acumed®

Polarus® 3 Solution

Plates and Nails

Surgical Technique

3.5 mm Screws

4.3 mm Screws

A COLSON ASSOCIATE

Acumed® is a global leader of innovative orthopaedic and medical solutions.

We are dedicated to developing products, service methods, and approaches that improve patient care.

Acumed® Polarus® 3 Solution

Plates and Nails

The Acumed Polarus 3 Solution is a comprehensive system designed to treat proximal humerus fractures with an array of plate and nail options. The system introduces a number of improvements to both the implants and the instrumentation when compared to prior generations.

Indications for Use

The Acumed Polarus 3 Solution includes plates, nails, screws, and accessories designed to address fractures, fusions, and osteotomies of the humerus.

Note: While they are provided together for convenience, a plate and a nail should not be used on the same fracture.

	Definition
Warning	Indicates critical information about a potential serious outcome to the patient or the user.
Caution	Indicates instructions that must be followed in order to ensure the proper use of the device.
Note	Indicates information requiring special attention.
4.3 mm Screws	This system uses 4.3 mm Low-profile Hexalobe screws.
3.5 mm Screws	This system uses 3.5 mm Nonlocking Low-profile Hexalobe screws.

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System Features

Polarus 3 Solution Proximal Humerus Plates

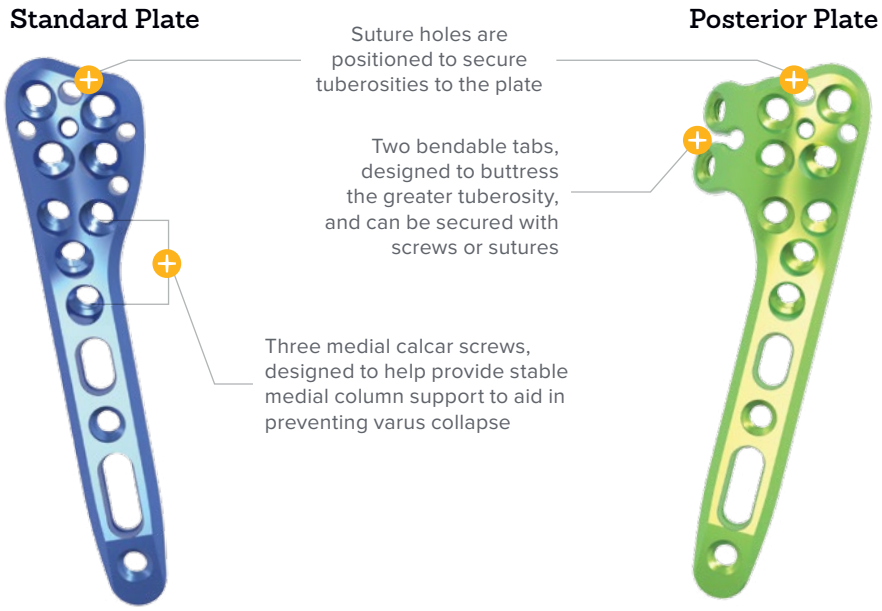
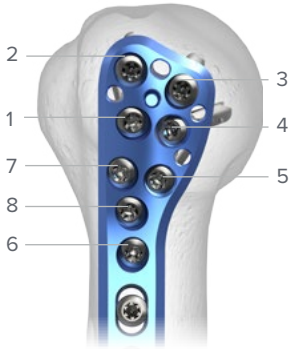


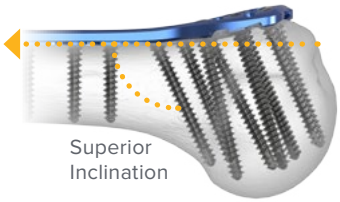
Plate Lengths

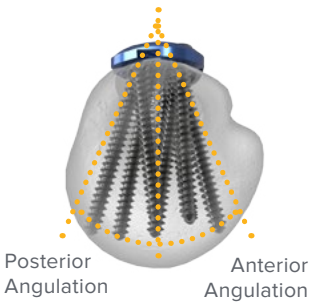
Standard	
4-hole	94 mm
6-hole	115 mm
10-hole	155 mm
14-hole*	195 mm
18-hole*	235 mm
22-hole*	275 mm
Posterior	
4-hole	94 mm
6-hole	115 mm

Standard and Posterior Plates are left and right specific to optimize plate placement.
*Special-order, sterile-packed only

Standard Plate Proximal Screw Approximate Trajectories







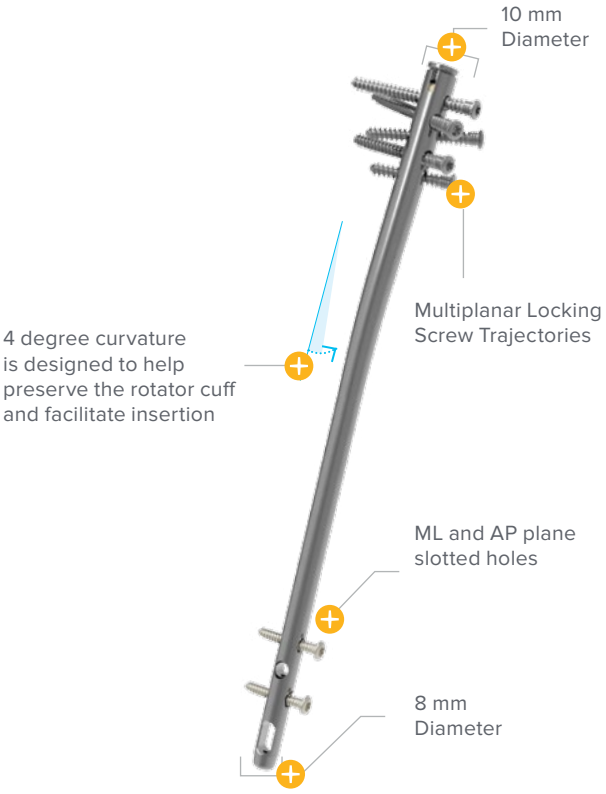
Hole #	Superior Inclination (Degrees)	Anterior/Posterior (Degrees)
1	114	13 Anterior
2	111	2 Anterior
3	114	6 Posterior
4	105	17 Posterior
5	102	11 Posterior
6	116	7 Posterior
7	115	10 Posterior
8	113	6 Anterior

System Features [continued]

Polarus 3 Solution Nails

Proximal Nail

Long Nail



Nail Lengths	
Proximal Nail	150 mm
Long Nail	200 mm
Long Nail	220 mm
Long Nail	240 mm
Long Nail	260 mm
Long Nail	280 mm

System Features [continued]

Low-Profile Screw

Low-profile screws are designed to reduce soft tissue irritation.

The hexalobe drive interface is designed to reduce the possibility of stripping the screw.

4.3 mm low-profile hexalobe screws, which function as locking screws, may be used in any hole of the Polarus 3 plate and proximal portion of the nail

3.5 mm nonlocking low-profile hexalobe screws may be used in any hole of the Polarus 3 plate, as well as the distal portion of the nail.

Screw Options	Outer Diameter	Inner (core) Diameter	Thread Pitch	Function
3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX)	3.5 mm	2.54 mm	1.07 mm	Cortical screw
4.3 mm Low-profile Hexalobe Screws (3011-430XX)	4.3 mm	2.59 mm	1.60 mm	Locking cancellous screw with blunt-tipped design

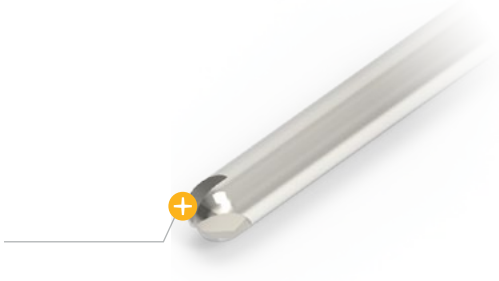
System Features [continued]

Versatile Instrumentation

Innovative instrumentation is intended to streamlne the surgical experience. The system includes both a traditional sharp drill and an optional blunt drill.

Radiolucent Carbon Fiber Retractors

Blunt Drill is designed to help avoid perforation of the humeral head



Ratcheting cannulas are designed to prevent back-out and assist in maintaining reduction

Instrumentation Overview

Polarus3 Washer Cannula
(80-1792)

2.0 mm x 9" ST Guide Wire
(WS-2009ST)

Freehand Targeting Guide
(MS-0210)

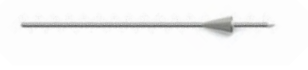
Polarus 3 Drill Guide, Nail
(80-1621)

Polarus 3 Cannula, Ratcheting
(80-1619)

Polarus 3 Cap Screw Driver
(80-1635)

Polarus 3 Nail Targeting Locking Bolt
(80-1625)

Polarus 3 Targeting Awl
(80-1620)



Polarus 3 Plate Tack
(80-1595)

Polarus 3 Plate Drill Guide, Locking
(80-1588)

Polarus 3 Guide Wire Guide
(80-1600)

Polarus 3 Guide Wire "T" Handle
(80-1734)

10.0 mm Bud Drill
(DRB1015)

8 mm Flexible Reamer
(80-1925)

9 mm Flexible Reamer
(80-1926)

Polarus 3 Implant Sizer
(80-1617)

Polarus 3 Guide Wire, 20" Blunt
(35-0008)

Polarus 3 Guide Wire, 20" Trocar Tip
(35-0009)

Locking Bolt Finger Wrench
(MS-0611)

Polarus 3 Locking Knob
(80-1633)

Polarus 3 Proximal Targeting Guide
(80-1628)

Polarus 3 Proximal Targeting Guide, L
(80-1626)

Polarus 3 Proximal Targeting Guide, R
(80-1627)

Polarus 3 Nail Targeting Connector
(80-1629)

Browne-type Retractor, Carbon Fiber
(80-1599)

Blunt Hohmann Retractor, Carbon Fiber
(80-1598)

Instrumentation Overview [continued]

8" Bone Reduction Forceps
(MS-1280)

9" Bone Reduction Spanish Forceps
(MS-47107)

Rotator Cuff Retractor, 6 x 4 mm
(80-1822)

Blunt Gelpi Retractor 165 mm Long, Deep
(80-1821)

Periosteal Elevator
(MS-46213)

Medium Ratcheting Driver Handle
(80-0663)

Polarus 3 Removal Instrument
(80-1546)

Polarus 3 Depth Gauge
(80-1776)

Polarus 3 Cannulated Awl
(80-1551)

Polarus 3 Guide Wire Passer
(80-1555)

Polarus 3 Cannulated Broach
(80-1553)

Polarus 3 Multiple Contact Hammer
(80-1538)

Polarus 3 2.8 mm Long Drill
(80-1624)

Polarus 3 2.8 mm Blunt Long Drill
(80-1634)

Polarus 3 2.8 mm Blunt Short Drill
(80-1597)

Polarus 3 Plate Drill Guide, Drop-In
(80-1587)

Polarus 3 2.8 mm Short Drill
(80-1592)

Polarus 3 4.3 mm Screw Tap
(80-1623)

Polarus 3 Tap Sleeve
(80-1593)

Polarus 3 Plate Targeting Locking Bolt
(80-1591)

Polarus 3 Reduction Device
(80-1601)

Ball Spike Reduction Tool
(80-1637)

Polarus 3 Long T15 Hexalobe Driver
(80-1618)

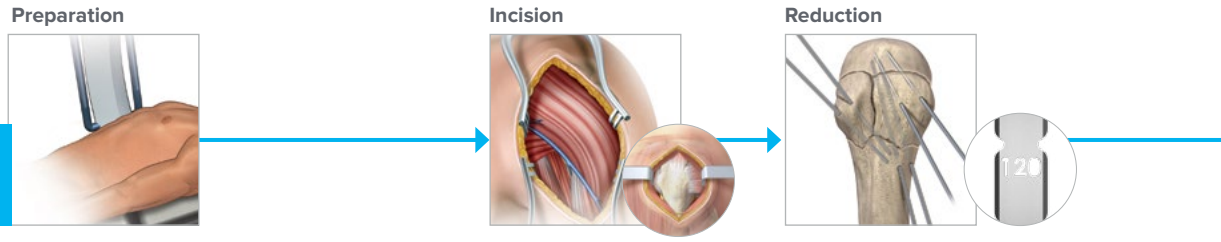
T15 Stick Fit Hexalobe Driver
(80-0760)

Polarus 3 Targeting Guide, Plate, Left
(80-1589)

Polarus 3 Targeting Guide, Plate, Right
(80-1590)

