

## Angulus<sup>2</sup>

*Angled Screwdriver*



*It's the head that counts – and the face. There is nothing with which we identify ourselves more than with the face. We are how we see ourselves. And more still: four of our five senses – sight, hearing, smell, and taste – are located in the head and the face.*

*Congenital facial deformities put individuals at a severe disadvantage not only in terms of outward appearance, but functionally too because severe loss of function is a frequent side-effect of such conditions. Of course, acquired defects can have similar consequences as well. Given the anatomical complexities of the cranial and facial structures, reconstruction and correction require a sort of specialization that fits into the broader context. But that's not all - because successful treatment wouldn't be possible without the availability of high-precision and reliable products.*

*KLS Martin is one of the globally leading suppliers in the field of craniomaxillofacial surgery. Our product portfolio offers you everything you need for advanced osteosynthesis and distraction. This implies that you get more than just standard products. We are always ready to develop patient-specific solutions wherever the need arises.*

## Table of Contents

	Pages
Feature, Function and Benefit	6 - 9
Step by Step to Optimal Care	10 - 19
Assembly	12 - 15
Surgical Technique	16 - 19
System Components	20 - 21
Storage	22
Recommended Set Configuration	23



## Angulus<sup>2</sup>

### Angled Screwdriver

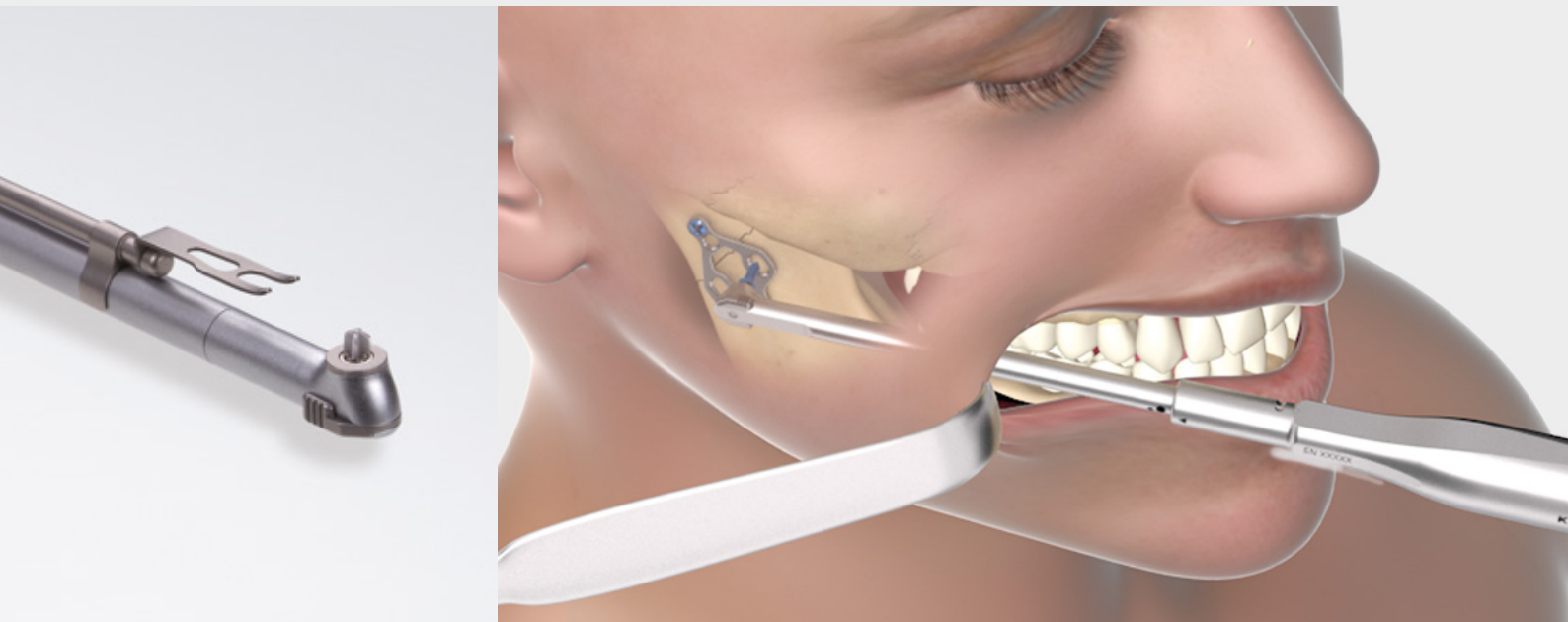
The angled screwdriver rounds off our product portfolio for transoral osteosynthesis in hard to reach regions of the jaw.

It is particularly well suited for osteosynthesis at the mandibular angle and ramus up to the condylar process.

Along with osteosynthesis plates and other instruments, especially developed for this indication, we provide complete one-stop solutions for this demanding anatomical region.



*Feature, Function*  
and Benefit

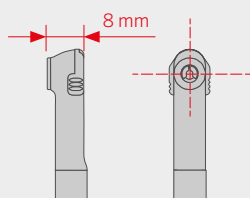


In osteosynthesis of the mandibular ramus and condyle transoral access has become ever more important. Miniaturized instruments especially developed for this indication are indispensable.

