Expert Nailing System With Radiolucent Instrumentation

Titanium Cannulated Lateral Entry Femoral Recon Nail

Surgical Technique

DePuy Synthes

PART OF THE Johnson & Johnson FAMILY OF COMPANIES

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MR Information
The Titanium Cannulated Lateral Entry Femoral Recon Nail System has not been evaluated for safety and compatibility in the MR environment. It has not been tested for heating, migration or image artifact in the MR environment. The safety of the Titanium Cannulated Lateral Entry Femoral Recon Nail System in the MR environment is unknown. Scanning a patient who has this device may result in patient injury.

Image intensifier control

Titanium Cannulated Lateral Entry Femoral Recon Nail

Expert Nailing System With Radiolucent Instrumentation

Advanced solutions

Nail features

- Design accommodates a lateral entry site through the greater trochanter
- Anatomic nail design based on a femoral canal study1
- Cannulated nails (from 9 mm to 16 mm diameter) for reamed or unreamed techniques
- Lengths from 300 mm to 480 mm, in 20 mm increments

Enhanced distal locking options

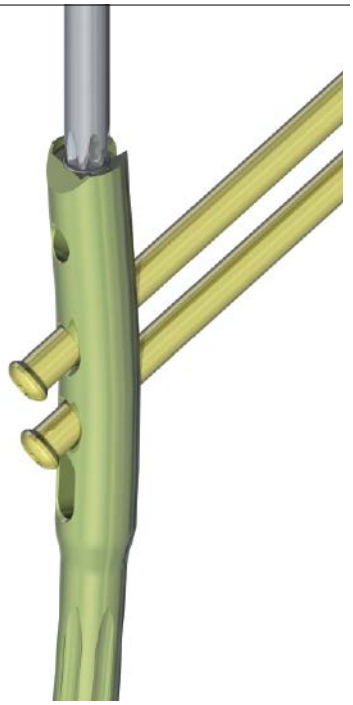
- Oblique distal locking hole offers enhanced stability of distal fractures

Improved instrumentation

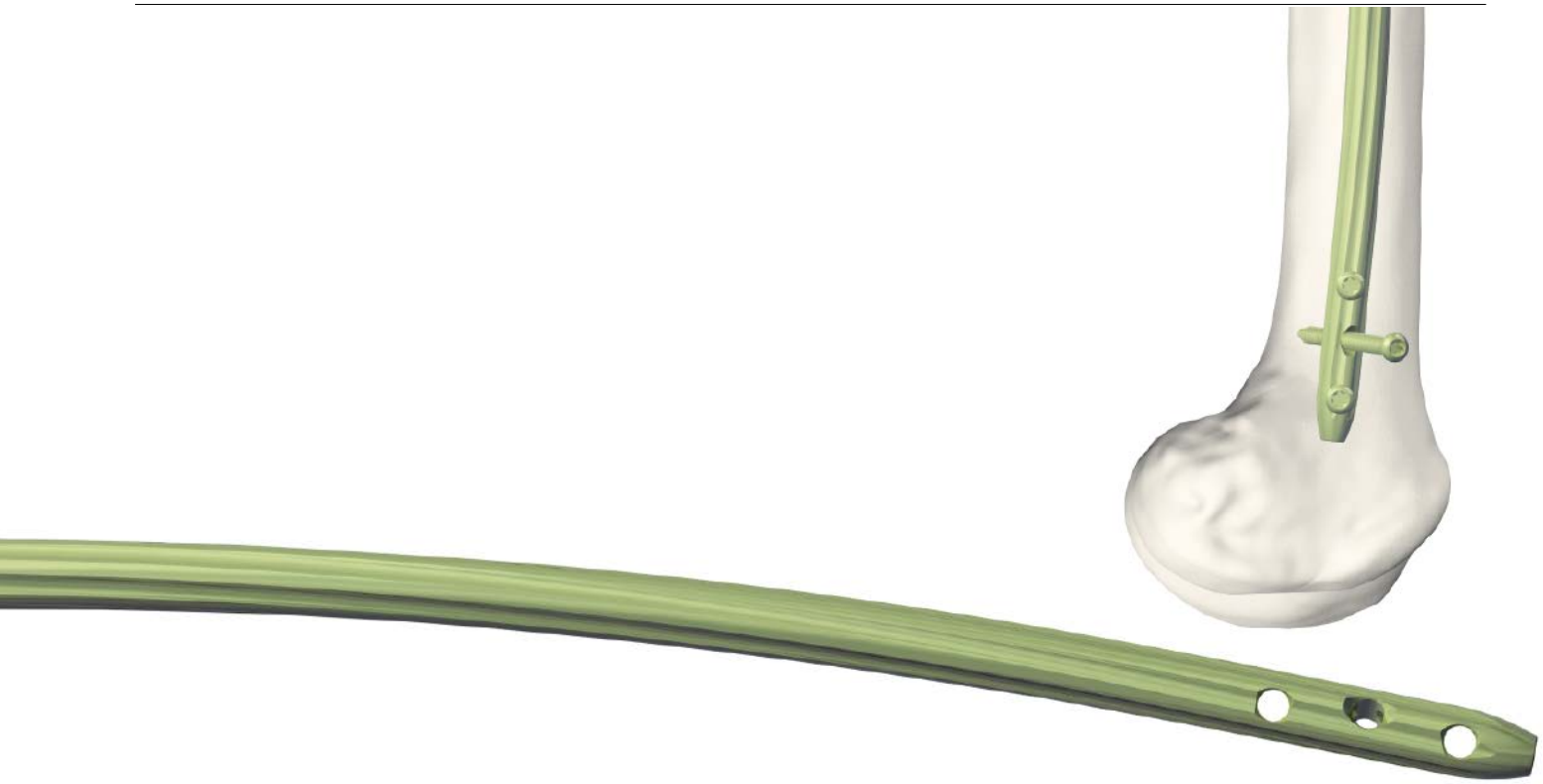
- Easy-to-use instrumentation facilitates the surgical procedure
- Ball-tip reaming rod can be removed through the nail and insertion instruments eliminating the need for an exchange tube
- Radiolucent aiming arms and insertion handles

End caps

- Prevent ingrowth of tissue and facilitate nail extraction
- Self-retaining, T40 StarDrive™ Recess for easy pickup and insertion of end cap
- Cannulated for insertion over a guide wire
- 0 mm end cap sits flush with nail
- 5, 10, 15, and 20 mm end caps extend nail height if nail is overinserted



1. L. Ehmke, B. Polzin, C. Roth, M. Bottlang, "Femoral Nailing Through the Trochanter: The Reamer Pathway Indicates A Helical Shape,"*Journal of Orthopedic Trauma*, Vol. 20, Number 10, November/December 2006, p. 668-674.



Standard locking screws

- Double-lead thread for ease of insertion
- Thread closer to screw head provides better bone purchase in the near cortex and improved stability
- Titanium alloy* for improved mechanical and fatigue properties
- Self-tapping blunt tip
- Self-retaining T25 StarDrive Recess allows improved torque transmission, increased resistance to stripping relative to a hex recess, and secure locking screw pickup
- 5.0 mm diameter for 9 mm to 13 mm nails
- 6.0 mm diameter for 14 mm to 16 mm nails

5.0 mm

6.0 mm

6.5 mm recon screws

- Self-retaining T25 StarDrive Recess
- Titanium alloy*
- Self-tapping blunt tip

6.5 mm

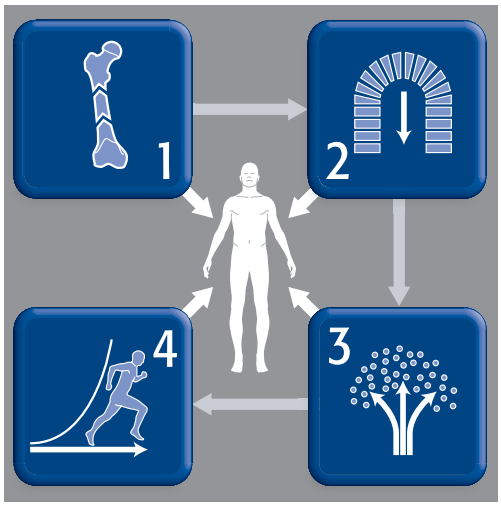
*Titanium-6% aluminum-7% niobium alloy

AO Principles

In 1958, the AO formulated four basic principles, which have become the guidelines for internal fixation.[2,3]

Anatomic reduction
Fracture reduction and fixation to restore anatomical relationships.

Early, active mobilization
Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.



Stable fixation
Fracture fixation providing absolute or relative stability, as required by the patient, the injury, and the personality of the fracture.

Preservation of blood supply
Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.

2. Müller ME, Allgöwer M, Schneider R, Willenegger H. *Manual of Internal Fixation*. 3rd ed. Berlin, Heidelberg, New York: Springer-Verlag; 1991.
3. Rüedi TP, RE Buckley, CG Moran. *AO Principles of Fracture Management*. 2nd ed. Stuttgart New York: Thieme; 2007.

Indications

The Lateral Entry Femoral Recon Nail–EX is indicated to stabilize:

- Subtrochanteric fractures
- Ipsilateral neck/shaft fractures
- Femoral shaft fractures
- Impending pathologic fractures
- Malunions and nonunions

Clinical Cases

Case 1–Standard locking

- 85-year-old female
- Isolated femoral shaft fracture (AO 32-A1.2)

For simple shaft fractures, two proximal and two distal ML locking screws are normally sufficient to stabilize the fracture. Stability of the distal fragment can be enhanced by the use of a third locking screw in the oblique hole.

Case 2–Recon locking

- 49-year-old male
- Ipsilateral femoral neck and shaft fractures (AO 31-B2, AO 32-B2)

The use of two recon screws (recon locking) ensures optimal stabilization for the treatment of combined femoral neck and shaft fractures.

The distal segment can be stabilized by using two ML locking screws. Stability of the distal fragment can be enhanced by the use of a third locking screw in the oblique hole.


Preoperative


Follow-up (1 month after surgery)


Preoperative


Follow-up (1 month after surgery)

Preoperative Planning

Use the preoperative planner template to estimate nail diameter and length.

To estimate nail diameter, place the template on the AP or lateral x-ray of the uninjured femur and measure the diameter of the medullary canal at the narrowest part that will contain the nail.

To estimate nail length, place the template on the AP x-ray of the uninjured femur and select the appropriate nail length based on patient anatomy. When selecting nail size, consider canal diameter, fracture pattern, patient anatomy and postoperative protocol.

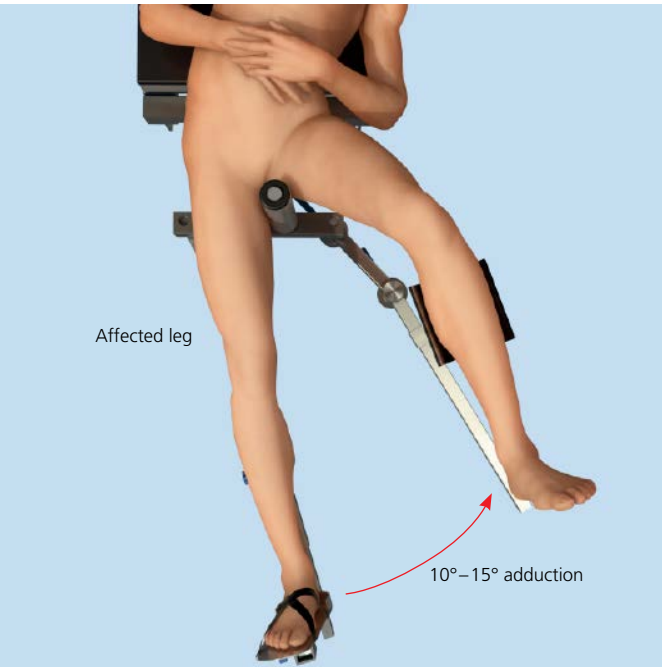
Note: Templates are available in two sizes: actual size and 115% magnification in which the image is enlarged 15% to correspond to typical radiographic magnification; however, variations in magnification levels are common.

Precaution: Using Intramedullary Nailing Implants in patients with open epiphysis may impair bone growth. Unless included within the specific indications in the corresponding surgical technique, using Intramedullary Nailing Implants are therefore not recommended for use in skeletally immature patients.

1. Position patient

Position the patient in the lateral decubitus or supine position on a fracture table or radiolucent operating table. Position the C-arm to allow visualization of the proximal femur in both the AP and lateral planes.

To facilitate access to the medullary canal, abduct the upper part of the body approximately 10°–15° to the contralateral side and adduct the affected limb by 10°–15°.



2. Reduce fracture

Instrument	
394.35*	Large Distractor

Perform closed reduction manually by axial traction under image intensifier control. The use of the large distractor or other reduction instrumentation may be appropriate in certain circumstances.

*Also available.

3. Confirm nail length

Instrument

03.010.020	Radiographic Ruler, for Titanium Cannulated Femoral Nails

The required nail length must be determined after reduction of the femoral fracture.

