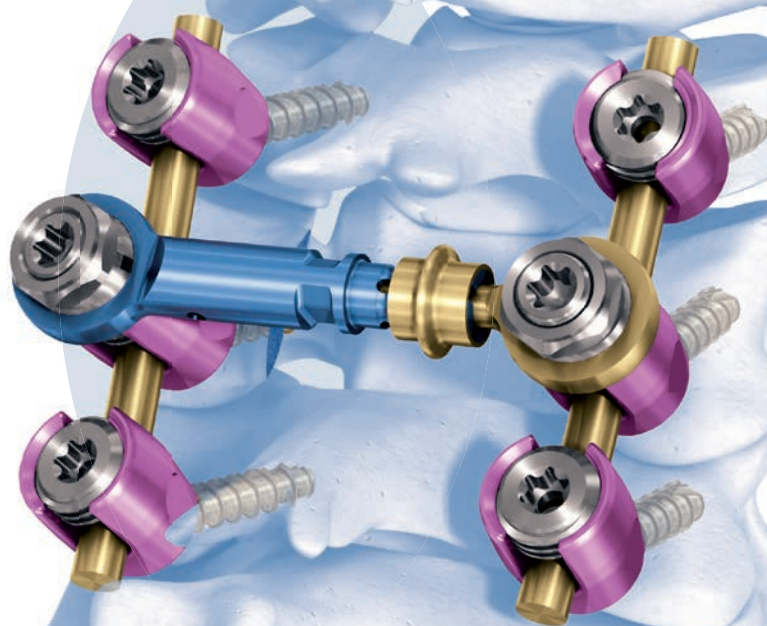


# SYNAPSE SYSTEM

An enhanced set of implants and instruments for posterior stabilization of the cervical and upper thoracic spine



Instruments and implants approved by the AO Foundation.  
This publication is not intended for distribution in the USA.

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## SURGICAL TECHNIQUE

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 Image intensifier control

**Warning**

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

**Processing, Reprocessing, Care and Maintenance**

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

<http://emea.depuyshnthes.com/hcp/reprocessing-care-maintenance>

For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes non-sterile implants, please consult the Important Information leaflet (SE\_023827) or refer to:

<http://emea.depuyshnthes.com/hcp/reprocessing-care-maintenance>

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# SYNAPSE SYSTEM

## AN ENHANCED SET OF IMPLANTS AND INSTRUMENTS FOR POSTERIOR STABILIZATION OF THE CERVICAL AND UPPER THORACIC SPINE

The Synapse System is an enhanced set of instruments and implants, including clamps, top-loading variable axis screws, hooks, transverse connectors and transverse bars and rods, designed for posterior stabilization of the cervical and upper thoracic spine.

The implants provide flexibility required to accommodate variations in patient anatomy.

The Synapse System uses 3.5 mm and 4.0 mm rods, allowing components from Axon and Occipito-Cervical Fusion System to be used interchangeably. This allows the construct to extend from the occiput to the lower spine using the Occipito-Cervical Fusion System and the Universal Spine System (USS), Matrix Spine System – Degenerative, or any other Synthes posterior rod-screw system.

### System features

- 3.5 mm and 4.0 mm titanium\* rods
- Top-loading lamina hooks
- Simple, efficient instrumentation
- Multiple implant options for crossing the cervicothoracic junction
- Fully compatible with the Occipito-Cervical Fusion System
- Square-threaded locking screws
- Robust polyaxial screws
- Top-loading transverse connectors

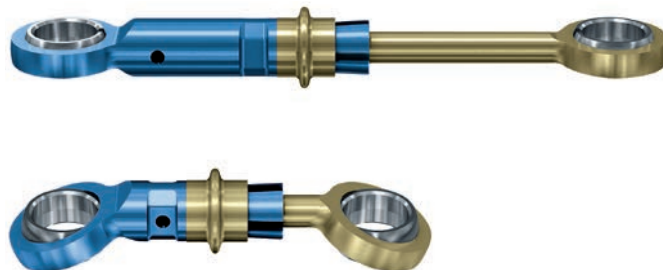


\* Titanium – 6% Aluminium – 7% Niobium Alloy (TAN)

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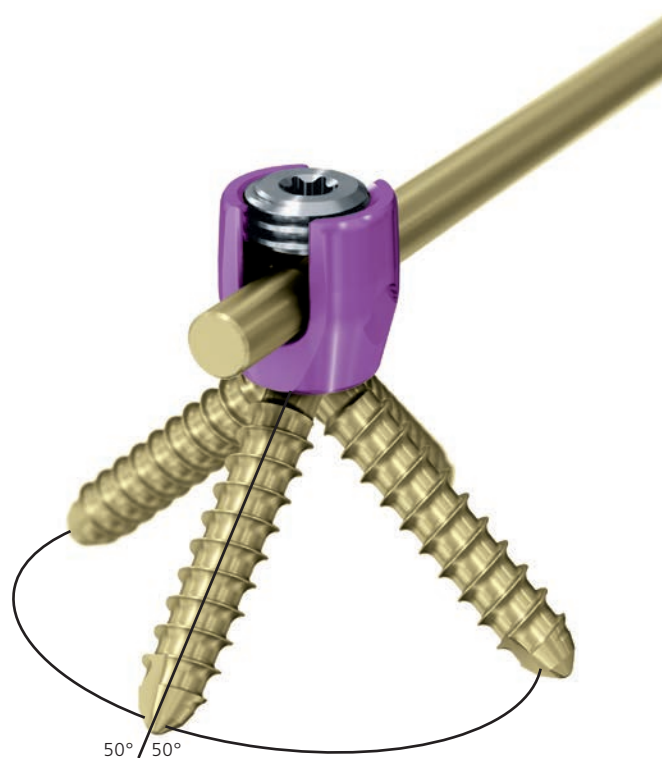
**Top-loading Transverse Connectors**

- Head to head connection for increased stability
- Adjustable connector available in four variable lengths to accommodate different patient anatomy
- Assemble on the head of Synapse polyaxial screw
- Straight and angled versions offer enhanced flexibility options



## ROBUST POLYAXIAL SCREWS

- Top loading
- 4.0 Screws accommodate  $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm rods
- One piece body
- Self-tapping
- Three diameters with cancellous profile:
  - $\varnothing$  3.5 mm
  - $\varnothing$  4.0 mm (rescue screw)
  - $\varnothing$  4.5 mm
- $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm cancellous screws offer up to 50° angulation ( $\varnothing$  4.5 mm screws offer up to 40° angulation)



### Shaft screw

- Lengths from 18 mm–50 mm\* with a 10 mm unthreaded shaft (2 mm increments)
- Self-tapping
- Shaft screws with cortical profile
- Offers 40° angulation in all directions

The threaded driver eliminates driver “sticking” in the bone screw



\* Screw length is total length.

**Synapse is fully compatible with the Occipito-Cervical Fusion System for posterior occipito-cervical fixations**

The Synthes Occipito-Cervical Fusion System is intended to provide stabilization and promote fusion of the occipito-cervical junction. It includes a complete set of implants and instruments designed to optimize fixation to the occiput and easily connect to all Synthes posterior cervical and thoracic rod-screw systems.

**Versatile fixation possibilities to the occiput**

The Occipito-Cervical Fusion System offers several implant options to maximize fixation to the occiput and minimize the implant footprint.

For further information see Surgical Technique "Occipito-Cervical Fusion System" (036.000.755).



**Occipital plates for Ø 3.5 mm rods**



**Occipital plates for Ø 4.0 mm rods**



# AO PRINCIPLES

---

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.<sup>1</sup> These are:

- Anatomical alignment
- Stable internal fixation
- Preservation of blood supply
- Early, active mobilization

The fundamental aims of fracture treatment in the limbs and fusion of the spine are the same. A specific goal in the spine is returning as much function as possible to the injured neural elements.<sup>2</sup>

## **AO Principles as Applied to the Spine<sup>3</sup>**

### **Anatomical alignment**

In the spine, this means reestablishing and maintaining the natural curvature and the protective function of the spine. By regaining this natural anatomy, the biomechanics of the spine can be improved and a reduction of pain may be experienced.

### **Stable internal fixation**

In the spine, the goal of internal fixation is to maintain not only the integrity of a mobile segment, but also to maintain the balance and the physiologic three-dimensional form of the spine.<sup>3</sup> A stable spinal segment allows bony fusion at the junction of the lamina and pedicle.

### **Preservation of blood supply**

The proper atraumatic technique enables minimal retraction or disturbance of the nerve roots and dura, and maintains the stability of the facet joints. The ideal surgical technique and implant design minimize damage to anatomical structures, i.e. facet capsules and soft tissue attachments remain intact, and create a physiological environment that facilitates healing.

### **Early, active mobilization**

The ability to restore normal spinal anatomy may permit the immediate reduction of pain, resulting in a more active, functional patient. The reduction in pain and improved function can result when a stable spine is achieved.

---

<sup>1</sup> Müller ME, Allgöwer M, Schneider R, Willenegger H (1995) Manual of Internal Fixation. 3rd, exp. a. completely rev. ed. 1991. Corr. 3rd printing. Berlin, Heidelberg, New York: Springer

<sup>2</sup> Ibid

<sup>3</sup> Aebi M, Arlet V, Webb JK (2007) AOSPINE Manual (2 vols), Stuttgart, New York: Thieme



# INDICATIONS AND CONTRAINDICATIONS

---

The Synapse System is an enhanced set of instruments and implants, including:

- Top-loading variable axis screws
- Hooks
- Transverse bars
- Rods

It is designed for posterior stabilization of the cervical spine and upper thoracic spine. The implants provide the flexibility required to accommodate variations in patient anatomy.

## **Indications**

Instabilities in the upper cervical spine and in the occipito-cervical region:

- Rheumatoid arthritis
- Congenital anomalies
- Posttraumatic conditions
- Tumors
- Infections

Instabilities in the lower cervical and upper thoracic spine:

- Posttraumatic conditions
- Tumors
- Iatrogenic instabilities following laminectomy etc.

Degenerative and painful posttraumatic conditions in the lower cervical and upper thoracic spine.

Anterior cervical fusions requiring additional posterior stabilization.

## **Contraindications**

- Spinal destruction accompanied by a loss of ventral support (caused by tumors, fractures and infections) results in major instability of the cervical spine and upper thoracic spine. In this situation, stabilization with Synapse is not sufficient. Additional anterior stabilization is crucial.
- Severe osteoporosis.

# PREPARATION

---

## 1

### Preparation

---

#### Required set

---

01.614.022	Synapse System 3.5 in Vario Case
------------	----------------------------------

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#### Optional sets

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01.615.022	Synapse System 4.0, in Vario Case
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01.601.022	Occipito-cervical Fusion System 3.5, in Vario Case
------------	---

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01.601.026	Occipito-cervical Fusion System 4.0, in Vario Case
------------	---

---

**Note:** Rods for the Synapse System are available in  $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm.

Where  $\varnothing$  4.0 mm rods are used, these must be combined with Synapse 4.0 screws/OC-Fusion 4.0 plates/clamps and the Synapse/Occipito-Cervical Fusion 4.0 Instrument set listed above.

---

## 2

### Preoperative planning

All necessary imaging studies should be available to plan implant placement and visualize individual patient anatomy.

---

## 3

### Position patient

Patient positioning is critical for cervical posterior fusion procedures. The patient should be placed on the operating table in the prone position with the patient's head securely immobilized. Proper patient position should be confirmed via direct visualization prior to draping and by radiograph.

Always use caution when positioning the patient, as physiologic alignment may not be attainable.

---

## 4

### Approach

Use the standard surgical approach to expose the spinous processes and laminae of the vertebrae to be fused.

---

## 5

### Assemble instruments

The following instruments have to be assembled prior to use:

- Screwdriver
- Rod introduction instrument
- Drill sleeve
- Depth gauge
- Top Loading Implant Remover

Assemble instruments according to the assembling instructions found on pages 57–63, or refer to [www.synthes.com/reprocessing](http://www.synthes.com/reprocessing).



