

PFN-2 Proximal Femoral Nail

Surgical Technique



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Patient Positioning



Position the patient supine on an extension table or a radiolucent operating table. Abduct the unaffected leg as far as possible and place it on a leg support, so that it allows free fluoroscopic examinations. This should be tested preoperatively.

For unimpeded access to the medullary cavity, abduct the upper body by about 10 –15° to the unaffected side (or adduct the affected leg by 10 –15°).

Preparation

1. Reduce fracture

Perform closed reduction of the fracture under image open intensifier control. If the result is not satisfactory, perform reduction.

Note:

Exact anatomical reduction and secure fixation of the patient to the operating table are essential for easy handling and a good surgical result.

2. Confirm nail length and diameter

Instruments

811.020 Radiographic Ruler For PFN-2 130°, 135°

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 Position. Mark the skin at the proximal end of the ruler.

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

Read the nail length directly from the ruler image. For long nails, select the measurement at or just proximal to the epiphyseal scar, or at the chosen insertion position.

Important

- ◆ It is recommended that all fractures are treated with the longest nail possible, taking into account patient anatomy or a previous implant.
- ◆ Standard PFN-2 (length 240mm) may be too long for small stature people.
- ◆ For fractures extending below the lesser trochanter always use a long nail.

Alternatives

Determine the nail length by the procedure above on the uninjured leg before draping (unsterile) or compare the length of two identical SynReam reaming rods 2.5mm or use the depth gauge in combination with the SynReam reaming rod 2.5mm length 950mm.

Place the radiographic canal width estimator perpendicular to the femur axis so that the diameter gauge is located over the isthmus. Select the nail diameter with which the intramedullary canal-to-cortex transition is still visible on both sides of the diameter gauge.

Notes

- ◆ The ruler provides only an estimate of the canal diameter as it is not at the same level as the femur.
- ◆ If the reamed technique is used, the diameter of the largest medullary reamer applied must be 0.5mm to 1.5mm larger than the nail diameter.
- ◆ Always choose the largest diameter nail that fits into the intramedullary canal (9mm nails should only be used for an intramedullary canal smaller than 11mm).



3. Approach

Palpate the trochanter major.

Make a 5cm incision proximal from the tip of the greater trochanter. Make a parallel incision of the fasciae of the gluteus medius and split the gluteus medius in line with the fibers.

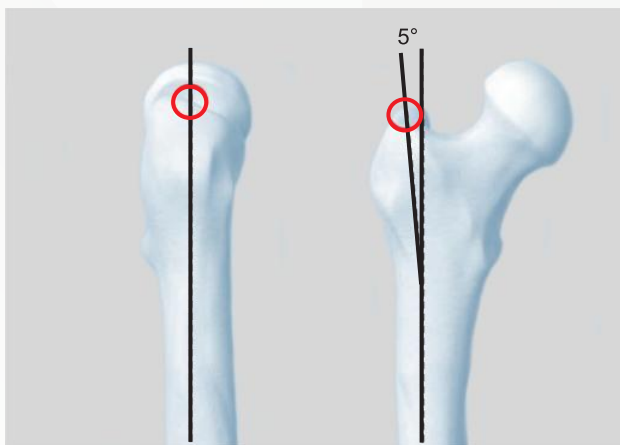


Open Femur

1. Determine entry point

In AP view, the PFN-2 entry point is on the tip or slightly lateral to the tip of the greater trochanter in the curved extension of the medullary cavity, as the ML angle of the PFN-2 is 5°.

In lateral view the entry point is in line with the axis of the intramedullary canal.



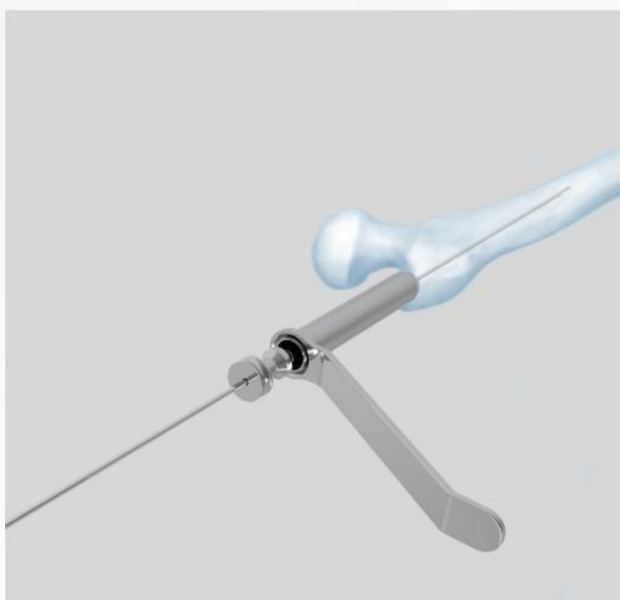
2. Insert guide wire

Instruments

- | | |
|---------|---|
| 804.012 | Stopper Guide Wire 2.5mm Length 950mm |
| 811.015 | Sleeve 17 x 3.2mm For Guide Wire |
| 811.014 | Protection Sleeve with Handle 20 x 17mm |

Secure the guide wire in the power tool. Alternatively, the universal chuck with T-handle can be used to insert the guide wire manually.

Position both the protection sleeve and the drill sleeve at the insertion point. Insert the guide wire through the protection sleeve and the drill sleeve. Remove the power tool and the drill sleeve.



3. Open femur with Flexible drill bit

Instruments

724.001 Flexible Reaming Shaft

811.014 Protection Sleeve with Handle 20 x 17mm

Guide the flexible cannulated drill bit through the protection sleeve over the guide wire and drill the cavity with the power tool for the proximal part of the PFN-2 nail. Remove the drill bit, the protection sleeve and the guide wire.

Notes:

It is recommended to open the femur by using a power tool at high speed or carefully by hand. To prevent dislocating the fracture fragments, avoid lateral movements or excessive compression forces.

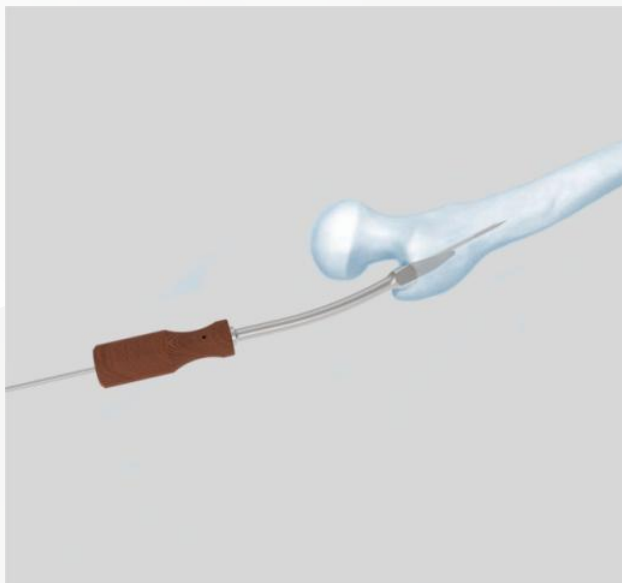


Open femur with awl

Instruments

811.035 Cannulated Bone Awl

Guide the awl over the guide wire and prepare with bi-directional turns the cavity for the proximal part of the PFN-2 nail. Remove the awl and the guide wire.



Open femur with drill bit

Instruments

- 811.025 Starting Reamer 16.5mm For Pfna Nail
- 811.014 Protection Sleeve with Handle 20 x 17mm

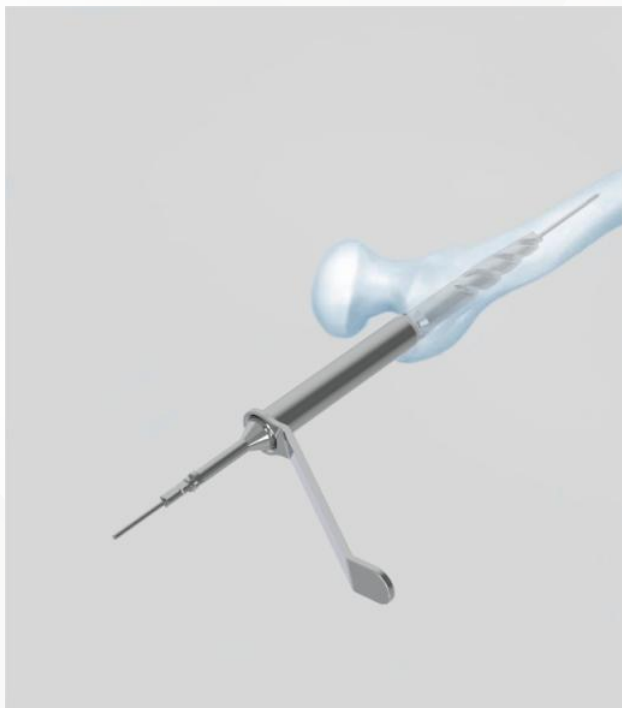
Important:

Use drill bit 811.025 only together with protection sleeve 811.014.

Guide the drill bit through the protection sleeve over the guide wire and drill as far as the stop on the protection sleeve. Remove the drill bit, the protection sleeve and the guide wire.