The angled screwdriver is a useful tool, allowing the surgeon to implant screws, plates, and distractors under the most constricted spatial conditions and without visible scarring.

## Angulus2

### New design



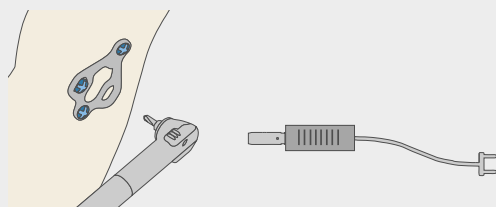
#### Feature

- Low profile (8 mm) head and slim shaft geometry
- Centered tool mount

#### Benefit

- Best view possible in site
- Perfect transmission of force without tool canting  
Suitable on both sides

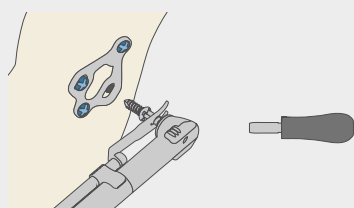
### Function



- Standardized INTRA coupling (ISO 3964)

- Suitable for numerous motor systems of various manufacturers

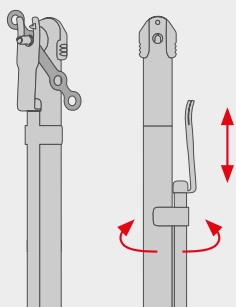
- For motor driven pre-drilling



- Gear ratio 1.75 : 1  
Universal coupling for turning handle

- For easier manual screw down

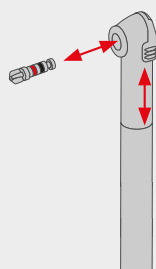
### Screw/implant holding device



- Optional adaptable holding device for screws up to 2.5 mm in diameter and corresponding plates or distractors

- Allows one-handed insertion of screws, plates, and distractors
- After use, the holding device can be pushed back and turned sideways, thus giving the best view possible in the site

### Tool change



- Quick release chuck

- Rapid intraoperative tool change in just two steps without additional measures

*Feature, Function*  
and Benefit

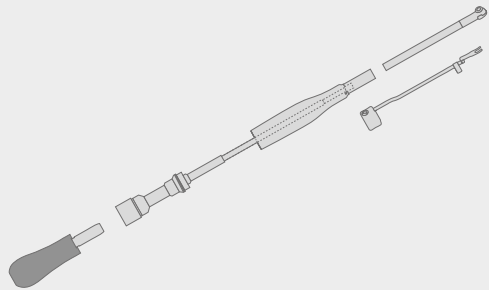


Specially configured storage trays help sustain the value of the angled screwdriver. They ensure clear and gentle storage and facilitate the appropriate sterilization of all system components.



## Angulus2

### Disassembly



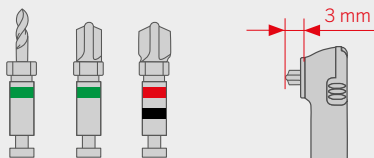
#### Feature

- Plug, screw and bayonet lock

#### Benefit

- Toolless disassembly in just a few steps
- Rapid delivery for postoperative processing Easy cleaning and disinfection

### Tools



- Low installed height

- Color coding

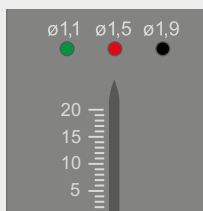
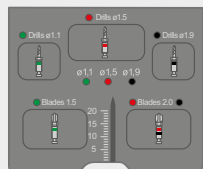
- Form-fit

- Good handling  
Best view possible in site

- Quick and safe selection of appropriate tool

- Secure tool grip in head of angled screwdriver

### Small parts storage



- Compact design

- Separate color coded compartments for twist drills and blades

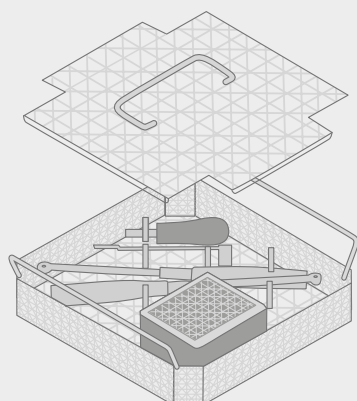
- Diameter and depth meter for twist drill

- Made for wire basket

- Clear tool storage

- Controlled tool selection and storage

### Wire basket



- Standard dimensions:  
L 255 x W 245 x H 50 mm

- Silicone and PPSU storage elements

- Lid

- Made for standardized half-size containers

- Clearly arranged storage for two angled screwdrivers, one turning handle, one screw holding device and small parts storage

- Protected against spilling

## *Step by Step* to Optimal Care

### *Use*

The angled screwdriver Angulus 2 is suited for transoral osteosynthesis at the mandibular body and ramus.





