

For Fixation of Femoral Neck Fractures

Femoral Neck System

Surgical Technique



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The AO Principles of Fracture Management

Mission

The AO's mission is promoting excellence in patient care and outcomes in trauma and musculoskeletal disorders.

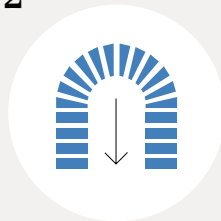
AO Principles^{1,2}

1



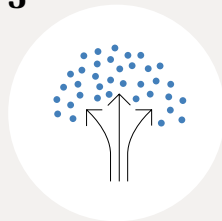
Fracture reduction and fixation to restore anatomical relationships.

2



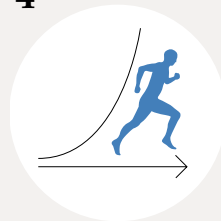
Fracture fixation providing absolute or relative stability, as required by the "personality" of the fracture, the patient, and the injury.

3



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

4



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

¹ Müller ME, M Allgöwer, R Schneider, H Willenegger. Manual of Internal Fixation. 3rd ed. Berlin, Heidelberg, New York: Springer. 1991

² Rüedi TP, RE Buckley, CG Moran. AO Principles of Fracture Management. 2nd ed. Stuttgart, New York: Thieme. 2007

Indications, Contraindications, and Warnings

Indications

The Femoral Neck System (FNS) is indicated for femoral neck fractures, including basilar, transcervical, and subcapital fractures, in adults and adolescents (12-21) in which the growth plates have fused or will not be crossed.

Contraindications

The specific contraindications for the Femoral Neck System (FNS) include:

- Pertrochanteric fractures
- Intertrochanteric fractures
- Subtrochanteric fractures

Warnings

This system should not be used for cases where there is a high incidence of:

- Sepsis
- Malignant primary or metastatic tumors
- Material sensitivity
- Compromised vascularity



System Highlights

The Femoral Neck System (FNS) is a dedicated product for the fixation of femoral neck fractures and offers the following features:

Antirotaion-Screw (ARScrew):

- Provides rotational stability (diverging design between ARScrew and Bolt)³
- Allows implant placement even in a small femoral neck⁵

Bolt:

- Provides angular stability (fixed angle between Bolt and ARScrew)⁴
- Dynamic design with up to 20 mm of controlled collapse, without lateral protrusion for the first 15 mm⁵

Product Offering

- Material: TAN (Ti-6Al-7Nb)
- Construct Sizes: 75 mm to 130 mm (5 mm increments)
- 1-hole and 2-hole plates with 130° angle

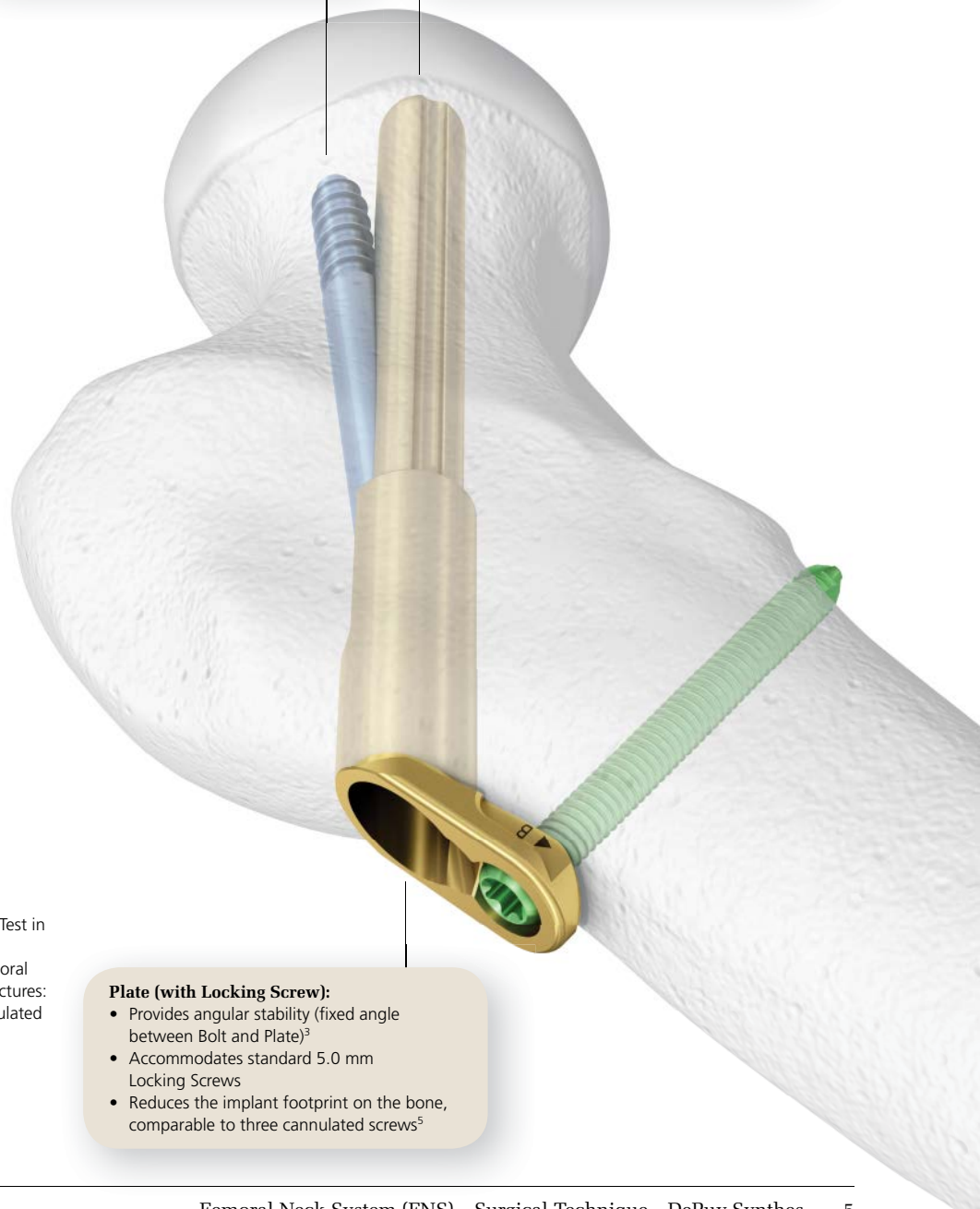
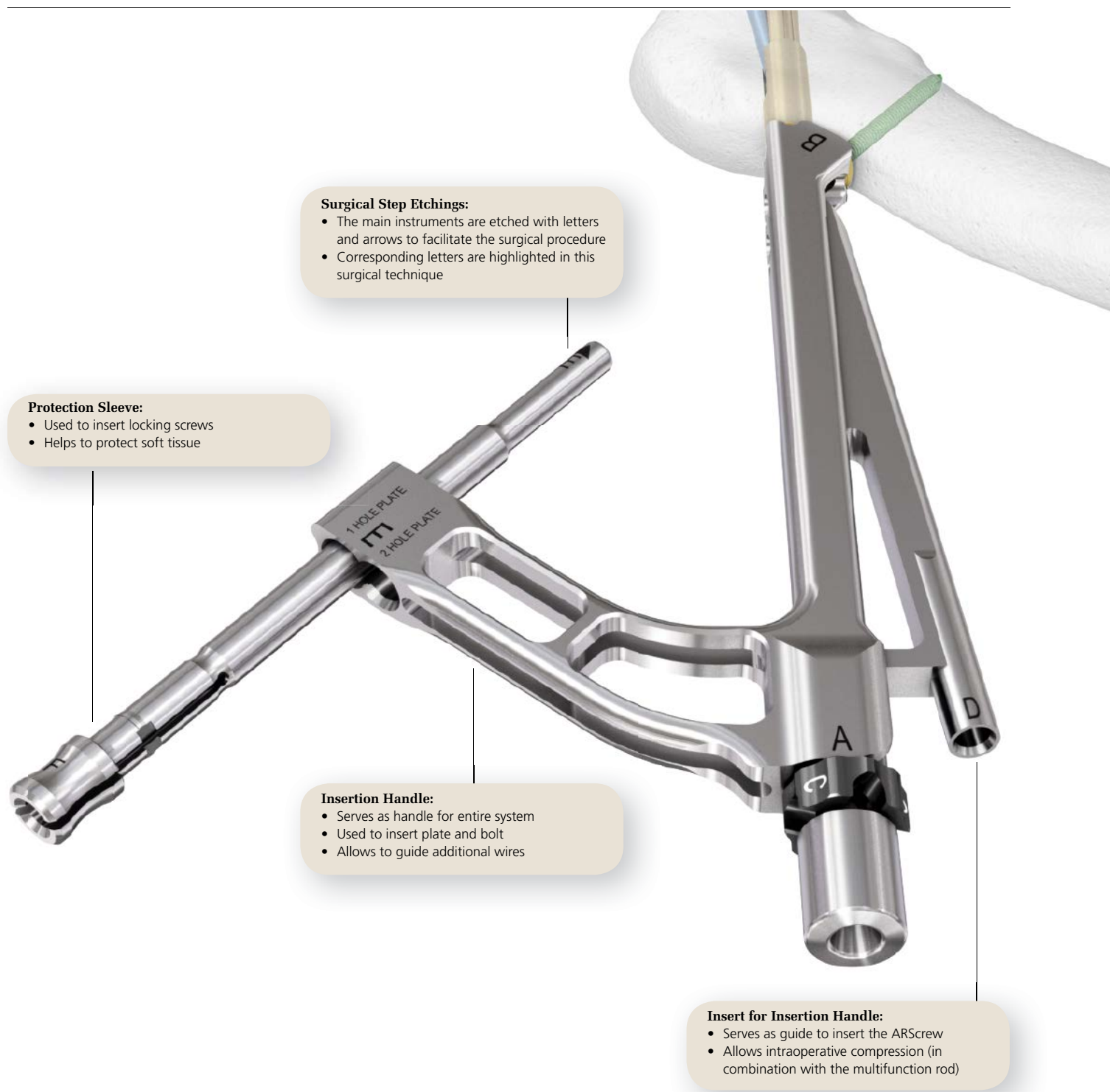


Plate (with Locking Screw):

- Provides angular stability (fixed angle between Bolt and Plate)³
- Accommodates standard 5.0 mm Locking Screws
- Reduces the implant footprint on the bone, comparable to three cannulated screws⁵

3. DePuy Synthes Report: Static Cut Through Rotation Test in Bone Foam. 2017. Ref: 0000165855.*
4. Stoffel K, et al. Biomechanical evaluation of the femoral neck system in unstable Pauwels III femoral neck fractures: a comparison with the dynamic hip screw and cannulated screws. *J Orthop Trauma*. 2017;31(3):131-137.*
5. DePuy Synthes Report: FNS Design and Procedure Comparison. 2018. Ref: 0000274963.

* Benchtop testing may not be indicative of clinical performance.

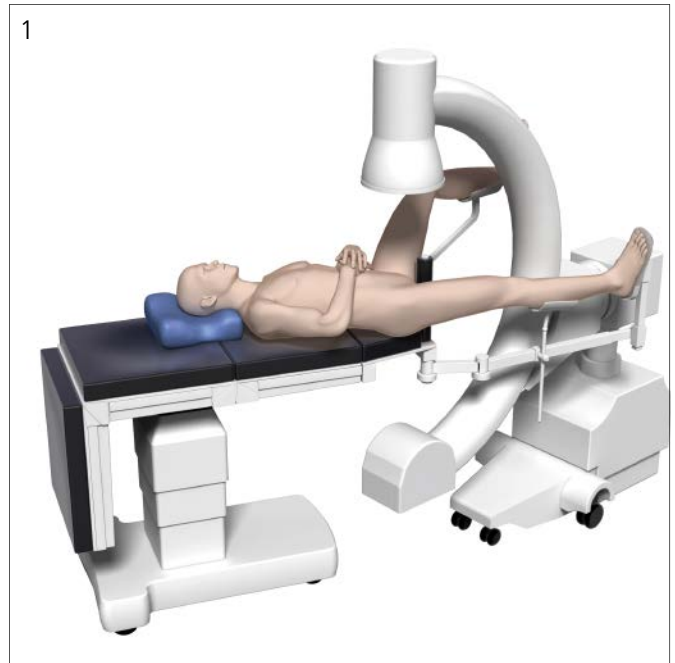


Preparation

1. Position patient

Place the patient in a supine position on the operating table.

- Position the image intensifier to enable visualization of the proximal femur in both the AP and lateral planes. (1)



2. Reduce fracture

Instrument

357.399 3.2 mm Guide Wire 400 mm

Note: Proper reduction of the fracture is crucial for good bone healing and function as well as reduction of complications.

Reduce the fracture by means of gentle traction/flexion, adduction/abduction and internal rotation (about 15°, so the femoral neck is parallel to the operating table).

- Check the reduction in two planes under image intensifier control. If the reduction is insufficient consider open reduction.

Insert an unused wire as an antirotation wire in the superior/anterior part of the femoral neck to prevent any inadvertent rotation of the femoral head.

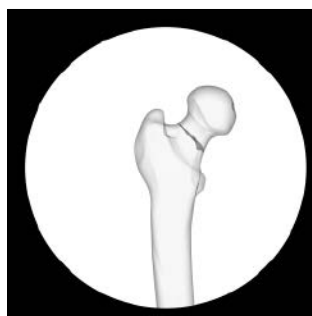
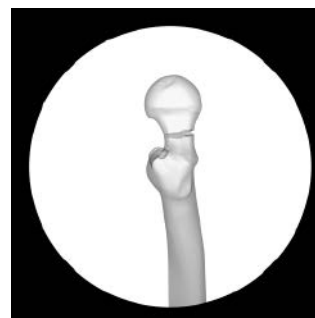
Notes:

- An inappropriate position of the antirotation wire may interfere with the proper placement of the implant.
- The antirotation wire can be placed percutaneous or through the lateral incision.

