

Synapse System. An enhanced set of instruments and implants for posterior stabilization of the upper spine.

Technique Guide



Table of Contents

Introduction	Synapse System	2
	AO Principles	3
	Indications	4

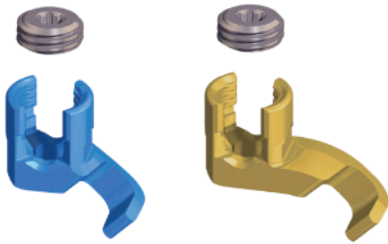
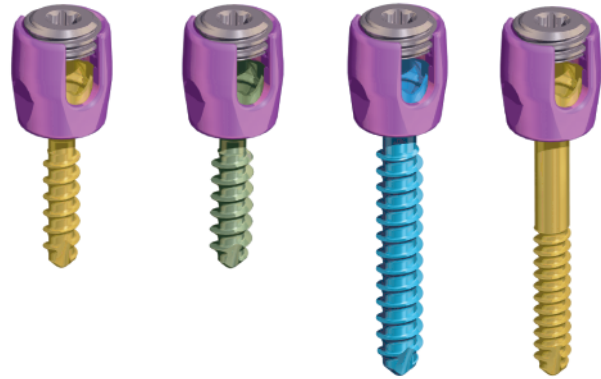
Surgical Technique	Preparation	5
	Technique	7
	Additional Techniques	18
	Implant Removal	26
	Assembly Guide	28

Product Information	Implants	30
	Instruments	33
	Set Lists	40

Synapse System

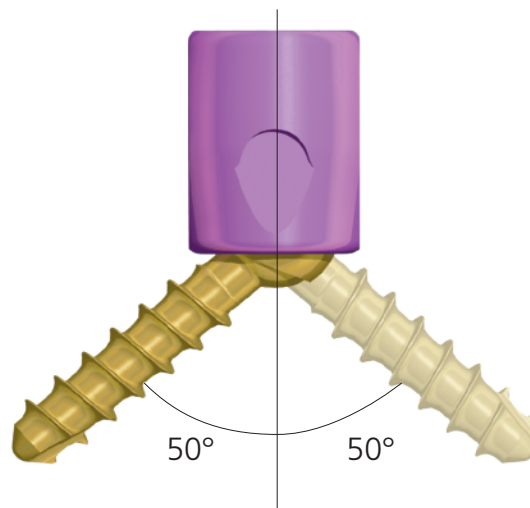
The Synapse System is an enhanced set of instruments and implants, including clamps, top loading variable axis screws, hooks, transconnectors and transverse bars and rods, designed for posterior stabilization of the upper spine. The implants provide the flexibility required to accommodate variations in patient anatomy.

The Synapse System uses 3.5 mm and 4.0 mm rods, allowing components from Synapse, Axon, CerviFix/StarLock and Occipital Cervical Fusion systems to be interchanged. This allows a construct to extend from the occiput to the lower spine using the Universal Spinal System (USS).



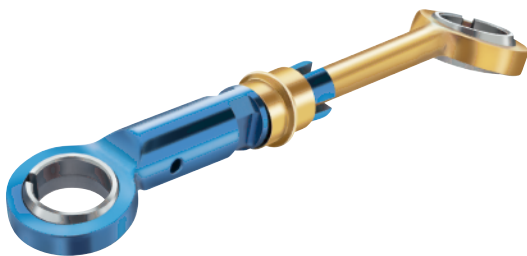
System features:

- 3.5 mm and 4.0 mm titanium* rods
- Top loading hooks
- Top loading transconnectors
- Square-threaded locking screws
- Robust polyaxial screws
- Simple, efficient instrumentation
- Multiple implant options for crossing the cervicothoracic junction
- Fully compatible with the OC Fusion system



Robust polyaxial screws

- Three diameters with cancellous profile
- Shaft screws with cortical profile
- 50° maximum screw angulation



*Titanium-6% aluminum-7% niobium alloy

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.¹ They are:

- Anatomic reduction
- 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.^{2,3}

1. M.E. Müller, M. Allgöwer, R. Schneider, and H. Willenegger. *Manual of Internal Fixation*, 3rd Edition. Berlin: Springer-Verlag. 1991.

2. Ibid.

3. M. Aebi, J.S. Thalgott, J.K. Webb. *AO ASIF Principles in Spine Surgery*. Berlin: Springer-Verlag. 1998.

Indications

The Synapse System is indicated as follows:

Hooks, plate/rods, plates, rods and screws

When intended to provide posterior stabilization as an adjunct to fusion of the cervical spine and occipitocervical junction (occiput–T3), the plate/rod, plates, rod, hook and screw (3.2 mm cortex) components of the Synthes CerviFix, Axon, OC Fusion and Synapse Systems are indicated for skeletally mature patients using allograft and/or autograft for the following:

- Degenerative disc disease (DDD) (defined as neck pain of discogenic origin with degeneration of the disc as confirmed by patient history and radiographic studies)
- Spondylolisthesis
- Spinal stenosis
- Fracture/dislocation
- Atlantoaxial fracture with instability
- Occipitocervical dislocation
- Revision of previous cervical spine surgery
- Tumor

When used to treat these cervical and occipitocervical conditions, screws are limited to occipital fixation only.

Hooks and rods

The rod and hook components are also intended to provide stabilization to promote fusion following reduction of fracture/dislocation or trauma in the cervical/upper thoracic (C1–T3) spine.

Rods, clamps, screws, nuts, variable axis screws, locking screws, and transverse bars

The rods, clamps, screws, nuts, variable axis screws, locking screws, and transverse bars are intended to promote fusion following reduction of fracture/dislocation or trauma in the upper thoracic spine (T1–T3).

The use of these screws (3.5 mm, 4.0 mm and 4.5 mm cancellous, and 3.5 mm and 4.2 mm cortex) is limited to placement in T1–T3 in treating thoracic conditions only. They are not intended to be placed in or treat conditions involving the cervical spine.

The Synthes CerviFix, Axon, and Synapse Systems can also be linked to the Synthes Universal Spinal System using the 3.5 mm/6.0 mm and 4.0 mm/6.0 mm parallel connectors from that system and via the CerviFix tapered rods using lamina hooks, transverse process hooks, pedicle hooks, 4.2 mm screws and the 5.0 mm/6.0 mm parallel connector.

Warning: This device is not intended for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic (T4–T12), or lumbar spine.

Contraindications

Contraindications for the use of the Synthes CerviFix, Axon, and Synapse Systems include:

- Active systemic infection or an infection localized to the site of the proposed implantation.
- Severe osteoporosis may prevent adequate fixation of the screws and preclude the use of this or any other spinal instrumentation system.
- Patients who have been shown to be safely and predictably treated without internal fixation.
- Open wounds
- Foreign body sensitivity

Mental or physical impairment, which compromises or prevents a patient's ability to comply with necessary limitations or precautions, may place that patient at a particular risk during postoperative rehabilitation.

Factors such as the patient's weight, activity level, and adherence to weight bearing or load bearing instructions have an effect on the stresses to which the implant is subjected. Additional factors which may preclude the possibility of fusion include any underlying physiological conditions such as kidney dialysis, cancer, osteopenia, smoking, or diabetes.

The CerviFix, Axon, and Synapse Systems (hooks) are contraindicated for use in postlaminectomy cases.

Please refer to package insert for the full list of indications, contraindications, warnings and/or precautions.

Preparation

1

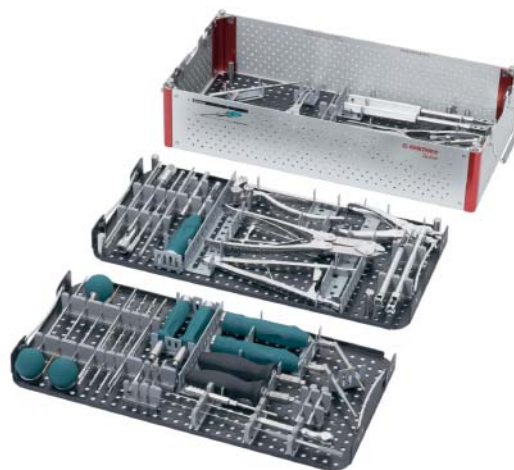
Preparation

Required set

- 01.614.001 Synapse Instrument and Titanium Implant Set
 - or
 - 01.615.006 Synapse 4.0 mm Instrument and Titanium Implant Set
-

Optional set

- 01.601.020 Occipital Cervical Fusion Instrument and Titanium Implant Set
-



01.614.001

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. Place the patient 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.

Surgical Technique

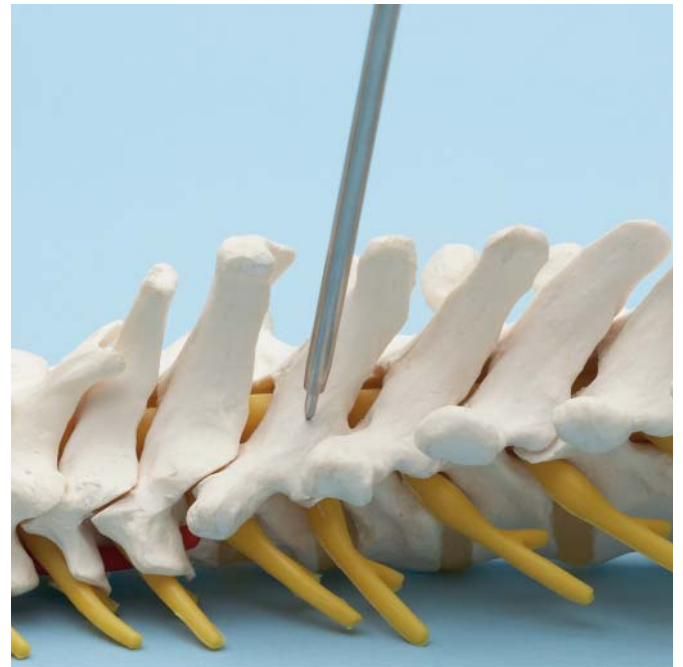
1

Start screw hole

Instrument

388.397 Awl

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.



