acumed®

Forearm Fracture Solutions

Surgical Technique

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® Forearm Fracture Solutions

Acumed Forearm Fracture Solutions includes plating and rodding systems with a range of diaphyseal radius and ulna fracture treatment options.

The plating system and rodding system may be used in combination for plating the radius and rodding the ulna, or vice versa.

By combining midshaft plates and nails for the radius and ulna, Acumed offers multiple surgical options for fractions, fusions, and osteotomies of the forearm, all in one tray.

Forearm Plate Indications for Use:
Acumed Anatomic Midshaft Forearm Plates are indicated for the treatment of fractures, fusions, and osteotomies of the radius and ulna.

Forearm Rod Indications for Use:
Acumed Forearm Rods are indicated for the treatment of fractures and osteotomies of the radius and ulna.

	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.

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System Features

Plates

Acumed Anatomic Midshaft Forearm Plates offer features not found in traditional straight plates. The system of precontoured plates, including Midshaft Ulna Plates, Volar Midshaft Plates, and Dorsolateral Midshaft Radius Plates, may be used to treat fractures, fusions, and osteotomies of the radius and ulna.

When used as templates, precontoured plates are intended to help restore forearm geometry and assist in reestablishing pronation and supination. Precontoured plates and rods are designed to help restore radial bow and may reduce the need for intraoperative bending, thereby reducing the risk of implant weakening that may come with bending of traditional implants.

Note: The plates may be used with either the Acumed cortical (hex) or hexalobe screws.

System Features [continued]

Dorsolateral Midshaft Radius Plates

6-Hole Dorsolateral Midshaft Radius Plate (80 mm)
(70-0074)

8-Hole Dorsolateral Midshaft Radius Plate (100 mm)
(70-0075)

10-Hole Dorsolateral Midshaft Radius Plate (130 mm)
(70-0076)

12-Hole Dorsolateral Midshaft Radius Plate (160 mm)
(70-0077)

14-Hole Midshaft Dorsolateral Radius Plate (180 mm)
(70-0466-S*)

16-Hole Midshaft Dorsolateral Radius Plate (210 mm)
(70-0467-S*)

Midshaft Ulna Plates

6-Hole Midshaft Ulna Plate (80 mm)
(70-0070)

8-Hole Midshaft Ulna Plate (100 mm)
(70-0071)

10-Hole Midshaft Ulna Plate (130 mm)
(70-0072)

12-Hole Midshaft Ulna Plate (160 mm)
(70-0073)

14-Hole Midshaft Ulna Plate (180 mm)
(70-0463-S*)

16-Hole Midshaft Ulna Plate (210 mm)
(70-0464-S*)

Volar Midshaft Radius Plates

6-Hole Volar Midshaft Radius Plate (80 mm)
(70-0066)

8-Hole Volar Midshaft Radius Plate (100 mm)
(70-0067)

10-Hole Volar Midshaft Radius Plate (130 mm)
(70-0068)

12-Hole Volar Midshaft Radius Plate (160 mm)
(70-0069)

14-Hole Volar Midshaft Radius Plate (180 mm)
(70-0469-S*)

16-Hole Volar Midshaft Radius Plate (210 mm)
(70-0470-S*)

*Optional, sterile-packed only

System Features [continued]

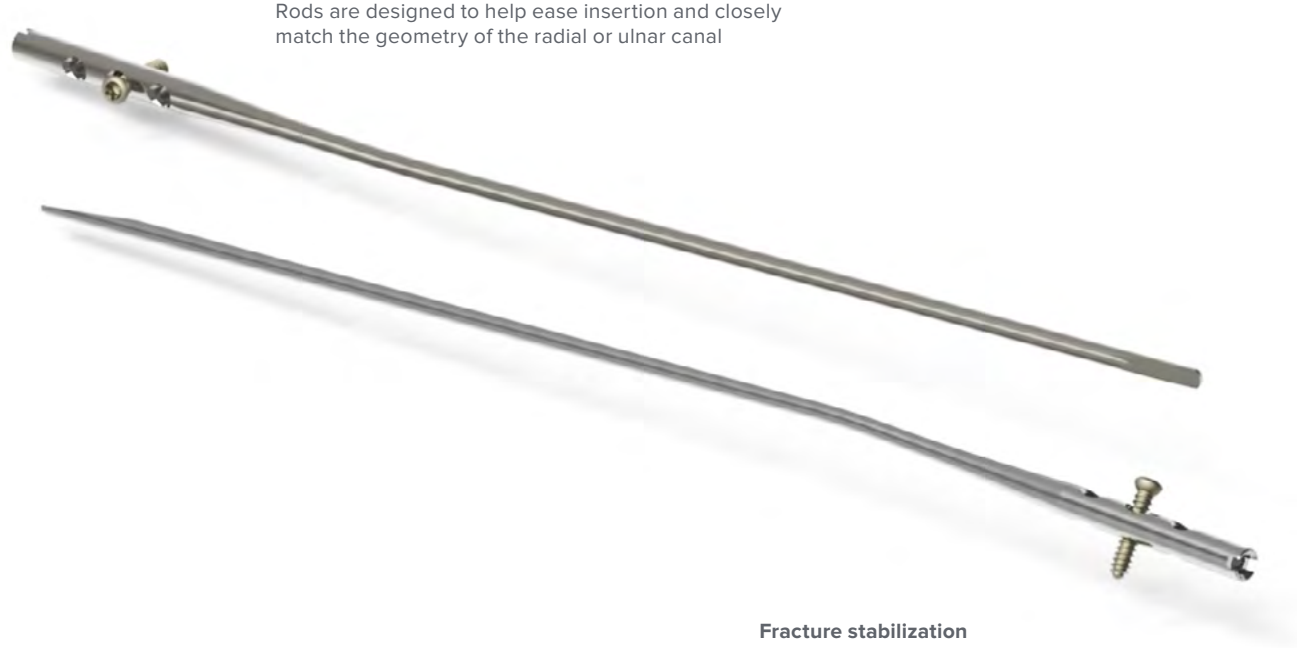
Rods

Acumed Forearm Rods offer an alternative to traditional plating for the treatment of fractures and osteotomies of the radius and ulna. Designed with an anatomic contour intended to ease insertion and closely match the curvature of the ulnar or radial canal, the rods' targeted interlocking screws and paddle-blade tip are designed to lock and rotationally secure bone segments to stabilize the fracture. This minimally invasive technique may reduce scarring and surgery time over traditional open reduction and internal fixation.

The plating system and rodding system may be used in combination for plating the radius and rodding the ulna, or vice versa.

By combining midshaft plates and nails for the radius and ulna, Acumed offers multiple surgical options for fractions, fusions, and osteotomies of the forearm, all in one tray.

Precontoured rods
Rods are designed to help ease insertion and closely match the geometry of the radial or ulnar canal



Fracture stabilization
A targeted interlocking screw and paddle-blade tip locks and rotationally secures bone fragments to assist in fracture union

System Features [continued]

Ulna Rods

3.0 mm x 210 mm Ulna Rod
(UL-3021-S)

3.0 mm x 230 mm Ulna Rod
(UL-3023-S)

3.0 mm x 250 mm Ulna Rod
(UL-3025-S)

3.0 mm x 270 mm Ulna Rod
(UL-3027-S)

3.6 mm x 210 mm Ulna Rod
(UL-3621-S)

3.6 mm x 230 mm Ulna Rod
(UL-3623-S)

3.6 mm x 250 mm Ulna Rod
(UL-3625-S)

3.6 mm x 270 mm Ulna Rod
(UL-3627-S)

Radius Rods

3.6 mm x 230 mm Radius Rod, Right
(RR-3623-S)

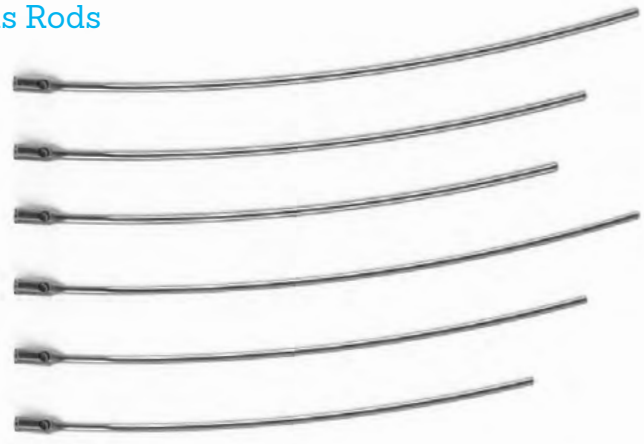
3.6 mm x 210 mm Radius Rod, Right
(RR-3621-S)