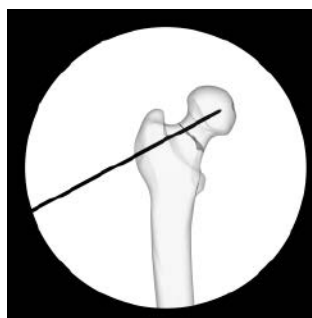
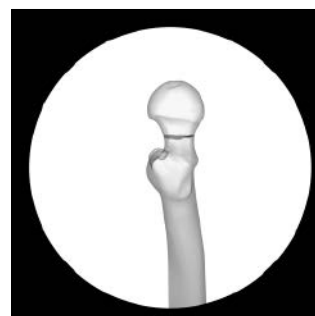
- **Precaution: Monitor the position of the wire during insertion and confirm the final position using the image intensifier. Over inserting guide wires could lead to damage to vital organs.**



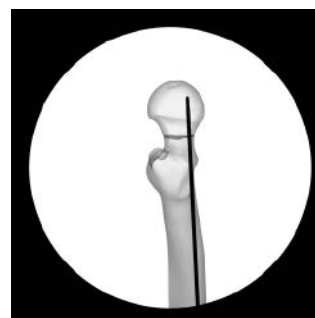
Before Reduction



After Reduction



Temp. Fixation



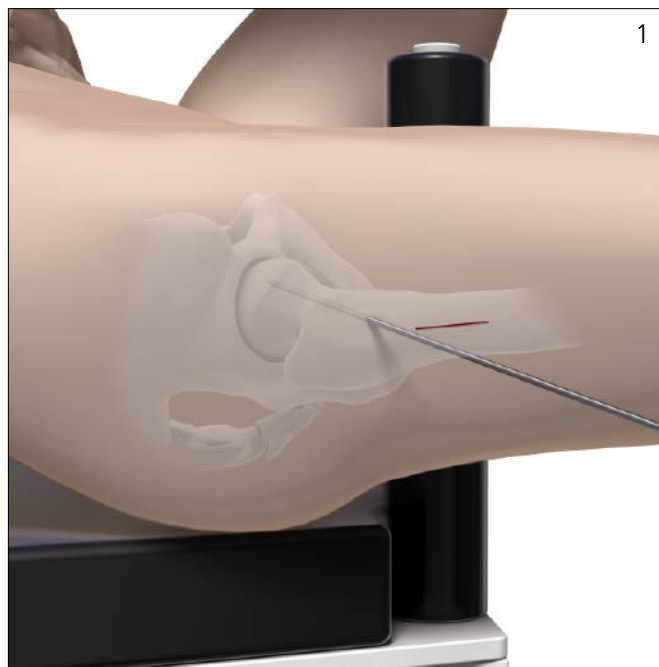
3. Approach

Make a straight lateral skin incision of approximately 6 cm in length, starting 2 to 3 cm proximal to the center of the femoral neck axis. (1)

Access and expose the lateral femoral surface accordingly for satisfactory hardware placement.

Option:

In obese patients, consider making a second incision during locking screw insertion. The second incision needs to be at the entry point of the protection sleeve, proximal to the main incision (see step Locking Screw Insertion for additional information on attaching the protection sleeve).



Implant Insertion

Irrigate and apply suction for removal of debris potentially generated during implant insertion.

1. Insert guide wire

Instruments

| | |
|------------|--|
| 357.399 | 3.2 mm Guide Wire 400 mm |
| 03.168.001 | 130° Angled Guide for 3.2 mm Guide Wires |

Insert a second, unused guide wire as central guide wire, using the 130° angled guide. (1)

- Use image intensification to place the guide wire slightly inferior to the apex of the femoral head, extending into the subchondral bone on the AP view. (2)

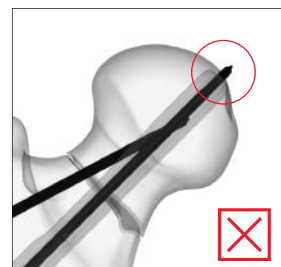
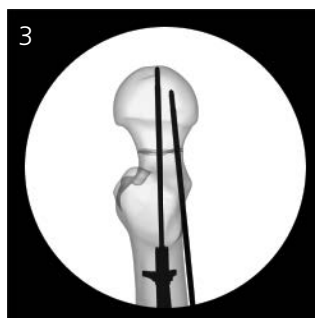
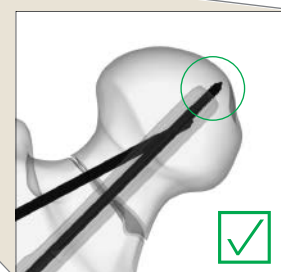
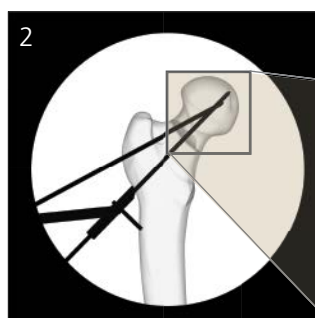
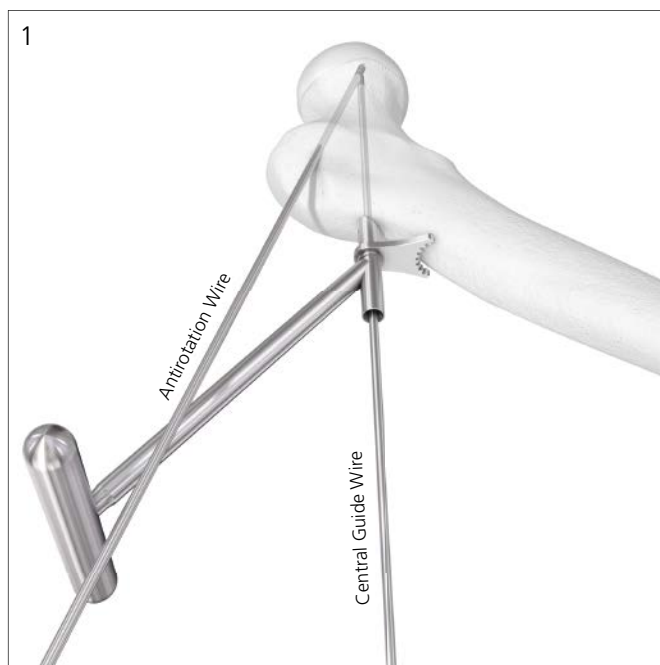
In the lateral view, the guide wire should be central in the femoral neck and head. (3)

Notes:

- The position of the guide wire within the femoral neck and head should be chosen according to the patient's anatomy before fracture. The implant plate allows a placement of about $\pm 5^\circ$ compared to the 130° angle.
- Depending on the calculated construct size (see page 13), the tip of the bolt will be 5 to 10 mm short compared to the tip of the guide wire.

Precautions:

- Monitor the position of the wire during insertion and confirm the final position using the image intensifier. Over inserting guide wires could lead to damage to vital organs.
- Replace wires if they are bent after insertion.



2. Option: adjust guide wire

Instruments

| | |
|------------|--|
| 357.399 | 3.2 mm Guide Wire 400 mm |
| 03.168.002 | Correction Guide for 3.2 mm Guide Wires (optional) |

Use the correction guide and an unused guide wire to adjust the position of the central guide wire in reference to the initial central guide wire. The following three types of adjustments are possible:

1. Parallel Correction (5 mm)

Insert the correction guide over the initial wire (orange) and turn the correction guide to define the new entry point (anterior/posterior or inferior/superior). Then use a new wire in the parallel hole (green) and remove the initial wire.

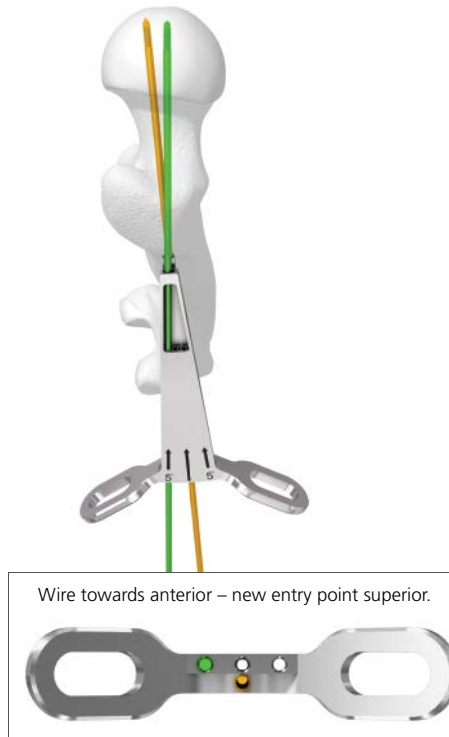
2. Angle Correction (5°) and Entry Point Correction (5 mm)

Insert the correction guide over the initial wire (orange) and turn the correction guide to define the new entry point. Then use a new wire in either the left or the right 5°-hole (green).

1. Example:
Parallel correction with new entry point anterior.



2. Example:
Angle correction towards anterior with new entry point superior.



3. Angle Correction (5°) and Same Entry Point

Insert the correction guide over the initial wire (orange hole in side-view), turn the correction guide to choose the new temporary entry point, insert a new wire in the parallel hole (blue) and remove the initial wire. Then use a new wire in either the left or the right 5°-hole (green) to correct the angle.

Precautions:

- **Monitor the position of the wire during insertion and confirm the final position using the image intensifier. Over inserting guide wires could lead to damage to vital organs.**
- **Replace wires if they are bent after insertion.**

3. Example:

Angle correction towards anterior with same entry point. Initial wire (orange) only shown in side-view.



Wire towards anterior – same entry point.



3. Determine length

Instrument

03.168.003 Direct Measuring Device for 3.2 mm Guide Wires

Slide the direct measuring device over the central guide wire. (1)

Read the depth of the guide wire on the direct measuring device. (2)

As the guide wire is inserted into the subchondral bone (in the AP view, see page10), remove 5 mm from the measured depth and choose the next shorter construct size, resulting in the calculated construct size.

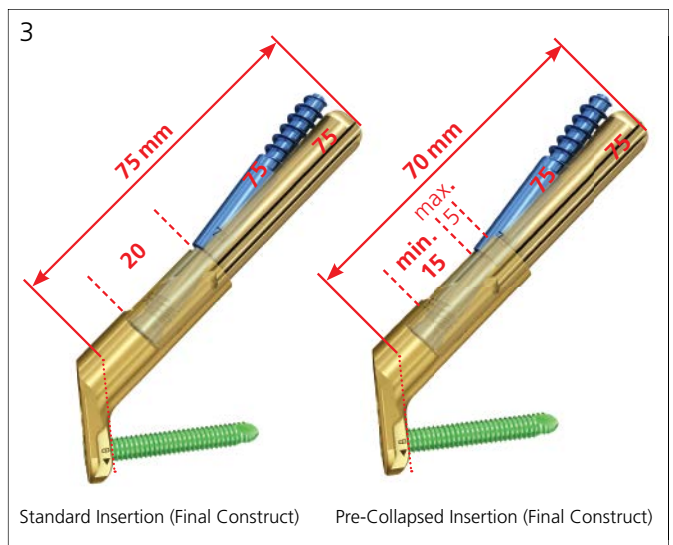
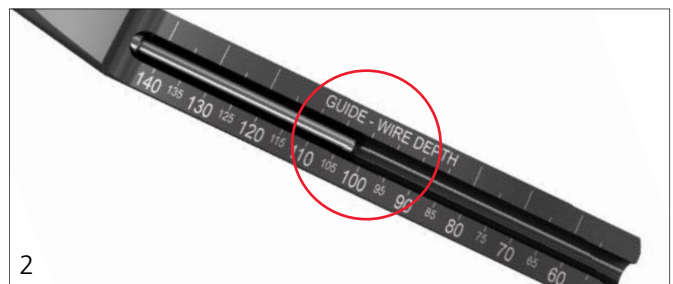
Example: If you read 102 mm on the direct measuring device, the construct size of the implant should be 95 mm (102-5=97 → choose 95 mm).

Construct Sizes:

| | | |
|-------------------------|--------|--------|
| 70 mm (see notes below) | 95 mm | 120 mm |
| 75 mm | 100 mm | 125 mm |
| 80 mm | 105 mm | 130 mm |
| 85 mm | 110 mm | |
| 90 mm | 115 mm | |

Notes:

- If patient anatomy demands, a calculated construct size of 70 mm can be achieved by inserting a pre-collapsed 75 mm construct size. (3)
- Proceed to pages 29 to 34 for pre-collapsed Insertion before returning to pages 18 to 25 for locking screw and antirotation-screw insertion.
- This technique reduces the tolerated amount of collapse from 20 mm to a minimum of 15 mm and can be performed with other construct sizes as well (see example on page 29).