2

Select screw and drill guide

Instrument

03.614.010 3.2 mm Drill Bit with 65 mm stop, quick coupling

03.614.011 Drill Guide with graduation, for 3.2 mm Drill Bit

or

388.394 2.4 mm Drill Bit with 65 mm stop, quick coupling

388.393 Drill Guide with graduation, for 2.4 mm Drill Bit

Screw Diameter	Drill Bit	Drill Guide
3.5 mm	388.394	388.393
4.0 mm	388.394	388.393
4.5 mm	03.614.010	03.614.011

Select the drill bit and drill guide that correspond to the screw diameter to be used. The 3.5 mm and 4.0 mm screws have the same core diameter (2.4 mm) and require the use of the same drill bit and drill guide, identified with a yellow band. The 4.5 mm screws have a larger core diameter (3.2 mm) and require the use of the drill bit and drill guide identified with a light blue color band. See table at right.

3

Set drill guide depth

Instrument

03.614.011 Drill Guide with graduation, for 3.2 mm Drill Bit

or

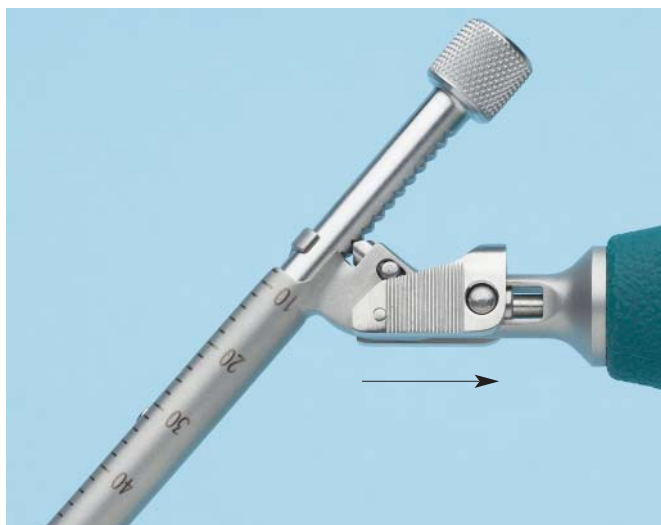
388.393 Drill Guide with graduation, for 2.4 mm Drill Bit

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

Alternative instrument

389.475* Drill Guide, 14 mm, for 2.4 mm drill bit

A drill guide with a fixed depth of 14 mm is additionally available for 3.5 mm and 4.0 mm screws.



*Also available

4

Drill hole

Instruments

388.393	Drill Guide with graduation, for 2.4 mm Drill Bit
388.394	2.4 mm Drill Bit, quick coupling, with 65 mm stop
388.549	Straight Ball Tip Probe

Drill to the desired trajectory and depth, using the 2.4 mm drill bit and drill guide. Use the straight ball tip probe to confirm, by palpation, accurate placement within the pedicle.

Caution: Do not touch the latch when drilling. Touching the latch could disengage the lock resulting in uncontrolled depth and potential harm to the patient.

Alternative instruments

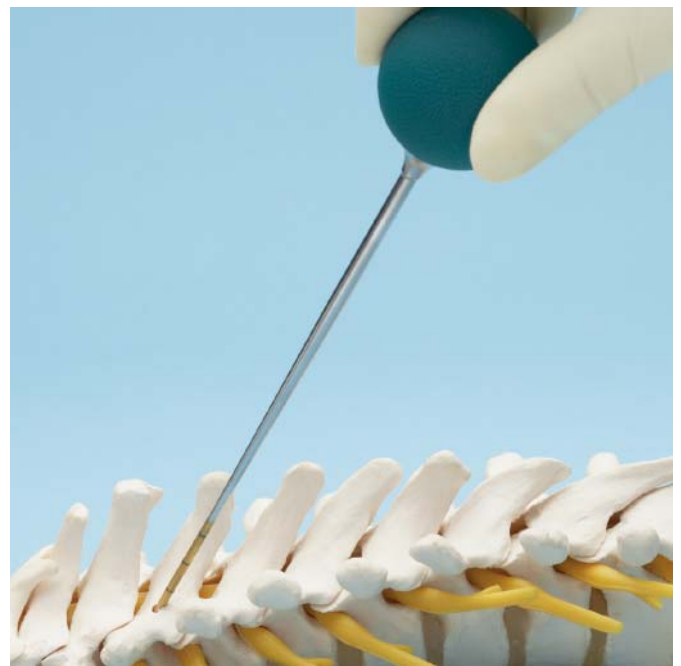
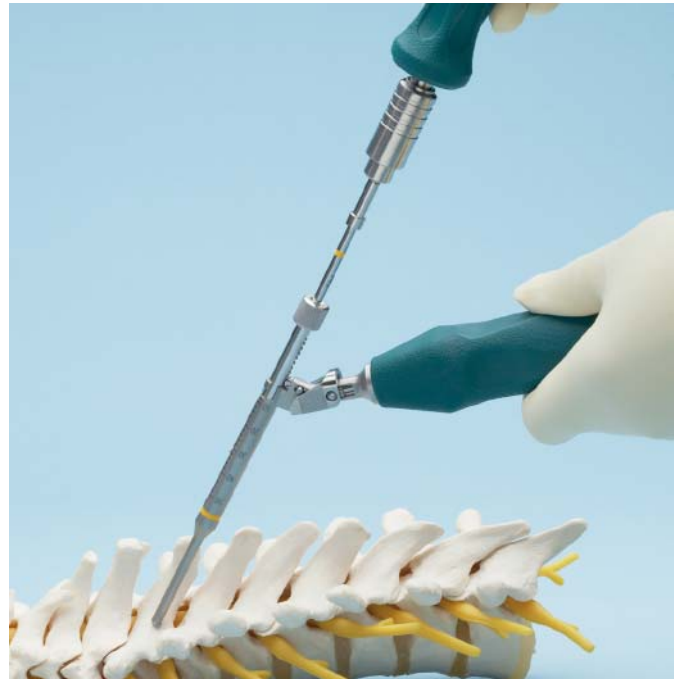
03.614.010	3.2 mm Drill Bit with 65 mm stop, quick coupling
03.614.011	Drill Guide with graduation, for 3.2 mm Drill Bit

Alternative technique

Instruments

03.614.012	Pedicle Probe, 2.4 mm
03.614.013	Curved Pedicle Probe, 2.4 mm

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



4

Drill hole continued

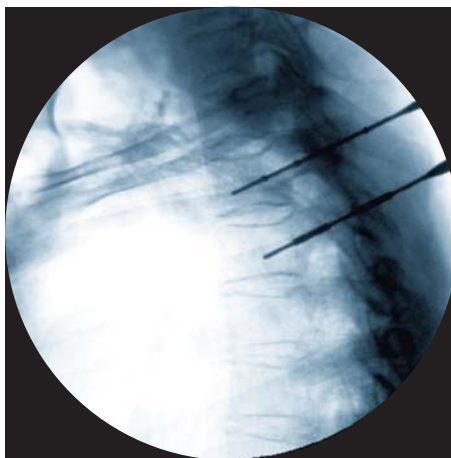
Optional technique

Instruments

389.473 Small Pedicle Marker, beaded

389.474 Small Pedicle Marker, long beaded

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



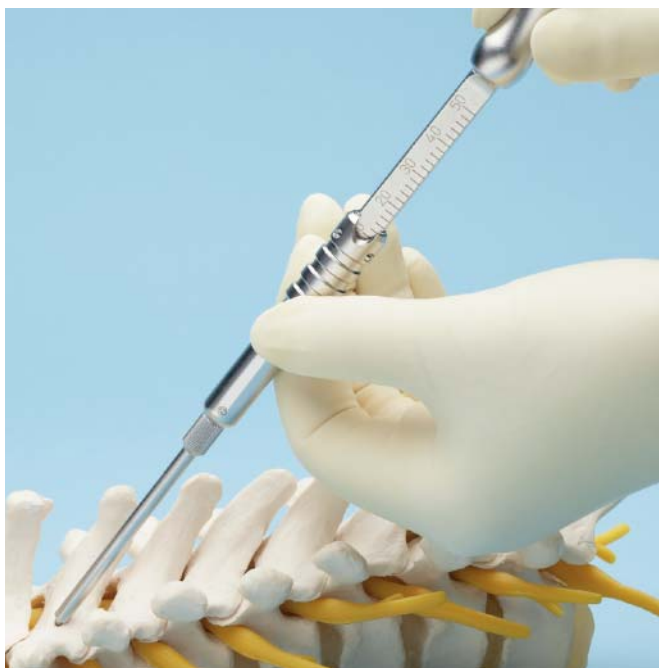
5

Measure

Instrument

03.161.028 Depth Gauge

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

Insert screw

Instruments

03.614.017	Threaded Holding Sleeve, for polyaxial screws
03.614.018	Cross Pinned StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
324.107	Quick Coupling Handle, with swivel cap

Optional instruments

03.614.036	Slip Sleeve, for Threaded Holding Sleeve
03.614.039	Cross Pinned Hexagonal Screwdriver Shaft, quick coupling

Refer to page 28 for screwdriver assembly and implant attachment instructions.

Insert the selected 3.5 mm or 4.5 mm self-tapping Synapse screw. A 4.0 mm emergency screw may be used if the primary 3.5 mm screw has less than optimal fixation.

Note: The optional slip sleeve may be used to grip the holding sleeve during screw insertion.



6

Insert screw continued

Alternative technique

Instruments

03.614.015 Tap for 4.5 mm Cancellous Bone Screws,
205 mm, 50 mm calibration

03.614.016 4.5 mm/3.5 mm Tap Sleeve

311.349 Tap for 3.5 mm Cancellous Bone Screws,
50 mm calibration

389.477 Tap for 3.5 mm Cortex Screws, 50 mm
calibration

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

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

7

Place additional screws

Use the same technique to insert the remaining screws.