Notes:

It is recommended to open the femur by using a power tool at high speed or carefully by hand. To prevent dislocating the fracture fragments, avoid lateral movements or excessive compression forces.



Insert Nail

1. Assemble PFN-2 instruments

Instruments

- | | |
|---------|---|
| 811.001 | Insertion Handle For Pfna |
| 811.006 | Connecting Bolt |
| 811.040 | T Handle Hexagonal Wrench 8.0mm for universal |

Guide the connecting screw through the insertion handle and secure the desired PFN-2 to the insertion handle using the hexagonal screwdriver with spherical head.

Important:

Ensure that the connection between PFN-2 and insertion handle is tight (retighten, if necessary) to avoid deviations when inserting the PFN-2 blade through the aiming arm. Do not attach the aiming arm yet.



2. Insert PFN-2

Use image intensifier control to insert the PFN-2.

Carefully insert the PFN-2 manually using slight bidirectional turns of the insertion handle as far as possible into the femoral opening. If the PFN-2 cannot be inserted, select a smaller size PFN-2 diameter or ream the medullary cavity to a diameter that is at least 1 mm larger than that of the selected nail.

The correct PFN-2 insertion depth is reached as soon as the projected PFN-2 blade is positioned in the center of the femoral head.

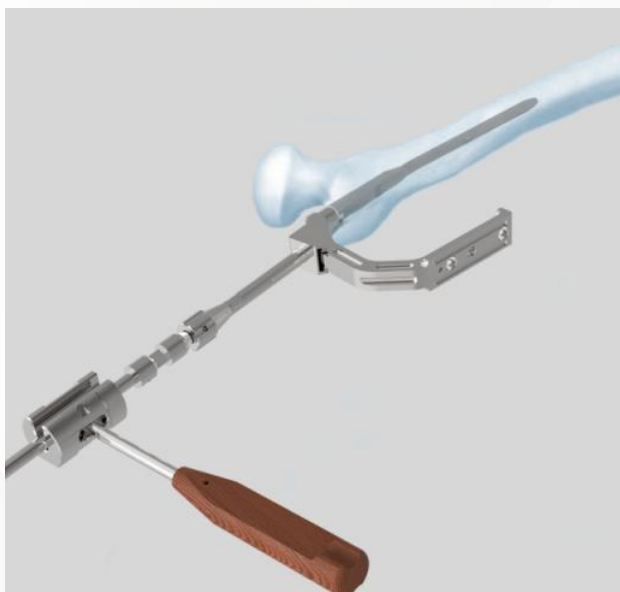
The anteversion can be determined by inserting a guide wire ventral to the femoral neck in the femoral head. In the mediolateral view, place the insertion handle parallel to the guide wire to align the correct rotation of the PFN-2.

Remove all guide wires. Do not reuse. Dispose of the guide wires.

Important:

Always ensure that the PFN-2 is firmly attached to the insertion handle.





Optional instruments

811.001 Insertion Handle For Pfna

811.036 Slotted Hammer 400gm

811.032 Hammer Guide

Attach the connector on the insertion handle and use light hammer blows on the connector to insert the nail.

Remove the connector.

Optionally, instead of the connector, the hammer guide can be threaded into the insertion handle and the hammer can be used as a slide hammer.

Remove the hammer guide.

Important:

Use only light blows on the connector for insertion handle. Avoid unnecessary use of force to prevent loss of reduction or an iatrogenic fracture.

Proximal Locking

1. Choose aiming arm for PFN-2 blade insertion

Instruments

811.003 Aiming Arm 130° For pfna

811.004 Aiming Arm 135° For pfna

Using the hexagonal screwdriver with spherical head, confirm that the connecting screw between the insertion handle and the PFN-2 is sufficiently tightened.

Mount the appropriate aiming arm based on the chosen CCD angle of the PFN-2 and fix it firmly to the insertion handle.

Insert the plug for aiming arm into the locking hole of the nail length that is NOT used in this case.

2. Prepare guide wire insertion

Instruments

811.007 Buttress Compression Nut For Pfna Blade

811.008 Protection Sleeve 16 x 11mm For Pfna Blade

811.009 Drill Sleeve 11 x 3.2mm For Pfna Blade

811.010 Trocar 3.2mm For Pfna Blade

Screw the buttress nut on the golden protection sleeve for Pfna blade. Make sure the lateral side marking points towards the head of the sleeve. Screw the buttress nut up to the marking on the protection sleeve.

Insert the drill sleeve and the trocar through the protection sleeve.

Advance the entire sleeve assembly for Pfna blade through the aiming arm to the skin until it clicks into the aiming arm. Adjust the position of the buttress nut if necessary.

Important:

Ensure that the sleeve assembly clicks into the aiming arm, otherwise it will not guarantee the exact position of the PFN-2 blade.



3. Insert guide wire

Instruments

811.030 Guide Wire 3mm For Pfna Blade

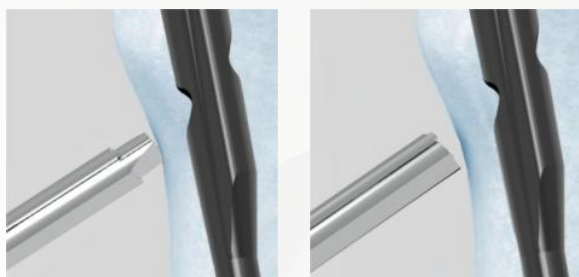
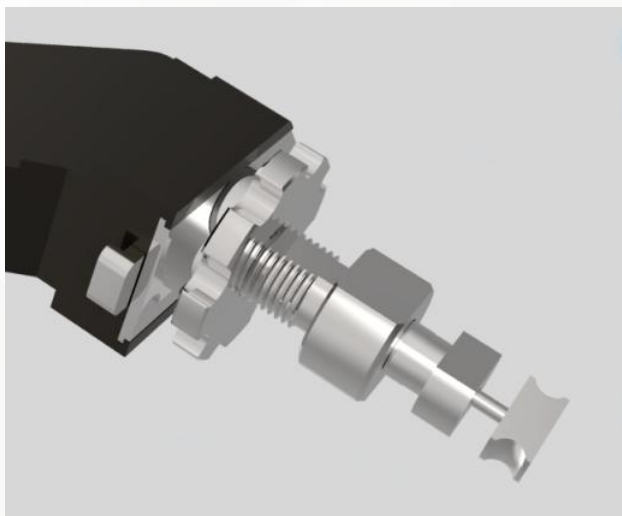
Make a stab incision in the area of the trocar tip. Advance the sleeve assembly through the soft tissues in direction of the lateral cortex.

Insert the sleeve assembly as far as the lateral cortex. Advance the protection sleeve to the lateral cortex using slight clockwise turns of the buttress nut. Prepare the passage of the protection sleeve by turning the internal golden drill sleeve.

Important:

The sleeve assembly must be in contact with the bone during the entire blade implantation. Do not tighten the buttress nut too firmly as this could impair the precision of the insertion handle and sleeve assembly.

Remove the trocar. Insert a new guide wire through the drill sleeve into the bone. Verify both direction and position under image intensifier control in both AP and lateral view.



Incorrect position

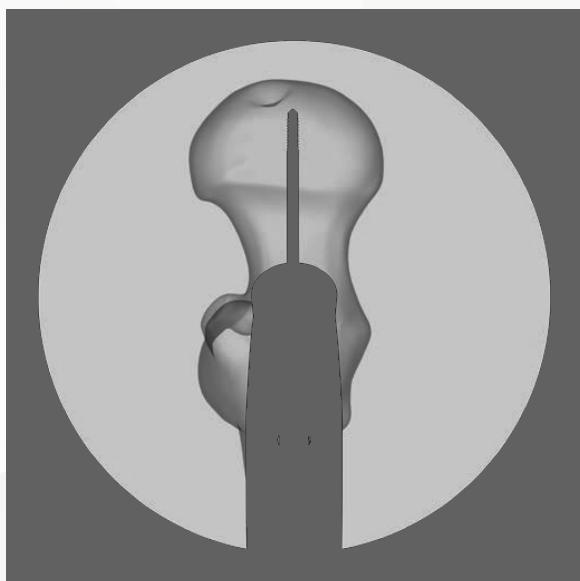
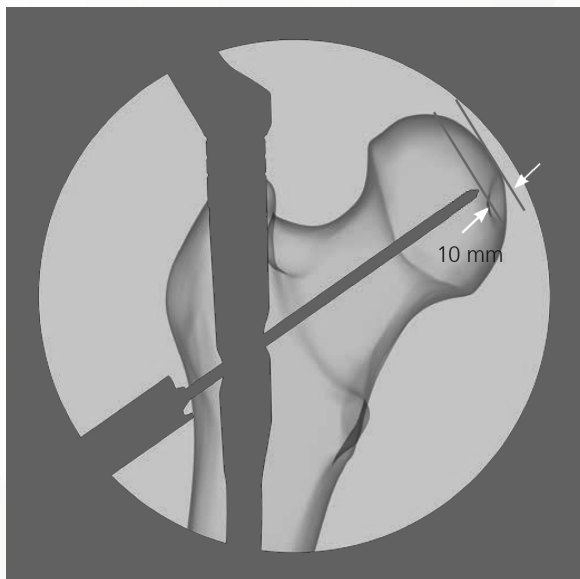
Correct position



In the AP and lateral view, the optimal position of the guide wire is the exact center of the femoral head. Insert the guide wire subchondrally into the femoral head at a distance of 10mm below the joint level. Minimal distance to the joint is 5mm. The tip of the guide wire is positioned at the intended blade tip position.