3.6 mm x 190 mm Radius Rod, Right
(RR-3619-S)

3.0 mm x 230 mm Radius Rod, Right
(RR-3023-S)

3.0 mm x 210 mm Radius Rod, Right
(RR-3021-S)

3.0 mm x 190 mm Radius Rod, Right
(RR-3019-S)



3.0 mm x 190 mm Radius Rod, Left
(RL-3019-S)

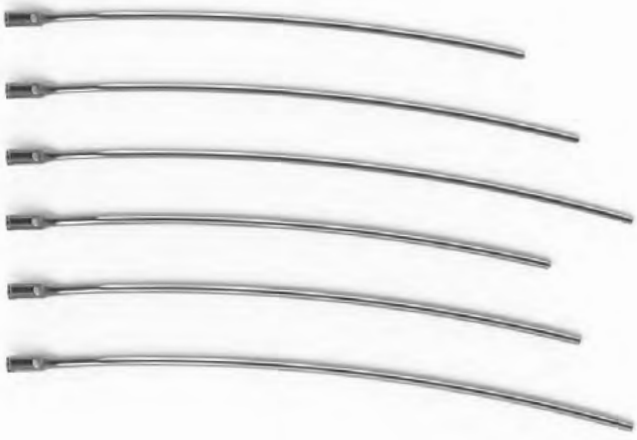
3.0 mm x 210 mm Radius Rod, Left
(RL-3021-S)

3.0 mm x 230 mm Radius Rod, Left)
(RL-3023-S)

3.6 mm x 190 mm Radius Rod, Left
(RL-3619-S)

3.6 mm x 210 mm Radius Rod, Left
(RL-3621-S)

3.6 mm x 230 mm Radius Rod, Left
(RL-3623-S)



System Features [continued]

Instrumentation

Forearm Fracture Solutions includes several instruments designed to streamline the surgical experience.

Customized Plate Clamps

- One end shaped to fit over and grasp the plate
- Opposing end has serrated teeth to grip the bone to maintain plate placement and reduction
- Fit of the clamp is intended to help position the plate on the bone and avoid plate scratches that can be caused by a traditional clamp's serrated jaw closing down on the plate

Angled Drill Guide (Optional)

- Allows the surgeon to angle the drill at three predetermined angles: 15, 30, and 45 degrees. Surgeons may lag across the fracture site through the plate or prior to plate application
- Contains K-wire holes for visualization of the screw's trajectory and placement in the bone

Soft Tissue Spreader

- Attaches to the locking holes in the plate and holds the soft tissue away from the surgical site
- Allows fewer retractors and instruments in the surgical site
- K-wire holes secure spreader to the plate for alignment if the locking bolt is not used

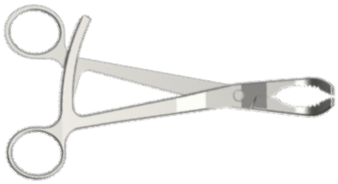
Plate Clamps

Angled Drill Guide

Soft Tissue Spreader

Instrument Overview

Plate Clamp
(80-0223)



Reduction Forceps with Serrated Jaws
(PL-CL04)

Hexalobe Locking Drill Guide 6–65 mm
(80-0668)

2.8 mm/3.5 mm Thin Drill Guide
(PL-2196)

3.5 mm Narrow Drill Guide Cannula
(PL-2095)

Depth Gauge 6–65 mm
(80-0623)

2.3 mm Quick Release Drill
(80-0627)

2.8 mm Quick Release Drill
(80-0387)

2.8 mm x 5" Quick Release Drill
(MS-DC28)

3.0 mm x 5" Quick Release Drill
(80-1088)

3.5 mm x 5" Quick Release Drill
(MS-DC35)

3.5 mm Cortical Screw Bone Tap
(MS-LTT35)

Instrument Overview [continued]

Periosteal Elevator
(MS-46212)

Medium Ratcheting Driver Handle
(80-0663)

Intramedullary Rod Targeting Base
(MS-0620)

.059 x 5" ST Guide Wire
(WS-1505ST)

T15 Stick Fit Hexalobe Driver
(80-0760)

Intramedullary Rod Locking Bolt
(MS-0621)

.045" x 6" Guide Wire
(WS-1106ST)

15 mm Hohmann Retractor
(MS-46827)

Rosette Knob
(MS-0100)

Large Plate Bender
(PL-2045)

Plate Tack
(PL-PTACK)

Ulna M/L Targeting Guide
(MS-0622)

Instrument Overview [continued]

Radius M/L Targeting Guide
(RA-0622)

3.5 mm Drill Guide/ Depth Gauge
(HR-3104)

Generic Cannula Assembly
(MS-2000)

Locking Bolt Finger Wrench
(MS-0611)

6.1 mm Cortical Awl Assembly
(MS-0204)

2.5 mm Solid Hex Driver Assembly
(HD-2500)

3.5 mm Targeting Cannula
(HR-3101)

2.8 mm Tap Drill
(HR-D105)

3.5 mm Short Cortical Screw Tap
(MS-T35S)

3.5 mm Targeting Probe
(HR-3102)

3.1 mm x 300 mm Intramedullary Rod Reamer
(RMT3130)

3.7 mm T-Handle Reamer
(RMT3730)

6.1 mm x 5" Drill
(MS-D761)

Surgical Technique Overview

Anatomic Midshaft Forearm Plate Surgical Technique

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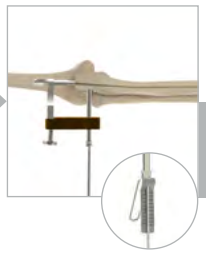


Canal Preparation and Rod Selection

Implant Insertion

Interlocking Screw Insertion

Anatomic Midshaft Forearm Plate Surgical Technique

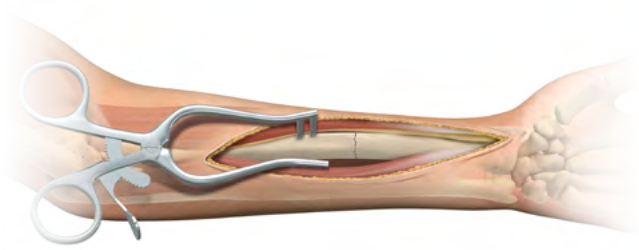


Figure 1

1 Exposure and Fracture Reduction

Expose the surgical site according to the surgeon's preference, using either the anterior approach or the posterolateral approach for the radius, depending on the plate to be used for fixation.

Note: A lag screw may be placed across the fracture site prior to plate application or through the plate in a later step.

Note: To lag a 3.5 mm Nonlocking Hexalobe Screw (30-0XXX), angle the 2.8 mm/3.5 mm Thin Drill Guide (PL-2196) so that the 2.8 mm Quick Release Drill (80-0627) drills diagonally through the fracture site and crosses the far cortex. Then drill the near cortex by keeping the 2.8 mm/3.5 mm Thin Drill Guide at the same angle and drill with the 3.5 mm x 5" Quick Release Drill (MS-DC35) to the near cortex, ensuring the drill does not pass the fracture site. Measure for screw length by using the Depth Gauge 6–65 mm (80-0623).

Insert the appropriate length 3.5 mm Nonlocking Hexalobe Screw by connecting the T15 Stick Fit Hexalobe Driver (80-0760) to the Medium Ratcheting Driver Handle (80-0663).

3.5 mm Nonlocking Hexalobe Screw
(30-0XXX)

2.8 mm/3.5 mm Thin Drill Guide
(PL-2196)

2.8 mm Quick Release Drill
(80-0627)

3.5 mm x 5" Quick Release Drill
(MS-DC35)

Depth Gauge 6–65 mm
(80-0623)

T15 Stick Fit Hexalobe Driver
(80-0760)

Medium Ratcheting Driver Handle
(80-0663)

Anatomic Midshaft Forearm Plate Surgical Technique [continued]

2 Plate Selection and Placement

Use fracture assessment and/or preoperative X-ray templating to determine appropriate plate length. If necessary, bend the plate using the Large Plate Bender (PL-2045).