4. Ream for insertion of plate and bolt

Instrument

| | |
|----------------|--|
| 03.168.004 | Complete Opening Drill Bit/Reamer Assembly |
| Consisting of: | |
| 03.168.005 | 10.2 mm Cannulated Drill Bit Length 251 mm |
| 03.168.006 | 12.5 mm Reamer |
| 03.168.007 | Nut for Reamer |

Assemble the reamer by sliding the reamer-component over the drill bit until it clicks into place at the selected construct size (95 mm in the example before). Lock the reamer by adding and fully tightening the nut. (1)

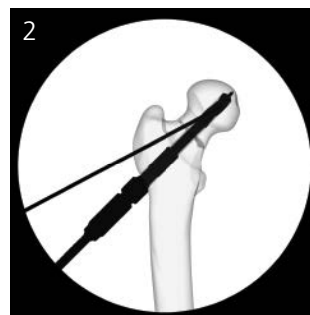
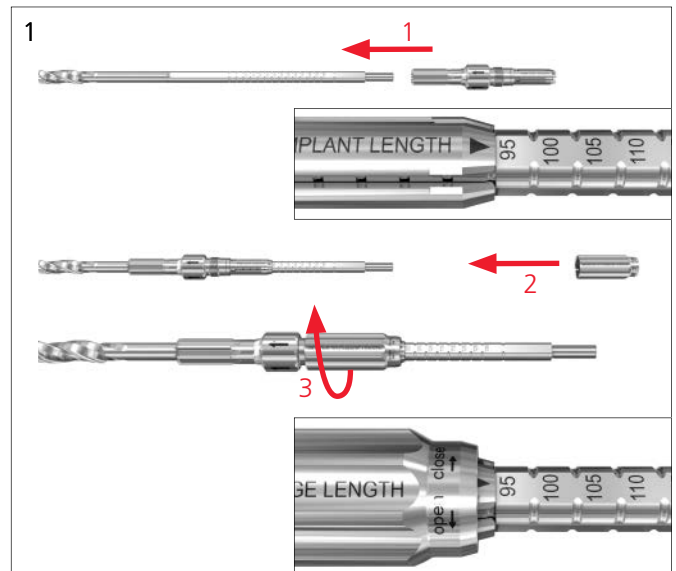
Ream down until the reamer stops on the bone. (2)

Notes:

- It is recommended that the femoral head is temporarily fixated with an antirotation wire prior to reaming.
- An inappropriate position of the antirotation wire may interfere with the proper placement of the implant.
- Control guide wire migration, check reaming depth during reaming, and ensure complete reaming is achieved using the image intensifier.
- When reaming in dense bone, use of continuous irrigation is recommended.
- Avoid excessive reaming force during reaming.

Remove the reamer.

It is important to reinsert the guide wire if it is removed accidentally. To reinsert the wire, push the reamer back into the reamed hole (without the use of a power tool) and use the cannulation to reinsert the guide wire into the original position.



5. Assemble implant and insertion instruments

Instruments

03.168.008 Femoral Neck System Insertion Handle

03.168.009 Insert for FNS Insertion Handle

A Slide the insert into the insertion handle, without tightening the black screw. (1)

Fully insert the bolt with the selected construct size (95 mm in the example before) into the plate. (2)

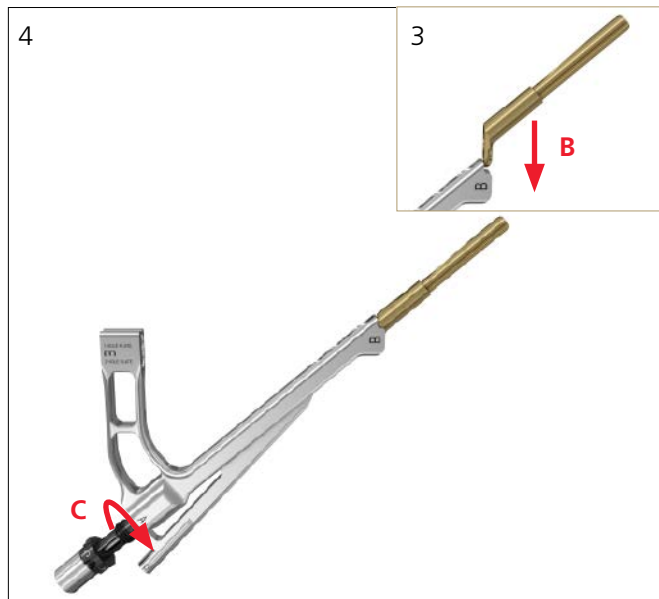
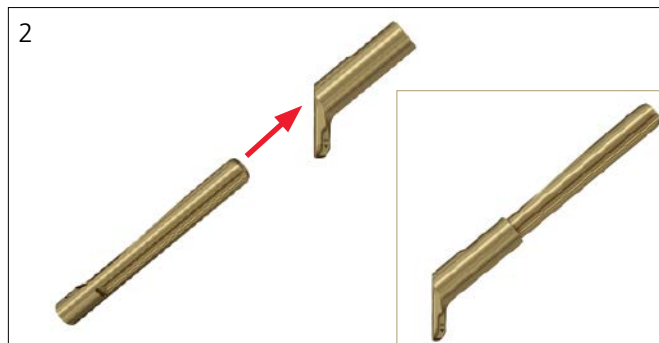
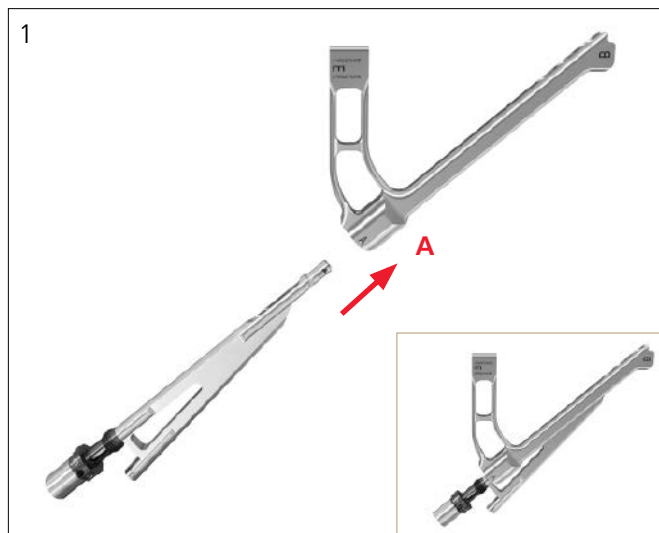
Option: A longer side plate with two locking holes (2-hole plate) is available as option.

B Mount the implant onto the insertion handle. (3)

Note: Ensure that the implant is correctly fixed to the insertion instrument and that the bolt is in the completely extended position.

C Manually tighten the black screw of the insert to attach the implant. (4)

Precaution: Hand-tightening the black screw is sufficient. Using additional tools might cause overtightening.



6. Insert implant

Instrument

03.168.015 Cylinder for Insertion Instruments (optional)

Insert the implant over the central guide wire into the prereamed hole. (1)

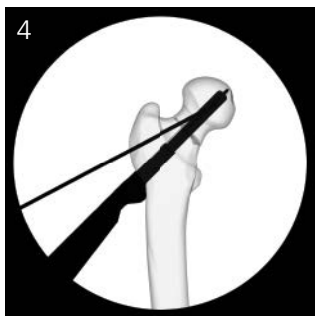
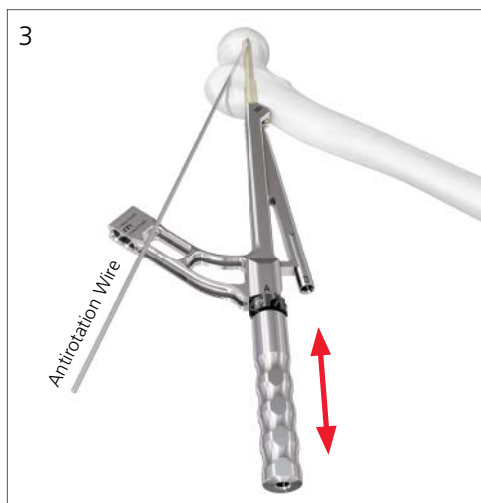
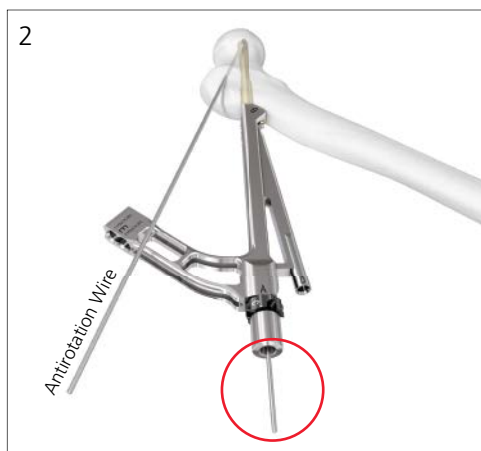
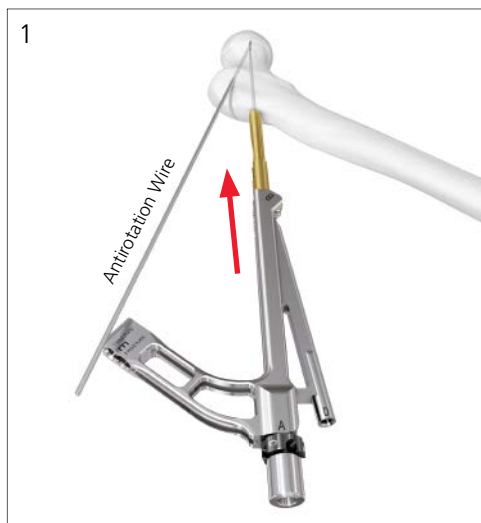
Precaution: When not using the cylinder, the guide wire will become visible on the outer side of the insert. Ensure not to move the guide wire. (2)

Option: The cylinder can be used to manually tap the plate onto the bone. (3) If additional tapping is required, use a standard surgical hammer to slightly tap onto the cylinder.

- Use image intensification to confirm the insertion depth and ensure that the plate is inserted down to the bone as well as aligned with the axis of the femoral shaft. (4)

Notes:

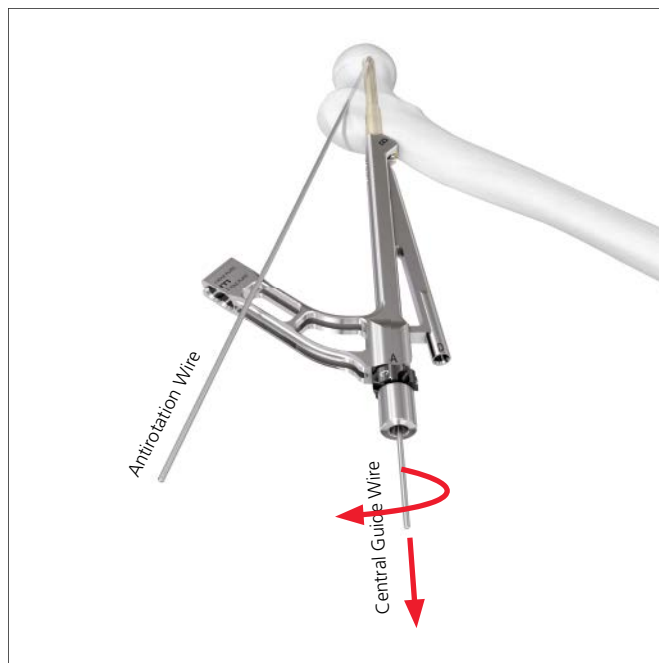
- It is recommended that the femoral head is temporarily fixated with an antirotation wire prior to implant insertion.
- Avoid excessive insertion force.
- Ensure that the black screw is not turning, if tapping is required during insertion.



7. Remove guide wire

Remove the central guide wire. (1)

Keep the antirotation wire to prevent loss of reduction and rotation of the head.



Locking Screw and Antirotation-Screw Insertion

Irrigate and apply suction for removal of debris potentially generated during antirotation-screw and locking screw insertion.

1. Attach protection sleeve for locking screw insertion*

Instrument

| | |
|------------|---|
| 03.168.013 | Protection Sleeve for FNS Insertion Instruments |
|------------|---|

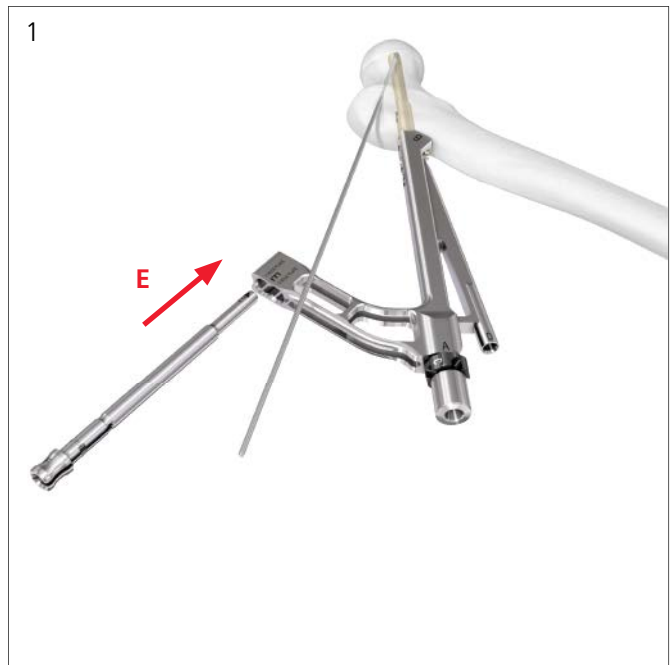
Note: Ensure that the central guide wire is removed.

E Attach the protection sleeve to the insertion handle. (1)

Notes:

- In obese patients, the use of a second incision to insert the protection sleeve should be considered.
- Check that the protection sleeve is inserted in the correct position (1-hole plate or 2-hole plate) of the insertion handle.
- Insert the proximal locking screw first if using a 2-hole plate.

Check that the protection sleeve is fully inserted. (2)



*Alternative for standard insertion only: The system allows to insert the antirotation-screw before inserting the locking screw(s). Perform steps 5 to 8 first before completing steps 1 to 4.

