

***DT SWISS***

***WHEELS***

*DICUT*

*Technical Manual*

V2016.11

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# 1 General

## Validity

This manual describes the component specified on the front page and the footer. Deviations are possible and all items are subject to technical changes.

## 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 hazardous situation that, if not avoided, could result in a minor or moderate injury.

### NOTICE

...indicates information considered important, but not hazard-related.



...characterizes further information, or information which supplement the respective steps.

## Target Group

This manual is intended for end users and dealers.

It offers the possibility for experienced users to carry out small maintenance works on their own. If there are any doubts concerning the own skills, a DT Swiss service center should be contacted.

Warranty will expire if works are not done properly.

## 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 backside provides a list of the DT Swiss service centers. 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.

## 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.

## How to Use this 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.

Instructions begin with the table «Preparatory Steps» and end with the table «Closing Steps». The instructions in these tables must be carried out.

Moving parts, threads, O-rings and sealings must be greased before assembling.

## Cross References

In order to simplify the use of this manual, some text is edited as hypertext. Whenever the text is formatted blue and underlined, it is a reference to a chapter. If the text is formatted black and underlined, it is a reference to a figure. After clicking you will be automatically redirected to the target of the reference.

Example: Click here: [chap. 1, page 2](#) to jump to the beginning of this chapter.

## Warranty (Europe)

In addition to the general guarantee required by law, DT Swiss AG based in Biel/Switzerland, provides a guarantee for 24 months from the date of purchase. DT Swiss AG shall reject any liability for both indirect damage caused by accidents and consequential damage.

Any contradictory or extended national rights of the purchaser are not affected by this warranty. Place of performance and jurisdiction is Biel/Switzerland. Swiss law shall apply.

Submit any warranty claims to your retailer or a DT Swiss service center. Any defects recognized by DT Swiss AG as a warranty claim will be repaired or replaced by a DT Swiss service center.

Warranty and guarantee claims can only be made by the original purchaser with a valid sales receipt.

There shall be no claim under the guarantee for:

- Normal wear and tear caused by use of the components
- Incorrect assembly
- Incorrect or nonexistent maintenance
- Incorrectly completed repairs
- Use of unsuitable products
- Modification of components
- Incorrect use or misuse
- Carelessness
- Leasing, commercial use or use in competitions
- Damage caused by accidents
- Delivery and transport damage
- Modification, defacing or removal of the serial number

## Limited Equipment Warranty USA

DT Swiss LTD makes every effort to assure that its product meets high quality and durability standards and warrants to the original retail consumer/purchaser of our product that each product is free from defects in materials and workmanship as follows:

**2 YEAR LIMITED WARRANTY ON THIS DT SWISS PRODUCT.** This warranty does not apply to defects due directly or indirectly to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities or to a lack of maintenance.

DT SWISS LTD LIMITS ALL IMPLIED WARRANTIES TO THE PERIOD OF TWO YEARS FROM THE DATE OF INITIAL PURCHASE AT RETAIL. EXCEPT AS STATED HEREIN, ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS ARE EXCLUDED. SOME STATES MAY NOT ALLOW LIMITATIONS ON HOW LONG THE IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. DT SWISS LTD SHALL IN NO EVENT BE LIABLE FOR DEATH, INJURIES TO PEOPLE OR PROPERTY OR FOR INCIDENTAL, CONTINGENT, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF OUR PRODUCTS. SOME STATES MAY NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

To take advantage of this warranty, the product or part must be returned for examination, postage prepaid, to the dealer where you bought the product or to a DT Swiss service center. Proof of purchase date and an explanation of the complaint must accompany the product. If our inspection discloses a defect, DT Swiss will either repair or replace the product or refund the purchase price, if we cannot readily and quickly provide a repair or replacement. DT Swiss will return repaired product or replacement at DT Swiss expense, but if it is determined there is no defect, or that the defect resulted from causes not within the scope of this warranty, then the user must bear the cost of shipping. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Legal venue and place of performance is Biel (Switzerland). Swiss law shall apply. Subject to technical changes. Please keep the user manual and warranty for future use.

## 1.1 General Maintenance Information

### Cleaning

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

DT Swiss recommends the following cleaners:

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

Use soap water or similar mild cleaners for external cleaning.