Place the selected plate onto the bone with the middle of the plate positioned over the fracture site to optimize compression.

Use Plate Tacks (PL-PTACK), Plate Clamps (80-0223), Reduction Forceps with Serrated Jaw (PL-CL04), or .045" x 6" ST K-wires (WS-1106ST) to aid with provisional plate fixation if necessary.

Optional: Thread the Surgical Spreader (Plate Mounted) (80-0251) into one of the locking holes in the plate with the Surgical Spreader Locking Bolt (80-0252) to aid with visibility of the surgical site.

Note: Instrument availability may vary depending on which iteration of tray is supplied.

Note: 14- and 16-hole plates are sterile-packed only. Use a ruler and the plate length table to the left as a reference to determine if longer plates should be used.

Note: If the implants are all sterile-packed, trial plates are available to determine appropriate plate length.

Figure 2

Plate Lengths

Number of Holes	Length (mm)
6	80
8	100
10	130
12	160
14*	180
16*	210

Large Plate Bender
(PL-2045)

Plate Tack
(PL-PTACK)

Plate Clamp
(80-0223)

Reduction Forceps with Serrated Jaw
(PL-CL04)

.045" x 6" ST Guide Wire
(WS-1106ST)
Also used as a K-wire

Surgical Spreader
(80-0251)

Surgical Spreader Locking Bolt
(80-0252)

Anatomic Midshaft Forearm Plate Surgical Technique [continued]

Figure 3

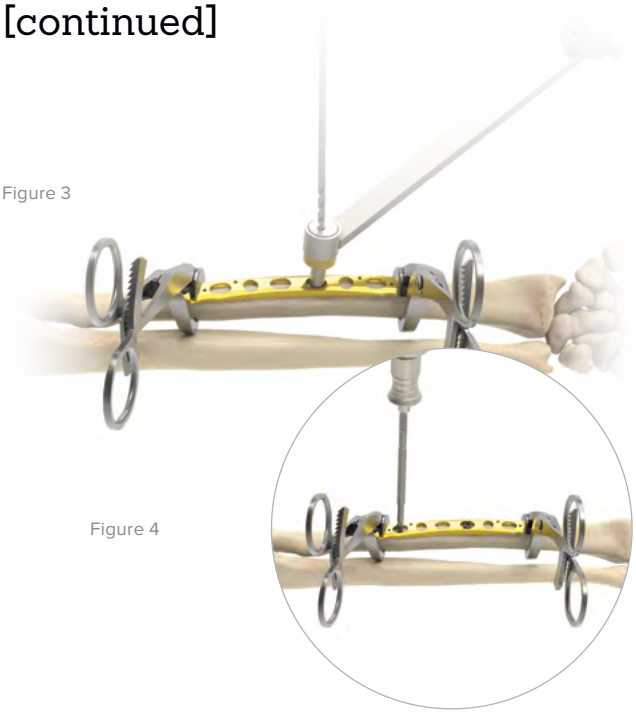


Figure 4

3 Nonlocking Screw Insertion

Insert a 3.0 or 3.5 mm Nonlocking Hexalobe Screw (30-0XXX) to ensure compression in the axial plane. It is recommended these screws be implanted bicortically for optimal fixation.

To implant a 3.0 mm Nonlocking Hexalobe Screw, drill bicortically through the 3.5 mm Narrow Drill Guide Cannula (PL-2095) in either neutral or dynamic compression mode with the 2.3 mm Quick Release Drill (80-0627).

To implant a 3.5 mm Nonlocking Hexalobe Screw, drill bicortically through the 3.5 mm Narrow Drill Guide Cannula (PL-2095) in either neutral or dynamic compression mode with the 2.8 mm Quick Release Drill (80-0387). Measure for screw length by using the Depth Gauge 6–65 mm (80-0623).

Insert the appropriate length 3.0 mm or 3.5 mm Nonlocking Hexalobe Screw by connecting the T15 Stick Fit Hexalobe Driver (80-0760) to the Medium Ratcheting Driver Handle (80-0663).

Insert screws by alternating from one side of the fracture to the other.

Check forearm rotation regularly throughout the procedure.

Optional: The Angled Drill Guide Assembly (80-0204) may be used to angle the drill at 15°, 30°, or 45° angles if desired.

Caution: Inserting a screw at 45 degrees utilizing the Angled Drill Guide may cause screw trajectory interference with surrounding screws. K-wire holes are included in the drill guide for additional visualization of screw trajectory and bone placement.

Note: If dense bone is encountered, use the 3.5 mm Cortical Screw Bone Tap (MS-LTT35) prior to implanting screws.

Optional: 3.5 mm Cortical (Hex) Screws (CO-3XXX-S) can also be used in the Anatomic Midshaft Forearm Plates. To implant a 3.5 mm Cortical Screw, drill bicortically with the 2.8 mm x 5" Quick Release Drill (MS-DC28) and measure for screw length by using the Depth Gauge 6–65 mm. Insert the appropriate length screw using the 2.5 mm Solid Hex Driver Assembly (HD-2500).

Screw / Drill Diameter

	Hex	Hexalobe	Hexalobe
Screw Diameter	3.5 mm	3.0 mm	3.5 mm
Drill Diameter	2.8 mm (MS-DC28)	2.3 mm (80-0627)	2.8 mm (80-0387)
Colorband on Drill/ Drill Guide/Driver	None	Red	Black

3.0 or 3.5 mm Nonlocking Hexalobe Screw (30-0XXX)

3.5mm Narrow Drill Guide Cannula (PL-2095)

2.3mm Quick Release Drill (80-0627)

2.8 mm Quick Release Drill (80-0387)

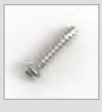
Depth Gauge 6–65 mm (80-0623)

T15 Stick Fit Hexalobe Driver (80-0760)

Medium Ratcheting Driver Handle (80-0663)

Angled Drill Guide Assembly (80-0204)

3.5 mm Cortical Screw Bone Tap (MS-LTT35)



3.5 mm Cortical (Hex) Screw (CO-3XXX-S))

2.8 mm x 5" Quick Release Drill (MS-DC28)

2.5 mm Solid Hex Driver Assembly (HD-2500)

Anatomic Midshaft Forearm Plate Surgical Technique [continued]

4 Fracture Site Compression

Using the gold end of the 3.5 mm Narrow Drill Guide Cannula (PL-2095), drill in dynamic compression mode to provide compression at the fracture site.

The proximal shaft screw must be slightly loosened to allow for compression. If a longer plate is used and further compression is required, partially insert another nonlocking screw into a distal slot in dynamic compression mode and then loosen the first two screws to allow for plate movement.

Insert at least three 3.0 or 3.5 mm Nonlocking Hexalobe Screws (30-0XXX) on each side of the fracture.

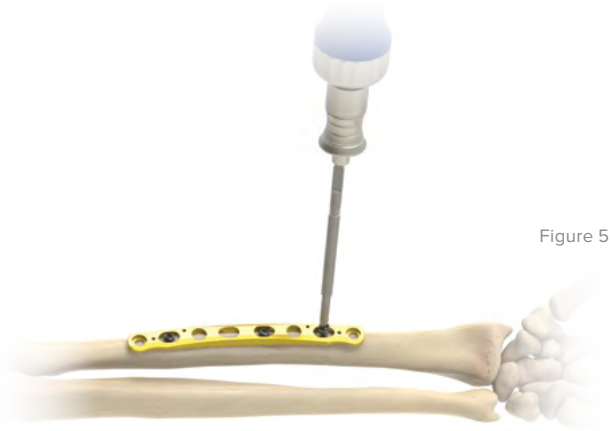


Figure 5

5 Locking Screw Insertion

Either 3.5 mm Cortical (Hex) Screws (CO-3XXX-S) or 3.5 mm Locking Hexalobe Screws (30-023X) can be used in the locking holes of the Anatomic Midshaft Forearm Plates.

To implant a 3.5mm Locking Hexalobe Screw, drill through the Hexalobe Locking Drill Guide 6–65 mm (80-0668) with the 2.8 mm Quick Release Drill (80-0387). Measure for screw length by using the Depth Gauge 6–65 mm (80-0623). Insert the appropriate length 3.5 mm Locking Hexalobe Screw by connecting the T15 Stick Fit Hexalobe Driver (80-0760) to the Medium Ratcheting Driver Handle (80-0663).