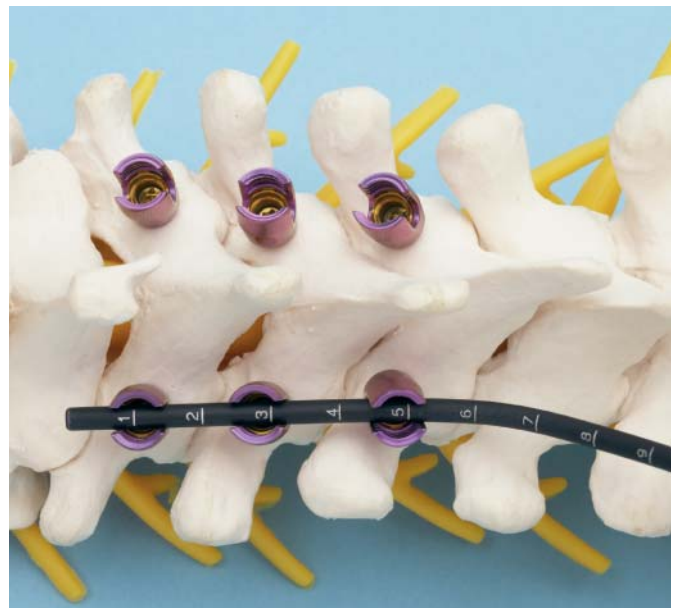
8

Contour template

Instrument

388.868	Rod Template, 240 mm (for 3.5 mm and 4.0 mm rods)
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Contour the rod template to fit the anatomy.



9

Bend and cut rod

Instruments

03.614.021 Rod Cutter

03.614.022 Rod/Plate Bender

Use the rod/plate bender to contour the rod to match the curve of the template. The bend line arrow indicates where the rod will be bent.

Use the rod cutter to cut the rod to the appropriate length.

Alternative technique

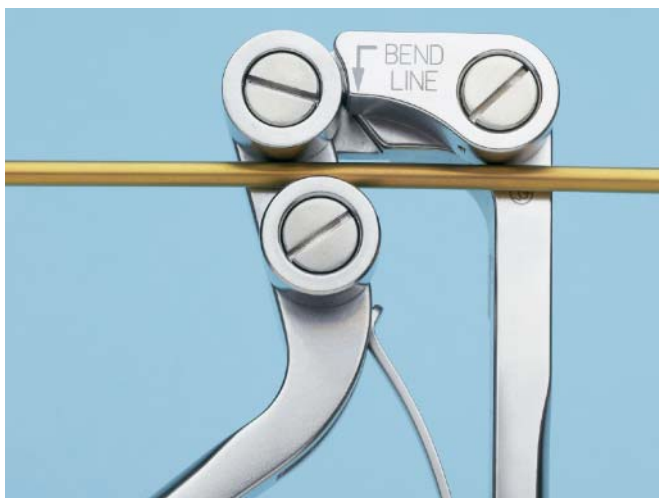
Shorter rod sections may be bent by placing one end of the rod on the internal ledge of the bending feature.

Alternative instruments

03.614.024 Bending Iron, left

03.614.025 Bending Iron, right

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 thumbwheels clockwise. With both ends locked inside the irons, the rod may be contoured.



10

Insert rod

Instrument

388.407	Holding Forceps
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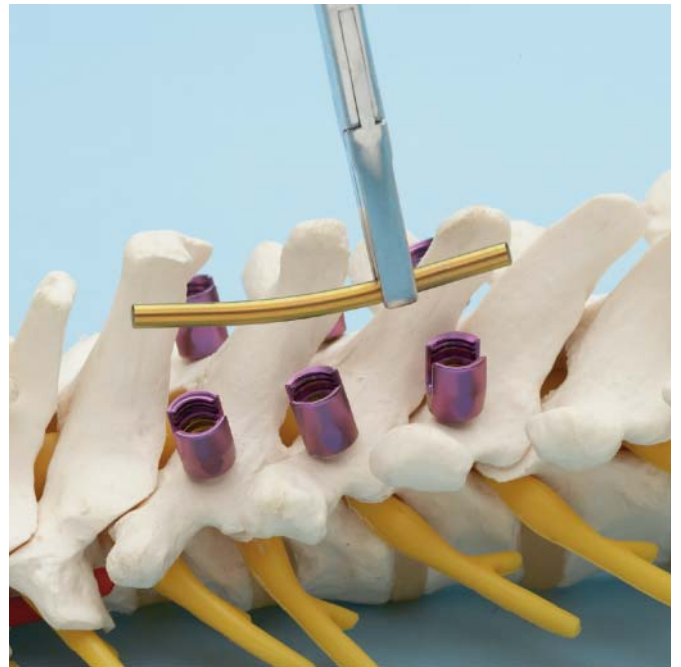
Optional instruments

03.614.024	Bending Iron, left
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03.614.025	Bending Iron, right
------------	---------------------

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 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.



11

Insert locking screw

Instruments

03.614.019	StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
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03.614.035	2 Nm Torque Limiting Handle, with quick coupling
------------	---

Loosely fasten the locking screws using the StarDrive 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.



11

Insert locking screw continued

Alternative technique

Instrument

03.614.027 Persuader

or

03.615.009 Persuader, for 4.0 mm rods

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



Optional technique

Instrument

03.614.023 Rod Holder

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



12

Lock construct

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling

03.614.026 Countertorque
or

03.615.010 Countertorque, for 4.0 mm rods

03.614.035 2 Nm Torque Limiting Handle

After final adjustment of the construct, fully tighten all locking screws with the screwdriver shaft and the 2 Nm torque limiting handle. The construct is now rigidly locked. Final tightening should be accomplished after all locking screws have been placed, and should be aided by the countertorque tool.

Note: The persuader may be used in place of the countertorque tool to lock the construct.



13

Apply compression or distraction

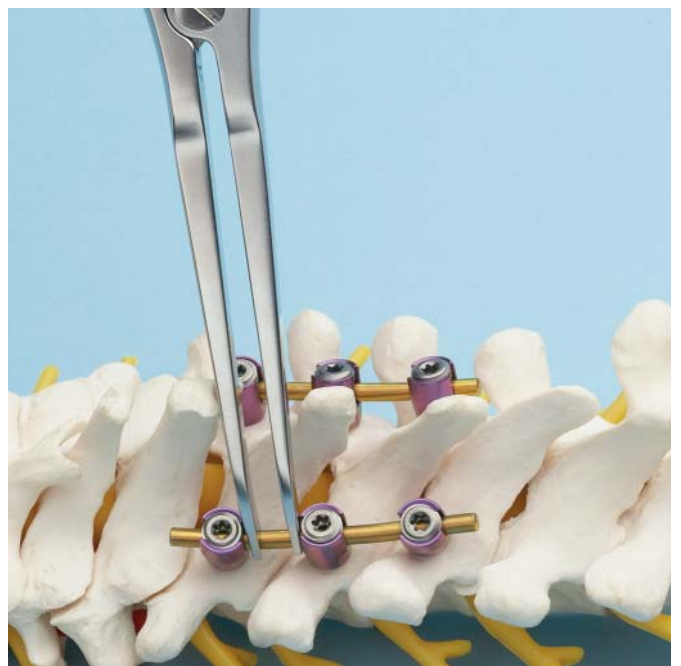
Instruments

03.614.028 Distraction Forceps

03.614.029 Compression Forceps

Compression or distraction with variable axis heads is only possible if the locking screws have not been tightened. Use the compression forceps to achieve compression, or the distraction forceps to achieve distraction, and then tighten the setscrew as described in Step 12.

Note: All setscrews are designed to be near flush to the top of the implant when locked. To ensure proper implant and rod (3.0 mm or 4.0 mm) configuration, please verify the part number of the implant.



Additional Techniques

A. Place top loading hooks

Instruments

03.614.019	StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
03.614.030	Implant Holding Forceps
324.107	Quick Coupling Handle, with swivel cap

Position hook

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

Insert rod

Insert locking screw

Tighten the locking screw using the StarDrive screwdriver shaft with quick coupling handle. Turn the screwdriver one-quarter to one-half turn counterclockwise to seat the thread before tightening.



B. Insert top loading transconnectors

Note: The Synapse Top Loading Transconnector, compatible only with the Synapse System, is placed on top of two mono-segmental variable axis screws (T1–T3) to cover the exposed spinal cord following laminectomy.

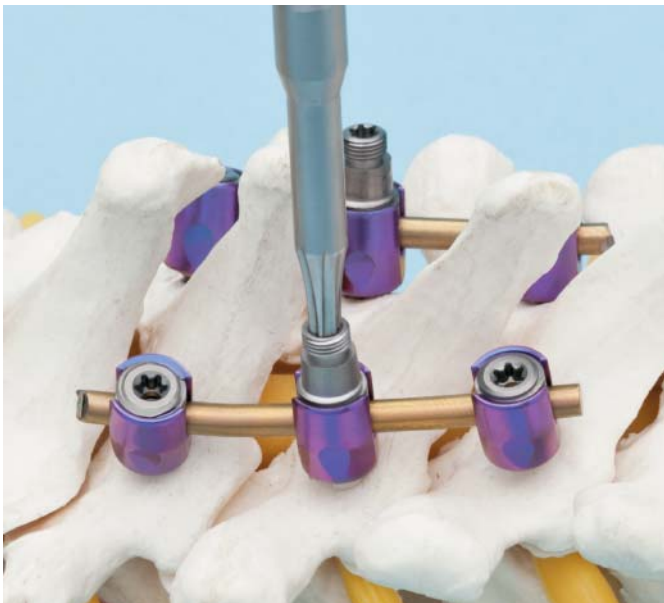
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Insert transconnector locking screw

Instruments

03.614.019	StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
03.614.035	2 Nm Torque Limiting Handle

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



2

Lock construct

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling

03.614.026 Countertorque

03.614.035 2 Nm Torque Limiting Handle

Optional instrument

03.614.027 Persuader

After final adjustment of the construct, fully tighten all locking screws using the screwdriver shaft and 2 Nm torque limiting handle. The construct is now rigidly locked. Final tightening should be accomplished after all locking screws have been placed, and should be aided by the countertorque tool.

