



WUS MOTO Mounting process mode

Ref : **C 307 020 0010**  
Version : E2


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## TITLE: WUS MOTO Mounting process mode

Reference : C 307 020 0010

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Internal Approval			
	<i>Author</i>	<i>Check</i>	<i>Approver</i>
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<b>Date</b>	06/09/16		
<b>Signature</b>			

**VERSIONS HISTORY**

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Version	Update Date	Chapters / Pages modified	Modification origin	Author	Comments
A0	13/05/08	All	Creation	T. Benard	Initial version
A1	14/05/08	All	Detailed procedure	T. Benard	
A2	05/08/08	12	Screwing profile	T. Benard	
A3	25/08/08	12	Screwing profile	D.Luce	
A4	14/09/08	12	Screwing tool	D.Luce	
A5	25/09/08	7,9,10,11,12	Screwing procedure	D.Luce	
A6	06/01/09	Title	Screwing procedure	D.Luce	all OEM version
B0	08/01/09	All	Merge between 3080820010-A6 and S 307 020 0010-A2	L.Lafranchis	
B1	01/09/09	1	Adding C for customer document.	T. Benard	
B2	05/10/09	All	Spec for new L valve Gen2	D.Luce	
C0	22/10/10	6,12	Tire ease recommendation and maximum speed	D.Luce	
D0	21/05/13	6	Recommendation on rim interface	D.Luce	
E0	05/08/13	all	Scheme adapted to 50°	D.Luce	
E1	31/01/14	All	Update Pictures	L.Lafranchis	
E2	06/09/16	6	Warning FCC part 15/ RSS	D.Luce	

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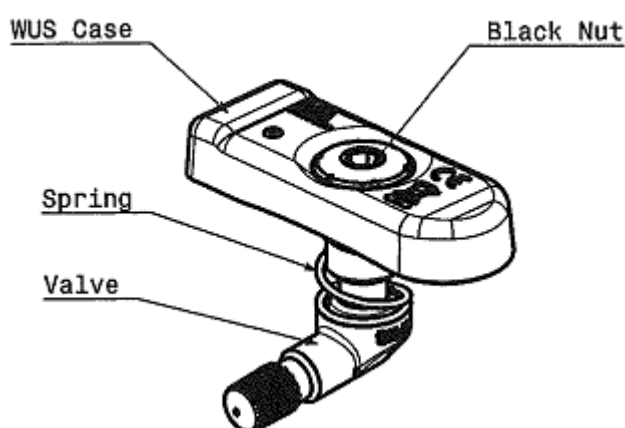
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## 1. PURPOSE

This document describes the requirements for the mounting of WUS.

## 2. TERMINOLOGY, ACRONYMS AND ABBREVIATIONS

### 2.1. TERMINOLOGY



### 2.2. ACRONYMS

App	Approval
NA	Non Available
NR	Non Relevant
TBD	To Be Defined
TBC	To Be Confirmed
HW	Hardware
Q	Quality
SW	Software
RF	Radio Frequency
TW™	Tire Watch™ (system for surveying tires pressure)
WUS	Wheel Unit Sensor
SY	System
WL	Wireless
MD	Mechanical Design

### 3. DESCRIPTION

The wheel unit sensor (WUS) of TIRE WATCH™ system is a pressure and temperature sensor composed with:

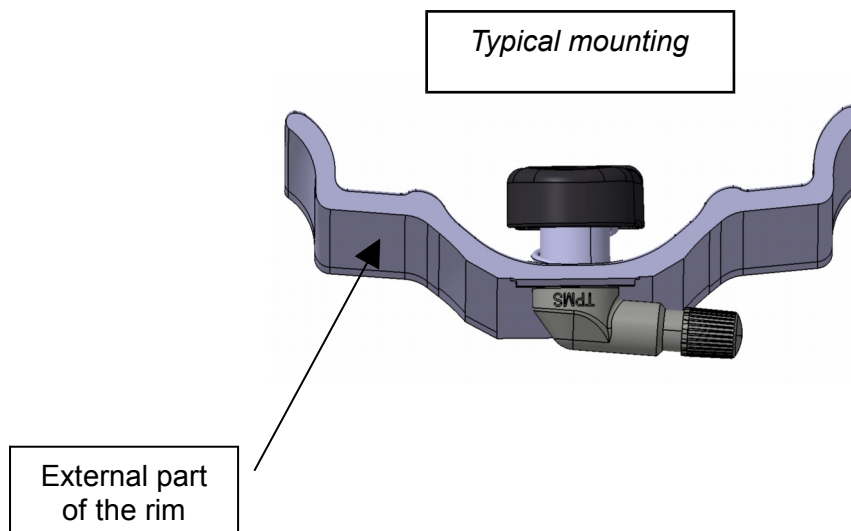
- A molded black plastic housing,
- An anodized aluminium nut with BTR cavity for hexagonal key (5mm.), clipped in housing with a stainless steel spring,
- An anodized aluminum valve oriented at 90°; including an EPDM seal, a short core mechanism and a cap.