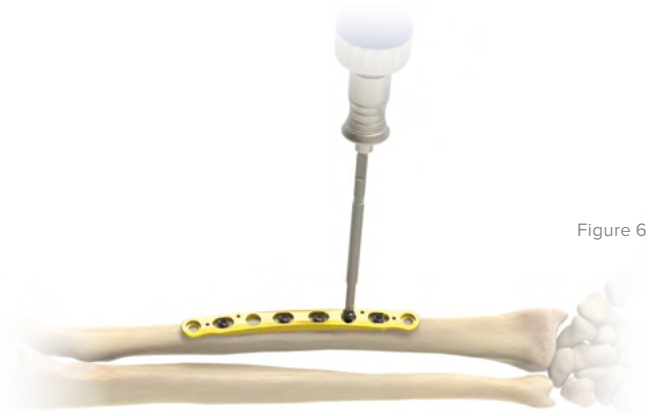


Figure 6

To implant a 3.5 mm Cortical (Hex) Screw, drill through the 2.8 mm/3.5 mm Thin Drill Guide (PL-2196) with the 2.8 mm x 5" Quick Release Drill (MS-DC28). Measure for screw length by using the Depth Gauge 6–65 mm. Insert the appropriate length 3.5 mm Cortical Screw using the 2.5 mm Solid Hex Driver Assembly (HD-2500).

Ensure all screws are fully tightened down at the end of the procedure.

Figure 7

3.5 mm Narrow Drill Guide Cannula (PL-2095)

3.0 or 3.5 mm Nonlocking Hexalobe Screw (30-0XXX)

3.5 mm Cortical (Hex) Screw (CO-3XXX-S)

3.5 mm Locking Hexalobe Screw (30-023X)

Hexalobe Locking Drill Guide 6–65 mm (80-0668)

2.8 mm Quick Release Drill (80-0387)

Depth Gauge 6–65 mm (80-0623)

T15 Stick Fit Hexalobe Driver (80-0760)

Medium Ratcheting Driver Handle (80-0663)

2.8 mm/3.5 mm Thin Drill Guide (PL-2196)

2.8 mm x 5" Quick Release Drill (MS-DC28)

2.5 mm Solid Hex Driver Assembly (HD-2500)

Anatomic Midshaft Forearm Plate Surgical Technique [continued]

6 Postoperative Protocol

Perform a thorough radiographic evaluation, checking reduction, alignment, and screw placement. Close the wound and support the forearm according to bone quality and stability. Postoperative rehabilitation is at the discretion of the surgeon.

Optional: Implant Removal Instructions

To remove a Midshaft Forearm Plate, either use the T15 Stick Fit Hexalobe Driver (80-0760) and Medium Ratcheting Driver Handle (80-0663) to remove all of the hexalobe screws in the plate, or use the 2.5 mm Solid Hex Driver Assembly (HD-2500) to remove all of the cortical (hex) screws in the plate. Referencing the Screw Removal Brochure (SPF10-00) may aid in implant removal if difficulty is experienced.

T15 Stick Fit Hexalobe Driver
(80-0760)

Medium Ratcheting Driver Handle
(80-0663)

2.5 mm Solid Hex Driver Assembly
(HD-2500)

Ulna Rod Surgical Technique

1 Preoperative Planning and Evaluation

Evaluate positioning of the fracture(s) using fluoroscopy. It may be necessary to reference the uninjured ulna to more accurately estimate rod length.

Place the patient in a supine position. A radiolucent arm board should be used. Alternatively a lateral position can be used, bringing the arm over the patient's torso.

Implant the Ulna Rod (UL-3XXX-S) under fluoroscopy to evaluate the position of the rod and the screw. Radiographs in both the anterior to posterior (A/P) and medial to lateral (M/L) planes are suggested.

Figure 1

2 Assemble the Targeting Guide

To assemble the targeting guide, first slide the Intramedullary Rod Locking Bolt (MS-0621) through the Intramedullary Rod Targeting Base (MS-0620), then thread it into the rod.

Align the laser mark on the base plate barrel with the corresponding laser mark on the proximal end of the Ulna Rod. This will ensure proper orientation when implanting the rod.

Tighten the locking bolt with the Locking Bolt Finger Wrench (MS-0611). Slide the Ulna M/L Targeting Guide (MS-0622) onto the base plate pins. Lock it into place with a Rosette Knob (MS-0100).

Figure 2

Ulna Rod
(UL-3XXX-S)

Intramedullary Rod Locking Bolt
(MS-0621)

Intramedullary Rod Targeting Base
(MS-0620)

Locking Bolt Finger Wrench
(MS-0611)

Ulna M/L Targeting Guide
(MS-0622)

Rosette Knob
(MS-0100)

Ulna Rod Surgical Technique [continued]

Figure 3

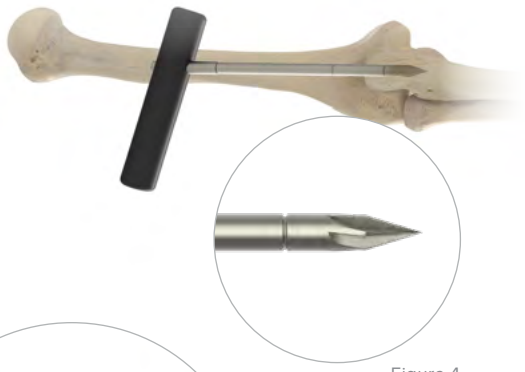


Figure 4

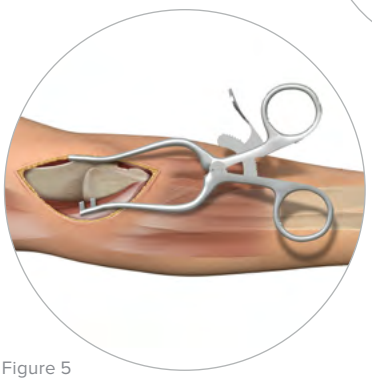


Figure 5

3 Surgical Approach and Cortex Perforation

The method for approaching the insertion site is at the surgeon's discretion and may be altered based on the individual patient's anatomy. The following technique may be used as an approach:

Make a 1–2 cm incision longitudinally along the tip of the olecranon to expose the implant entry site.

Carry dissection down sharply through the subcutaneous tissues and the triceps tendon. Care should be taken to avoid the ulnar nerve that sits medially to the olecranon.

Establish the implant insertion point by using the 6.1 mm Cortical Awl Assembly (MS-0204) to perforate the cortex. The Generic Cannula Assembly (MS-2000) may be used in conjunction with the awl as a tissue protector.

Start the awl in the center of the olecranon process, directly in line with the proximal intramedullary canal of the ulna. Bury the awl to the depth groove on the shaft labeled “ULNA.” Fluoroscopy is helpful when verifying proper alignment within the intramedullary canal.

Optional: The 6.1 mm x 5" Drill (MS-D761) is provided in the system and may be used as an alternative to the 6.1 mm Cortical Awl Assembly to perforate the cortex.

Figure 6

4 Canal Preparation and Rod Selection

Ream the diaphyseal canal with the 3.1 mm x 300 mm Intramedullary Rod Reamer (RMT3130) and, if necessary to achieve desired cortical engagement, use the 3.7 mm T-Handle Reamer (RMT3730). Start with the smaller reamer to avoid over-reaming. Rod length can be read directly off the side of the reamer handle labeled “ULNA” (shown).

Note: Select a rod diameter that will pass down the canal with minimal reaming. Choosing a diameter that is too large may cause the rod to become impacted during insertion and difficult to remove.

The reamer should always be used to ensure that the rod will pass down the canal without becoming impacted upon insertion.

6.1 mm Cortical Awl Assembly (MS-0204)

Generic Cannula Assembly (MS-2000)

6.1 mm x 5" Drill (MS-D761)

3.1 mm x 300 mm Intramedullary Rod Reamer (RMT3130)

3.7 mm T-Handle Reamer (RMT3730)

Ulna Rod Surgical Technique [continued]

5 Implant Insertion

Insert the selected Ulna Rod (UL-3XXX-S) down the canal and across the fracture site. The rod should be aligned so that the screw is inserted from either an M/L or A/P direction based on the surgeon's preference.

Under fluoroscopy, gently glide the rod tip past the fracture site and down to the distal metaphysis.

