check correct assembly, see "2.13 Mounting the freewheel system", page 18.
	The ring nut has been fitted the wrong way round or has not been screwed in far enough.	Check the correct assembly of the ring nut, see .
	A non-fitting end cap has been fitted.	Shimano end caps on a SRAM XD freewheel body can cause jamming.
	Defects on the hub body, on the freewheel body or on one of the end caps.	Check all parts for defects and replace parts as necessary.
Freewheel does not engage / slips	One or both ratchets are mounted upside down.	Check correct assembly, see "2.1 Overview", page 5.
	Too much or wrong grease on the ratchets.	Clean and grease ratchets, see "2.13 Mounting the freewheel system", page 18.
	Ratchets are worn.	Replace ratchets.
	One or both springs were forgotten during assembly.	Check correct assembly, see "2.1 Overview", page 5.
	Washer was forgotten during assembly	Check correct assembly, see "2.1 Overview", page 5.
Hub has axial play	Ball bearings were not mounted correctly.	Check correct assembly, see "2.1 Overview", page 5.
	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, see "2.1 Overview", page 5.
	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 alloy web of the freewheel body.	Remove bad notches on the freewheel body using a file.
Freewheel body rotates with difficulty.	Ball bearings in the freewheel body are worn out.	Replace freewheel body.

Issue	Reason	Solution
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 between the ratchets. Less grease increases the freewheeling sound, but at the same time leads to higher wear.	

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