



austofix

austofix **F1**

SHORT PROXIMAL FEMORAL NAIL

Surgical Technique



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## Disclaimer

This document is intended to be read by experienced orthopaedic trauma surgeons familiar with I.M. Nailing of the long bones.

This publication is intended as the recommended procedure for using the Austofix nailing system. It offers guidance only. Each surgeon should consider the particular needs of the patient and make appropriate adjustments where necessary.

For further advice please contact your local Austofix representative.  
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# Introduction

Austofix is an Australian medical device manufacturer that specialises in orthopaedic trauma. Since 1993, Austofix has designed, manufactured and marketed its range of implants throughout the world.

Austofix is dedicated to excellence in every aspect of medical device design, manufacture and product service. In collaboration with Australian surgeons we have introduced innovative, cost-effective implant systems that improve patient outcomes whilst ensuring the fastest operative times.

## austofix F1

There is emergent evidence to suggest that IM nails are a superior implant for the treatment of unstable intertrochanteric fractures. It has been shown that with unstable intertrochanteric fractures, problems with compression hip screw fixation such as excessive fracture collapse and implant cut-out increase. Fractures classified as AO 31-A3 are often referred to as “reverse obliquity” fractures and in these cases the rates of failure for compression hip screws are too high to recommend its use. In these cases, IM nails can be shown to provide clinical advantage.

Theoretical mechanical advantages of intramedullary nails over screw and plate fixation are attributed to a reduced distance between the hip joint and the implant, which diminishes the bending moment across the implant/fracture construct. Also, nails can be inserted percutaneously, thereby reducing both operating time

Austofix continues to develop its capabilities through the addition of new expertise, technologies and partnerships with surgeons and scientific institutions.

Austofix distributes the Austofix range of orthopaedic trauma products throughout Australia and overseas in conjunction with international partners. As a specialist in orthopaedic trauma, our product specialists understand the need for product support and service.

and soft-tissue damage. Importantly, the nail acts as an intramedullary buttress to prevent excessive shaft medialisation.

Using Titanium alloy (ISO5832-3), the Austofix F1 Hip Nail offers superior strength combined with the smallest diameter available for a proximal femoral nail.

The instruments have been developed through clinical trials to be simple to use and enable the screws to be easily aligned in the femoral head. Operative times can be reduced significantly when using the F1 Hip Nail.

The Austofix F1 Hip Nail complements the Austofix Nail Range; for antegrade femoral nailing indications. The S2 Supracondylar Nail is used for retrograde femoral nailing.

# Design Details

## Nail - Titanium

### 170mm Nail

- 170mm & 190mm Lengths
- 15.5mm Proximal Diameter
- 11mm Distal Diameter

### Multiple Proximal Oblique Screw Angles

- 120°
- 125°
- 130°

### Stress Relief Cuts

- Reduces Nail Fatigue.

### Proximal Hole

- Oblique Screw

### Positioning of Distal Screw Hole

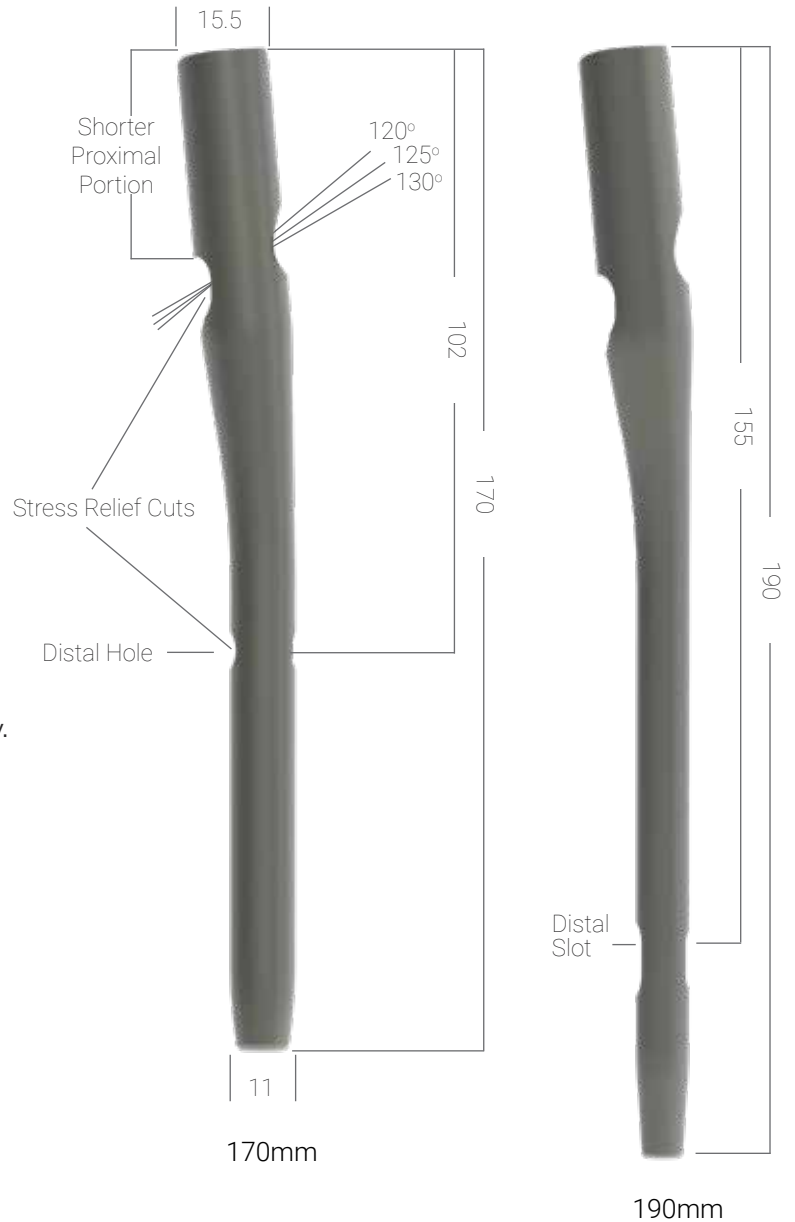
- High position for greater strength & accuracy.

### Intuitive Instrument Set

- Decreased Procedure Time.
- Enhanced safety.

### Lateral Chamfer

- Reduces tendon irritation.