Note: The rod should pass easily down the canal without impaction. If resistance is met, the rod should be withdrawn and the canal checked again with the appropriate reamer.

Verify with fluoroscopy in two directions that the rod has successfully crossed the fracture or fractures and gained reduction.

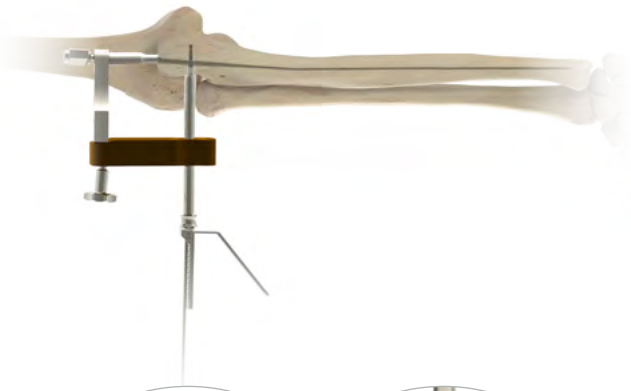
Check that the proximal end of the rod has been inserted below the surface of the bone.

Figure 7

Ulna Rod
(UL-3XXX-S)

Ulna Rod Surgical Technique [continued]

Figure 8



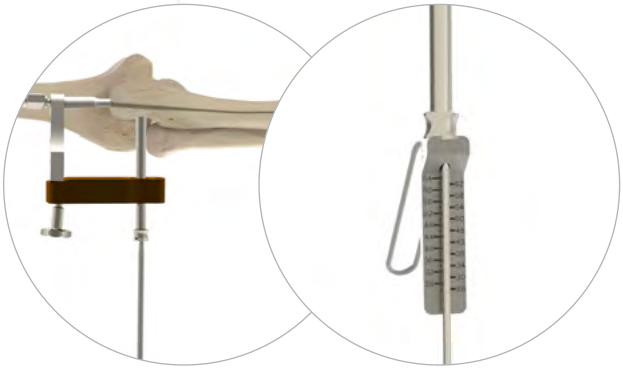


Figure 9

Figure 10

Figure 11

6 Interlocking Screw Insertion

Insert the 3.5 mm Targeting Cannula (HR-3101) and 3.5 mm Targeting Probe (HR-3102) into the selected hole in the targeting guide. Lightly tap the probe against the bone to create a dimple. Insert the 3.5 mm Drill Guide/Depth Gauge (HR-3104) through the cannula. Using the 2.8 mm Tap Drill (HR-D105), drill through both cortices.

Ensure that the drill guide is flush to the bone. Use fluoroscopy to verify drill depth that is read off the 3.5 mm Drill Guide/ Depth Gauge. Remove the drill guide and cannula.

Insert the appropriate length 3.5 mm Cortical (Hex) Screw (CO-3XXX-S) through the cannula with the 2.5 mm Solid Hex Driver Assembly (HD-2500) and verify screw position under fluoroscopy.

Note: The screw should not extend past the far cortex by more than 3 mm.

As the screw is being inserted, a groove on the driver shaft indicates that the screw is fully seated against the bone when it aligns with the back of the cannula.

Be sure that the cannula is fully seated against the bone if this method is used. If dense bone is encountered, use the 3.5 mm Short Cortical Screw Tap (MS-T35S) prior to implanting screws.

Note: If inserting a screw from the posterior to anterior aspect of the ulna, use fluoroscopy to ensure that the screw does not violate the ulnohumeral joint space.

If the posterior to anterior screw position is chosen, only the most distal screw should be used to avoid the articular surface.

Note: The Hexalobe Screw System is not currently designed to be used with the Acumed Forearm Rod System. Surgeons should continue to use the sterile-packed 3.5 mm cortical (hex) screws.

7 Optional: Implant Removal Instructions

If removal of the implant is desired, confirm the location of the implant and screws under fluoroscopy. The soft-tissue dissection should be done at the surgeon's discretion.

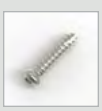
Thread the Intramedullary Rod Locking Bolt (MS-0621) to the rod and use the 2.5 mm Solid Hex Driver Assembly (HD-2500) to remove all the screws from the rod. Once the screws have been removed, a hammer or impactor tool may be used to extract the rod. Referencing the Screw Removal Brochure (SPF10-00) may aid in implant extraction.

3.5 mm Targeting Cannula (HR-3101)

3.5 mm Targeting Probe (HR-3102)

3.5 mm Drill Guide/ Depth Gauge (HR-3104)

2.8 mm Tap Drill (HR-D105)



3.5 mm Cortical (Hex) Screw (CO-3XXX-S)

2.5 mm Solid Hex Driver Assembly (HD-2500)

3.5 mm Short Cortical Screw Tap (MS-T35S)

Intramedullary Rod Locking Bolt (MS-0621)

Radius Rod Surgical Technique

1 Preoperative Planning and Evaluation

Evaluate positioning of the fracture(s) using fluoroscopy. It may be necessary to reference the uninjured radius to more accurately estimate screw length.

Place the patient in a supine position. A radiolucent arm board should be used. Alternatively a lateral position can be used, bringing the arm over the patient's torso.

Implant the Radius Rod (RX-3XXX-S) under fluoroscopy to evaluate the position of the rod and the screw. Radiographs in both the anterior to posterior (A/P) and medial to lateral (M/L) planes are suggested.

Figure 1

2 Assemble the Targeting Guide

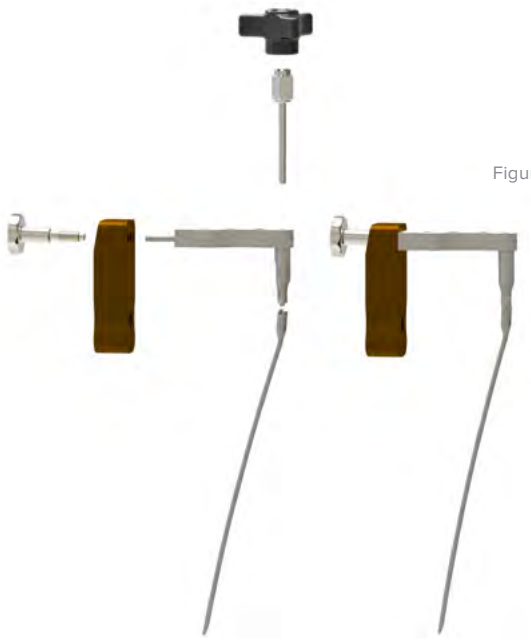
To assemble the targeting guide, first slide the Intramedullary Rod Locking Bolt (MS-0621) through the Intramedullary Rod Targeting Base (MS-0620), then thread it into the rod.

Align the laser mark on the base plate barrel with the corresponding laser mark on the distal end of the Radius Rod (RX-3XXX-S). This will ensure proper orientation when implanting the rod.

Tighten the Intramedullary Rod Locking Bolt with the Locking Bolt Finger Wrench (MS-0611). Slide the Radius M/L Targeting Guide (RA-0622) onto the base plate pins.

Lock the construct into place with a Rosette Knob (MS-0100).

Figure 2



Radius Rod
(RX-3XXX-S)

Intramedullary Rod Locking Bolt
(MS-0621)

Intramedullary Rod Targeting Base
(MS-0620)

Locking Bolt Finger Wrench
(MS-0611)

Radius M/L Targeting Guide
(RA-0622)

Rosette Knob
(MS-0100)

Radius Rod Surgical Technique [continued]

Figure 3

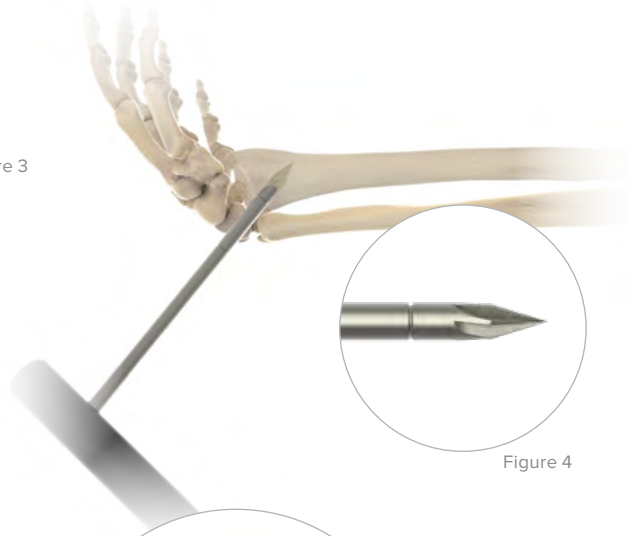


Figure 4

Figure 5

Figure 6

3 Surgical Approach and Cortex Perforation

The method for approaching the insertion site is at the surgeon's discretion and may be altered based on the individual patient's anatomy. The following technique may be used for the surgical approach.