## *Handling and Surgical Technique*

### Assembly

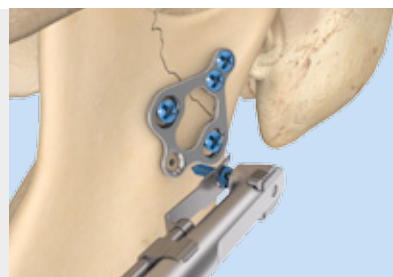
*Pages 12-15*

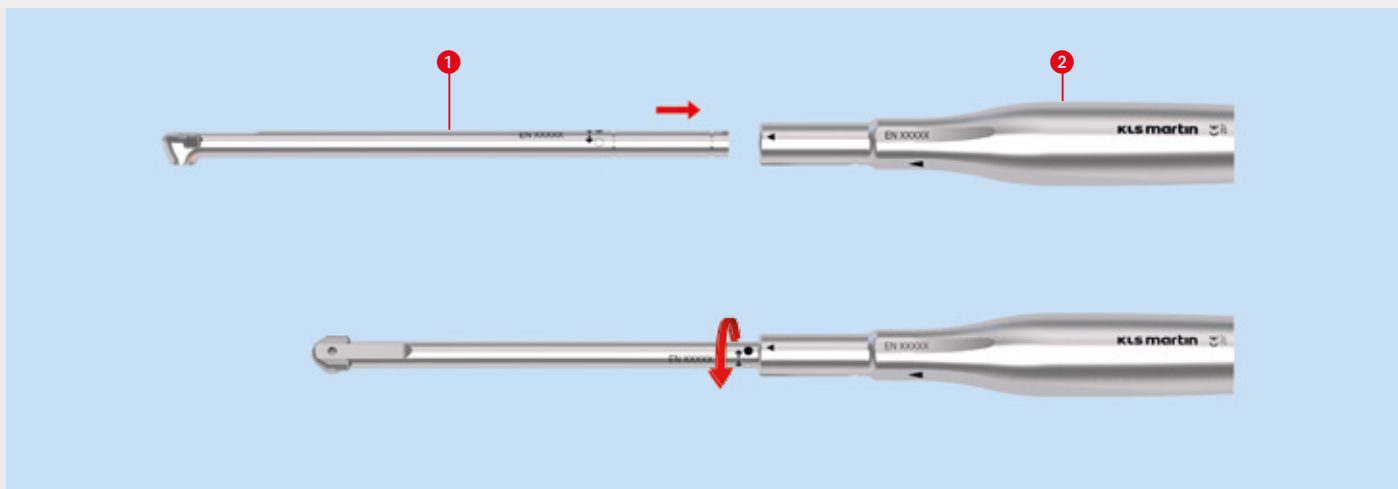


### Surgical Technique

*Exemplified by implantation of a  
"Rhombic" 3D Condylar Plate*

*Pages 16-19*





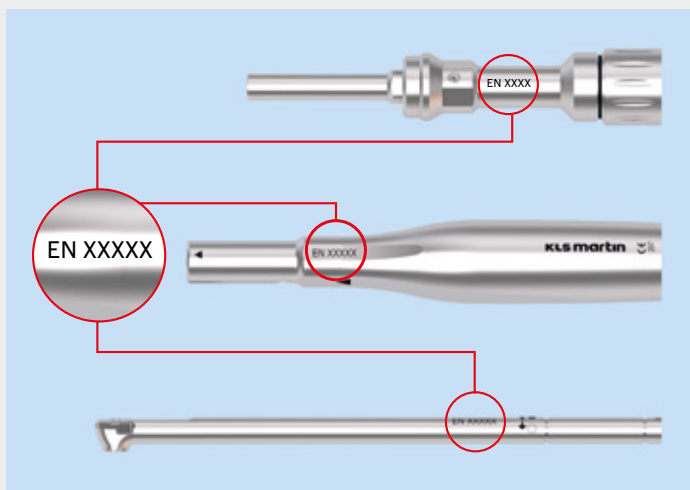
### 1. Inserting the head

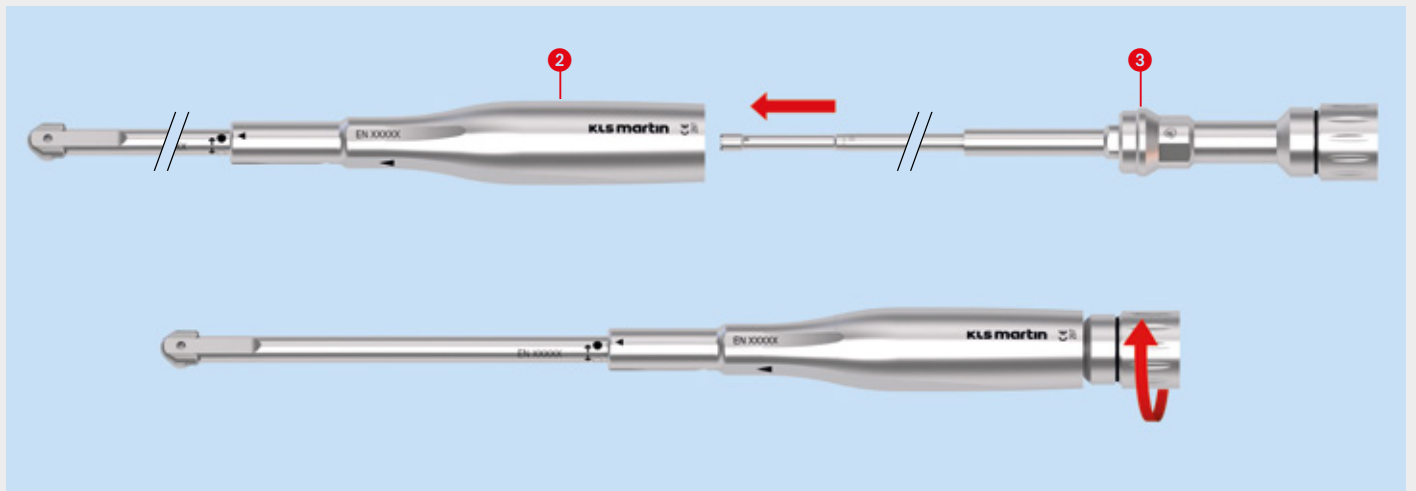
Slide the head ① into the sheath ② until fully seated.