## Screws & End Caps - Titanium

The following are used with the F1 Short Nail:

- 10.4 Hip Screw
- Helical Blade
- 4.8mm Locking Screws used distally.
- 4.0mm Locking Screws (Ø9 Nails only)
- F1 Proximal Femoral Nail Set Screw (Pre-assembled in the Nail)
- M10 End Cap



10.4 Hip Screw



Helical Blade



4.8mm Locking Screw



4.0mm Locking Screw



M10 End Cap



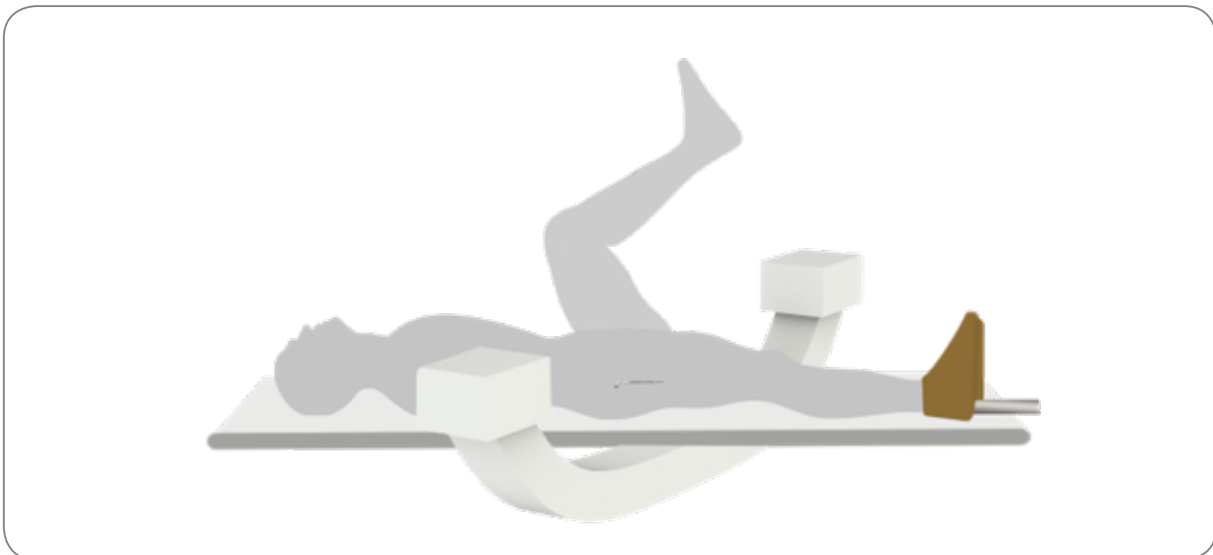
## Indications & Pre-Operative Planning

The medullary canal must be checked on radiographs to determine whether reaming is necessary. The canal is wider on lateral radiographs, so true anteroposterior views are necessary. This is usually available from the contralateral limb.



## Patient Positioning

A traction table and Image Intensifier are used in the same manner as for most other types of hip nail. The affected hip is in neutral or slight flexion and 5° adduction. The traction boot should be carefully applied. The reduction should be checked on both views and rotation is adjusted as necessary. Neutral rotation is normally appropriate for trochanteric fractures, while displaced cervical fractures require manipulation and internal rotation. The opposite hip should be either fully extended or flexed, preferable in a high lithotomy position to allow good lateral X-ray views (image below).



# Incision & Bone Preparation

## Incision

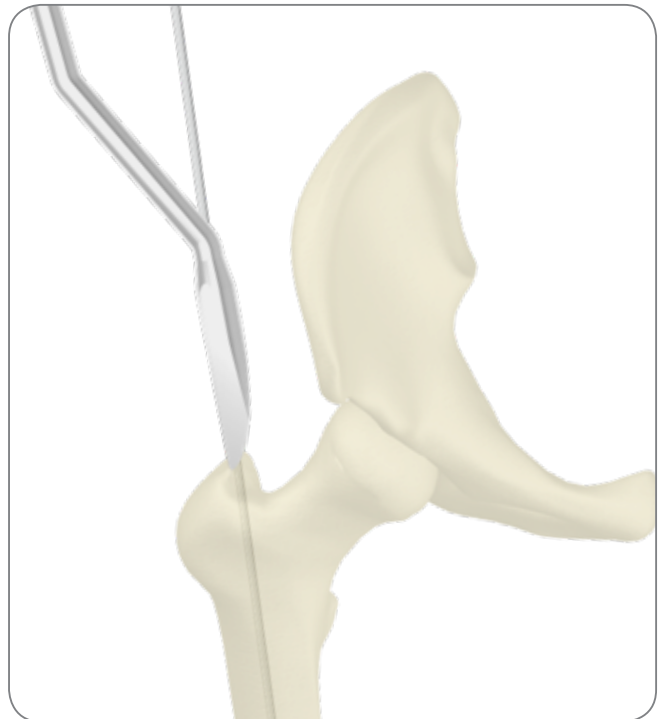
The incision begins 1 cm above the Greater Trochanter and extends upward from 3 to 4cm. Pass the knife obliquely downward to incise the fascia over the top of the Greater Trochanter (Right).

## Entry Point

Insert the 3.2x400mm Guidewire at the tip of the Greater Trochanter, 1/3 anterior. Use the Cannulated Awl to make the initial entry into the medullary canal.

## Tissue Guard Trocar

The Tissue Guard Trocar can be used to ensure the Guidewire is concentric to the Tissue Guard or to offset the entry point by 4.0, 4.5, 5.0 or 5.5mm.



## Reaming

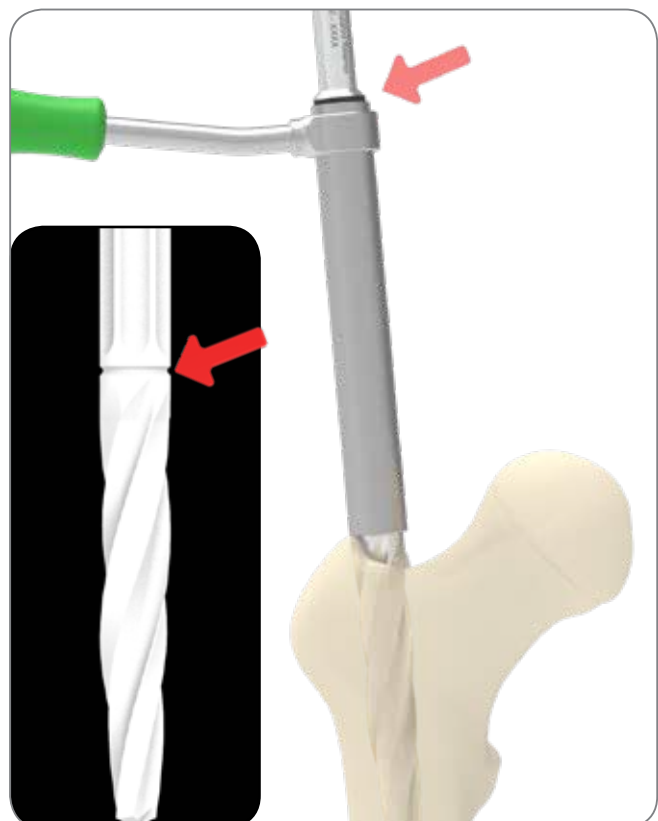
Use the Tissue Guard with the Starting Reamer for bone preparation. The Starting Reamer can be used by hand with the T-handle or with a drill. Ensure the Reamer passes into the subtrochanteric area. Use marked band for reaming depth, or the groove under II if not using a tissue guard.