Make a 2–3 cm incision longitudinally along the distal radius over the fourth extensor compartment to expose the implant entry site. Carry dissection down bluntly through the subcutaneous tissues.

Establish the implant insertion point by using the 6.1 mm Cortical Awl Assembly (MS-0204) and the Generic Cannula Assembly (MS-2000) to perforate the cortex just ulnar to Lister's tubercle, approximately 5 mm from the articular surface.

Direct the awl down the canal and insert to the first depth groove labeled "RADIUS." Care should be taken to avoid accidental penetration of the adjacent cortex.

Avoid penetrating the far cortex of the radius when using the awl.

Use the Generic Cannula Assembly in conjunction with the awl as a tissue protector if necessary. Fluoroscopy is helpful when verifying proper alignment of the rod.

Optional: The 6.1 mm x 5" Drill (MS-D761) is provided in the system and may be used as an alternative to the 6.1 mm Cortical Awl Assembly to perforate the cortex.

4 Canal Preparation and Rod Selection

Ream the diaphyseal canal with the 3.1 mm x 300 mm Intramedullary Rod Reamer (RMT3130) and, if necessary to achieve desired cortical engagement, use the 3.7 mm T-Handle Reamer (RMT3730). Start with the smaller reamer to avoid over-reaming. Rod length can be read directly off of the side of the reamer handle labeled "RADIUS."

Note: The reamer should always be used to ensure that the rod will pass down the canal without becoming impacted upon insertion.

6.1 mm Cortical Awl Assembly (MS-0204)

Generic Cannula Assembly (MS-2000)

6.1 mm x 5" Drill (MS-D761)

3.1 mm x 300 mm Intramedullary Rod Reamer (RMT3130)

3.7 mm T-Handle Reamer (RMT3730)

Radius Rod Surgical Technique [continued]

5 Implant Insertion

Insert the Radius Rod (RX-3XXX-S) down the canal and across the fracture site. The rod should be aligned so that the screw is inserted from a dorsal-to-volar direction.

Under fluoroscopy, gently glide the rod tip past the fracture site and up to the proximal metaphysis.

Note: The rod should pass easily down the canal without impaction. If resistance is met, the rod should be withdrawn and the canal checked again with the appropriate reamer.

Verify under fluoroscopy in two directions that the rod has successfully crossed the fracture or fractures and gained reduction. Check that the distal end of the rod has been inserted below the surface of the bone.

Figure 7

Radius Rod
(RX-3XXX-S)

Radius Rod Surgical Technique [continued]

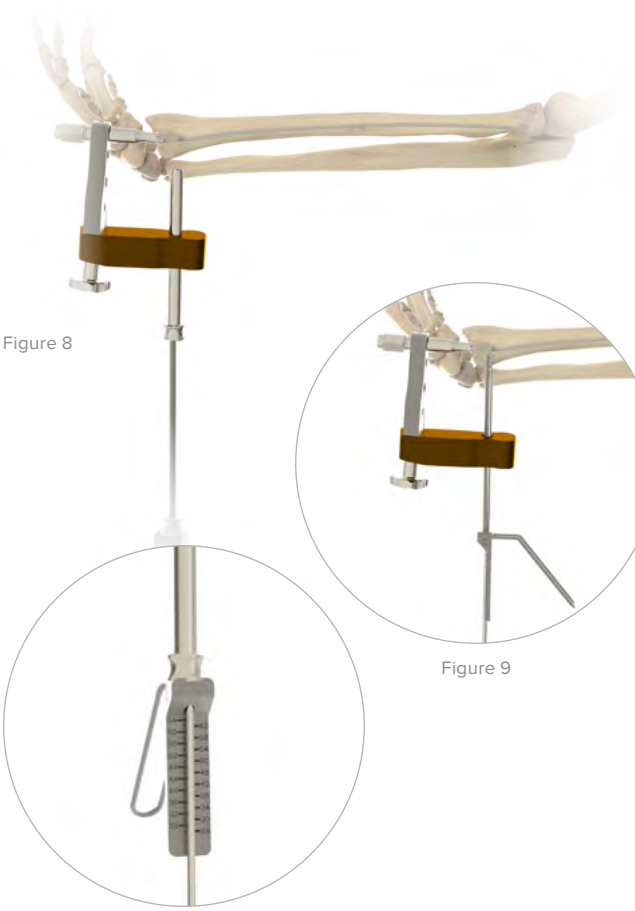


Figure 8

Figure 9

Figure 10

Figure 11

6 Interlocking Screw Insertion

Insert the 3.5 mm Targeting Cannula (HR-3101) and 3.5 mm Targeting Probe (HR-3102) into the targeting guide hole.

Lightly tap the probe against the bone to create a dimple. Insert the 3.5 mm Drill Guide/Depth Gauge (HR-3104) through the cannula. Using the 2.8 mm Tap Drill (HR-D105), drill through both cortices. Ensure that the drill guide is flush to the bone. Use fluoroscopy to verify drill depth that is read off the drill guide.

Remove the drill guide and cannula. Insert the appropriate length 3.5 mm Cortical (Hex) Screw (CO-3XXX-S) through the cannula with the 2.5 mm Solid Hex Driver Assembly (HD-2500).

Note: Verify screw position under fluoroscopy. The screw should not extend past the volar cortex by more than 3 mm.

As the screw is being inserted, a groove on the driver shaft indicates that the screw is fully seated against the bone when it aligns with the back of the cannula.

Be sure that the cannula is fully seated against the bone if this method is used. If dense bone is encountered, use the 3.5 mm Short Cortical Screw Tap (MS-T35S) prior to implanting screws.

Note: The Hexalobe Screw System is not currently designed to be used with the Acumed Forearm Rod System. Surgeons should continue to use the sterile-packed 3.5 mm cortical (hex) screws.

7 Optional: Implant Removal Instructions

If removal of the implant is desired, confirm the location of the implant and screws under fluoroscopy. The soft-tissue dissection should be done at the surgeon's discretion.

Thread the Intramedullary Rod Locking Bolt (MS-0621) to the rod and use the 2.5 mm Solid Hex Driver Assembly (HD-2500) to remove all the screws from the rod. Once the screws have been removed, a hammer or impactor tool may be used to extract the rod. Referencing the Screw Removal Brochure (SPF10-00) may aid in implant extraction.

3.5 mm Targeting Cannula (HR-3101)

3.5 mm Targeting Probe (HR-3102)

3.5 mm Drill Guide/ Depth Gauge (HR-3104)

2.8 mm Tap Drill (HR-D105)

3.5 mm Cortical (Hex) Screw (CO-3XXX-S)

2.5 mm Solid Hex Driver Assembly (HD-2500)

3.5 mm Short Cortical Screw Tap (MS-T35S)

Intramedullary Rod Locking Bolt (MS-0621)

Ordering Information

Sterile Implants

Radius Rods

3.0 mm x 190 mm Radius Rod, Left	RL-3019-S*
3.0 mm x 210 mm Radius Rod, Left	RL-3021-S
3.0 mm x 230 mm Radius Rod, Left	RL-3023-S
3.6 mm x 190 mm Radius Rod, Left	RL-3619-S
3.6 mm x 210 mm Radius Rod, Left	RL-3621-S
3.6 mm x 230 mm Radius Rod, Left	RL-3623-S
3.0 mm x 190 mm Radius Rod, Right	RR-3019-S
3.0 mm x 210 mm Radius Rod, Right	RR-3021-S
3.0 mm x 230 mm Radius Rod, Right	RR-3023-S
3.6 mm x 190 mm Radius Rod, Right	RR-3619-S
3.6 mm x 210 mm Radius Rod, Right	RR-3621-S
3.6 mm x 230 mm Radius Rod, Right	RR-3623-S

Ulna Rods

3.0 mm x 210 mm Ulna Rod	UL-3021-S
3.0 mm x 230 mm Ulna Rod	UL-3023-S
3.0 mm x 250 mm Ulna Rod	UL-3025-S
3.0 mm x 270 mm Ulna Rod	UL-3027-S
3.6 mm x 210 mm Ulna Rod	UL-3621-S
3.6 mm x 230 mm Ulna Rod	UL-3623-S
3.6 mm x 250 mm Ulna Rod	UL-3625-S
3.6 mm x 270 mm Ulna Rod	UL-3627-S

*Part numbers with -S are offered sterile-packed only.