Observe the icons and twist from ○ “open” to ● “locked”.

*Note:*

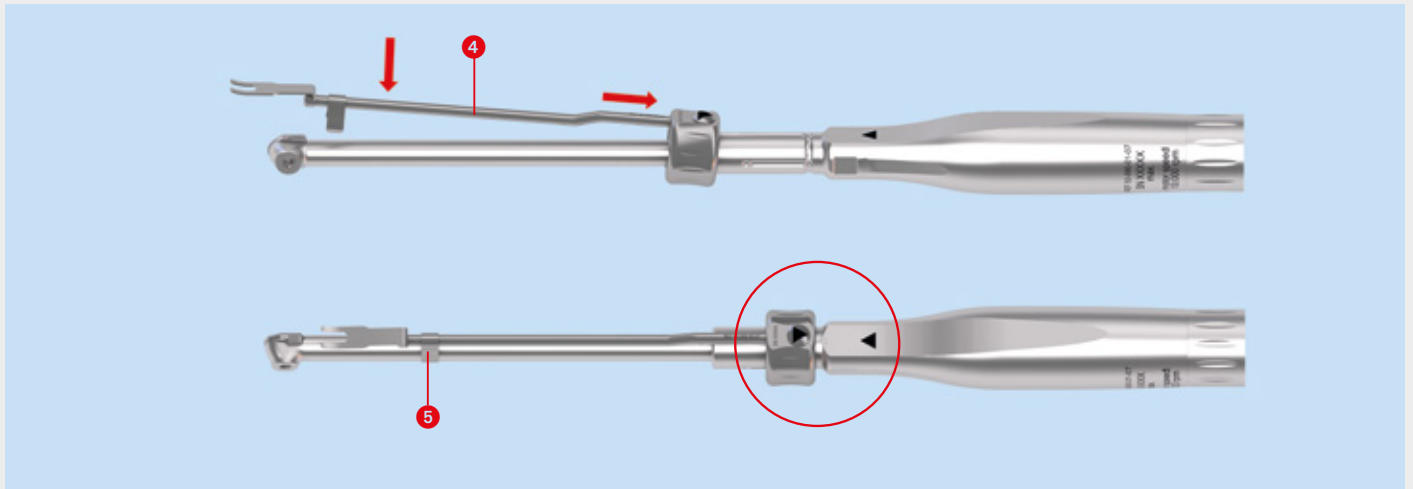
*During assembly verify that the EN (serial numbers) of the components match. Especially when using several angled screwdrivers.*





## *2. Mounting the shaft*

Slide the shaft ③ into the sheath ② and tighten in clockwise direction.

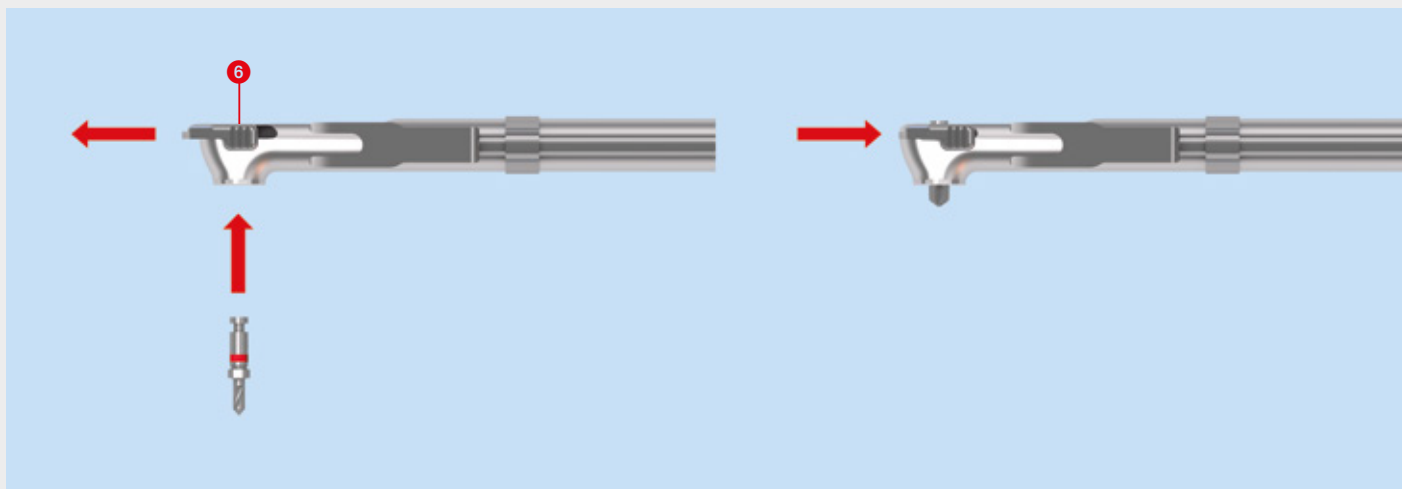


### *3. Attaching screw/implant holding device*

Slide the screw holding device ④ over the sheath until it engages with an audible click.