Note: The persuader may be used in place of the countertorque to lock the construct.



3

Insert transconnector

Instrument

388.407 Holding Forceps

Select a straight or angled transconnector of appropriate length. Place the transconnector on the Synapse screw construct to assess fit. Hold the transconnector with the holding forceps. Adjust as necessary. Both sides of the transconnector should be placed over the locking screws before proceeding.

Note: Ensure the etched band on the transconnector shaft is not visible when implanting.

CAUTION: Do not bend the transconnector.



4

Tighten locking nut

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling

03.614.035 2 Nm Torque Limiting Handle

03.614.040 Transconnector Nut Driver, 7.5 mm

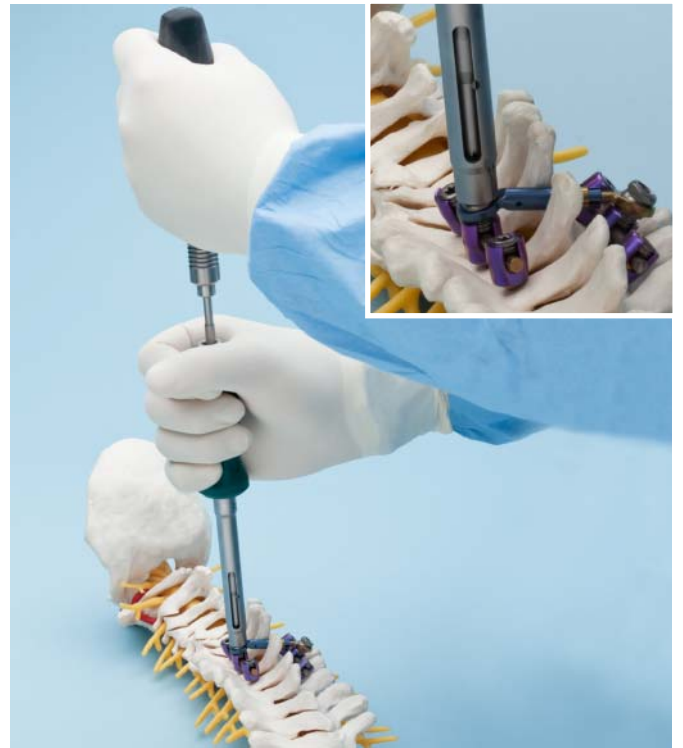
Select and place the locking nut onto the transconnector locking screw using the 7.5 mm nut driver. To provide alignment, insert the StarDrive screwdriver shaft and 2 Nm torque limiting handle into the cannula of the 7.5 mm nut driver and engage the T15 recess.

Loosely thread the locking nut onto the transconnector locking screw using the 7.5 mm nut driver. After all locking nuts have been placed, firmly tighten them with the 7.5 mm nut driver, using the StarDrive screwdriver shaft and 2 Nm torque limiting handle as counter torque.

Tip: Use the 7.5 mm nut driver to help seat the transconnector onto the transconnector locking screw.

CAUTION: Use only one hand to tighten. Overtightening may make removal difficult.

Note: When inserting the locking nuts, they may be turned one-quarter to one-half turn counterclockwise to seat the thread before tightening.



5

Lock connection

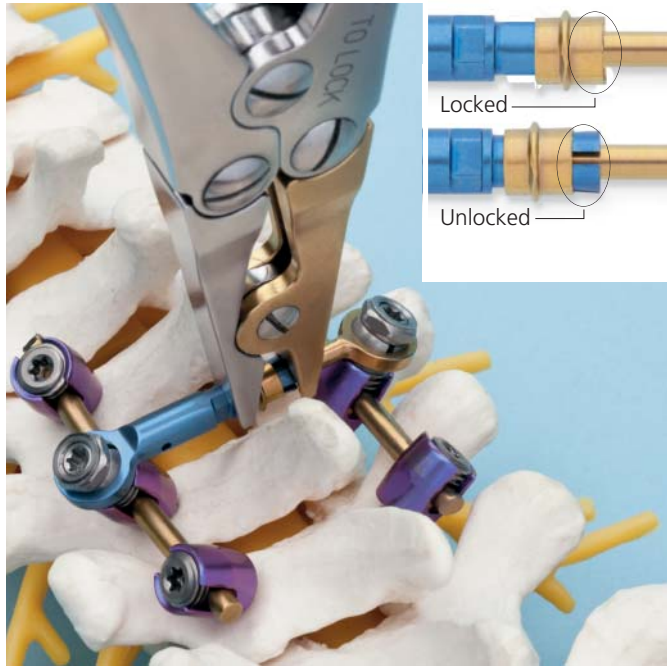
Instrument

388.038 Crimper, for use with Transconnector

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 transconnector shaft. The transconnector is now rigidly locked.

Notes: If necessary, the connection can be unlocked using the same instrument with the gold tip touching the blue portion of the transconnector.

Locking more than once may weaken the transconnector.



C. Adding rod-to-rod transconnectors

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling

03.614.021 Rod Cutter

324.107 Quick Coupling Handle, with swivel cap

388.038 Crimper for Transconnector

388.407 Holding Forceps

Position the transconnector

Place the transconnector on the Synapse rod construct. The transconnector may be held with the holding forceps.



Tighten clamp

Tighten the setscrew of the transconnector hook on the rod with the StarDrive screwdriver shaft. Slide the rod within the hook if necessary. Hold the second hook in the appropriate position and tighten the setscrew.

Tip: The rod may be bent to accommodate the anatomy. Locking one end of the transconnector with the crimper may facilitate placement.

Note: All setscrews are designed to be near flush to the top of the implant when locked. To ensure proper implant and rod (3.0 mm or 4.0 mm) configuration, please verify the part number of the implant.



Lock connections

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

Note: If necessary, the connection can be unlocked using the same instrument with the gold tip facing laterally. The rod may be shortened with the rod cutter.



D. Adding transverse bars

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling

324.107 Quick Coupling Handle, with swivel cap

Place the opening of the appropriate titanium 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 StarDrive screwdriver shaft.

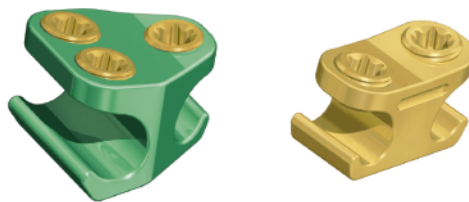
Note: All setscrews are designed to be near flush to the top of the implant when locked. To ensure proper implant and rod (3.0 mm or 4.0 mm) configuration, please verify the part number of the implant.



E. Parallel Connectors

Open parallel connectors allow side loading of the 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.

Note: All setscrews are designed to be near flush to the top of the implant when locked. To ensure proper implant and rod (3.0 mm or 4.0 mm) configuration, please verify the part number of the implant.



F. Tapered Rods

Tapered rods may be used to extend a Synapse construct. Connect the 3.5 mm or 4.0 mm section to the Synapse polyaxial screws as instructed in Steps 8–10 of the surgical technique. Connect the 5.0 mm/6.0 mm end of the rod to the appropriate Universal Spine System (USS).



G. Occipital fusion technique

Occipital plates or occipital clamps may be attached to the occiput as described in the *Occipital Cervical Fusion System Technique Guide*. These plates or clamps can then be connected to the Synapse system via 3.5 mm or 4.0 mm rods or pre-bent rods.



Implant Removal

Implant removal

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling

03.614.039 Cross Pinned Hexagonal Screwdriver Shaft, quick coupling

388.038 Crimper for Transconnector

All Synapse system implants can be removed with a T15 StarDrive screwdriver. The transconnectors also require that the crimper be used for removal.

Note: Synapse polyaxial screws may also be removed with the cross pinned hex shaft, with quick coupling.

Removing top loading transconnectors

Instrument

03.614.040 Transconnector Nut Driver, 7.5 mm

Remove nut

To remove the top loading transconnector, remove the nut using the 7.5 mm nut driver.



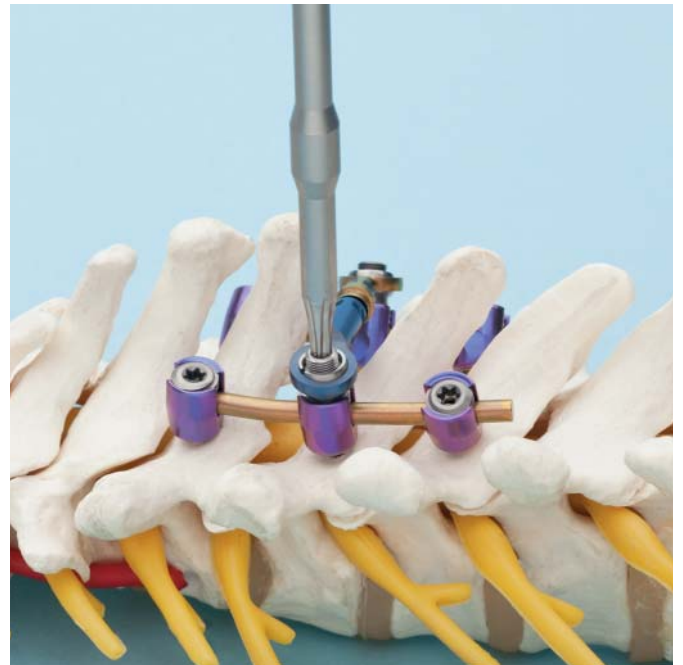
Remove transconnector

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15,
self-retaining, quick coupling

03.614.035 2 Nm Torque Limiting Handle

Use the StarDrive screwdriver shaft and 2 Nm torque limiting handle to unlock the locking screw and remove the transconnector.