Ordering Information [continued]

Tray Components

1	Hexalobe Screw Caddy	80-1917

Dorsolateral Midshaft Radius Plates

2	6-Hole Dorsolateral Midshaft Radius Plate (80 mm)	70-0074
3	8-Hole Dorsolateral Midshaft Radius Plate (100 mm)	70-0075
4	10-Hole Dorsolateral Midshaft Radius Plate (130 mm)	70-0076
5	12-Hole Dorsolateral Midshaft Radius Plate (160 mm)	70-0077

Midshaft Ulna Plates

6	12-Hole Midshaft Ulna Plate (160 mm)	70-0073
7	10-Hole Midshaft Ulna Plate (130 mm)	70-0072
8	8-Hole Midshaft Ulna Plate (100 mm)	70-0071
9	6-Hole Midshaft Ulna Plate (80 mm)	70-0070

Volar Midshaft Radius Plates

10	6-Hole Volar Midshaft Radius Plate (80 mm)	70-0066
11	8-Hole Volar Midshaft Radius Plate (100 mm)	70-0067
12	12-Hole Volar Midshaft Radius Plate (160 mm)	70-0069
13	10-Hole Volar Midshaft Radius Plate (130 mm)	70-0068

Optional Sterile Implants

Dorsolateral Midshaft Radius Plates

14-Hole Midshaft Dorsolateral Radius Plate (180 mm)	70-0466-S
16-Hole Midshaft Dorsolateral Radius Plate (210 mm)	70-0467-S

Midshaft Ulna Plates

14-Hole Midshaft Ulna Plate (180 mm)	70-0463-S
16-Hole Midshaft Ulna Plate (210 mm)	70-0464-S

Volar Midshaft Radius Plates

14-Hole Volar Midshaft Radius Plate (180 mm)	70-0469-S
16-Hole Volar Midshaft Radius Plate (210 mm)	70-0470-S

*Part numbers with -S are sterile-packed.

*All screws can also be ordered as sterile-packed. Add a "-S" at end of product number for sterile product. For more details on sterile products, including pricing, contact our Business Services Department toll free at 888.627.9957.

Optional Trial Implants

Trial Dorsolateral Midshaft Radius Plates

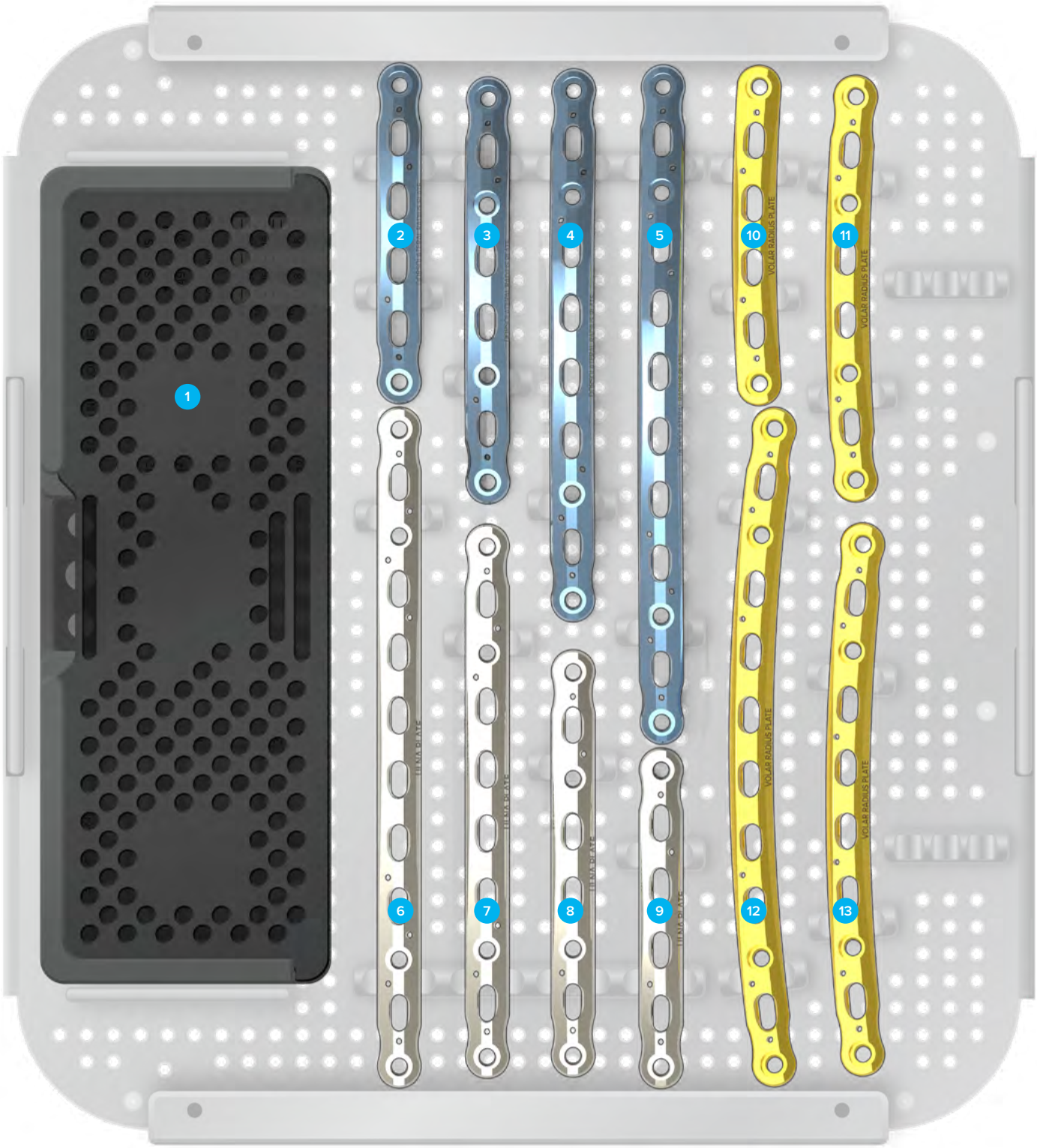
Trial 6-Hole Dorsolateral Midshaft Radius Plate	70T-0074
Trial 8-Hole Dorsolateral Midshaft Radius Plate	70T-0075
Trial 10-Hole Dorsolateral Midshft Radius Plate	70T-0076
Trial 12-Hole Dorsolateral Midshft Radius Plate	70T-0077

Trial Midshaft Ulna Plates

Trial 6-Hole Midshaft Ulna Plate	70T-0070
Trial 8-Hole Midshaft Ulna Plate	70T-0071
Trial 10-Hole Midshaft Ulna Plate	70T-0072
Trial 12-Hole Midshaft Ulna Plate	70T-0073

Trial Volar Midshaft Radius Plates

Trial 6-Hole Volar Midshaft Radius Plate	70T-0066
Trial 8-Hole Volar Midshaft Radius Plate	70T-0067
Trial 10-Hole Volar Midshaft Radius Plate	70T-0068
Trial 12-Hole Volar Midshaft Radius Plate	70T-0069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Ordering Information [continued]

Tray Components

Midshaft Forearm Instrumentation

1	2.3 mm Quick Release Drill	80-0627
2	2.8 mm Quick Release Drill	80-0387
3	Periosteal Elevator	MS-46212
4	Depth Gauge 6–65 mm	80-0623
5	Hexalobe Locking Drill Guide 6–65 mm	80-0668
6	Large Plate Bender	PL-2045
7	15 mm Hohmann Retractor	MS-46827
8	2.8 mm/3.5 mm Thin Drill Guide	PL-2196
9	3.5 mm Narrow Drill Guide Cannula	PL-2095
10	Medium Ratcheting Driver Handle	80-0663
11	3.5 mm Cortical Screw Bone Tap	MS-LTT35
12	3.5 mm x 5" Quick Release Drill	MS-DC35
13	3.0 mm x 5" Quick Release Drill	80-1088
14	2.8 mm x 5" Quick Release Drill	MS-DC28
15	Plate Tack	PL-PTACK
16	T15 Stick Fit Hexalobe Driver	80-0760
17	.045" x 6" ST Guide Wire	WS-1106ST
18	.059 x 5" ST Guide Wire	WS-1505ST
19	Plate Clamp	80-0223
20	Reduction Forceps with Serrated Jaws	PL-CL04