### 4. UTILISATION RULES

The Wheel Unit Sensor can be mounted on all motorcycle rims according to the following specification :

- with a minimal wide of 3 inches and with a diameter from 12 to 21 inches,
  - with an ETRTO compliant valve hole about 11.5mm +/- 0,2 diameter, or 8,5mm+/-0,2,
  - with a radial orientation of the valve hole axis
  - with a maximum rim thickness around the valve hole about 6 mm.
  - Rim Internal surface and External surface must be co planar on each side of the valve hole
  - No Burrs accepted on external side of the valve hole for the seat of the seal,
- Valve, nut and spring seats must be plan with a sufficient diameter to accept spring, nut and valve.  
A seat diameter about 16.5mm +0.5 / -0 is sufficient to accept our TPMS system on spring side (internal rim side) and on valve side (external rim side)

*For other mounting interface (ex : hole 8,3mm or valve in spoke (BMW)) ask to LDL the specification).*



#### 4.1. SPECIFICATIONS

Screwing torque for valve core mechanism:	0.3 +/- 0.1 Nm.
Screwing torque for valve cap:	0.2 to 0.35 Nm.
Manual screwing torque for nut:	5 Nm +/- 0.5 Nm.
Environmental Temperature Range:	-20°C to +60°C.
Monitoring Temperature Range:	-30°C to +125°C
Surviving Temperature Range 1 minute :	-40°C to +150°C
Relative Pressure Range Monitored:	0 to 3,5 bars.
Relative Maximum pressure range non destructive:	0 to 15 bars
Used Inflating Fluid:	Air or Nitrogen
Anti-puncture Fluid utilisation:	Utilisation without any consequence. <b>Just introduce Fluid when the valve is down, close to the ground</b>
Maximum speed of the vehicle:	350 Km/h on rim 17"

\*\*\*\*\*

#### NOTA :

*Part 15 Clause 15.21 [ Do not Modify warning ]:*

*"Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment"*

*FCC Part 15.19(a) [interference compliance statement]:*

*"This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."*

*This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two conditions:*

*(1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device*

*Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :*

*1) l'appareil ne doit pas produire de brouillage; 2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement."*

## 5. WUS MOUNTING

### 5.1. PRECAUTIONS DURING MOUNTING OPERATION

- ◆ Do NOT use WUS after a drop of more than 1 meter on a hard ground

- ◆ Do NOT generate an electrostatic discharge higher than 6 Kilovolts by air onto the WUS, during mounting and disassembly of the WUS or at any time during utilization (avoid the use of nylon worksuit, and in general way, avoid all textile rubbing before handling WUS)
- ◆ Do NOT store the TIRE WATCH at temperatures higher than 30°C and lower than 0°C
- ◆ When removing the core from the valve, it has to be replaced by a new short core (brass without chrome forbidden) of the same type, according to V0.07.1 ETRTO core chamber specification.
- ◆ The valve cap must always be in place (except for inflating, pressure release or pressure checks).

## 5.2. WUS MOUNTING

- ◆ Check the external surface of the rim cleanness ; remove grits and other paint marks
- ◆ Orientation of the Wheel Unit Sensor on the rim : the black housing engraved must be visible after mounting.
- ◆ The sensor body must be presented in front of the valve hole, inside the rim, then lay the spring upon the flat surface around the valve hole.
- ◆ Shove the valve into the valve hole, the seal must face the rim.
- ◆ Push onto the WUS nut in order to bend the spring, and then start screwing the valve manually still the seal get in touch with the rim.
- ◆ While screwing keep the WUS in place.
- ◆ Make sure that the screwing tool stays aligned with the hexagonal cavity of the nut during the screwing process.

### 5.3. WUS SCREWING RECOMMENDATIONS

**Make sure the following recommendations are respected :**

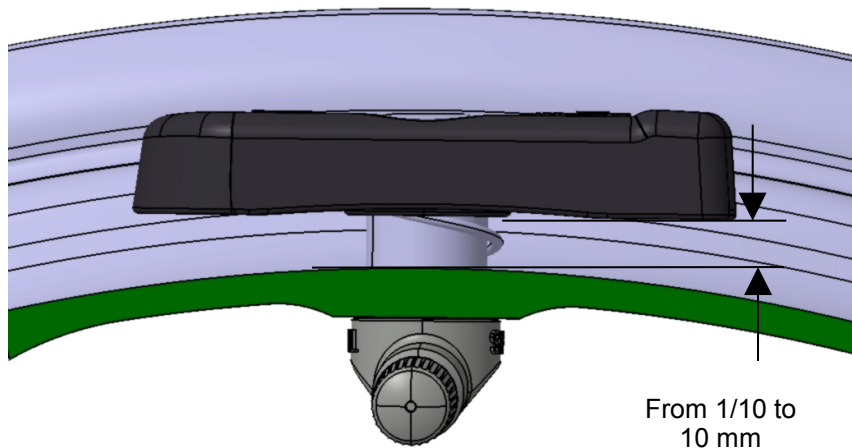
**Screwing speed : max of 2 turns in 1 second.**

- ◆ Apply a torque of 5 Nm +/- 0,5 Nm with the good **screwing speed**. This is the screwing condition of on which the specification of our WUS is based.
- ◆ For the manual process please use a torque controlled tool.
- ◆ The valve and the nut have to be screwed on **5 complete threads (5 nut rounds) Minimum**,

The plastic part must slightly be able to turn around its nut after tightening; under no circumstances it has to be in contact on the rim surface. You must be able to introduce a piece of paper between the sensor and the rim (minimum slack of 1/10 mm).