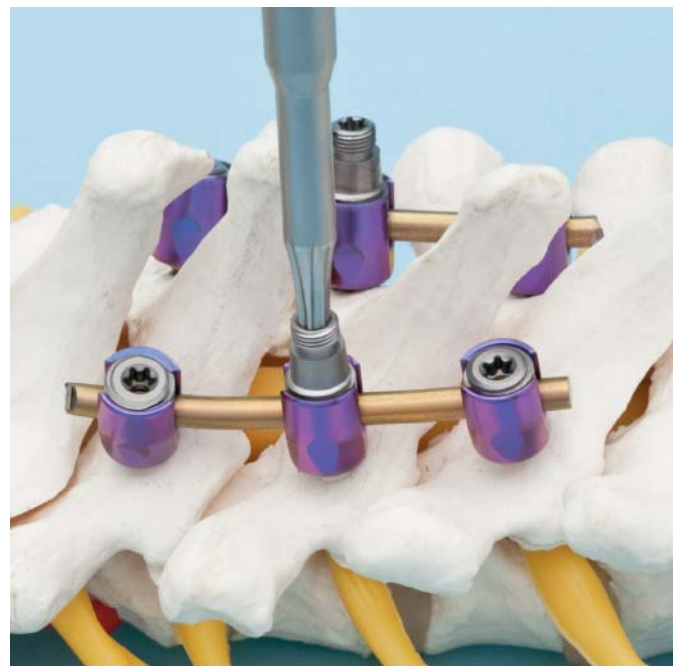
Remove transconnector locking screw

Instruments

03.614.019 StarDrive Screwdriver Shaft, T15,
self-retaining, quick coupling

03.614.035 2 Nm Torque Limiting Handle

Use the StarDrive screwdriver shaft and 2 Nm torque limiting handle to remove the transconnector locking screw.



Assembly Guide

Driver assembly elements

Instruments

03.614.017	Threaded Holding Sleeve, for polyaxial screws
03.614.018	Cross Pinned StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling
324.107	Quick Coupling Handle, with swivel cap

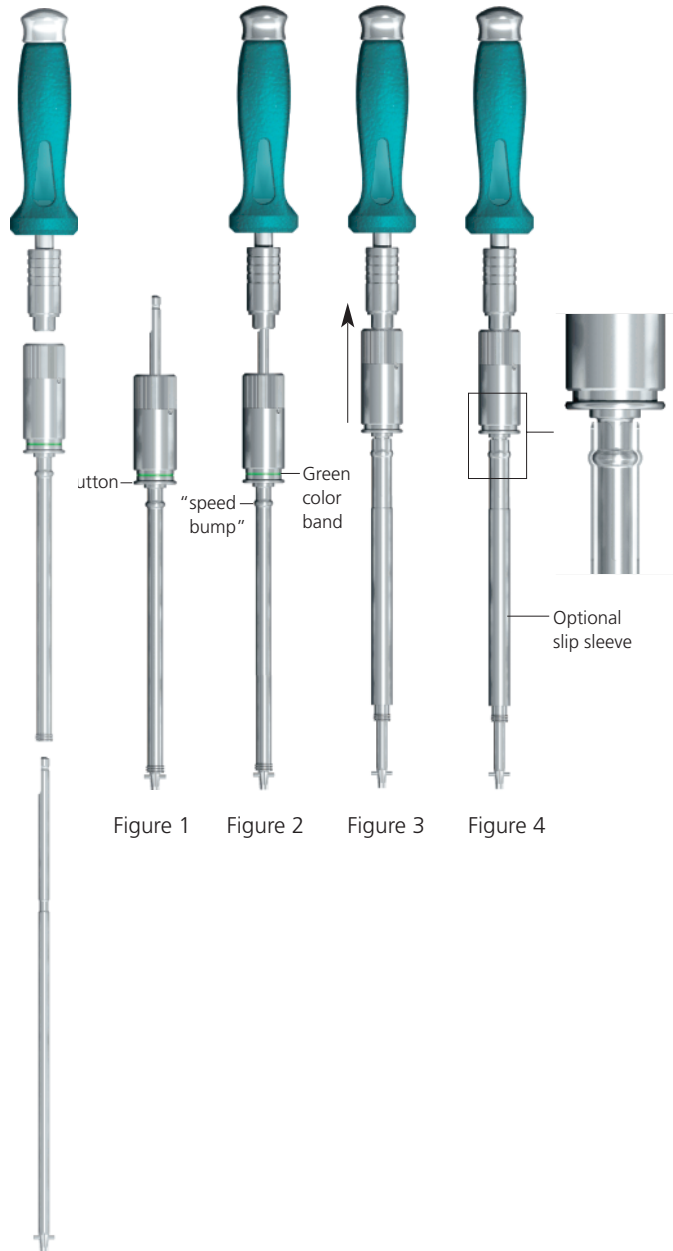
Optional instruments

03.614.036	Slip Sleeve, for Threaded Holding Sleeve
03.614.039	Cross Pinned Hexagonal Screwdriver Shaft, quick coupling

- Insert the back end of the cross pinned StarDrive screwdriver shaft through the distal tip of the threaded holding sleeve. Press the button on the threaded holding sleeve while inserting the screwdriver shaft. Ensure that the threaded holding sleeve has bottomed out on the cross pin at the distal end of the screwdriver shaft (Figure 1).
- Connect the quick coupling handle to the StarDrive screwdriver shaft (Figure 2).
- Reset the driver by pressing the button on the threaded sleeve and pulling back on the sleeve until it hits the handle (Figure 3). The green color band on the threaded holding sleeve should not be visible. Driver is ready for use

Optional assembly

- The optional slip sleeve may be added to the threaded holding sleeve prior to the steps above. Insert the threaded sleeve through the slotted end of the slip sleeve past the threads of the threaded holding sleeve. Snap the slip sleeve over the "speed bump" (Figure 4).
- The hexagonal screwdriver shaft may be used in place of the self-retaining screwdriver shaft.



Attach driver to polyaxial screw

- Ensure that the driver is in the reset position (Figure 3). The green color band on the threaded holding sleeve should not be visible.
- Insert the tip of the StarDrive screwdriver shaft into the bone screw of the polyaxial screw (Figure 5).
- Slide the threaded sleeve until it comes in contact with the body of the polyaxial screw (Figure 6).
- Rotate the threaded holding sleeve clockwise until it bottoms out on the cross pin of the StarDrive screwdriver shaft (Figure 7). The green color band should be visible. The polyaxial screw is ready for bone insertion.

Remove driver from polyaxial screw

- Rotate the threaded sleeve counterclockwise (Figure 3). Before accepting another polyaxial screw, the driver should be reset as shown in Figure 3. The green color band on the threaded holding sleeve should not be visible.

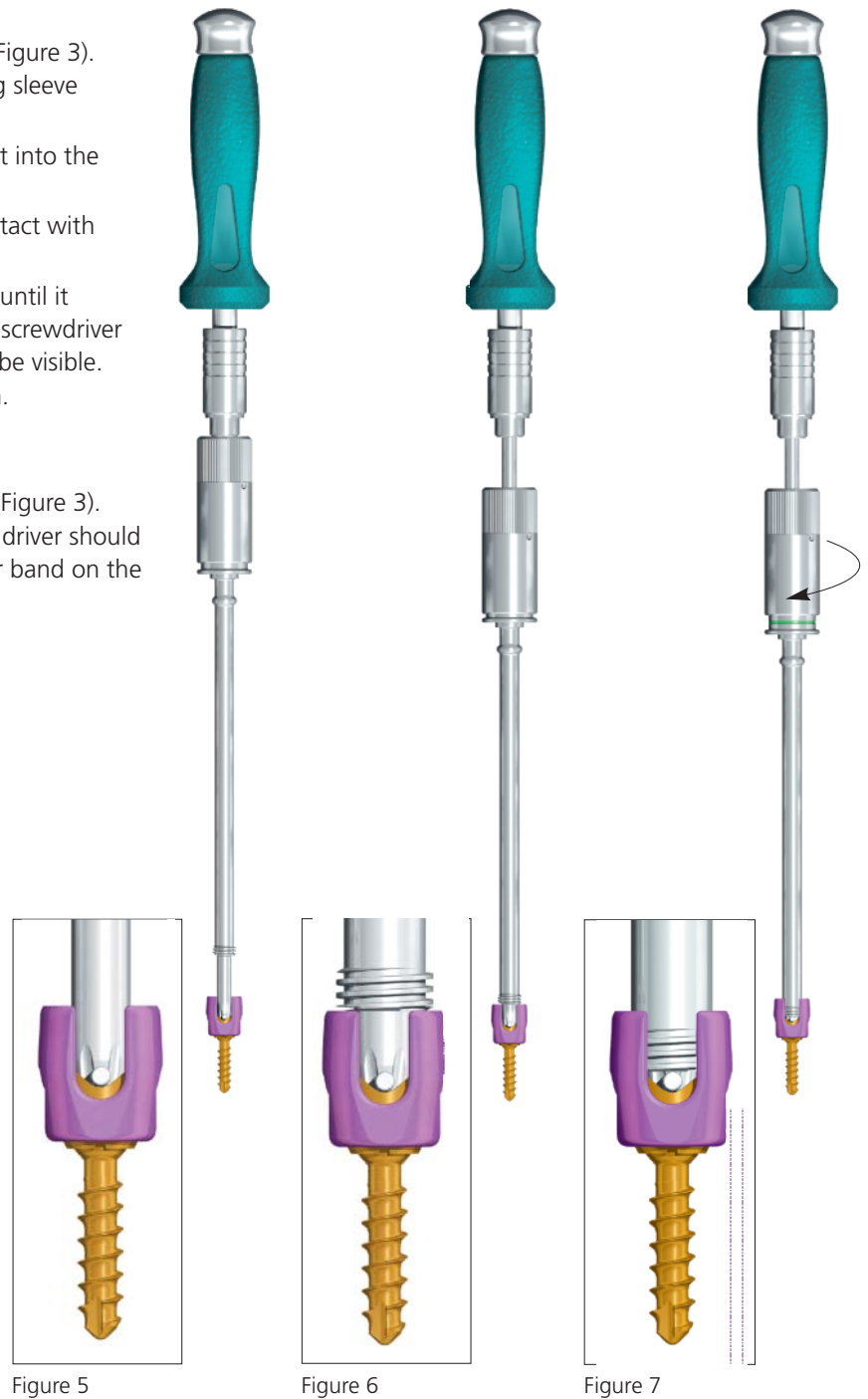


Figure 5

Figure 6

Figure 7

Implants

Variable axis screws

- For use with 3.5 mm rods (purple screwhead)
- For use with 3.5 mm and 4.0 mm rods (teal screwhead)