### Tools

If special materials like grease or oil are needed, they will be specified in the table «Required Material» at the beginning of a chapter. The symbol «✂» refers to the table «Required Material» in the respective steps.

### Environmental Protection

Whenever possible, waste has to be avoided. 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.

### Disclaimer

The operations described in this manual should only be performed by experts. The user is liable for any damage or consequential damage caused by wrong maintained or wrong installed components. If you have doubts, please contact a DT Swiss service center.

## 2 Safety

### DANGER

**Incorrect handling, installation, maintenance or servicing can lead to accidents causing severe injuries or death!**

- Compliance with the following provisions is a prerequisite for accident-free use and faultless functioning.
- Assembly and maintenance of the component requires a basic knowledge of handling bicycle components. If in any doubt, consult your retailer.
- Components should only be used in accordance with their intended use, otherwise the user shall assume full responsibility.
- The component must be compatible with all parts of the bicycle.
- Only use original spare parts.
- The components must not be changed or modified.
- The component must not be used if it is damaged or there are any signs of damage. If in any doubt, consult your retailer.

### DANGER

**Risk of death caused by incorrectly assembled or faulty wheels!**

- Check that the wheel is connected correctly before each ride.
- Check the wheel for damage before and after each ride.
- Regularly check the spoke tension, rotation and wear of the wheel.

### DANGER

**Risk of death caused by failure or reduction of the brake performance when using wheels for rim brakes!**

- Brake with both brakes!
- When riding down hill only brake briefly with pauses in between.
- Avoid sliding and permanent braking, as the wheel will overheat thus causing the failure of the rim, tyre or inner tube.
- If using new wheels or brake pads, the braking power is also reduced in wet conditions. Adjust the manner of cycling accordingly.
- Do not expose the wheel to temperatures above 90°C during transport or storage.

### NOTICE

**Risk of damaging the wheel by selecting incorrect components or tools!**

- Do not use metal tire levers. These can damage the surface of the rim, tyre or inner tube.
- Only use valves with a diameter of 6.5 mm and of an adequate length.
- The maximum tyre pressure of the wheel and of the tyre used must not be exceeded.
- Only use rim tapes, inner tubes and tyres which fit the dimensions of the wheel.
- Carbon rims must not be used with tubeless kits and tubeless tyres.
- Carbon rims must not be used with latex tubes.

### 3 Maintenance

This chapter describes activities which are concerning the whole wheel:

- Truing the wheel, see [chap. 3.2, p.9](#)
- Changing a single spoke, see [chap. 3.3, p.12](#)
- Rebuilding the wheel, [chap. 3.4, p.18](#)

Maintenance works of the hub can be found in the technical manual at [www.dtswiss.com](http://www.dtswiss.com).

DT Swiss recommends the following service works:

Action	Interval
Maintenance of the hub (see Technical Manual at <a href="http://www.dtswiss.com">www.dtswiss.com</a> ).	annually or as required
Check spoke tension, run-out and wear of the wheel.	10 hours of use
Check the wheel for damages.	before and after each ride
Clean the wheel with a soft cloth and an appropriate cleaner. Do not use high pressure cleaners and aggressive cleaners!	after each ride
Check the proper fixation of the wheel.	before each ride
Check the braking surface and the brake pads: <ul style="list-style-type: none"> <li>• Remove any contaminations (especially oil and grease) from the brake surfaces.</li> <li>• Check the degree of wear of the brake pads.</li> <li>• Remove any entrenched impurities (grit, swarf, etc.).</li> <li>• Check the degree of wear of the rim brake surfaces. In case of any doubts or viewable wear, contact a skilled professional.</li> </ul>	before each ride

#### 3.1 Safety



#### DANGER

##### Danger to life due to wrong maintenance!

Incorrect maintenance or assembly can lead to unpredictable errors!

- Maintenance and assembly may only be done by a skilled professional.
- In case of any doubt, contact a DT Swiss service center.



#### CAUTION

##### Risk of injury due to wrong spare parts!

Incorrect spare parts can lead to unpredictable errors!

- Only use original spare parts.

## 3.2 Truing the Wheel

### Preparatory Steps

Remove the wheel from the bike.

Remove the rim strip, the inner tube and the tire.

Clean the wheel and check for damages.