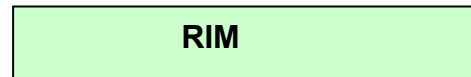
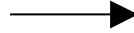
Once mounted, the WUS must be distant from the rim as illustrated here under ; the distance between them can reach 10mm.

Optimal distance is 1mm.

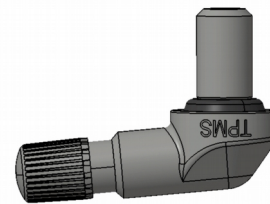




Electronic part including the spring. This part is situated inside of the tyre



Valve including the seal ; situated on the external part of the tire



#### 5.4. DETAILED VIEWS OF WUS ASSEMBLY

Step N° 1



*The Spring side must face the internal side of the rim.*

Step N°2



*The valve seal must face the rim valve hole on the external side.*

Step N°3



*While pushing on the nut, keep it centred on the valve hole ; then introduce the valve in the valve hole.*

Step N°4



*While you are still pushing on the nut start screwing the valve manually still the seal get in touch with the rim.*

Step N°5



- Screw the nut with a allen key (5mm). Do not exceed 2 rounds per second.
- Final torque 5 Nm +/- 0.5 Nm.

**AVOID ANY SCREWING IF PLASTIC HOUSING IS IN CONTACT WITH THE RIM**

(the introduction of a piece of paper (80gr/m<sup>2</sup>) between the rim and the plastic parts make you sure that there is no contact).

Step N°6



- Check that the external part of the valve does not meet any obstacle during rim rotation (like break system).

- Check that the external seal is correctly set and that the valve is in contact with the rim.

Step N°7



- The flat surface of the valve must feet the flat surface of rim valve hole.

- The plastic parts must be free from rim constraints (no contact).

- The plastic parts must slightly be able to turn around its nut, on approximatively +/- 5°. (no constraints on plastic parts operated by the rim sides after tightening).

### 5.5. METHOD TO VERIFY THE SCREWING TORQUE

- ◆ The measurement of the residual torque is done by retightening the valve nut by a ¼ turn maximum in reduced speed (1/4 of a turn in 10 seconds). Therefore use a torque-controlled tool which is able to memorize the maximum torque. IF the torque mandatory to start the rotation of the nut in the measurement is equal to 4 Nm, stop the procedure, the Torque is correct.
- ◆ The retightening torque may not be smaller than 4 Nm.

It is recommended to verify the screwing torque at each tire mounting.

## 6. TIRE MOUNTING

### 6.1. PRECAUTIONS

- ◆ Before any mounting operation of the tire, make sure that the Wheel Unit Sensor has been correctly mounted and tightened to the rim.
- ◆ The tire must be lubricated so as to facilitate its mounting. Respect manufacturer recommendations.
- ◆ ***NO lubrication product, tire ease or any other matter may partially or completely cover the pressure measuring hole or the inflation hole of the wheel unit. In general, it is forbidden to coat the wheel unit with a soap for tire mounting***
- ◆ The tire must never be allowed to put mechanical constraints onto the wheel unit sensor during the mounting operation; only a dynamic slide touch is acceptable, constant pressure stress is forbidden.
- ◆ Make sure that the tire does not get trapped between the rim and the wheel unit sensor during mounting procedure.
- ◆ It's recommended to check the screwing torque before any tire mounting.

### 6.2. MOUNTING

- ◆ The bead of the tire must be engaged approximately 80° beyond the valve.
- ◆ Do not introduce a mounting tool between the valve and the point of engagement of the tire.
- ◆ Tire mounting must be done while ***moving away from the valve.***
- ◆ Beyond this point starts the final engagement operation, which finishes in the zone of the valve.
- ◆ During this phase, only fast sliding touch is allowed during final tire jumping onto the rim. Process to be validated by LDL Technology.

***For manual mounting only – standard dealer shop machine***

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**For clockwise tire mounting machine**

***First sidewall :***

Step N°1



*Start putting the tire on the rim on the opposite side of the valve*

Step N°2

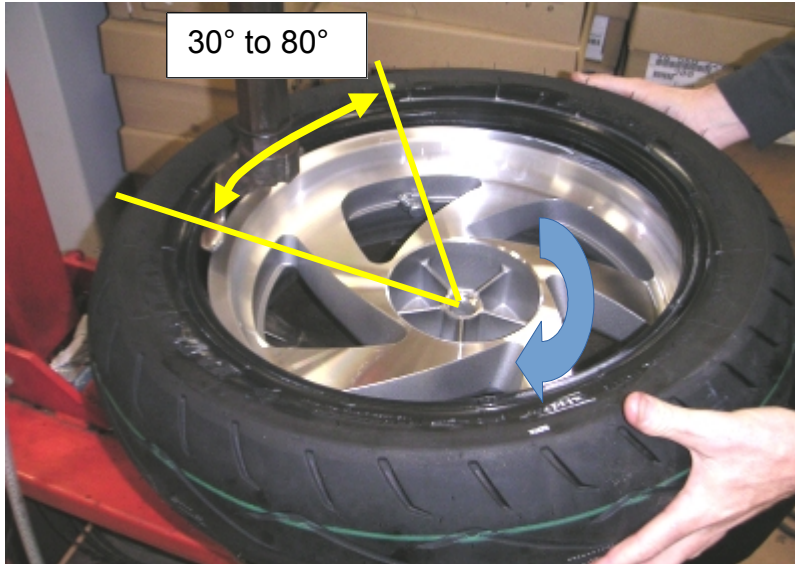


*The first sidewall is now introduced*

***Second sidewall :***

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Step N°3



*Start introducing manually the second sidewall  
At almost 50° far away the valve*