Surgical Technique Overview

Proximal Humerus: Standard and Posterior Plate Surgical Technique



Proximal Nail Surgical Technique

Long Nail Surgical Technique

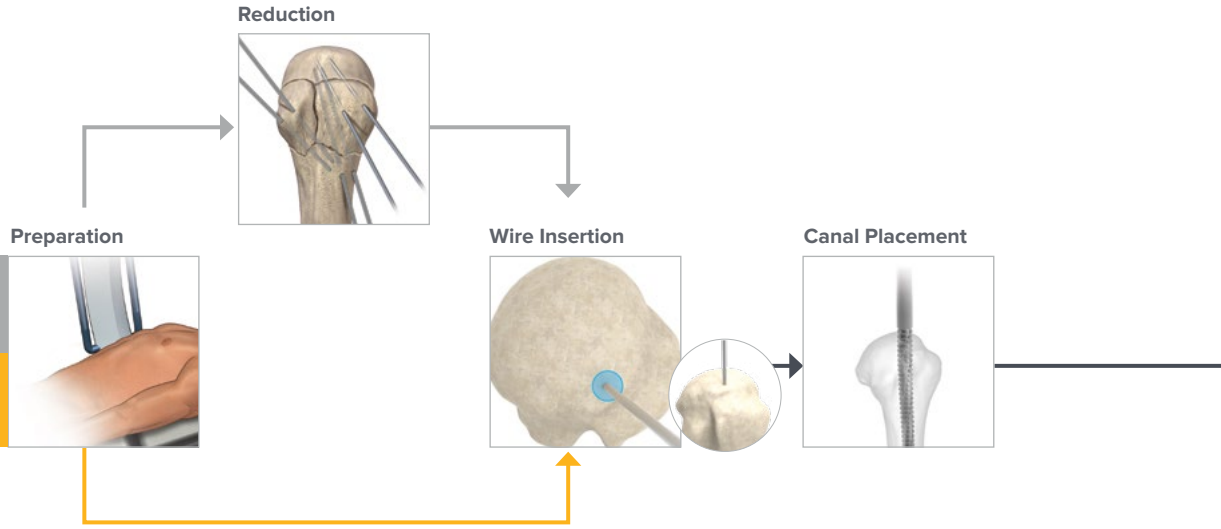
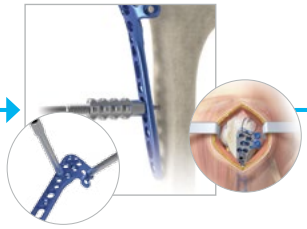
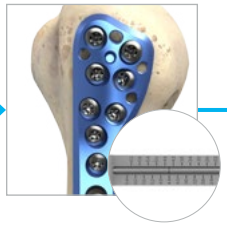


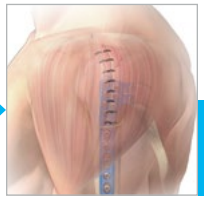
Plate Placement



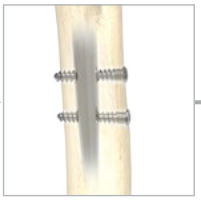
Screw Preparation



Closure



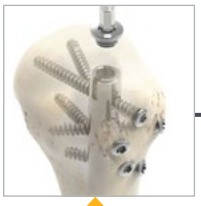
Target Distal Screw Placement



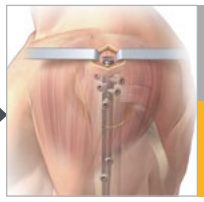
Implant Insertion and Proximal Screw Placement

Targeting Guide Assembly

Cap Screw Insertion



Rotator Cuff Repair



Freehand Distal Screw Placement

Proximal Humerus: Standard and Posterior Plate
Surgical Technique

Figure 1

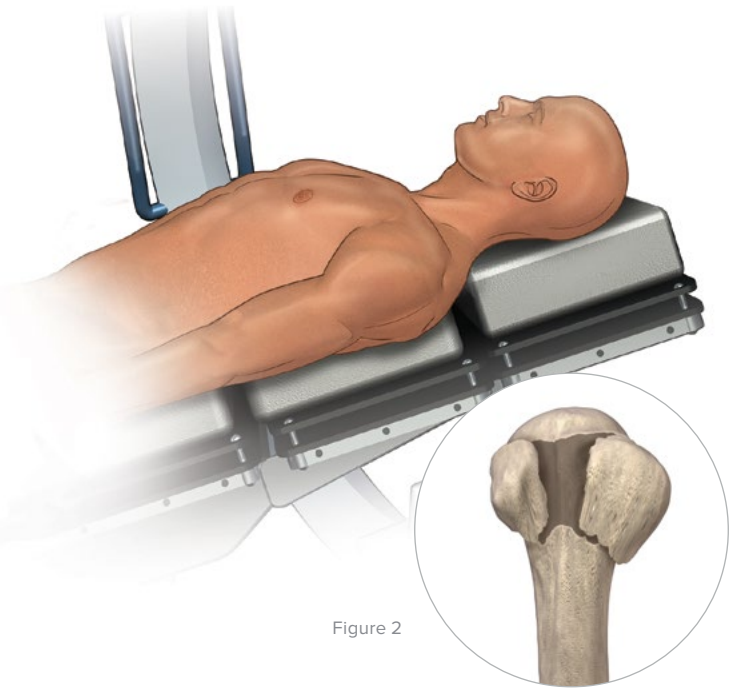


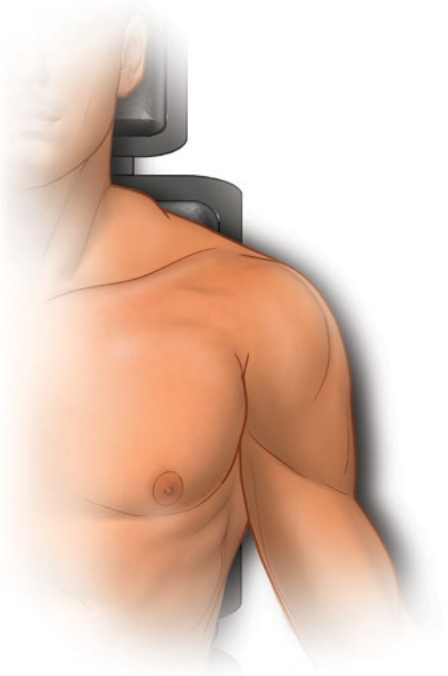
Figure 2

1 Preoperative Planning

Fluoroscopy should be used in all cases. Polarus 3 Plate X-ray Templates (90-0037) are available and should be used preoperatively to aid in implant selection.

Plate selection should be based on the fracture pattern. Fracture patterns that include posterior greater tuberosity fragments will likely require the Posterior Plate (7001-02XXX), while less complex fracture patterns can utilize the Standard Plate (7001-01XXX). The left plates are colored blue and the right plates are colored green. Images in this surgical technique indicate left plates only.

Figure 3



2 Patient Positioning

The patient is placed in a beach chair position and the arm is draped. Create an entry site for access to the proximal humerus through a 10 mm standard deltopectoral incision made obliquely, in line with the deltopectoral interval. As an alternative, a deltoid-splitting incision may be made in a more longitudinal direction, starting at the level of the acromioclavicular joint and extending distally. This approach may be more cosmetic for the patient. More detail for each approach is offered in the next section.

Posterior Plate
(7001-02XXX)

Standard Plate
(7001-01XXX)

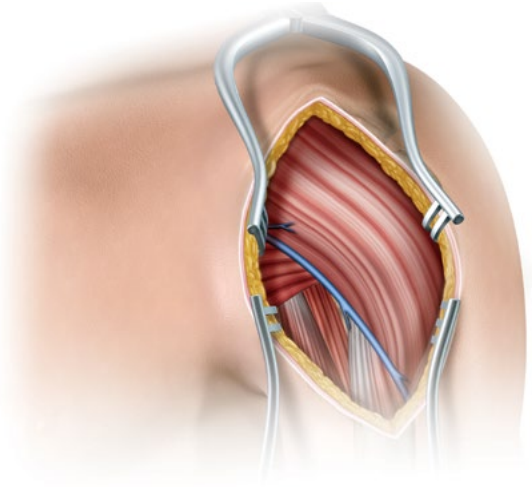
Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

3 Approach and Incision

Deltopectoral

Sharply dissect down to the level of the fascia and elevate the skin flaps. Identify the cephalic vein and develop the interval between the deltoid and the pectoralis. Retract the cephalic vein laterally and the pectoralis major medially. Release the fascia along the lateral border of the coracobrachialis and retract it medially to expose the proximal humerus with the subscapularis tendon attachment. To help facilitate reduction and improve fracture visualization, release the superior one-third of the pectoralis major from the shaft. It is important to place a finger underneath the pectoralis major as it is being released to protect the biceps tendon, which lies directly underneath.

Figure 4 Deltopectoral Approach



Deltoid Split

Either a bra strap (with reflection of a distally-based skin flap) incision or a direct lateral skin incision can be used. The deltoid is split and reflected off the acromion proximally. The axillary nerve is identified and carefully protected. The nerve is often located approximately 5.6 cm from the apex of the humeral head and 6.9 cm from the acromion.[1]

Two soft-tissue windows are created through the deltoid above and below the area where the axillary nerve passes. The upper window is used for fracture reduction, plate insertion and insertion of proximal screws into the plate. The lower window is used to ensure the plate is properly seated on the shaft of the humerus and to allow insertion of the distal screws.

Figure 5 Deltoid Split Approach

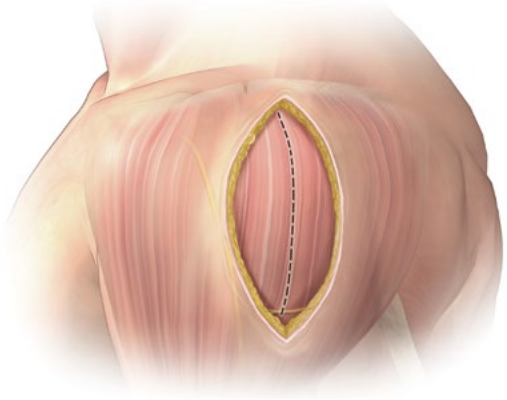
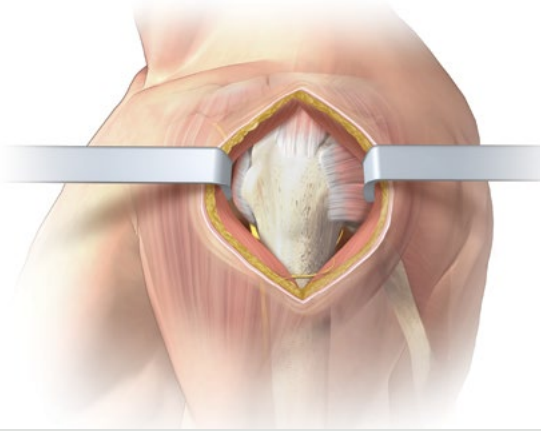


Figure 6 Deltoid Exposed



Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

Figure 7

4 Bone Reduction

The goals of bone reduction are:

1. Reduction of any subluxation or dislocation of the humeral head from the glenoid
2. Correction of any varus or valgus deformity of the humeral head
3. Restoration of the normal anatomic relationship between the head and tuberosities (if these are fractured)
4. Reduction of the humeral head to the shaft

The definitive fixation should aim to fix the humeral head to one or both tuberosities and to secure the humeral head to the shaft without residual subluxation or varus/valgus deformity. This may require a combination of screws separate from the plate, non-absorbable interosseous sutures, and locking plate fixation.

The Ball Spike Reduction Tool (80-1637) can aid in reducing a fracture in the proximal aspect of the humeral head.

Note: Radiolucent Carbon Fiber Retractors (80-1598 and 80-1599) are available to assist in reduction without obscuring radiographic visibility.

Ball Spike Reduction Tool
(80-1637)

Carbon Fiber Retractors
(80-1598 or 80-1599)

Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

5 Plate Selection

The Polarus 3 Proximal Humerus Plates are designed to fit an array of patient anatomies and are left and right specific. If the fracture involves the greater tuberosity, the Posterior Plate may be a good choice. If the fracture pattern includes a fracture line distal to the surgical neck, a variety of plate lengths are available. To assist with plate selection, the Polarus 3 Implant Sizer (80-1617) can be used under fluoroscopy. The sizer can be used externally or inserted against the periosteum.

Note: If plates longer than 10 holes (155 mm) are desired, optional plates of up to 22 holes (275 mm) may be requested from Acumed prior to surgery.

Plate Lengths

Standard	
4-hole	94 mm
6-hole	115 mm
10-hole	155 mm
14-hole*	195 mm
18-hole*	235 mm
22-hole*	275 mm
Posterior	
4-hole	94 mm
6-hole	115 mm

*Special-order, sterile-packed only

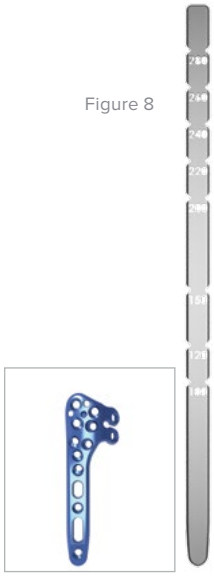


Figure 8

Figure 9

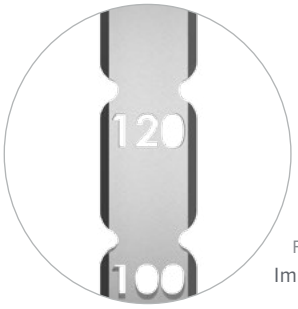


Figure 10
Implant Sizer

Polarus 3
Implant Sizer
(80-1617)

Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

Figure 11

Targeting guide assembly and posterior tab adjustment

Figure 12

6 Plate Placement and Reduction

Select the appropriate Polarus 3 Targeting Guide, Plate (Left: 80-1589 or Right: 80-1590) and secure to the plate's hole #8 (figures 11 and 18) with the Polarus 3 Plate Targeting Locking Bolt (80-1591).

If the Posterior Plate is selected, Polarus 3 Plate Drill Guides, Locking (80-1588) can adjust the angle of the posterior tabs prior to screw placement.

Caution: Do not bend tabs past 20 degrees and do not bend more than once.