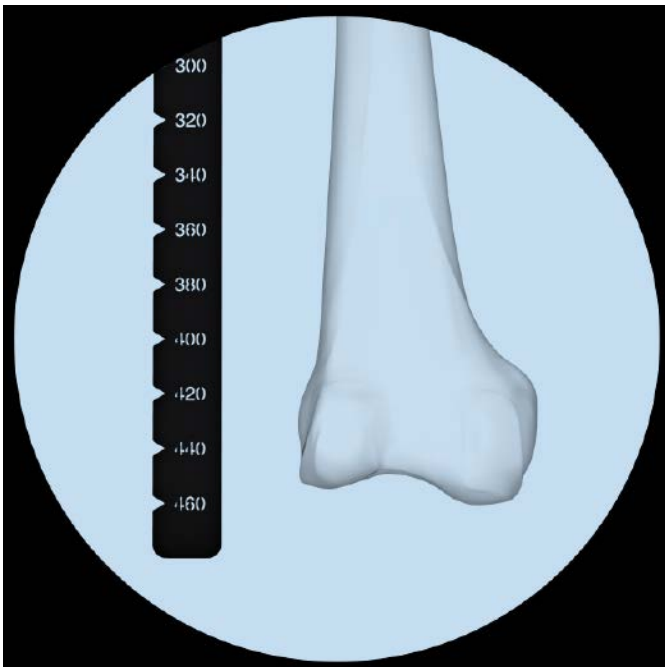
- Position the C-arm for an AP view of the proximal femur. With long forceps, hold the ruler alongside the lateral thigh, parallel to and at the same level as the femur. Adjust the ruler until the proximal end is at the desired nail insertion depth. Mark the skin at the proximal end of the ruler.

- Move the C-arm to the distal femur. Verify fracture reduction. Align the proximal end of the radiographic ruler to the skin mark, and take an AP image of the distal femur.

Read nail length directly from the ruler image, selecting the measurement at or just proximal to the epiphyseal scar, or at the chosen insertion depth.

Notes:

- **It is recommended that all fractures be treated with the longest nail possible, taking into account patient anatomy or a previous implant.**
- **Back-hammering or dynamization to close a fracture gap must be taken into account when determining the nail length. A shorter nail should be chosen when back-hammering or dynamization is planned. The dynamic slot allows 7 mm of movement.**



4. Confirm nail diameter

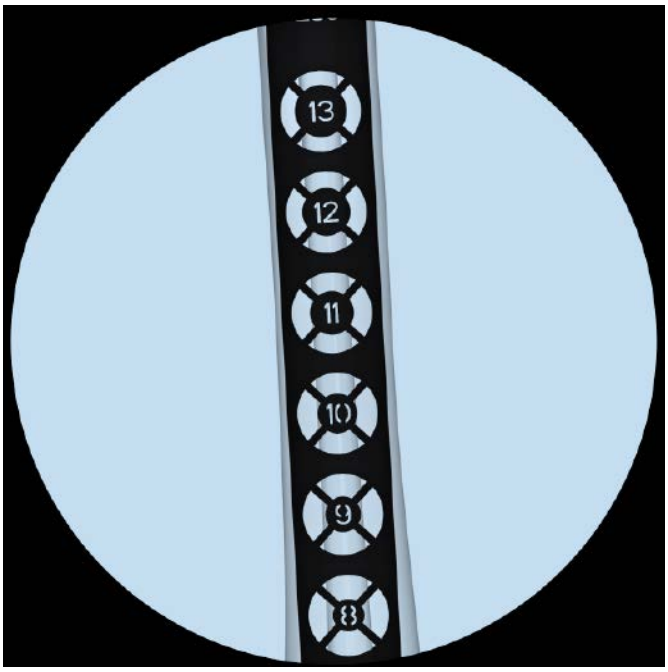
Instrument

03.010.023	Radiographic Canal Width Estimator

Position the C-arm for an AP or lateral view of the femur at the level of the isthmus. Hold the radiographic canal width estimator over the femur so that the diameter gauge is centered over the narrowest part of the medullary canal. Read the estimated diameter measurement on the circular indicator that fills the canal.

Notes:

- **If the reamed technique is used, the diameter of the largest medullary reamer must be a minimum of 1.0 mm larger than the nail diameter.**
- **The ruler provides only an estimate of the canal diameter as it is not at the same level as the femur.**



Opening the Femur

1. Approach

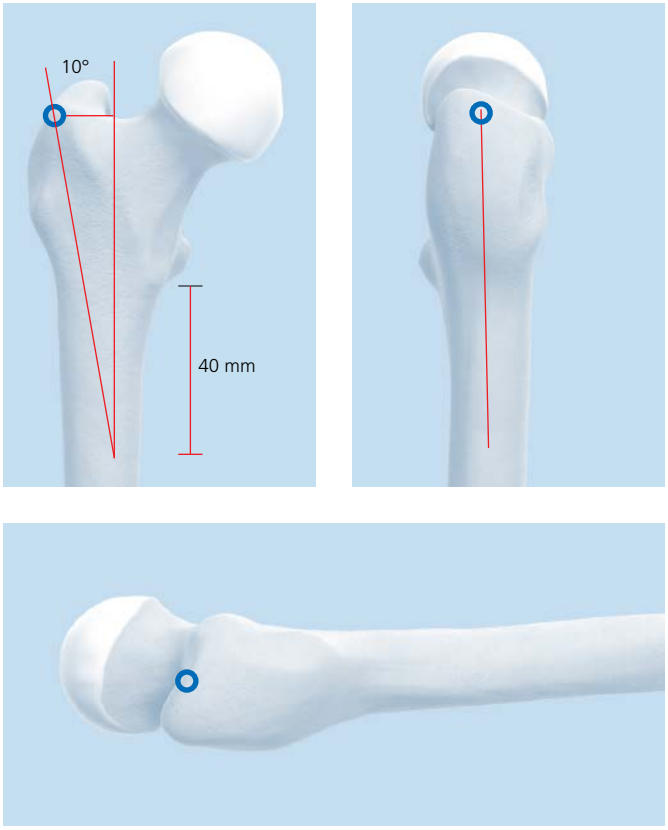
Palpate the posterior edge of the greater trochanter.

Make a 3 cm incision in line with the central axis of the intramedullary canal in the lateral view, and depending on the anatomy of the patient, 2–5 cm proximal to the tip of the greater trochanter.

2. Determine entry point

The insertion point for the nail is approximately 20 mm lateral to the center of the medullary canal. The insertion point is 10° lateral to the greater trochanter, as measured from a point 40 mm distal to the lesser trochanter.

The entry point can also be described as lateral to the greater trochanter at the same level as the superior aspect of the base of the femoral neck (just above the piriformis fossa). This point can be found by extending a line horizontally from the base of the femoral neck to the lateral side of the femur.



3. Insert guide wire

Instruments	
03.010.115	3.2 mm Guide Wire, 290 mm
03.010.500	Silicone Handle, with Quick Coupling
03.010.505	17 mm Protection Sleeve for Lateral Femoral Nails
03.010.510	Multi Hole Wire Guide for Expert LFN

Assemble the handle, protection sleeve and wire guide. Insert the assembly through the incision to the bone. Hold the protection sleeve firmly and insert the guide wire through the central hole in the wire guide.

The guide wire must be inserted laterally at an angle of 10° to the center of the medullary canal. The tip of the guide wire should be centered in the medullary canal 40 mm distal to the lesser trochanter.

Verify that the guide wire position allows adequate clearance on the lateral side of the femur for the opening drill bit.

The guide wire is inserted with it centered in the lateral view. If the position of the initial wire must be altered, adjust wire guide to the desired position and insert a second guide wire into guide.

Precautions:

- **The correct entry point and angle are essential for a successful result. To ensure the correct position of the guide wire, hold a sterile Expert Lateral Femoral Nail onto the femur and check radiographically.**
- **The position of the guide wire will be decisive for the success of the next steps. If the position of the inserted guide wire is not optimal, it needs to be realigned.**

Remove the first wire and wire guide.

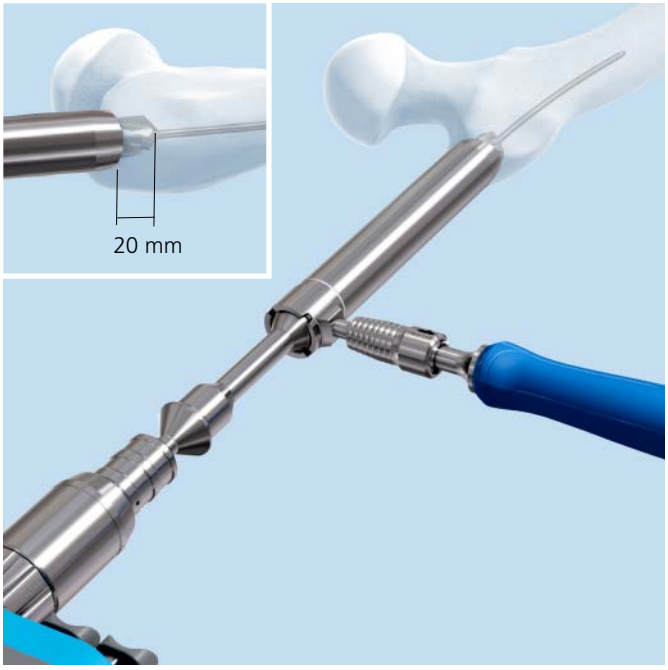
Alternative instrument	
03.037.008*	8.0 mm Cannulated Curved Awl

In place of a guide wire, the medullary canal can be initially opened with the curved awl. After opening the canal, insert a reaming rod through the curved awl.

*Also available.

4. Open medullary canal with drill bit and flexible reamers

Instruments	
03.010.028	15.0 mm Cannulated Drill Bit
03.010.029	17.0 mm Cannulated Drill Bit
03.010.500	Silicone Handle, with Quick Coupling
03.010.505	17 mm Protection Sleeve for Lateral Femoral Nails



Drill
Select appropriate cannulated drill bit as follows:

Nail Diameter	Drill Bit Size
9.0 mm–12.0 mm	15.0 mm
13.0 mm–16.0 mm	17.0 mm

Drill through the protection sleeve. Drill the medullary canal to a depth of 20 mm.

Remove the guide wire, drill bit and protection sleeve.

Precautions:
- **Dispose of the guide wire. Do not reuse.**
- **In case of small or difficult anatomy use the flexible drill bit in order to avoid damage to the far cortex.**

Ream
Proceed to page 17 for the section on reaming. Place the 2.5 mm reaming rod and ream the medullary canal to the desired diameter.

Open
Open the proximal femur to a depth of 80 mm using the flexible reamers as follows:

Nail Diameter	Proximal Reamer Diameter
9.0 mm–12.0 mm	15.0 mm
13.0 mm–16.0 mm	17.0 mm

Alternative techniques

Open medullary canal with cannulated drill bits

Instruments	
03.010.028	15.0 mm Cannulated Drill Bit
03.010.029	17.0 mm Cannulated Drill Bit
03.010.500	Silicone Handle, with Quick Coupling
03.010.505	17 mm Protection Sleeve for Lateral Femoral Nails

Using the protection sleeve and cannulated drill bit, drill over the 3.2 mm guide wire until the drill stop on the drill reaches the protection sleeve.

Monitor progress of the drill with the image intensifier. Ensure that the lateral and medial cortical walls are not compromised. Adjust the guide wire if necessary.

Remove the guide wire, protection sleeve and drill bit.

Precautions:

- **Dispose of the guide wire. Do not reuse.**
- **In case of small or difficult anatomy use the flexible drill bit in order to avoid damage to the far cortex.**

Alternative instruments	
03.010.165*	15.0 mm Cannulated Flexible Drill Bit, large quick coupling
03.010.167*	17.0 mm Cannulated Flexible Drill Bit, large quick coupling

Insert the guide wire approximately 20 mm into the proximal femur.

Using the cannulated flexible drill bit, ream to the level of the lesser trochanter.

Remove the guide wire and drill bit.

Precaution: Dispose of the guide wire. Do not reuse.

*Also available.

Open medullary canal with awl

Instruments	
03.010.041	14.0 mm Cannulated Awl
357.399	3.2 mm Guide Wire, 400 mm

Place the cannulated awl over the guide wire and open the medullary canal. Use a twisting motion to advance the awl to a depth of approximately 80 mm.

Remove the guide wire and awl.

Precaution: **After opening the proximal femur, dispose of the guide wire. Do not reuse.**

5. Ream medullary canal (optional)

Required set	
150.060	Flexible Reamer Set for IM Nails
Alternative set	
105.309	Reamer/Irrigator/Aspirator Instrument Set
Instruments	
03.010.024*	Holding Device for Guide Wires and Reaming Rods
03.010.093	Reaming Rod Push Rod
351.706S*	2.5 mm Reaming Rod with ball tip, 950 mm
351.707S*	2.5 mm Reaming Rod with ball tip and extension, 950 mm
351.708S*	2.5 mm Reaming Rod with ball tip, 1150 mm
351.782*	Holding Forceps for Reaming Rods
360.251	7.5 mm Intramedullary Reduction Tool
393.105*	Small Universal T-Handle Chuck

If necessary, enlarge the femoral canal with the medullary reamer to the desired diameter.

Check fracture reduction under image intensifier.

*Also available.

Insert reaming rod
Insert the reaming rod with ball tip into the medullary canal, using the holding device or T-handle chuck, to the desired insertion depth.

If using the holding device, set thumb switch to the 'RELEASE' or 'LOCK' position (Figure 1).

Insert guide wire/reaming rod. Apply force to the lever with your hand as far from the pivot as possible (Figure 2).

RELEASE position: Clamp will free the wire upon releasing the handle.

LOCK position: Clamp will retain the wire. The device will click when set to the LOCK position.

Note: To release a wire retained in the LOCK position, apply force to the lever on its lower end, then push the thumb switch to the RELEASE position. This relaxes the engagement of the locking mechanism by deflecting the lever (Figure 3).