Required Material	Specification	Amount
spoke holder 1.0 - 1.3 mm	 TTSXXXXS05644S	1
spoke holder 0.8 - 1.0 mm	 TTSXXXXR05641S	1
nipple wrench TORX	 TTSXXXXS05630S	1
spokey square	 TTSXXXXR05664S	1

## NOTICE

### Risk of damaging the bladed spokes and the nipples!

- Bladed spokes must be hold with the spoke holder while turning the nipple.
- There are used different spokes types. Ensure that the correct tool is being used.
- When holding the spoke, push the spoke holder as far as possible in direction of the rim.

1. Put the wheel into the truing stand.
2. Check the axial and radial run-out.  
The wheel should meet the following values:
  - dish < 0.2 mm
  - axial run out < 0.25 mm
  - radial run out
    - ➔ carbon rims: < 0.5 mm
    - ➔ aluminium rims: < 0.3 mm



3. Slide the spoke holder onto the spoke.  
To avoid damages of the spoke, slide the spoke holder as far as possible to the direction of the nipple.
4. True the wheel.
5. Stress relieve the wheel (see [chap. 3.4, page 16](#)) and re-true it, if necessary.



6. Check the axial and radial run out again. If necessary, repeat the last steps.
7. Check the spoke tension (see [chap. 4.1, page 24](#)) and increase or decrease the spoke tension if necessary.
8. Check the axial and radial run out again. If necessary, repeat the last steps.
9. When the maximal spoke tension is reached, stress relieve the wheel (see [chap. 3.4, page 16](#)).  
The values must not change after the last stress relieve.

#### Closing Steps

---

Mount the rim tape, tube and tire if necessary.

---

Mount the wheel if necessary.

### 3.3 Changing a Single Spoke

#### Preparatory Steps

Remove the wheel from the bike.

Remove the rim strip, the inner tube and the tire.

Required Material	Specification	Amount
spoke holder 1.0 - 1.3 mm	 TTSXXXXS05644S	1
spoke holder 0.8 - 1.0 mm	 TTSXXXXR05641S	1
nipple wrench TORX	 TTSXXXXS05630S	1
axle holder	 HXTXXX00N5001S	1
DT Swiss universal grease (20 g)	 HXTXXX00NMG20S	1

## NOTICE

### Risk of damaging the bladed spokes and the nipples!

- Bladed spokes must be hold with the spoke holder while turning the nipple.
- There are used different spokes types. Ensure that the correct tool is being used.
- When holding the spoke, push the spoke holder as far as possible in direction of the rim.

## Loosen the Nipple

1. Fully unscrew the nipple of the spoke to be changed.

A washer is positioned between the nipple and the rim. Take care that the nipple does not fall into the rim profile.



## Changing the Spoke on the Drive Side of the Rear Wheel



The spokes on the drive side can be changed without dismounting the rotor or the end cap.

2. Push the spoke a few millimeters in direction of the hub and turn it 90°.

⇒ The connection of spoke and hub is ???



3. Remove the spoke.



4. Put on the new spoke in a similar manner. Regard the correct crossing of the spokes!

## Replacing a Spoke on the Front Wheel / on the Non Drive Side of Rear Wheel

### NOTICE

#### Risk of damaging the end caps!

To avoid damages, only use grind clamping jaws, aluminum clamping jaws or special tools to clamp the end caps.

1. Put the axle holder into a vice.
2. Clamp the end cap into the axle holder.
3. Pull the wheel off the end cap with both hands.



4. Push the spoke through the hub flange.



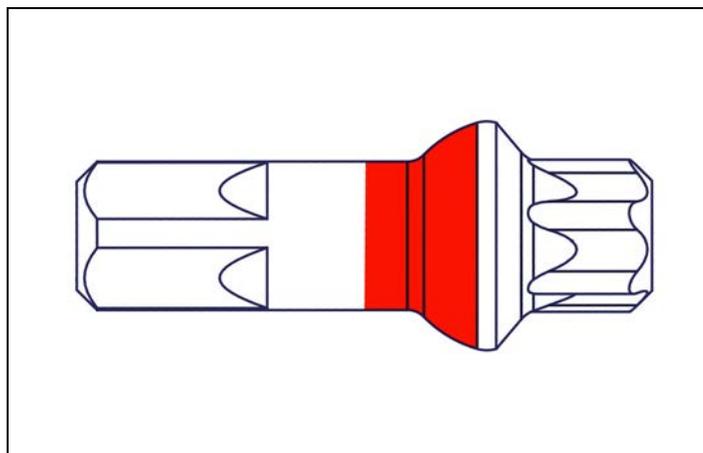
5. Put on the new spoke in a similar manner. Regard the correct crossing of the spokes!