Place the plate approximately 5 mm posterior to the bicipital groove and approximately 8–10 mm inferior from the tip of the greater tuberosity. The deltoid insertion may need to be partially recessed in order to position the plate in a sufficiently lateral position.[2] Confirm fracture reduction and plate height fluoroscopically. Provisionally secure one of the shaft's slots with a 3.5 mm Nonlocking Low-profile Hexalobe Screw (3025-350XX), Polarus 3 Plate Tack (80-1595), or Polarus 3 Reduction Device (80-1601).

Note: If the Polarus 3 Reduction Device is selected, the instrument should be used in the plate's longest slot to avoid blocking the surrounding screw holes. Do not fully seat the reduction device's threads under power. As the reduction device and the 4.3 mm Low-profile Hexalobe Screws (3011-430XX) have the same outer diameter, the screw can replace the reduction instrument without additional drilling.

Polarus 3 Targeting Guide, Plate
(Left: 80-1589 or Right: 80-1590)

Polarus 3 Plate Targeting Locking Bolt
(80-1591)

Polarus 3 Plate Drill Guides, Locking
(80-1588)

3.5 mm Nonlocking Low-profile Hexalobe Screws
(3025-350XX)

Polarus 3 Plate Tacks
(80-1595)

Polarus 3 Reduction Device
(80-1601)

Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

If a 3.5 mm nonlocking low-profile hexalobe screw is chosen, drill the center of one of the plate shaft's slots to allow for adjustment prior to definitive fixation. Use the Polarus 3 2.8 mm Short Drill (80-1592) and Polarus 3 Plate Drill Guide, Drop In (80-1587), referring to the drill guide's laser band to determine the appropriate screw length. Screw depth can also be measured with the Polarus 3 Depth Gauge (80-1776). Insert the 3.5 mm screw using the (short) T15 Stick-Fit Hexalobe Driver (80-0760).

Adjust the plate's position under fluoroscopy, using a guide wire as a reference point relative to the calcar. Position the 2.0 mm X 9" ST Guide Wire (WS-2009ST) through hole #6 (figures 13 and 14) using the Polarus 3 Guide Wire Guide (80-1600) and Polarus 3 plate drill guide, locking. Once the plate's proper positioning is confirmed, ensure the 3.5 mm screw is inserted in a bicortical fashion.

Suture holes are available to secure tuberosities to the plate with the appropriately sized suture. The posterior plate's tabs can be used as suture holes.

Screw	Application
3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX)	Any hole in the plates
4.3 mm Low-profile Hexalobe Screws (3011-430XX)	Any hole in the plates

Warning: Use only the 3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX) included in the Polarus 3 system. Use of a **non-Polarus 3** 3.5 mm screw, from a different Acumed or competitor's system, risks it passing through the Polarus 3 plate. The head of the Polarus 3 3.5 mm screw has the same diameter as the 4.3 mm screw, which is larger than a traditional 3.5 mm screw.

Note: Suture holes are available to secure tuberosities to the plate with the appropriately sized suture. The targeting guide contains a suture cleat that can be used to temporarily maintain tension on the suture. This should be used with care to avoid damaging the suture's integrity.

Figure 13

Figure 14

Polarus 3 2.8 mm Short Drill
(80-1592)

Polarus 3 Plate Drill Guide, Drop In
(80-1587)

Polarus 3 Depth Gauge
(80-1776)

T15 Stick-Fit Hexalobe Driver
(80-0760)

2.0 mm X 9" ST Guide Wire
(WS-2009ST)

Polarus 3 Guide Wire Guide
(80-1600)

4.3 mm Low-profile Hexalobe Screws
(3011-430XX)

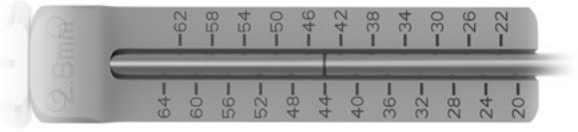
Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

Figure 15

Blunt Drill

Sharp Drill

Figure 16



Depth gauge

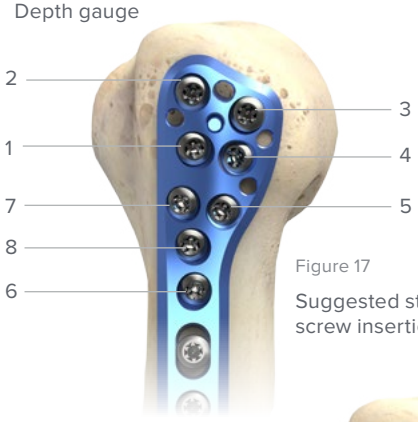


Figure 17

Suggested standard plate screw insertion order

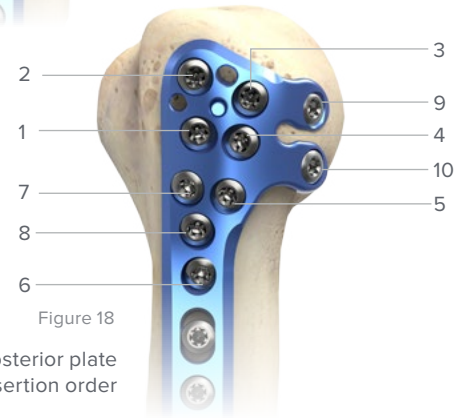


Figure 18

Suggested posterior plate screw insertion order

7 Screw Preparation—Humeral Head

Standard or Posterior Plate

The Polarus 3 Plate Drill Guide, Drop In (80-1587) or Polarus 3 Plate Drill Guide, Locking (80-1588) is used with the selected drill (Figure 15). The drop-in drill guide allows for measuring without a traditional depth gauge. Ensure this instrument is fully seated in the Targeting Guide, Plate (Left: 80-1589 or Right: 80-1590), for accurate measurement. Place gentle tactile pressure on the drill guide to minimize any toggle in the targeting guide. The Polarus 3 Depth Gauge (80-1776) is used in conjunction with the locking drill guide.

Insert the appropriate length 4.3 mm Low-profile Hexalobe Screw (3011-430XX) or 3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX) screw using the (short) T15 Stick Fit Hexalobe Driver (80-0760) and verify placement with fluoroscopy throughout the procedure. Screw tips should remain 5 to 10 mm from the subchondral bone.[3] The 4.3 mm screw functions as a locking screw. A 3.5 mm screw can be used to reduce the plate to the bone. Proceed with drilling and filling the appropriate screws, with the exception of hole #8 (see Figure 18 and Caution below.) Remove sutures from the targeting guide, then remove the targeting guide from the plate. Secure sutures to the plate by passing through the respective suture holes.

Caution:

1. Hole #8 should be the final screw addressed, as the locking bolt and targeting guide must be removed to insert a screw.
2. Inserting 4.3 mm screws longer than 26 mm in the posterior tab holes will deflect or interfere with adjacent screws. This may cause damage to the implant or instrumentation. The risk of interference progressively increases when the tabs are bent.

Note: Replacing a 3.5 mm nonlocking low-profile hexalobe screw with a 4.3 mm low-profile hexalobe screw in the head is recommended to prevent screw loosening.

Polarus 3 Plate Drill Guide, Drop In (80-1587)

Polarus 3 Plate Drill Guide, Locking (80-1588)

Polarus 3 Targeting Guide, Plate (Left: 80-1589 or Right: 80-1590)

3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX)

4.3 mm Low-profile Hexalobe Screw (3011-430XX)

Polarus 3 Depth Gauge (80-1776)

T15 Stick Fit Hexalobe Driver (80-0760)

Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

8 Additional Shaft Screw Insertion

For the remaining shaft holes, insert 3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX) or 4.3 mm Low-profile Hexalobe Screws (3011-430XX). If the 4.3 mm low-profile hexalobe screw is selected, the Polarus 3 Plate Drill Guide, Locking (80-1588) must be used when drilling the round locking holes.

Note:

1. Take care to remove any burrs that may have formed during screw insertion.
2. If dense bone is encountered when implanting 4.3 mm low-profile hexalobe screws, a Polarus 3 4.3 mm Screw Tap (80-1623) and Polarus 3 Tap Sleeve (80-1593) are available.
3. 3.5 mm screws can be inserted at a maximum angle of 20 degrees in the shaft holes or slots.

Figure 19

4.3 mm Low-profile Hexalobe Screw (3011-430XX)

Polarus 3 Plate Drill Guide, Locking (80-1588)

Polarus 3 4.3 mm Screw Tap (80-2623)

Polarus 3 Tap Sleeve (80-1593)

Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

Figure 20

9 Soft-Tissue Closure

Layered closure is performed using heavy absorbable sutures. In the deltoid-splitting approach, meticulous repair of the deltoid split is important to avoid deltoid dehiscence. Direct transosseous suturing of the deltoid to the acromion is recommended. Close the wound in layers with a subcuticular stitch.

Proximal Humerus: Standard and Posterior Plate
Surgical Technique [continued]

10 Postoperative Protocol

Note: The following protocol may be replaced with an alternative protocol at the surgeon's discretion.

Passive range of motion exercises are initiated for the first 4 weeks, then active assisted for 2 weeks. Active range of motion and strengthening are started at approximately 6 weeks postoperatively. Clinical and radiological monitoring should continue until a satisfactory functional outcome and fracture union have been achieved.

11 Implant Removal

If removal of the implant is desired, prepare the exposure as in Step 3. Locate the screws and remove them with the T15 Stick-Fit Hexalobe Driver (80-0760), then remove the plate. If Acumed drivers are unavailable, the hexalobe screws may be removed with a T15 hexalobe connection. The Acumed Screw Removal System can also assist with removal.

T15 Stick-Fit Hexalobe Driver
(80-0760)

Proximal Nail Surgical Technique

1 Preoperative Planning

Fluoroscopy should be used in all cases. Polarus 3 Nail X-ray Templates (90-0038) are available and should be used preoperatively to aid in implant selection. The proximal nails are left and right specific.

Figure 1

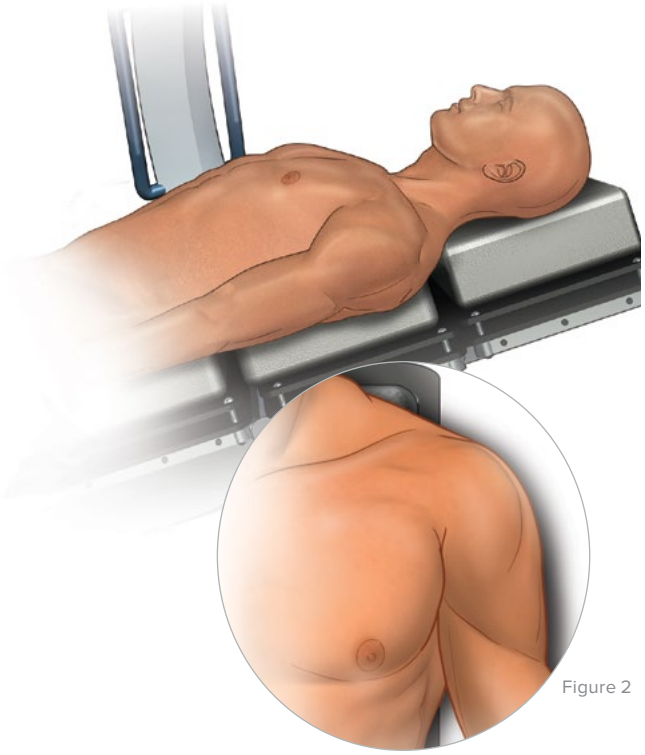


Figure 2

2 Patient Positioning and Surgical Exposure

The patient may be placed either supine or in a beach chair position so that fluoroscopy can be used to allow intraoperative assessments of fracture reduction, implant insertion, and a thorough evaluation of the final implant position. A radiolucent table is recommended to facilitate fluoroscopy. Position the shoulder off the edge of the table or, alternatively, a bolster can be placed beneath the scapula to elevate the shoulder.

For an anterolateral approach, a 3–5 cm incision is made at the anterolateral aspect of the acromion extending parallel to the fibers of the deltoid. The supraspinatus tendon is then split in the direction of the fibers to expose the proximal humerus posterior to the biceps tendon. It is important not to detach the insertion of the tendon. A Rotator Cuff Retractor (80-1822) is available to assist with exposure.

Rotator Cuff Retractor, 6 x 4 mm
(80-1822)

Proximal Nail Surgical Technique [continued]

3 Fracture Reduction

The goals of fracture reduction are:

1. Reduction of any subluxation or dislocation of the humeral head from the glenoid
2. Correction of any varus or valgus deformity of the humeral head
3. Restoration of the normal anatomic relationship between the head and tuberosities (if these are fractured)
4. Reduction of the humeral head to the shaft

The definitive fixation should aim to fix the humeral head to one or both tuberosities and to secure the humeral head to the shaft without residual subluxation or varus/valgus deformity. This may require a combination of screws separate from the nail, nonabsorbable interosseous sutures, and locking nail fixation.

Figure 3

Proximal Nail Surgical Technique [continued]

Figure 4

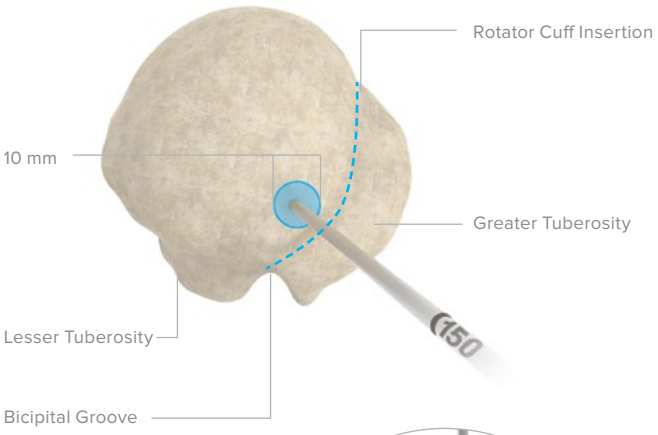


Figure 5

Figure 6

4 Guide Wire Insertion

Insert the Polarus 3 Guide Wire, 20" Trocar Tip (35-0009) approximately 10 mm posterior to the bicipital groove, medial to the greater tuberosity, at the musculotendinous junction. Advance the Guide Wire into the proximal diaphyseal region. Next, ensure the Guide Wire is centered in the medullary canal using fluoroscopy in multiple planes.