To bend reaming rods, insert extension tip into 'reaming rod' hole on the back of the handle. Bend until the rod contacts the handle. This allows a 15° bend on the reaming rod tip (Figure 4).

Figure 1


Figure 2


Figure 3

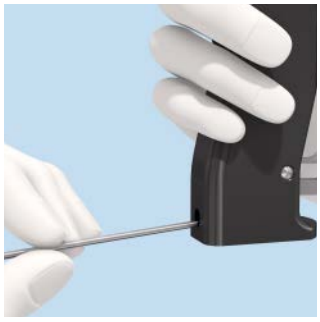


Figure 4

Reaming
Starting with the 8.5 mm diameter reaming head, ream to a diameter a minimum of 1.0 mm greater than the nail diameter. Ream in 0.5 mm increments and advance the reamer with steady, moderate pressure. Do not force the reamer. Partially retract the reamer often to clear debris from the medullary canal.

The holding forceps can be used to control the rotation of the reaming rod.

Note: The reaming rod with ball tip can be removed through all cannulated lateral entry femoral nails. Reaming rod exchange is not required.

Option: Use the reaming rod push rod to help retain the reaming rod during reamer extraction.

1. Assemble insertion instruments

Instruments	
03.010.146	Cannulated Connecting Screw with Internal Thread for Percutaneous Insertion Handle
03.010.486	Radiolucent Standard Insertion Handle for Expert Nails, 100 mm
03.010.517	T-Handle Ball Hex Screwdriver, 8 mm

Match the tang on the handle to the notch in the Titanium Cannulated Lateral Entry Femoral Recon Nail–EX.

Place the connecting screw into the insertion handle and thread it into the proximal nail end using the 8 mm ball hex screwdriver.

The recon nails are labeled left or right on the proximal nail end.

Precaution: Check that the connecting screw is correctly tightened. Do not overtighten.

Alternative instruments

03.010.093	Reaming Rod Push Rod
03.010.487*	Radiolucent Percutaneous Insertion Handle for Expert Nails, 175 mm
03.010.499*	Cannulated Connecting Screw, for 175 mm Percutaneous Insertion Handle

Optionally, slide the connecting screw onto the reaming rod push rod. Slide the assembly through the insertion handle and match the tang on the handle to the nail. Tighten using the hex on the reaming rod push rod.

Secure the assembly using the 8 mm ball hex screwdriver.

Precaution: Check that the connecting screw is correctly tightened. Do not overtighten.

*Also available.

2. Insert nail

Instruments	
03.010.170	Hammer Guide
03.010.522	Spiral Combination Hammer, 500 grams
03.010.523	Driving Cap, threaded
321.17	4.5 mm Pin Wrench
321.20	11 mm Ratchet Wrench
357.398	Cannulated Shaft with 8 mm hex

Thread the driving cap into the insertion handle and secure it using the 11 mm ratchet wrench. If patient anatomy allows, thread the driving cap in the medial position.

If necessary, the hammer guide can be threaded onto the driving cap and the hammer can be used as a slide hammer.

- Orient the insertion handle in an anterior position. Use the C-arm to verify fracture reduction. Insert the nail as far as possible.

The nail rotates approximately 90° during insertion. The insertion handle rotates from an anterior to a lateral position during insertion of the last one-third of the nail length. If the nail does not rotate to the lateral position, remove the nail and reinsert with the handle slightly lateral to the sagittal plane.

- Monitor nail passage across the fracture, and control in two planes to avoid malalignment.

Precaution: Do not mount the aiming arm until the nail has been completely inserted.

If desired, insert the nail using light hammer blows.

Precautions:

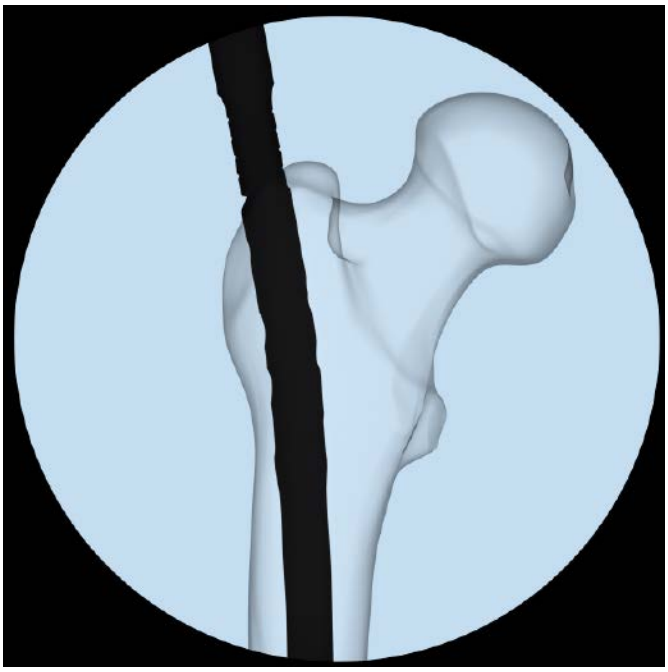
- **If nail insertion is difficult, choose a smaller diameter nail or ream the intramedullary canal to a larger diameter.**
- **Do not hammer directly onto the connector or insertion handle. Especially after hammering, confirm that the nail is securely connected to the insertion handle. Retighten if necessary.**

3. Check proximal nail position

Insert the nail until it is at or below the femoral opening. Check final nail position under image intensification in AP and lateral views.

If primary compression or secondary dynamization are planned, it is recommended to overinsert the nail by more than 7 mm, which corresponds to the maximum distance between the positions in static and dynamic modes.

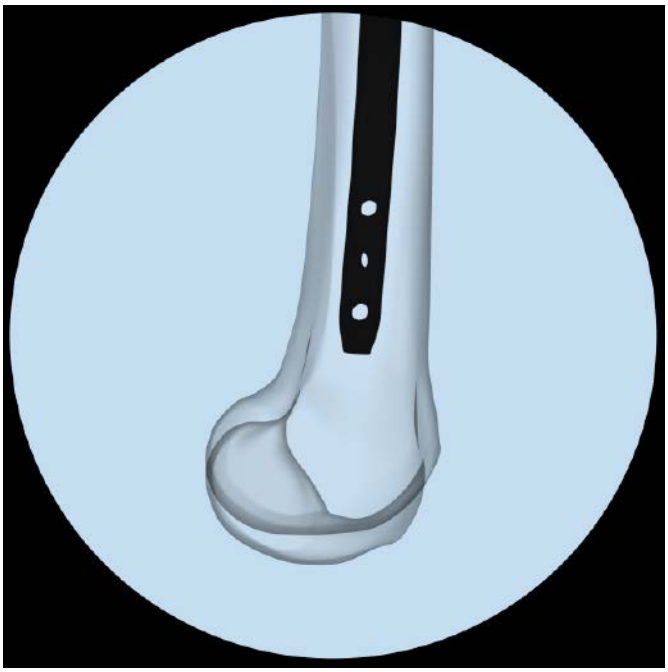
Note: The distance between the markings on the insertion handle is 5 mm and corresponds to the extensions of the end caps. This feature can be used for overinsertion of the nail.



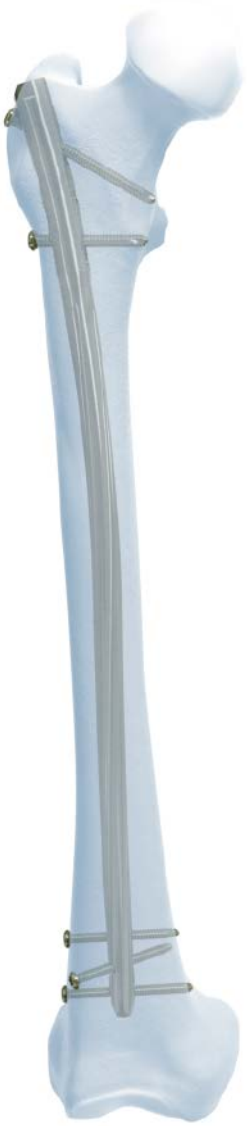
4. Check distal nail location

Use image intensification to ensure the nail is centered in both AP and lateral views. Verify fracture alignment.

Remove the reaming rod.



Locking Options



Proximal locking with 120° locking screw and dynamic locking option

Proximal locking with static locking option

Proximal locking with two recon screws

1. Choose appropriate locking screws and instruments

Use the correct locking screw, drill sleeve, trocar and drill bit for the selected nail diameter, as shown on the table.

Nail Diameter	Locking Screws	Protection Sleeve	Drill Sleeve	Trocar	Calibrated Drill Bit
9.0 mm–13.0 mm (green)	5.0 mm (green)	12.0 mm/8.0 mm (03.010.063)	8.0 mm/4.2 mm (03.010.065)	4.2 mm (03.010.070)	4.2 mm (03.010.061)
14.0 mm–16.0 mm (aqua)	6.0 mm (aqua)	12.0 mm/8.0 mm (03.010.063)	8.0 mm/5.0 mm (03.010.066)	5.0 mm (03.010.071)	5.0 mm (03.010.062)

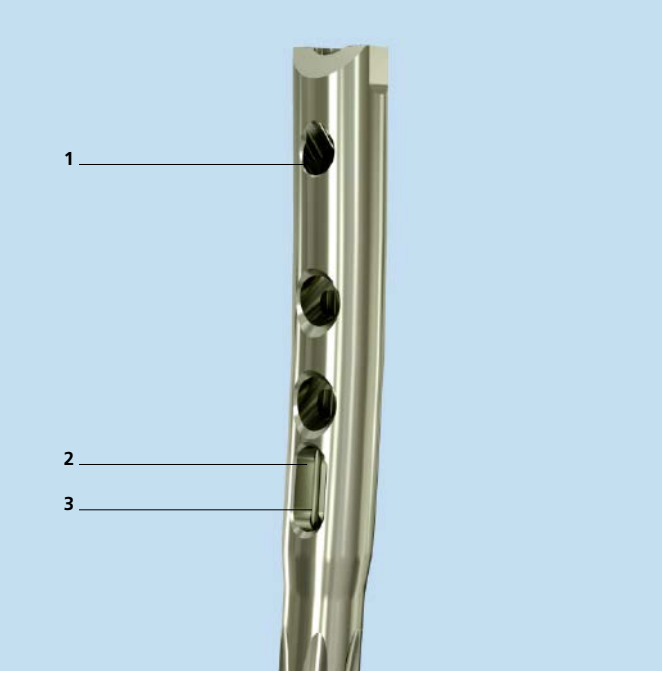
For standard locking, three targeted proximal locking options are possible:

1 120° antegrade locking

2 Dynamic locking (LM)

3 Static locking (LM)

For immediate dynamization, insert one proximal locking screw through the dynamic slot. If dynamization may be required in the future, use the dynamic locking option with the 120° antegrade locking hole.



2. Connect aiming arm

Instruments	
03.010.482	Radiolucent Aiming Arm for Lateral Entry Femoral Nail–EX
03.010.517	T-Handle Ball Hex Screwdriver, 8 mm

Confirm that the nail is securely connected to the insertion handle using the 8 mm ball hex screwdriver. Mount the aiming arm to the insertion handle.

3. Insert trocar combination

Instruments	
03.010.063	12.0 mm/8.0 mm Protection Sleeve, 188 mm
03.010.065	8.0 mm/4.2 mm Drill Sleeve
03.010.066	8.0 mm/5.0 mm Drill Sleeve
03.010.070	4.2 mm Trocar
03.010.071	5.0 mm Trocar

Assemble the three-part trocar combination (protection sleeve, drill sleeve and trocar) and insert it through the desired LM hole in the aiming arm. The cam lock lever must be in the unlocked position to insert the assembly. Make a stab incision and insert the trocar to the bone.

Remove the trocar.

Alternative instrument	
03.010.491	Scalpel Handle, long

The scalpel handle may be used through the aiming arm for precise placement of the incision.

If using the 120° antegrade locking option, insert the trocar combination through the hole labeled 120° on the insertion handle.

Precaution: Do not exert forces on the aiming arm, protection sleeve, drill sleeves and drill bits. These forces may prevent accurate targeting through the proximal locking holes and damage the drill bits.

4. Drill and measure for locking screw length

Instruments	
03.010.061	4.2 mm Three-Fluted Drill Bit, quick coupling, 330 mm, 100 mm calibration
03.010.062	5.0 mm Three-Fluted Drill Bit, quick coupling, 330 mm, 100 mm calibration

Ensure that the drill sleeve is pressed firmly to the lateral cortex. Using the appropriate drill bit (4.2 mm for 5.0 mm locking screws or 5.0 mm for 6.0 mm locking screws), drill through both cortices until the tip of the drill bit just penetrates the far cortex.

Confirm drill bit position.

Ensure that the drill sleeve is pressed firmly to the lateral cortex and read the measurement from the calibrated drill bit at the back of the drill sleeve. This measurement corresponds to the appropriate length locking screw. Remove the drill bit and the drill sleeve.

Ensure that the protection sleeve is pressed firmly to the near cortex and depress the cam lock lever to lock the protection sleeve in position.

Alternative instruments	
03.010.428	Depth Gauge, for Locking Screws to 100 mm
or	
03.010.072*	Depth Gauge, for Locking Screws

After drilling both cortices, remove the drill bit and the drill sleeve.

Note: A correct end position of the drill sleeve is important in order to choose the correct length of the locking screw.

*Also available.

Disassemble the depth gauge into two parts: the outer sleeve and the measuring device with hook. Insert the measuring device into the protection sleeve. Make sure that the hook grasps the far cortex.