## Putting Nipples on DICUT Wheels with Aluminum Rims

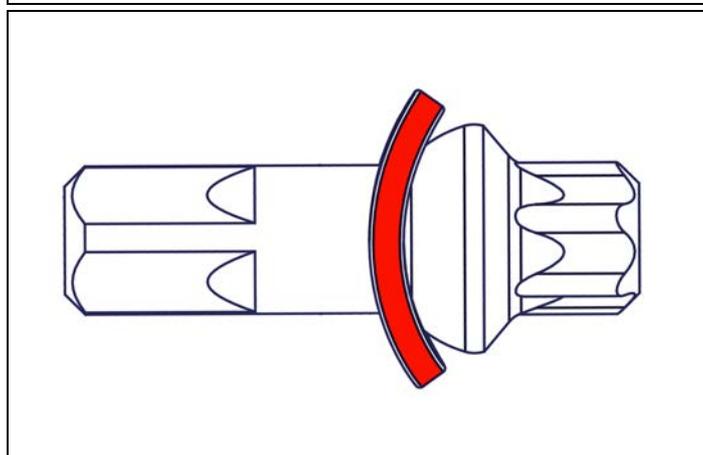


On DICUT wheels with aluminum rims, Squorx nipples with special washers (PHR washer) are used.

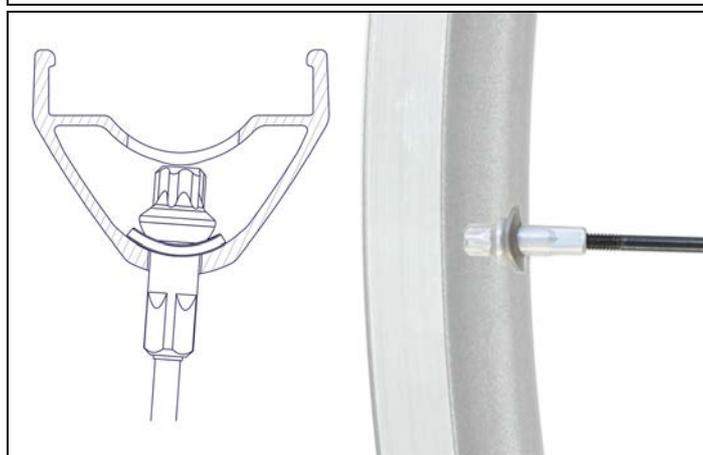
- Grease the contact surface of the PHR washer and the Squorx nipple.



- Slide the PHR washer onto the nipple. Orientation of the washer, see figure.



- Put the spoke through the hub.
- Screw the Squorx nipple onto the spoke.
- Check, if the PHR-washer is positioned correctly and fits correctly within the radius of the rim.



6. Slide the spoke holder onto the spoke.  
To avoid damages of the spoke, slide the spoke holder as far as possible to the direction of the nipple.
7. Screw a new nipple onto the new spoke.
8. Increase the spoke tension until the head of the spoke can't turn itself inside the hub.



### Putting Nipples on DICUT Wheels with Carbon Rims

1. Put a new nipple onto the nipple wrench.
2. Slide the nipple through the rim and screw it a few turns onto the spoke.
3. Slide the spoke holder onto the spoke.  
To avoid damages of the spoke, slide the spoke holder as far as possible to the direction of the nipple.
4. Increase the spoke tension until the head of the spoke can't turn itself inside the hub.



#### Closing Steps

True the wheel.

Mount the rim tape, tube and tire if necessary.

Mount the wheel if necessary.