Tissue Guard Trocar

## Nail Selection

Decide from the post-reduction X-ray the appropriate Nail, 120°, 125° or 130°. Since the line of the calcar femorale is usually well above the lower margin of the femoral head, the 10.4 Hip Screw must pass close to the calcar femorale. The apex distance should be 10-10.





# Instrument Assembly

## Nail Holder and Proximal Screw Guide

Align the Nail's proximal groove to the Nail Holder.

Use the 6mm Hex Driver to fasten the In-built Nail Holding Screw.

Slide in the Proximal Screw Guide Locking Sleeve Short (green) into the Proximal Screw Guide ensuring the pin is aligned in the slot.

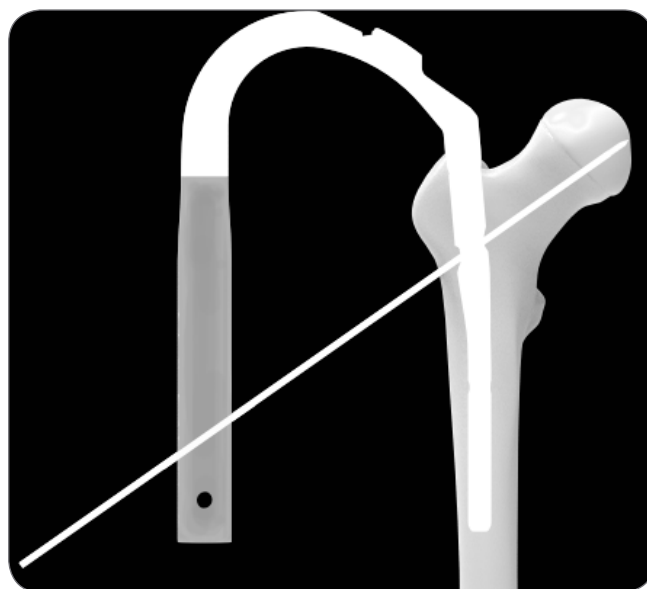
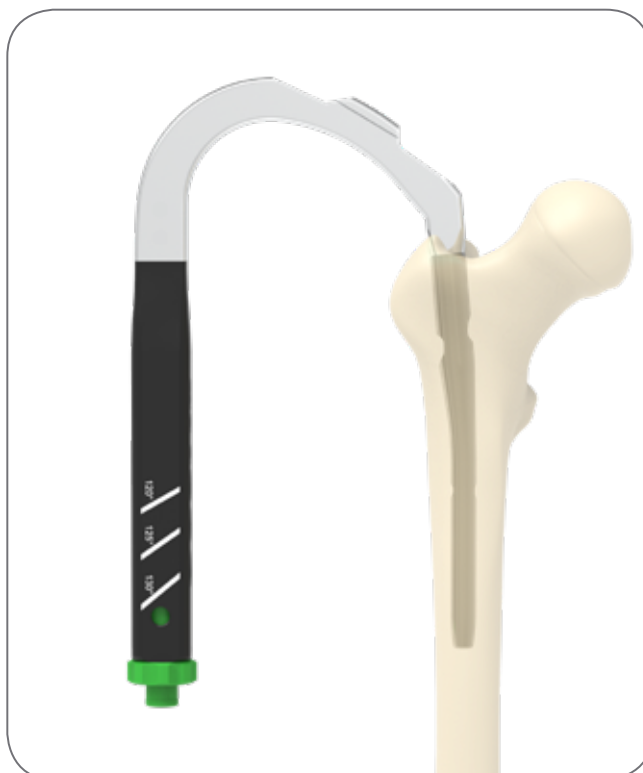


# Nail Insertion

## Nail Depth

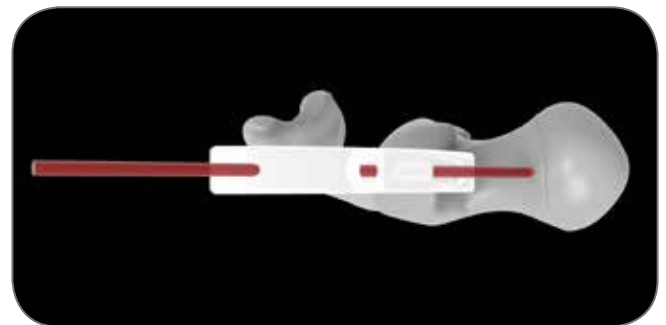
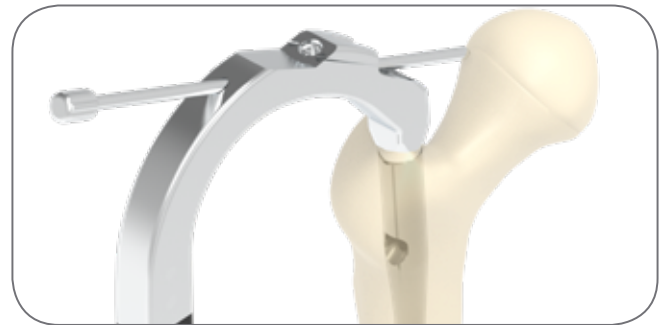
Depth is assessed initially by using the X-ray outline of the oblique holes to estimate the path of the screws. Normally this is when anteroposterior radiographs indicate the top of the Nail is 5mm below the tip of the Greater Trochanter. Adjust Nail depth as necessary until the screw track is just above the calcar and below the centre of the femoral head.

If the Nail is not loose in the bone, align the rotary position while inserting the last 1-2cm. Use the Slide Hammer assembly if extraction and reinsertion is required.



## Nail Rotation

Use the Single Shot Pin with the Xray aligned on a lateral image of the Nail Holder for correct Nail Rotation. The Pin is to be centred on the femoral head.