Note:

1. A “T” Handle (80-1734) for use with the Polarus 3 Guide Wire, 20" Trocar Tip is available. Assemble the “T” Handle and the Polarus 3 Locking Knob (80-1633) onto the Guide Wire (Figure 6).
2. A 2.8 mm drill can also be used to perforate the cortex to pass the Polarus 3 Guide Wire, 20" Trocar Tip or 20" Blunt (35-0008), down the canal.

Polarus 3 Guide Wire, 20" Trocar Tip (35-0009)

Polarus 3 Guide Wire “T” Handle (80-1734)

Polarus 3 Locking Knob (80-1633)

Polarus 3 Guide Wire, 20" Blunt (35-0008)

Proximal Nail Surgical Technique [continued]

5 Canal Preparation

There are three options available:

1. Polarus 3 Cannulated Awl (80-1551). Insert over the guide wire to the groove's depth, 50 mm from tip (Figure 7).
2. 10 mm Bud Drill (DRB1015). Insert over the guide wire to the first groove's depth, 50 mm from tip (Figure 8).
3. Polarus 3 Cannulated Broach (80-1553). Insert over the guide wire to the level of the last cutting tooth. The lateral side of the broach is designated by the direction of the broach handle.

Figure 7

Figure 8

6 Targeting Guide Assembly

1. Attach the Polarus 3 Nail Targeting Connector (80-1629) to the appropriate Proximal Targeting Guide (Left: 80-1626 or Right: 80-1627), securing with a Locking Knob (80-1633).
2. Insert the Polarus 3 Nail Targeting Locking Bolt (80-1625) through the barrel of the targeting connector.

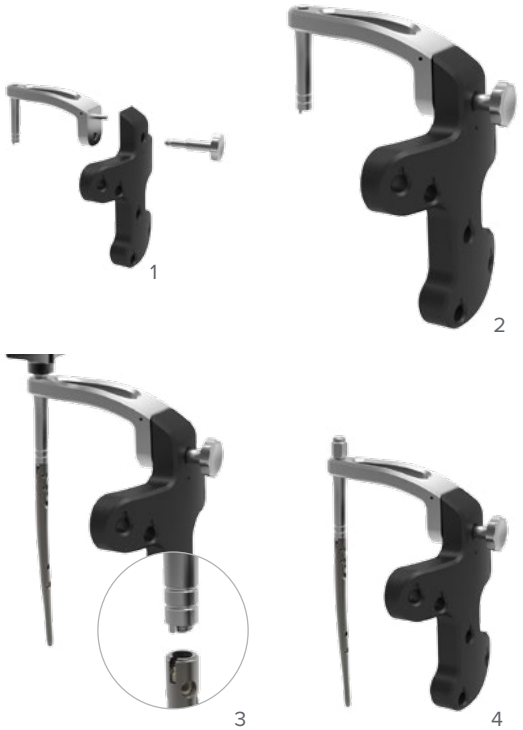
Note: When removing implant from sterile packaging, take care not to disengage the polyether ether ketone (PEEK) insert from the head of the nail. The insert should be visible through the slot in the nail prior to insertion.

3. Assemble implant onto the targeting connector, aligning the reference marks on the implant and targeting connector.

Note: The slot on the implant is offset to prevent misalignment.

4. Firmly tighten the locking bolt into position with the provided Locking Bolt Finger Wrench (MS-0611). When assembled properly, the nail should curve toward the targeting guide.

Figure 9



Polarus 3 Cannulated Awl (80-1551)

10 mm Bud Drill (DRB1015)

Polarus 3 Cannulated Broach (80-1553)

Polarus 3 Nail Targeting Connector (80-1629)

Proximal Targeting Guide (80-162X)

Locking Knob (80-1633)

Polarus 3 Nail Targeting Locking Bolt (80-1625)

Locking Bolt Finger Wrench (MS-0611)

Proximal Nail Surgical Technique [continued]

Figure 10

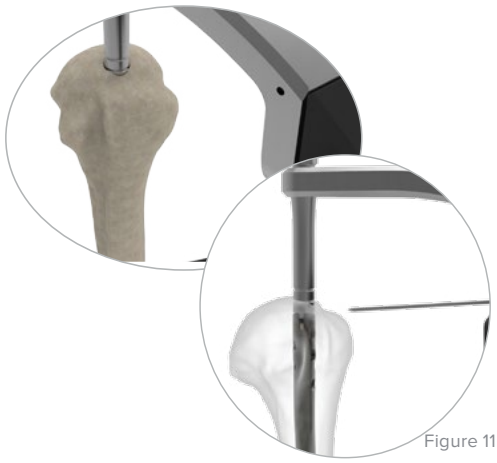


Figure 11

Figure 12

Figure 13

Figure 14

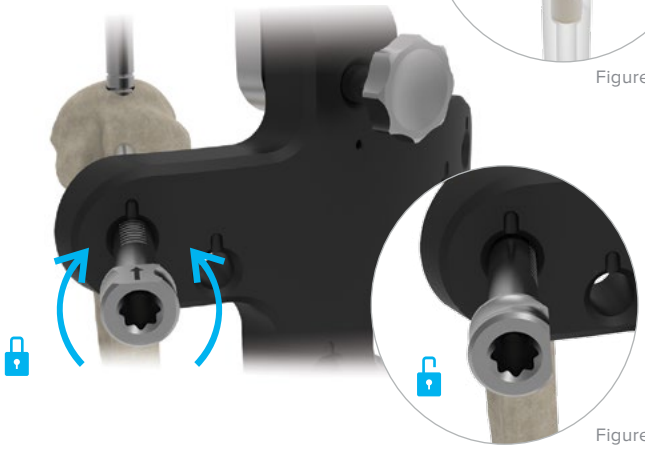


Figure 15

7 Implant Insertion

Insert the appropriate left or right nail over the guide wire until the proximal end is 5 mm to 10 mm below the surface to avoid impingement. The targeting connector's distal etched mark on the barrel represents 5 mm below the surface and the proximal etched mark represents 10 mm below the surface (Figure 10).

The depth of the nail may also be verified by inserting a 2.0 mm Guide Wire (WS-2009ST) through the small hole located below the knob on the targeting guide. Under fluoroscopy, the wire will point to the top of the nail.

Caution: Remove the guide wire prior to drilling.

Warning: To avoid injury to the axillary nerve, do not insert the nail more than 10 mm deep relative to the surface.

Nail	Application
4.3 mm Low-profile Hexalobe Screws (3011-430XX)	Proximal portion of nail
3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX)	Distal portion of nail

Warning: Do not use 3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX) in the proximal portion of the nail. There is significant risk of these backing out.

8 Proximal Screw Placement

Implant the anterior-oblique screw first (Figure 13) to ensure it sits posterior to the bicipital groove. The remaining screws' orientation will be based on the first screw's placement.

Following a stab incision, place the Polarus 3 Targeting Awl (80-1620) in the Polarus 3 Cannula, Ratcheting (80-1619) and proceed to insert through the Proximal Targeting Guide (80-162X), making a small indent in the bone for targeting accuracy. The Multiple Contact Hammer (80-1538) is available for light tapping on the awl. The ratcheting cannula locks when the arrow and flat edge are facing up (Figure 13). The instrument can assist with the fracture's reduction. The ratcheting cannula is unlocked by rotating a quarter-turn left or right.

Guide Wire
(WS-2009ST)

4.3 mm Low-profile Hexalobe Screws
(3011-430XX)

Polarus 3 Cannula, Ratcheting
(80-1619)

Polarus 3 Targeting Awl
(80-1620)

Proximal Targeting Guide
(80-162X)

Multiple Contact Hammer
(80-1538)

Proximal Nail Surgical Technique [continued]

Next, remove the awl and fully insert the Polarus 3 Drill Guide, Nail (80-1621) in the cannula (Figure 17). Proceed to drill with the Polarus 3 2.8 mm Long Drill (Sharp: 80-1624 or Blunt: 80-1634).

Important: Measure by referencing the drill guide's laser band (Figure 18), subtracting by one size.

Insert the appropriate 4.3 mm low-profile hexalobe screw (3011-430XX) using the Polarus 3 Long T15 Hexalobe Driver (80-1618). When the screw is appropriately measured, the screw head is fully seated when the groove on the driver's shaft aligns with the end of the cannula. Screw tips should remain 5 to 10 mm from the subchondral bone.[3] Repeat these steps to insert the remaining proximal screws, using fluoroscopy, throughout the procedure.

Warning:

1. Use only 4.3 mm low-profile hexalobe screws in the proximal portion of the nail. Do not use 3.5 mm nonlocking low-profile hexalobe screws, as there is significant risk of these backing out.
2. Use fluoroscopy, in multiple views, to verify the screws remain in the humeral head.

Note:

1. The Polarus 3 Washer Cannula (80-1792) is used to insert a Polarus 3 8 mm Washer, Locking (7001-03001-S). The Washer Cannula is not ratcheting.
2. The blunt drill is available to help avoid perforation of the humeral head.
3. The insertion torque of the screw into the nail may increase as the screw engages the proximal PEEK insert of the nail. This resistance will lock the screw into position.
4. Small burrs may form during screw insertion into PEEK, but these should remain contained inside the nail.

Figure 16

Figure 17

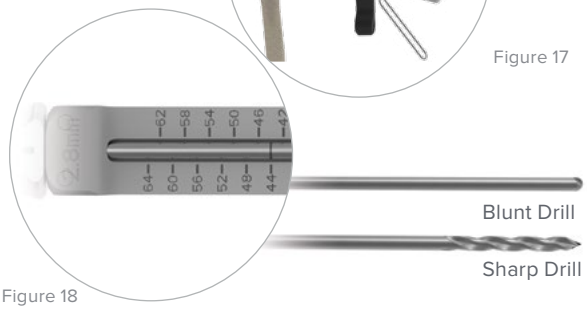
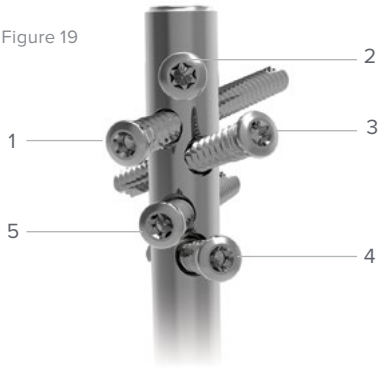


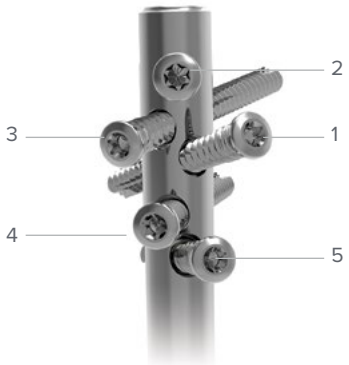
Figure 18

Figure 19



4.3 mm low-profile hexalobe screw insertion order (left shoulder shown)

Figure 20



4.3 mm low-profile hexalobe screw insertion order (right shoulder shown)

Polarus 3 Drill Guide, Nail
(80-1621)

Polarus 3 2.8 mm Long Drill
(Sharp: 80-1624 or Blunt: 80-1634)

Polarus 3 Long T15 Hexalobe Driver
(80-1618)

Polarus 3 8 mm Washer, Locking
(7001-03001-S)

Polarus 3 Washer Cannula
(80-1792)

Proximal Nail Surgical Technique [continued]

9 Targeting Distal Screws

Ensure the arm is in neutral rotation. Following a stab incision for the proximal of the two distal holes, place the Polarus 3 Targeting Awl (80-1620) in the Polarus 3 Cannula, Ratcheting (80-1619) and proceed to insert through the Proximal Targeting Guide, making a small indent in the bone for targeting accuracy. Remove the awl and fully insert the Polarus 3 Drill Guide, Nail (80-1621) in the cannula. Proceed to drill with the Polarus 3 2.8 mm Long Drill (Sharp: 80-1624) and measure accordingly. Insert a 3.5 mm Nonlocking Hexalobe Screw (3025-350XX) in a bicortical fashion, using the Polarus 3 Long T15 Hexalobe Driver (80-1618). Repeat the same steps for the distal of the two screws.

Note: The distal holes are angled relative to each other by 15 degrees to provide multiplanar fixation.

Polarus 3 Nail Targeting Connector
(80-1629)

Polarus 3 Targeting Awl
(80-1620)

Polarus 3 Cannula, Ratcheting
(80-1619)

Polarus 3 Drill Guide, Nail
(80-1621)

Polarus 3 2.8 mm Long Drill
(Sharp: 80-1624)

3.5 mm Nonlocking Hexalobe Screw
(3025-350XX)

Polarus 3 Long T15 Hexalobe Driver
(80-1618)

Proximal Nail Surgical Technique [continued]

10 Cap Screw Insertion

Cap Screws (4004-1000X-S) are available to use at the surgeons' discretion. Place the cap screw (0, 2, 4, or 6 mm) onto the Polarus 3 Cap Screw Driver (80-1635) and thread into the top of the nail. Advance until fully seated. Do not over-torque. The 0 mm cap screw will be fully seated in the nail when properly inserted.