2. Drill for locking screw

Instruments

| | |
|------------|-------------------------------------|
| 03.168.011 | 4.3 mm Drill Bit Length 413 mm |
| 03.168.017 | Depth Gauge up to 100 mm (optional) |

Precautions:

- **Confirm that the insertion handle and plate are aligned with the femoral shaft axis.**
- **Push on the insertion handle to ensure that the plate is down to the bone.**

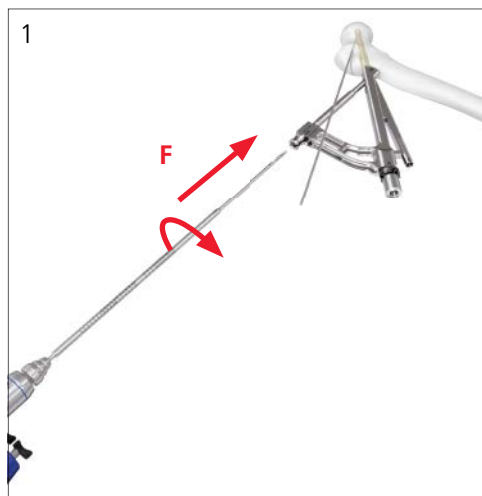
F Drill the hole for the bi-cortical locking screw through the protection sleeve. (1)

Read the screw length directly off the etching on the drill bit. (2)

Option:

Use the depth gauge through the protection sleeve to determine the depth of the drilled hole. (3)

Note: The screw length should be chosen at least 4 mm longer than the determined depth of the hole.



3. Insert locking screw

Instruments

| | |
|------------|--|
| 03.168.014 | T25 StarDrive Screwdriver Shaft 241 mm |
| 511.774 | Torque Limiting Attachment, 4 Nm, for AO Reaming Coupler |
| 03.140.027 | Large Cannulated Handle w/Quick Coupling – 12 mm Hex |

Precautions:

- **Confirm that the insertion handle and plate are still aligned with the femoral shaft.**
- **Push on the insertion handle to ensure that the plate is still down to the bone.**

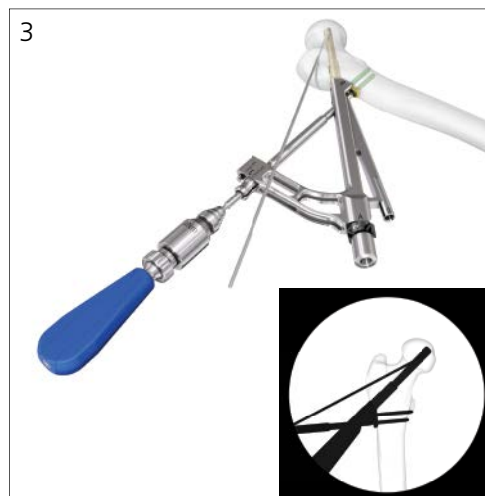
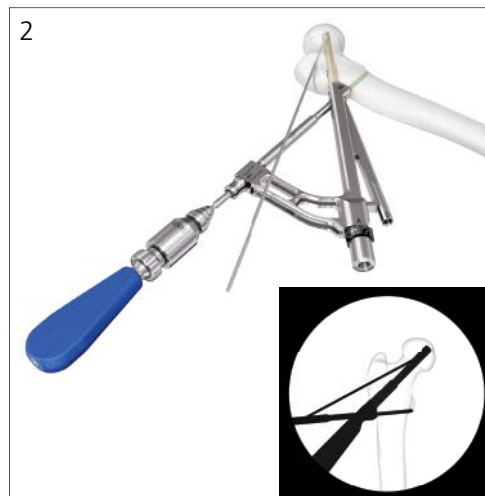
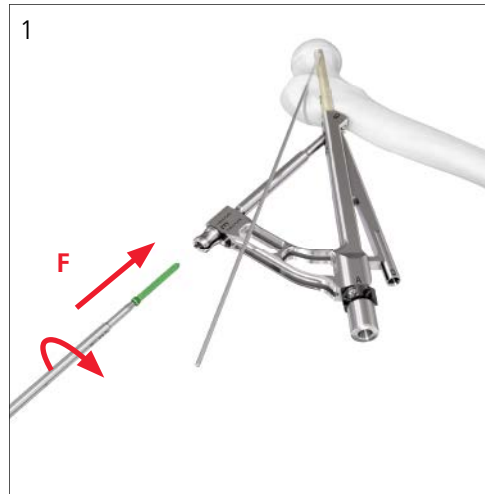
F Insert the locking screw with the determined length, as read from the drill bit or depth gauge. (1)

The locking screw may be inserted using power equipment. Final tightening must be done slowly and by hand using the screwdriver shaft, together with the 4 Nm torque limiter and the appropriate handle. (2)

- ⓐ **Note: Monitor locking screw insertion and confirm screw position as well as length using the image intensifier prior to final tightening.**

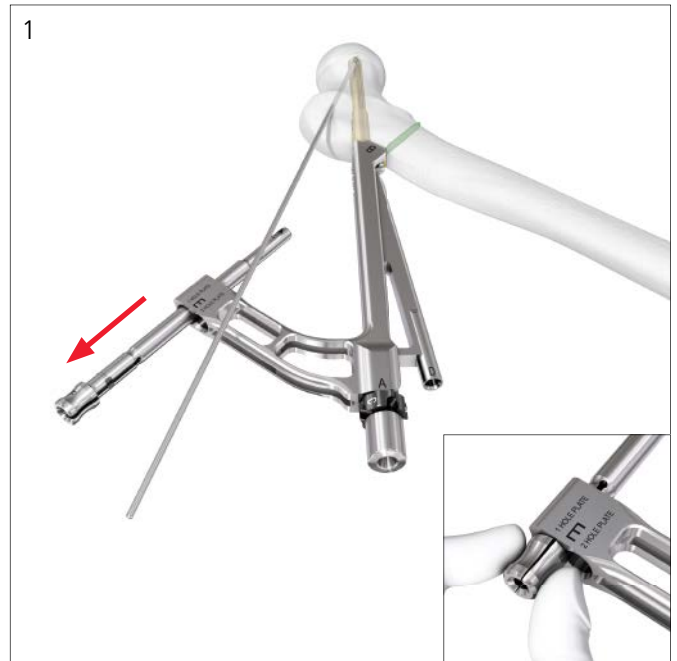
Option:

If using a 2-hole plate, repeat steps 1 to 3 to insert the distal screw. (3)



4. Remove protection sleeve

Remove the protection sleeve by pressing together the head of the sleeve while pulling. (1)



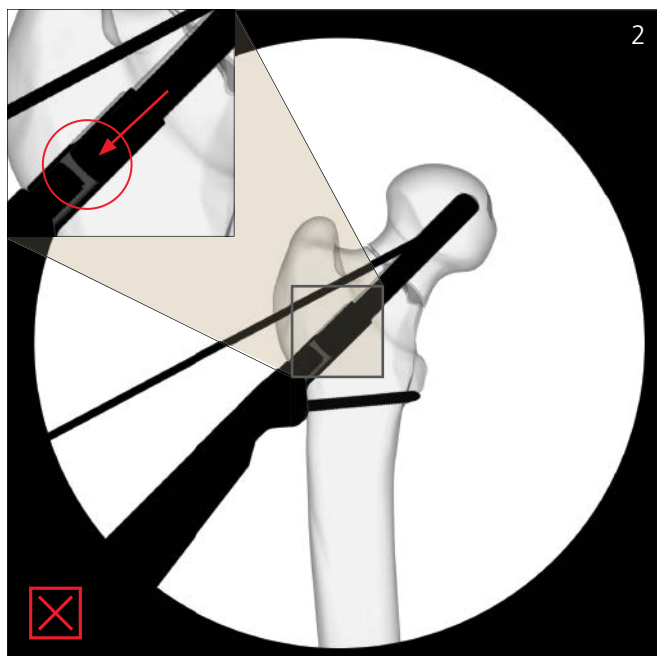
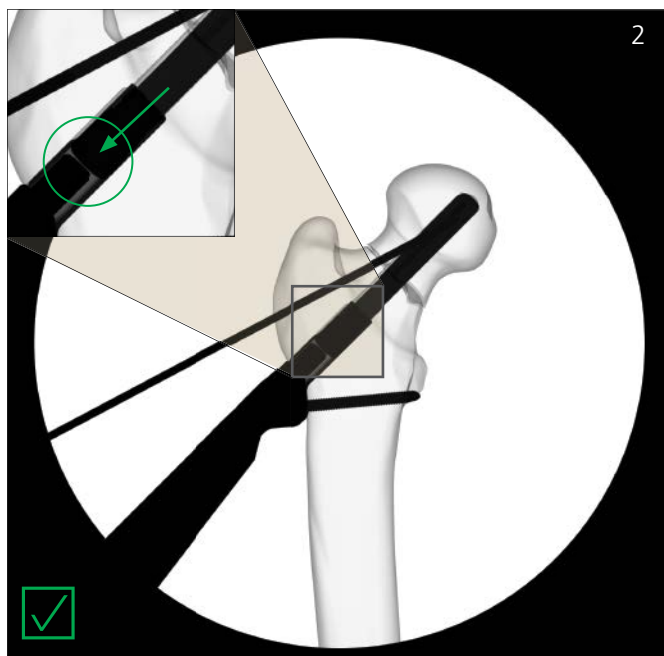
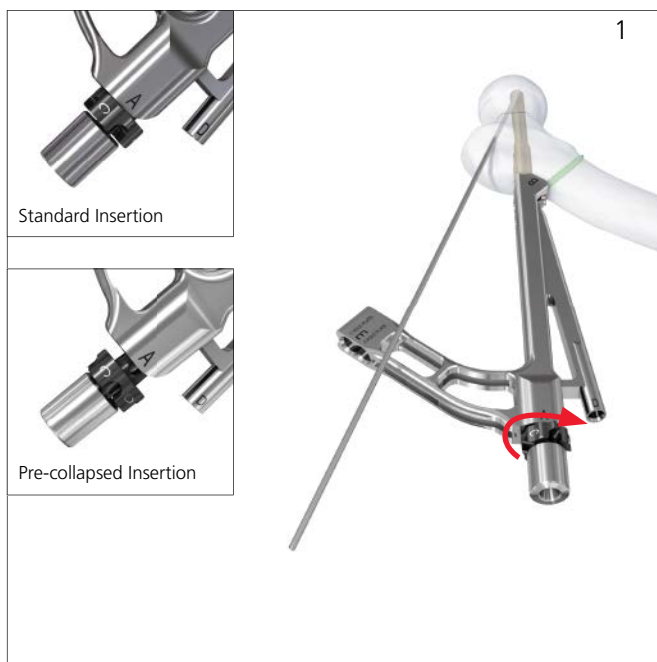
5. Check Insertion Instruments

Ensure that the tip is in contact with the bolt by carefully turning the black screw clockwise. (1) If needed, this will close the gap between insert tip and bolt. (2)

Note: If the implant is inserted pre-collapsed (see page 13), the black screw can have a distance from the handle of as much as 5 mm, even after tightening.

Precautions:

- • Use image intensification to reconfirm that the insert tip is in contact with the bolt. (2)
- • Use image intensification to reconfirm the insertion depth of the bolt. (2)



6. Drill for antirotation-screw

Instruments

03.168.011 4.3 mm Drill Bit Length 413 mm

03.168.012 Drill Stop

Pass the drill stop over the back end of the drill bit and check the drill stop for wear per the instructions on page 28. (1) Adjust the setting to the same construct size as the bolt (95 mm in the example before, respectively 75 mm with pre-collapsed insertion as shown in table on page 29). (2)

Note: The length of the bolt and the antirotation-screw are pre-defined based on the calculated construct size.

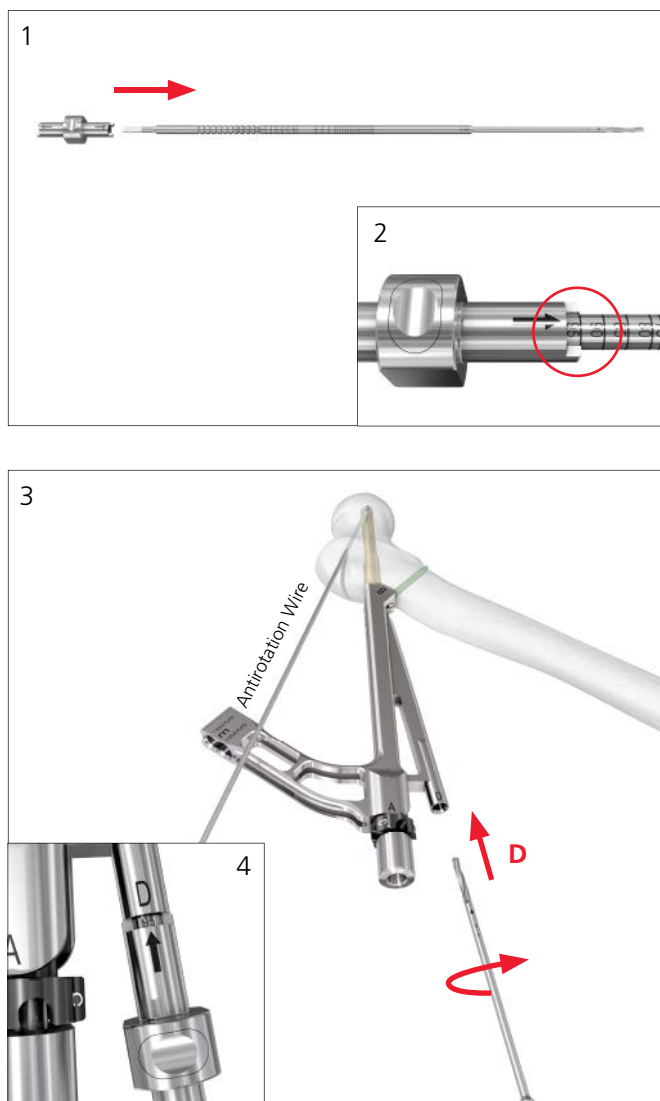
Precautions:

- Monitor depth during drilling using the image intensifier. Drilling too deep could lead to bone damage.
- Confirm that the insertion handle and plate are aligned with the femoral shaft, if using the alternative of inserting the antirotation-screw before inserting the locking screw.

D Use the guide of the insert to drill the hole for the antirotation-screw. (3)

Drill until the drill stop stops on the guide of the insert. (4)

Remove the drill bit.