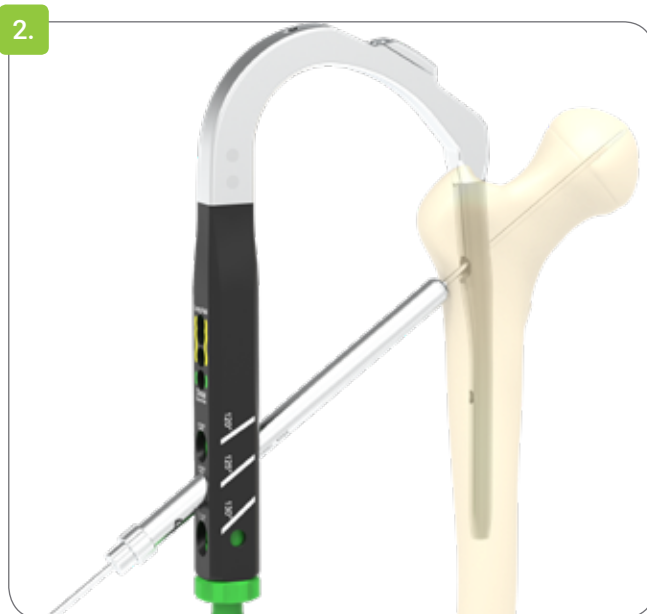
# Insertion of Screws

## Hip Screw/Helical Blade

1. Assemble the Lag Screw Trocar and Lag Screw Sleeve and pass through Proximal Screw Guide until it contacts the Cortical Bone.



2. Replace the Lag Screw Trocar with the Guide Wire Sleeve, ensuring the sleeves contact the lateral cortex. Insert the 3.2x400mm Guidewire to the medial tip of the femoral head.

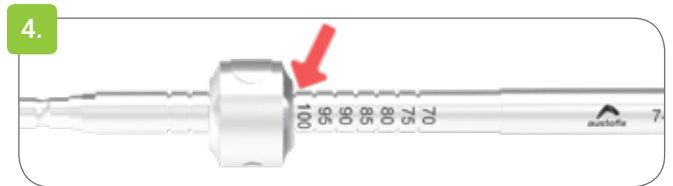


3. Push the Length Gauge up to the Lag Screw Sleeve and take the reading from the lateral point of the Guidewire.

Use the closest 5mm interval to determine 10.4 Hip Screw Length.



4. Use the Stepdrill Stop for accurate drilling depth.  
Ensure the reading on the medial side of the Stepdrill Stop is the same as the desired 10.4 Hip Screw length.

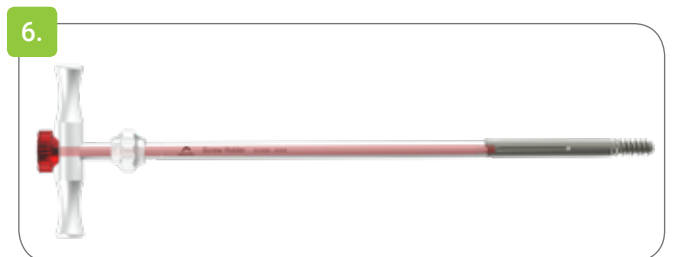


5. Use the 7-10.5mm Step Drill until the Stepdrill Stop contacts the Lag Screw Sleeve.  
**Note:** the 7-10.5mm Bone Conserving Reamer can be used if bone conservation is desired.



Hip Screw continue to step 6 below.  
Helical Blade go to page 15.

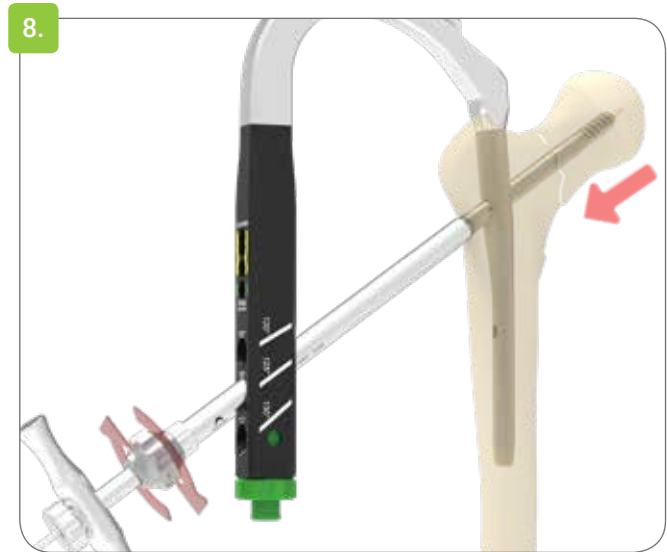
6. Align the Screw Holder to the 10.4 Hip Screw, then screw in the Screw Holder Retainer.



7. Screw in the 10.4 Hip Screw.



8. A Compression Nut can be used to reduce the fracture in the femoral Head. Rotate the Compression Nut Clockwise for reduction.



Check on X-ray for optimal fracture reduction.

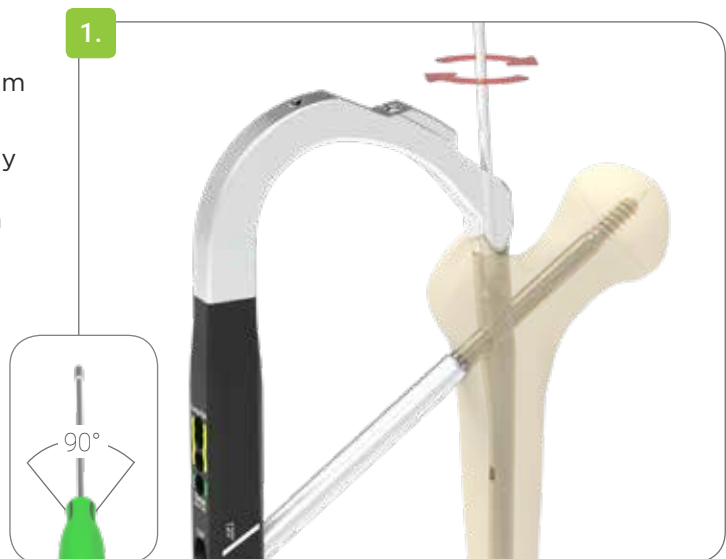
9. Correct 10.4 Hip Screw depth is indicated by when the groove in the Screw Holder is flush with the Lag Screw Sleeve. Ensure the Screw Holder handle is either parallel or perpendicular to the Proximal Screw Guide.



