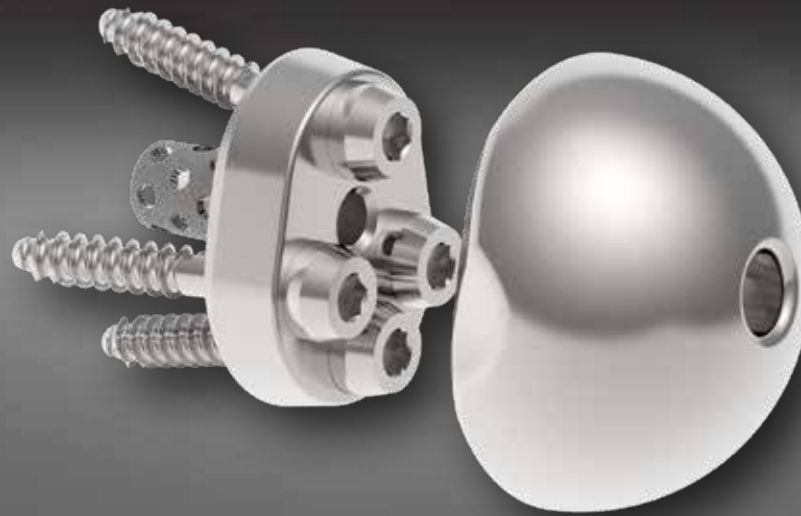


# EXACTECH | EXTREMITIES

Operative Technique Addendum



## equinox®

Small Reverse Shoulder for Ergo®  
Operative Technique Addendum to  
Equinox® Platform Shoulder System



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## NOTE

This document presents an addendum to the Equinox® Platform Shoulder System with Ergo® Instruments operative technique<sup>1</sup> to include the Equinox Small Reverse Shoulder devices.

The Equinox Small Reverse implants are inserted using steps similar to those used to insert the standard Equinox reverse shoulder glenoid plate and glenospheres. The steps described in this operative technique addendum address the steps specific to the Equinox Small Reverse implants and related instrumentation.

Surgeons should be aware the Equinox Small Reverse Shoulder baseplates used with this operative technique addendum provide four screw holes, which may limit fixation options as compared to standard Equinox baseplates, which provide six.

## INTRODUCTION

Thank you for considering the Equinox® Shoulder System. We have been committed to providing clinical solutions to challenges in shoulder arthroplasty since 2004. The Equinox System is unique because of its focus on anatomical replication and options for challenging glenoids and revisions. As a complement to this existing system, we are pleased to present the next generation of our glenoid implants. The Exactech Small Reverse implants were designed through collaboration with thought leaders worldwide; the result is a small baseplate that delivers an anatomic shape, a press-fit bone cage for strong initial fixation, and compatibility with the Equinox platform humeral components. It is our pleasure to present the Equinox Small Reverse Shoulder operative technique.