Important:

If the PFN-2 or the guide wire requires repositioning remove the guide wire, release the sleeve assembly with buttress nut from the aiming arm by pressing the button on the clamp device, and remove it. The PFN-2 can be repositioned only by rotation, deeper insertion or partial retraction. Reinsert the sleeve assembly and turn the buttress nut clockwise to position the assembly on the bone. Reinsert the guide wire.



4. Measure the PFN-2 blade length

Instruments

811.021 Direct Measuring Device For 3.2mm Guide Wire

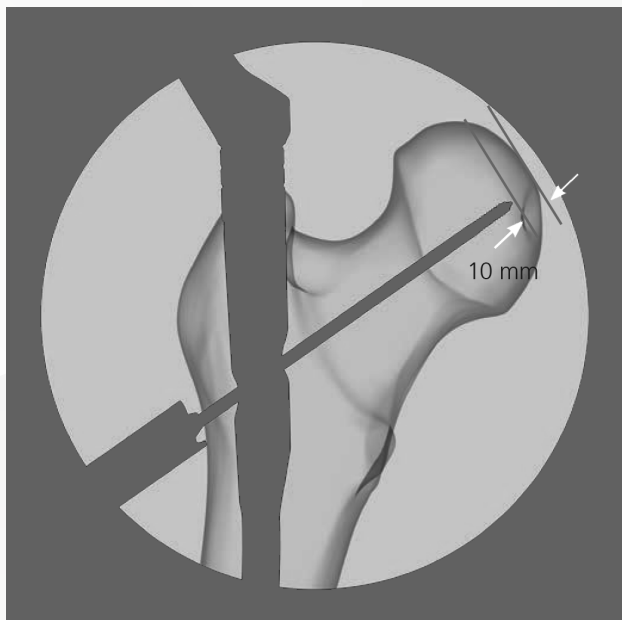
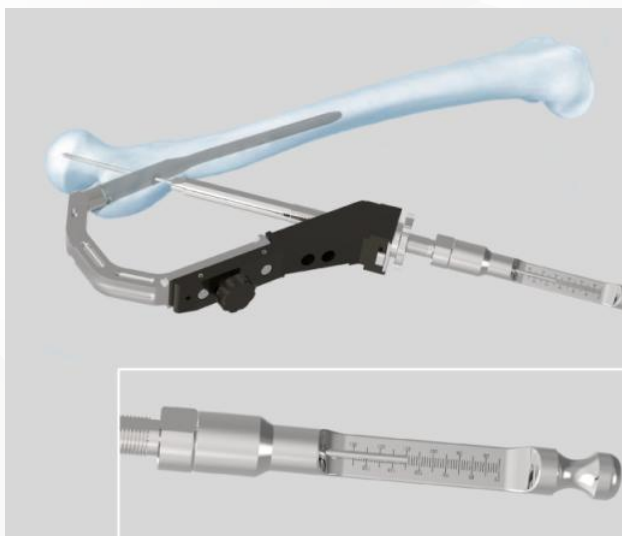
Verify the position of the guide wire in AP and lateral view before measuring the length.

Guide the measuring device over the guide wire. Advance the measuring device to the protection sleeve and determine the length of the required blade. The measuring device indicates the exact length of the guide wire in the bone.

In the AP and lateral view, the correct position of the PFN-2 blade is 10mm below the joint level. Minimal distance to the joint is 5mm. If the guide wire's position is subchondral, subtract 10mm to measure the PFN-2 blade length correctly.

Remove the measuring device.

Carefully remove the drill sleeve without changing the position of the guide wire.



5. Open lateral cortex for PFN-2 blade insertion

Instruments

811.027 Drill bit 10.3mm For Pfna Blade Screw

Push the cannulated drill bit over the 3mm guide wire. Drill to the stop. This opens the lateral cortex.

Important:

If the guide wire has been bent slightly during insertion, guide the drill bit over the wire using carefully forward and backward movements. However, if the wire has been bent to a greater extent, reinsert it or replace it by a new guide wire. Otherwise, the guide wire may be advanced through the joint.



6. Drill hole for PFN-2 blade

Instruments

811.026 Reamer 10.3mm For Pfna Blade Screw

811.028 Fixation Sleeve Pfna for Reamer 10.3mm

Important:

Use reamer only in a situation with good bone quality.

Set the chosen blade length on the cannulated reamer by fixing the fixation sleeve in the corresponding position. Read off the correct length on the side of the fixation sleeve pointing towards the tip of the reamer.

Push the reamer over the guide wire. Monitor drilling under image intensifier control. Drill to the stop. The fixation sleeve prevents further drilling.

Note:

Use the reamer only after opening the lateral cortex. If the guide wire has been bent slightly during insertion, guide the reamer over the wire using carefully forward and backward movements. However, if the wire has been bent to a greater extent, reinsert it or replace it with a new guide wire. Otherwise, the guide wire may be advanced through the joint.



7. Assemble PFN-2 blade on the impactor

Instruments

811.016 Impactor For Pfna Blade

The PFN-2 blade is supplied in a locked state.

While attaching the PFN-2 blade on the impactor, screw the impactor counterclockwise (note the mark "attach" on the impactor) into the end of the PFN-2 blade to unlock the blade. Push the PFN-2 blade gently towards the impactor while attaching the PFA-2 blade. Do not overtighten.

Important:

If the guide wire has been bent slightly during insertion, guide the drill bit over the wire using carefully forward and backward movements. However, if the wire has been bent to a greater extent, reinsert it or replace it by a new guide wire. Otherwise, the guide wire may be advanced through the joint.



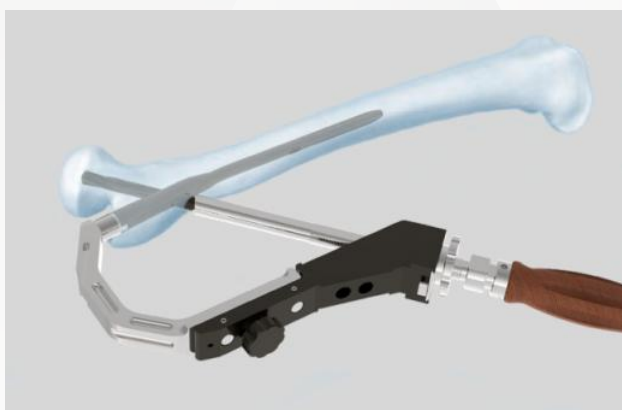
8. Insert PFN-2 blade

Instruments

811.018 Hammer Guide For Pfna Blade

Insert the blade-impactor assembly over the guide wire. Push the button on the protection sleeve, align the blade and advance the blade impactor assembly further through the protection sleeve.

Manually insert the blade over the guide wire advancing as far as possible into the femoral head.



Use monitoring during insertion of the PFN-2 blade.

Insert the PFN-2 blade to the stop by applying gentle blows with the hammer.

Important:

Inserting the blade to the stop is important, as the impactor must click into the protection sleeve. Do not use unnecessary force when inserting the PFN-2 blade.

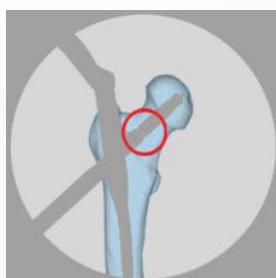
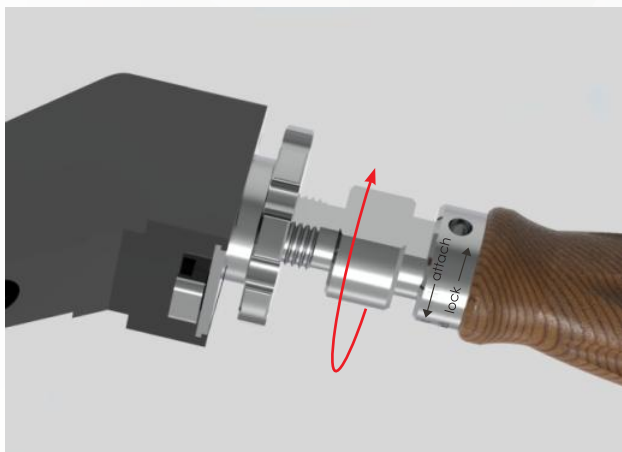
9. Lock PFN-2 blade

To lock the PFN-2 blade, turn the impactor clockwise (note «lock» marking on the handle) and tighten the blade.

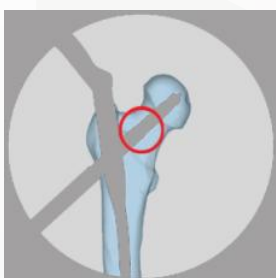
Verify PFN-2 blade locking intraoperatively. The PFN-2 blade is locked if all gaps are closed.