7. Insert antirotation-screw

Instruments

| | |
|------------|--|
| 03.168.014 | T25 StarDrive Screwdriver Shaft 241 mm |
| 511.774 | Torque Limiting Attachment, 4 Nm, for AO Reaming Coupler |
| 03.140.027 | Large Cannulated Handle w/Quick Coupling – 12 mm Hex |

Precautions:

- **Confirm that the femoral head is temporarily fixated with an antirotation wire and hold the position of the handle during final tightening to prevent any inadvertent rotation.**
- **Confirm that the insertion handle and plate are still aligned with the femoral shaft, if using the alternative of inserting the antirotation-screw before inserting the locking screw.**

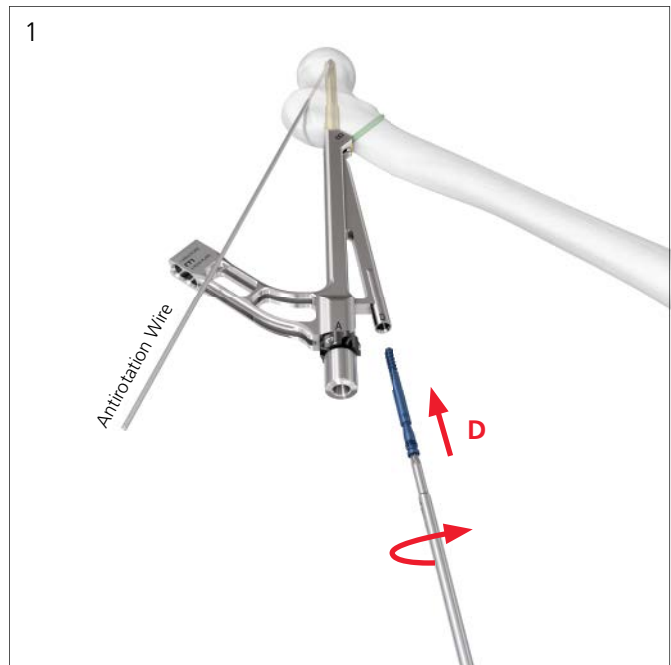
D Insert the antirotation-screw with the same construct size as the bolt (95 mm in the example before, respectively 75 mm with pre-collapsed insertion as shown in table on page 29). (1)

Insertion as well as final tightening should be done slowly and by hand using the screwdriver shaft, together with the 4 Nm torque limiter and the appropriate handle.

(2) If dense bone is preventing antirotation-screw insertion, then carefully use the handle without torque limiter for insertion.

- ⊙ **Precaution: Monitor antirotation-screw insertion and confirm screw position using the Image Intensifier prior to final tightening.**

Remove any antirotation wires.



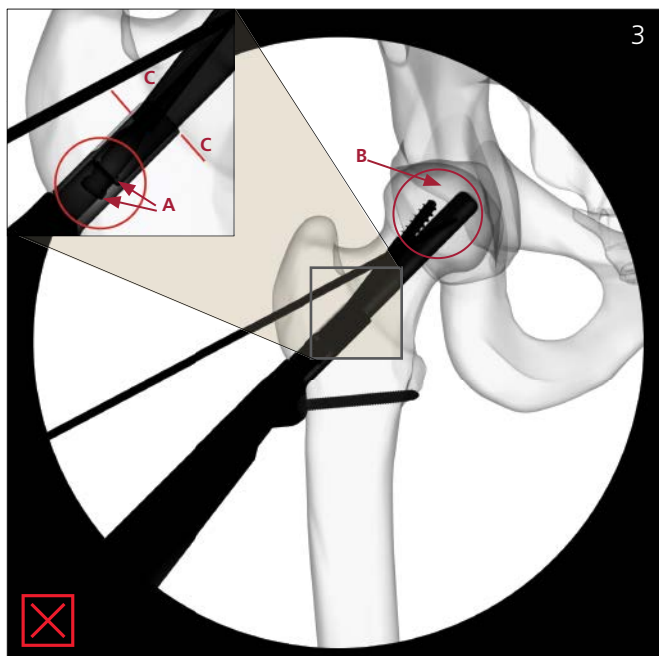
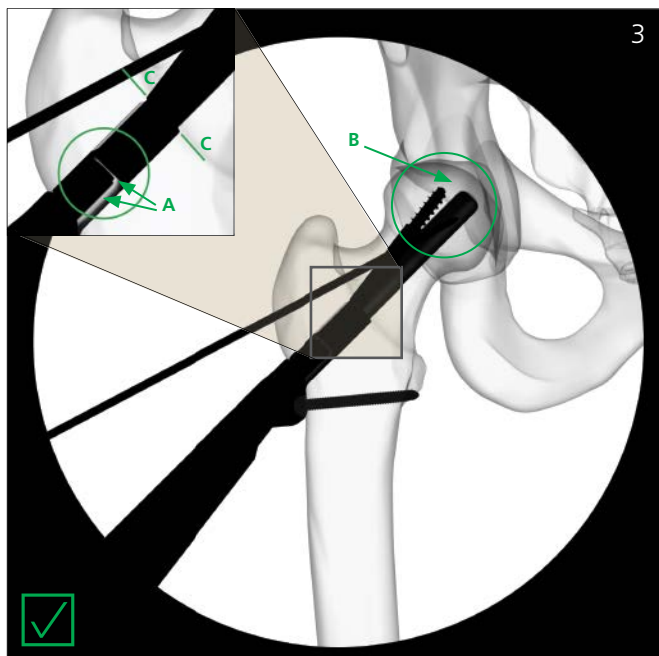
8. Check Antirotation-Screw

- Ⓒ **Precaution:** After final tightening, use the image intensifier to check that the antirotation-screw is fully inserted. (3) If not, then loosen and reinsert the antirotation-screw. Use the 4 Nm torque limiter and the appropriate handle for final tightening.

- A** The head of the antirotation-screw should not appear outside of the bolt.
- B** The tip of the antirotation-screw should be in a similar insertion depth when compared to the tip of the bolt.

For Standard Insertion only (not applicable for Pre-Collapsed Insertion):

- C** The notch of the antirotation-screw should be at the same level as the notch of the plate barrel.



Instrument Disassembly and Final Check

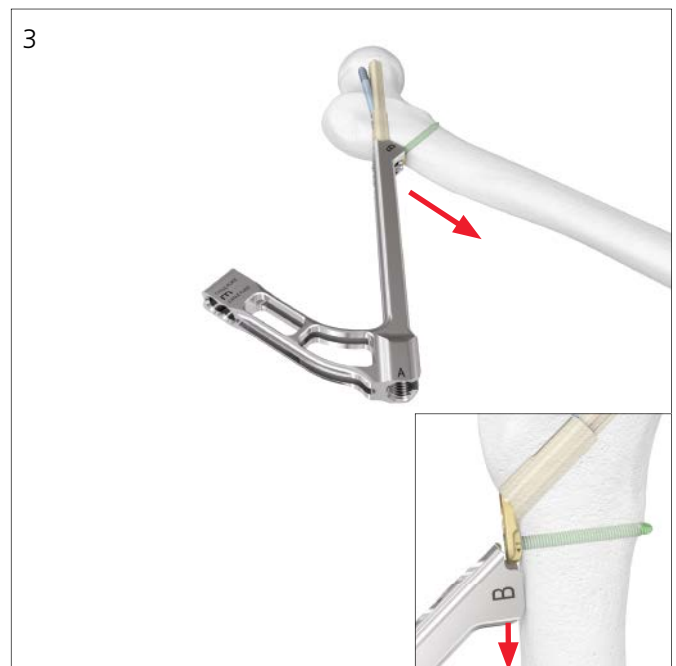
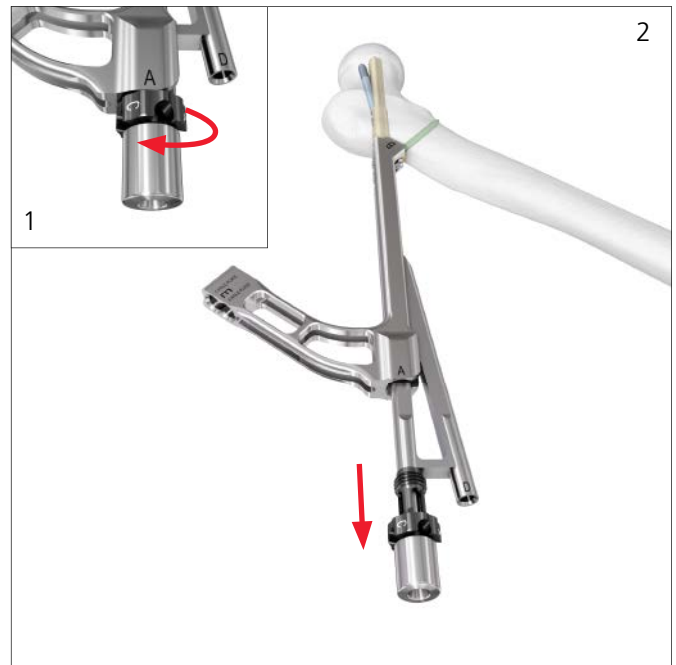
Option: The system allows to apply intraoperative compression. See page 35 to perform this option before instrument disassembly.

1. Remove insertion instruments

Unscrew (counterclockwise) the insert from the insertion handle by completely loosening the screw of the insert. (1)

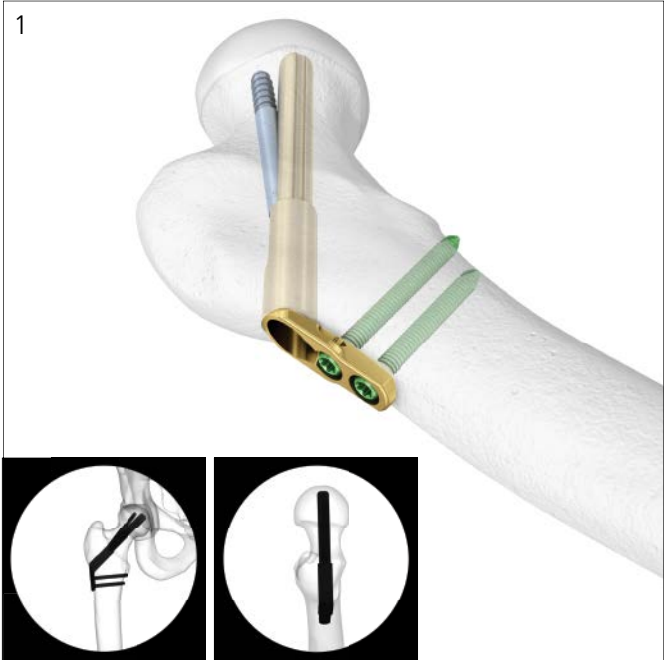
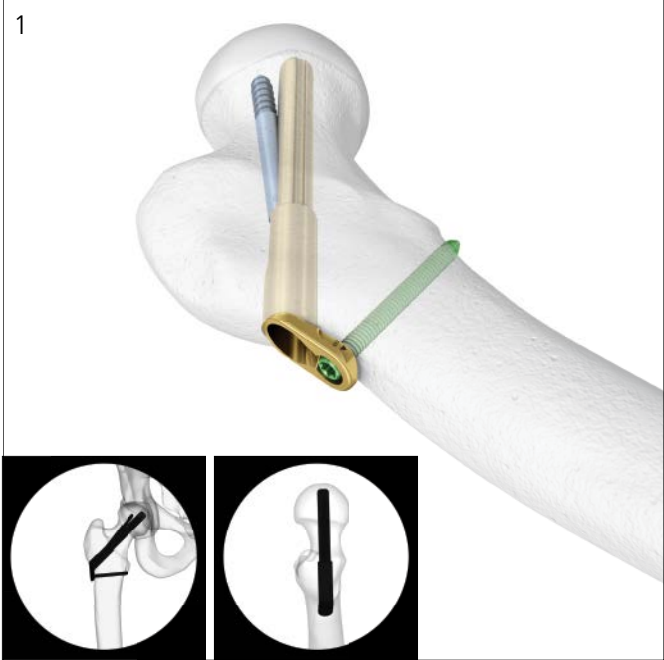
Remove the insert from the insertion handle. (2)

Remove the insertion handle by sliding it off the plate in a distal direction. (3)



2. Final check

- Before closing the wound, use the image intensifier to confirm implant size as well as positioning and re-confirm that the antirotation-screw and the locking screw are fully locked. (1)



Checking Drill Stop Wear

1. Perform drill stop wear test

Instruments

03.168.011 4.3 mm Drill Bit Length 413 mm

03.168.012 Drill Stop

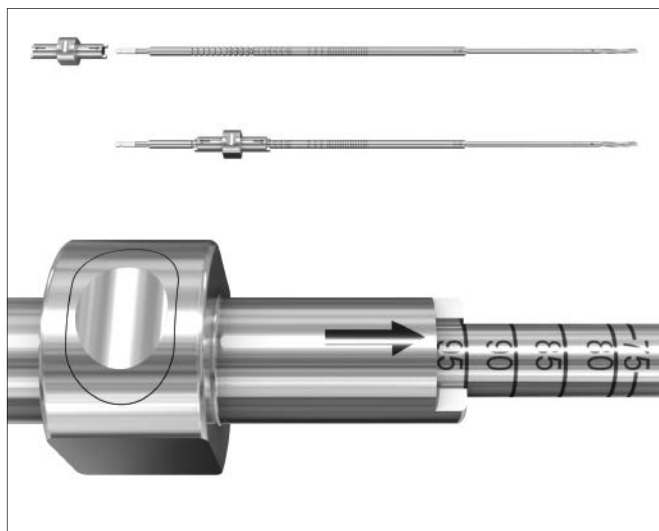
If excessive wear occurs, the drill stop can slip, resulting in incorrect drilling depth.