Confirm depth gauge position in the far cortex of the femur. Read the measurement from the back of the protection sleeve, to determine the appropriate length locking screw.

5. Insert locking screw

Instrument	
03.010.518	StarDrive Screwdriver, T25, self-retaining, 319 mm

Insert the appropriate length locking screw through the protection sleeve using the Star/HexDrive screwdriver. Verify locking screw length under image intensification.

The tip of the locking screw should not project more than 2 mm to 4 mm beyond the far cortex.

Note: A groove on the screwdriver provides a rough indication that the locking screw is fully inserted through the sleeve.

Repeat for the second proximal locking screw if desired.

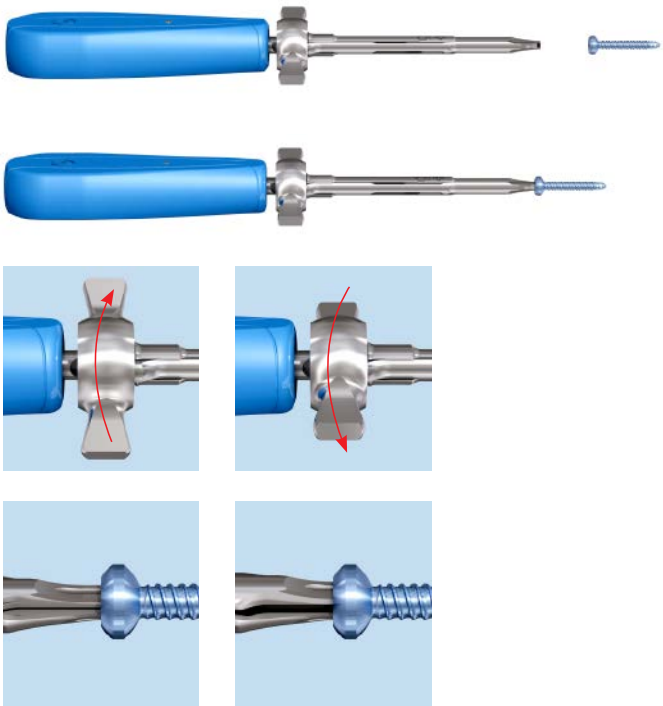
Alternative technique

Instrument	
03.010.472*	Inter-lock Screwdriver, T25, 3.5 mm Hex, 330 mm

Ensure that the slider of the screwdriver is fully retracted. Seat the inter-lock screwdriver tip in the appropriate length screwhead recess. Turn the nut clockwise until the tip of the slider is fully wedged into the screwhead recess.

Always use the standard screwdriver for final tightening of the screw.

To disengage the screw from the screwdriver, turn the nut counter-clockwise until the slider is ejected from the screwhead recess.



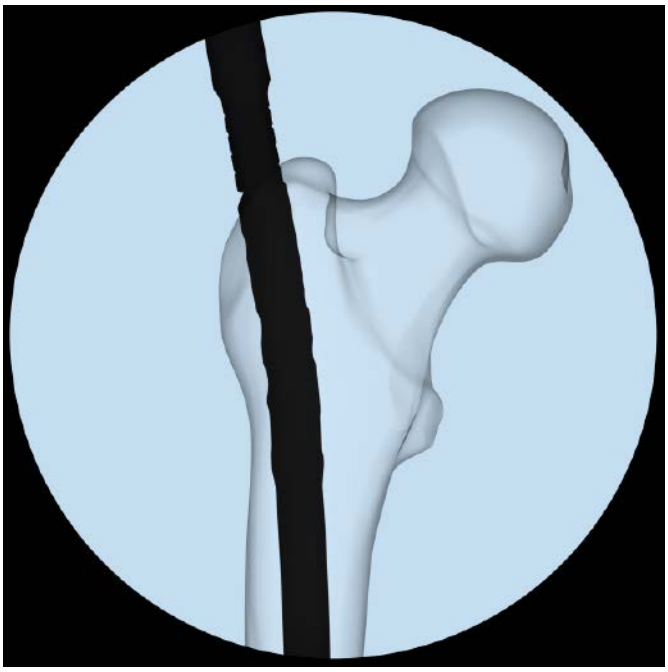
*Also available.

1. Confirm nail position

In the AP view, adjust the nail insertion depth to ensure that the two recon screws can be placed into the femoral head.

Adjust nail position for correct anteversion.

Precaution: Adjusting for the correct anteversion before making a skin incision is crucial to allow uncomplicated guide wire and screw insertion.



2. Connect aiming arm

Instruments	
03.010.482	Radiolucent Aiming Arm for Lateral Entry Femoral Nail–EX
03.010.517	T-Handle Ball Hex Screwdriver, 8 mm

Confirm that the nail is securely connected to the insertion handle using the 8 mm ball hex screwdriver. Mount the aiming arm to the insertion handle.

3. Insert guide wires for recon screws

Instruments	
03.010.075	11.5 mm/8.5 mm Protection Sleeve, for Recon Locking
03.010.076	8.5 mm/3.2 mm Wire Guide, for Recon Locking
03.010.077	3.2 mm Trocar, for Recon Locking
357.399	3.2 mm Guide Wire, 400 mm

Assemble both three-part trocar combination (protection sleeve, drill sleeve and trocar) and insert it through the desired LM recon holes in the aiming arm. The cam lock lever must be in the unlocked position to insert the assembly. Make a stab incision and insert the trocar to the bone.

Remove the inferior trocar.

Alternative Instrument	
03.010.491	Scalpel Handle, long

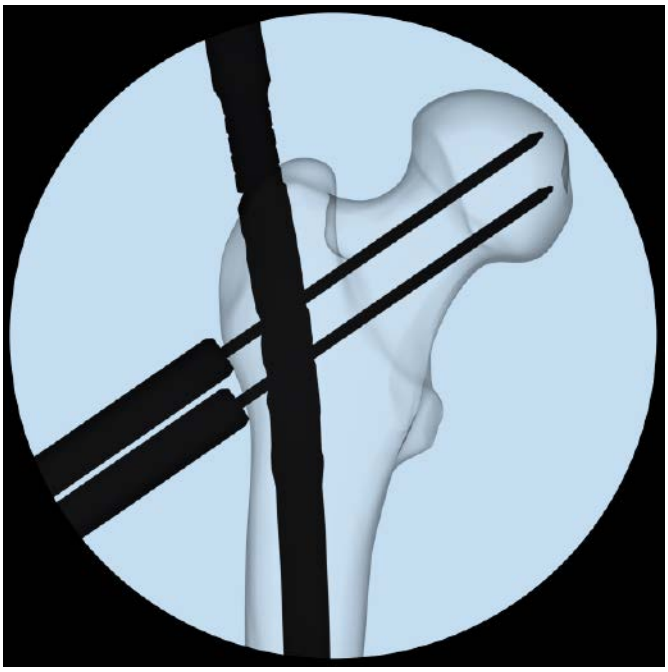
The scalpel handle may be used through the aiming arm for precise placement of the incision.

Insert a guide wire into the femoral head approximately 5 mm from subchondral bone. Check guide wire placement radiographically in both AP and lateral views.

Remove the superior trocar.

Insert the second guide wire into the femoral head approximately 5 mm from subchondral bone. Check the guide wire placement in both AP and lateral views.

Precaution: Do not exert forces on the aiming arm, protection sleeves, and drill sleeves. These forces may prevent accurate targeting through the locking holes.



4. Determine length and drill for inferior recon screw

Instruments	
03.010.078	4.5 mm/6.5 mm Stepped Drill Bit, Large Quick Coupling, 485 mm
03.010.079	Drill Stop, for 4.5 mm/6.5 mm Stepped Drill Bit
03.010.493	Direct Measuring Device for Recon Screws to 400 mm
or 03.010.085*	Specialty Locking Measuring Device

Measure for the inferior screw.

Ensure that the protection sleeve is pressed firmly to the near cortex and depress the cam lock lever to lock the protection sleeve in position. Remove the wire guide and insert the specialty locking measuring device over the guide wire, into the protection sleeve, and to the bone. Read the length of the required recon screw directly on the measuring device.

Note: The determined length indicates the effective screw length.

Remove the measuring device and the inferior guide wire.

Attach the drill stop to the stepped drill bit for the appropriate length screw.

Guide the stepped drill bit through the protection sleeve to the bone. Drill to the stop.

Note: Secure the fixation sleeve by engaging the locking mechanism in the locking grooves of the drill.

*Also available.

5. Insert inferior recon screw

Instrument	
03.010.519	StarDrive Screwdriver, T25, self-retaining, 440 mm

Insert the appropriate recon screw through the protection sleeve into the femoral head, using the long T25 StarDrive Screwdriver. Verify the position of the locking screw under image intensification in both planes.

A groove on the screwdriver indicates when the recon screw is fully inserted.

Repeat steps 3 through 5 for the second, superior recon screw.

1. Distal locking

There are three distal locking options:

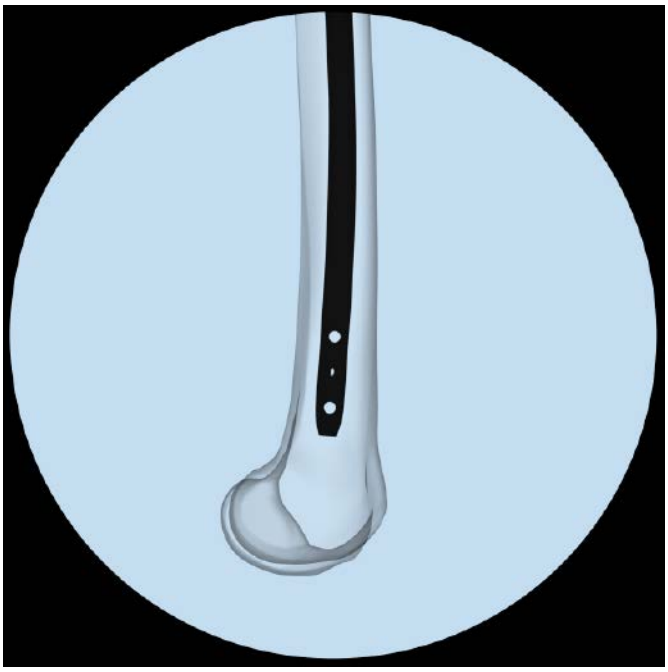
- Two transverse, lateral to medial holes
- One oblique locking hole for enhanced stability of distal fractures

Nail Diameter	Locking Screws	Drill Bit
9.0 mm–13.0 mm (green)	5.0 mm (green)	4.2 mm (03.010.101) or (03.010.104)
14.0 mm–16.0 mm (aqua)	6.0 mm (aqua)	5.0 mm (03.010.102) or (03.010.105)

If using the oblique locking hole, insert at least one transverse LM screw prior to rotating the leg for the oblique locking hole. This will maintain rotational alignment.

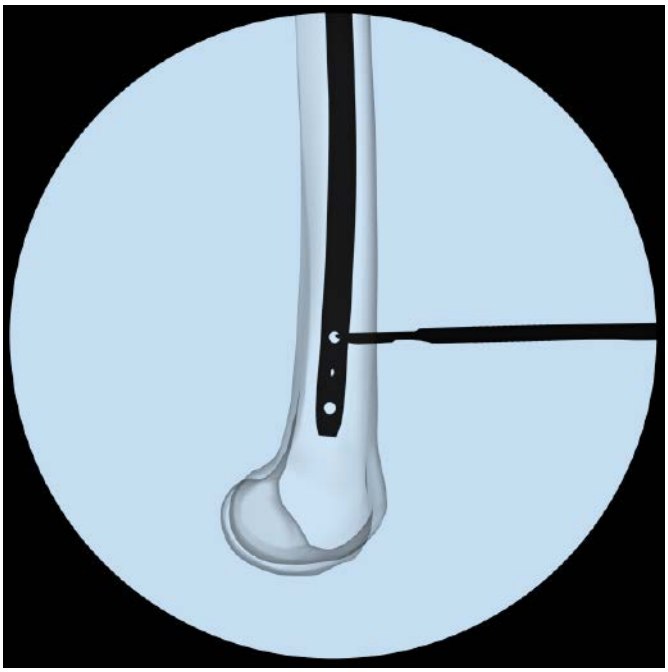
2. Align image

- Check the reduction and correct alignment of the fragments and leg length before locking the nail.
- Align the C-arm with the hole in the nail closest to the fracture until a perfect circle is visible in the center of the screen.



3. Determine incision point

Place a scalpel blade on the skin over the center of the hole to mark the incision point and make a stab incision.



4. Drill

Instruments	
03.010.101*	4.2 mm Three-Fluted Drill Bit, quick coupling, 145 mm, for Radiolucent Drive
03.010.102*	5.0 mm Three-Fluted Drill Bit, quick coupling, 145 mm, for Radiolucent Drive

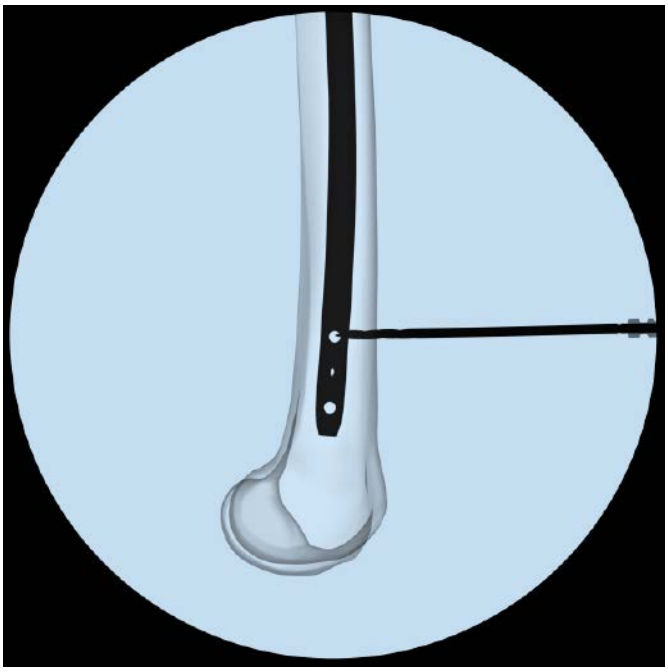
Using the radiolucent drive under image intensification, insert the tip of the appropriate drill bit through the incision and down to the bone.