Important:

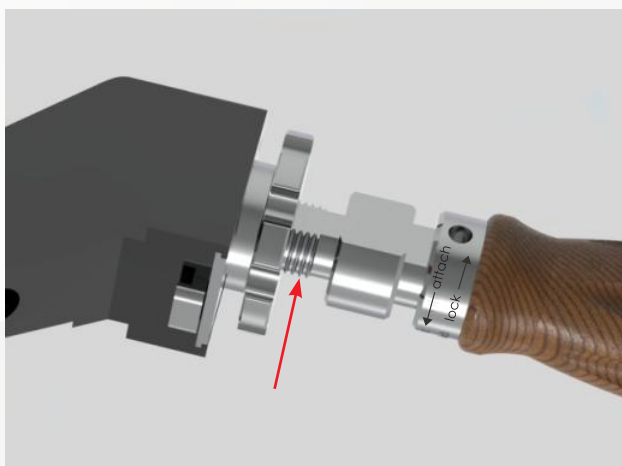
The gliding of the PFN-2 blade is guaranteed. If the PFN-2 blade cannot be locked, remove it and replace it with a new PFN-2 blade (see implant removal, step 1).



PFN-2 blade unlocked

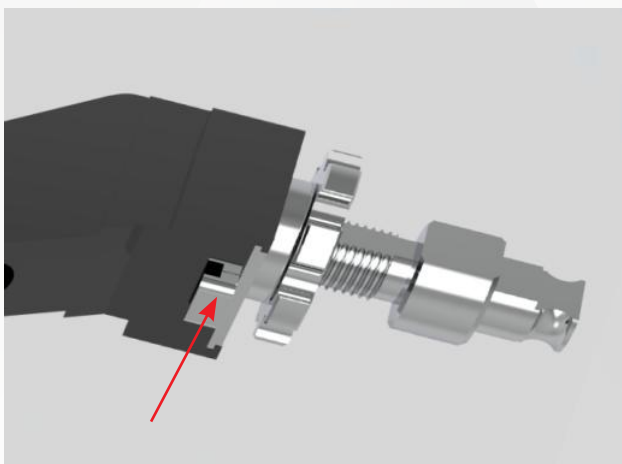


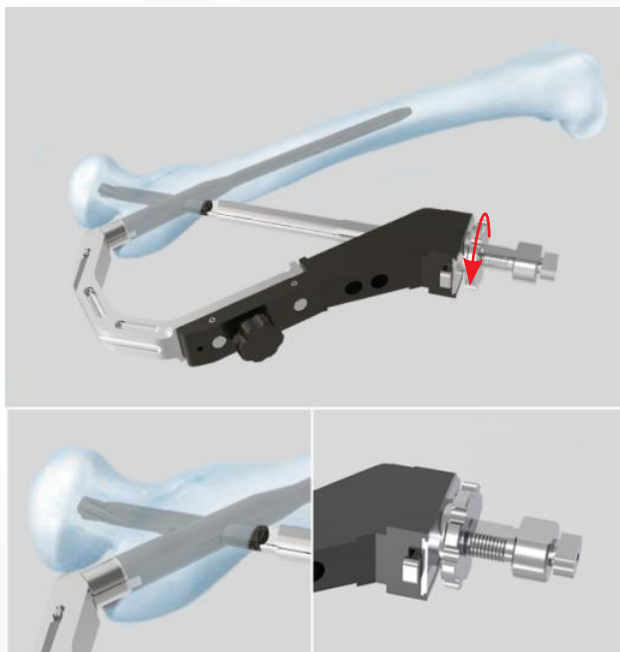
PFN-2 blade locked



Press the button on the protection sleeve to remove the impactor. Remove and dispose of the guide wire.

When proximal locking is complete, release and remove the protection sleeve and the buttress nut by pressing the button on the clamp device of the aiming arm in order to continue with distal locking or leave it in place to continue with intraoperative compression.





Under image intensifier control, further turn the buttress nut counterclockwise to achieve intraoperative compression and close the fracture gap.

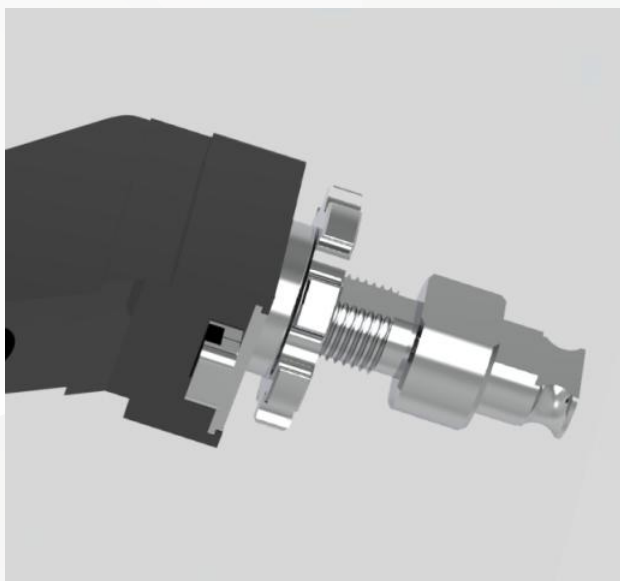
Important

- ◆ The blade must be locked to apply intraoperative compression.
- ◆ Control compression under image intensifier control.
- ◆ Do not use excessive force in order to avoid pulling out blade from the femoral head.

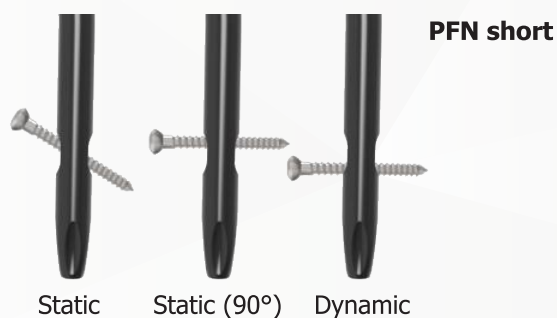
Release strain by turning the buttress nut clockwise.

Verify PFN-2 blade locking under image intensifier control. The PFN-2 blade is locked if all gaps are closed. If necessary, relock the blade using the extraction screw.

Release and remove the protection sleeve and the buttress nut by pressing the button on the clamp device of the aiming arm to continue with distal locking.

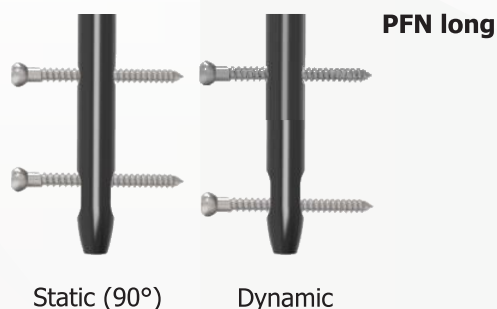


Distal Locking



Distal Locking for PFN-2 Short (Length 170mm - 240mm)

Static or dynamic locking can be performed via the aiming arm



Distal Locking for PFN-2 Long (Length 320mm - 420mm)

allows for secondary dynamization.

Distal locking of PFN-2 long is performed with the freehand technique. Alternatively distal locking can be performed.

See table below for corresponding instruments.

Short PFN-2 Nails (170mm - 240mm) Locking Bolts 4.9mm

Code No.	Description
602.030	Drill Bits 4.0mm
811.011	Protection Sleeve 11 x 8mm
811.012	Drill Sleeve 8 x 4mm
811.013	Trocar 4mm
811.023	Measuring Device For Locking Bolt
804.010	Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt

Short PFN-2 Nails (320mm - 4200mm) Locking Bolts 4.9mm

Code No.	Description
602.030	Drill Bits 4.0mm
811.011	Protection Sleeve 11 x 8mm
811.012	Drill Sleeve 8 x 4mm
811.013	Trocar 4mm
811.023	Measuring Device For Locking Bolt
804.010	Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt

Distal Locking

For PFN-2 Short

Distal Locking for PFN-2 Short (Length 170 mm – 240 mm)

1. Choose aiming arm for distal locking

Distal locking of PFN-2 short is performed through the aiming arm. Choose an appropriate aiming arm according to the table below. Make sure the plug for aiming arm is inserted into the locking hole of the nail length that is NOT used in this case.

Nail length	Locking	Aiming arm	Description
170mm - 240mm	Static	811.003	Aiming Arm 130° For Pfna
170mm - 240mm	Static	811.004	Aiming Arm 135° For Pfna
170mm - 240mm	Static (90°)	811.005A	Aiming Arm For Dynamic Locking
170mm - 240mm	Dynamic	811.005B	Aiming Arm For Static Locking

2. Option A: Static distal locking of PFN-2 short

Instruments

811.011	Protection Sleeve 11 x 8mm
811.012	Drill Sleeve 8 x 4mm
811.013	Trocar 4mm

Using the hexagonal screwdriver with spherical head, confirm that the connecting screw between the insertion handle and the PFN-2 is sufficiently tightened.

Insert the three-part trocar combination (protection sleeve, drill sleeve and trocar) through the hole in the aiming arm that corresponds with the nail length, make a stab incision and insert the trocar to the bone. Remove the trocar.