#### Link

[chap. 3.2, page 8](#)

### 3.4 Rebuilding the Wheel

#### 3.4.1 Lacing the Wheel

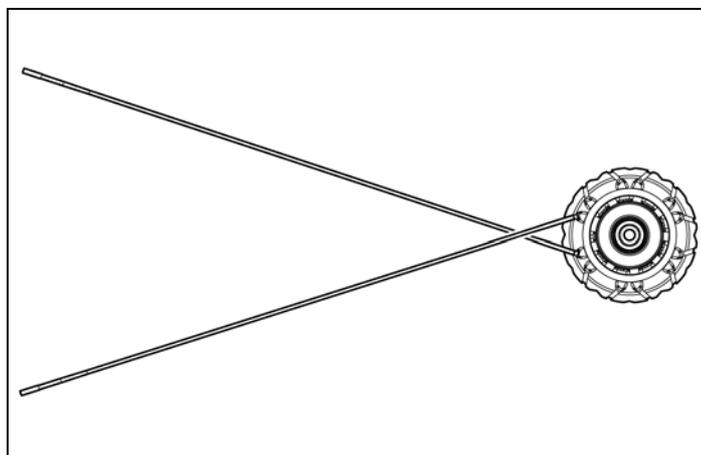
Preparatory Steps		Link
Remove the endcap if necessary.		<a href="#">chap. 3.3, p.10</a>
Remove the rim strip, the inner tube and the tire.		
Required Material	Specification	Amount
spoke holder DT NEW AERO	 TTSXXXXS05644S	1
spoke holder DT Universal	 TTSXXXXNSPUNIS	1
nipple wrench	 TTSXXXXR05631S	1

## NOTICE

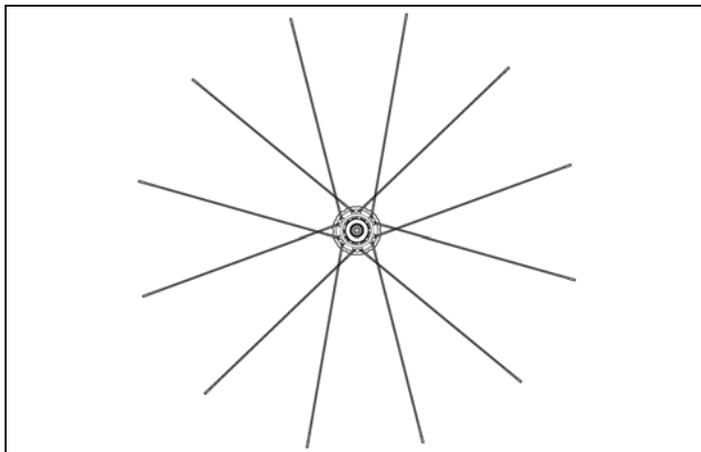
DICUT<sup>®</sup> hubs must only be used with T-Head spokes!

#### General:

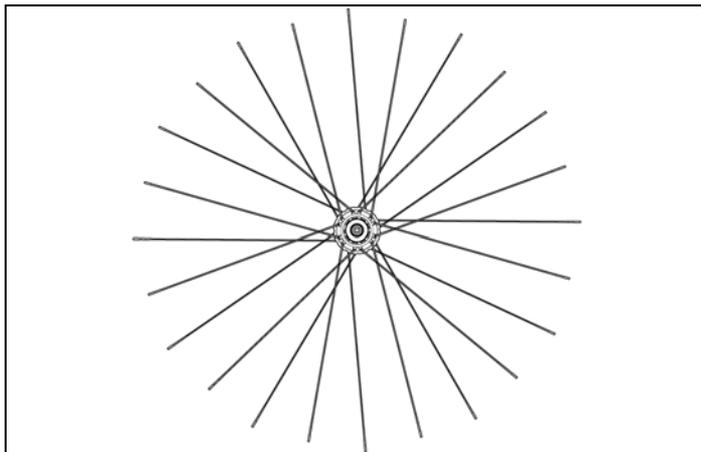
The crossing of the spokes must always be like shown in the picture.



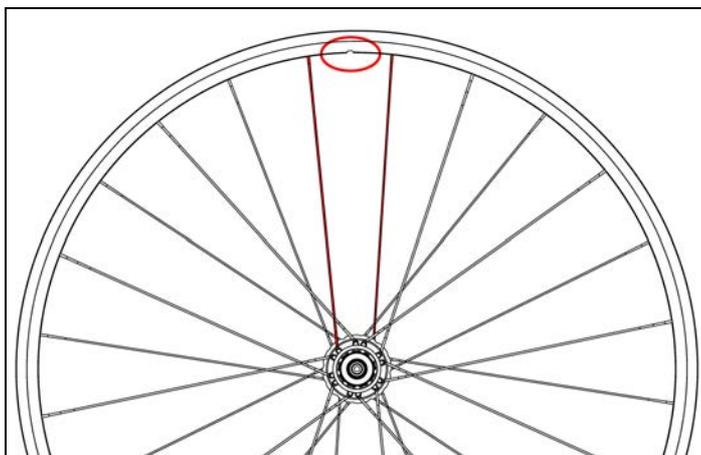
1. Put on all spokes to the first side of the hub.