Warning: Never leave the construct proud.

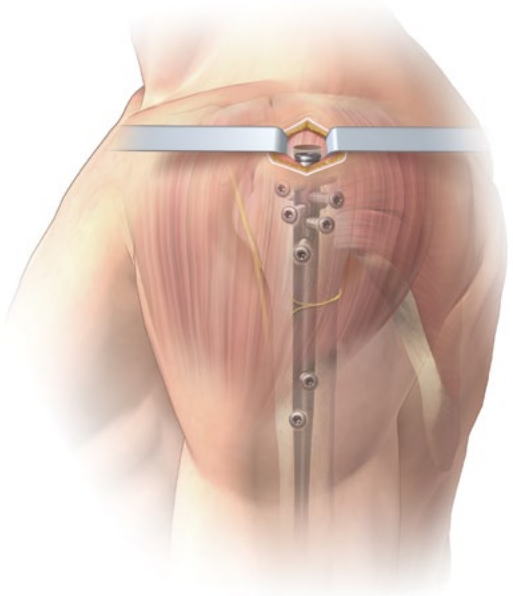
Note: A cap screw is not required to lock the proximal screws due to the fact the PEEK insert allows for locking screw friction.

Figure 21

11 Rotator Cuff Repair

It is important to close the rotator cuff after insertion of the nail. A permanent suture such as Number 2 Ethibond may be utilized to close the rotator cuff. Generally, two figure-eight sutures are used to close the small longitudinal incision of the rotator cuff. After this the deltoid is closed. The wound is then closed in layers with the deltoid closed with Number One Vicryl or similar absorbable suture and the skin is closed in standard fashion.

Figure 22



Cap Screw
(4004-1000X-S)

Polarus 3 Cap Screw Driver
(80-1635)

Proximal Nail Surgical Technique [continued]

12 Postoperative Protocol

Note: The following protocol may be replaced with an alternative protocol at performing surgeon's discretion.

Postoperatively, the patient is placed in an arm sling and a pain pump may be placed in the subacromial space to help with postoperative pain relief. The patient is started on pendulum motion exercises at 1 to 2 weeks, a passive motion program for 2 to 6 weeks, and active strengthening at 6 weeks when evident signs of healing are seen.

Figure 23

Figure 24

13 Implant Removal

Warning: The Polarus 3 Removal Instrument (80-1546) **is specific (only) to the Polarus 3 nailing system.**

Remove only the proximal screws with the Polarus 3 Long T15 Hexalobe Driver (80-1618). Next, if a cap screw was implanted, remove using the Polarus 3 Cap Screw Driver (80-1635). Thread the Polarus 3 Removal Instrument (80-1546) four degrees laterally into the nail to accommodate the curvature. The instrument's cutting flutes help remove soft tissue. Remove the distal screws with the same driver. Following the removal of all screws, back-slap the removal instrument with the Multiple Contact Hammer (80-1538).

Warning: Remove all screws before attempting to remove the nail.

Polarus 3 Removal Instrument
(80-1546)

Polarus 3 Long T15 Hexalobe Driver
(80-1618)

Polarus 3 Cap Screw Driver
(80-1635)

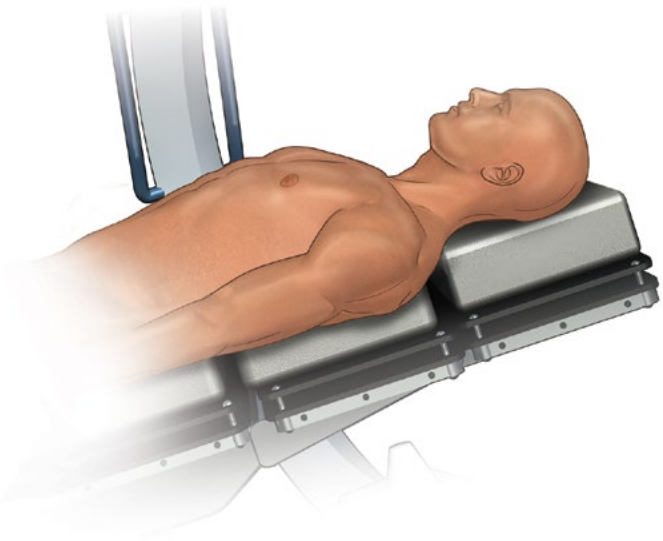
Multiple Contact Hammer
(80-1538)

Long Nail Surgical Technique

1 Preoperative Planning

Fluoroscopy should be used in all cases. Polarus 3 Nail X-ray Templates (90-0038) are available and should be used preoperatively to aid in implant selection. Select a nail that extends the appropriate length past the fracture. The Polarus 3 Long Nails (200–280 mm) are not left or right specific.

Figure 1



2 Patient Positioning, Surgical Exposure, and Nail Length Assessment

The patient may be placed either supine or in a beach chair position so that fluoroscopy can be used to allow intraoperative assessments of fracture reduction, implant insertion, and a thorough evaluation of the final implant position. A radiolucent table is recommended to facilitate fluoroscopy. Position the shoulder off the edge of the table or, alternatively, a bolster can be placed beneath the scapula to elevate the shoulder. The Polarus 3 Implant Sizer (80-1617) is available to determine the appropriate nail. The depth markings on the Polarus 3 Guide Wire, 20" Trocar Tip (35-0009) or 20" Blunt (35-0008) are also available to assess the appropriate length.

For an anterolateral approach, a 3–5 cm incision is made at the anterolateral aspect of the acromion extending parallel to the fibers of the deltoid. The supraspinatus tendon is then split in the direction of the fibers to expose the proximal humerus posterior to the biceps tendon. It is important not to detach the insertion of the tendon. A Rotator Cuff Retractor (80-1822) is available to assist with exposure.

Figure 2

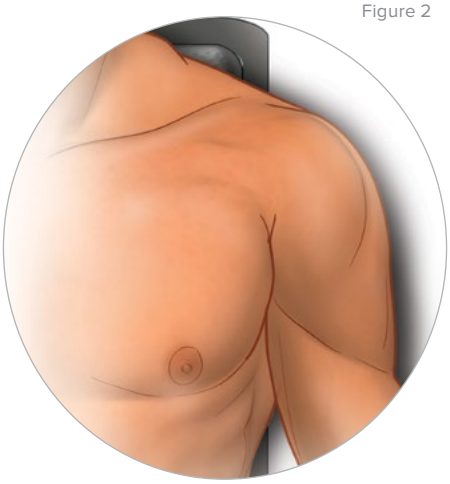


Figure 3

Polarus 3 Long Nails
(4001-1015x))

Polarus 3 Implant Sizer
(80-1617)

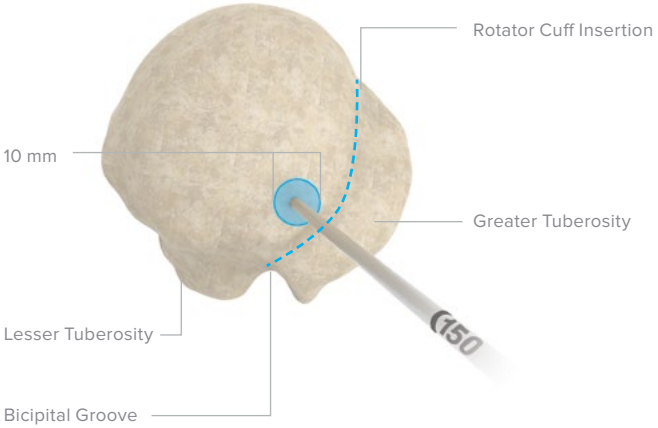
Polarus 3 Guide Wire, 20" Trocar or Blunt Tip
(35-000X)

Rotator Cuff Retractor
(80-1822)

Long Nail Surgical Technique [continued]

Figure 4

Figure 5



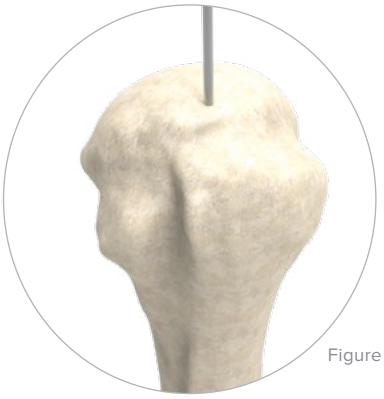


Figure 6

3 Guide Wire Insertion

Insert the Polarus 3 Guide Wire, 20" Trocar Tip (35-0009) approximately 10 mm posterior to the bicipital groove, medial to the greater tuberosity, at the musculotendinous junction. Advance the Guide Wire into the proximal diaphyseal region. Next, ensure the Guide Wire is centered in the medullary canal using fluoroscopy in multiple planes.

Note:

1. A “T” Handle (80-1734) for use with the Polarus 3 Guide Wire, 20" Trocar Tip is available. Assemble the “T” Handle and the Polarus 3 Locking Knob (80-1633) onto the Guide Wire (Figure 6).
2. A 2.8 mm drill can also be used to perforate the cortex to pass the Polarus 3 Guide Wire, 20" Trocar Tip, or 20" Blunt (35-0008) down the canal.

Polarus 3 Guide Wire, 20" Trocar Tip (35-0009)

Polarus 3 Guide Wire “T” Handle (80-1734)

Polarus 3 Locking Knob (80-1633)

Polarus 3 Guide Wire, 20" Blunt (35-0008)

Long Nail Surgical Technique [continued]

4 Canal Preparation

There are three options available:

1. Polarus 3 Cannulated Awl (80-1551). Insert over the guide wire to the groove's depth, 50 mm from tip (Figure 7).
2. 10 mm Bud Drill (DRB1015). Insert over the guide wire to the first groove's depth, 50 mm from tip (Figure 8).
3. Polarus 3 Cannulated Broach (80-1553). Insert over the guide wire to the level of the last cutting tooth. The lateral side of the broach is designated by the direction of the broach handle.

After preparing the proximal portion of the canal, advance the Guide Wire past the fracture. The Polarus 3 Guide Wire Passer (80-1555) is available to aid with passing the guide wire past the fracture. Next, ensure the Guide Wire is centered in the medullary canal using fluoroscopy in the multiple planes. Before inserting the 200 to 280 mm length nails, ensure the canal can accommodate the 8 mm distal diameter by preparing the canal with the 8 mm Flexible Reamer (80-1925), followed by the 9 mm Flexible Reamer (80-1926).

Figure 7

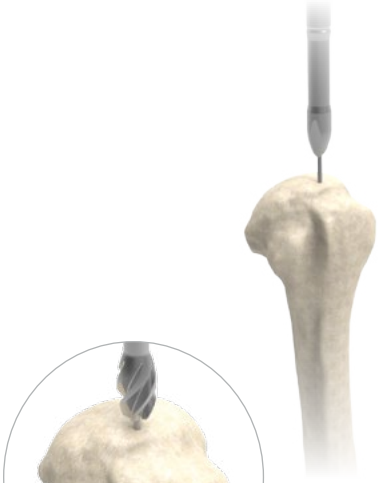


Figure 8

Pushing the reamer across the fracture site can help protect the radial nerve from the instrument and thermal injury.[4] Isolating the radial nerve through a small, separate incision and allowing for direct visualization during canal reaming should be considered.[4]

Warning: Not preparing the canal, relative to the nail's length and diameter, can result in undue resistance when inserting the nail.[4] Note that meticulous technique should be used, as canal reaming weakens the humerus and does not prevent deformity from off-axis entry sites.[4]

Figure 9

5 Targeting Guide Assembly

Attach the Polarus 3 Nail Targeting Connector (80-1629) to the Polarus 3 Proximal Targeting Guide (80-1628), securing with a Polarus 3 Locking Knob (80-1633). Insert the Locking Bolt (80-1625) through the barrel of the Targeting Connector.

Note: When removing implant from sterile packaging, take care not to disengage the polyether ether ketone (PEEK) insert from the head of the nail.

Make sure the internal PEEK sleeve is still fully seated in the head of the nail prior to attaching the targeting guide. Assemble implant onto the targeting connector, aligning the reference mark on the implant and targeting connector. Firmly tighten the locking bolt into position with the provided Locking Bolt Finger Wrench (MS-0611).

Note: The slot on the implant is offset to prevent misalignment. When assembled properly, the nail will curve toward the targeting guide.

Polarus 3 Cannulated Awl (80-1551)

10 mm Bud Drill (DRB1015)

Polarus 3 Cannulated Broach (80-1553)

Polarus 3 Guide Wire Passer (80-1555)

Flexible Reamer (80-1925 or 80-1926)

Polarus 3 Nail Targeting Connector (80-1629)

Proximal Targeting Guide (80-1628)

Locking Knob (80-1633)

Polarus 3 Nail Targeting Locking Bolt (80-1625)

Locking Bolt Finger Wrench (MS-0611)

Long Nail Surgical Technique [continued]

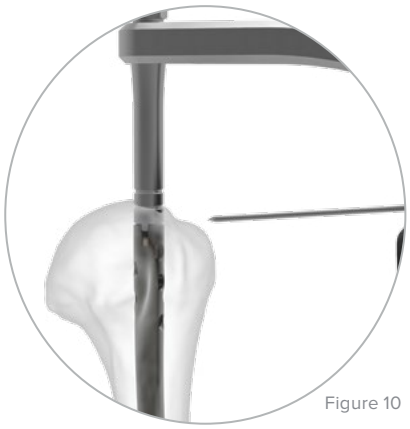


Figure 10

6 Implant Insertion

Insert the appropriate 200 to 280 mm length nail, over the guide wire, until the proximal end is 5 mm to 10 mm below the surface to avoid impingement and accommodate for back slapping of the fracture in Step 8 if compression is desired.