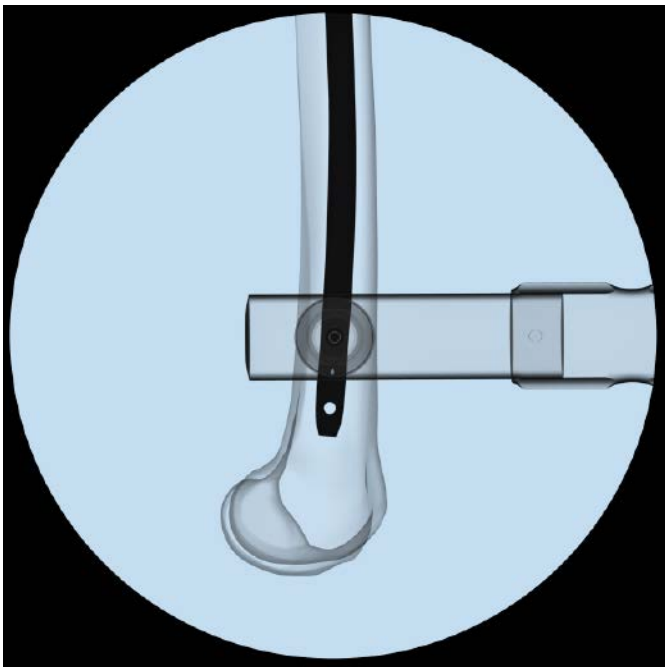
Incline the drive so that the tip of the drill bit is centered over the locking hole. The drill bit should almost completely fill the circle of the locking hole. Hold the drill bit in this position and drill through both cortices.

Note: For greater drill bit control, discontinue drill power after perforating the near cortex. Manually guide the drill bit through the nail before resuming power to drill the far cortex.

Alternative instruments	
03.010.104	4.2 mm Three-Fluted Drill Bit, quick coupling, 145 mm
03.010.105	5.0 mm Three-Fluted Drill Bit, quick coupling, 145 mm

If there is no radiolucent drive available and locking is performed with the standard freehand technique, use the 4.2 mm or 5.0 mm three-fluted drill bit, quick coupling.



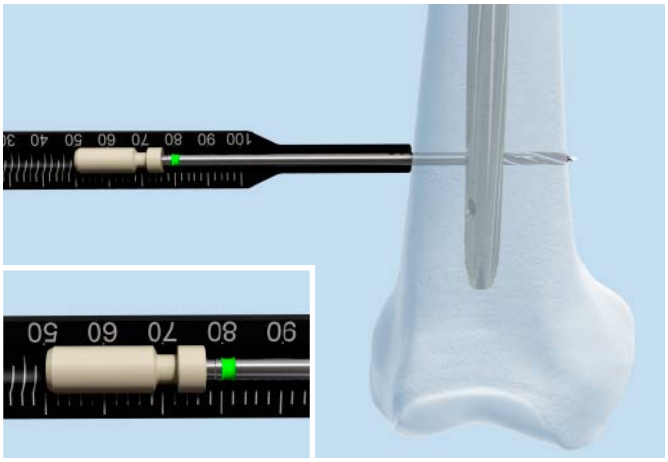


*Also available.

5. Determine length of locking screw

Instruments

03.010.101*	4.2 mm Three-Fluted Drill Bit, quick coupling, 145 mm, for Radiolucent Drive
03.010.102*	5.0 mm Three-Fluted Drill Bit, quick coupling, 145 mm, for Radiolucent Drive
03.010.104	4.2 mm Three-Fluted Drill Bit, quick coupling, 145 mm
03.010.105	5.0 mm Three-Fluted Drill Bit, quick coupling, 145 mm
03.010.429	Direct Measuring Device, for Locking Screws to 100 mm for IM Nails
or	
03.010.106*	Direct Measuring Device, for Locking Screws to 100 mm, for IM Nails



Stop drilling immediately after penetrating the far cortex. Disassemble the power drive or radiolucent drive from the drill bit.

Ensure the correct position of the drill bit in regard to the far cortex of the femur.

Place the direct measuring device onto the drill bit. Read the graduation of the measuring device at the end of the drill bit. This corresponds to the appropriate locking screw length.

Precaution: Drill bit location with respect to the far cortex is critical for measuring the appropriate locking screw length.

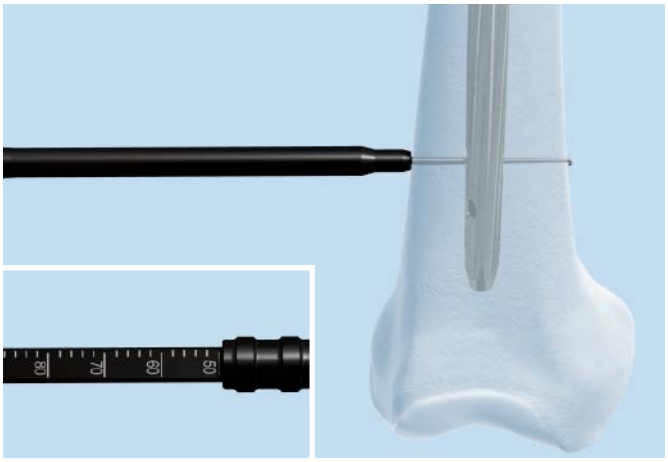
* Also available

Alternative instruments

03.010.428 or 03.010.072*	Depth Gauge, for Locking Screws to 100 mm Depth Gauge, for Locking Screws to 100 mm, for IM Nails
03.010.494	Depth Gauge for Distal Locking Screws, 100 mm

Measure the locking screw length using the depth gauge for locking screws. Ensure the outer sleeve is in contact with the bone and the hook grasps the far cortex.

Read the locking screw length directly from the depth gauge at the back of the outer sleeve or on the gauge.



* Also available

6. Insert locking screw

Instruments	
03.010.112*	Holding Sleeve with Locking Device
03.010.518	StarDrive Screwdriver, T25, self-retaining, 319 mm

Insert the appropriate length locking screw using the T25 StarDrive Screwdriver and the holding sleeve with locking device, if needed.

Verify locking screw length under image intensification. If needed, a second locking screw may be inserted using the same technique.

Repeat Steps 2 to 6 for the remaining locking screws.

Use the holding sleeve as described below:

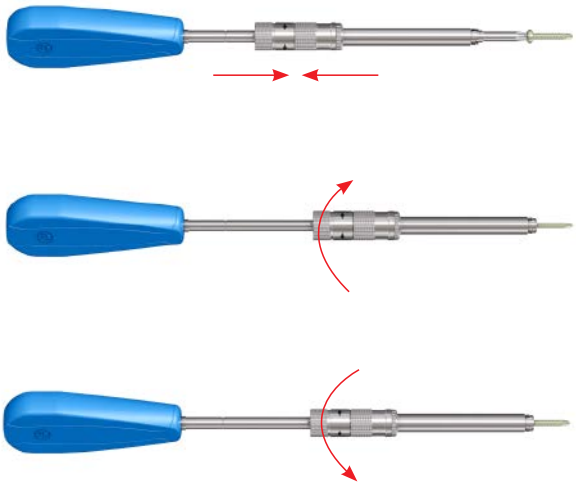
a Insert the holding sleeve onto the shaft of the screwdriver and place the tip of the screwdriver in the recess of the locking screw.

Push the holding sleeve in the direction of the locking screw, the sleeve now holds the locking screw.

b Lock the holding sleeve by tightening it counterclockwise.

c Release the holding sleeve after insertion of the locking screw, by loosening it clockwise and pushing backward.

Note: In the event of diastasis, the backstroke technique can be used after insertion of the second distal locking screw.



*Also available.

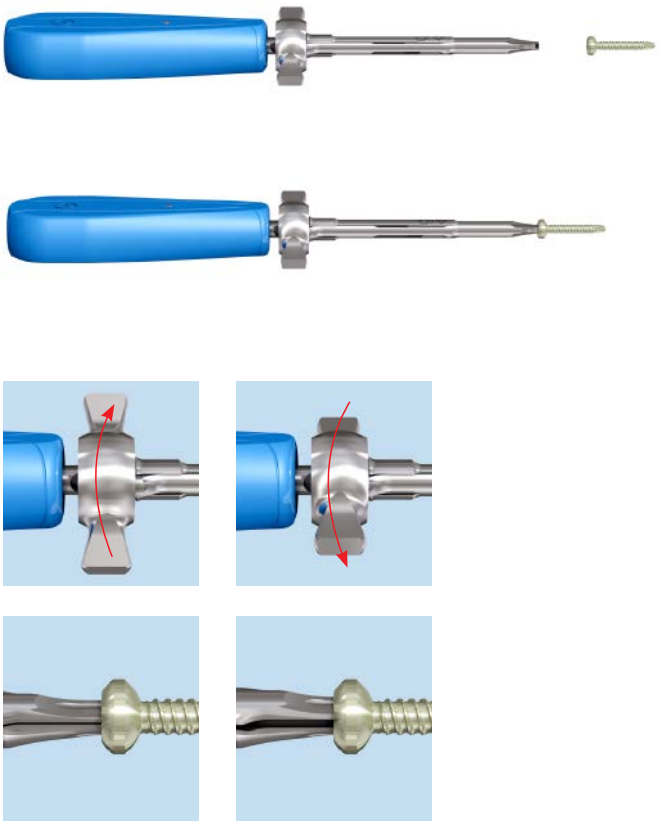
Alternative technique

Instrument	
03.010.473*	Inter-lock Screwdriver, T25, 3.5 mm Hex, 224 mm

Ensure that the slider of the screwdriver is fully retracted. Seat the inter-lock screwdriver tip in the appropriate length screwhead recess. Turn the nut clockwise until the tip of the slider is fully wedged into the screwhead recess.

Always use the standard screwdriver for final tightening of the screw.

To disengage the screw from the screwdriver, turn the nut counterclockwise until the slider is ejected from the screwhead recess.



*Also available.

End Cap Insertion

1. Insert end cap

Instruments	
03.010.520	Cannulated StarDrive Screwdriver, T40, self-retaining, 277 mm

Alternative instrument	
03.010.515*	Inter-lock Screwdriver, T40, 377 mm

The end caps for femoral nails are available in extension lengths of 0 mm, 5 mm, 10 mm, 15 mm, and 20 mm. End caps fulfill two functions: preventing bone ingrowth into the nail and extending the nail height if it is overinserted.

The end caps are cannulated for use over a guide wire, if necessary.

Remove the nail insertion instruments.

Optionally, for insertion of the 0 mm end cap, remove the connecting screw only. The insertion handle can remain to help align the end cap to the top of the nail. The 0 mm end cap fits through the barrel of the insertion handle.

Insert the guide wire into the proximal end of the nail.

Engage the end cap with the cannulated screwdriver by exerting axial pressure, or attach to the T40 inter-lock screwdriver. To prevent cross-threading, align the end cap with the nail axis and turn the end cap counterclockwise, until the thread of the end cap aligns with that of the nail. Turn the end cap clockwise to thread the end cap into the nail.

Remove the guide wire and screwdriver.

Always use the standard screwdriver for final tightening of the endcap.

Note: The use of an end cap is recommended. The end cap protects the nail connection threads from bone ingrowth to facilitate removal, and extends the nail height if the nail is overinserted.

*Also available.

1. Remove end cap and locking screws

Instruments	
03.010.518	StarDrive Screwdriver, T25, self-retaining, 319 mm
03.010.520	Cannulated StarDrive Screwdriver, T40, self-retaining, 277 mm
357.399	3.2 mm Guide Wire

Implant removal is an optional procedure.

Clear the StarDrive Recess of the end cap and the locking implants of any ingrown tissue. Insert the guide wire for easy alignment of the screwdriver in the cannulated end cap.

Remove the end cap using the T40 screwdriver.

Remove all locking screws except one proximal locking screw.

Alternative instruments	
03.010.111*	Cannulated StarDrive Screwdriver, T40, with lever handle, self-retaining
03.010.112*	Holding Sleeve, with Locking Device
03.010.515*	Inter-lock Screwdriver, T40, 377 mm

Alternatively, the T40 inter-lock screwdriver, or the cannulated StarDrive Screwdriver, T40, with lever handle may be used with the 11 mm ratchet wrench to remove the end cap.

Precaution: When removing implants after long-term implantation, especially in the presence of large amounts of bony ingrowth, first use a solid screwdriver to loosen the end cap. The inter-lock screwdriver can be used to remove the end cap from the surgical sight.

*Also available.

2. Attach extraction screw and hammer guide

Instruments	
03.010.170	Hammer Guide, for Slide Hammer
357.133	Extraction Screw

Before removing the final locking screw, screw the extraction screw into the nail and tighten it. The locking screw will prevent nail rotation as the extraction screw is tightened.