2. Put on all spokes to the second side of the hub.



3. Connect the spoke tree to the rim.  
Align the spoke tree that no spokes are crossing each other above the valve hole.



## NOTICE

### **Risk of damaging the spokes!**

To avoid damages of the spokes, the universal spoke holder should be used. The metallic spoke holder should only be used if the universal spoke holder can't be used due to the high torque.

4. Slide the spoke holder onto the spoke.  
To avoid damages of the spoke, slide the spoke holder as far as possible to the direction of the nipple.
5. Screw on all nipples.



Closing Steps	Link
True the wheel.	<a href="#">chap. 3.2, p.8</a>
Stress relieve the wheel.	<a href="#">chap. 3.4.2, p.17</a>
Mount the rim tape, tube and tire if necessary.	

### 3.4.2 Stress Relieving the Wheel

DICUT<sup>®</sup> wheels must be stress relieved four times during the truing process. The first time should be done when 50% of the max. spoke tension (see [chap. 4.1, p.24](#)) is reached.

At the end of the truing process the wheel should be stress relieved a last time. The truing values should not change any more.

After the last stress relieve, the wheel should meet the following values:

- dish < 0.2 mm
- axial run out < 0.25 mm
- radial run out:
  - ➔ carbon rims: < 0.5 mm
  - ➔ aluminium rims: < 0.3 mm

### 3.5 Servicing the Freewheel System

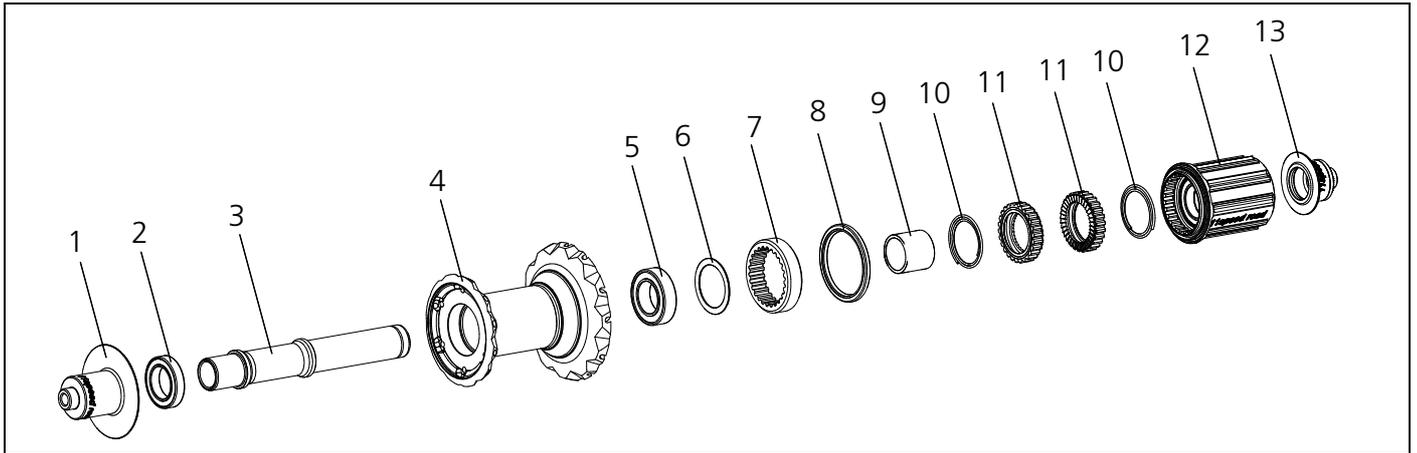


Figure 3-1: DICUT Hub

#### Preparatory Steps

Remove the wheel from the bike.

Remove the rim strip, the inner tube and the tire.

Clean the wheel and check for damages.