# SURGICAL TECHNIQUE

## 1

### Start screw hole

---

#### Instrument

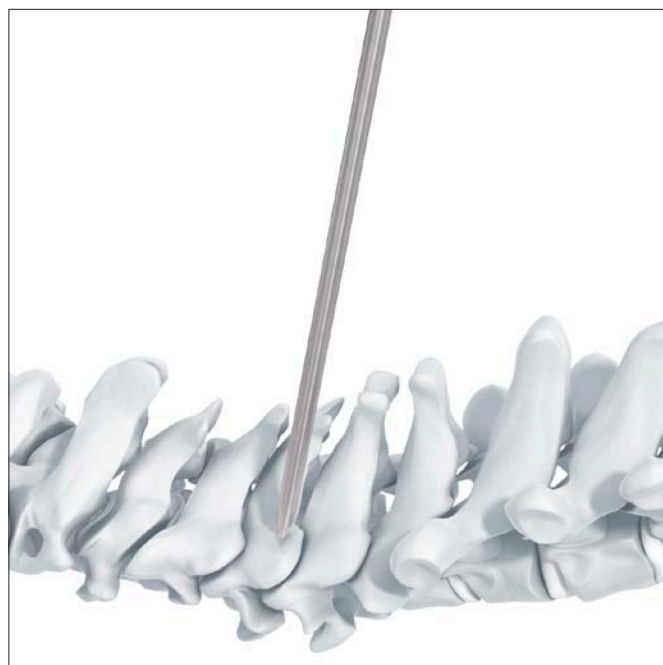
---

388.397      Awl Ø 3.5 mm, length 179.5 mm

---

Determine the entry point and trajectory for the screw and use the awl to create a pilot hole. This helps to prevent displacement of the drill bit during initial insertion.

- ① Confirm screw entry point, orientation and depth.



---

## 2

### Select screw and drill sleeve

---

#### Instrument

---

388.393	Drill Sleeve with Scale, for Drill Bit Ø 2.4 mm No. 388.394
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---

or

---

03.614.011	Drill Sleeve with Scale, for Drill Bits Ø 3.2 mm No. 03.614.010
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---

Select the drill bit and drill sleeve that correspond to the screw diameter to be used. Ø 3.5 mm and Ø 4.0 mm screws have the same core diameter (2.4 mm) and are to be used with the same drill bit and drill sleeve, identified by a yellow band. Ø 4.5 mm screws have a larger core diameter (3.2 mm) and are to be used with the drill bit and drill sleeve identified by a light blue color band. See table below.

---

<b>Screw diameter</b>	<b>3.5 mm</b>	<b>4.0 mm</b>	<b>4.5 mm</b>
Drill bit	388.394	388.394	03.614.010
Drill sleeve	388.393	388.393	03.614.011

---

**3****Set drill sleeve depth****Instrument**

---

388.393      Drill Sleeve with Scale, for Drill Bit  
Ø 2.4 mm No. 388.394

---

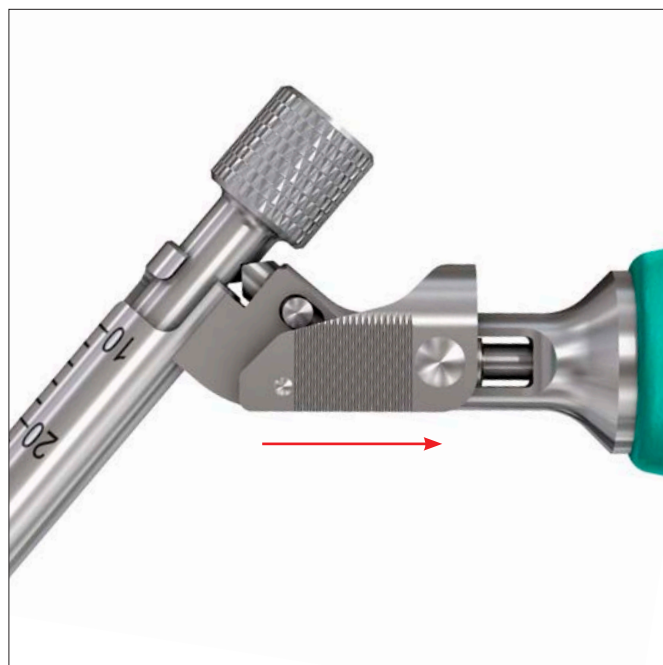
or

---

03.614.011      Drill Sleeve with Scale, for Drill Bits  
Ø 3.2 mm No. 03.614.010

---

To set the drill sleeve to the desired depth, slide back the latch to release the inner tube; align the distal end of the internal drill sleeve tube with the appropriate depth calibration on the window. Release the latch to lock the drill sleeve at the desired depth.



## 4

### Drill hole

---

#### Instruments

---

388.393	Drill Sleeve with Scale, for Drill Bit Ø 2.4 mm No. 388.394
388.394	Drill Bit Ø 2.4 mm with Stop, 2-flute, for Quick Coupling
388.549	Feeler, straight, with rounded tip

---

Drill to the desired trajectory and depth, using the Ø 2.4 mm drill bit and drill sleeve. Use the feeler to confirm, by palpation, accurate placement within the pedicle or lateral mass.

**Note:** Perform drilling in steps until the appropriate depth is reached. Confirm screw entry point, orientation and depth.

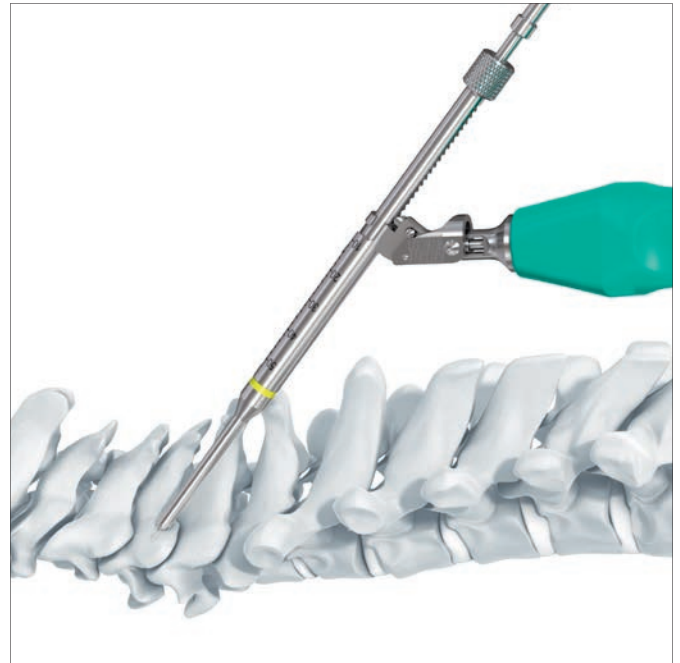
---

#### Alternative instruments

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03.614.010	Drill Bit Ø 3.2 mm with Stop, 2-flute, for Quick Coupling
03.614.011	Drill Sleeve with Scale, for Drill Bits Ø 3.2 mm No. 03.614.010

---



### Alternative technique

#### Instruments

03.614.012 Pedicle Probe Ø 2.4 mm, straight

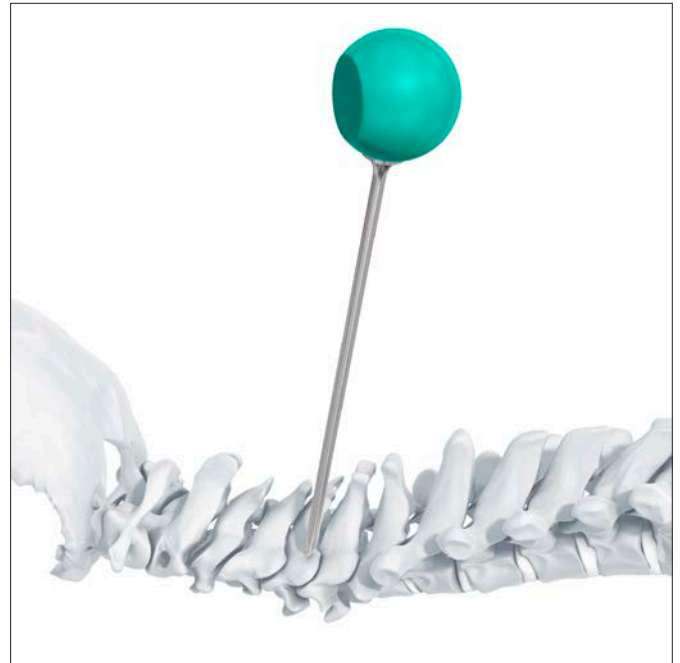
03.614.013 Pedicle Probe Ø 2.4 mm, curved

or

03.614.037 Pedicle Probe Ø 3.2 mm,  
length 220 mm

03.614.038 Pedicle Probe Ø 3.2 mm, curved,  
length 220 mm

Pedicle preparation may also be performed using either the straight or curved pedicle probe.



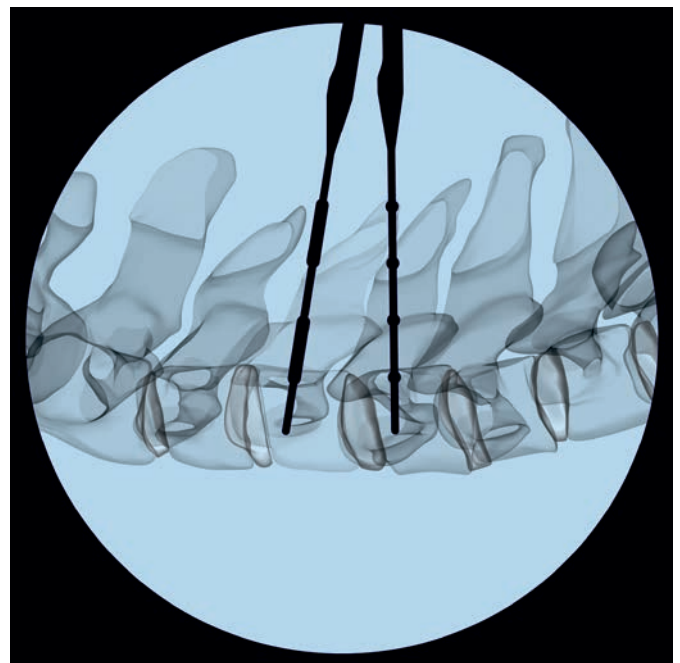
### Optional technique

#### Instruments

389.473 Pedicle Marker, small, with short markings

389.474 Pedicle Marker, small, with long markings

- ⓘ The small pedicle markers may be used to radiographically confirm position and orientation of screw sites.





## 5 Measure

---

### Instrument

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03.161.028	Depth Gauge for Screws $\varnothing$ 3.5 to 5.0 mm, measuring range up to 50 mm
------------	---

---

Use the depth gauge to confirm hole depth and select the corresponding screw length. The depth gauge reading and the screw length indicate actual bone purchase. The depth gauge must sit directly on the bone.



## 6 Tapping (optional)

---

### Instruments

---

03.614.015	Tap for Cancellous Bone Screws $\varnothing$ 4.5 mm, for Quick Coupling
03.614.016	Guide Sleeve for Tap $\varnothing$ 3.5 mm and $\varnothing$ 4.5 mm
311.349	Tap for Cancellous Bone Screws $\varnothing$ 3.5 mm, for Quick Coupling
389.477	Tap for Cortex Screw $\varnothing$ 3.5 mm, length 185 mm, for Quick Coupling
324.107	Handle with Quick Coupling

---

Dense bone may be tapped using the appropriate tap, depending on the chosen screw.

The guide sleeve may be used as a tissue protector, and to indicate tap depth.