Step N°4



*At the end of the mounting process, the second sidewall end climbing on the rim when the shoe is in front of the valve*

## 7. DISMOUNTING A TIRE EQUIPPED WITH A WUS

- ◆ Before detaching the tire, make sure that the Wheel Unit Sensor is still correctly mounted and tightened on the rim, by checking that the valve is tightened.
- ◆ Before any introduction of tools between the tire and the rim, make sure that both sidewalls of the tire are completely detached from the rim.

*For clockwise tire mounting machine*

Step N°1



*Grip the tire with the press at 50° minimum from the valve*

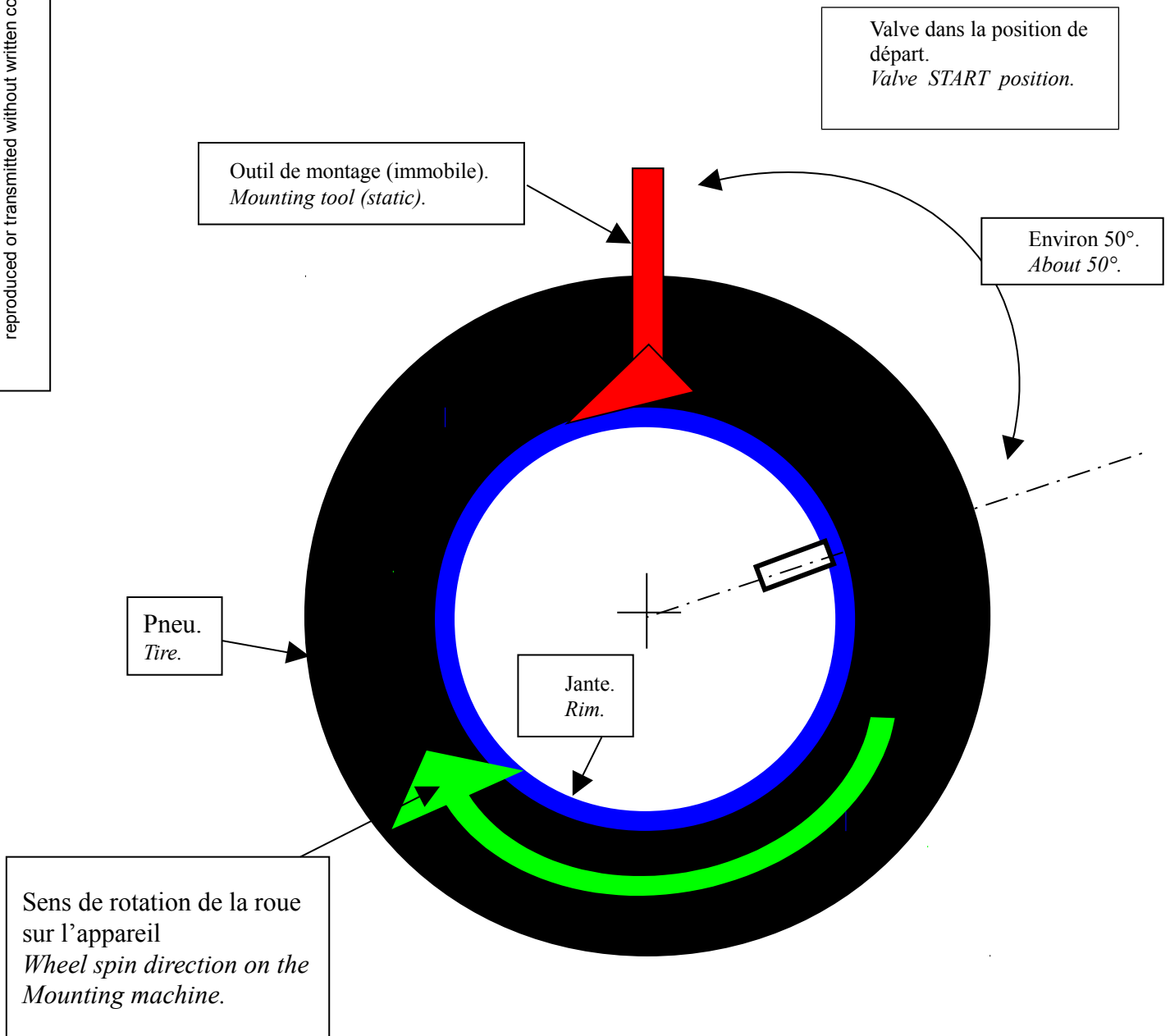
Step N°2



*With a tire iron, raise the first sidewall at 50° from the valve according to scheme next page*

**Scheme: Universal tire mounting and dismounting procedure**

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## Step N°3



*Slide the tool head  
under the tire*

## Step N°4



*Then make the tire turn  
to disengage the first sidewall*

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**Disassembly of the second sidewall.**