Required Material	Specification	Amount
DT Swiss multipurpose grease	 HXTXXX00NMG20S	as required
DT Swiss special grease for ratchet system	 HXTXXX00NSG20S	as required

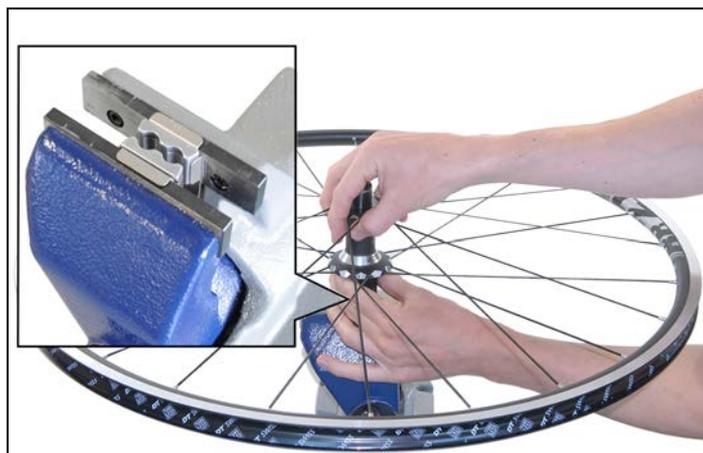
## NOTICE

### Risk of damaging the end caps!

To avoid damages, only use grind clamping jaws, aluminum clamping jaws or special tools to clamp the end caps.

## Removing the End Cap and the Rotor

1. Put the axle holder into a vice.
2. Clamp the end cap (fig. 3-1/13) into the axle holder.
3. Pull the wheel off the end cap with both hands.



4. Pull off the rotor (fig. 3-1/12) with one of the both springs (fig. 3-1/10) by hand.



5. Remove both ratchets (fig. 3-1/11).



6. Remove the spacer (fig. 3-1/9) and the second spring (fig. 3-1/10).



## Cleaning and Checking the Parts

The wear of the star ratchet starts at its outer diameter. If there is only low wear, the star ratchets can be further used. In this case the star ratchets must be checked regularly in short intervals. In case of heavy wear, the star ratchets must be changed immediately.

1. Clean the star ratchets (fig. 3-1/11), check for wear and change them if necessary.
2. Check the rotor (fig. 3-1/12) for damages.  
→Grooves from the cassette are no damages.  
These are normal signs of usage.
3. Remove bad notches from the rotor using a file.
4. Clean the rotor. Metal filings must be removed completely.



## Putting on the Ratchet System®

### DANGER

#### **Danger of injury by limited function of the freewheel due to incorrect lubrication!**

If too much grease is applied on the star ratchets, the actuation of the star ratches may not work.

- 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 star ratchets (fig. 3-1/11) using a fine brush.  
→For an optimal functionality, a thin layer of grease is sufficient.



2. Grease the tothing of the rotor with DT Swiss special grease.



3. Grease the tothing of the threaded ring (fig. 3-1/7) with DT Swiss special grease.



4. Put on the spacer (fig. 3-1/9) and the first spring (fig. 3-1/10).

→The big diameter of the spring must be placed on the bearing of the hub.



5. Slide both ratchets (fig. 3-1/11) onto the axle.

→The tothing of the ratchets must face at one another.



6. Slide the second spring with the big diameter into the rotor.
7. Carefully push the rotor with an anti clockwise rotary motion onto the axle.



8. Push the end cap (fig. 3-1/13) onto the axle.



9. Check the function of the freewheel system.
  - The rotor must easily be turnable in anti clockwise direction and the freewheel system must engage defined.
  - The rotor must block when turning in clockwise direction.
  - The rotor must not have play.
10. If there are any malfunctions, dismount the rotor and mount it regarding the steps above. If the malfunction remains, contact your dealer or a DT Swiss service center.



## 4 Technical Data

Further technical data like spoke types, spoke lengths etc. can be found in the DT Swiss Techbook at [www.dts-wiss.com](http://www.dts-wiss.com).

### 4.1 Spoke Tension

	maximum tolerated tension difference per wheel side [N]	max tolerated spoke tension difference per wheel side [N]	min. tolerated spoke tension of the higher tightened wheel side [N]	average spoke tension of the higher tightened wheel side [N]
VR	250	1 000	800	950 - 850
HR	250	1 300	1 050	1 250 - 1 100

### 4.2 Tolerance

	Dish [mm]	axial run-out [mm]	radial run-out [mm]
Carbon	0.2	0.25	0.5
Aluminum	0.2	0.25	0.3

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