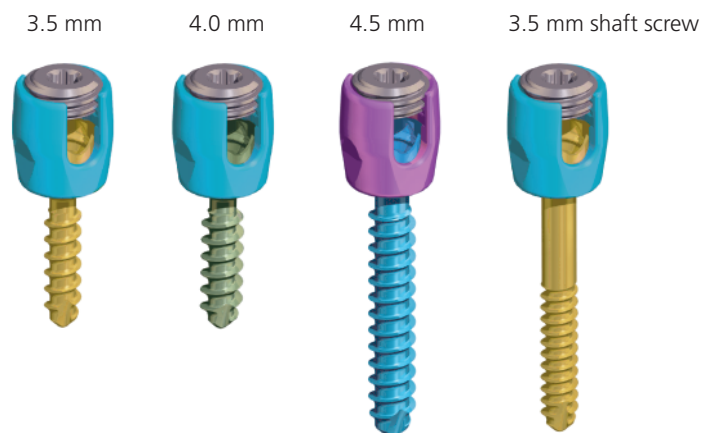
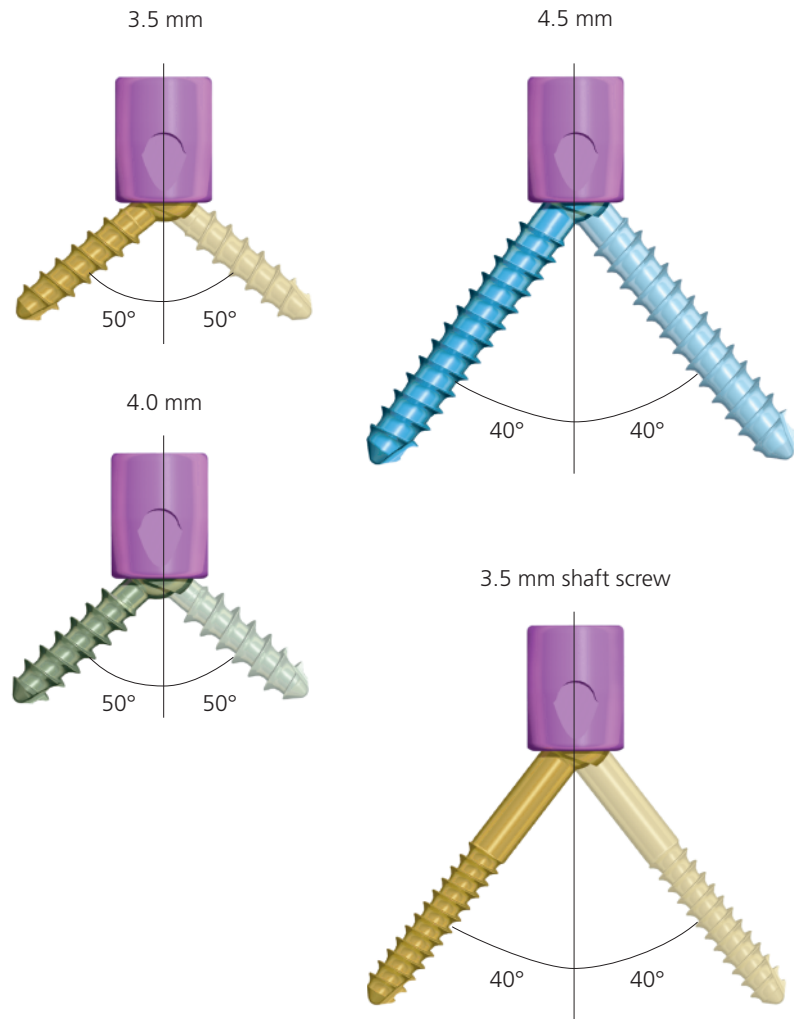
Cancellous screws

- 3.5 mm and 4.0 mm cancellous screws offer up to 50° of angulation in all directions
- 4.5 mm cancellous screws offer 40° of angulation in all directions
- Self-tapping
- Thread length from 8 mm to 50 mm
- Square-thread locking cap reduces occurrence of cross-threading
- T15 StarDrive interface mitigates screw toggle
- 8.0 mm run on rod

Shaft screws

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

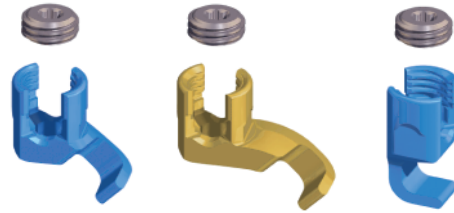
Outer Diameter (mm)	Core Diameter (mm)	Color Code
3.5	2.4	Gold
4.0	2.4	Green gray
4.5	3.2	Light blue



*Screw length is total length

Lamina hooks

- For sublaminar insertion and stabilization
- Short/long offsets ease construct assembly
- Top loading hooks
- Straight hooks
- Side-locking hooks



Transconnectors (rod-to-rod)

- Preassembled transconnectors 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



Top loading transconnectors (head-to-head)

- Increase construct rigidity
- 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 transconnector versions offer enhanced flexibility options



3.5 mm and 4.0 mm rods

- Rods are available in lengths of 80 mm, 120 mm, 240 mm and 350 mm
- Curved rods are available in lengths of 40 mm and 80 mm
- 3.5 mm rods (gold)
- 4.0 mm rods (blue)



Tapered rods

- Rods with dual diameters of 3.5 mm/4.0 mm, 3.5 mm/5.0 mm, 3.5 mm/6.0 mm, 4.0 mm/5.0 mm and 4.0 mm/6.0 mm in 120 mm/175 mm length
- 5 mm transition zone allows adjacent screws to be placed closer together
- Link the Synapse system to the Universal Spinal System (USS)



Transverse bars

- Provide a lateral offset of 9 mm or 15 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
- 5.0 mm and 6.0 mm clamps facilitate connection between the Synapse system and thoracolumbar system



Parallel open rod connectors

- Parallel open rod connectors link the Synapse construct to the Universal Spinal System (USS)



Instruments

292.745 Kirschner Wire, 2.4 mm with stop,
quick coupling



03.161.028 Depth Gauge



03.614.010 3.2 mm Drill Bit with 65 mm stop, quick
coupling



03.614.011 Drill Guide with graduation, for 3.2 mm
Drill Bit



03.614.012 Pedicle Probe, 2.4 mm



03.614.013 Curved Pedicle Probe, 2.4 mm



03.614.015 Tap for 4.5 mm Cancellous Bone Screws,
205 mm, 50 mm calibration



03.614.016 4.5 mm/3.5 mm Tap Sleeve



03.614.017 Threaded Holding Sleeve, for polyaxial screws



03.614.018 Cross Pinned StarDrive Screwdriver Shaft,
T15, self-retaining, quick coupling



03.614.019 StarDrive Screwdriver Shaft, T15,
self-retaining, quick coupling



03.614.021 Rod Cutter



03.614.022 Rod/Plate Bender



03.614.023 Rod Holder



03.614.024 Bending Iron, left
and
03.614.025 Bending Iron, right



03.614.026 Countertorque



03.614.027 Persuader



03.614.028 Distraction Forceps



03.614.029 Compression Forceps



03.614.030 Implant Holding Forceps



03.614.034 Alignment Tool



03.614.035 2 Nm Torque Limiting Handle,
with quick coupling



03.614.036 Slip Sleeve, for Threaded Holding Sleeve



03.614.039 Cross Pinned Hexagonal Screwdriver Shaft,
quick coupling



03.614.040 Transconnector Nut Driver, 7.5 mm



03.615.009 Persuader, for 4.0 mm rods



03.615.010 Countertorque, for 4.0 mm rods



03.615.011 Rod Shearer, for 4.0 mm rods



311.349 Tap for 3.5 mm Cancellous Bone Screws,
50 mm calibration



324.107 Quick Coupling Handle, with swivel cap



388.038 Crimper, for use with Transconnector



388.393 Drill Guide, with graduation for 2.4 mm
Drill Bit



388.394 2.4 mm Drill Bit, quick coupling, with 65 mm
stop



388.397

Awl



388.407

Holding Forceps



388.549

Straight Ball Tip Probe, small



388.868

Rod Template, 240 mm



389.473

Small Pedicle Markers
beaded



389.474

long beaded



389.477

Tap for 3.5 mm Cortex Screws, 50 mm
calibration



Synapse Instrument and Titanium Implant Set (01.614.001)

01.614.001 consists of:

01.614.010 Synapse 3.5 mm Titanium Rod Implant Set

01.614.011 Synapse Instrument Set

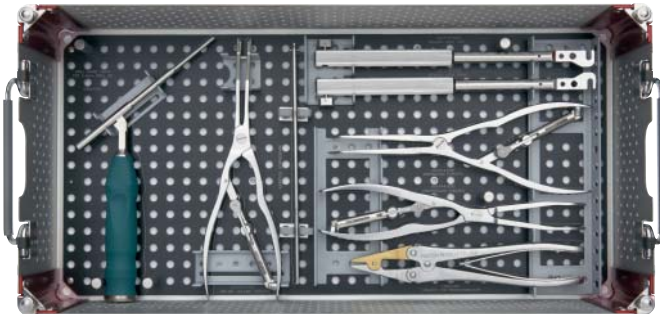
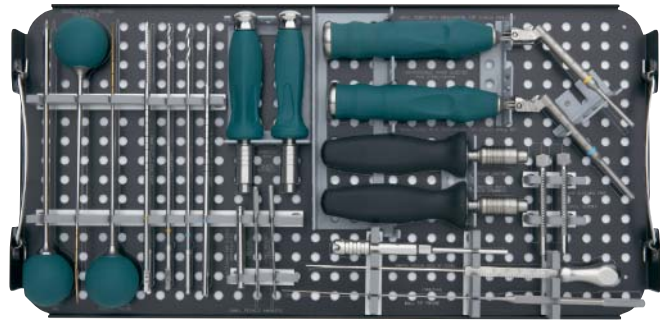
Graphic Cases