Before use:

- Slide drill stop onto the drill bit
- Press on the drill stop with the thumb without pressing the button. If the drill stop moves under pressure, replace it
- Do the same test in the opposite direction. If the drill stop moves, replace it

Precautions:

- **Drill only under periodic image intensifier control.**
- **While drilling, do not force.**
- **Replace drill stops that do not pass the described wear test.**



Option: Pre-Collapsed Insertion

4. Ream for Insertion of Plate and Bolt

Instruments

03.168.004 Reamer, complete

Consisting of:

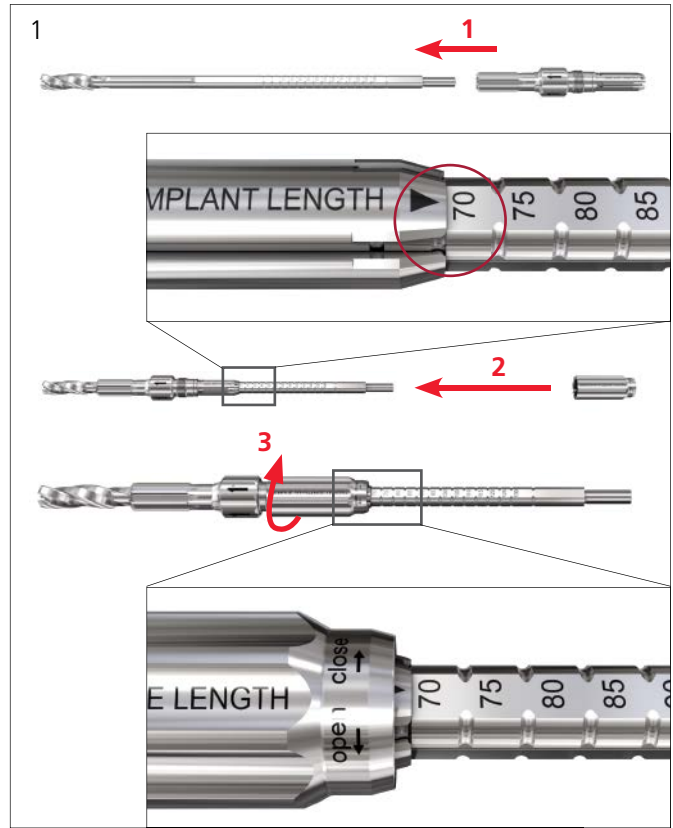
03.168.005 Drill Bit Ø 10.2 mm, cannulated, length 251 mm

03.168.006 Reamer Ø 12.5 mm

03.168.007 Nut, for Reamer

Assemble the reamer by sliding the reamer-component over the drill bit until it clicks into place at the calculated construct size (70 mm in the example*). Lock the reamer by adding and fully tightening the nut. (1)

Note: Set the reamer to the calculated construct size (therefore 5 mm shorter than the construct size to be used, see table below).



Pre-Collapsed Insertion – Reference Table:

| Calculated Construct Size (refer to page 13) | Setting on Reamer (refer to above) | Construct Size to be Used (Bolt/ARscrew) (refer to page 24/31) | Setting on Drill for ARscrew (refer to page 23) |
|---|---------------------------------------|---|--|
| 70 | 70* | 75 | 75 |

*If not etched, select the groove next to 75 mm towards the drill tip.

Note: This technique can be performed with other construct sizes as well, for example using a 100 mm construct size when the calculated construct size is 95 mm (see table below).

| Calculated Construct Size (refer to page 13) | Setting on Reamer (refer to above) | Construct Size to be Used (Bolt/ARscrew) (refer to page 24/31) | Setting on Drill for ARscrew (refer to page 23) |
|---|---------------------------------------|---|--|
| 95 | 95 | 100 | 100 |

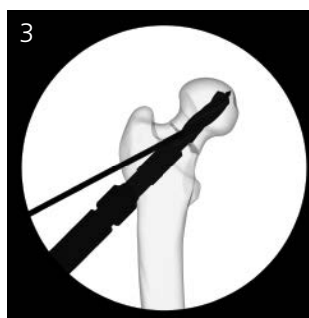
Ream down until the reamer stops on the bone. (2)

Notes:

- It is recommended that the femoral head is temporarily fixated with an antirotation wire prior to reaming.
- An inappropriate position of the antirotation wire may interfere with the proper placement of the implant.
- Control guide wire migration, check reaming depth during reaming and ensure complete reaming is achieved using the image intensifier. (3)
- When reaming in dense bone, use of continuous irrigation is recommended.
- Avoid excessive reaming force during reaming.

Remove the reamer.

It is important to reinsert the guide wire if it is removed accidentally. To reinsert the wire push the reamer back into the reamed hole (without the use of a power tool) and use the cannulation to reinsert the guide wire into the original position.



5. Assemble Implant and Insertion Instruments

Instruments

03.168.008 Insertion Handle

03.168.009 Insert, for Insertion Handle

A Slide the insert into the insertion handle, without tightening the black screw. (1)

Fully insert the bolt with a 5 mm longer construct size than calculated and reamed (therefore 75 mm in the example, refer to table on page 29) into the plate. (2)

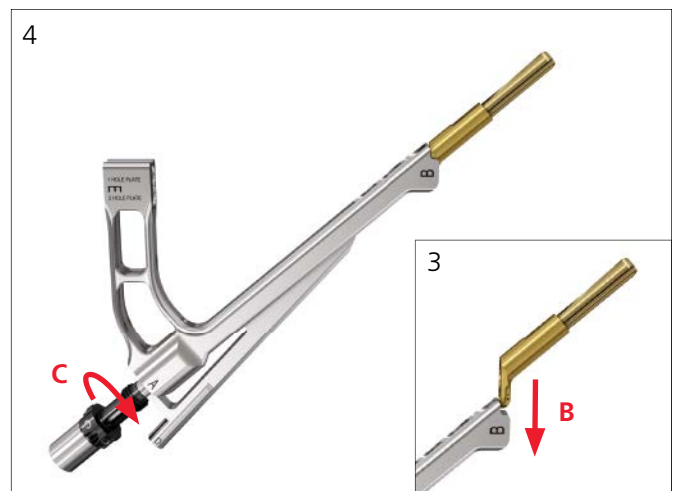
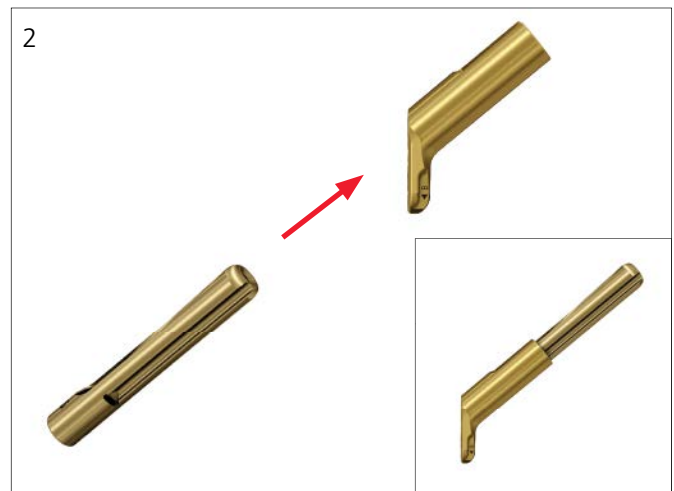
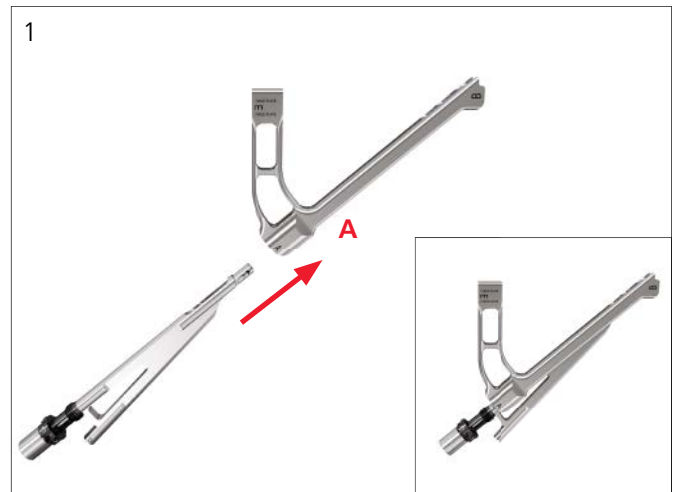
Option: A longer side plate with two locking holes (2-hole plate) is available as option.

B Mount the implant onto the insertion handle. (3)

Note: Ensure that the implant is correctly fixed to the insertion instrument and that the bolt is in the completely extended position.

C Manually tighten the black screw of the insert to attach the implant. (4)

Precaution: Hand-tightening the black screw is sufficient. Using additional tools might cause overtightening.



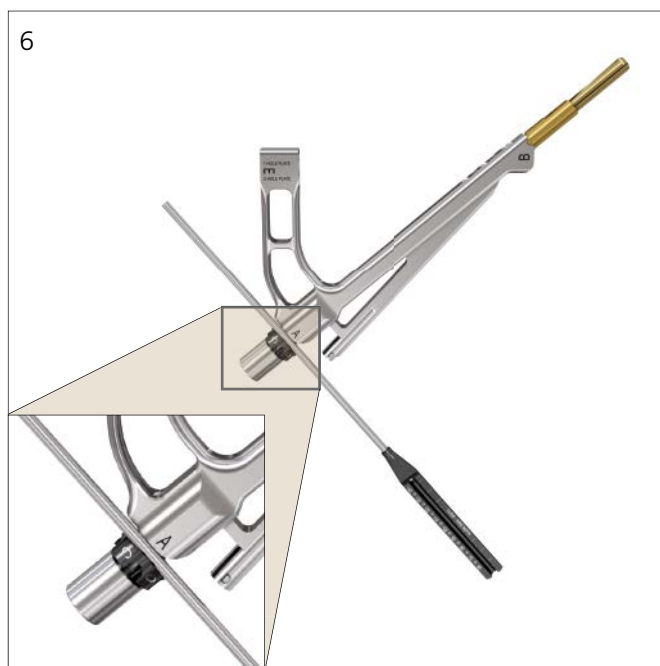
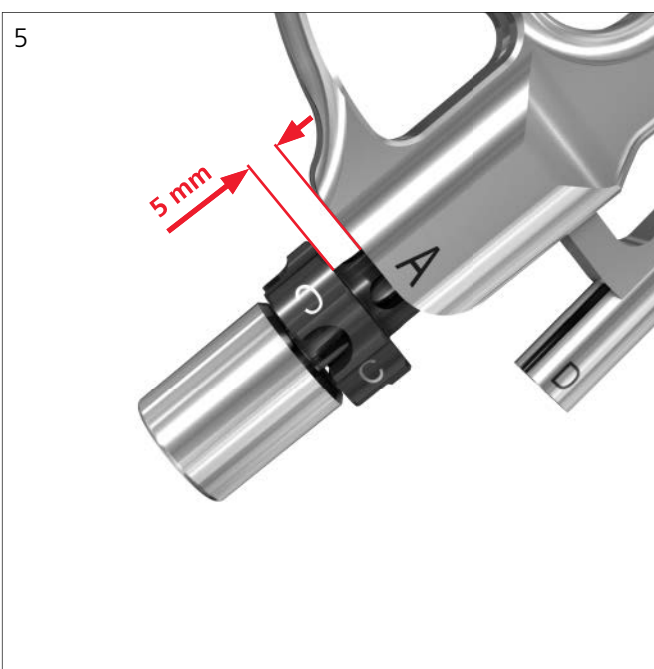
6. Pre-Collapse Insertion Instruments

Instrument

03.168.003 Direct Measuring Device, for 3.2 mm Guide Wires

After tightening, untighten (counterclockwise) the black screw by at least 5 mm (e.g. by 5 halfturns), allowing the implant construct to shorten for 5 mm. (5)

Precaution: Confirm that the distance is at least 5 mm, by loosely fitting the direct measuring device between the black screw and the insertion handle. (6)



7. Insert implant

Instrument

03.168.015 Cylinder for Insertion Instruments (optional)

Insert the implant over the central guide wire into the pre-reamed hole. (1)

Precaution: When not using the cylinder, the guide wire will become visible on the outer side of the insert. Ensure not to move the guide wire. (2)

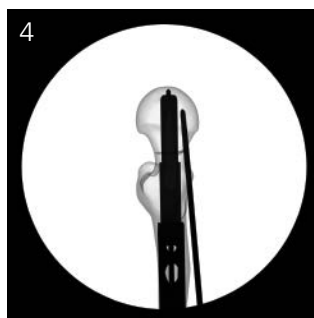
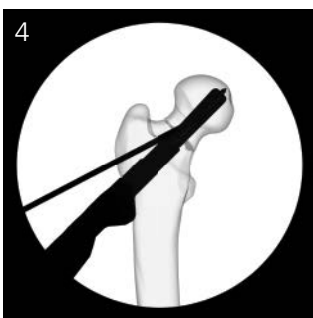
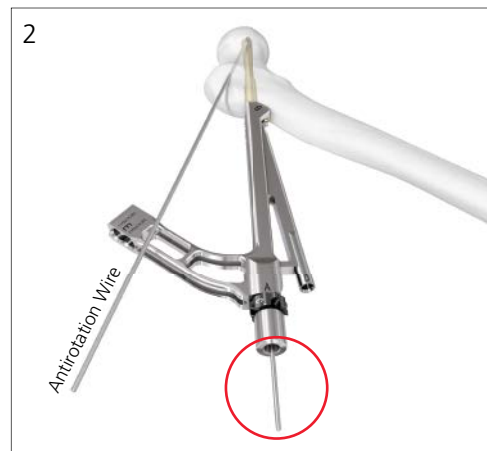
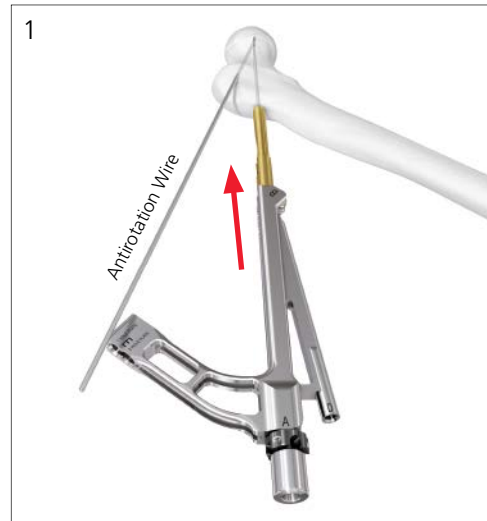
Option: The cylinder can be used to manually tap the plate onto the bone. (3) If additional tapping is required, use a standard surgical hammer to slightly tap onto the cylinder.