Optional Components

Midshaft Forearm Plate Instrumentation

Angled Drill Guide Assembly	80-0204
Surgical Spreader (Plate Mounted)	80-0251
Surgical Spreader Locking Bolt	80-0252


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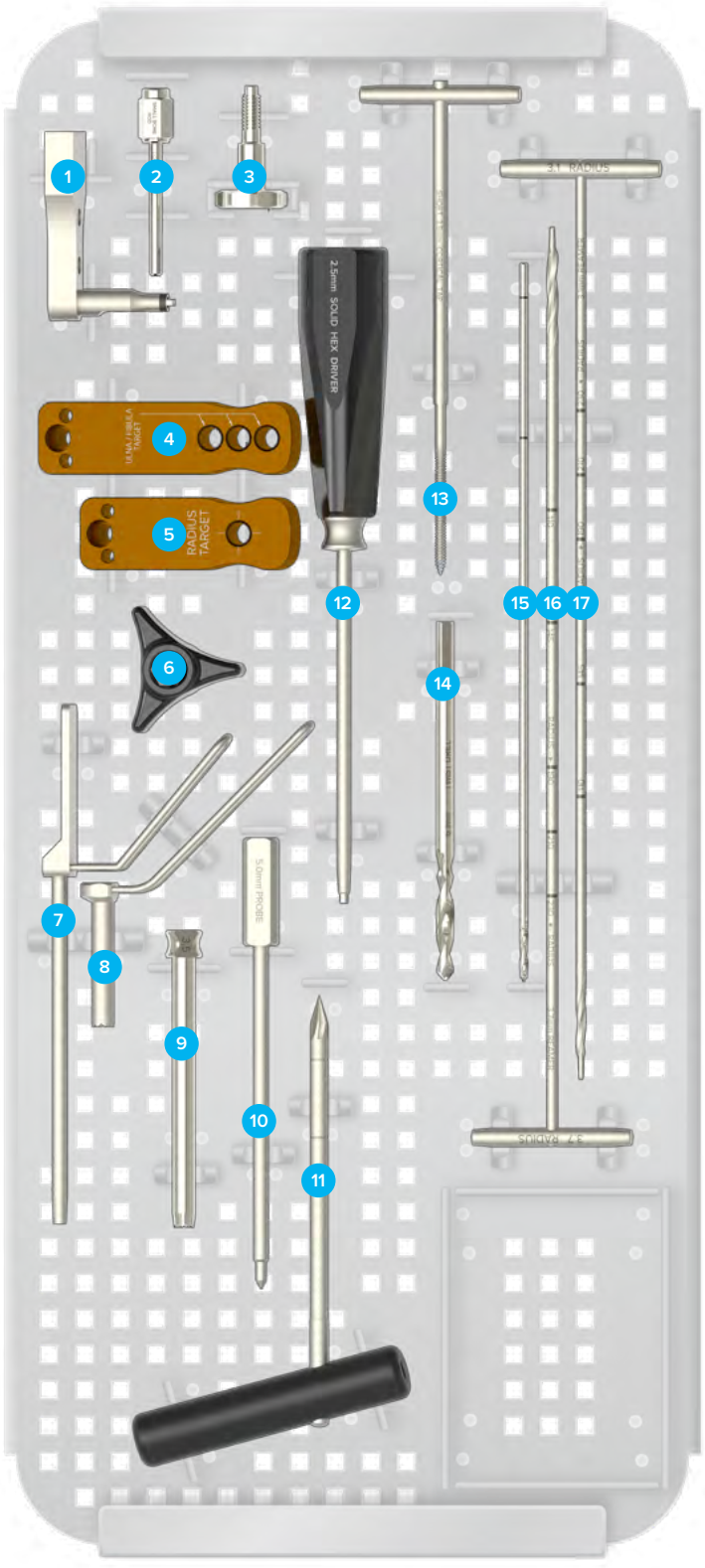
Ordering Information [continued]

Tray Components

Forearm Rod Instrumentation

1	Intramedullary Rod Targeting Base	MS-0620
2	Intramedullary Rod Locking Bolt	MS-0621
3	Rosette Knob	MS-0100
4	Ulna M/L Targeting Guide	MS-0622
5	Radius M/L Targeting Guide	RA-0622
6	Locking Bolt Finger Wrench	MS-0611
7	3.5 mm Drill Guide/Depth Gauge	HR-3104
8	Generic Cannula Assembly	MS-2000
9	3.5 mm Targeting Cannula	HR-3101
10	3.5 mm Targeting Probe	HR-3102
11	6.1 mm Cortical Awl Assembly	MS-0204
12	2.5 mm Solid Hex Driver Assembly	HD-2500
13	3.5 mm Short Cortical Screw Tap	MS-T35S
14	6.1 mm x 5" Drill	MS-D761
15	2.8 mm Tap Drill	HR-D105
16	3.7 mm T-Handle Reamer	RMT3730
17	3.1 mm x 300 mm Intramedullary Rod Reamer	RMT3130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2.5mm SOLID HEX DRIVER
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ULNA FIBULA TARGET
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RADIUS TARGET
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5.0mm PROBE
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Ordering Information [continued]

Screws

3.5 mm Cortical (Hex) Screws

3.5 mm x 12.5 mm Cortical Screw	CO-3125-S
3.5 mm x 15.0 mm Cortical Screw	CO-3150-S
3.5 mm x 17.5 mm Cortical Screw	CO-3175-S
3.5 mm x 20.0 mm Cortical Screw	CO-3200-S
3.5 mm x 22.5 mm Cortical Screw	CO-3225-S
3.5 mm x 25.0 mm Cortical Screw	CO-3250-S
3.5 mm x 27.5 mm Cortical Screw	CO-3275-S
3.5 mm x 30.0 mm Cortical Screw	CO-3300-S
3.5 mm x 32.5 mm Cortical Screw	CO-3325-S

Locking Hexalobe Screws

3.5 mm x 8 mm Locking Hexalobe Screw	30-0232
3.5 mm x 10 mm Locking Hexalobe Screw	30-0233
3.5 mm x 12 mm Locking Hexalobe Screw	30-0234
3.5 mm x 14 mm Locking Hexalobe Screw	30-0235
3.5 mm x 16 mm Locking Hexalobe Screw	30-0236
3.5 mm x 18 mm Locking Hexalobe Screw	30-0237
3.5 mm x 20 mm Locking Hexalobe Screw	30-0238
3.5 mm x 22 mm Locking Hexalobe Screw	30-0239

Nonlocking Hexalobe Screws

3.5 mm x 10 mm Nonlocking Hexalobe Screw	30-0256
3.5 mm x 12 mm Nonlocking Hexalobe Screw	30-0257
3.5 mm x 14 mm Nonlocking Hexalobe Screw	30-0258
3.5 mm x 16 mm Nonlocking Hexalobe Screw	30-0259
3.5 mm x 18 mm Nonlocking Hexalobe Screw	30-0260
3.5 mm x 20 mm Nonlocking Hexalobe Screw	30-0261
3.5 mm x 22 mm Nonlocking Hexalobe Screw	30-0262
3.0 mm x 10 mm Nonlocking Hexalobe Screw	30-0302
3.0 mm x 12 mm Nonlocking Hexalobe Screw	30-0303
3.0 mm x 14 mm Nonlocking Hexalobe Screw	30-0304
3.0 mm x 16 mm Nonlocking Hexalobe Screw	30-0305
3.0 mm x 18 mm Nonlocking Hexalobe Screw	30-0306
3.0 mm x 20 mm Nonlocking Hexalobe Screw	30-0307
3.0 mm x 22 mm Nonlocking Hexalobe Screw	30-0308

*Part numbers with -S are sterile-packed.

*All screws can also be ordered as sterile-packed. Add a “-S” at end of product number for sterile product. For more details on sterile products, including pricing, contact our Business Services Department toll free at 888.627.9957.

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