### In-built Set Screw

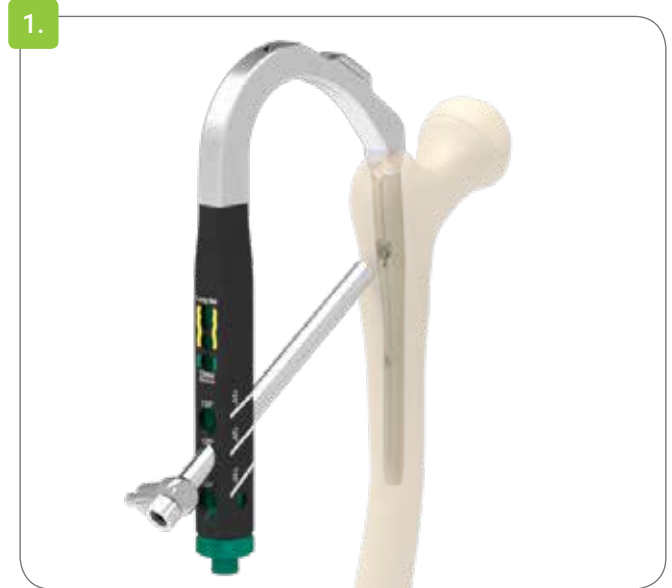
**Note:** Set Screw should be fastened before 4.8mm Locking Screw has been inserted.

1. Use the 5mm Articulating Hex Driver to firmly fasten the Set Screw. If desired, turn the Driver back a quarter of a turn to allow lateral movement. Use the Screw Holder to ensure the desired toggle has been achieved.

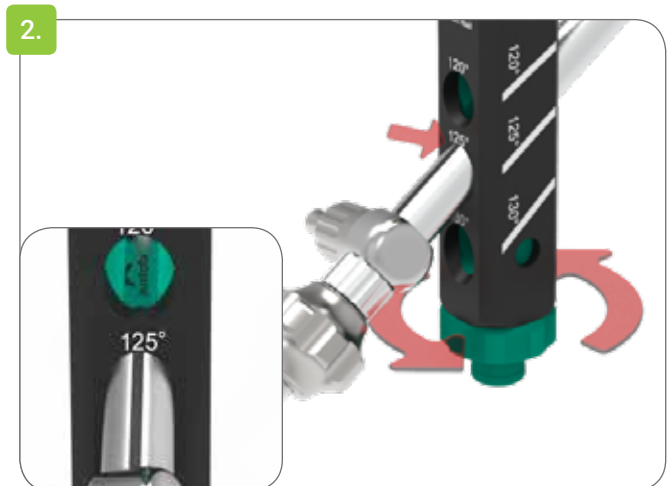


## Helical Blade

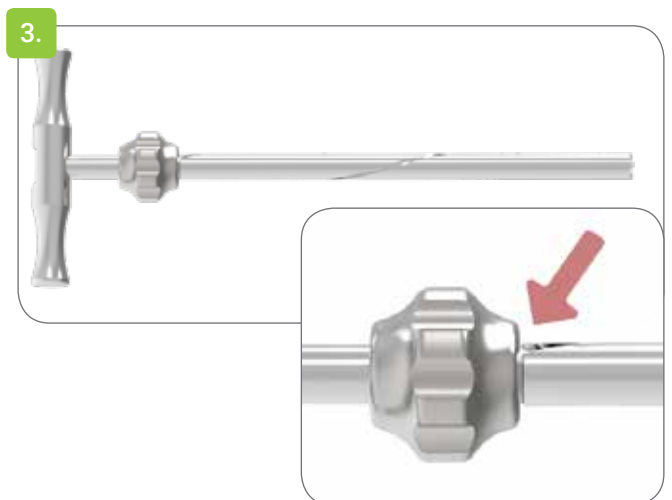
1. Temporarily remove the Outer Sleeve, slide the Alignment Pin over the Outer Sleeve, ensuring the pin does not secure in the hole on the Outer Sleeve. Then place back into the Proximal Screw Guide



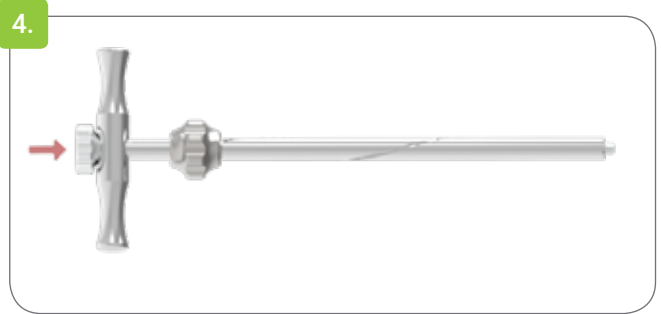
2. Ensure the line on the Outer Sleeve aligns with the centre number and the Locking Sleeve is firmly secured.



3. Screw the Compression Nut onto the Screw Holder, ensuring the edge lines up with the groove on the Blade Holder.



1. Insert the Lag Screw Retainer through the Blade Holder.



2. Screw on the desired Helical Blade length, ensuring it is tightly fastened.



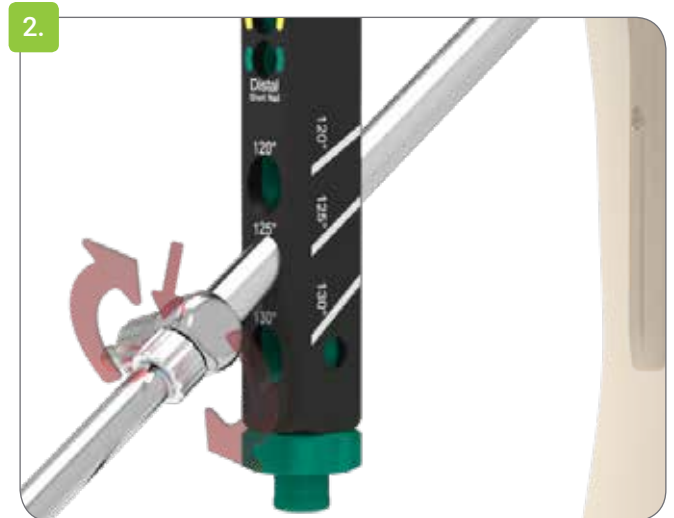


## Helical Blade Insertion

1. Pass the assembled Helical Blade, Screw Holder, Retainer and Compression Nut through the Outer Sleeve until Helical Blade contacts the near cortex.



2. Ensure the Alignment Pin is pushed against the back end of the Outer Sleeve and then spin until an audible click is heard or the Alignment Pin no longer spins.



3. Spin the Nail Holder until an audible click is heard or the Nail Holder no longer spins.
4. Remove the 3.2x400mm Guidepin.