The targeting connector's distal etched mark on the barrel represents 5 mm below the surface and the proximal etched mark represents 10 mm below the surface (Figure 9). The depth of the nail may also be verified by inserting a 2.0 mm Guide Wire (WS-2009ST) through the small hole located below the knob on the targeting guide. Under fluoroscopy, the wire will point to the top of the nail.

Caution: Remove the guide wire prior to drilling.

Warning: To avoid injury to the axillary nerve, do not insert the nail more than 10 mm deep relative to the surface.

Nail	Application
4.3 mm Low-profile Hexalobe Screws (3011-430XX)	Proximal portion of nail
3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX)	Distal portion of nail

Warning: Do not use 3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX) in the proximal portion of the nail. There is significant risk of these backing out.

Figure 11

Figure 12

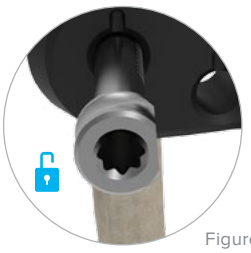


Figure 13

7 Proximal Screw Placement

Implant the anterior-oblique screw first (Figure 11) to ensure it sits posterior to the bicipital groove. The remaining screws' orientation will be based on the first screw's placement.

Following a stab incision, place the Polarus 3 Targeting Awl (80-1620) in the Polarus 3 Cannula, Ratcheting (80-1619) and proceed to insert through the Proximal Targeting Guide (80-1628), making a small indent in the bone for targeting accuracy. The Multiple Contact Hammer (80-1538) is available for light tapping on the awl. The ratcheting cannula locks when the arrow and flat edge are facing up (Figure 11). The instrument can assist with the fracture's reduction. The ratcheting cannula is unlocked by rotating a quarter-turn left or right.

2.0 mm Guide Wire (WS-2009ST)

4.3 mm Low-profile Hexalobe Screws (3011-430XX)

3.5 mm Nonlocking Hexalobe Screw (3025-350XX)

Polarus 3 Targeting Awl (80-1620)

Polarus 3 Cannula, Ratcheting (80-1619)

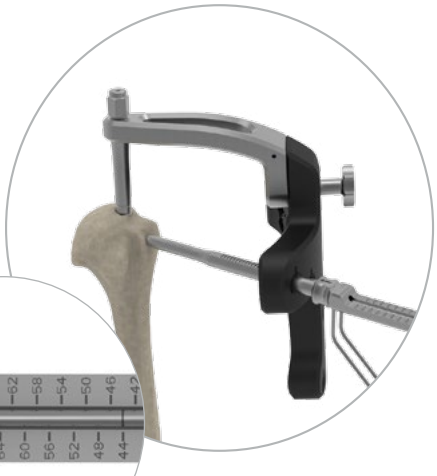
Proximal Targeting Guide (80-1628)

Multiple Contact Hammer (80-1538)

Long Nail Surgical Technique [continued]

Remove the awl and and fully insert the Polarus 3 Drill Guide, Nail (80-1621) in the cannula (Figure 14). Proceed to drill with the Polarus 3 2.8 mm Long Drill (Sharp: 80-1624 or Blunt: 80-1634). Measure by referencing the drill guide's laser band (Figure 15), subtracting by one size.

Figure 14



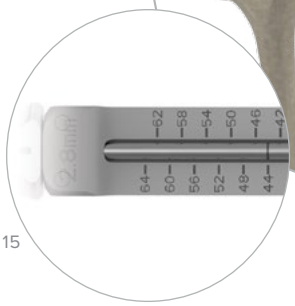


Figure 15

Insert the appropriate 4.3 mm Low-profile Hexalobe Screws (3011-430XX) using the Polarus 3 Long T15 Hexalobe Driver (80-1618). When the screw is appropriately measured, the screw head is fully seated with the bone when the groove on the driver's shaft aligns with the end of the cannula. Screw tips should remain 5 to 10 mm from the subchondral bone.[3] Repeat these steps to install the remaining proximal screws, using fluoroscopy throughout the procedure.

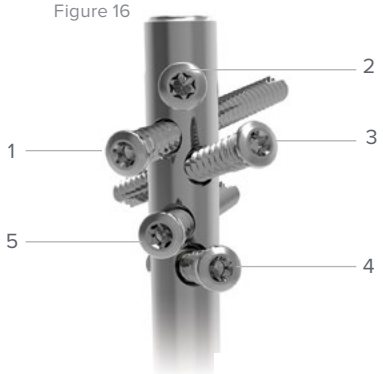
Warning:

1. Use only 4.3 mm low-profile hexalobe screws in the proximal portion of the nail. Do not use 3.5 mm nonlocking low-profile hexalobe screws, as there is significant risk of these backing out.
2. Use fluoroscopy, in multiple views, to verify the screws remain in the humeral head.

Note:

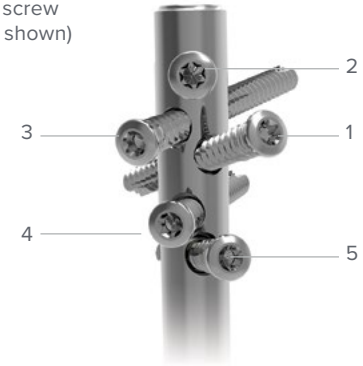
1. The Polarus 3 Washer Cannula (80-1792) is used to insert a Polarus 3 8 mm Washer, Locking (7001-03001-S). The Washer Cannula is not ratcheting.
2. The blunt drill is available to help avoid perforation of the humeral head.
3. The insertion torque of the screw into the nail may increase as the screw engages the proximal PEEK insert of the nail. This resistance will lock the screw into position.
4. Small burrs may form during screw insertion into PEEK, but these should remain contained inside the nail.

Figure 16



4.3 mm low-profile hexalobe screw insertion order (left shoulder shown)

Figure 17



4.3 mm low-profile hexalobe screw insertion order (right shoulder shown)

Polarus 3 Drill Guide, Nail
(80-1621)

Polarus 3 2.8 mm Long Drill
(Sharp: 80-1624 or Blunt: 80-1634

4.3 mm Low-profile Hexalobe Screws
(3011-430XX)

Polarus 3 Long T15 Hexalobe Driver
(80-1618)

Polarus 3 Washer Cannula
(80-1792)

Polarus 3 8 mm Washer, Locking
(7001-03001-S)

Long Nail Surgical Technique [continued]

Figure 18

A/P plane

Figure 19

M/L plane

8 Freehand Targeting and Insertion of the Distal Screws

The freehand (perfect circle) technique is used to insert the 3.5 mm Nonlocking Low-profile Hexalobe Screws (3025-350XX) in the A/P or M/L holes.

Ensure the arm is in neutral rotation. If desired, back-slap the extremity to achieve cortical contact and apply compression at the fracture site. Remain aware of the proximal portion of the nail relative to the surface.[5] Next, identify the proximal portion of the distal slot. Carefully dissect, enlisting a mini-open or limited open approach to help identify and prevent damage to the radial nerve.[5]

Using fluoroscopy liberally, proceed with tapping the bone, using the Freehand Targeting Guide (MS-0210) to create a starting dimple prior to drilling. This helps prevent “skiving” of the drill. Next, using the Polarus 3 Plate Drill Guide, Drop In (80-1587), insert the 2.8 mm Short Drill (80-1592) through the first cortex. Verify in multiple views the drill is appropriately placed. Following verification, manually push the drill to the far cortex. Then proceed to drill the far cortex. Assess the appropriate screw length using the drill’s laser band and reading off the drill guide’s markings.

Important: When measuring with the Polarus 3 Plate Drill Guide, Drop In (80-1587), subtract one size from the length measured.

Screw depth can also be measured with the Polarus 3 Depth Gauge (80-1776). Using the T15 Stick Fit Hexalobe Driver (80-0760), insert a 3.5 mm nonlocking screw in a bicortical fashion, using fluoroscopy in multiple views to ensure proper placement. Proceed to implant additional screws per the surgeon’s discretion.

3.5 mm Nonlocking Hexalobe Screw
(3025-350XX)

Freehand Targeting Guide
(MS-0210)

Polarus 3 Plate Drill Guide, Drop In
(80-1587)

Polarus 3 2.8 mm Short Drill
(80-1592)

Polarus 3 Depth Gauge
(80-1776)

T15 Stick Fit Hexalobe Driver
(80-0760)

Long Nail Surgical Technique [continued]

9 Cap Screw Insertion

Cap Screws (4004-1000X-S) are available to use at the surgeons' discretion. Place the cap screw (0, 2, 4, or 6 mm) onto the Polarus 3 Cap Screw Driver (80-1635) and thread into the top of the nail. Advance until fully seated. Do not over-torque. The 0 mm cap screw will be fully seated in the nail when properly inserted.

Warning: Never leave the construct proud.

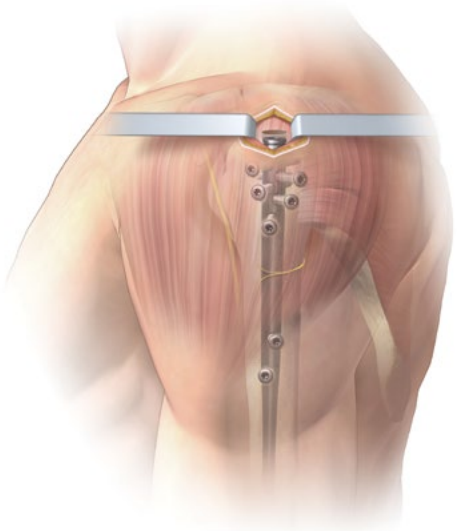
Note: A cap screw is not required to lock the proximal screws due to the fact the PEEK insert allows for locking screw friction.

Figure 20

10 Rotator Cuff Repair

It is important to close the rotator cuff after insertion of the nail. A permanent suture such as Number 2 Ethibond may be utilized to close the rotator cuff. Generally, two figure-eight sutures are used to close the small longitudinal incision of the rotator cuff. After this the deltoid is closed. The wound is then closed in layers with the deltoid closed with Number One Vicryl or similar absorbable suture and the skin is closed in standard fashion.

Figure 21



Cap Screw
(4004-1000X-S)

Polarus 3 Cap Screw Driver
(80-1635)

Long Nail Surgical Technique [continued]

12 Postoperative Protocol

Note: The following protocol may be replaced with an alternative protocol at performing surgeon's discretion.

Postoperatively, the patient is placed in an arm sling and a pain pump may be placed in the subacromial space to help with postoperative pain relief. The patient is started on pendulum motion exercises at 1 to 2 weeks, a passive motion program for 2 to 6 weeks, and active strengthening at 6 weeks when evident signs of healing are seen.

Figure 22

Figure 23

13 Implant Removal

Warning: The Polarus 3 Removal Instrument (80-1546) **is specific only to the Polarus 3 nailing system.**

Remove the proximal screws with the Polarus 3 Long T15 Hexalobe Driver (80-1618). If a cap screw was implanted, remove it using the Polarus 3 Cap Screw Driver (80-1635). Thread the Polarus 3 Removal Instrument four degrees laterally into the nail to accommodate the curvature. The instrument's cutting flutes help remove soft tissue. Remove the distal screws with the same driver. Following the removal of all screws, back-slap the removal instrument with the Multiple Contact Hammer (80-1538).

Warning: Remove all screws before attempting to remove the nail.