Attach the hammer guide to the extraction screw.

Remove the remaining locking screw with the screwdriver.

3. Remove nail

Instrument	
03.010.522	Spiral Combination Hammer, 500 grams

Extract the nail by applying gentle blows with the hammer.

Note: The nail will rotate about 90°, similar to the movement during the insertion.

Alternative technique–extraction hook

For removal of broken nail

Instruments	
355.399*◊	Extraction Hook, for Titanium Cannulated Nails
393.10 or 393.105*	Universal Chuck with T-Handle Small Universal Chuck with T-Handle

1. Clear tissue from the end of the nail and remove the end cap.

2. Remove the locking bolts and/or screws with the appropriate screwdriver.

3. Insert the extraction hook into the universal chuck with T-handle. The hook should be parallel with the T-handle.

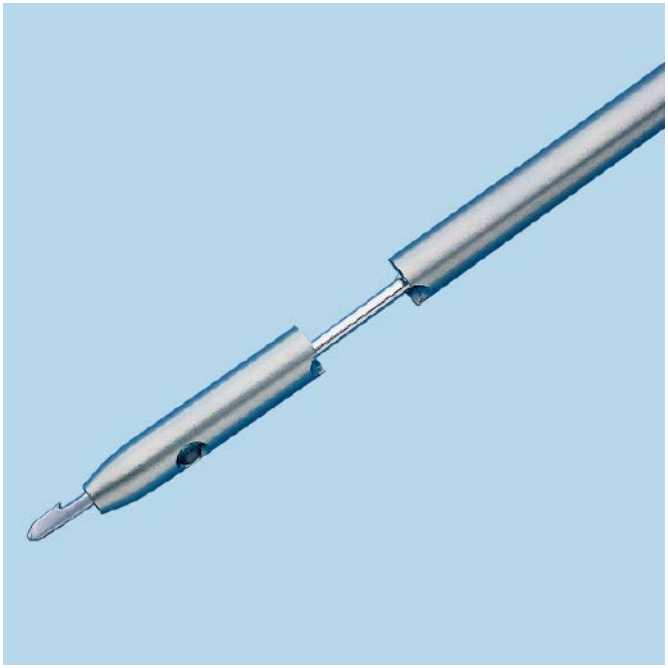
This facilitates visualization of the hook position in the bone.

*Also available.
◊ Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

4. Attach appropriate extraction bolt or connecting screw to the nail.

Remove the near nail fragment using the extraction bolt or connecting screw.

Note: **The extraction hook can be used as an alternative to extraction instrumentation.**



5. Ream the medullary canal 1 mm larger than the diameter to clear a path for the distant nail fragment.

6. Insert the extraction hook and explanted, near nail fragment into the medullary canal.

The near nail fragment aligns the extraction hook with the cannulation of the distant nail fragment.

7. Pass the extraction hook through the cannula of the distant nail fragment.

Precaution: **Under image intensification, verify that the hook has passed through and engaged the distant end of the nail.**

8. Extract both nail fragments.

Note: **Keep the patient's limb restrained to increase the efficiency of the extraction force.**

For removal of an intact nail

Instruments	
355.399*◊	Extraction Hook, for Titanium Cannulated Nails
393.10 or 393.105*	Universal Chuck with T-Handle Small Universal Chuck with T-Handle

1. Clear tissue from the end of the nail and remove the end cap.

2. Remove the locking bolts and/or screws with the appropriate screwdriver.

3. Insert the extraction hook into the universal chuck with T-handle.

The hook should be parallel with the T-handle.
This facilitates visualization of the hook position in the bone.

4. Insert the extraction hook through the nail cannula.

Precaution: **Under image intensification, verify that the hook has passed through and engaged the distant end of the nail.**

5. Extract the nail.

Note: **Keep the patient's limb restrained to increase the efficiency of the extraction force.**

*Also available.
◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

Implant Specifications

Lateral Entry Femoral Recon Nail–EX
- Available for left or right femur
- Anatomic nail design based on a femoral canal tracing study[3]

Material
- Titanium-6% aluminum-7% niobium alloy

Diameters
- 9.0 mm to 16.0 mm, cannulated
- 9.0 mm through 12.0 mm nails—13.5 mm proximal diameter
- 13.0 mm through 16.0 mm nails—16.0 mm proximal diameter

Colors
- 9.0 mm through 13.0 mm (light green)
- 14.0 mm through 16.0 mm (aqua)

Lengths
- 300 mm through 480 mm in 20 mm increments

Cross Section
- 9.0 mm through 16.0 mm diameter nails—helical fluted

Proximal Locking
- Two recon locking holes (130° neck/shaft angle)
- Dynamization slot (LM)
- Static transverse locking hole (LM)
- 120° antegrade locking hole

Distal Locking
- Two transverse locking holes (LM)
- One oblique locking hole (LM)

3. L.Ehmke, et al.

Implants

Titanium Cannulated Lateral Entry Femoral Recon Nails–EX, sterile (green)

Length (mm)	9 mm dia. right	9 mm dia. left
300	04.003.240S	04.003.241S
320	04.003.244S	04.003.245S
340	04.003.248S	04.003.249S
360	04.003.252S	04.003.253S
380	04.003.256S	04.003.257S
400	04.003.260S	04.003.261S
420	04.003.264S	04.003.265S
440	04.003.268S	04.003.269S
460	04.003.272S	04.003.273S
480	04.003.276S	04.003.277S

Length (mm)	10 mm dia. right	10 mm dia. left
300	04.003.340S	04.003.341S
320	04.003.344S	04.003.345S
340	04.003.348S	04.003.349S
360	04.003.352S	04.003.353S
380	04.003.356S	04.003.357S
400	04.003.360S	04.003.361S
420	04.003.364S	04.003.365S
440	04.003.368S	04.003.369S
460	04.003.372S	04.003.373S
480	04.003.376S	04.003.377S

Length mm)	11 mm dia. right	11 mm dia. left
300	04.003.440S	04.003.441S
320	04.003.444S	04.003.445S
340	04.003.448S	04.003.449S
360	04.003.452S	04.003.453S
380	04.003.456S	04.003.457S
400	04.003.460S	04.003.461S
420	04.003.464S	04.003.465S
440	04.003.468S	04.003.469S
460	04.003.472S	04.003.473S
480	04.003.476S	04.003.477S

Length (mm)	12 mm dia. right	12 mm dia. left
300	04.003.540S	04.003.541S
320	04.003.544S	04.003.545S
340	04.003.548S	04.003.549S
360	04.003.552S	04.003.553S
380	04.003.556S	04.003.557S
400	04.003.560S	04.003.561S
420	04.003.564S	04.003.565S
440	04.003.568S	04.003.569S
460	04.003.572S	04.003.573S
480	04.003.576S	04.003.577S

Length (mm)	13 mm dia. right	13 mm dia. left
300	04.003.640S	04.003.641S
320	04.003.644S	04.003.645S
340	04.003.648S	04.003.649S
360	04.003.652S	04.003.653S
380	04.003.656S	04.003.657S
400	04.003.660S	04.003.661S
420	04.003.664S	04.003.665S
440	04.003.668S	04.003.669S
460	04.003.672S	04.003.673S
480	04.003.676S	04.003.677S

Titanium Cannulated Lateral Entry Femoral Recon Nails–EX, sterile (aqua)

Length (mm)	14 mm dia. right	14 mm dia. left
300	04.003.740S	04.003.741S
320	04.003.744S	04.003.745S
340	04.003.748S	04.003.749S
360	04.003.752S	04.003.753S
380	04.003.756S	04.003.757S
400	04.003.760S	04.003.761S
420	04.003.764S	04.003.765S
440	04.003.768S	04.003.769S
460	04.003.772S	04.003.773S
480	04.003.776S	04.003.777S

Length (mm)	15 mm dia. right	15 mm dia. left
300	04.003.840S	04.003.841S
320	04.003.844S	04.003.845S
340	04.003.848S	04.003.849S
360	04.003.852S	04.003.853S
380	04.003.856S	04.003.857S
400	04.003.860S	04.003.861S
420	04.003.864S	04.003.865S
440	04.003.868S	04.003.869S
460	04.003.872S	04.003.873S
480	04.003.876S	04.003.877S

Length (mm)	16 mm dia. right	16 mm dia. left
300	04.003.940S	04.003.941S
320	04.003.944S	04.003.945S
340	04.003.948S	04.003.949S
360	04.003.952S	04.003.953S
380	04.003.956S	04.003.957S
400	04.003.960S	04.003.961S
420	04.003.964S	04.003.965S
440	04.003.968S	04.003.969S
460	04.003.972S	04.003.973S
480	04.003.976S	04.003.977S

5.0 mm Titanium Locking Screws, with T25 StarDrive Recess,◊ for IM Nails (light green)

- Titanium alloy*
- Lengths: 26 mm–80 mm (2 mm increments)
  85 mm–100 mm (5 mm increments)
- 4.3 mm core diameter
- Fully threaded
- Self-tapping, blunt tip
- T25 StarDrive Recess for improved torque transmission and self-retention on screwdriver

	Length (mm)		Length (mm)
04.005.516	26	04.005.548	58
04.005.518	28	04.005.550	60
04.005.520	30	04.005.552	62
04.005.522	32	04.005.554	64
04.005.524	34	04.005.556	66
04.005.526	36	04.005.558	68
04.005.528	38	04.005.560	70
04.005.530	40	04.005.562	72
04.005.532	42	04.005.564	74
04.005.534	44	04.005.566	76
04.005.536	46	04.005.568	78
04.005.538	48	04.005.570	80
04.005.540	50	04.005.575	85
04.005.542	52	04.005.580	90
04.005.544	54	04.005.585	95
04.005.546	56	04.005.590	100

*Titanium-6% aluminum-7% niobium alloy.
◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

6.0 mm Titanium Locking Screws, with T25 StarDrive Recess,◊ for IM Nails (aqua)

- Titanium alloy*
- Lengths: 26 mm–60 mm (2 mm increments)
  64 mm–80 mm (4 mm increments)
  85 mm–100 mm (5 mm increments)
- 4.8 mm core diameter
- Self-tapping tip
- T25 StarDrive Recess for improved torque transmission and self-retention on screwdriver.

	Length (mm)
04.005.616	26
04.005.618	28
04.005.620	30
04.005.622	32
04.005.624	34
04.005.626	36
04.005.628	38
04.005.630	40
04.005.632	42
04.005.634	44
04.005.636	46
04.005.638	48
04.005.640	50
04.005.642	52

	Length (mm)
04.005.644	54
04.005.646	56
04.005.648	58
04.005.650	60
04.005.654	64
04.005.658	68
04.005.662	72
04.005.666	76
04.005.670	80
04.005.675	85
04.005.680	90
04.005.685	95
04.005.690	100

*Titanium-6% aluminum-7% niobium alloy.
◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

6.5 mm Titanium Recon Screws◊, with T25 StarDrive Recess

- Titanium alloy*
- Lengths: 60 mm–130 mm (5 mm increments)
- Self-tapping tip
- T25 StarDrive Recess for improved torque transmission and self-retention on screwdriver.

	Length (mm)	Length (mm)	
04.003.022	60	04.003.030	100
04.003.023	65	04.003.031	105
04.003.024	70	04.003.032	110
04.003.025	75	04.003.033	115
04.003.026	80	04.003.034	120
04.003.027	85	04.003.035	125
04.003.028	90	04.003.036	130
04.003.029	95		

Titanium End Caps◊, with T40 StarDrive Recess, for Titanium Cannulated Lateral Entry Femoral Recon Nail–EX

- Titanium alloy*
- Protect nail threads from tissue ingrowth
- Cannulated to allow insertion over a guide wire
- T40 StarDrive Recess

0 mm
Sits flush with end of nail

5 mm, 10 mm, 15 mm, and 20 mm extensions
Extend nail height if nail is overinserted

04.003.000	End Cap, 0 mm extension	
12 mm End Caps for 9 mm–12 mm nails	16 mm End Caps for 13 mm–16 mm nails	
04.003.001	04.003.006	5 mm extension
04.003.002	04.003.007	10 mm extension
04.003.003	04.003.008	15 mm extension
04.003.004	04.003.009	20 mm extension

*Titanium-6% aluminum-7% niobium alloy.
◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

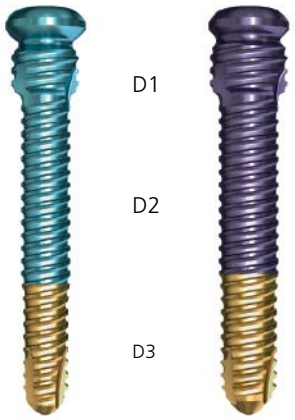
Additionally Available Implants

Titanium Angular Stable Locking Screws, with T25 StarDrive Recess, for intramedullary nails, sterile*

- Titanium alloy**
- 5.0 mm (light blue) ASLS screws, 30 mm–100 mm, are compatible with titanium cannulated lateral entry femoral recon nails in diameters 9 mm–13 mm
- 6.0 mm (dark purple) ASLS screws, 32 mm–125 mm, are compatible with titanium cannulated lateral entry femoral recon nails in diameters 14 mm–16 mm

- Fully threaded shaft with 3 diameters
  – D1: Provides purchase in reamed near cortex
  – D2: Expands sleeve, providing angular stability
  – D3: Holds unexpanded sleeve for screw insertion, provides purchase in far cortex
- T25 StarDrive Recess
- Sterile packaged

Note: For more information, please see ASLS technique guide and brochure.