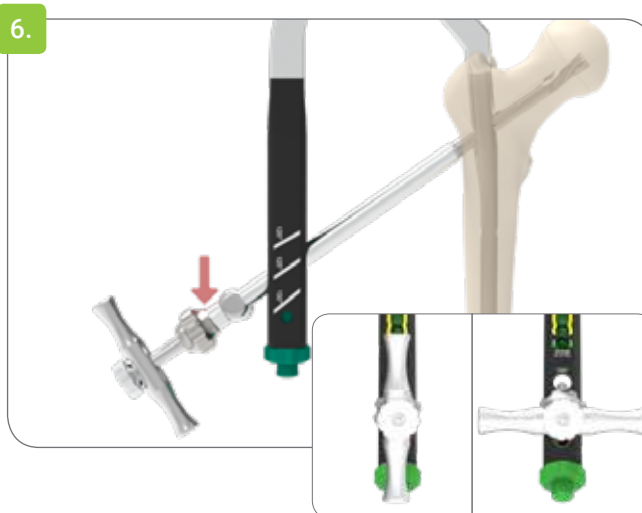


5. Advance the Helical Blade through the femoral head by gently tapping the Screw Holder Retainer with a mallet.

**Note:** continue to check that the line on the Outer Sleeve is aligned to the centre number on the Proximal Screw Guide. The Locking Sleeve Nut may need to be re-tightened.



6. Continue to insert the Helical Blade until the Compression Nut (or groove on Nail Holder) contacts the Outer Sleeve. Check that the Screw Holder Handle is either perpendicular or parallel to the Proximal Screw Guide.



7. Insert the Articulating Driver and tighten the Internal Set Screw in the Nail, then back off 90° (use lines on Articulating Driver for reference)  
**Note:** please check the Set Screw has engaged by wiggling the Screw Holder.



8. Untighten the Screw Holder Retainer and remove the Screw Holder and corresponding instruments.



## Distal Screw

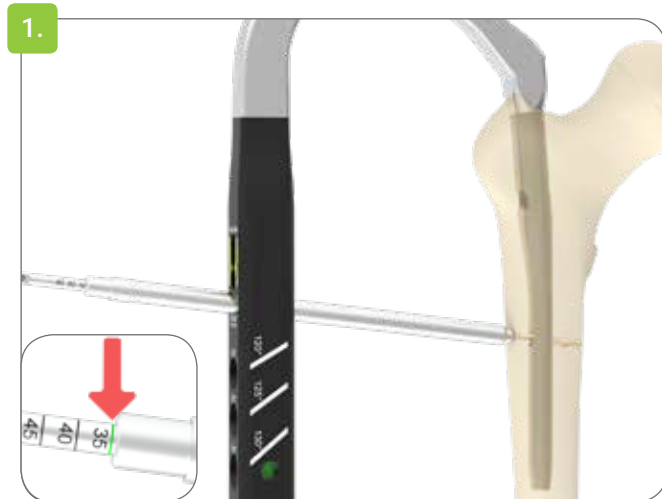
**190mm Nail:** If using the F1 190mm Short Nail, swap out the short Locking Sleeve (green) with the 190mm Locking Sleeve (orange) for the distal locking screw.

Then use technique below with either the static or dynamic option.

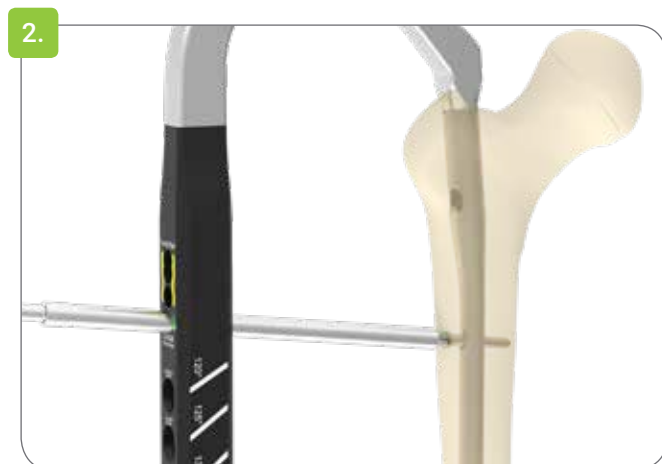
1. Pre-assemble the Outer and Inner Sleeves and insert through the Short Distal Hole. Pass the 4.5x270mm Drill through the inner sleeve and drill to the far cortex.

**Note:** the green line indicates the 35mm screw, the most commonly used.

The Universal Depth Gauge can be used if desired.



2. Select the desired 4.8mm Locking Screw length as per measurement above. Remove Inner Sleeve and pass the 3.5mm Hex driver with 4.8mm Locking Screw through Outer Sleeve. Tightly fasten.



Remove Nail Holder with the 6mm Hex Driver



## End Cap

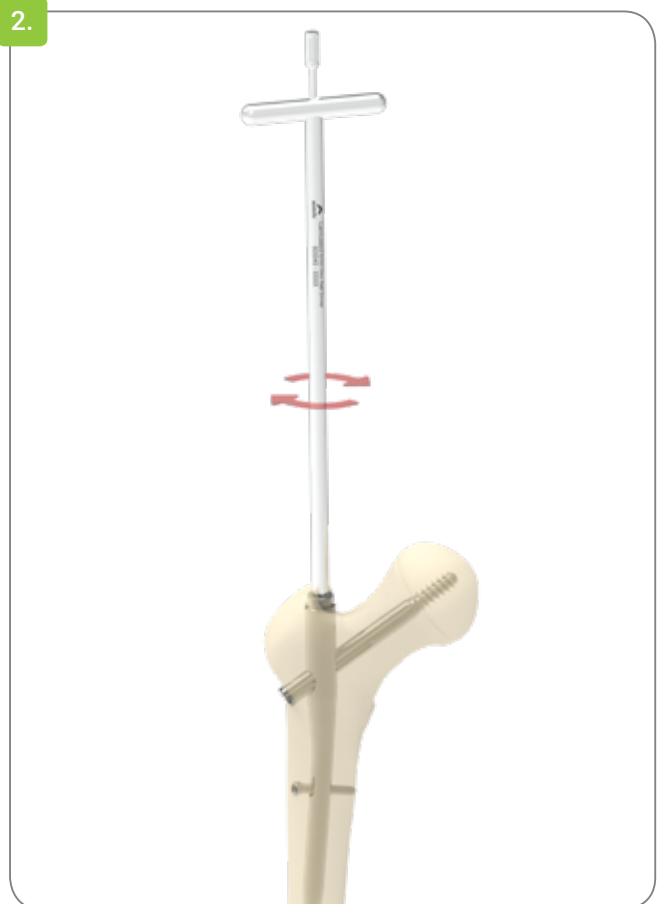
If a End Cap is desired, ensure correct length is chosen and the Nail Holder is removed.

1. Insert the End Cap Retainer through the Cannulated 6mm Hex Ball Driver and screw into the chosen End Cap.
2. Pass the assembled instrument and End Cap through the incision. Push down on the Cannulated 6mm Hex Ball Driver until the End Cap contacts the nail, tightly fasten.