**7****Insert screw****Instruments**

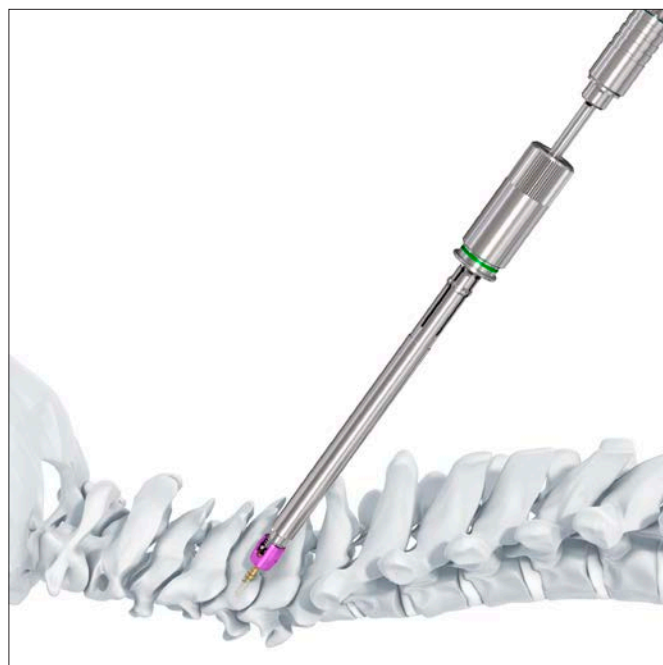
03.614.017	Holding Sleeve with thread
03.614.036	Outer Sleeve for Holding Sleeve No. 03.614.017
03.614.039	Hexagonal Screwdriver Shaft, cross pinned, for Quick Coupling
324.107	Handle with Quick Coupling

**Optional Instruments**

03.688.505	Handle with Ratchet Wrench for Quick Coupling, small
03.614.041	T-Handle with Ratchet Wrench, for Quick Coupling

Refer to pages 57–58 for screwdriver assembly and implant attachment instructions. Insert the selected  $\varnothing$  3.5 mm or  $\varnothing$  4.5 mm self-tapping Synapse screw. A  $\varnothing$  4.0 mm emergency screw may be used if the primary  $\varnothing$  3.5 mm screw has less than optimal fixation.

**Note:** The outer sleeve should be used to grip the holding sleeve during screw insertion.



## 8

### Place additional screws

Use the same technique to insert the remaining screws.



## 9

### Contour template

---

#### Instrument

---

388.868      Trial Rod  $\varnothing$  3.5 mm

---

Contour the trial rod to fit the anatomy.



**10****Bend and cut rod****Instruments**

03.614.021	Cutting Pliers for Rods
03.614.022	Bending Pliers for Rods Ø 3.5 mm and Plates 3.5

**Optional instrument**

03.615.011	Rod Shearer for Rods Ø 4.0 mm
------------	-------------------------------

Use the bending pliers to contour the rod to match the curve of the template. The bend line arrow indicates where the rod will be bent.

Use the cutting pliers to cut the rod to the appropriate length.

**Alternative technique**

Shorter rod sections may be bent by placing one end of the rod on the internal ledge of the bending feature.

**Alternative bending technique****Instruments**

03.614.024	Bending Iron for Rods Ø 3.5 mm, left
03.614.025	Bending Iron for Rods Ø 3.5 mm, right

The bending irons can be used for both Ø 3.5 mm and Ø 4.0 mm rods. The bending irons can also be used as pipe rod benders. Insert the rod into the rear of each bending iron and lock in place by turning the thumb-wheels clockwise. With both ends locked inside the irons, the rod may be contoured.

**Warning: Repeated or reverse bending may weaken the rod.**



## 11

### Insert rod

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#### Instrument

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388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
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#### Optional instrument

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03.614.034	Alignment Tool
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Insert the rod into the variable axis heads of the screws using the holding forceps. The holding forceps can be used for both Ø 3.5 mm and Ø 4.0 mm rods. The alignment tool may be used to help orient the heads to the correct position. The bending irons may be used to adjust the curve of the rod.



## 12

### Insert locking screw

---

#### Instruments

---

03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
03.614.035	Handle with Torque Limiter, 2.0 Nm, with Quick Coupling

---

Loosely fasten the locking screws using the screwdriver shaft with the 2 Nm torque limiting handle. When inserting the locking screws, they may be turned one-quarter to one-half turn counterclockwise to seat the thread before tightening.

**Note:** If intending on inserting a transverse connector for head-to-head connection, the Locking Screw for Transverse Connectors and Cap Nut 7.5 mm must be used as described in the section titled Additional Technique – Transverse Connector (Head to Head).



---

## Alternative technique

---

### Instrument

---

03.614.027 Rod Introduction Instrument

---

### Optional instruments

---

03.615.042 Handle for Rod Introduction Instrument with Speed Nut

---

03.614.026 Rod Pusher

---

03.615.009 Rod Introduction Instrument  $\varnothing$  4.0 mm

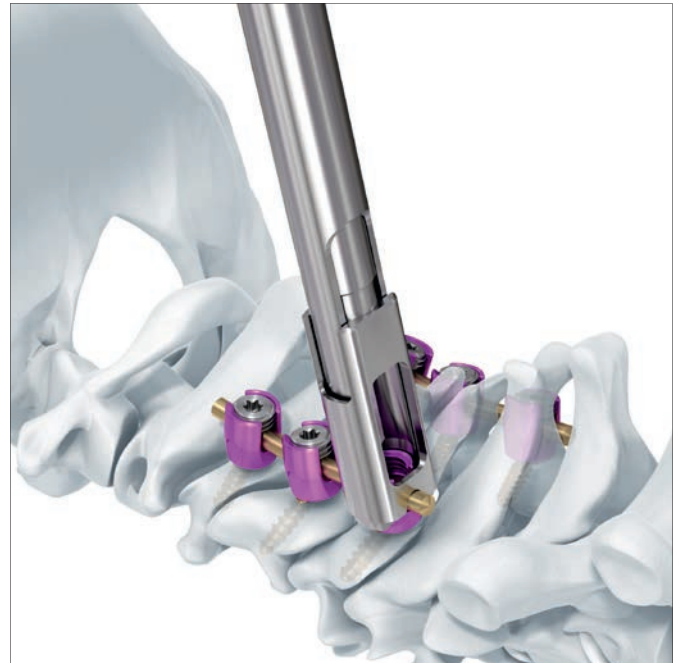
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03.615.010 Rod Pusher for Rods  $\varnothing$  4.0 mm

---

Use the rod introduction instrument or rod pusher to introduce the rod into the variable axis head of the screws. Place the instrument over the rod and onto the variable axis head until the tip of the instrument sits below the screw head reduction feature. Squeeze the handle to engage the instrument and introduce the rod into the head of the screw. Loosely fasten the locking screws using the screwdriver shaft with the 2 Nm torque limiting handle through the cannulation of the rod introduction instrument. When inserting the locking screws, they may be turned one-quarter to one-half turn counterclockwise to seat the thread before tightening.

Alternatively, when using the handle for rod introduction instrument with speednut, squeeze the handle to engage the instrument and introduce the rod into the head of the screw. Thread the speednut down to lock the instrument into the reduced position.



## 13

### Optional technique A: Rod Rotation

---

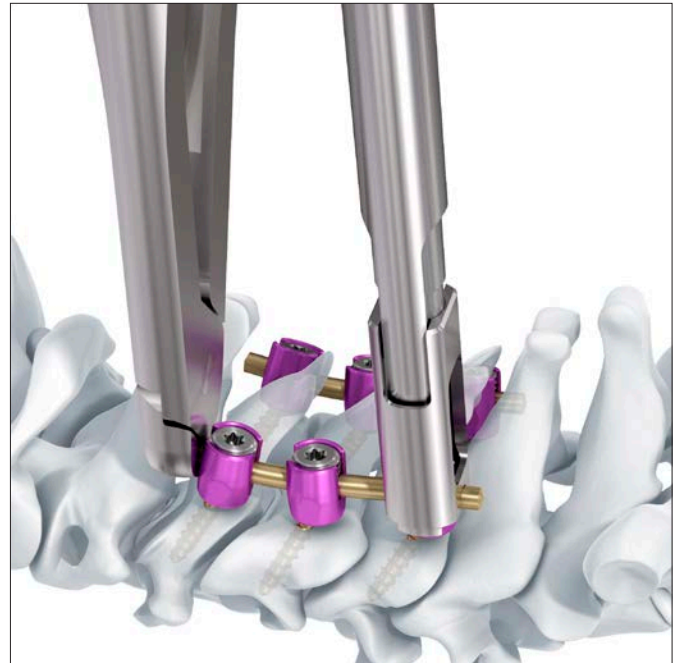
#### Instrument

---

03.614.023      Holding Forceps for Rods Ø 3.5 mm

---

If rotation of the rod is desired, it is recommended that the holding forceps be used.



### Optional technique B: Compression or distraction

---

#### Instruments

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03.614.028      Distraction Forceps

---

03.614.029      Compression Forceps

---

Compression or distraction with variable axis heads is only possible with the locking screws not tightened. Use compression forceps to achieve compression, or the distraction forceps to achieve distraction, and then fully tighten the locking screws as described in step 14.





## 14

### Lock construct

---

#### Instruments

---

03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
03.614.026	Rod Pusher
03.614.035	Handle with Torque Limiter, 2.0 Nm, with Quick Coupling

---

#### Optional instruments

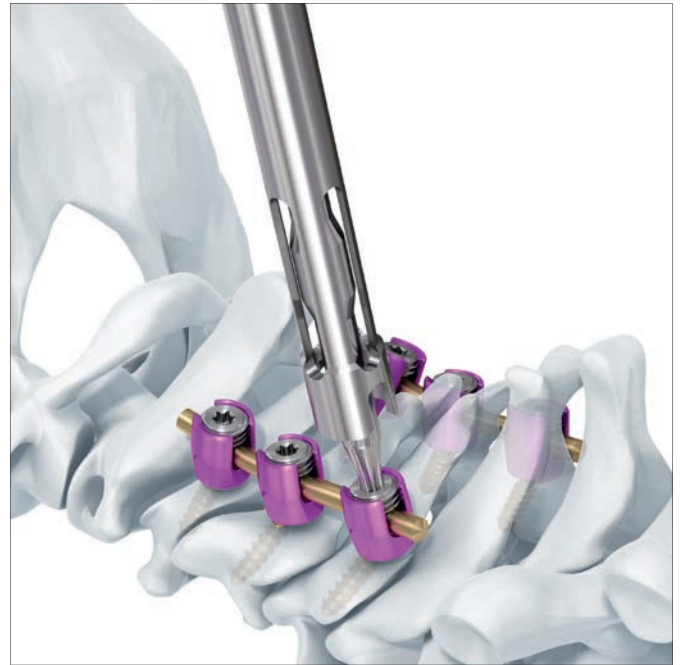
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03.615.010	Rod Pusher for Rods Ø 4.0 mm
03.614.027	Rod Introduction Instrument
03.615.009	Rod Introduction Instrument Ø 4.0 mm
03.615.042	Handle for Rod Introduction Instrument with Speed Nut

---

After final adjustment of the construct, fully tighten all locking screws with the screwdriver shaft and the 2 Nm torque limiting handle by turning the torque limiting handle until it clicks once on all sections. The construct is now rigidly locked. Final tightening should be accomplished after all locking screws have been placed, and should be aided by a rod pusher.

**Note:** The rod introduction instrument may be used in place of the rod pusher to lock the construct.



# ADDITIONAL TECHNIQUE – TOP LOADING HOOKS

---

## Place top loading hooks

---

### Instruments

---

03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
03.614.030	Holding Forceps for Implants
324.107	Handle with Quick Coupling

---

#### a. Position hook

Attach the holding forceps to the appropriate hook. Place the hook in the desired location using the screwdriver as an aid.

#### b. Insert rod

#### c. Insert locking screw

Tighten the locking screw using the screwdriver shaft for locking screw. Turn the screwdriver one-quarter to one-half turn counterclockwise to seat the thread before tightening.