60.614.010 Graphic Case, for Synapse 3.5 mm Titanium Rod Implant Set

60.614.011 Graphic Case, for Synapse Instrument Set

Instruments (in set 01.614.011)

- 292.745 2.4 mm Kirschner Wire with stop, quick coupling
- 03.161.028 Depth Gauge
- 03.614.010 3.2 mm Drill Bit with 65 mm stop, quick coupling, 2 ea.
- 03.614.011 Drill Guide with graduation, for 3.2 mm Drill Bit
- 03.614.012 Pedicle Probe, 2.4 mm
- 03.614.013 Curved Pedicle Probe, 2.4 mm
- 03.614.015 Tap for 4.5 mm Cancellous Bone Screws, 205 mm, 50 mm calibration
- 03.614.016 4.5 mm/3.5 mm Tap Sleeve
- 03.614.017 Threaded Holding Sleeve, for polyaxial screws, 2 ea.
- 03.614.018 Cross Pinned StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling, 2 ea.
- 03.614.019 StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling, 2 ea.
- 03.614.021 Rod Cutter
- 03.614.022 Rod/Plate Bender
- 03.614.023 Rod Holder, 2 ea.
- 03.614.024 Bending Iron, left
- 03.614.025 Bending Iron, right
- 03.614.028 Distraction Forceps
- 03.614.029 Compression Forceps
- 03.614.030 Implant Holding Forceps
- 03.614.034 Alignment Tool



60.614.011

Note: For additional information, please refer to package insert. For detailed cleaning and sterilization instructions, please refer to <http://us.synthes.com/Medical+Community/Cleaning+and+Sterization.htm> or to the below listed inserts, which will be included in the shipping container:

- Processing Synthes Reusable Medical Devices—Instruments, Instrument Trays and Graphic Cases—DJ1305
- Processing Non-sterile Synthes Implants—DJ1304

Instruments (in set 01.614.011) *continued*

- 03.614.035 2 Nm Torque Limiting Handle, with quick coupling, 2 ea.
- 03.614.036 Slip Sleeve, for Threaded Holding Sleeve, 2 ea.
- 03.614.039 Cross Pinned Hexagonal Screwdriver Shaft, quick coupling, 2 ea.
- 311.349 Tap for 3.5 mm Cancellous Bone Screws, 50 mm calibration
- 324.107 Quick Coupling Handle, with swivel cap, 2 ea.
- 388.038 Crimper, for use with Transconnector
- 388.393 Drill Guide with graduation, for 2.4 mm Drill Bit
- 388.394 2.4 mm Drill Bit, quick coupling, with 65 mm stop, 2 ea.
- 388.397 Awl
- 388.407 Holding Forceps
- 388.549 Straight Ball Tip Probe, small
- 388.868 Rod Template, 240 mm
- 389.473 Small Pedicle Marker, beaded, 3 ea.
- 389.474 Small Pedicle Marker, long beaded, 3 ea.
- 389.477 Tap for 3.5 mm Cortex Screws, 50 mm calibration

Instrument (in set 01.614.019)

- 03.614.040 Transconnector Nut Driver 7.5 mm*

*Also available

Implants (in set 01.614.010)

3.5 mm Titanium Cancellous Polyaxial Screws

	Length (mm)	Qty.		Length (mm)	Qty.
04.614.008	8	8	04.614.030	30	4
04.614.010	10	12	04.614.032	32	4
04.614.012	12	12	04.614.034	34	4
04.614.014	14	12	04.614.036	36	4
04.614.016	16	12	04.614.038	38	2
04.614.018	18	8	04.614.040	40	2
04.614.020	20	8	04.614.042	42	2
04.614.022	22	8	04.614.044	44	2
04.614.024	24	8	04.614.046	46	2
04.614.026	26	4	04.614.048	48	2
04.614.028	28	4	04.614.050	50	2

4.0 mm Titanium Cancellous Polyaxial Screws

	Length (mm)	Qty.		Length (mm)	Qty.
04.614.108	8	4	04.614.130	30	2
04.614.110	10	4	04.614.132	32	2
04.614.112	12	4	04.614.134	34	2
04.614.114	14	4	04.614.136	36	2
04.614.116	16	4	04.614.138	38	2
04.614.118	18	4	04.614.140	40	2
04.614.120	20	4	04.614.142	42	2
04.614.122	22	4	04.614.144	44	2
04.614.124	24	4	04.614.146	46	2
04.614.126	26	4	04.614.148	48	2
04.614.128	28	2	04.614.150	50	2

4.5 mm Titanium Cancellous Polyaxial Screws

	Length (mm)	Qty.		Length (mm)	Qty.
04.614.220	20	2	04.614.236	36	4
04.614.222	22	2	04.614.238	38	2
04.614.224	24	4	04.614.240	40	2
04.614.226	26	4	04.614.242	42	2
04.614.228	28	4	04.614.244	44	2
04.614.230	30	4	04.614.246	46	2
04.614.232	32	4	04.614.248	48	2
04.614.234	34	4	04.614.250	50	2



60.614.010

3.5 mm Titanium Cortex Polyaxial Shaft Screws

	Length (mm)	Qty.		Length (mm)	Qty.
04.614.320	20	3	04.614.330	30	3
04.614.322	22	3	04.614.332	32	3
04.614.324	24	3	04.614.334	34	3
04.614.326	26	3	04.614.336	36	3
04.614.328	28	3			

Titanium Lamina Hooks

	Description	Qty.
04.614.500	Short, right	2
04.614.501	Short, left	2
04.614.502	Long, right	2
04.614.503	Long, left	2

Implants (in set 01.614.010) continued

Titanium Top Loading Lamina Hooks

	Description	Qty.
04.614.504	Short, right	2
04.614.505	Short, left	2
04.614.506	Long, right	2
04.614.507	Long, left	2
04.614.518	Short, straight	2
04.614.519	Long, straight	2

- 04.614.508 Titanium Locking Screw, 24 ea.
- 04.614.521 7.5 mm Locking Nut, 8 ea.
- 04.614.522 Transconnector Locking Screw, 8 ea.

Titanium Hard Rods

	Dia. (mm)	Length (mm)	Qty.
04.614.509	3.5/5.0	120/175	2
04.614.510	3.5/6.0	120/175	2

Titanium Transconnector for 3.5 mm Rods

	Length (mm)	Qty.
04.614.513	60	2
04.614.514	75	2

Titanium Top Loading Transconnectors

	Description	Qty.
04.614.515	Small	1
04.614.516	Medium	1
04.614.517	Large	1
04.614.550	Angled, small	1
04.614.551	Angled, medium	1
04.614.552	Angled, large	1

3.5 mm Titanium Rods

	Length (mm)	Qty.
498.120	80	4
498.125	120	4
498.957	240	4

3.5 mm Titanium Curved Rods

	Length (mm)	Qty.
498.136	40	2
498.137	80	4

- 406.103 3.5 mm Titanium Transverse Bar, 2 ea.
- 406.106 3.5 mm Titanium Transverse Bar with 5.0 mm clamp, 2 ea.
- 406.107 3.5 mm Titanium Transverse Bar with 6.0 mm clamp, 2 ea.
- 498.922 Titanium Parallel Open Rod Connector, 3.5 mm/3.5 mm, 2 ea.
- 498.923 Titanium Parallel Open Rod Connector, 3.5 mm/5.0 mm, 2 ea.
- 498.924 Titanium Parallel Open Rod Connector, 3.5 mm/6.0 mm, 2 ea.

Synapse 4.0 mm Instrument and Titanium Implant Set (01.615.006)

01.615.006 consists of:

01.615.007	Synapse 4.0 mm Titanium Implant Set	03.614.036	Slip Sleeve, for Threaded Holding Sleeve, 2 ea.
01.615.008	Synapse 4.0 mm Instrument Set	03.614.039	Cross Pinned Hexagonal Screwdriver Shaft, quick coupling, 2 ea.

Graphic Cases

60.615.001	Graphic Case, for Synapse 4.0 mm Titanium Rod Implant Set	03.615.009	Persuader, for 4.0 mm rod
60.615.002	Graphic Case, for Synapse 4.0 mm Rod Instrument Set	03.615.010	Countertorque, for 4.0 mm rod
60.614.019	Module for Titanium Transconnector Set	311.349	Tap for 3.5 mm Cancellous Bone Screws, 50 mm calibration

Instruments (in set 01.615.008)

292.745	2.4 mm Kirschner Wire with stop, quick coupling	388.393	Drill Guide with graduation, for 2.4 mm Drill Bit
03.161.028	Depth Gauge	388.394	2.4 mm Drill Bit, quick coupling, with 65 mm stop, 2 ea.
03.614.010	3.2 mm Drill Bit with 65 mm stop, quick coupling, 2 ea.	388.397	Awl
03.614.011	Drill Guide with graduation, for 3.2 mm Drill Bit	388.407	Holding Forceps
03.614.012	Pedicle Probe, 2.4 mm	388.549	Straight Ball Tip Probe, small
03.614.013	Curved Pedicle Probe, 2.4 mm	388.868	Rod Template, 240 mm
03.614.015	Tap for 4.5 mm Cancellous Bone Screws, 205 mm, 50 mm calibration	389.473	Small Pedicle Marker, beaded, 3 ea.
03.614.016	4.5 mm/3.5 mm Tap Sleeve	389.474	Small Pedicle Marker, long beaded, 3 ea.
03.614.017	Threaded Holding Sleeve, for polyaxial screws, 2 ea.	389.477	Tap for 3.5 mm Cortex Screws, 50 mm calibration
03.614.018	Cross Pinned StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling, 2 ea.		
03.614.019	StarDrive Screwdriver Shaft, T15, self-retaining, quick coupling, 2 ea.		
03.614.021	Rod Cutter		
03.614.022	Rod/Plate Bender		
03.614.023	Rod Holder, 2 ea.		
03.614.024	Bending Iron, left		
03.614.025	Bending Iron, right		
03.614.028	Distraction Forceps		
03.614.029	Compression Forceps		
03.614.030	Implant Holding Forceps		
03.614.034	Alignment Tool		
03.614.035	2 Nm Torque Limiting Handle, with quick coupling, 2 ea.		