## Step N°5

## Overview



## Rear View



*With a tire iron, raise the second sidewall at 50° from the valve*

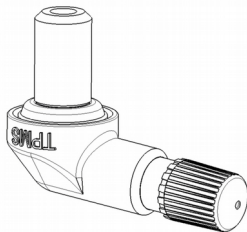
- ◆ Repeat the disassembly operations of the first sidewall until the tire is completely separated from the rim.
- ◆ **At any time the hand Tool or machine Tool must get in touch with the sensor.**

## 8. WUS DISMOUNTING

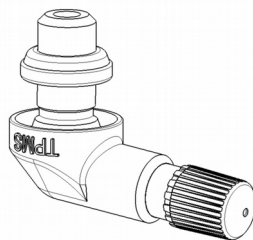
It is **MANDATORY** to interchange the seal if a complete disassembly of the WUS is done (if you change the rim for example), all unscrewing action on the nut is equivalent to a complete disassembly. It's **RECOMMENDED** to check the screwing torque at each time the tire is dismantled

### 8.1. REPLACING VALVE SEAL

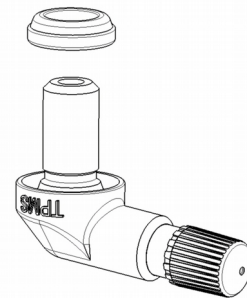
For the used valve seal dismounting, use a **PLASTIC TOOL** to disengage the seal from its case (in order to avoid damaging the valve).



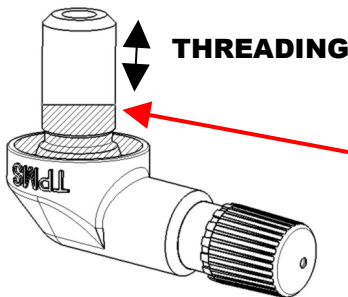
Disengage the seal from its case



Slide the seal along the valve body



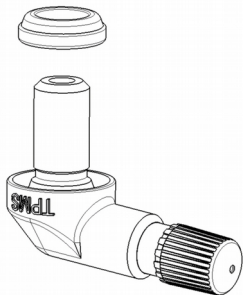
Remove the used seal



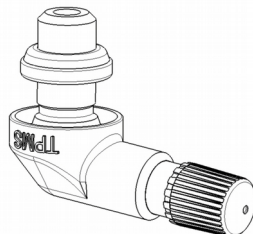
**IT IS MANDATORY TO CHANGE THE VALVE IF THERE IS ANY SCRATCH OR HIT IN THIS AREA**

### **NEW VALVE SEAL MOUNTING**

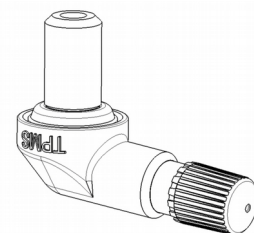
- ◆ Do not use lubricant, solvent, grease or oil.
- ◆ Check that the valve can be used again.
- ◆



Present the seal in this way, flat surface oriented to the valve cap



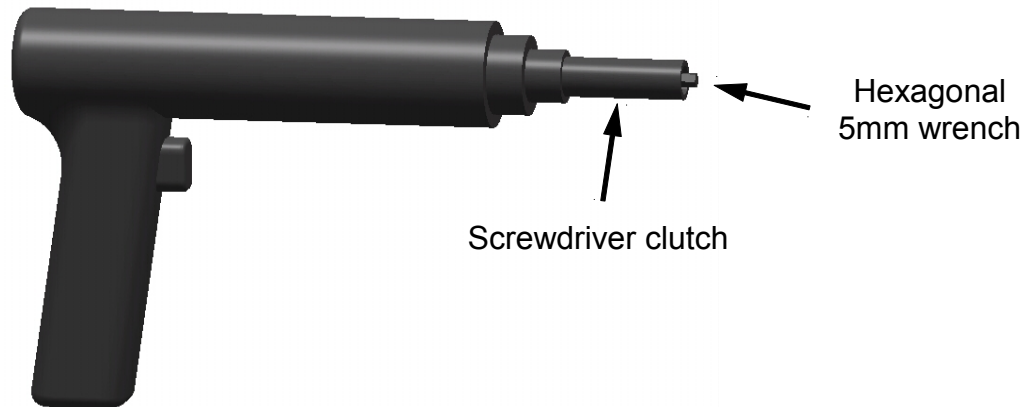
Shove the seal into the valve



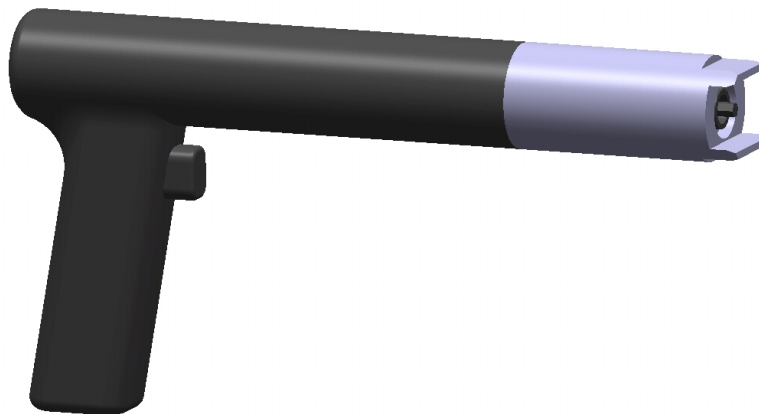
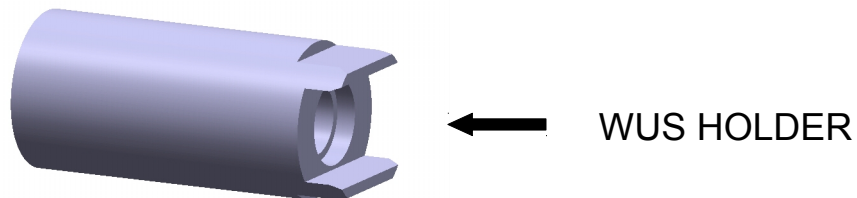
Check that the seal is in its lower position