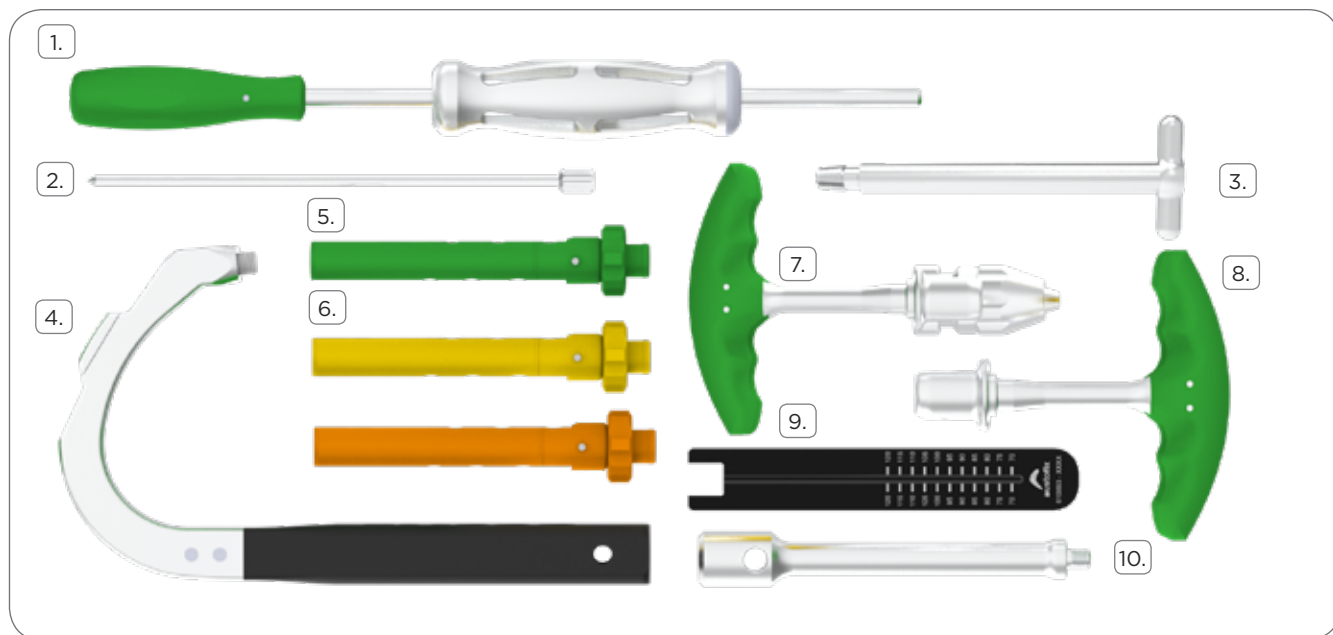
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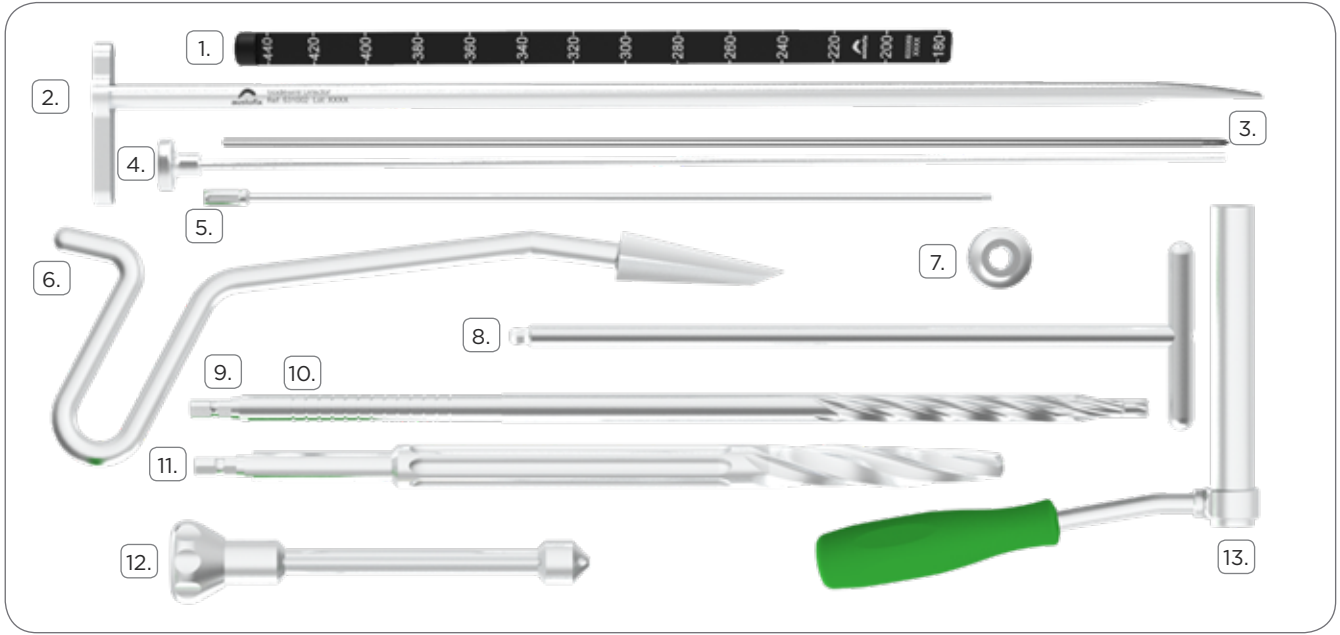
2.