# ADDITIONAL TECHNIQUE – TRANSVERSE CONNECTOR (HEAD TO HEAD)

## 1 Tighten Locking Screw for Transverse Connectors

### Instruments

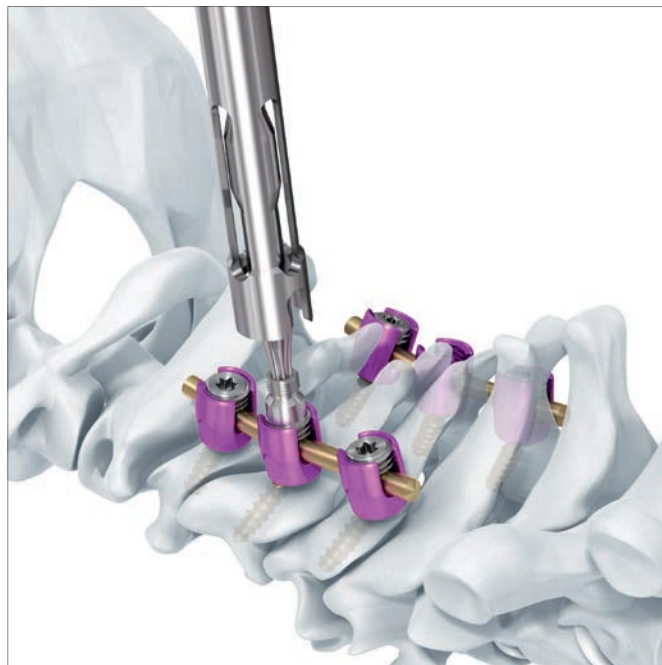
03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
03.614.026	Rod Pusher
03.614.035	Handle with Torque Limiter, 2.0 Nm, with Quick Coupling

### Optional Instruments

03.615.010	Rod Pusher for Rods Ø 4.0 mm
03.614.027	Rod Introduction Instrument
03.615.009	Rod Introduction Instrument Ø 4.0 mm
03.615.042	Handle for Rod Introduction Instrument with Speed Nut

Insert a locking screw for transverse connectors into the required screw head. Fully tighten all locking screws for transverse connectors with the screwdriver shaft and the 2.0 Nm torque limiting handle before seating the transverse connectors by turning the torque limiter handle until it clicks once.

**Note:** The rod introduction instrument may be used in place of rod pusher.



## 2

### Insert Transverse Connector for Head to Head Connection

---

#### Instrument

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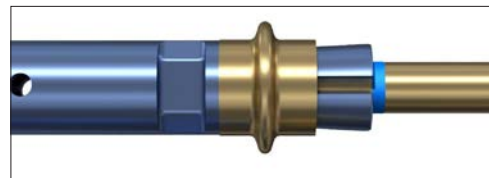
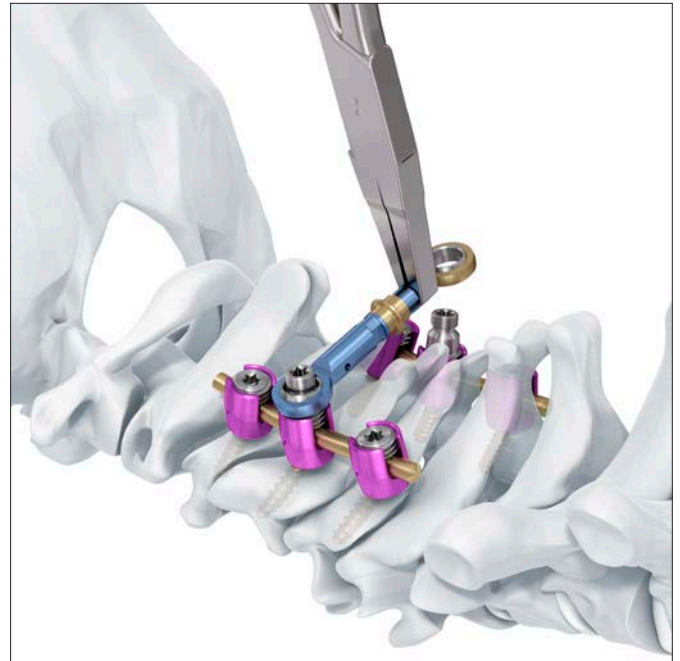
388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
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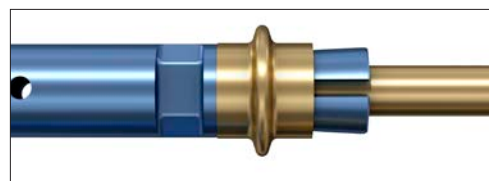
Select a straight or angled transverse connector of appropriate length. Place the transverse connector on the Synapse screw construct to assess fit. Hold the transverse connector with the holding forceps. Adjust as necessary. Both sides of the transverse connector should be placed over the locking screws for transverse connectors before proceeding.

**Note:** Ensure the etched band on the transverse connector shaft is not visible when implanting. If this band is visible, the connector is over-extended. Use the next size up.

**Warning:** Do not bend the transverse connector.



Incorrect



Correct

### 3

#### Insert and tighten cap nut 7.5 mm for Transverse Connectors

---

##### Instruments

---

03.614.048	Screwdriver Shaft Stardrive for Torque Limiter 2.5 Nm, for Quick Coupling
03.614.035	Handle with Torque Limiter, 2.0 Nm, with Quick Coupling
03.615.040	Torque Limiter 2.5 Nm, for Locking Nut Ø 7.5 mm
324.107	Handle with Quick Coupling

---

Select and place the cap nut onto the locking screw for transverse connector using the torque limiter, 2.5 Nm, for cap nut 7.5 mm. To provide alignment, insert the screwdriver shaft stardrive into the cannula of the torque limiter and engage the T15 recess.

After all cap nuts have been placed, firmly tighten them with the 2.5Nm torque limiter by turning the handle until it clicks, using the stardrive screwdriver shaft and the handle as countertorque.

##### Notes:

- Use the torque limiter for locking nut to help seat the transverse connector onto the transverse connector locking screw.
- When inserting the cap nuts, they may be turned one-quarter to one-half turn counterclockwise to seat the thread before tightening.



#### 4 Lock connection

---

##### Instrument

---

388.038      Crimper for Transverse Connectors

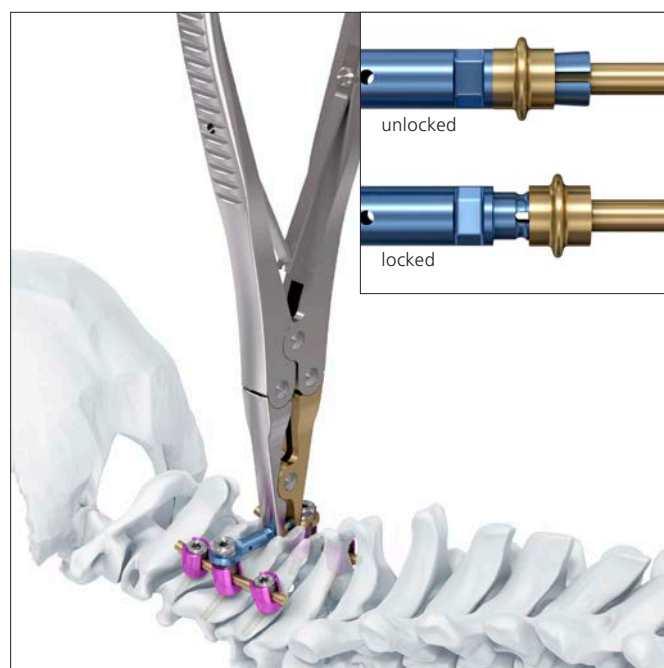
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Secure the locking sleeve with the crimper. When locking the connection, ensure that the gold tip of the instrument is touching the gold portion of the transverse connector shaft. The transverse connector is now rigidly locked.

##### Notes:

- Ensure the etched band on the transverse connector shaft is not visible. If this band is visible, then the connector is over extended. Use the next size up.
- If necessary, the connection can be unlocked using the same instrument with the gold tip touching the blue portion of the transverse connector.

**Warning:** Locking more than once may weaken the transverse connector.



# ADDITIONAL TECHNIQUE – TRANSVERSE CONNECTOR (ROD TO ROD)

## 1

### Position the transverse connectors

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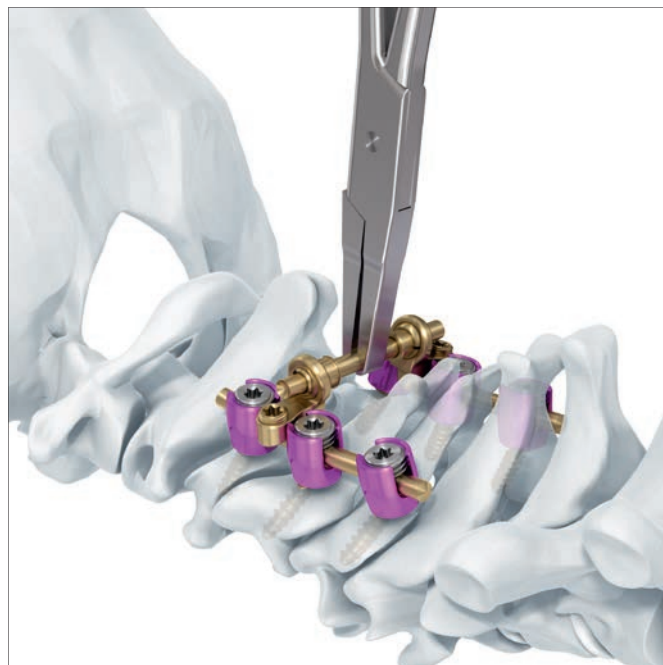
#### Instrument

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388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
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Place the transverse connectors on the Synapse rod construct. The transverse connectors may be held with the holding forceps.



## 2

### Tighten clamp

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#### Instruments

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03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
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324.107	Handle with Quick Coupling
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388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
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Tighten the setscrew of the transverse connector hook on the rod with the screwdriver shaft. Slide the rod within the hook if necessary. Hold the second hook in the appropriate position and tighten the setscrew.

#### Tips:

- The rod may be bent to accommodate the anatomy.
- Locking one end of the transverse connector with the crimper may facilitate placement.





### 3

#### Lock connections

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#### Instruments

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03.614.021	Cutting Pliers for Rods
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388.038	Crimper for Transverse Connectors
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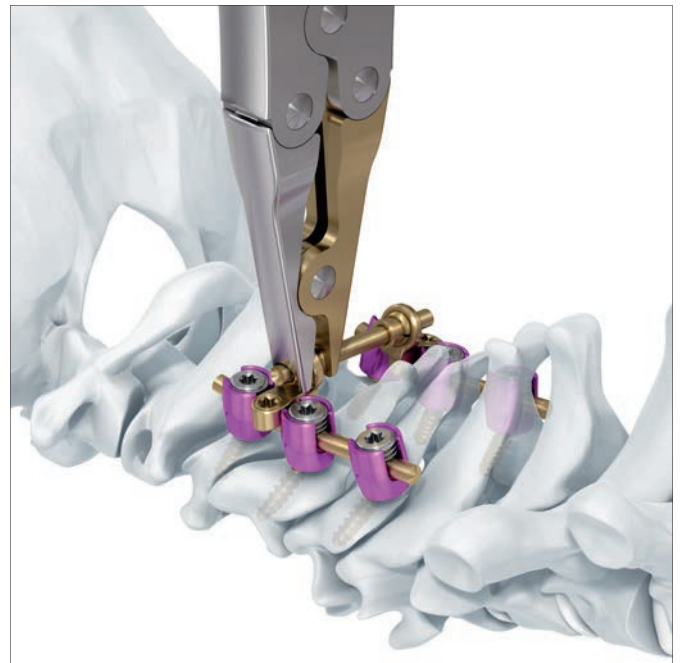
---

Lock both bushing connections with the crimper. Ensure that the golden tip of the instrument is facing medially when locking the connection. The transverse connector is now rigidly locked.

#### Notes:

- If necessary, the connection can be unlocked using the same instrument with the golden tip facing laterally.
- The rod may be shortened with the cutting pliers.