## 9. WUS MOUNTING – SCREWDRIVER PROCEDURE

### 9.1. PRESENTATION



Screwdriver (here LUM12 HRX8-50 from Atlas Copco reference: 8431028025)

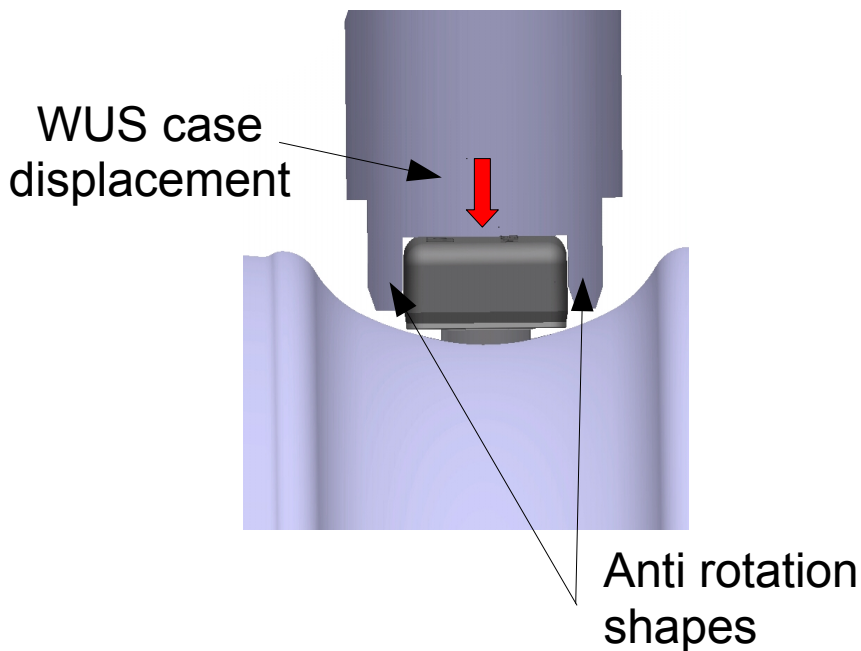
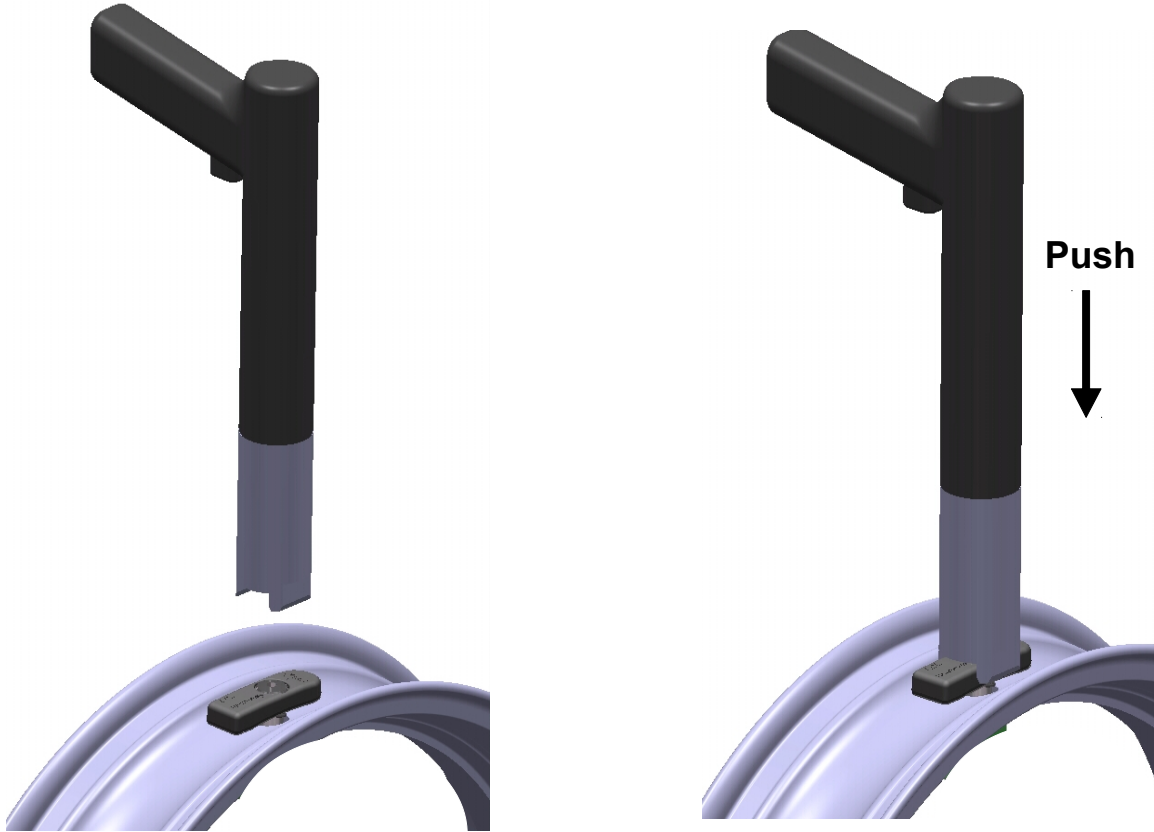