Option B: Static distal locking (90°) of PFN-2 short

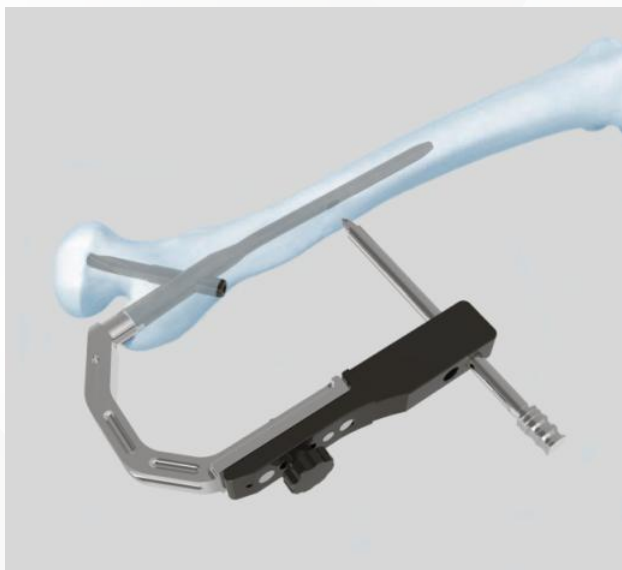
Instruments

- 811.005B Aiming Arm For Static Locking
- 811.011 Protection Sleeve 11 x 8mm
- 811.012 Drill Sleeve 8 x 4mm
- 811.013 Trocar 4mm

Using the hexagonal screwdriver with spherical head, confirm that the connecting screw between the insertion handle and the PFN-2 is well tightened.

Remove the aiming arm for PFA-2 blade. Mount the aiming arm for static locking 90° and fix it firmly to the insertion handle.

Insert the three-part trocar combination (protection sleeve, drill sleeve and trocar) through the hole in the aiming arm that corresponds with the nail length, make a stab incision and insert the trocar to the bone. Remove the trocar.



Option C: Dynamic distal locking of PFN-2 short

Instruments

- 811.005A Aiming Arm For Dynamic Locking
- 811.011 Protection Sleeve 11 x 8mm
- 811.012 Drill Sleeve 8 x 4mm
- 811.013 Trocar 4mm

Using the hexagonal screwdriver with spherical head, confirm that the connecting screw between the insertion handle and the PFN-2 is well tightened.

Remove the aiming arm for PFA-2 blade. Mount the aiming arm for dynamic locking and fix it firmly to the insertion handle.

Insert the three-part trocar combination (protection sleeve, drill sleeve and trocar) through the hole in the aiming arm that corresponds with the nail length, make a stab incision and insert the trocar to the bone. Remove the trocar.



3. Drill

Instruments

602.030 Drill Bits 4.0mm Length 300mm for Jacobs Chuck

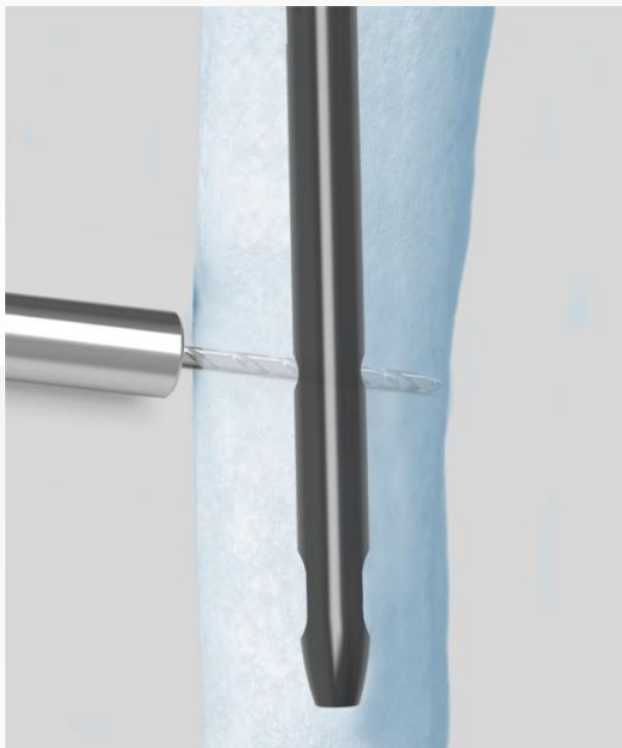
Use the drill bit to drill through both cortices. The tip of the drill bit should protrude by 2 to 4mm.

Just after drilling both cortices, confirm the drill bit position.

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

Important:

Always make sure that no diastasis has occurred intraoperatively before beginning distal locking. Diastasis can cause delayed healing. Always ensure that the connection between PFN-2, insertion handle and aiming arm is good, otherwise drilling for distal locking may damage the PFN-2.



4. Determine length of the locking bolt

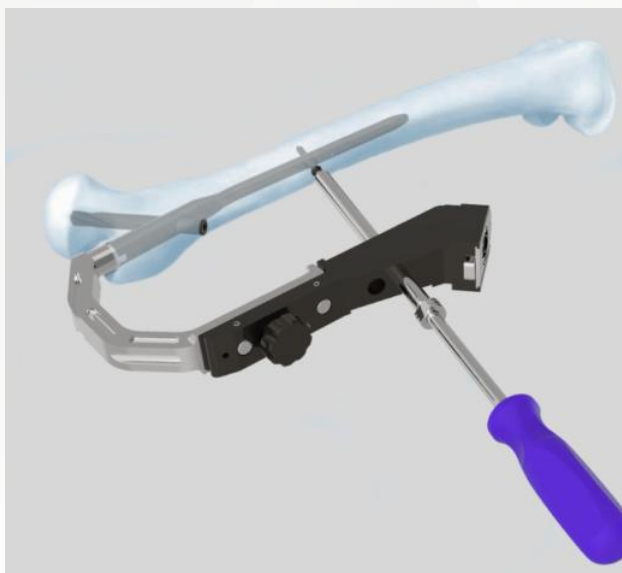
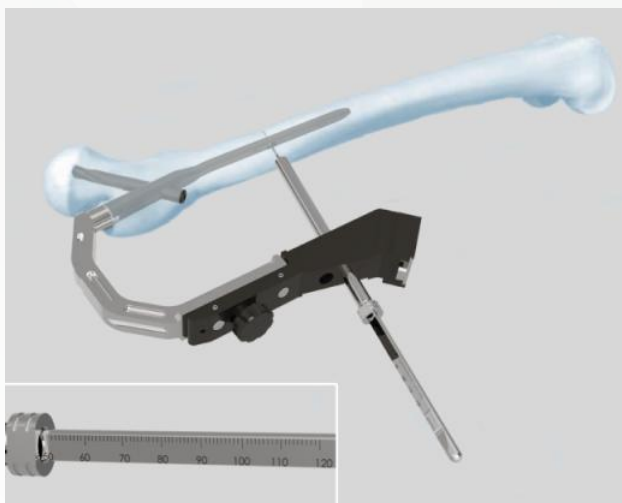
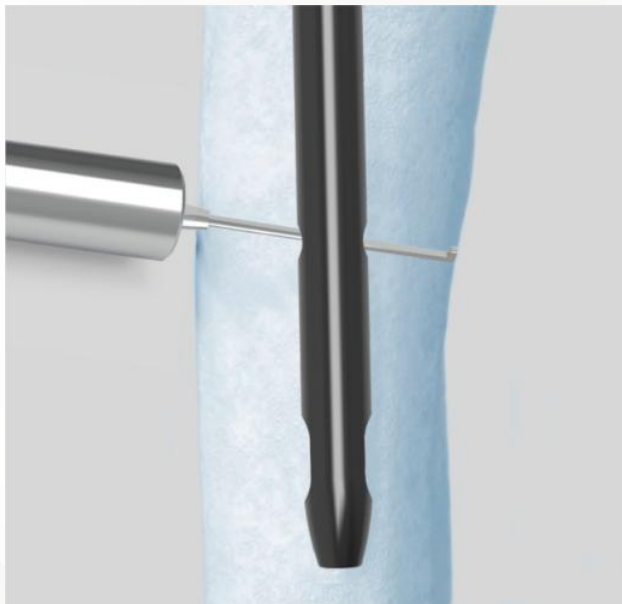
Instruments

811.023 Measuring Device For Locking Bolt

811.011 Protection Sleeve 11 x 8mm

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

Advance the depth gauge through the protection sleeve and through both cortices. Draw back the hook until it engages in the opposite cortex. Read the measurement from the depth gauge. Add 2 to 4mm to the measured length to ensure good engagement of the locking bolt in the opposite



5. Insert locking bolt

Instruments

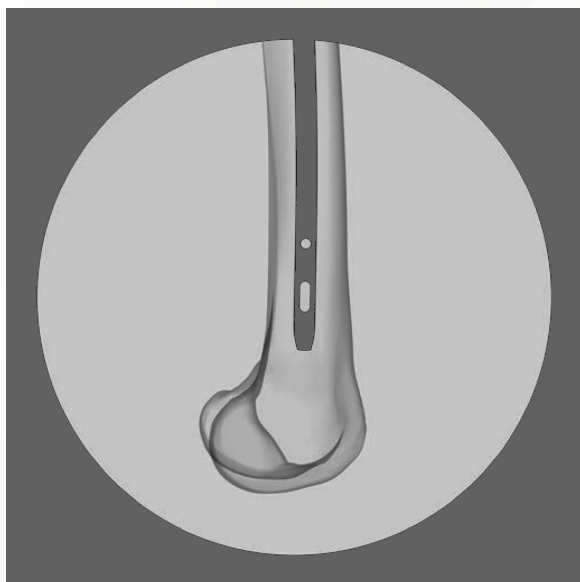
804.010 Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt

Insert a locking bolt of the measured length with the hexagonal screwdriver through the protection sleeve until the locking bolt head lies against the near cortex. The tip of the locking bolt should not project more than 1-2mm beyond the far cortex.