**Warning:** Locking more than once may weaken the transverse connector.



# ADDITIONAL TECHNIQUES

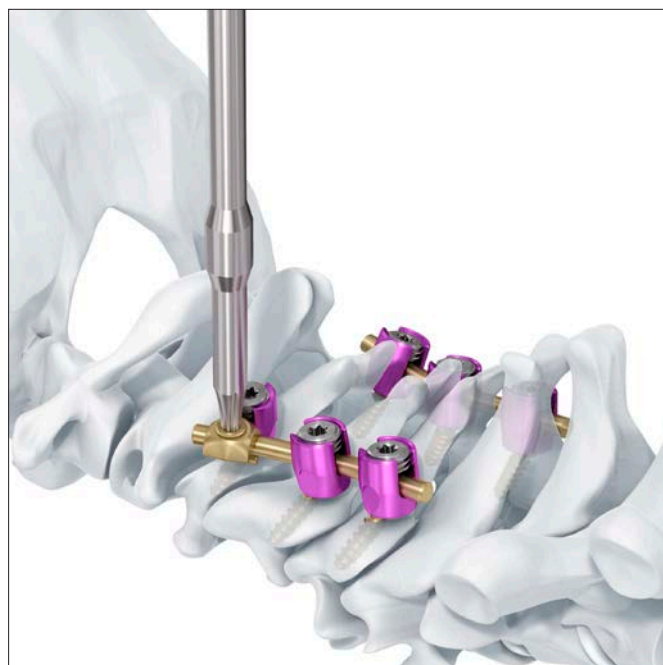
## Adding transverse bars

### Instruments

03.614.019 Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling

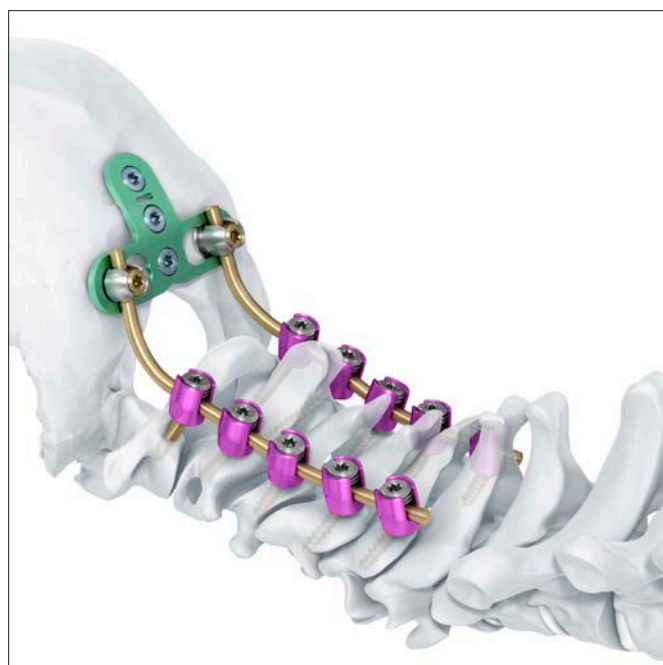
324.107 Handle with Quick Coupling

Place the opening of the transverse bar over the rod. Loosely attach the transverse bar to the rod. Introduce the transverse bar into the variable axis head of the screw. Insert the locking screw in the variable axis head as described in steps 11 and 12. Tighten the setscrew of the transverse bar using the screwdriver shaft.



## Occipital fusion technique

Occipital plates or occipital clamps may be attached to the occiput as described in the Surgical Technique for the Occipito-Cervical Fusion System (036.000.755). These plates or clamps can then be connected to the Synapse system via  $\varnothing$  3.5 mm or  $\varnothing$  4.0 mm rods or pre-bent rods.



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### Parallel Connectors

All parallel connectors are open and allow side-loading of the rods. They link  $\varnothing$  3.5 mm to  $\varnothing$  3.5 mm,  $\varnothing$  4.0 mm,  $\varnothing$  5.0 mm and  $\varnothing$  6.0 mm rods. Either side of the connector may be connected first. Tighten the setscrew on one side, then connect the remaining rod and tighten the setscrews. Parallel Connectors are also available to link  $\varnothing$  4.0 mm to  $\varnothing$  4.0 mm,  $\varnothing$  5.0 mm and  $\varnothing$  6.0 mm rods.



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### Connecting Rods

Connecting rods may be used to extend a Synapse construct. Connect the  $\varnothing$  3.5 mm or  $\varnothing$  4.0 mm rod section to the Synapse polyaxial screws as instructed in steps 9–11 of the surgical technique. Connect the  $\varnothing$  5.0 mm/5.5 mm/6.0 mm end of the rod to the appropriate qualified posterior spinal stabilization system. For a listing of qualified posterior spinal stabilization systems please refer to the Instructions for Use – Connecting Rods, [www.depuysynthes.com/ifu](http://www.depuysynthes.com/ifu)



# IMPLANT REMOVAL

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## Instruments

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03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
03.614.039	Hexagonal Screwdriver Shaft, cross pinned, for Quick Coupling
03.614.040	Screwdriver, hexagonal Ø 7.5 mm
388.038	Crimper for Transverse Connectors
388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
324.107	Handle with Quick Coupling

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All Synapse System implants can be removed with a T15 Stardrive screwdriver. The transverse connectors also require that the crimper be used for removal. Additionally, removal of head to head transverse connectors requires that the Screwdriver, hexagonal Ø 7.5 mm be used.

**Note:** Synapse polyaxial screws may also be removed with the cross pinned hexagonal screwdriver shaft.

## Removing transverse connectors for head to head connection

### Instruments

03.614.040	Screwdriver, hexagonal Ø 7.5 mm
388.038	Crimper for Transverse Connectors
388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm
03.615.041	Top-Loading Implant Remover
03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
324.107	Handle with Quick Coupling

If required, secure the transverse connector using the holding forceps. Unlock the transverse connector using the crimper. Ensure that the gold tip of the instrument is touching the blue portion of the transverse connector.

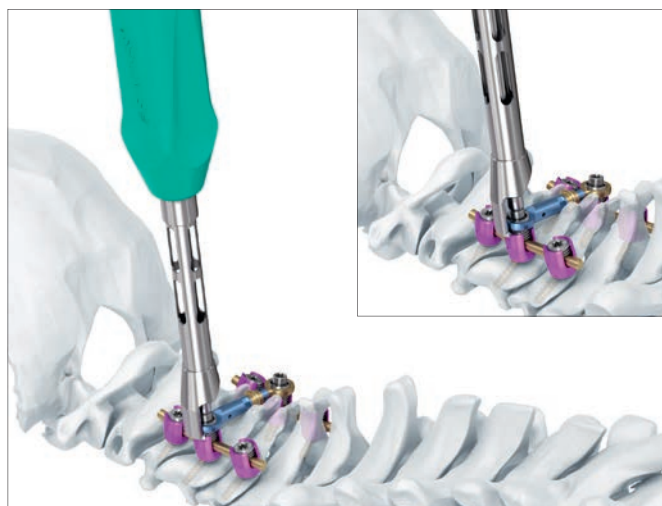
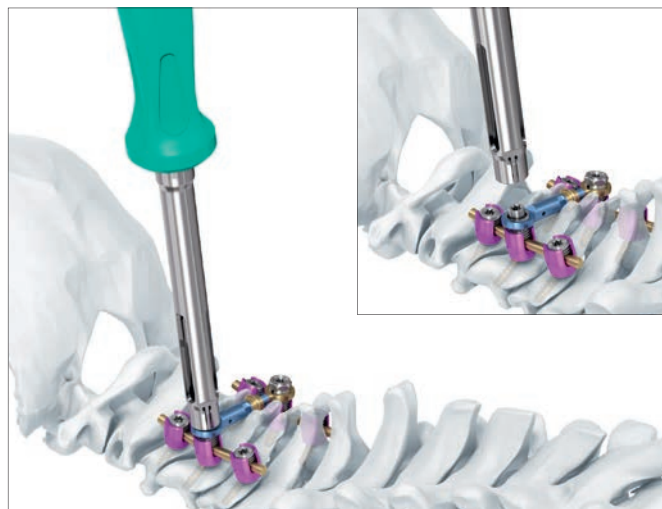
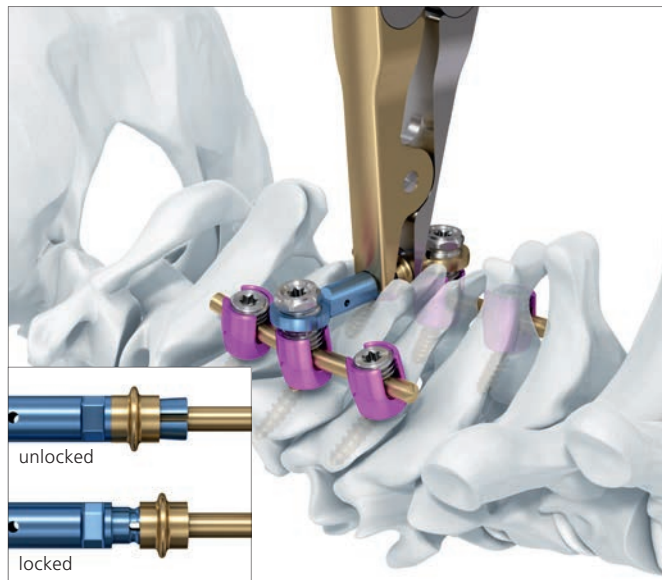
Remove all cap nuts using the hexagonal screwdriver.

**Note: If required, the screwdriver shaft stardrive can be used as countertorque.**

Using the top loading implant remover, approach the transverse connector from the lateral side until the forked opening sits just underneath the loop of the transverse connector. The inner shaft portion should contact the upper surface of the locking screw.

Slowly turn the top handle to thread the shaft down onto the locking screw. Continue turning slowly until the implant is removed.

Repeat on the other side.



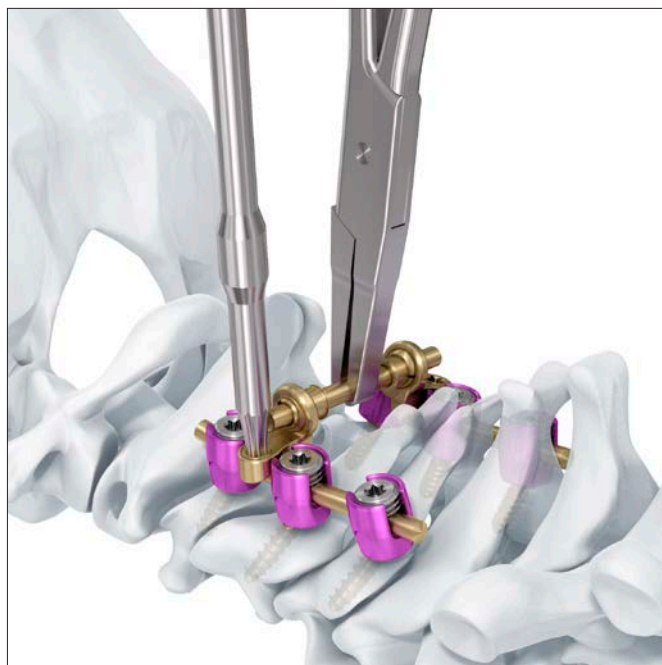
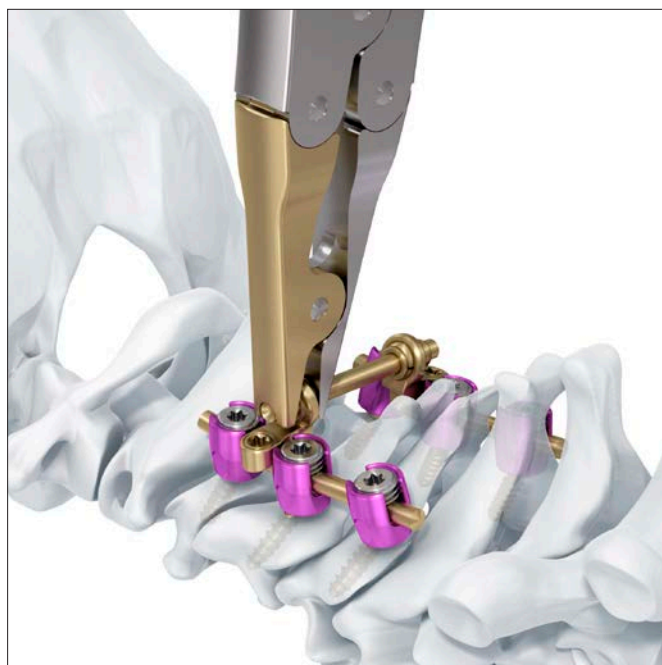
### Removing transverse connector for rod to rod connection

#### Instruments

03.614.019	Screwdriver Shaft Stardrive for Locking Screw, T15, for Quick Coupling
324.107	Handle with Quick Coupling
388.038	Crimper for Transverse Connectors
388.407	Holding Forceps for Rods Ø 3.5 mm, length 181 mm

Unlock both bushing connections with the crimper. Ensure that the gold tip of the instrument is facing laterally.