WUS HOLDER **FIXED** ONTO SCREWDRIVER

**9.2. WUS HOLDER GOAL**

For an automatic screwing, LDL recommend to use a WUS holder fixed onto the screwdriver which pushes the case down and lock the case in rotation.

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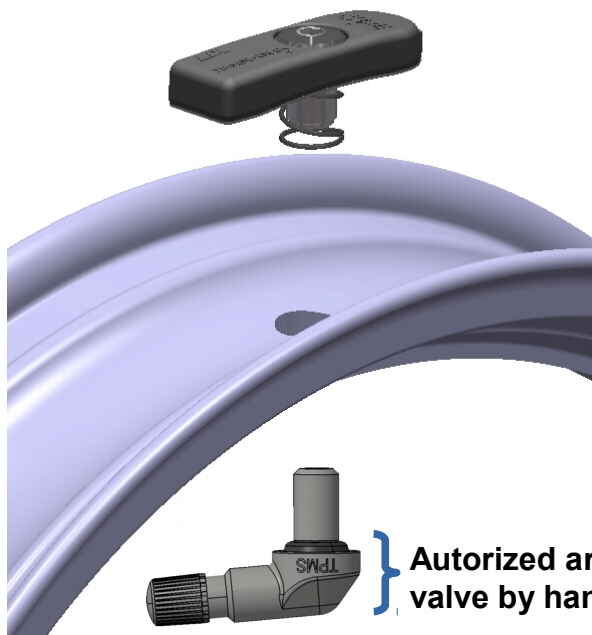


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## 10. SCREWING STEPS

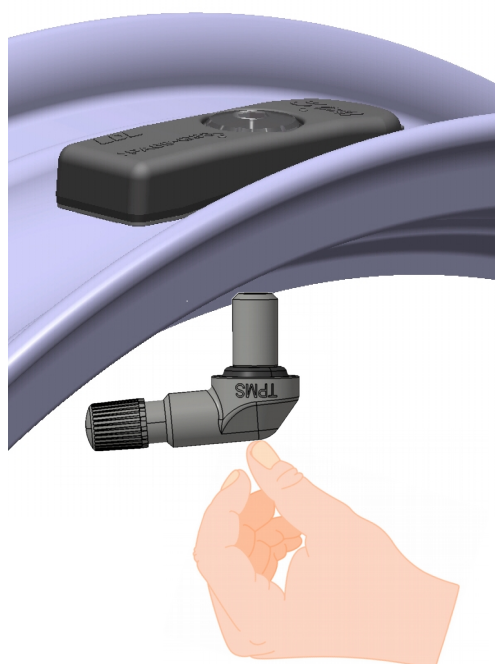
### 10.1. STEP 1

Introduce the valve



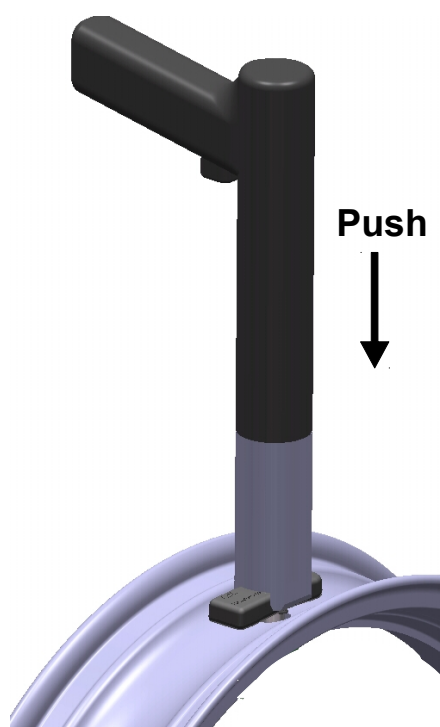
} Authorized area to hold the valve by hand