# Instruments

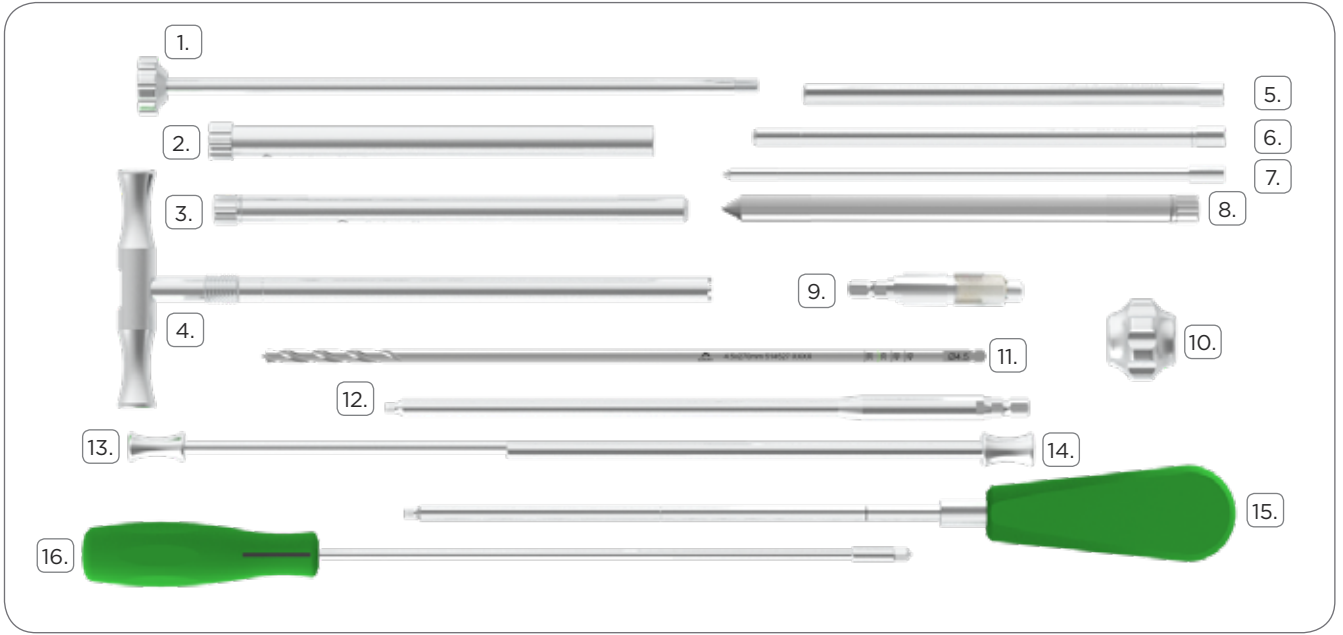


- |    |        |                            |     |        |                           |
|----|--------|----------------------------|-----|--------|---------------------------|
| 1. | 600097 | - Slide Hammer             | 6.  | 600096 | - PSG Locking Sleeve Long |
| 2. | 600092 | - Single Shot Pin          | 7.  | 531012 | - Guidewire T-Handle      |
| 3. | 600107 | - M10 Nail Extractor       | 8.  | 531004 | - T-Handle                |
| 4. | 600094 | - F1 Combo NH & PSG        | 9.  | 610093 | - Lag Screw Depth Gauge   |
| 5. | 600095 | - PSG Locking Sleeve Short | 10. | 600028 | - Impactor                |



- |    |         |                               |     |        |                                   |
|----|---------|-------------------------------|-----|--------|-----------------------------------|
| 1. | 600069  | - Nail Length Guidewire Gauge | 8.  | 600045 | - Cannulated 6mm Hex Ball Driver  |
| 2. | 531002  | - Guidewire Director          | 9.  | 610094 | - 7-10.5mm Step Drill             |
| 3. | 533235  | - 3.2x400mm Guidewire(2)*     | 10. | 600106 | - 7-10.5mm Bone Conserving Reamer |
| 4. | 531000  | - Guide Wire Pusher           | 11. | 600090 | - 15.8mm Cannulated Reamer        |
| 5. | 600093  | - End Cap Retainer            | 12. | 610089 | - Tissue Guard Trocar             |
| 6. | 600040C | - Cannulated Awl              | 13. | 610090 | - 16mm Tissue Guard               |
| 7. | 640090  | - 7-10.5mm Step Drill Stop    |     |        |                                   |

\* Supplied sterile/non-sterile



- |    |        |   |                       |     |         |   |                                     |
|----|--------|---|-----------------------|-----|---------|---|-------------------------------------|
| 1. | 610096 | - | Screw Holder Retainer | 9.  | 600042  | - | Long AO-ZH Adaptor                  |
| 2. | 610091 | - | Lag Screw Sleeve      | 10. | 610097  | - | Screw Holder Compression Nut        |
| 3. | 610092 | - | Guidewire Sleeve      | 11. | 514527  | - | 4.5x270mm Drill*                    |
| 4. | 610095 | - | Screw Holder          | 12. | 610068  | - | 3.5x270mm Power Screwdriver         |
| 5. | 610065 | - | 180mm Outer Sleeve    | 13. | 610069B | - | Universal 3.7-4.5 Depth Gauge Inner |
| 6. | 610064 | - | 4.5x180 Drill Sleeve  | 14. | 610069A | - | Universal 3.7-4.5 Depth Gauge Outer |
| 7. | 610063 | - | 180mm Trocar          | 15. | 610067  | - | 3.5 Hex 250mm Screwdriver           |
| 8. | 610088 | - | Lag Screw Trocar      | 16. | 610098  | - | 5mm Articulating Hex Driver         |

\* Supplied sterile/non-sterile

## Single Use Items



Guidewire	
Product Code	Description
533235	3.2x400 Guidewire (Twin Packed)

Drill	
Product Code	Description
514527	4.5 x 270mm Drill

# Implants

## F1 170mm Nail Short - Titanium

	120°	125°	130°
9mm Distal Diameter	379200	379250	379300
10mm Distal Diameter	370200	370250	370300
11mm Distal Diameter	371200	371250	371300



## F1 190mm Nail Short - Titanium

	120°	125°	130°
9mm Distal Diameter	379202	379252	379302
10mm Distal Diameter	370202	370252	370302
11mm Distal Diameter	371202	371252	371302





# Implants

## F1 10.4 Hip Screw

Product Code	Screw Length
361460	60
361465	65
361470	70
361475	75
361480	80
361485	85
361490	90
361495	95
361400	100
361405	105
361410	110
361415	115
361420	120



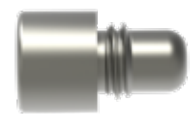
## 4.8mm Locking Screw

Product Code	Screw Length
364820	20
364825	25
364830	30
364835	35
364840	40
364845	45
364850	50
364855	55
364860	60
364865	65
364870	70



## M10 End Cap Ti

Product Code	Length
363405	5
363410	10
363415	15



## 10.4 Helical Blade

Product Code	Screw Length
360460	60
360465	65
360470	70
360475	75
360480	80
360485	85
360490	90
360495	95
360400	100
360405	105
360410	110
360415	115
360420	120



## 4.0mm Locking Screw

Product Code	Screw Length
364020	20
364025	25
364030	30
364032	32.5
364035	35
364037	37.5
364040	40
364045	45
364050	50
364055	55
364060	60
364065	65
364070	70





# Notes

# Notes



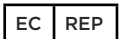
# austofix

**Head Office**

Austofix  
28 Dalglish Street  
Thebarton, SA, 5031  
AUSTRALIA

**Manufacturer**

Australian Orthopaedic Fixations Pty Ltd  
18 Kinkaid Avenue  
North Plympton SA 5037  
AUSTRALIA



Advena Ltd, Tower Business  
Centre, 2<sup>nd</sup> Flr., Tower Street,  
Swatara, BKR 4013 Malta



[austofix.com.au](http://austofix.com.au)