Check the position and click-fit the clip ⑤ of the screw holding device





#### 4. Clamping and unclamping the tool

All the twist drills or corresponding screwdriver blades listed on page 21 can be used with the angled screwdriver. After opening the tension clamp 6, the desired tool can be inserted and then locked securely by pushing back into the initial position.

After the tool has been inserted, the appropriate drive is attached:

- Twist drills: automatic (motor)
- Screws: manual (turning handle)

The tool is removed by opening the tension clamp as described above.

*Tip:*

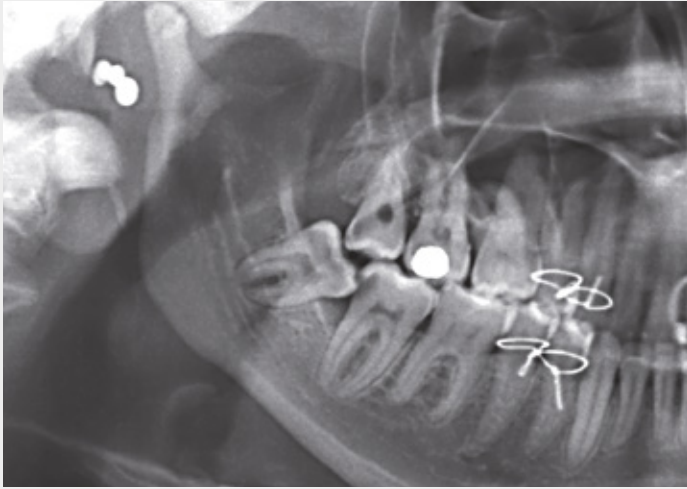
*Using a second Angulus 2 allows rapid intraoperative changeover between pre-drilling and screw insertion.*



Angulus2  
with motor drive



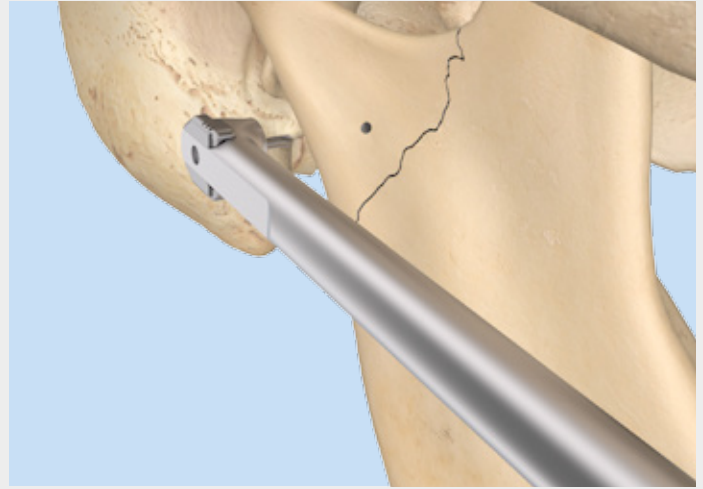
Angulus2 with turning handle  
and screw holding device



Source: Prof. Dr. Dr. Günter Lauer, University Clinic Dresden

### *Preoperative planning*

The x-ray shows a typical medially dislocated condylar process fracture, Spiessl and Schroll type II.



### *1. Predrilling*

As condylar process fractures are nearly always dislocated, the surgeon will generally first place the osteosynthesis screw which is closest to the fracture gap of the fractured condyle and therefore easy to access. For pre-drilling, mount the angled screwdriver on the motor and pre-drill with a maximum motor speed of 4,375 rpm.

#### *Note:*

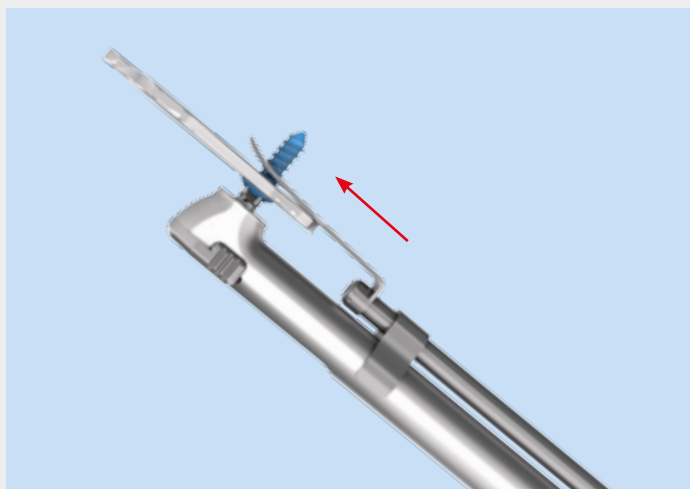
Since the angled screwdriver has a gear ratio of 1.75:1, the motor speed of 4,375 rpm results in a speed of 2,500 rpm for the drill bit.