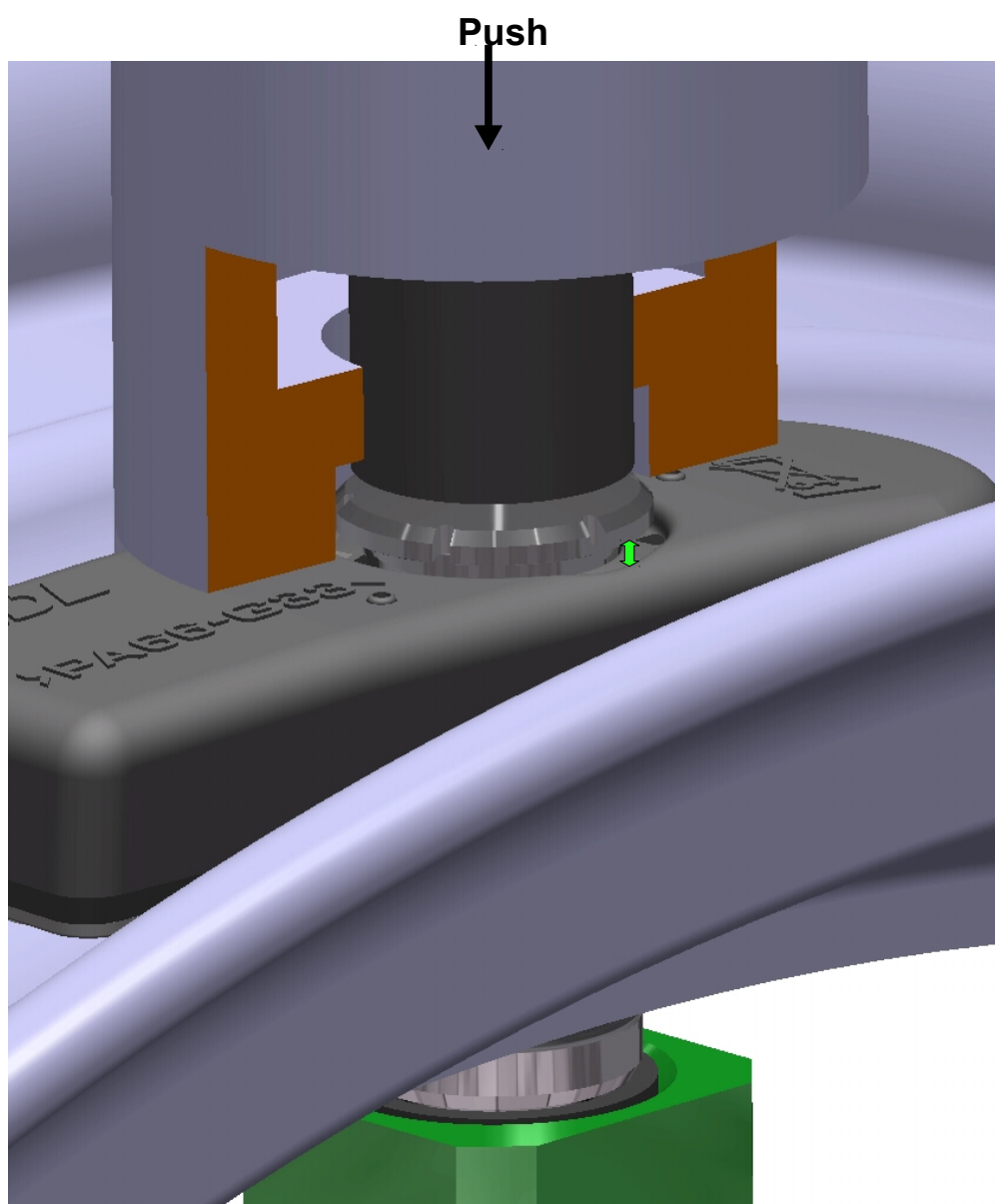
Start the screwing by hand till get contact between seal and rim external side.



## 10.2. STEP 2

Apply automatic screwdriver on the top housing till rise the introduction of the hexagonal 5mm wrench into the nut and lock in rotation the case with the WUS Holder (PTFE part mounted onto the screw driver). Just maintain the valve with hand by its nose.





### Details on WUS case displacement:

For a better understanding WUS holder is represented with a partial cut (orange area) Now the screwdriver clutch is on the nut and the WUS holder has pushed down the WUS case. There is a gap between the nut head and the WUS case (green arrow on scheme) so we can start screwing without the nut touching the WUS case and damaging the WUS anti rotation embossed shapes.

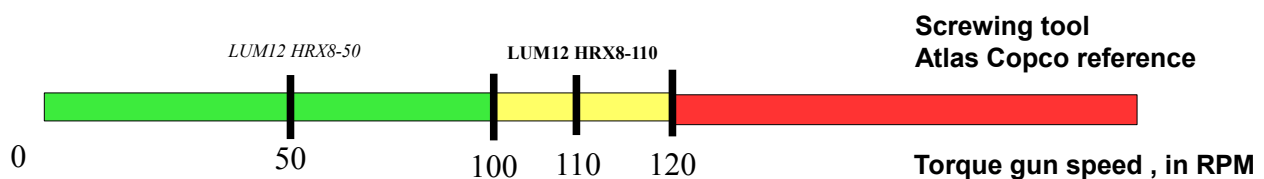
During screwing the nut must be pressed onto the rim, so it is the nut which achieves the coaxiality of the assembly in the valve hole and not the valve seal.

#### **10.3. STEP 3**

*In case of L-Valve rotation under screwing action, hold the valve during the screwing process with a PTFE spanner to avoid marking and scratch onto the valve anodization.*

LDL **recommend** to screw according the profile explained below :

- Screw the valve by hand till get contact between valve seal and external rim side (around 5 complete turns). Screwing by hand on at least 1 turn is also accepted for industrial production.
- Screw the nut with a torque gun at constant speed :  
No minimum, 50 rpm recommended , 100 rpm maximum , do not exceed 120rpm MAX



- **FINAL TORQUE: 5 Nm ± 0.5 Nm**