Using the holding forceps to hold the transverse connector, use the Stardrive screwdriver and the handle to unscrew the setscrew. Slide the rod within the hook if necessary to access the second setscrew.



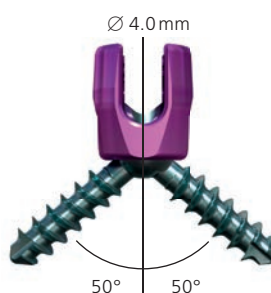
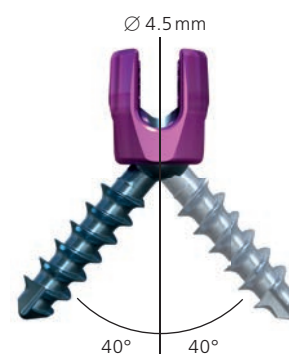
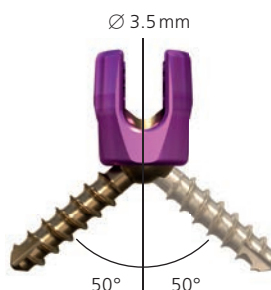
# IMPLANTS\*

## Variable axis screws

### Cancellous screws

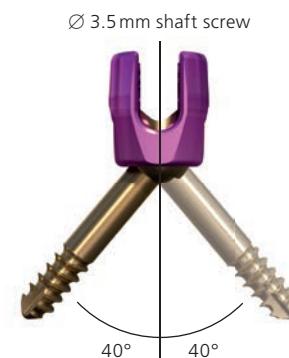
- $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm cancellous screws offer up to 50° of angulation in all directions
- $\varnothing$  4.5 mm cancellous screws offer 40° of angulation in all directions
- Self-tapping
- Thread length from 8 mm to 50 mm (2 mm increments)
- Square thread locking cap reduces occurrence of cross-threading
- 8.0 mm run on rod

Outer diameter (mm)	Core diameter (mm)	Color code
3.5	2.4	Gold
4.0	2.4	Green gray
4.5	3.2	Light blue



### Shaft screws

- Offer 40° of angulation in all directions
- $\varnothing$  3.5 mm cortex self-tapping screws
- Lengths from 18 mm to 50 mm\*\* with a 10 mm unthreaded shaft



\* All implants for use with 3.5 mm rods are available sterile and non-sterile. Add an 'S' to the article number. All implants for use with 4.0 mm rods are available sterile only, unless otherwise stated.

\*\* Screw length is total length.

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**Cancellous Bone Screw Synapse  $\varnothing$  3.5 mm,**  
 Titanium Alloy (TAN)

**For use with  $\varnothing$  3.5 mm Rods**

	<b>Length (mm)</b>
04.614.008	8
04.614.010	10
04.614.012	12
04.614.014	14
04.614.016	16
04.614.018	18
04.614.020	20
04.614.022	22
04.614.024	24
04.614.026	26
04.614.028	28
04.614.030	30
04.614.032	32
04.614.034	34
04.614.036	36
04.614.038	38
04.614.040	40
04.614.042	42
04.614.044	44
04.614.046	46
04.614.048	48
04.614.050	50

**For use with  $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm Rods**

	<b>Length (mm)</b>
04.615.008S	8
04.615.010S	10
04.615.012S	12
04.615.014S	14
04.615.016S	16
04.615.018S	18
04.615.020S	20
04.615.022S	22
04.615.024S	24
04.615.026S	26
04.615.028S	28
04.615.030S	30
04.615.032S	32
04.615.034S	34
04.615.036S	36
04.615.038S	38
04.615.040S	40
04.615.042S	42
04.615.044S	44
04.615.046S	46
04.615.048S	48
04.615.050S	50

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**Cancellous Bone Screw Synapse  $\varnothing$  4.0 mm,**  
Titanium Alloy (TAN)

**For use with  $\varnothing$  3.5 mm Rods**

	<b>Length (mm)</b>
04.614.108	8
04.614.110	10
04.614.112	12
04.614.114	14
04.614.116	16
04.614.118	18
04.614.120	20
04.614.122	22
04.614.124	24
04.614.126	26
04.614.128	28
04.614.130	30
04.614.132	32
04.614.134	34
04.614.136	36
04.614.138	38
04.614.140	40
04.614.142	42
04.614.144	44
04.614.146	46
04.614.148	48
04.614.150	50

**For use with  $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm Rods**

	<b>Length (mm)</b>
04.615.108S	8
04.615.110S	10
04.615.112S	12
04.615.114S	14
04.615.116S	16
04.615.118S	18
04.615.120S	20
04.615.122S	22
04.615.124S	24
04.615.126S	26
04.615.128S	28
04.615.130S	30
04.615.132S	32
04.615.134S	34
04.615.136S	36
04.615.138S	38
04.615.140S	40
04.615.142S	42
04.615.144S	44
04.615.146S	46
04.615.148S	48
04.615.150S	50

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**Cancellous Bone Screw Synapse  $\varnothing$  4.5 mm,**  
 Titanium Alloy (TAN)

**For use with  $\varnothing$  3.5 mm Rods**

	<b>Length (mm)</b>
04.614.208	8
04.614.210	10
04.614.212	12
04.614.214	14
04.614.216	16
04.614.218	18
04.614.220	20
04.614.222	22
04.614.224	24
04.614.226	26
04.614.228	28
04.614.230	30
04.614.232	32
04.614.234	34
04.614.236	36
04.614.238	38
04.614.240	40
04.614.242	42
04.614.244	44
04.614.246	46
04.614.248	48
04.614.250	50

**For use with  $\varnothing$  3.5 mm and  $\varnothing$  4.0 mm Rods**

	<b>Length (mm)</b>
04.615.208S	8
04.615.210S	10
04.615.212S	12
04.615.214S	14
04.615.216S	16
04.615.218S	18
04.615.220S	20
04.615.222S	22
04.615.224S	24
04.615.226S	26
04.615.228S	28
04.615.230S	30
04.615.232S	32
04.615.234S	34
04.615.236S	36
04.615.238S	38
04.615.240S	40
04.615.242S	42
04.615.244S	44
04.615.246S	46
04.615.248S	48
04.615.250S	50

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**Shaft Screw Synapse Ø 3.5 mm**

Titanium Alloy (TAN)

**For use with Ø 3.5 mm Rods**

	<b>Length (mm)</b>
04.614.318	18
04.614.320	20
04.614.322	22
04.614.324	24
04.614.326	26
04.614.328	28
04.614.330	30
04.614.332	32
04.614.334	34
04.614.336	36
04.614.338	38
04.614.340	40
04.614.342	42
04.614.344	44
04.614.346	46
04.614.348	48
04.614.350	50

**For use with Ø 3.5 mm and Ø 4.0 mm Rods**

	<b>Length (mm)</b>
04.615.318S	18
04.615.320S	20
04.615.322S	22
04.615.324S	24
04.615.326S	26
04.615.328S	28
04.615.330S	30
04.615.332S	32
04.615.334S	34
04.615.336S	36
04.615.338S	38
04.615.340S	40
04.615.342S	42
04.615.344S	44
04.615.346S	46
04.615.348S	48
04.615.350S	50

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**Other implants**

**Lamina hooks**

- For sublaminar insertion and stabilization
- Short/long offsets ease construct assembly
- Top-loading hooks
- Straight hooks
- Side-loading hooks for use with both 3.5 mm and 4.0 mm rods




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**Lamina Hooks**

04.614.500	Lamina Hook, right, short, Titanium Alloy (TAN)
04.614.501	Lamina Hook, left short, Titanium Alloy (TAN)
04.614.502	Lamina Hook, right, long, Titanium Alloy (TAN)
04.614.503	Lamina Hook, left long, Titanium Alloy (TAN)
04.614.504	Lamina Hook Top-Loading, right, short, Titanium Alloy (TAN)
04.614.505	Lamina Hook Top-Loading, left, short, Titanium Alloy (TAN)
04.614.506	Lamina Hook Top-Loading, right, long, Titanium Alloy (TAN)
04.614.507	Lamina Hook Top-Loading, left, long, Titanium Alloy (TAN)
04.614.518	Lamina Hook Top-Loading, straight, short, Titanium Alloy (TAN)
04.614.519	Lamina Hook Top-Loading, straight, long, Titanium Alloy (TAN)

**Transverse connectors (rod-to-rod)**

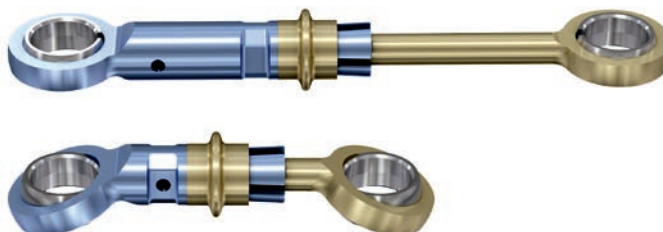
- Preassembled transverse connectors are available in lengths of 60 mm and 75 mm
- Easily placed after Synapse construct is in position, reducing operative time
- Bushings allow clamps to be placed offset to each other
- Assembly can be rigidly locked



04.614.513	Transverse Connector, length 60 mm, for Rods Ø 3.5 mm, Titanium Alloy (TAN)
04.614.514	Transverse Connector, length 75 mm, for Rods Ø 3.5 mm, Titanium Alloy (TAN)
04.615.542S	Transverse Connector, length 60 mm, for Rods Ø 4.0 mm, Titanium Alloy (TAN)
04.615.543S	Transverse Connector, length 75 mm, for Rods Ø 4.0 mm, Titanium Alloy (TAN)

**Transverse connectors (head to head)**

- Increase construct stability
- Assemble easily on the head of any Synapse polyaxial screw
- Adjustable connector comes in four variable lengths to accommodate different patient anatomy
- Straight and angled versions offer enhanced flexibility options



**Connectors**

04.614.515	Transverse Connector, short, for Head to Head Connection, Titanium Alloy (TAN)	04.614.550	Angled Transverse Connector, short , for Head to Head Connection, Titanium Alloy (TAN)
04.614.516	Transverse Connector, medium, for Head to Head Connection, Titanium Alloy (TAN)	04.614.551	Angled Transverse Connector, medium, for Head to Head Connection, Titanium Alloy (TAN)
04.614.517	Transverse Connector, long, for Head to Head Connection, Titanium Alloy (TAN)	04.614.552	Angled Transverse Connector, long, for Head to Head Connection, Titanium Alloy (TAN)
04.614.520	Transverse Connector, extra-long, for Head to Head Connection, Titanium Alloy (TAN)	04.614.553	Angled Transverse Connector, extra-long, for Head to Head Connection, Titanium Alloy (TAN)

**3.5 mm and 4.0 mm rods\***

- Rods are available in lengths of 80 mm, 120 mm, 240 mm and 350 mm
- Prebent rods are available in various lengths
- Ø 3.5 mm rods (gold)
- Ø 4.0 mm rods (aqua)



**Rods**

**Cross-Link Rod Ø 3.5 mm, Titanium Alloy (TAN)**

	Length (mm)
498.120	80
498.125	120
498.957	240

**Rod Ø 4.0 mm, length 80 mm, Titanium Alloy (TAN), sterile**

	Length (mm)
04.615.525S	80
04.615.526S	120
04.615.527S	240
04.615.528S	350

**Rod Ø 3.5 mm, prebent, Titanium Alloy (TAN)**

	Length (mm)
04.614.730	30
04.614.735	35
04.614.745	45
04.614.750	50
04.614.761	60
04.614.770	70
04.614.775	75
04.614.785	85

**Rod Ø 4.0 mm, prebent, Titanium Alloy (TAN)**

	Length (mm)
04.615.730	30
04.615.735	35
04.615.745	45
04.615.750	50
04.615.760	60
04.615.770	70
04.615.775	75
04.615.785	85

\* Prebent 4.0mm rods are available both sterile and non sterile. Add an «S» to the article number for the sterile version.