Precaution: Ensure that the black screw is not turning (e.g. by holding it), if tapping is required during insertion.

- Use image intensification to confirm the insertion depth and ensure that the plate is inserted down to the bone as well as aligned with the axis of the femoral shaft. (4)

Notes:

- It is recommended that the femoral head is temporarily fixated with an antirotation wire prior to implant insertion.
- Avoid excessive insertion force.

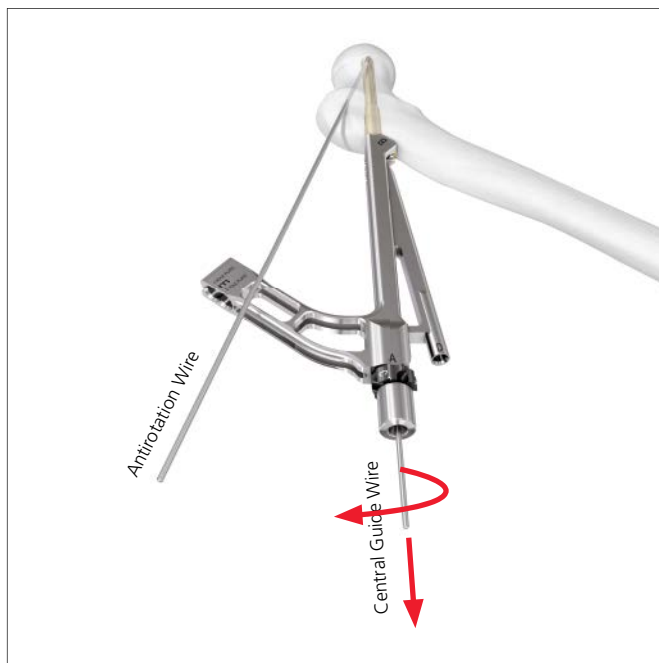


8. Remove guide wire

Remove the central guide wire. (1)

Keep the antirotation wire to prevent loss of reduction and rotation of the head.

Continue with Locking Screw and Antirotation-Screw Insertion (see page 18 to 25).



Option: Intraoperative Compression

Interfragmentary compression may be applied intraoperatively. The locking screw as well as the antirotation-screw need to be inserted prior to applying compression.

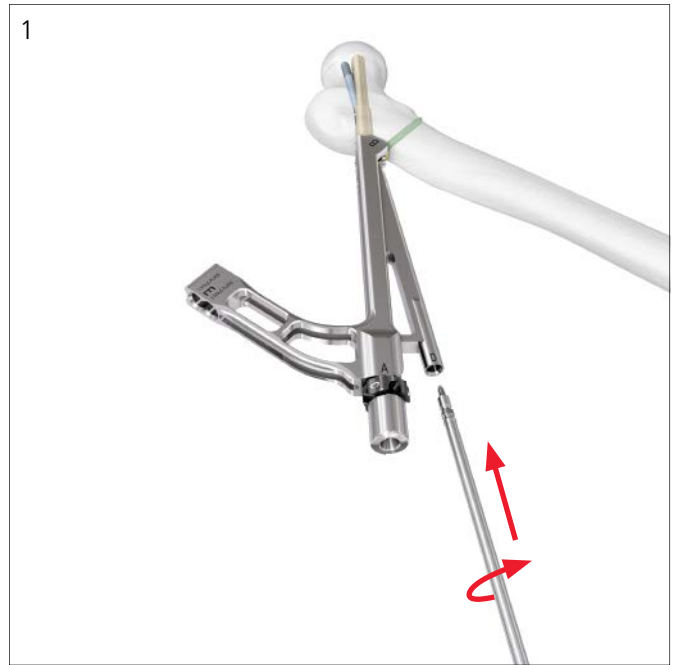
1. Attach multifunction rod for compression

Instrument

03.168.010 Multifunction Rod for Insertion Instruments

Insert the multifunction rod through the guide of the antirotation-screw. (1)

Hand-tighten the rod by turning it clockwise until the rod is fully inserted. (2)



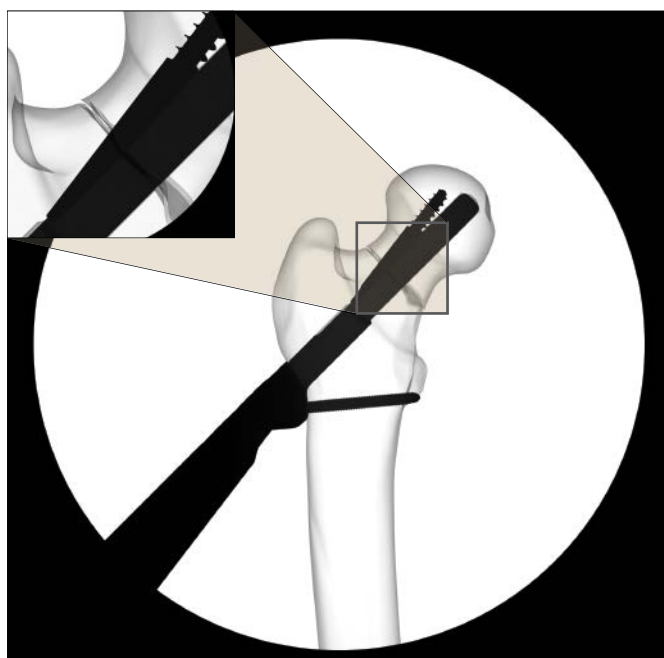
2. Apply compression

Notes:

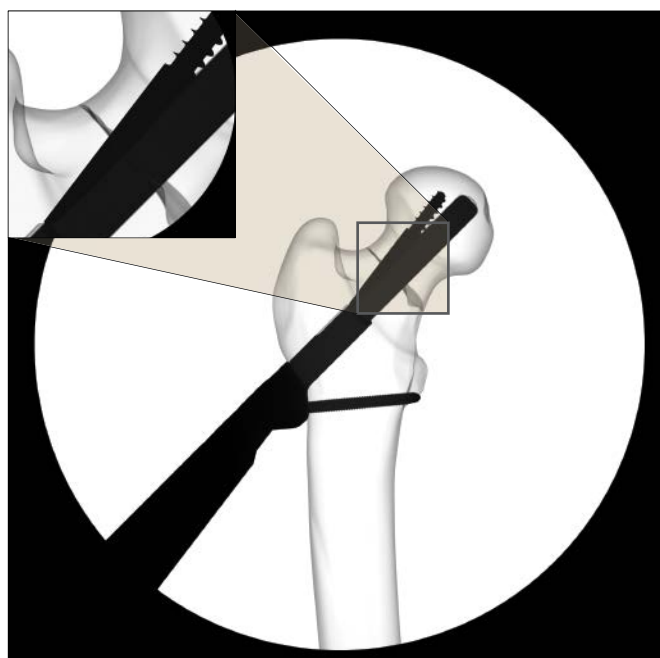
- If applicable, consider to loosen traction before applying compression.
- Monitor the implant position during compression using the image intensifier.

Apply inter-fragmentary compression by turning the screw of the insert counterclockwise. (1)

Precaution: Applying compression by hand is sufficient. Using additional tools for compression might cause excessive forces.



Before Compression



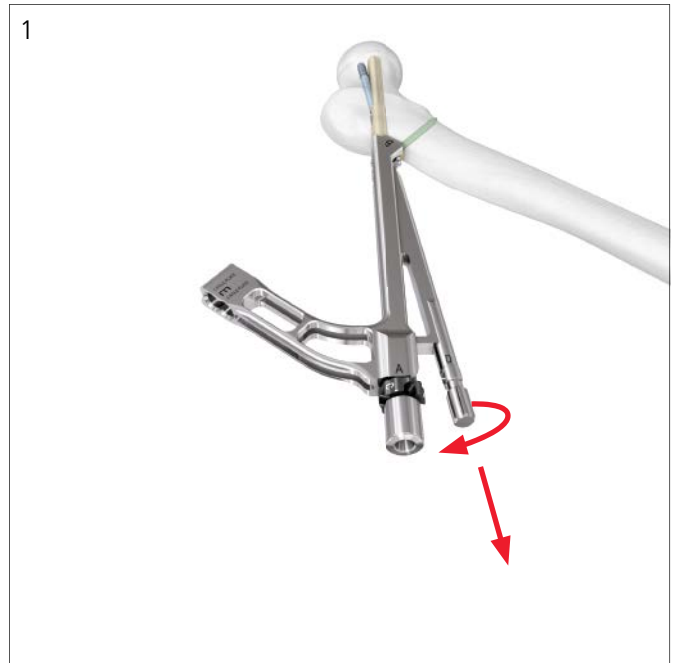
After Compression

3. Remove Multifunction Rod

Remove the multifunction rod by turning it counterclockwise. (1)

Note: If loosening by hand is not possible, then use another instrument (eg, a screwdriver shaft) through the hole in the multifunction rod to untighten it.

- ① Use image intensification to confirm that the antirotation-screw remains locked in the implant.



Option: Implant Removal

Irrigate and apply suction for removal of debris potentially generated during implant removal.

1. Remove locking screw(s)

Instruments

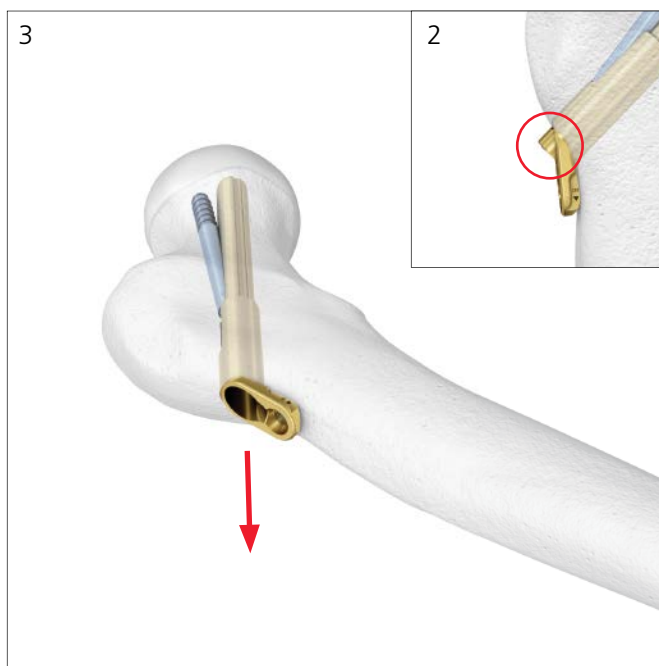
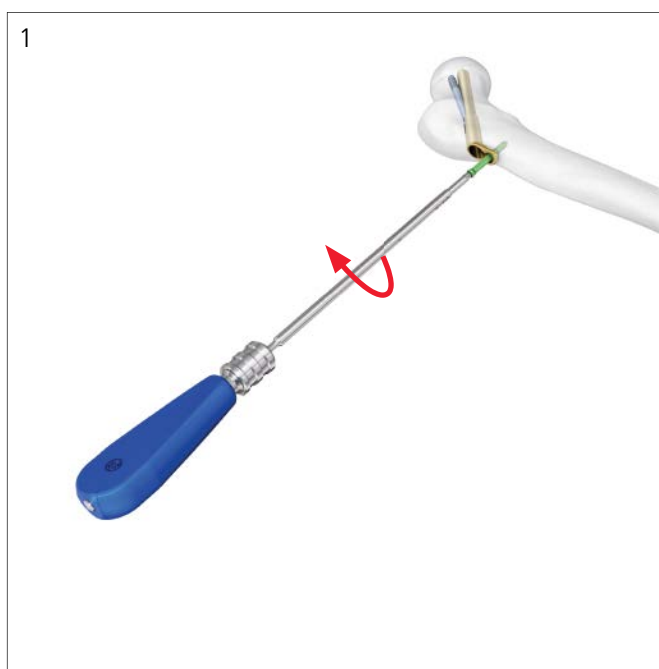
03.168.014 T25 StarDrive Screwdriver Shaft 241 mm

03.010.516 Handle/Large with Quick Coupling

Remove the locking screw(s) by hand using the screwdriver shaft together with the appropriate handle and without torque limiter. (1)

If the screw cannot be removed with the screwdriver, consult the separate publication "Screw Removal Set" (J8568-C).