*Also available.
**Titanium-6% aluminum-7% niobium alloy.

ASLS Sleeves*

Resorbable Sleeves for Angular Stable Locking Screws, sterile*

- 70:30 poly(L/DL-lactide)
- Inner thread for secure fit to ASLS screw
- Expands in nail's locking hole to provide angular stability
- 5.0 mm and 6.0 mm sleeves used with corresponding ASLS screws
- Sterile packaged (2 per package)

	Resorbable Sleeve for Angular Stable Locking Screws, sterile, 2/pkg.
08.025.044S	for 5.0 mm ASLS Screws
08.025.057S	for 6.0 mm ASLS Screws

ASLS Compatibility with Existing Nails

The Angular Stable Locking System is compatible with all DePuy Synthes titanium cannulated nailing systems.

			Angular Stable Locking Systems	
	Nailing System	Nail Diameters (mm)	5.0 mm (light blue)	6.0 mm (dark purple)
Femur	Titanium Cannulated Lateral Entry Femoral Nail-EX	9–13	•	
		14–16		•

*Must be ordered separately.

Instruments

03.010.020	Radiographic Ruler, for Titanium Cannulated Femoral Nails	
03.010.028	15.0 mm Cannulated Drill Bit, large quick coupling, 280 mm	
03.010.029	17.0 mm Cannulated Drill Bit, large quick coupling, 280 mm	
03.010.041	14.0 mm Cannulated Awl	
03.010.061◊	4.2 mm Three-Fluted Drill Bit, quick coupling, 330 mm, 100 mm calibration	
03.010.062◊	5.0 mm Three-Fluted Drill Bit, quick coupling, 330 mm, 100 mm calibration	

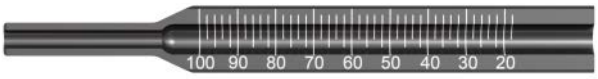
◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

03.010.063	12.0 mm/8.0 mm Protection Sleeve, 188 mm	
03.010.065	8.0 mm/4.2 mm Drill Sleeve, 200 mm	
03.010.066	8.0 mm/5.0 mm Drill Sleeve, 200 mm	
03.010.070	4.2 mm Trocar, 210 mm	
03.010.071	5.0 mm Trocar, 210 mm	
03.010.075	11.5 mm/8.5 mm Protection Sleeve for Recon Locking	
03.010.076	8.5 mm/3.2 mm Wire Guide for Recon Locking	

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

03.010.077	3.2 mm Trocar for Recon Locking	
03.010.079	Drill Stop, for 4.5 mm/6.5 mm Stepped Drill Bit	
03.010.078	4.5 mm/6.5 mm Stepped Drill Bit Large, quick coupling, 485 mm	
03.010.080	Tap for 6.5 mm Recon Screws	
03.010.104◊	4.2 mm Three-Fluted Drill Bit, quick coupling, needle point, 145 mm	
03.010.105◊	5.0 mm Three-Fluted Drill Bit, quick coupling, needle point, 145 mm	
03.010.146	Cannulated Connection Screw for 100 mm Insertion Handle	

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

03.010.151	Star/Hex Screwdriver Shaft, 165 mm	
03.010.152	Star/Hex Screwdriver Shaft, 280 mm	
03.010.170	Spiral Hammer Guide	
03.010.428	Depth Gauge for Locking Screws to 100 mm for IM Nails	
03.010.429	Direct Measuring Device for Locking Screws to 100 mm for IM Nails	
03.010.482	Radiolucent Aiming Arm for Lateral Femoral Nails	

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

03.010.486	Radiolucent Standard Insertion Handle, 100 mm	
03.010.491	Scalpel Handle, long	
03.010.493	Direct Measuring Device for Recon Screws 400 mm	
03.010.494	Depth Gauge for Distal Locking Screws, 100 mm	
03.010.500	Silicone Handle, with Quick Coupling	
03.010.505	17 mm Protection Sleeve for Lateral Femoral Nails	

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

03.010.510	Multi Hole Wire Guide for Expert LFN	
03.010.513	StarDrive Screwdriver, T25, self-retaining, 250 mm	
03.010.516	Large Handle with Quick Coupling	
03.010.517	T-Handle Ball Hex Screwdriver, 8 mm	
03.010.518	StarDrive Screwdriver, T25, self-retaining, 319 mm	
03.010.519	StarDrive Screwdriver, T25, self-retaining, 440 mm	
03.010.520	Cannulated StarDrive Screwdriver, T40, self-retaining, 277 mm	

03.010.522	Combination Hammer, 500 g	
03.010.523	Driving Cap, Threaded	
03.900.044	T40 StarDrive Screwdriver Shaft	
321.17	4.5 mm Pin Wrench, 120 mm	
321.20	Ratchet Wrench, 11 mm width across flats	
357.133	Extraction Screw, for Titanium Femoral and Tibial Nails	
357.398	Cannulated Shaft with 8 mm hex, 125 mm	
357.399	3.2 mm Guide Wire, 400 mm	

Lateral Entry Femoral Nail Recon–EX Implant Set (01.003.006)

Rack

690.502	Locking Screw/Spiral Blade Rack for Femoral Nail–EX Implants

Instrument

319.97	Screw Forceps

Implants

5.0 mm Titanium Locking Screws◊ with T25 StarDrive Recess, for IM Nails, 2 ea.

	Length (mm)		Length (mm)
04.005.516	26	04.005.548	58
04.005.518	28	04.005.550	60
04.005.520	30	04.005.552	62
04.005.522	32	04.005.554	64
04.005.524	34	04.005.556	66
04.005.526	36	04.005.558	68
04.005.528	38	04.005.560	70
04.005.530	40	04.005.562	72
04.005.532	42	04.005.564	74
04.005.534	44	04.005.566	76
04.005.536	46	04.005.568	78
04.005.538	48	04.005.570	80
04.005.540	50	04.005.575	85
04.005.542	52	04.005.580	90
04.005.544	54	04.005.585	95
04.005.546	56	04.005.590	100

6.0 mm Titanium Locking Screws◊ with T25 StarDrive Recess, for IM Nails, 2 ea.

	Length (mm)		Length (mm)
04.005.616	26	04.005.644	54
04.005.618	28	04.005.646	56
04.005.620	30	04.005.648	58
04.005.622	32	04.005.650	60
04.005.624	34	04.005.654	64
04.005.626	36	04.005.658	68
04.005.628	38	04.005.662	72
04.005.630	40	04.005.666	76
04.005.632	42	04.005.670	80
04.005.634	44	04.005.675	85
04.005.636	46	04.005.680	90
04.005.638	48	04.005.685	95
04.005.640	50	04.005.690	100
04.005.642	52		

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

ASLS Screw Sets

01.025.009 **5.0 mm Angular Stable Locking System Screw Set**

5.0 mm Titanium Angular Stable Locking Screws, with T25 StarDrive Recess, for intramedullary nails, sterile, 2 ea.

	Length (mm)		Length (mm)
04.025.520S	30	04.025.550S	60
04.025.522S	32	04.025.552S	62
04.025.524S	34	04.025.554S	64
04.025.526S	36	04.025.556S	66
04.025.528S	38	04.025.558S	68
04.025.530S	40	04.025.560S	70
04.025.532S	42	04.025.562S	72
04.025.534S	44	04.025.564S	74
04.025.536S	46	04.025.566S	76
04.025.538S	48	04.025.568S	78
04.025.540S	50	04.025.570S	80
04.025.542S	52	04.025.575S	85
04.025.544S	54	04.025.580S	90
04.025.546S	56	04.025.585S	95
04.025.548S	58	04.025.590S	100

ASLS Sleeves*

	Resorbable Sleeve for Angular Stable Locking Screws, sterile, 2/pkg.
08.025.044S	for 5.0 mm ASLS Screws
08.025.057S	for 6.0 mm ASLS Screws

*Must be ordered separately.

Implants continued

6.5 mm Titanium Recon Screws◊ with T25 StarDrive Recess, for IM Nails, 2 ea.

	Length (mm)		Length (mm)
04.003.022	60	04.003.030	100
04.003.023	65	04.003.031	105
04.003.024	70	04.003.032	110
04.003.025	75	04.003.033	115
04.003.026	80	04.003.034	120
04.003.027	85	04.003.035	125
04.003.028	90	04.003.036	130
04.003.029	95		

04.003.000 Titanium End Cap, with T40 StarDrive Recess, 0 mm extension, 2 ea.

12 mm Titanium End Caps, with T40 StarDrive Recess, 2 ea.

04.003.001 5 mm extension
04.003.002 10 mm extension
04.003.003 15 mm extension
04.003.004 20 mm extension

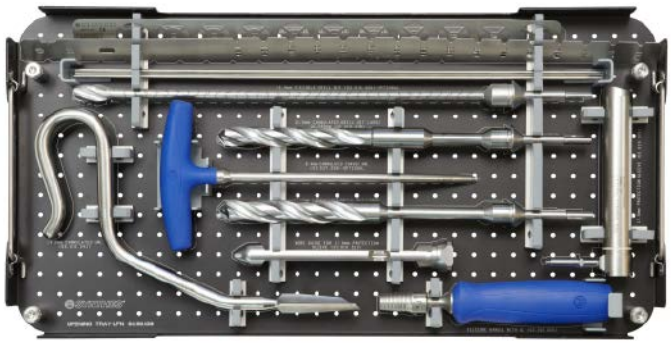
16 mm Titanium End Caps, with T40 StarDrive Recess, 2 ea.

04.003.006 5 mm extension
04.003.007 10 mm extension
04.003.008 15 mm extension
04.003.009 20 mm extension

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

Titanium Cannulated Lateral Femoral Nail–EX Opening Instrument Set (01.116.038)

Note: Opening, Insertion, and Locking Sets required for procedure.



Graphic Case Tray

1 Level High, fully loaded weight 6.65 lbs.

60.116.138	Opening LFN Tray
60.116.158	Label Sheet for LFN–EX Opening Instrumentation

Instruments

03.010.020	Radiographic Ruler for Titanium Cannulated Femoral Nails
03.010.023	Radiographic Canal Width Estimator
03.010.028	15.0 mm Cannulated Drill Bit Large, quick coupling, 280 mm
03.010.029	17.0 mm Cannulated Drill Bit Large, quick coupling, 280 mm
03.010.041	14.0 mm Cannulated Awl
03.010.500	Silicone Handle, with Quick Coupling
03.010.505	17 mm Protection Sleeve for Lateral Femoral Nails
03.010.510	Multi Hole Wire Guide for Expert LFN
357.399	3.2 mm Guide Wire, 400 mm, 10 ea.

Graphic Cases

60.037.001	Graphic Case, Full Length 1-High
60.037.002	Graphic Case, Full Length 2-High
60.037.003	Graphic Case, Full Length 3-High
60.037.004	Graphic Case, Full Length 4-High

Graphic Cases must be ordered separately, they are not part of set. Choose the graphic case necessary to hold selected set trays by height and weight restrictions.

60.116.170	Lifting Posts, 8 pack

Note: For additional information, please refer to the package insert or www.e-ifu.com.

For detailed cleaning and sterilization instructions, please refer to www.depuysynthes.com/hcp/cleaning-sterilization or sterilization instructions, if provided in the instructions for use.

Titanium Cannulated Lateral Femoral Nail–EX Insertion Instrument Set (01.116.045)

Note: Opening, Insertion, and Locking Sets required for procedure.

Graphic Case Tray

1.5 Level High,* fully loaded weight 10.79 lbs.

60.116.145	LFN Insertion Tray
60.116.165	Label Sheet for LFN–EX Insertion Instrumentation

Instruments

03.010.061	4.2 mm Three-Fluted Drill Bit, quick coupling, 330 mm/100 mm calibration, 2 ea.
03.010.062	5.0 mm Three-Fluted Drill Bit, quick coupling, 330 mm/100 mm calibration, 2 ea.
03.010.063	12.0 mm/8.0 mm Protection Sleeve, 188 mm, 2 ea.
03.010.065	8.0 mm/4.2 mm Drill Sleeve, 200 mm, 2 ea.
03.010.066	8.0 mm/5.0 mm Drill Sleeve, 200 mm, 2 ea.
03.010.070	4.2 mm Trocar, 210 mm, 2 ea.
03.010.071	5.0 mm Trocar, 210 mm, 2 ea.
03.010.075	11.5 mm/8.5 mm Protection Sleeve for Recon Locking, 2 ea.
03.010.076	8.5 mm/3.2 mm Wire Guide for Recon Locking, 2 ea.
03.010.077	3.2 mm Trocar for Recon Locking, 2 ea.
03.010.078	4.5 mm/6.5 mm Stepped Drill Bit Large, quick coupling, 485 mm, 2 ea.
03.010.079	Drill Stop, for 4.5 mm/6.5 mm Stepped Drill Bit
03.010.080	Tap for 6.5 mm Recon Screws
03.010.104	4.2 mm Three-Fluted Drill Bit, quick coupling, needle point, 145 mm, 2 ea.
03.010.105	5.0 mm Three-Fluted Drill Bit, quick coupling, needle point, 145 mm, 2 ea.
03.010.146	Cannulated Connecting Screw with Internal Thread for Percutaneous Insertion Handle
03.010.482	Radiolucent Aiming Arm for Lateral Femoral Nails–EX
03.010.486	Radiolucent Standard Insertion Handle
03.010.493	Specialty Locking Measuring Device for Titanium Femoral Nails–EX
03.010.517	T-Handle Ball Hex Screwdriver, 8 mm
03.010.523	Driving Cap, Threaded
357.399	3.2 mm Guide Wire, 400 mm, 3 ea.