Remove the screwdriver and the protection sleeve.

Distal Locking

For PFN-2 Long

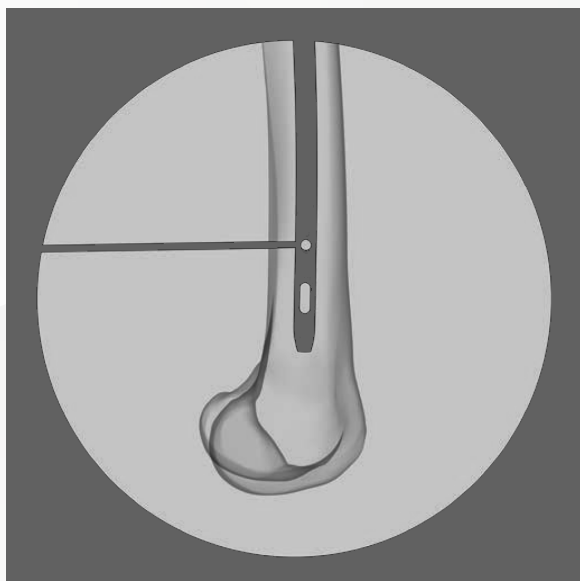


Distal Locking for PFN-2 Long (Length 320mm – 420mm)

1. Align C-arm

Check reduction, then correct alignment of the fragments and leg length before locking the nail.

Align the C-arm with the hole in the nail until a perfect circle is visible in the center of the screen.



2. Determine incision point

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

3. Determine length of the locking bolt and insert locking bolt

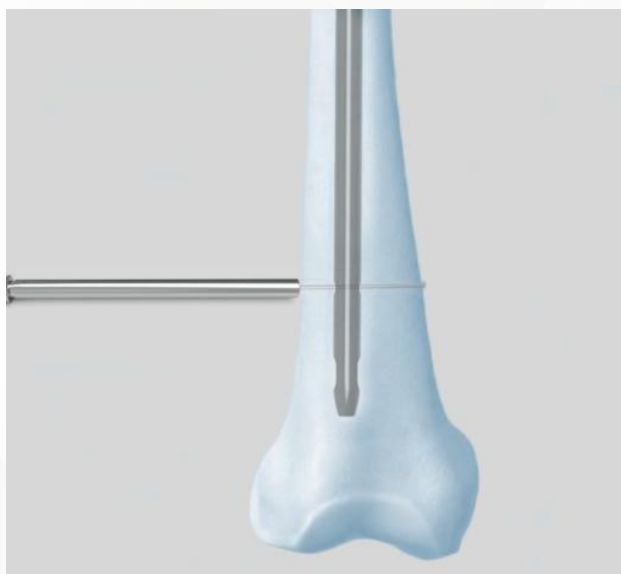
Instruments

- 811.023 Measuring Device For Locking Bolt
- 811.010 Hexagonal Screw Driver 3.5mm
Tip Long for 4.9mm Bolt
- 811.011 Protection Sleeve 11 x 8mm

Measure the locking bolt length using the measuring device. Ensure that the outer sleeve is in contact with the bone and the hook grasps the far cortex. Add 2 to 4mm to the measured length in order to ensure that the locking bolt is well engaged in the opposite cortex.

Insert the locking bolt with the appropriate length using the hexagonal screwdriver and the holding sleeve, if required.

Verify the bolt length under image intensification. The bolt tip should be about 1-2mm outside of the cortex. Exchange the locking bolt with the appropriate length if necessary.



Insert End Cap

1. Remove PFN-2 instruments

Instruments

811.034 8mm Hexagonal Shaft With Spherical Head

Remove the aiming arm. Loosen the connection screw the connecting screw and the insertion handle. with the hexagonal screwdriver with spherical head Remove.

Tip:

The end cap with 0mm extension can be inserted through the insertion handle barrel. Only remove the connecting screw and leave the insertion handle in place.



2. Insert end cap

Instruments

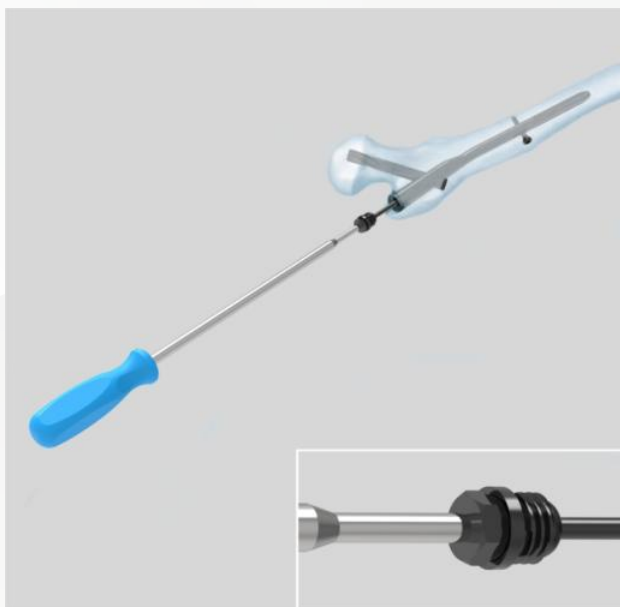
811.029 Guide Wire 2.8 x 460mm With Hook

807.012 Canulated Screw Dirver Long for PFN Screws

If the proximal end of the nail is flush with the upper edge of the trochanter major use the end cap with 0mm extension. Use the end cap with 5 to 15mm extension to lengthen the nail end.

Screw the end cap into the proximal end of the nail and tighten it firmly.

Remove the screwdriver.



Implant Removal

1. Remove PFN-2 blade

Instruments

- | | |
|---------|--------------------------------|
| 811.030 | Guide Wire 3mm, for PFN Blade |
| 811.017 | Extraction Screw for PFN Blade |
| 811.036 | Slotted Hammer with Handle |

Note:

Implant removal is an elective procedure.

After an incision through the old scars, locate the PFN-2 blade by palpation or under image intensifier control. Insert the guide wire through the cannulated PFN-2 blade. Push the extraction screw over the guide wire and use gentle pressure to screw it counterclockwise into the PFN-2 blade (note "attach" marking on the extraction screw shaft).

Extract the PFN-2 blade by applying gentle blows with the hammer.

Tips

- ◆ If the extraction of the PFN-2 blade is difficult, remove the locking bolt and the end cap, screw the hammer guide into the PFN-2 and mobilize the nail to loosen the nail-blade connection.
- ◆ To detach the blade from the bone use light hammer blows to slightly drive in the blade before removal of the blade.

Use the key for PFN blade to detach the blade from the extraction screw if necessary.

Note:

If the removal of the PFN-2 blade is not possible with the standard instruments use the special instruments from.

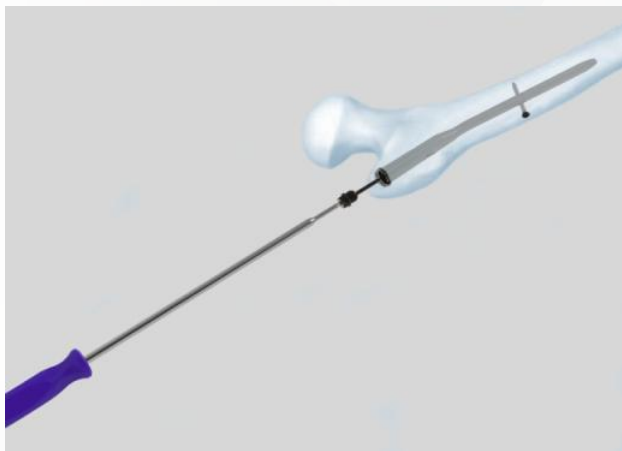


2. Remove end cap

Instruments

811.010 Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt

Remove the end cap with the 3.5mm Screw Driver



3. Remove locking bolt and nail

Instruments

811.032 Hammer Guide

811.010 Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt

811.036 Slotted Hammer with Handle

811.041 PFN-2 Nail Extractor Attachment

Before removing the locking bolt, screw the hammer guide into the PFN-2 and tighten it.

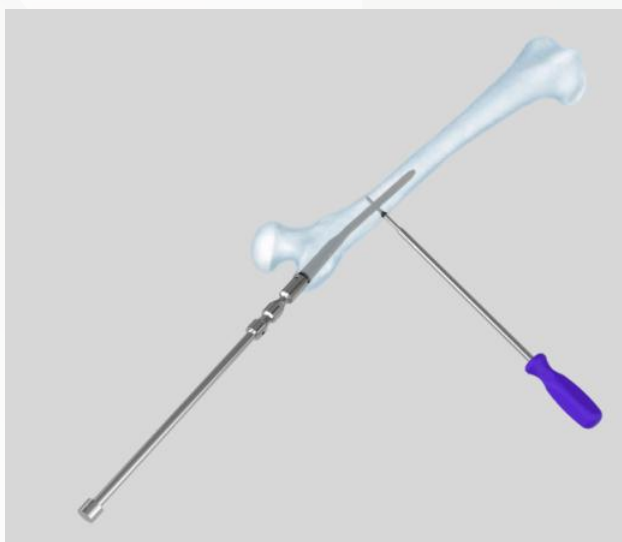
Remove the locking bolt with the hexagonal screwdriver. Mount the large holding sleeve onto the hexagonal screwdriver to facilitate removal of the locking bolt.