Note: If the implant is fully telescoped, resulting in the bolt being more lateral than the plate (2), pull on the plate (eg, with surgical pliers) to extend it from the bolt (to about 5 mm) before conducting the steps on the following pages. (3)



2. Remove antirotation-screw

Instruments

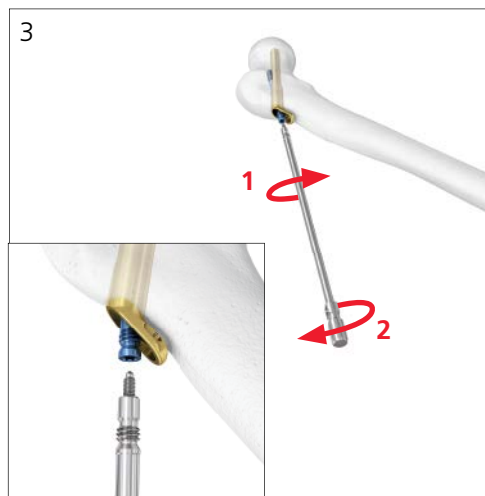
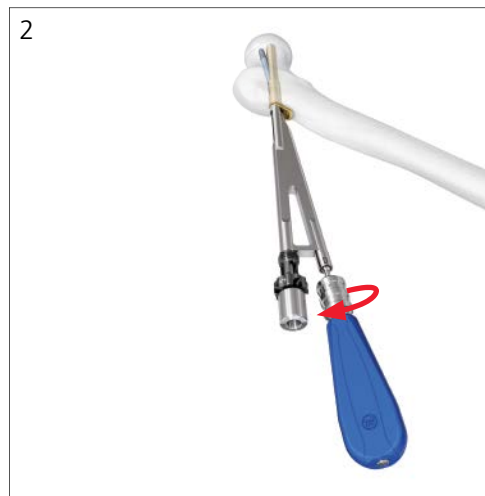
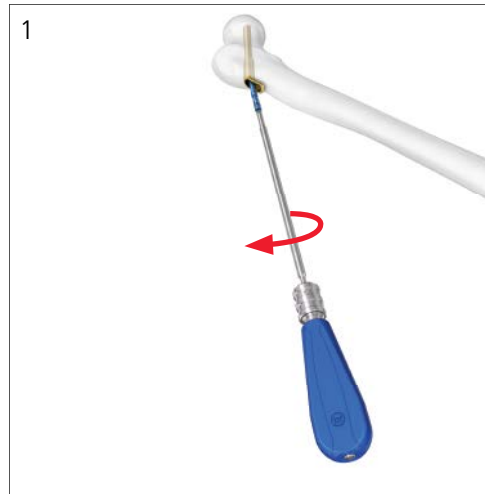
| | |
|------------|--|
| 03.168.014 | T25 StarDrive Screwdriver Shaft 241 mm |
| 03.010.516 | Handle/Large with Quick Coupling |
| 03.168.009 | Insert for FNS Insertion Handle (optional) |
| 03.168.010 | Multifunction Rod for Insertion Instruments (optional) |

Remove the antirotation-screw by hand using the screwdriver shaft together with the appropriate handle and without torque limiter. (1)

Option:

- If it is difficult to find the recess of the antirotation-screw, then use the Insert (03.168.009) as a guide within the plate. (2)
- If the antirotation-screw gets detached from the screwdriver, then use the multifunction rod and turn it clockwise to catch the antirotation-screw. Pull on the multifunction rod and turn anti-clockwise to fully remove the antirotation-screw. (3)

If the antirotation-screw cannot be removed with the screwdriver or the multifunction rod, consult the separate publication "Screw Removal Set" (J8568-C).



3. Remove plate and bolt

Instruments

03.168.010 Multifunction Rod for Insertion Instruments

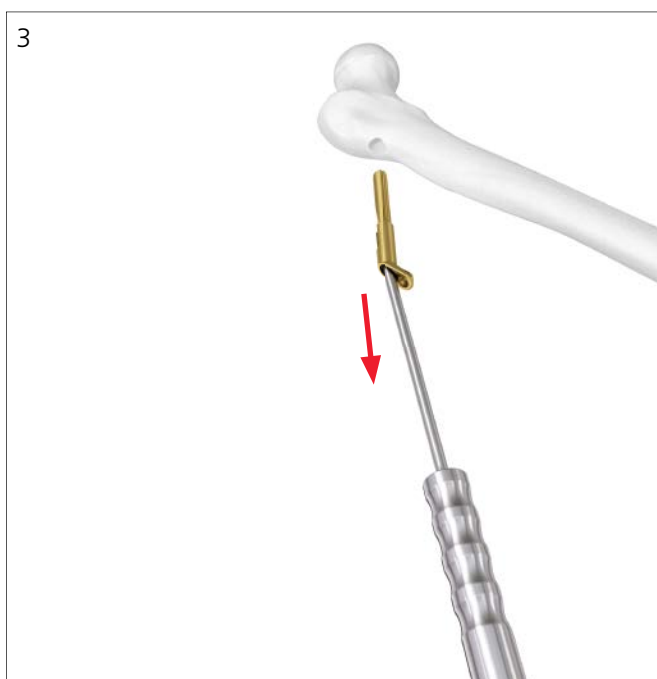
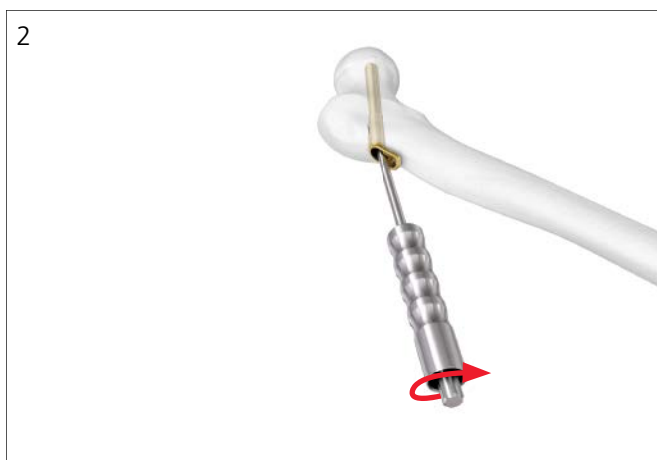
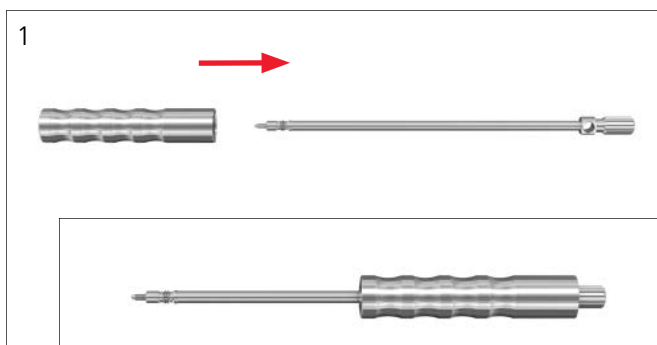
03.168.015 Cylinder for Insertion Instruments

Slide the cylinder over the multifunction rod. (1)

Attach the multifunction rod by turning it clockwise. Use the direction of the previously removed antirotation-screw. (2)

Tap outward with the cylinder to remove the plate and bolt simultaneously. (3)

Note: Avoid excessive forces during removal.



Implants

Features of the Femoral Neck System

Plate

- 130° CCD angle
- Material: Ti-6Al-7Nb (TAN)
- Color: Gold
- Lengths: 1-hole and 2-hole
- Sterile

Bolt

- Material: Ti-6Al-7Nb (TAN)
- Color: Gold
- Diameter: 10 mm
- Construct Lengths: 75 to 130 mm (5 mm increments)
- Sterile

Antirotation-Screw

- T25 StarDrive
- Material: Ti-6Al-7Nb (TAN)
- Color: Blue
- Diameter: 6.4 mm
- Construct Lengths: 75 to 130 mm (5 mm increments)
- Sterile

Locking Screw

- T25 StarDrive
- Material: Ti-6Al-7Nb (TAN)
- Color: Green
- Diameter: 5.0 mm
- Lengths: 30 to 60 mm (2 mm increments 30 to 50 mm, 5 mm increments 50 to 60 mm)
- Sterile or non-sterile



Plates

04.168.000S Femoral Neck System 1-Hole Plate, sterile



04.268.000S Femoral Neck System 2-Hole Plate, sterile



Bolts

Bolt, for Femoral Neck System, sterile
Construct Length

04.168.275S 75 mm

04.168.280S 80 mm

04.168.285S 85 mm

04.168.290S 90 mm

04.168.295S 95 mm

04.168.300S 100 mm

04.168.305S 105 mm

04.168.310S 110 mm

04.168.315S 115 mm

04.168.320S 120 mm

04.168.325S 125 mm

04.168.330S 130 mm



Antirotation-Screws

Antirotation Screw, for Femoral Neck System, sterile

| | Construct Length |
|-------------|------------------|
| 04.168.475S | 75 mm |
| 04.168.480S | 80 mm |
| 04.168.485S | 85 mm |
| 04.168.490S | 90 mm |
| 04.168.495S | 95 mm |
| 04.168.500S | 100 mm |
| 04.168.505S | 105 mm |
| 04.168.510S | 110 mm |
| 04.168.515S | 115 mm |
| 04.168.520S | 120 mm |
| 04.168.525S | 125 mm |
| 04.168.530S | 130 mm |



5.0 mm Locking Screws*

- 412.209– 5.0 mm Titanium Locking Screw,
- 412.221 self-tapping, with T25 StarDrive Recess



*Available non-sterile and sterile packed. Add "S" to the article number to order sterile products.

Instruments

03.168.001 130 Degree Angled Guide, for 3.2 mm Guide Wires, for Femoral Neck System



03.168.002 Correction Guide, for 3.2 mm Guide Wires, for Femoral Neck System



357.399 3.2 mm Guide Wire, 400 mm



03.168.003 Direct Measuring Device, for 3.2 mm Guide Wires, for Femoral Neck System



03.168.004 Complete Opening Drill Bit/Reamer Assembly



Consisting of:

03.168.005 10.2 mm Cannulated Drill Bit, 251 mm in Length, component of the 03.168.004

03.168.006 12.5 mm Reamer, component of the 03.168.004

03.168.007 Nut for Reamer, component of the 03.168.004

03.168.008 Insertion Handle, for Femoral Neck System



03.168.009 Insert, for Femoral Neck System
Insertion Handle



03.168.010 Multifunction Rod, for Insertion
Instruments, for Femoral Neck System



03.168.011 4.3 mm Drill Bit, 413 mm in Length



03.168.012 Drill Stop for Femoral Neck System



03.168.013 Protection Sleeve, for Femoral Neck
System Insertion Instruments



03.168.014 T25 StarDrive Screwdriver Shaft,
Length 241 mm



03.168.015 Cylinder, for Insertion Instruments,
for Femoral Neck System



03.168.017 Depth Gauge up to 100 mm,
for Femoral Neck System



03.140.027 Large Cannulated Handle,
Quick Coupling, 12 mm Hexagonal



511.774 Torque Limiting Attachment, 4 Nm,
for AO Reaming Coupler



03.010.516 Handle, Large, with Quick Coupling



MRI Safety Information



Non-clinical testing has demonstrated the DePuy Synthes Femoral Neck System (FNS) is MR Conditional. A patient with these devices can be safely scanned in an MR system meeting the following conditions:

- Static magnetic field of 1.5 Tesla or 3.0 Tesla transmit quadrature-driven coil only
- Maximum spatial field gradient of 3,000 gauss/cm (30 T/m) for 1.5 Tesla or 3.0 Tesla
- Maximum MR system reported, whole body averaged specific absorption rate (SAR) of 2 W/kg (Normal Operating Mode)

Under the scan conditions defined above, the DePuy Synthes Femoral Neck System (FNS) is expected to produce a maximum temperature rise of less than 7.0°C in both 1.5 Tesla and 3.0 Tesla for 15 minutes of continuous scanning. In non-clinical testing, the image artifact caused by the device extends approximately 25 mm from the DePuy Synthes Femoral Neck System (FNS) when imaged with a gradient echo pulse sequence and a 3.0 Tesla MRI system.

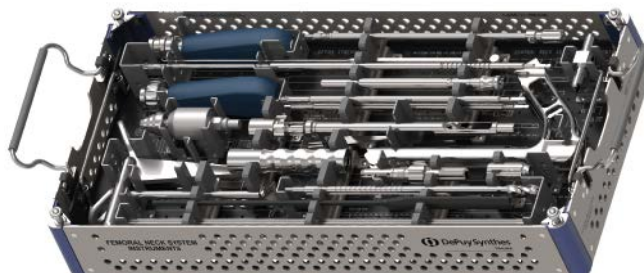
Femoral Neck System Instrument Set (01.168.030)

Graphic Case

61.168.030 Graphic Case for Femoral Neck System

Instruments

- 03.168.001 130 Degree Angled Guide, for 3.2 mm Guide Wires, for Femoral Neck System
- 03.168.002 Correction Guide, for 3.2 mm Guide Wires, for Femoral Neck System
- 03.168.003 Direct Measuring Device, for 3.2 mm Guide Wires, for Femoral Neck System
- 03.168.004 Complete Opening Drill Bit/Reamer Assembly
- 03.168.008 Insertion Handle, for Femoral Neck System
- 03.168.009 Insert, for Femoral Neck System
Insertion Handle
- 03.168.010 Multifunction Rod, for Insertion Instruments, for Femoral Neck System
- 03.168.011 4.3 mm Drill Bit, 413 mm in Length
- 03.168.012 Drill Stop for Femoral Neck System
- 03.168.013 Protection Sleeve, for Femoral Neck System Insertion Instruments
- 03.168.014 T25 StarDrive Screwdriver Shaft, Length 241 mm
- 03.168.015 Cylinder, for Insertion Instruments, for Femoral Neck System
- 03.168.017 Depth Gauge up to 100 mm, for Femoral Neck System
- 03.140.027 Large Cannulated Handle, Quick Coupling, 12 mm Hexagonal
- 357.399 3.2 mm Guide Wire, 400 mm
- 511.774 Torque Limiting Attachment, 4 Nm, for AO Reaming Coupler
- 03.010.516 Handle, Large, with Quick Coupling



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.depuy-synthes.com/hcp/cleaning-sterilization or sterilization instructions, if provided in the instructions for use.

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.



Manufactured by:

Synthes USA, LLC
1101 Synthes Avenue
Monument, CO 80132

Synthes GmbH
Luzernstrasse 21
4528 Zuchwil, Switzerland

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

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

www.depuyssynthes.com