Graphic Cases

60.037.001	Graphic Case, Full Length 1-High
60.037.002	Graphic Case, Full Length 2-High
60.037.003	Graphic Case, Full Length 3-High
60.037.004	Graphic Case, Full Length 4-High

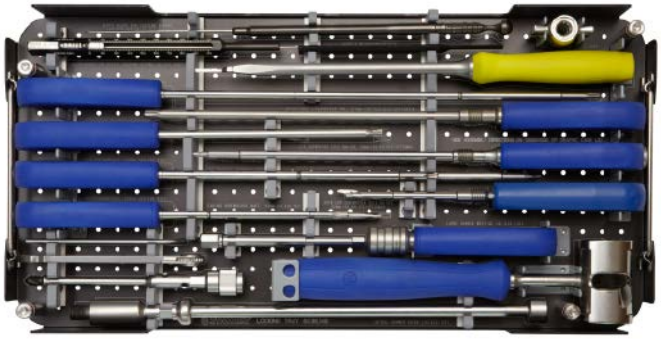
Graphic Cases must be ordered separately, they are not part of set. Choose the graphic case necessary to hold selected set trays by height and weight restrictions.

60.116.170	Lifting Posts, 8 pack

*Some graphic case trays are 1.5 levels high. If these trays are to be stored individually in a 2-High Graphic case, the lifting posts pack (60.116.170) must be ordered.

Locking Instrument Set (01.116.049)

Note: Opening, Insertion, and Locking Sets required for procedure.



Graphic Case Tray

1.5 Level High,* fully loaded weight 11.02 Lbs.

60.116.149	Locking Tray
60.116.169	Label Sheet for all EX Nail Locking Instrumentation

Instruments

03.010.151	Star/Hex Screwdriver Shaft, 165 mm
03.010.152	Star/Hex Screwdriver Shaft, 280 mm
03.010.170	Spiral Hammer Guide
03.010.428	Depth Gauge for Locking Screws to 100 mm for IM Nails
03.010.429	Direct Measuring Device for locking screws to 100 mm for IM Nails
03.010.491	Scalpel Handle, long
03.010.494	Depth Gauge for Distal Locking Screws, 100 mm
03.010.513	StarDrive Screwdriver, T25, self-retaining, 250 mm
03.010.516	Large Handle with quick coupling
03.010.518	StarDrive Screwdriver, T25, self-retaining, 319 mm
03.010.519	StarDrive Screwdriver, T25, self-retaining, 440 mm
03.010.520	Cannulated StarDrive Screwdriver, T40, self-retaining, 277 mm
03.010.522	Combination Hammer, 500 g
03.900.044	T40 StarDrive Screwdriver Shaft
321.17	4.5 mm Pin Wrench, 120 mm, 2 ea.
321.20	Ratchet Wrench, 11 mm width across flats
357.133	Extraction Screw for Titanium Nails
357.398	Cannulated Shaft with 8 mm Hex, 125 mm

Graphic Cases

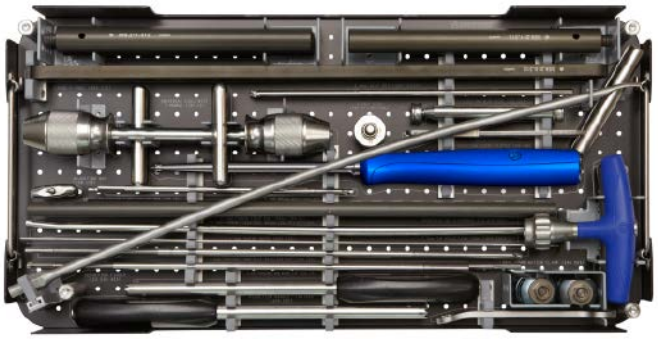
60.037.001	Graphic Case, Full Length 1-High
60.037.002	Graphic Case, Full Length 2-High
60.037.003	Graphic Case, Full Length 3-High
60.037.004	Graphic Case, Full Length 4-High

Graphic Cases must be ordered separately, they are not part of set. Choose the graphic case necessary to hold selected set trays by height and weight restrictions.

60.116.170	Lifting Posts, 8 pack

*Some graphic case trays are 1.5 levels high. If these trays are to be stored individually in a 2-High Graphic case, the lifting posts pack (60.116.170) must be ordered.

Reduction Instrument Set with MIPO (01.116.041)



Graphic Case Tray

1.5 Level High,* fully loaded weight 10.82 lbs.

60.116.141	Reduction Tray
60.116.162	Label Sheet for Reduction Instrumentation

Instruments

03.010.495	IM Reduction Tool, Curved with Quick Coupling
03.010.496	Universal Quick Coupling T-Handle
292.655	1.6 mm Guide Wire , 4 ea.
294.788	5.0 mm Self Drilling Schanz Screws, 250 mm, 2 ea.
310.37	3.5 mm Drill Bit
321.16	Combination Wrench
328.020	Reduction Handle, toothed, 2 ea.
328.100	Protection Sleeve, slotted
328.120	5.0 mm/1.6 mm Wire Guide
328.130	11.0 mm/5.0 mm Drill Sleeve
328.140	Cannulated Tap for 5.0 mm Threaded Rod
328.150	Adjusting Nut, 2 ea.
328.160	5.0 mm Threaded Rod, self-drilling tip, 2 ea.
328.170	5.0 mm Threaded Rod, blunt tip, 2 ea.
359.212	Large F-Tool
360.251	7.5 mm IM Reduction Tool
390.005	Large Combination Clamp, 2 ea.
393.10	Universal Chuck with T-Handle, 2 ea.
394.86	11.0 mm Carbon Fiber Rod, 350 mm
398.54	Straight Ball Spike, 337 mm length

Graphic Cases

60.037.001	Graphic Case, Full Length 1-High
60.037.002	Graphic Case, Full Length 2-High
60.037.003	Graphic Case, Full Length 3-High
60.037.004	Graphic Case, Full Length 4-High

Graphic Cases must be ordered separately, they are not part of set. Choose the graphic case necessary to hold selected set trays by height and weight restrictions.

60.116.170	Lifting Posts, 8 pack

*Some graphic case trays are 1.5 levels high. If these trays are to be stored individually in a 2-High Graphic case, the lifting posts pack (60.116.170) must be ordered.

Reduction Instrument Set (01.116.042)

Graphic Case Tray

1.5 Level High,* Fully loaded weight 7.63 lbs.

60.116.142	Reduction Tray
60.116.162	Label Sheet for Reduction Instrumentation

Instruments

03.010.495	IM Reduction Tool, Curved with Quick Coupling
03.010.496	Universal Quick Coupling with T-Handle, 2 ea.
294.788	5.0 mm Self Drilling Schanz Screws, 250 mm, 2 ea.
359.212	Large F-Tool
360.251	7.5 mm IM Reduction Tool
393.10	Universal Chuck with T-handle, 2 ea.
398.54	Straight Ball Spike, 337 mm length

Graphic Cases

60.037.001	Graphic Case, Full Length 1-High
60.037.002	Graphic Case, Full Length 2-High
60.037.003	Graphic Case, Full Length 3-High
60.037.004	Graphic Case, Full Length 4-High

Graphic Cases must be ordered separately, they are not part of set. Choose the graphic case necessary to hold selected set trays by height and weight restrictions.

60.116.170	Lifting Posts, 8 pack

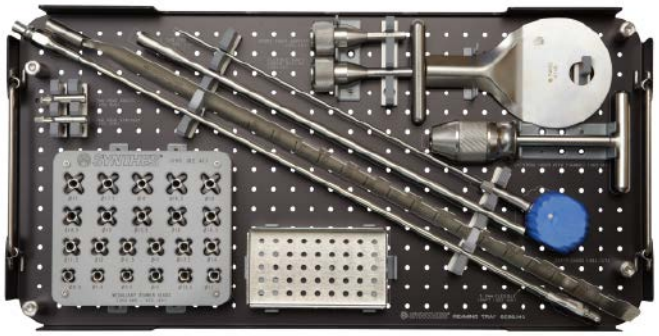
*Some graphic case trays are 1.5 levels high. If these trays are to be stored individually in a 2-High Graphic case, the lifting posts pack (60.116.170) must be ordered.

Reaming Instrument Set (01.116.043)

Graphic Case Tray

1 Level High,* fully loaded weight 5.54 lbs.

60.116.143	Reaming Tray
690.382.40	Reamer Head Tray
60.116.163	Label Sheet for Reaming Instrumentation



Instruments

03.010.093	Reaming Rod Push Rod with Ball Handle
351.05	Tissue Protector
351.15	Flexible Shaft Handle with Quick Coupling
351.16J	Jacobs Chuck Adapter
351.717	Depth Gauge
351.719	Extension Tube for Depth Gauge
351.783	Removal Tool
352.040	5.0 mm Flexible Shaft, 2 ea.
352.050	7 mm Head, straight
352.055	7 mm Head, angled
393.10	Universal Chuck with T-Handle

Reamer Heads

	Length (mm)		Length (mm)
352.085	8.5	352.140	14.0
352.090	9.0	352.145	14.5
352.095	9.5	352.150	15.0
352.100	10.0	352.155	15.5
352.105	10.5	352.160	16.0
352.110	11.0	352.165	16.5
352.115	11.5	352.170	17.0
352.120	12.0	352.175	17.5
352.125	12.5	352.180	18.0
352.130	13.0	352.185	18.5
352.135	13.5	352.190	19.0

Graphic Cases

60.037.001	Graphic Case, Full Length 1-High
60.037.002	Graphic Case, Full Length 2-High
60.037.003	Graphic Case, Full Length 3-High
60.037.004	Graphic Case, Full Length 4-High

Graphic Cases must be ordered separately, they are not part of set. Choose the graphic case necessary to hold selected set trays by height and weight restrictions.

60.116.170	Lifting Posts, 8 pack

*Some graphic case trays are 1.5 levels high. If these trays are to be stored individually in a 2-High Graphic case, the lifting posts pack (60.116.170) must be ordered.

Also Available

Sets

01.116.041	Reduction Set with MIPO Instrumentation
01.116.042	Reduction Set
01.116.043	Reaming Set
105.309	Reamer/Irrigator/Aspirator Instrument Set
150.060	Flexible Reamer Set for IM Nails

Graphic Cases

60.116.151	Auxillary Tray, Full Length, 1-High
60.116.152	Auxillary Tray, Full Length, 2-High
60.116.173	Auxillary Tray Divider, 1-High, 6 pack
60.116.174	Auxillary Tray Divider, 1-High, 12 pack
60.116.183	Auxillary Tray Divider, 2-High, 6 pack
60.116.184	Auxillary Tray Divider, 2-High, 12 pack

Instruments

03.010.024	Holding Device, for Guide Wires and Reaming Rods
03.010.072	Depth Gauge, for Locking Screws
03.010.085	Specialty Locking Measuring Device
03.010.101	4.2 mm Three-Fluted Drill Bit, quick coupling, 145 mm, for Radiolucent Drive
03.010.102	5.0 mm Three-Fluted Drill Bit, quick coupling, 145 mm, for Radiolucent Drive
03.010.106	Direct Measuring Device, for Locking Screws to 100 mm, for IM Nails
03.010.111	Cannulated StarDrive Screwdriver, T40, with lever handle, self-retaining
03.010.112	Holding Sleeve with Locking Device
03.010.120	4.6 mm Cleaning Stylet
03.010.165	15.0 mm Cannulated Flexible Drill Bit
03.010.167	17.0 mm Cannulated Flexible Drill Bit
03.010.472	Inter-lock Screwdriver, T25, 3.5 mm Hex, 330 mm
03.010.473	Inter-lock Screwdriver, T25, 3.5 mm Hex, 224 mm
03.010.484	Connecting Screw for Radiolucent Aiming Arms
03.010.487	Radiolucent Percutaneous Insertion Handle
03.010.497	Cam Lock Lever
03.010.497S	Cam Lock Lever, 2 pack, sterile
03.010.499	Cannulated Connection Screw for Percutaneous Insertion Handle
03.010.515	Inter-lock Screwdriver, T40, 377 mm
03.037.008	8 mm Cannulated Awl
319.97	Screw Forceps
351.706S	2.5 mm Reaming Rod with Ball Tip, 950 mm, sterile
351.707S	2.5 mm Reaming Rod with Ball Tip and Extension, 950 mm, sterile
351.708S	2.5 mm Reaming Rod with Ball Tip, 1150 mm, sterile
351.782	Holding Forceps for Reaming Rods
355.399◊	Extraction Hook, for Titanium Cannulated Nails
357.408	Cleaning Stylet, 3.2 mm
357.409	Cleaning Brush, 3.2 mm
393.105	Small Universal T-Handle Chuck
394.35	Large Distractor, Complete

◊Available nonsterile or sterile-packed.
Add "S" to product number to indicate sterile product.

Please also refer to the package insert(s) or other labeling associated with the devices identified in this surgical technique for additional information.
CAUTION: Federal Law restricts these devices to sale by or on the order of a physician.
Some devices listed in this technique guide may not have been licensed in accordance with Canadian law and may not be for sale in Canada.
Please contact your sales consultant for items approved for sale in Canada.
Not all products may currently be available in all markets.

DePuy Synthes

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To order (USA): 800-523-0322
To order (Canada): 844-243-4321

Note: For recognized manufacturer, refer to the product label.

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