Note:

If removal of the locking bolt is not possible and/or in case of broken locking bolts, the Screw Extraction Set.

Note:

Remove the locking bolt after screwing the hammer guide into the PFN-2. Thereby a rotation of the PFN-2 in the bone will be avoided.



Correction of Insertion Depth of PFN-2 Blade

Instruments

- 811.017 Extraction Screw For Pfna Blade
- 811.036 Slotted Hammer with Handle

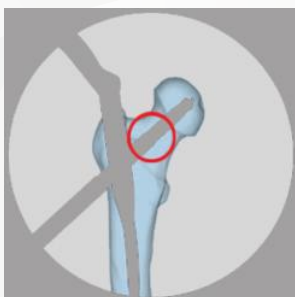
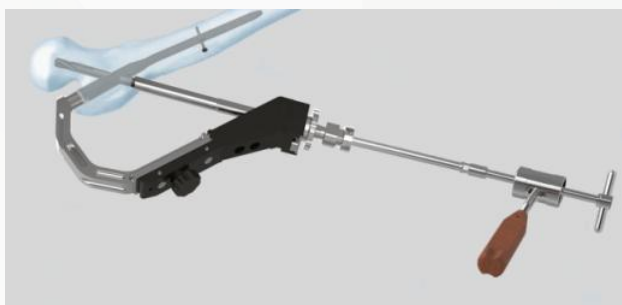
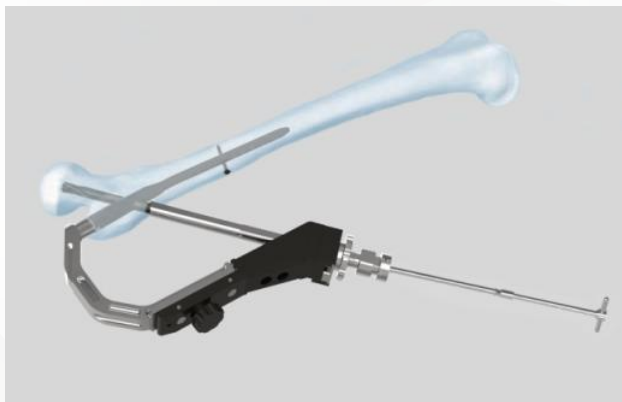
Remove the impactor if it is still in place. Insert the extraction screw over the guide wire and through the sleeve assembly using gentle counterclockwise pressure to attach the extraction screw to the PFN-2 blade (note "attach" marking).

Advance the now unlocked PFN-2 blade to the desired insertion depth by applying gentle blows with the combined hammer. In the AP and lateral view, the correct position of the PFN-2 blade is 10 mm below the joint level. Minimal distance to the joint is 5 mm. Turning the extraction screw clockwise to the stop (note "lock" marking) allows for relocking of the PFN-2 blade and removing the extraction screw.

Verify PFN-2 blade locking intraoperatively.

Note:

The PFN-2 blade is locked if all gaps are closed.



Implants

PFN-2 Nails

Material: Titanium / Stainless Steel

Diameters: 9mm to 12mm (short nails, 1mm increments)
 9mm to 11mm (long nails)
 All nails have a proximal diameter of 16.5mm with a lateral flattened surface

Lengths short Nails:

170mm
 200mm
 240mm

Lengths long Nails (Left & Right):

320mm	340mm
360mm	380mm
400mm	420mm

CCD-Angle: 130°, 135°

Cannulation: All nails are cannulated





PFN-2 Nail Length 170mm

Distal Dia. (mm)	Angle	SS Code No.	Titanium Code No.
9	130°	393D.17	T393D.17
10	130°	393E.17	T393E.17
11	130°	393F.17	T393F.17
12	130°	393G.17	T393G.17
9	135°	394D.17	T394D.17
12	135°	394E.17	T394E.17
11	135°	394F.17	T394F.17
12	135°	394G.17	T394G.17

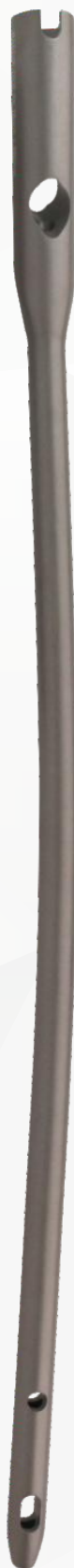
PFN-2 Nail Length 200mm

Distal Dia. (mm)	Angle	SS Code No.	Titanium Code No.
9	130°	393D.20	T393D.20
10	130°	393E.20	T393E.20
11	130°	393F.20	T393F.20
12	130°	393G.20	T393G.20
9	135°	394D.20	T394D.20
12	135°	394E.20	T394E.20
11	135°	394F.20	T394F.20
12	135°	394G.20	T394G.20

PFN-2 Nail Length 240mm

Distal Dia. (mm)	Angle	SS Code No.	Titanium Code No.
9	130°	393D.24	T393D.24
10	130°	393E.24	T393E.24
11	130°	393F.24	T393F.24
12	130°	393G.24	T393G.24
9	135°	394D.24	T394D.24
12	135°	394E.24	T394E.24
11	135°	394F.24	T394F.24
12	135°	394G.24	T394G.24

PFN-2 Nail Long



Length (mm)	Angle	9mm Right Stainless Steel	9mm Left Stainless Steel	9mm Right Titanium	9mm Left Titanium
320	130°	393D.32R	393D.32L	T393D.32R	T393D.32L
340	130°	393D.34R	393D.34L	T393D.34R	T393D.34L
360	130°	393D.36R	393D.36L	T393D.36R	T393D.36L
380	130°	393D.38R	393D.38L	T393D.38R	T393D.38L
400	130°	393D.40R	393D.40L	T393D.40R	T393D.40L
420	130°	393D.42R	393D.42L	T393D.42R	T393D.42L

Length (mm)	Angle	9mm Right Stainless Steel	9mm Left Stainless Steel	9mm Right Titanium	9mm Left Titanium
320	135°	394D.32R	394D.32L	T394D.32R	T394D.32L
340	135°	394D.34R	394D.34L	T394D.34R	T394D.34L
360	135°	394D.36R	394D.36L	T394D.36R	T394D.36L
380	135°	394D.38R	394D.38L	T394D.38R	T394D.38L
400	135°	394D.40R	394D.40L	T394D.40R	T394D.40L
420	135°	394D.42R	394D.42L	T394D.42R	T394D.42L

Length (mm)	Angle	10mm Right Stainless Steel	10mm Left Stainless Steel	10mm Right Titanium	10mm Left Titanium
320	130°	393E.32R	393E.32L	T393E.32R	T393E.32L
340	130°	393E.34R	393E.34L	T393E.34R	T393E.34L
360	130°	393E.36R	393E.36L	T393E.36R	T393E.36L
380	130°	393E.38R	393E.38L	T393E.38R	T393E.38L
400	130°	393E.40R	393E.40L	T393E.40R	T393E.40L
420	130°	393E.42R	393E.42L	T393E.42R	T393E.42L

Length (mm)	Angle	10mm Right Stainless Steel	10mm Left Stainless Steel	10mm Right Titanium	10mm Left Titanium
320	135°	394E.32R	394E.32L	T394E.32R	T394E.32L
340	135°	394E.34R	394E.34L	T394E.34R	T394E.34L
360	135°	394E.36R	394E.36L	T394E.36R	T394E.36L
380	135°	394E.38R	394E.38L	T394E.38R	T394E.38L
400	135°	394E.40R	394E.40L	T394E.40R	T394E.40L
420	135°	394E.42R	394E.42L	T394E.42R	T394E.42L

Length (mm)	Angle	11mm Right Stainless Steel	11mm Left Stainless Steel	11mm Right Titanium	11mm Left Titanium
320	130°	393F.32R	393F.32L	T393F.32R	T393F.32L
340	130°	393F.34R	393F.34L	T393F.34R	T393F.34L
360	130°	393F.36R	393F.36L	T393F.36R	T393F.36L
380	130°	393F.38R	393F.38L	T393F.38R	T393F.38L
400	130°	393F.40R	393F.40L	T393F.40R	T393F.40L
420	130°	393F.42R	393F.42L	T393F.42R	T393F.42L

Length (mm)	Angle	11mm Right Stainless Steel	11mm Left Stainless Steel	11mm Right Titanium	11mm Left Titanium
320	135°	394F.32R	394F.32L	T394F.32R	T394F.32L
340	135°	394F.34R	394F.34L	T394F.34R	T394F.34L
360	135°	394F.36R	394F.36L	T394F.36R	T394F.36L
380	135°	394F.38R	394F.38L	T394F.38R	T394F.38L
400	135°	394F.40R	394F.40L	T394F.40R	T394F.40L
420	135°	394F.42R	394F.42L	T394F.42R	T394F.42L