Instrument (in set 01.615.007)

03.614.040	Transconnector Nut Driver 7.5 mm
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Implants (in set 01.615.007)

Titanium Top Loading Lamina Hooks

	Description	Qty.
04.614.504	Short, right	2
04.614.505	Short, left	2
04.614.506	Long, right	2
04.614.507	Long, left	2
04.614.518	Short, straight	2
04.614.519	Long, straight	2

Titanium Top Loading Transconnectors

	Description	Qty.
04.614.515	Small	1
04.614.516	Medium	1
04.614.517	Large	1
04.614.550	Angled, small	1
04.614.551	Angled, medium	1
04.614.552	Angled, large	1

Titanium Transconnectors, for 4.0 mm rods

	Length	Qty.
04.615.542	60	2
04.615.543	75	2

- 04.614.508 Titanium Locking Screw, 24 ea.
04.614.521 7.5 mm Locking Nut, 8 ea.
04.614.522 Transconnector Locking Screw, 8 ea.

Titanium Parallel Open Rod Connectors

	Description	Qty.
04.615.537	4.0 mm/3.5 mm, small	2
04.615.538	4.0 mm/4.0 mm, small	2
04.615.539	4.0 mm/5.0 mm, small	2
04.615.540	4.0 mm/6.0 mm, small	2
04.615.564	4.0 mm/3.5 mm, large	2
04.615.565	4.0 mm/4.0 mm, large	2
04.615.566	4.0 mm/5.0 mm, large	2
04.615.567	4.0 mm/6.0 mm, large	2

Implants (in set 01.615.007)

3.5 mm Titanium Cancellous Polyaxial Screws, for 4.0 mm rods

	Length (mm)	Qty.		Length (mm)	Qty.
04.615.008	8	4	04.615.030	30	4
04.615.010	10	8	04.615.032	32	4
04.615.012	12	12	04.615.034	34	4
04.615.014	14	12	04.615.036	36	4
04.615.016	16	12	04.615.038	38	2
04.615.018	18	8	04.615.040	40	2
04.615.020	20	8	04.615.042	42	2
04.615.022	22	8	04.615.044	44	2
04.615.024	24	8	04.615.046	46	2
04.615.026	26	4	04.615.048	48	2
04.615.028	28	4	04.615.050	50	2

4.0 mm Titanium Cancellous Polyaxial Screws, for 4.0 mm rods

	Length (mm)	Qty.		Length (mm)	Qty.
04.615.108	8	4	04.615.130	30	2
04.615.110	10	4	04.615.132	32	2
04.615.112	12	4	04.615.134	34	2
04.615.114	14	4	04.615.136	36	2
04.615.116	16	4	04.615.138	38	2
04.615.118	18	4	04.615.140	40	2
04.615.120	20	4	04.615.142	42	2
04.615.122	22	4	04.615.144	44	2
04.615.124	24	4	04.615.146	46	2
04.615.126	26	4	04.615.148	48	2
04.615.128	28	2	04.615.150	50	2

4.5 mm Titanium Cancellous Polyaxial Screws, for 4.0 mm rods

	Length (mm)	Qty.		Length (mm)	Qty.
04.615.220	20	2	04.615.236	36	4
04.615.222	22	2	04.615.238	38	2
04.615.224	24	4	04.615.240	40	2
04.615.226	26	4	04.615.242	42	2
04.615.228	28	4	04.615.244	44	2
04.615.230	30	4	04.615.246	46	2
04.615.232	32	4	04.615.248	48	2
04.615.234	34	4	04.615.250	50	2

3.5 mm Titanium Cortex Polyaxial Shaft Screws, for 4.0 mm rods

	Length (mm)	Qty.		Length (mm)	Qty.
04.615.320	20	3	04.615.330	30	3
04.615.322	22	3	04.615.332	32	3
04.615.324	24	3	04.615.334	34	3
04.615.326	26	3	04.615.336	36	3
04.615.328	28	3			

Titanium Hard Rods

	Diameter (mm)	Length (mm)	Qty.
04.615.510	3.5/4.0	120/175	2
04.615.511	4.0/5.0	120/175	2
04.615.512	4.0/6.0	120/175	2

4.0 mm Titanium Rods

	Length (mm)	Qty.
04.615.525	80	4
04.615.526	120	4
04.615.527	240	4

4.0 mm Titanium Curved rods

	Length (mm)	Qty.
04.615.529	40	2
04.615.530	80	4

4.0 mm Titanium Transverse Bars, 2 ea.

04.615.531	Short
04.615.532	Long
04.615.533	With 5.0 mm clamp, short
04.615.534	With 5.0 mm clamp, long
04.615.535	With 6.0 mm clamp, short
04.615.536	With 6.0 mm clamp, long

Also Available

Set

01.601.020 Occipital Cervical Fusion Instrument and Titanium Implant Set

Instruments

03.614.037 Straight Pedicle Probe, 3.2 mm
03.614.038 Curved Pedicle Probe, 3.2 mm
03.615.011 Rod Shearer for 4.0 mm rods
388.016 Rod Cutter, for 3.5 mm Titanium Rods
389.475 Drill Guide, 14 mm for 2.4 mm drill bit
389.476 Reamer

Implants

4.5 mm Titanium Cancellous Polyaxial Screws

	Length (mm)
04.614.208	8
04.614.210	10
04.614.212	12
04.614.214	14
04.614.216	16
04.614.218	18

3.5 mm Titanium Cortex Polyaxial Shaft Screws

	Length (mm)
04.614.318	18
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

04.614.520 Titanium Top Loading Transconnector, X-Large
04.614.553 Angled Titanium Top Loading Transconnector, X-Large

04.614.525 3.5 mm Titanium Transverse Bar, long

Titanium Parallel Open Rod Connectors

04.614.560 3.5 mm/3.5 mm, large
04.614.562 3.5 mm/5.0 mm, large
04.614.563 3.5 mm/6.0 mm, large

Implants continued

498.958 3.5 mm Titanium Rod, 350 mm

04.615.528 4.0 mm Titanium Rod, 350 mm

4.5 mm Titanium Cancellous Polyaxial Screws, for 4.0 mm rods

	Length (mm)
04.615.208	8
04.615.210	10
04.615.212	12
04.615.214	14
04.615.216	16
04.615.218	18

3.5 mm Titanium Cortex Polyaxial Shaft Screws, for 4.0 mm rods

	Length (mm)
04.615.318	18
04.615.338	38
04.615.340	40
04.615.342	42
04.615.344	44
04.615.346	46
04.615.348	48
04.615.350	50

Titanium Hard Rods

	Dia. (mm)	Length (mm)
04.221.000	3.5/5.0	190/500
04.221.001	3.5/6.0	190/500
04.614.511	3.5/5.0	240/255
04.614.512	3.5/6.0	240/255
04.615.515	4.0/5.0	240/255
04.615.516	4.0/6.0	240/255
04.615.520	4.0/5.0	195/500
04.615.521	4.0/6.0	195/500

Synapse System Compatibility Matrix

	Synapse 4.0 mm Rod System	Synapse 3.5 mm Rod System
Features and Design		
Rods	4.0 mm Titanium Tapered Rod	3.5 mm Titanium Tapered Rod
	4.0 mm Titanium Straight Rod	3.5 mm Titanium Straight Rod
	4.0 mm Titanium Pre-Curved Rod	3.5 mm Titanium Pre-Curved Rod
Screws	Accommodate 4.0 mm Rods and 3.5 mm Rods	Accommodate 3.5 mm Rods
	Polyaxial	same
	One piece body	same
	Top-loading	same
	Square thread locking screw	same
	T15 StarDrive Recess	same
	3.5 mm Titanium Cancellous Screws 8 mm – 50 mm (2 mm increments) 50° maximum angulation	3.5 mm Titanium Cancellous Screws 8 mm – 50 mm (2 mm increments) 50° maximum angulation
	4.0 mm Titanium Cancellous Screws 8 mm – 50 mm (2 mm increments) 50° maximum angulation	4.0 mm Titanium Cancellous Screws 8 mm – 50 mm (2 mm increments) 50° maximum angulation
	4.5 mm Titanium Cancellous Screws 8 mm- 50 mm (2 mm increments) 40° maximum angulation	4.5 mm Titanium Cancellous Screws 8 mm – 50 mm (2 mm increments) 40° maximum angulation
	3.5 mm Titanium Cortex Shaft Screw 18 mm- 50 mm (2 mm increments) 40° maximum angulation	3.5 mm Titanium Cortex Shaft Screw 18 mm – 50 mm (2 mm increments) 40° maximum angulation
Hooks	Not offered with the 4.0 mm system	Lamina Hooks (side-loading) Left and right offset T15 StarDrive Recess
	Top-Loading Lamina Hooks Left, right and straight offsets Short and long versions	Top-Loading Lamina Hooks Same
Transconnector	Top-Loading Transconnector	same
	4.0 mm Rod-to-Rod Transconnector	3.5 mm Rod-to-Rod Transconnector
	Transconnector Locking Screw and 7.5 mm Locking Nut	same
Additional components	4.0 mm Transverse Bars and Open Parallel Connectors	3.5 mm Transverse Bars and Open Parallel Connectors



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