Polarus 3 Removal Instrument
(80-1546)

Polarus 3 Long T15 Hexalobe Driver
(80-1618)

Polarus 3 Cap Screw Driver
(80-1635)

Multiple Contact Hammer
(80-1538)

References

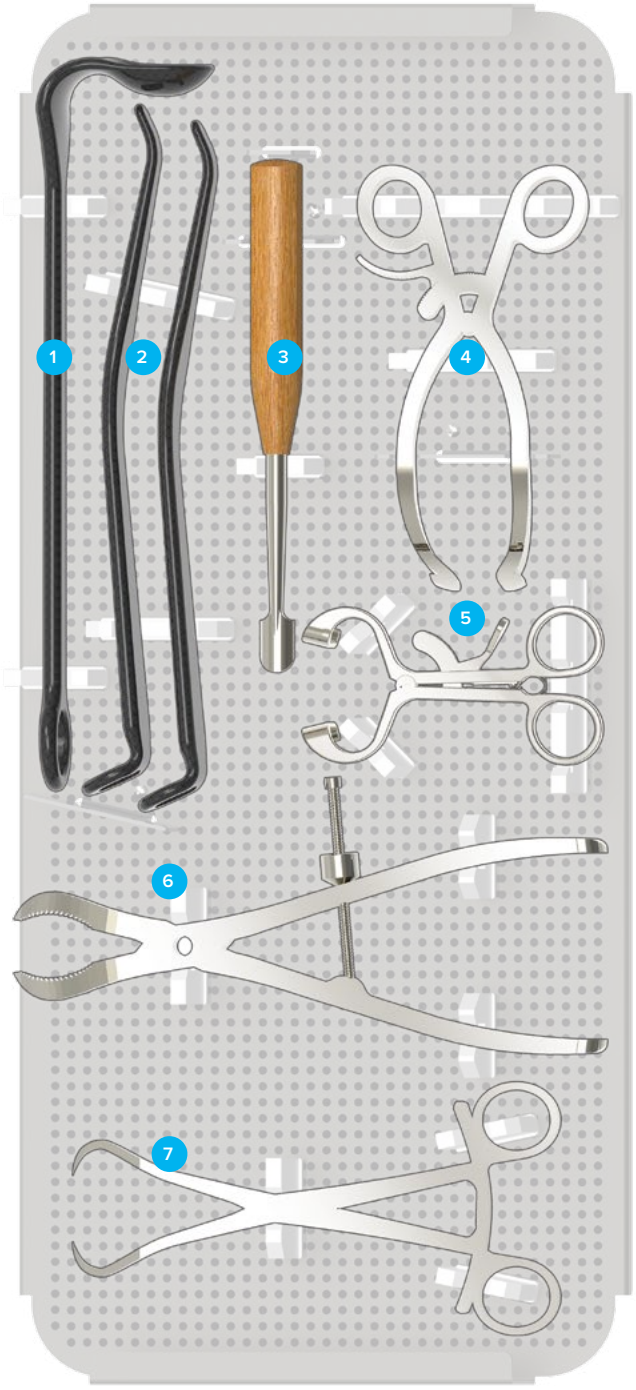
1. Stecco C, Gagliano G, Lancerotto L, et al. Surgical anatomy of the axillary nerve and its implication in the transdeltoid approaches to the shoulder. *J Shoulder Elbow Surg.* 2010;19(8):1166-1174.
2. Ricchetti E, Warrender W, Abboud J. Use of locking plates in the treatment of proximal humerus fractures. *J Shoulder Elbow Surg.* 2010;19:66-75.
3. Owsley K, Gorczyca T. Displacement/screw cutout after open reduction and locked plate fixation of humeral fractures. *J Bone Joint Surg Am.* 2008;90:223-240.
4. Steffner, R. Emerging concepts in upper extremity trauma. *Orthop Clin N Am.* 2013; 44(1):21-33.
5. Cole P, Wijdicks, C. The operative treatment of diaphyseal humeral shaft fractures. *Hand Clin.* 2007;23:437-448.

Ordering Information

Tray Components

Polarus 3 Instruments

1	Browne-type Retractor, Carbon Fiber	80-1599
2	Blunt Hohmann Retractor, Carbon Fiber	80-1598
3	Periosteal Elevator	MS-46213
4	Blunt Gelpi Retractor 165 mm Long, Deep	80-1821
5	Rotator Cuff Retractor, 6 x 4 mm	80-1822
6	9" Bone Reduction Forceps	MS-47107
7	8" Bone Reduction Forceps	MS-1280
8	Polarus 3 Tap Sleeve	80-1593
9	Polarus 3 Plate Drill Guide, Drop-In	80-1587
10	Polarus 3 Targeting Guide, Plate, Left	80-1589
11	Polarus 3 Targeting Guide, Plate, Right	80-1590
12	Polarus 3 Guide Wire Guide	80-1588
13	Polarus 3 Plate Drill Guide, Locking	80-1600
14	Ball Spike Reduction Tool	80-1637
15	Polarus 3 Plate Targeting Locking Bolt	80-1591
16	Medium Ratcheting Driver Handle	80-0663
17	T15 Stick Fit Hexalobe Driver	80-0760
18	Polarus 3 Plate Tack	80-1595
19	Polarus 3 Cap Screw Driver	80-1635
20	Polarus 3 4.3 mm Screw Tap	80-1623
21	Polarus 3 Reduction Device	80-1601
22	Polarus 3 Long T15 Hexalobe Driver	80-1618
23	Polarus 3 2.8 mm Long Drill	80-1624
24	Polarus 3 2.8 mm Blunt Long Drill	80-1634
25	Polarus 3 2.8 mm Blunt Short Drill	80-1597
26	Polarus 3 2.8 mm Short Drill	80-1592
27	2.0 mm x 9" ST Guide Wire	WS-2009ST
28	Polarus 3 Targeting Awl	80-1620
29	Polarus 3 Depth Gauge	80-1776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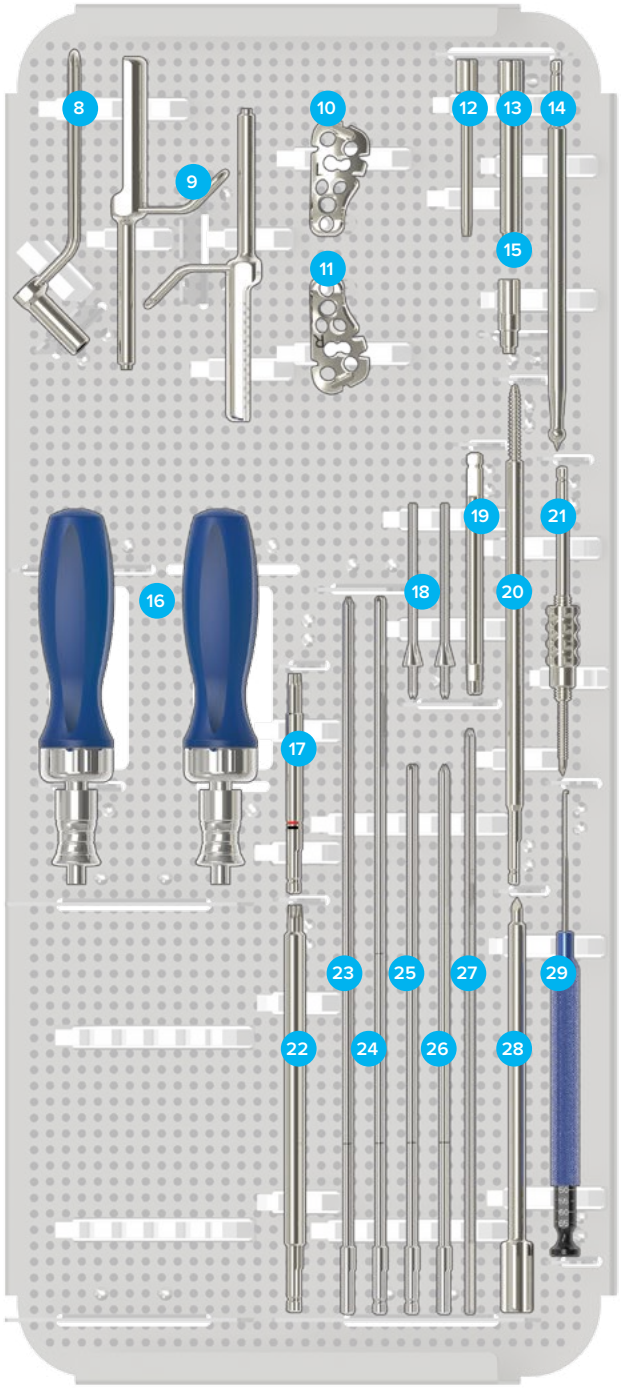
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Ordering Information [continued]

Tray Components

Polarus 3 Posterior Plates

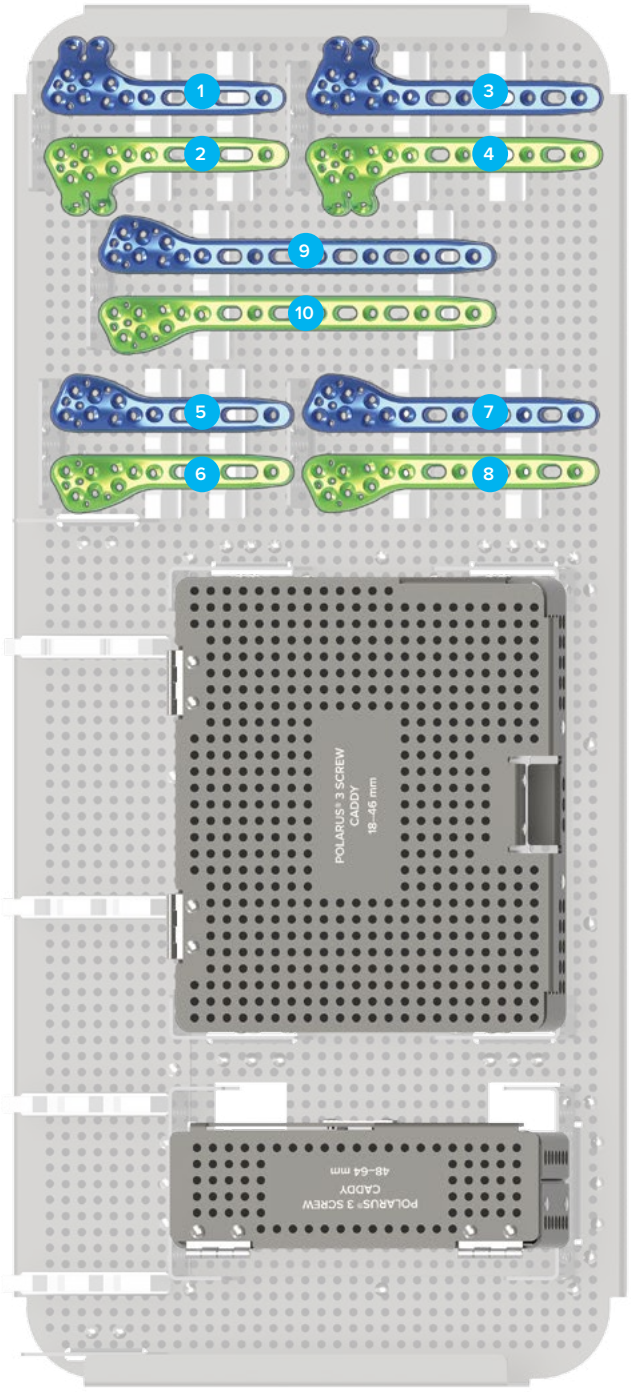
1	Polarus 3 Posterior Plate 4-Hole, Left	7001-0204L
2	Polarus 3 Posterior Plate 4-Hole, Right	7001-0204R
3	Polarus 3 Posterior Plate 6-Hole, Left	7001-0206L
4	Polarus 3 Posterior Plate 6-Hole, Right	7001-0206R

Polarus 3 Standard Plates

5	Polarus 3 Standard Plate 4-Hole, Left	7001-0104L
6	Polarus 3 Standard Plate 4-Hole, Right	7001-0104R
7	Polarus 3 Standard Plate 6-Hole, Left	7001-0106L
8	Polarus 3 Standard Plate 6-Hole, Right	7001-0106R
9	Polarus 3 Standard Plate 10-Hole, Left	7001-0110L
10	Polarus 3 Standard Plate 10-Hole, Right	7001-0110R

Polarus 3 Instruments

11	8 mm Flexible Reamer	80-1925
12	9 mm Flexible Reamer	80-1926
13	Polarus 3 Guide Wire, 20" Blunt	35-0008
14	Polarus 3 Guide Wire, 20" Trocar Tip	35-0009
15	10.0 mm Bud Drill	DRB1015
16	Polarus 3 Cannulated Broach	80-1553
17	Polarus 3 Guide Wire Passer	80-1555
18	Polarus 3 Cannulated Awl	80-1551
19	Polarus 3 Guide Wire “T” Handle	80-1734
20	Polarus 3 Implant Sizer	80-1617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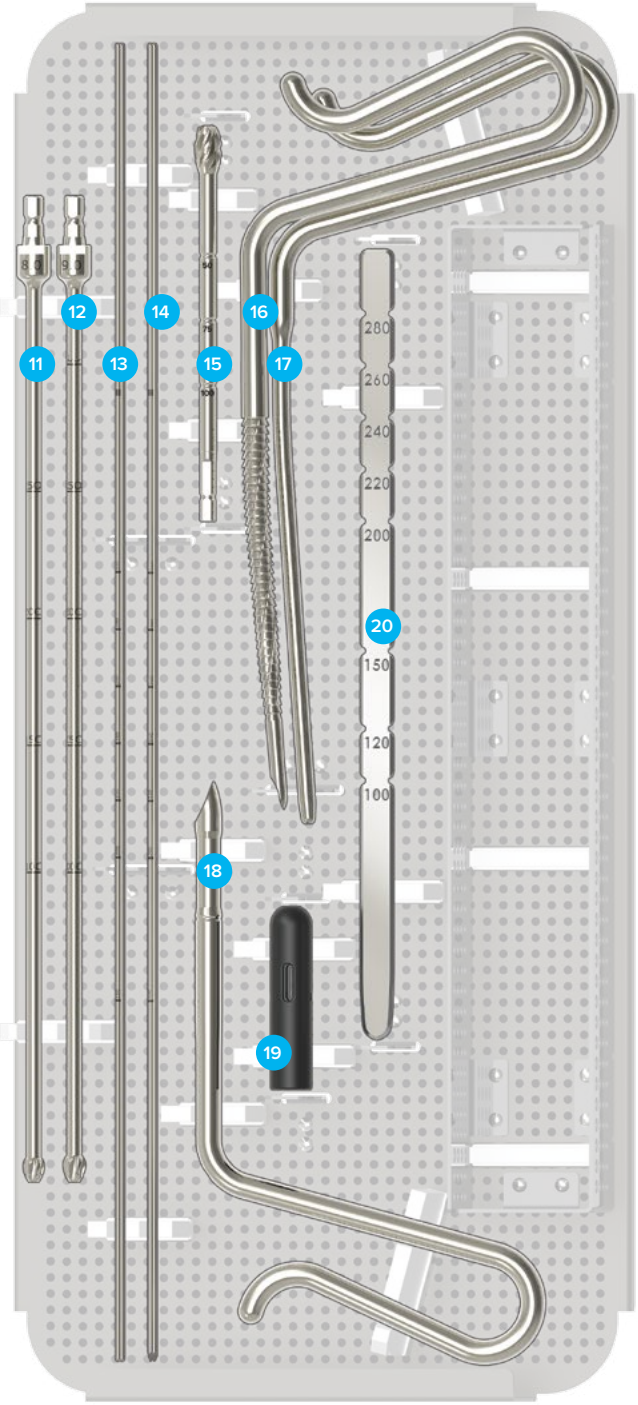
POLARUS® 3 SCREW
CADDY
18–46 mm
POLARUS® 3 SCREW
CADDY
48–64 mm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Ordering Information [continued]