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### Connecting rods

- Rods with dual diameter of 3.5 mm/4.0 mm, 3.5 mm/5.0 mm, 3.5mm/5.5 mm\*, 3.5 mm/6.0 mm, 4.0 mm/5.0 mm, 4.0 mm/5.5 mm\* and 4.0 mm/6.0 mm are available in various lengths
- 5 mm transition zone allows adjacent screws to be placed closer together
- For a listing of qualified posterior spinal stabilization systems please refer to the Instructions for Use – Connecting Rods, [www.depuysynthes.com/ifu](http://www.depuysynthes.com/ifu)



### Tapered Rods

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04.614.509	Connecting Rod Ø 3.5/5.0 mm, length 300 mm (Ø 3.5/120 mm, Ø 5.0/175 mm), Titanium Alloy (TAN)
04.614.510	Connecting Rod Ø 3.5/6.0 mm, length 300 mm (Ø 3.5/120 mm, Ø 6.0/175 mm), Titanium Alloy (TAN)
04.614.511	Connecting Rod Ø 3.5/5.0 mm, length 500 mm (Ø 3.5/240 mm, Ø 5.0/255 mm), Titanium Alloy (TAN)
04.614.512	Connecting Rod Ø 3.5/6.0 mm, length 500 mm (Ø 3.5/240 mm, Ø 6.0/255 mm), Titanium Alloy (TAN)
04.615.510S	Connecting Rod Ø 3.5/4.0 mm, length 300 mm (Ø 3.5/120 mm, Ø 4.0/175 mm), Titanium Alloy (TAN), sterile
04.615.511S	Connecting Rod Ø 4.0/5.0 mm, length 300 mm (Ø 4.0/120 mm, Ø 5.0/175 mm), Titanium Alloy (TAN), sterile
04.615.512S	Connecting Rod Ø 4.0/6.0 mm, length 300 mm (Ø 4.0/120 mm, Ø 6.0/175 mm), Titanium Alloy (TAN), sterile
04.615.515S	Connecting Rod Ø 4.0/5.0 mm, length 500 mm (Ø 4.0/240 mm, Ø 5.0/255 mm), Titanium Alloy (TAN), sterile
04.615.516S	Connecting Rod Ø 4.0/6.0 mm, length 500 mm (Ø 4.0/240 mm, Ø 6.0/255 mm), Titanium Alloy (TAN), sterile

\* 3.5 mm/5.5 mm and 4.0 mm/5.5 mm Connecting Rods can be found in the Matrix Spine System – Degenerative, Surgical Technique 036.001.185

**Transverse bars**

- Provide a lateral offset of 9 mm or 15 mm from the rod to the Synapse screw
- The angled transverse bar offers a lateral offset of 20 mm from the rod to the Synapse screw
- Eliminate the need for severe rod contouring
- Can be placed onto the rod from the top after the Synapse construct is in position
- Ø 5.0 mm and Ø 6.0 mm clamps facilitate connection between the Synapse system and thoracolumbar system



04.614.525	Transverse Bar Ø 3.5 mm, long, Titanium Alloy (TAN)
406.103	Transverse Bar Ø 3.5 mm, Titanium Alloy (TAN)
406.106	Transverse Bar Ø 3.5 mm, with clamps Ø 5.0 mm, Titanium Alloy (TAN)
406.107	Transverse Bar Ø 3.5 mm, with clamps Ø 6.0 mm , Titanium Alloy (TAN)
04.615.531S	Transverse Bar Ø 4.0 mm, short, Titanium Alloy (TAN), sterile
04.615.532S	Transverse Bar Ø 4.0 mm, long, Titanium Alloy (TAN), sterile
04.615.533S	Transverse Bar Ø 4.0 mm, short, with clamps Ø 5.0mm, Titanium Alloy (TAN), sterile
04.615.534S	Transverse Bar Ø 4.0 mm, long, with clamps Ø 5.0mm, Titanium Alloy (TAN), sterile
04.615.535S	Transverse Bar Ø 4.0 mm, short, with clamps Ø 6.0mm, Titanium Alloy (TAN), sterile
04.615.536S	Transverse Bar Ø 4.0 mm, long, with clamps Ø 6.0mm, Titanium Alloy (TAN), sterile
04.614.523	Transverse Bar Ø 3.5 mm, angled, Titanium Alloy (TAN)
04.615.523S	Transverse Bar Ø 4.0 mm, angled, Titanium Alloy (TAN), sterile



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**Parallel open rod connectors**

Parallel open rod connectors link the Synapse construct to the Universal Spinal System (USS) or any other Synthes posterior rod-screw system

**Short****Parallel Connector, open, for Rods  $\varnothing$  3.5 mm, Titanium Alloy (TAN)**

498.922	3.5/3.5
498.923	3.5/5.0
498.924	3.5/6.0

**Long****Parallel Connector, open, long, for Rods  $\varnothing$  3.5 mm, Titanium Alloy (TAN)**

04.614.560	3.5/3.5
04.614.562	3.5/5.0
04.614.563	3.5/6.0

**Parallel Connector, open, short, for Rods  $\varnothing$  4.0 mm, Titanium Alloy (TAN), sterile**

04.615.537S	3.5/4.0
04.615.538S	4.0/4.0
04.615.539S	4.0/5.0
04.615.540S	4.0/6.0

**Parallel Connector, open, long, for Rods  $\varnothing$  4.0 mm, Titanium Alloy (TAN), sterile**

04.615.564S	3.5/4.0
04.615.565S	4.0/4.0
04.615.566S	4.0/5.0
04.615.567S	4.0/6.0

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**Locking screw**

04.614.508	Locking Screw Synapse, Titanium Alloy (TAN)
04.614.521	Cap Nut 7.5 mm, for Transverse Connectors
04.614.522	Locking Screw for Transverse Connectors, Titanium Alloy (TAN)

# INSTRUMENTS

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03.614.048 Screwdriver Shaft Stardrive for Torque Limiter 2.5 Nm, for Quick Coupling



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292.745 Kirschner Wire Ø 2.4 mm with Stop, length 170 mm



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03.161.028 Depth Gauge for Screws Ø 3.5 to 5.0 mm, measuring range up to 50 mm



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03.614.010 Drill Bit Ø 3.2 mm with Stop, 2-flute, for Quick Coupling



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03.614.011 Drill Sleeve with Scale, for Drill Bits Ø 3.2 mm No. 03.614.010



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03.614.012 Pedicle Probe Ø 2.4 mm, straight



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03.614.013 Pedicle Probe Ø 2.4 mm, curved



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03.614.015 Tap for Cancellous Bone Screws  
Ø 4.5 mm, for Quick Coupling



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03.614.016 Guide Sleeve for Tap Ø 3.5 mm and  
Ø 4.5 mm



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03.614.017 Holding Sleeve with thread



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03.614.019 Screwdriver Shaft Stardrive for Locking  
Screw, T15, for Quick Coupling



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03.614.021 Cutting Pliers for Rods



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03.614.022 Bending Pliers for Rods  $\varnothing$  3.5 mm  
and Plates 3.5



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03.614.023 Holding Forceps for Rods  $\varnothing$  3.5 mm



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03.614.024 Bending Iron for Rods  $\varnothing$  3.5 mm, left  
and



03.614.025 Bending Iron for Rods  $\varnothing$  3.5 mm, right



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03.614.026 Rod Pusher



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03.614.027 Rod Introduction Instrument



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03.615.042 Handle for Rod Introduction Instrument with Speed Nut



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03.614.028 Distraction Forceps



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03.614.029 Compression Forceps



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03.614.030 Holding Forceps for Implants



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03.614.034 Alignment Tool



03.614.035 Handle with Torque Limiter, 2.0 Nm, with Quick Coupling



03.688.505 Handle with Ratchet Wrench for Quick Coupling, small



03.614.041 T-Handle with Ratchet Wrench, for Quick Coupling



03.614.036 Outer Sleeve for Holding Sleeve No. 03.614.017



03.614.039 Hexagonal Screwdriver Shaft, cross pinned, for Quick Coupling



311.349 Tap for Cancellous Bone Screws Ø 3.5 mm, for Quick Coupling



324.107 Handle with Quick Coupling



388.038 Crimper for Transverse Connectors



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388.393 Drill Sleeve with Scale, for Drill Bit  
Ø 2.4 mm No. 388.394



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388.394 Drill Bit Ø 2.4 mm with Stop, 2-flute,  
for Quick Coupling



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388.397 Awl Ø 3.5 mm, length 179.5 mm



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388.407 Holding Forceps for Rods Ø 3.5 mm,  
length 181 mm



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388.549 Feeler, straight, with rounded tip



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388.868 Trial Rod Ø 3.5 mm



389.473	Pedicle Markers, small, with short markings	
389.474	with long markings	
389.477	Tap for Cortex Screw $\varnothing$ 3.5 mm, length 185 mm, for Quick Coupling	
03.615.011	Rod Shearer for $\varnothing$ 4.0 mm	
03.614.040	Screwdriver, hexagonal $\varnothing$ 7.5 mm	
03.615.040	Torque Limiter 2.5 Nm, for Locking Nut $\varnothing$ 7.5 mm	
03.615.041	Top-Loading Implant Remover	
03.615.010	Rod Pusher for Rods $\varnothing$ 4.0 mm	
03.615.009	Rod Introduction Instrument $\varnothing$ 4.0 mm	



# SYNAPSE SYSTEM COMPATIBILITY

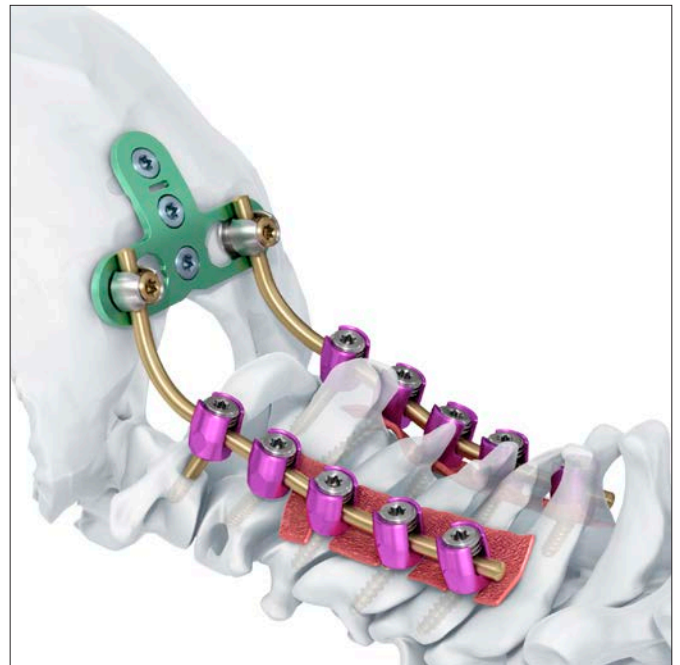
Synapse System		3.5 Rod System	4.0 Rod System
Implants	Unsterile	✓	
	Sterile	✓	✓
Rods	Connecting Rod	Ø 3.5 mm/Ø 5.0 mm Ø 3.5 mm/Ø 5.5 mm* Ø 3.5 mm/Ø 6.0 mm	Ø 3.5 mm/Ø 4.0 mm Ø 4.0 mm/Ø 5.0 mm Ø 4.0 mm/Ø 5.5 mm* Ø 4.0 mm/Ø 6.0 mm
	Straight Rod	✓	✓
	Pre-bent Rod	✓	✓
Polyaxial Screws	Polyaxial head height	10.5 mm Accommodate Ø 3.5 mm rods	11 mm Accommodate Ø 3.5 mm and Ø 4.0 mm rods
	Polyaxial head diameter	9.5 mm Accommodate Ø 3.5 mm rods	10.5 mm Accommodate Ø 3.5 mm and Ø 4.0 mm rods
	Ø 3.5 mm Cancellous Screws	8 mm – 50 mm (2 mm increments)	8 mm – 50 mm (2 mm increments)
	Ø 4.0 mm Cancellous Screws	8 mm – 50 mm (2 mm increments)	8 mm – 50 mm (2 mm increments)
	Ø 4.5 mm Cancellous Screws	8 mm – 50 mm (2 mm increments)	8 mm – 50 mm (2 mm increments)
	Ø 3.5 mm Cortex Shaft Screws	18 mm – 50 mm (2 mm increments)	18 mm – 50 mm (2 mm increments)
Hooks	Side loading Lamina hooks	✓	
	Top loading Lamina hooks	✓	✓
Transverse connectors	Head to head loading	✓	✓
	Rod to rod	✓	✓
Transverse bars		Accommodate Ø 3.5 mm rods	Accommodate Ø 3.5 mm and Ø 4.0 mm rods
Parallel connectors		Extend Ø 3.5 mm rods	Extend Ø 3.5 mm and Ø 4.0 mm rods

\*Connecting rods Ø 3.5/5.5mm and Ø 4.0/5.5mm are part of the Matrix Spine System - Degenerative

# BIOMATERIAL IMPLANTS

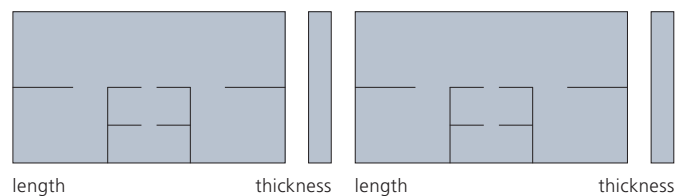
To facilitate fusion, bone graft is often applied in the lateral gutters. A suitable bone graft substitute (e.g. chronOS, DBX) may be used by itself or in combination with autograft.