Angulus2  
with motor drive

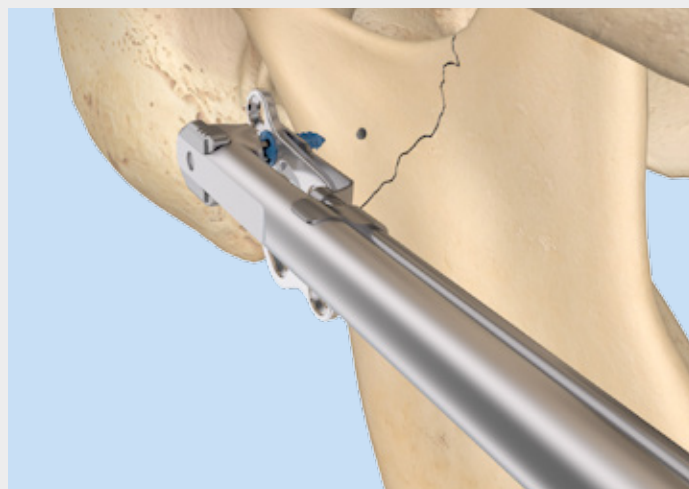


Twist drill  
for Angulus2



## 2. Clamping screw and plate

Pick up the screw and clip the corresponding plate hole into the screw. Then push the screw holding device, which can optionally also be used as plate holding device, forward to fixate the implants.



## 3. Insertion of the implants

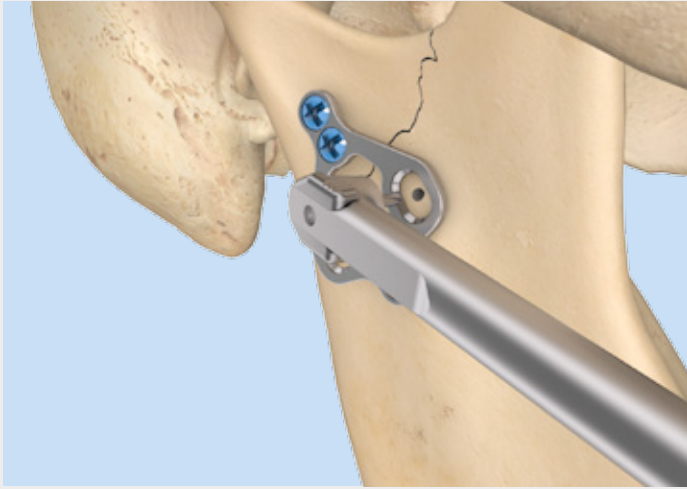
To implant the first screw, the turning handle is first attached to the angled screwdriver. Once the screw has found purchase in the bone, the screw and plate holding device is retracted. Then the implants can be pre-fixedated.



Angulus2 with turning handle  
and screw holding device



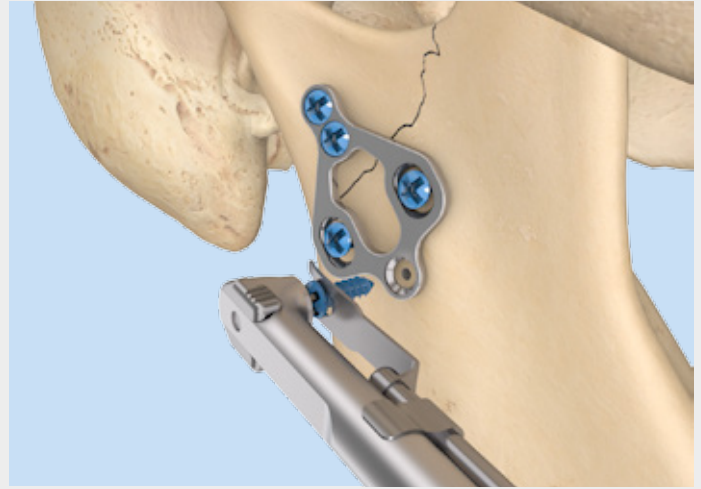
Screwdriver blade  
for Angulus2



#### 4. Pre-drilling of additional screw holes

To achieve the desired fracture position, the drill holes in the gliding holes of the plate are set as caudally as possible.

Once the surgeon has convinced himself/herself of the correct anatomical position of the condyle or the cranial fragment, then this position can be secured successively with further screws in the caudal, intact region of the jaw. Due to the special gliding hole geometry of the plate, there are still 2.5 mm of glide path available for any further corrections if necessary. After setting the desired fracture reduction, the screws are tightened firmly in the gliding holes.



#### 5. Placement of the final screw

The final osteosynthesis screw is placed as soon as the fracture has been sufficiently repositioned. This screw cancels the gliding hole effect.