PFN-2 Blades



Length (mm)	SS Code No.	Titanium Code No.
75	395.75	T395.75
80	395.80	T395.80
85	395.85	T395.85
90	395.90	T395.90
95	395.95	T395.95
100	395.100	T395.100
105	395.105	T395.105
110	395.110	T395.110
115	395.115	T395.115
120	395.120	T395.120

PFN-2 End Caps

Used to protect nail threads from tissue ingrowth



SS Code No.	Titanium Code No.
355.13	T355.13



SS Code No.	Titanium Code No.
355.13A	T355.13A

Locking Bolts

PFN-2 Nails

Material:	Titanium / Stainless Steel
Drill:	4mm
Lengths:	22mm - 60mm (2mm increments) 60mm - 100mm (5mm increments)
Design:	Hexagonal recess 3.5mm

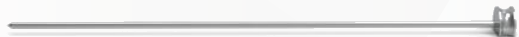
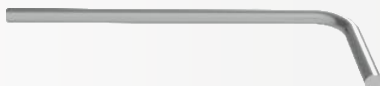


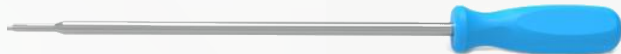
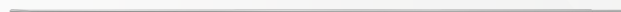
4.9mm Interlocking Bolts

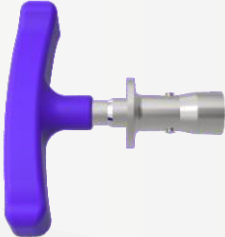
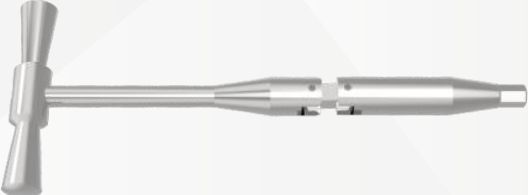
Length (mm)	SS Code No.	Titanium Code No.
22	353.22	T353.22
24	353.24	T353.24
26	353.26	T353.26
28	353.28	T353.28
30	353.30	T353.30
32	353.32	T353.32
34	353.34	T353.34
36	353.36	T353.36
38	353.38	T353.38
40	353.40	T353.40
42	353.42	T353.42
44	353.44	T353.44
46	353.46	T353.46
48	353.48	T353.48
50	353.50	T353.50
52	353.52	T353.52
54	353.54	T353.54
56	353.56	T353.56
58	353.58	T353.58
60	353.60	T353.60
65	353.65	T353.65
70	353.70	T353.70
75	353.75	T353.75
80	353.80	T353.80
85	353.85	T353.85
90	353.90	T353.90
95	353.95	T353.95
100	353.100	T353.100

Instruments

811.001 Insertion Handle For Pfna	811.003 Aiming Arm 130° For Pfna
	
811.004 Aiming Arm 135° For Pfna	811.005A Aiming Arm For Dynamic Locking
	
811.005B Aiming Arm For Static Locking	811.038 Connecting Bolt For PFN Aiming Arm
	
811.006 Connecting Bolt	811.007 Buttress Compression Nut For Pfna Blade
	
811.008 Protection Sleeve 16 x 11mm For Pfna Blade	811.009 Drill Sleeve 11 x 3.2mm For Pfna Blade
	

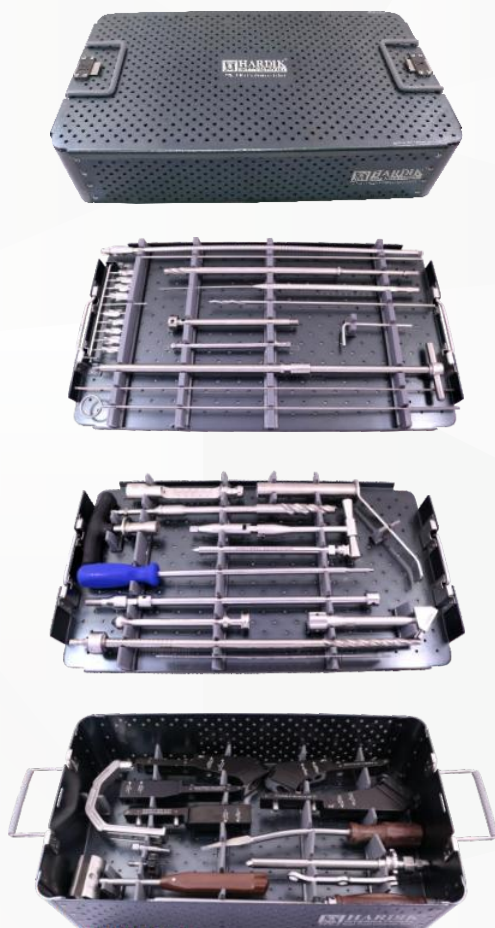
811.010 Trocar 3.2mm For Pfna Blade 	811.011 Protection Sleeve 11 x 8mm 
811.012 Drill Sleeve 8 x 4mm 	811.013 Trocar 4mm 
811.014 Protection Sleeve With Handle 20 x 17mm 	811.015 Sleeve 17 x 3.2mm For Guide Wire 
811.016 Impector For Pfna Blade 	811.017 Extraction Screw For Pfna Blade 
811.018 Hammer Guide For Pfna Blade 	811.019 Pin Wrench L & Key Type 

811.020 Radiographic Ruler For Pfna 130°,135°	811.021 Direct Measuring Device For 3.2mm Guide Wire
	
811.022 Key For Pfna Blade With Combination Wrench 11mm	811.023 Measuring Device For Locking Bolt
	
804.010 Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt	811.025 Starting Reamer 16.5mm For Pfna Nail
	
811.026 Reamer 10.3mm For Pfna Blade Screw	811.027 Drill bit 10.3mm For Pfna Blade Screw
	
811.028 Fixation Sleeve Pfna for Reamer 10.3mm	811.029 Guide Wire 2.8 x 460mm With Hook
	

811.030 Guide Wire 3mm For Pfna Blade	811.031 Guide Wire 3 x 450mm With Eye
	
811.032 Hammer Guide	811.033 Connector For Hammer Guide
	
811.034 8mm Hexagonal Shaft With Spherical Head	811.035 Cannulated Bone Awl
	
811.036 Slotted Hammer with Handle	811.037 T Handle Cannulated
	
811.039 Pointer for Sleeve 17 x 3.2mm	811.040 T Handle Hexagonal Wrench 8.0mm for universal
	
811.041 PFN-2 Nail Extractor Attachment	602.030 Drill Bits 4.0mm x 300mm for Jacobs Chuck
	

Set

AGC.48 PFN-2 Nail Instrument Set



811.001	Insertion Handle For Pfna
811.003	Aiming Arm 130° For Pfna
811.004	Aiming Arm 135° For Pfna
811.005A	Aiming Arm For Dynamic Locking
811.005B	Aiming Arm For Static Locking
811.006	Connecting Bolt
811.007	Buttress Compression Nut For Pfna Blade
811.008	Protection Sleeve 16 x 11mm For Pfna Blade
811.009	Drill Sleeve 11 x 3.2mm For Pfna Blade
811.010	Trocar 3.2mm For Pfna Blade
811.011	Protection Sleeve 11 x 8mm
811.012	Drill Sleeve 8 x 4mm
811.013	Trocar 4mm
811.014	Protection Sleeve With Handle 20 x 17mm
811.015	Sleeve 17 x 3.2mm For Guide Wire
811.016	Inspector For Pfna Blade
811.017	Extraction Screw For Pfna Blade
811.018	Hammer Guide For Pfna Blade
811.019	Pin Wrench L & Key Type
811.020	Radiographic Ruler For Pfna 130°, 135°
811.021	Direct Measuring Device For 3.2mm Guide Wire
811.022	Key For Pfna Blade With Combination Wrench 11mm
811.023	Measuring Device For Locking Bolt
811.025	Starting Reamer 16.5mm For Pfna Nail
811.026	Reamer 10.3mm For Pfna Blade Screw
811.027	Drill bit 10.3mm For Pfna Blade Screw
811.028	Fixation Sleeve Pfna for Reamer 10.3mm
811.029	Guide Wire 2.8 x 460mm With Hook
811.030	Guide Wire 3mm For Pfna Blade
811.031	Guide Wire 3 x 450mm With Eye
811.032	Hammer Guide
811.033	Connector For Hammer Guide
811.034	8mm Hexagonal Shaft With Spherical Head
811.035	Cannulated Bone Awl
811.036	Slotted Hammer with Handle
811.037	T Handle Cannulated
811.038	Connecting Bolt For PFN Aiming Arm
811.039	Pointer for Sleeve 17 x 3.2mm
811.040	T Handle Hexagonal Wrench 8.0mm for universal
811.041	PFN-2 Nail Extractor Attachment
602.030	Drill Bits 4.0mm x 300mm for Jacobs Chuck
804.010	Hexagonal Screw Driver 3.5mm Tip Long for 4.9mm Bolt
804.012	Stopper Guide Wire 2.5mm Length 950mm (Without Box)
804.013	Guide Wire 2.5mm Length 950mm (Without Box)
724.001	Flexible Reaming Shaft
724	Bit for Flexible Reaming Shaft 8.0mm, 8.5mm, 9.0mm, 9.5mm, 10.0mm, 10.5mm, 11.0mm, 11.5mm, 12.0mm



House of Ortho Tools

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