Tray Components

Polarus 3 Instruments

1	Polarus 3 Cannula, Ratcheting	80-1619
2	Polarus 3 Washer Cannula	80-1792
3	Polarus 3 Nail Targeting Connector	80-1629
4	Polarus 3 Nail Targeting Locking Bolt	80-1625
5	Locking Bolt Finger Wrench	MS-0611
6	Polarus 3 Locking Knob	80-1633
7	Polarus 3 Proximal Targeting Guide	80-1628
8	Polarus 3 Drill Guide, Nail	80-1621
9	Polarus 3 Proximal Targeting Guide, Right	80-1627
10	Polarus 3 Proximal Targeting Guide, Left	80-1626
11	Multiple Contact Hammer	80-1538
12	Polarus 3 Removal Instrument	80-1546
13	Freehand Targeting Guide	MS-0210

Sterile-Packed*

Polaru 3 Standard Plates

Polarus 3 Standard Plate 14-Hole, Left	7001-0114L-S
Polarus 3 Standard Plate 14-Hole, Right	7001-0114R-S
Polarus 3 Standard Plate 18-Hole, Left	7001-0118L-S
Polarus 3 Standard Plate 18-Hole, Right	7001-0118R-S
Polarus 3 Standard Plate 22-Hole, Left	7001-0122L-S
Polarus 3 Standard Plate 22-Hole, Right	7001-0122R-S

Polarus 3 Proximal Nails

Polarus 3 Proximal Locking Nail 150 mm, Left	4001-1015L-S
Polarus 3 Proximal Locking Nail 150 mm, Right	4001-1015R-S

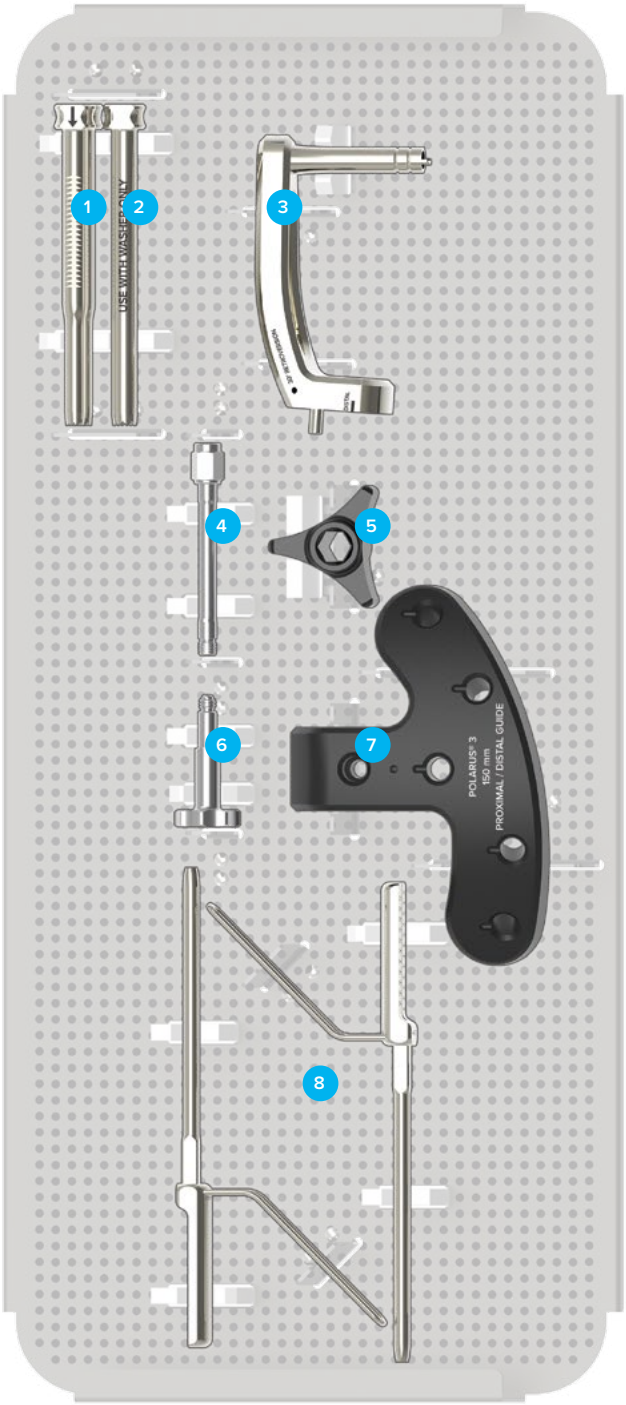
Polarus 3 Long Nails

Polarus 3 Locking Nail 200 mm	4002-10200-S
Polarus 3 Locking Nail 220 mm	4002-10220-S
Polarus 3 Locking Nail 240 mm	4002-10240-S
Polarus 3 Locking Nail 260 mm	4002-10260-S
Polarus 3 Locking Nail 280 mm	4002-10280-S

Polarus 3 Cap Screws and Washers

Polarus 3 Cap Screw 0 mm	4004-10000-S
Polarus 3 Cap Screw 2 mm	4004-10002-S
Polarus 3 Cap Screw 4 mm	4004-10004-S
Polarus 3 Cap Screw 6 mm	4004-10006-S
Polarus 3 8 mm Washer, Locking	7001-03001-S

Note: *Sterile-packed and available upon request.
Contact Acumed prior to surgery for these special-order plates.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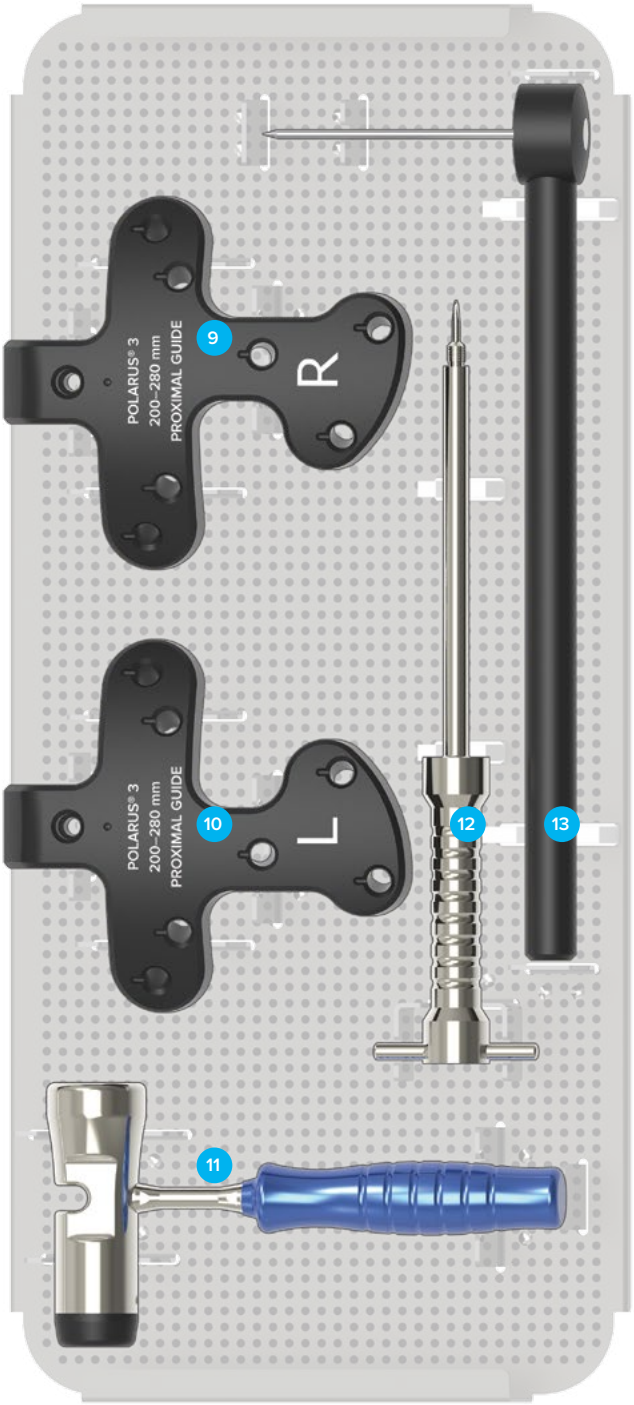
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Ordering Information [continued]

Polarus Screws

Polarus 3 4.3 mm Screws

4.3 mm x 18 mm Low-profile Hexalobe Screw	3011-43018
4.3 mm x 20 mm Low-profile Hexalobe Screw	3011-43020
4.3 mm x 22 mm Low-profile Hexalobe Screw	3011-43022
4.3 mm x 24 mm Low-profile Hexalobe Screw	3011-43024
4.3 mm x 26 mm Low-profile Hexalobe Screw	3011-43026
4.3 mm x 28 mm Low-profile Hexalobe Screw	3011-43028
4.3 mm x 30 mm Low-profile Hexalobe Screw	3011-43030
4.3 mm x 32 mm Low-profile Hexalobe Screw	3011-43032
4.3 mm x 34 mm Low-profile Hexalobe Screw	3011-43034
4.3 mm x 36 mm Low-profile Hexalobe Screw	3011-43036
4.3 mm x 38 mm Low-profile Hexalobe Screw	3011-43038
4.3 mm x 40 mm Low-profile Hexalobe Screw	3011-43040
4.3 mm x 42 mm Low-profile Hexalobe Screw	3011-43042
4.3 mm x 44 mm Low-profile Hexalobe Screw	3011-43044
4.3 mm x 46 mm Low-profile Hexalobe Screw	3011-43046
4.3 mm x 48 mm Low-profile Hexalobe Screw	3011-43048
4.3 mm x 50 mm Low-profile Hexalobe Screw	3011-43050
4.3 mm x 52 mm Low-profile Hexalobe Screw	3011-43052
4.3 mm x 54 mm Low-profile Hexalobe Screw	3011-43054
4.3 mm x 56 mm Low-profile Hexalobe Screw	3011-43056
4.3 mm x 58 mm Low-profile Hexalobe Screw	3011-43058
4.3 mm x 60 mm Low-profile Hexalobe Screw	3011-43060
4.3 mm x 62 mm Low-profile Hexalobe Screw	3011-43062
4.3 mm x 64 mm Low-profile Hexalobe Screw	3011-43064

Ordering Information [continued]

Polarus Screws

Polarus 3 3.5 mm Screws

3.5 x 18 mm Nonlocking Low-profile Hexalobe Screw	3025-35018	3.5 x 42 mm Nonlocking Low-profile Hexalobe Screw	3025-35042
3.5 x 20 mm Nonlocking Low-profile Hexalobe Screw	3025-35020	3.5 x 44 mm Nonlocking Low-profile Hexalobe Screw	3025-35044
3.5 x 22 mm Nonlocking Low-profile Hexalobe Screw	3025-35022	3.5 x 46 mm Nonlocking Low-profile Hexalobe Screw	3025-35046
3.5 x 24 mm Nonlocking Low-profile Hexalobe Screw	3025-35024	3.5 x 48 mm Nonlocking Low-profile Hexalobe Screw	3025-35048
3.5 x 26 mm Nonlocking Low-profile Hexalobe Screw	3025-35026	3.5 x 50 mm Nonlocking Low-profile Hexalobe Screw	3025-35050
3.5 x 28 mm Nonlocking Low-profile Hexalobe Screw	3025-35028	3.5 x 52 mm Nonlocking Low-profile Hexalobe Screw	3025-35052
3.5 x 30 mm Nonlocking Low-profile Hexalobe Screw	3025-35030	3.5 x 54 mm Nonlocking Low-profile Hexalobe Screw	3025-35054
3.5 x 32 mm Nonlocking Low-profile Hexalobe Screw	3025-35032	3.5 x 56 mm Nonlocking Low-profile Hexalobe Screw	3025-35056
3.5 x 34 mm Nonlocking Low-profile Hexalobe Screw	3025-35034	3.5 x 58 mm Nonlocking Low-profile Hexalobe Screw	3025-35058
3.5 x 36 mm Nonlocking Low-profile Hexalobe Screw	3025-35036	3.5 x 60 mm Nonlocking Low-profile Hexalobe Screw	3025-35060
3.5 x 38 mm Nonlocking Low-profile Hexalobe Screw	3025-35038	3.5 x 62 mm Nonlocking Low-profile Hexalobe Screw	3025-35062
3.5 x 40 mm Nonlocking Low-profile Hexalobe Screw	3025-35040	3.5 x 64 mm Nonlocking Low-profile Hexalobe Screw	3025-35064

Note: All screws and plates are also available sterile-packed.

To learn more about the full line of Acumed innovative surgical solutions, please contact your local Acumed independent sales contractor, call 888.627.9957, or visit **www.acumed.net.**

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