The construct shown is complemented with chronOS Strip precast, which optimally integrates with patient anatomy and implanted hardware. Perfusion of strip with bone marrow aspirate provides a favorable environment for bony ingrowth.



## chronOS Strip Bone Void Filler precast

07.801.200.02S 47 × 18 × 3 mm, pack of 2 units



# SCREWDRIVER ASSEMBLY

## Instruments

03.614.017	Holding Sleeve with thread
03.614.039	Hexagonal Screwdriver Shaft, cross pinned, for Quick Coupling
324.107	Handle with Quick Coupling

## Optional instrument

03.614.036	Outer Sleeve for Holding Sleeve No. 03.614.017
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- Add the outer sleeve to the holding sleeve. Insert the holding sleeve through the slotted end of the outer sleeve past the threads of the holding sleeve. Snap the outer sleeve over the "speed bump". (1)
- Insert the back end of the cross pinned hexagonal screwdriver shaft through the distal tip of the holding sleeve (2). Press the button on the holding sleeve while inserting the screwdriver shaft. Ensure that the holding sleeve has bottomed out on the cross pin at the distal end of the screwdriver shaft.
- Connect the handle with quick coupling to the hexagonal screwdriver shaft (3).
- Reset the driver by pressing the button on the sleeve and pulling back on the sleeve until it hits the handle (4). The green color band on the sleeve should not be visible.

Driver is ready for use.

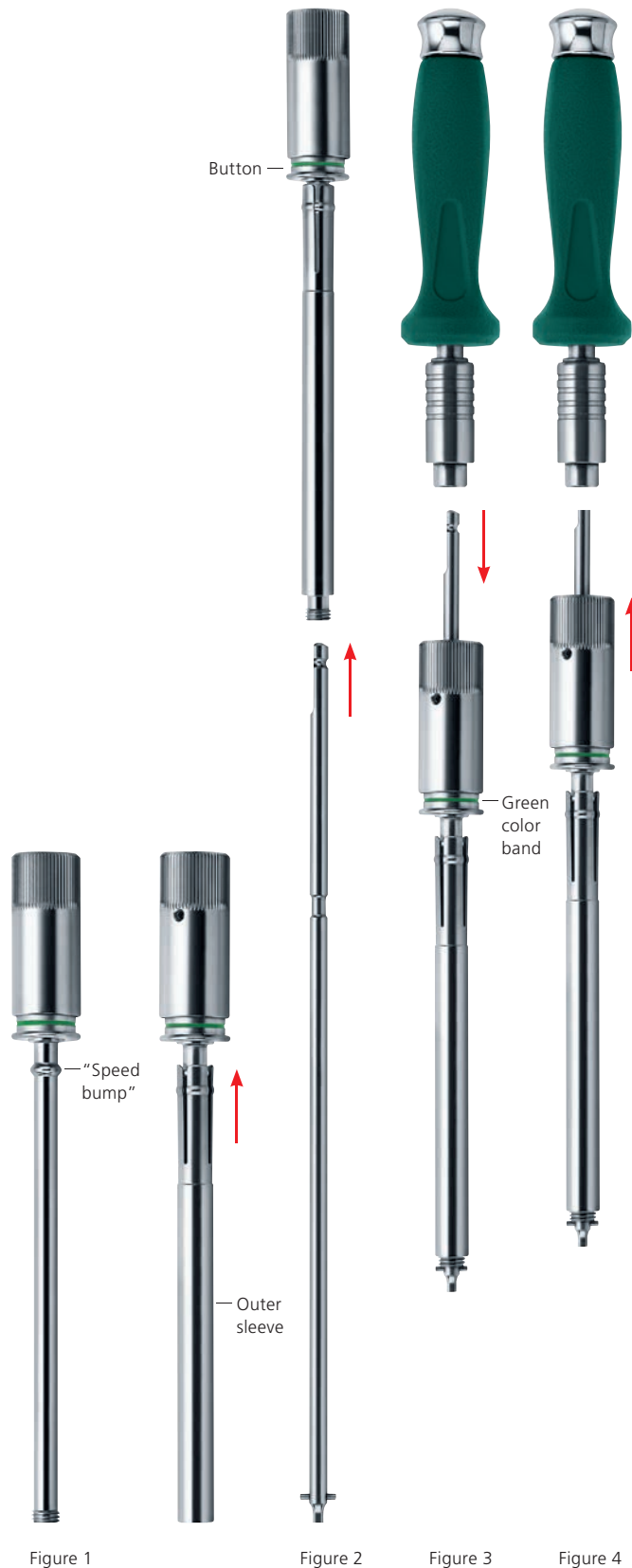


Figure 1

Figure 2

Figure 3

Figure 4

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**Attach screwdriver to polyaxial screw**

- Ensure that the driver is in the reset position. The green color band on the holding sleeve should not be visible.
- Insert the tip of the hexagonal screwdriver shaft into the bone screw of the polyaxial screw (5).
- Slide the sleeve until it comes in contact with the body of the polyaxial screw (6).
- Rotate the sleeve clockwise until it bottoms out on the cross pin of the hexagonal screwdriver shaft (7). The green color band should be visible. The polyaxial screw is ready for bone insertion.

**Remove screwdriver from the polyaxial screw**

- Rotate the sleeve counterclockwise. Before accepting another polyaxial screw the driver should be reset as shown in figure 4. The green color band on the holding sleeve should not be visible.

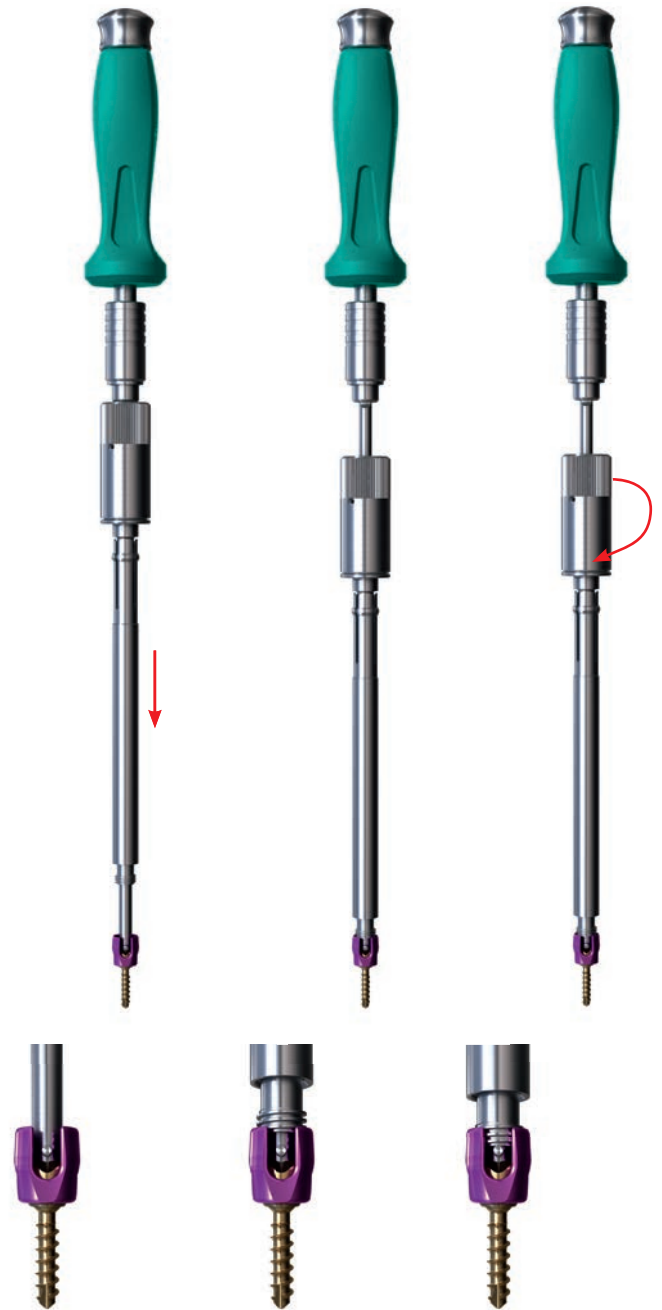


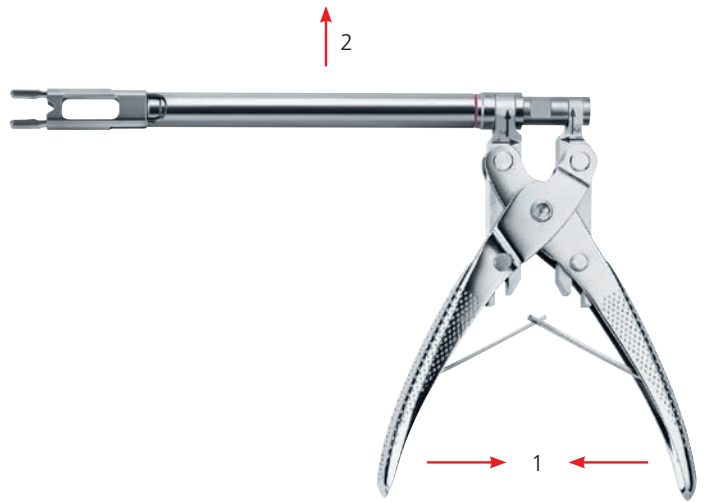
Figure 5

Figure 6

Figure 7



**1**



**2**



**3**

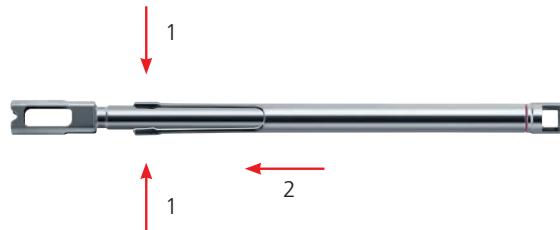




**1**



**2**

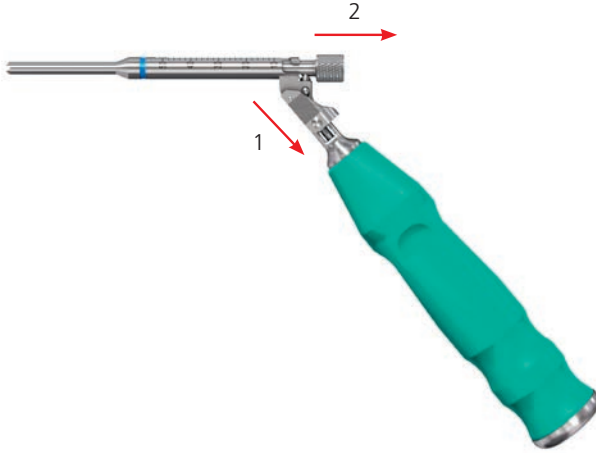


**3**





**1**



**2**





**1**



**2**



**3**







**1**



**2**



**3**