Angulus2  
with motor drive



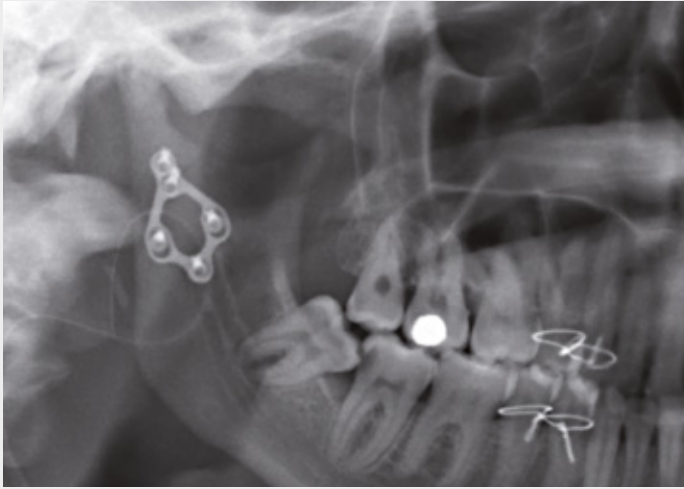
Twist drill  
for Angulus2



Angulus2 with turning handle  
and screw holding device



Screwdriver blade  
for Angulus2



Source: Prof. Dr. Dr. Günter Lauer, University Clinic Dresden

### *Postoperative control*

The postoperative x-ray shows the repositioned condyle process and the correct position of the “Rhombic” 3D condylar plate which was implanted safely and effectively using the Angulus2.

## *Angled Screwdriver* **Angulus2** System components



1/2

50-990-00-07  
*Angled screwdriver, complete*  
with turning handle and screw holding device

St 1



1/2

50-990-01-07  
*Angled screwdriver*  
without turning handle and screw holding device

St 1



1/2

50-990-05-07  
*Turning handle*  
(spare part)

St 1



1/2









50-990-06-07  
*Screw holding device*  
(spare part)

St 1




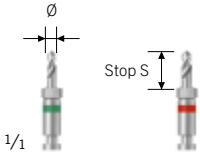








#### Explanation of icons

-  St Stainless steel
-  Attachment Angulus WSD
-  1 Packaging unit
-  maxDrive®
-  Centre Drive®
-  Cross Drive
-  Ø 1.5 mm
-  Ø 2.0 mm
-  Ø 2.3 mm

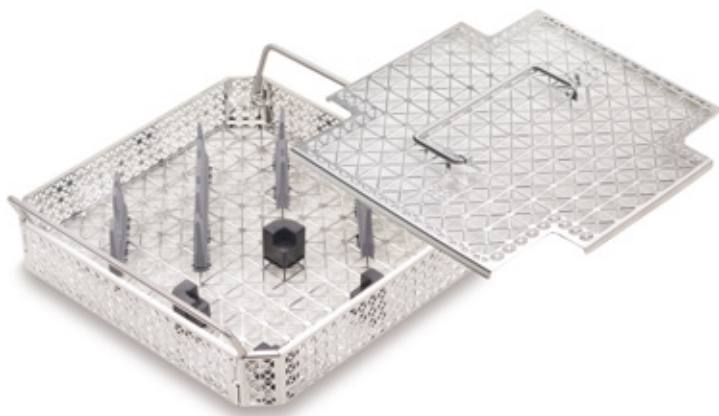
### Twist Drills

  				Ø	S	Item no.
				1.1 mm	5 mm	50-995-05-07
				1.1 mm	7 mm	50-995-07-07
				1.1 mm	17 mm	50-995-17-07
				1.5 mm	5 mm	50-996-05-07
				1.5 mm	7 mm	50-996-07-07
				1.5 mm	9 mm	50-996-09-07
				1.5 mm	11 mm	50-996-11-07
				1.5 mm	13 mm	50-996-13-07
				1.5 mm	15 mm	50-996-15-07
				1.5 mm	17 mm	50-996-17-07
				1.9 mm	5 mm	50-997-05-07
				1.9 mm	7 mm	50-997-07-07
				1.9 mm	19 mm	50-997-19-07

### Screwdriver Blades

  				for screws	Item no.
				Ø 1.5 mm	
				maxDrive®	50-991-15-07
				Centre Drive®	50-992-15-07
				Cross Drive	50-993-15-07
				Ø 2.0/2.3 mm	
				maxDrive®	50-991-20-07
				Centre Drive®	50-992-20-07
				Cross Drive	50-993-20-07

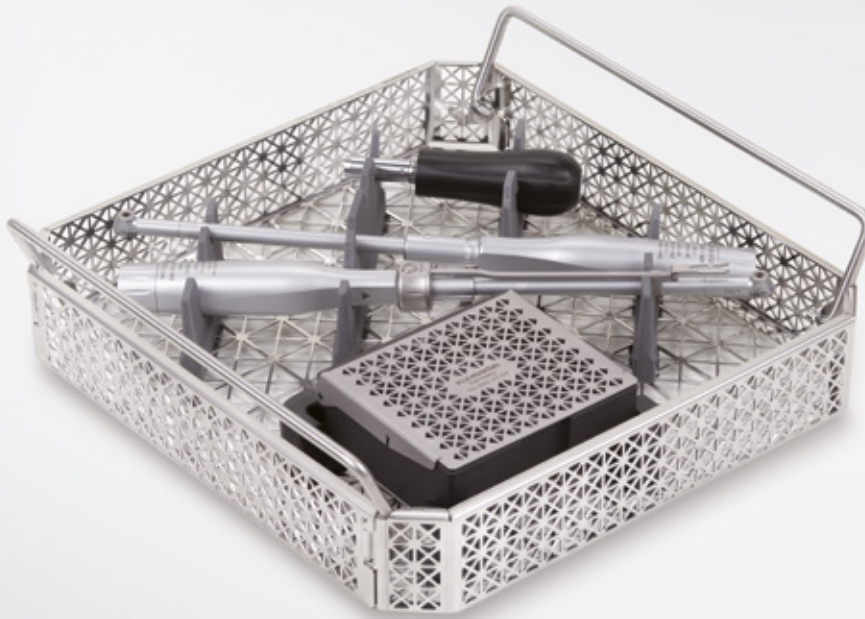
## *Angled Screwdriver* **Angulus2** Storage



50-990-40-04  
*Wire basket for angled  
screwdriver Angulus2*  
including lid and holding elements  
(without contents)



50-990-41-04  
*Small parts storage*  
for twist drills and screwdriver blades  
(without contents)



## Angulus2

### Recommended set configuration\*

(\* for use with maxDrive® screws 1.5 mm and 2.0 mm)

Angled screwdriver		
50-990-00-07	Angled screwdriver Angulus2, complete	1 unit
50-990-01-07	Angled screwdriver Angulus2, only	1 unit
Twist drill for screws Ø 1.5 mm		
50-995-05-07	Twist drill for Angulus2 WSD, 1.1 x 5 mm	2 units
50-995-07-07	Twist drill for Angulus2 WSD, 1.1 x 7 mm	2 units
50-995-17-07	Twist drill for Angulus2 WSD, 1.1 x 17 mm	1 unit
Twist drill for screws Ø 2.0 mm		
50-996-05-07	Twist drill for Angulus2 WSD, 1.5 x 5 mm	4 units
50-996-07-07	Twist drill for Angulus2 WSD, 1.5 x 7 mm	4 units
50-996-09-07	Twist drill for Angulus2 WSD, 1.5 x 9 mm	2 units
50-996-13-07	Twist drill for Angulus2 WSD, 1.5 x 13 mm	1 unit
50-996-17-07	Twist drill for Angulus2 WSD, 1.5 x 17 mm	1 unit
Screwdriver blades		
50-991-15-07	Screwdriver blade maxDrive® 1.5 for Angulus2 WSD	2 units
50-991-20-07	Screwdriver blade maxDrive® 2.0 for Angulus2 WSD	2 units
Storage		
50-990-41-04	Small parts storage for Angulus2 WSD	1 unit
50-990-40-04	Wire basket for Angulus2 WSD	1 unit

## KLS Martin Group

**KLS Martin France SARL**  
68200 Mulhouse · France  
Tel. +33 3 8951 3150  
france@klsmartin.com

**KLS Martin UK Ltd.**  
Reading RG1 3EU · United Kingdom  
Tel. +44 1189 000 570  
uk@klsmartin.com

**KLS Martin do Brasil Ltda.**  
CEP 04.531-011 São Paulo · Brazil  
Tel.: +55 11 3554 2299  
brazil@klsmartin.com

**Gebrüder Martin GmbH & Co. KG**  
Representative Office  
121471 Moscow · Russia  
Tel. +7 499 792-76-19  
russia@klsmartin.com

**Martin Italia S.r.l.**  
20864 Agrate Brianza (MB) · Italy  
Tel. +39 039 605 67 31  
italia@klsmartin.com

**Nippon Martin K.K.**  
Tokyo 113-0024 · Japan  
Tel. +81 3 3814 1431  
nippon@klsmartin.com

**KLS Martin Australia Pty Limited**  
Artarmon NSW 2064 · Australia  
Tel.: +61 2 9439 5316  
australia@klsmartin.com

**Gebrüder Martin GmbH & Co. KG**  
Representative Office  
201203 Shanghai · China  
Tel. +86 21 5820 6251  
china@klsmartin.com

**Martin Nederland/Marned B.V.**  
1270 AG Huizen · The Netherlands  
Tel. +31 35 523 45 38  
nederland@klsmartin.com

**KLS Martin L.P.**  
Jacksonville, FL 32246 · USA  
Tel. +1 904 641 77 46  
usa@klsmartin.com

**KLS Martin SE Asia Sdn. Bhd.**  
14100 Simpang Ampat, Penang · Malaysia  
Tel.: +604 505 7838  
malaysia@klsmartin.com

**Gebrüder Martin GmbH & Co. KG**  
Representative Office  
Dubai · United Arab Emirates  
Tel. +971 4 454 16 55  
middleeast@klsmartin.com

**Gebrüder Martin GmbH & Co. KG**  
A company of the KLS Martin Group  
KLS Martin Platz 1 · 78532 Tuttlingen · Germany  
Postfach 60 · 78501 Tuttlingen · Germany  
Tel. +49 7461 706-0 · Fax +49 7461 706-193  
info@klsmartin.com · www.klsmartin.com