Respectfully,

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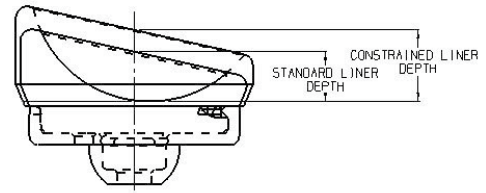
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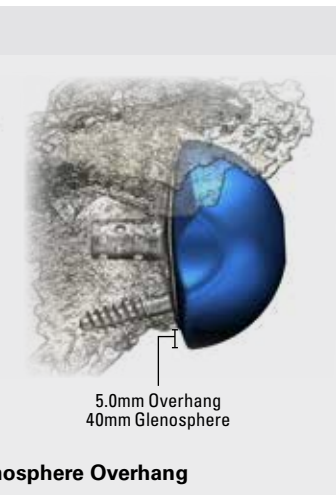
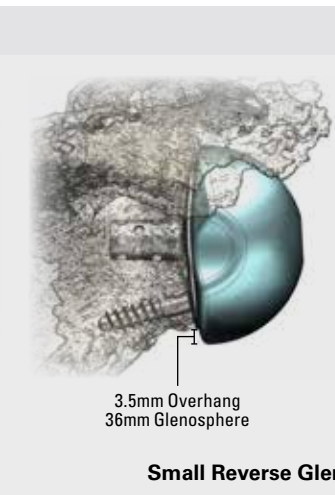
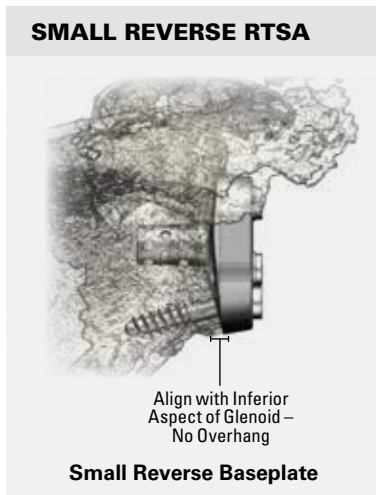
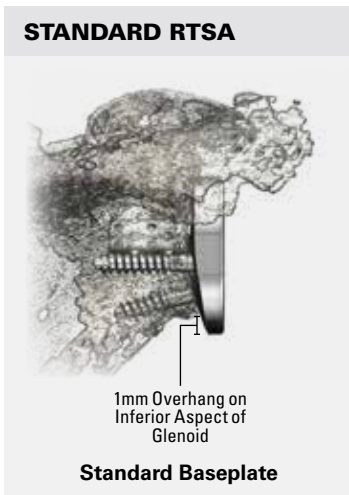
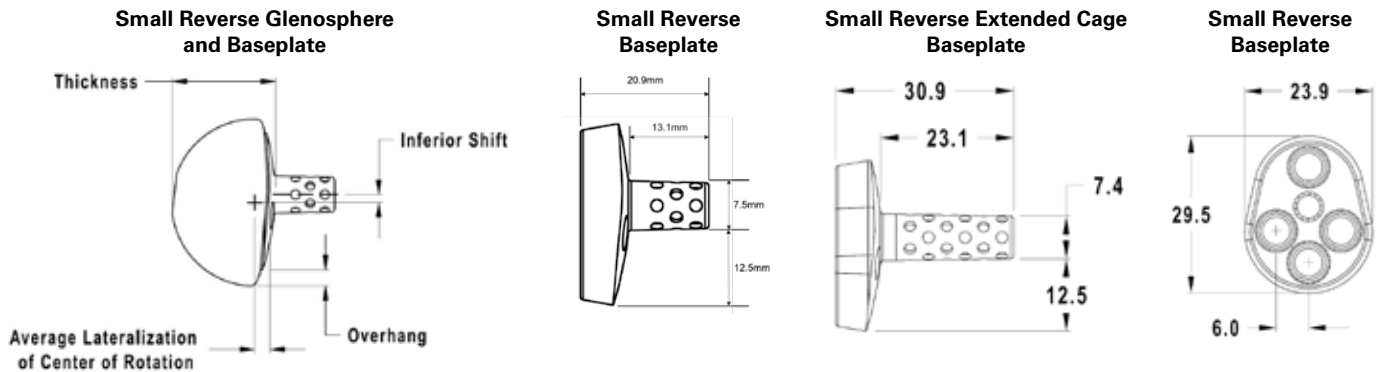
**HUMERAL LINER DEPTH COMPARISONS**

	Standard Liner Depth (+0mm and +2.5mm)	Constrained Liner Depth (+0mm and +2.5mm)
36 Humeral Liners	8.5	12.0
40 Humeral Liners	8.6	12.3



**SMALL REVERSE GLENOSPHERE / GLENOID BASEPLATE**

Part Number	Description	Glenosphere Diameter (mm)	Glenosphere Thickness (mm)	Glenosphere Inferior Overhang (mm)	Average Lateralization of Center of Rotation (mm)
320-31-36	36mm Small Reverse Glenosphere	36	22.3	3.5	2.8
320-31-40	40mm Small Reverse Glenosphere	40	24.3	5.0	2.8
320-32-36	36mm Expanded Small Reverse Glenosphere	36	26.1	3.0	6.6
320-32-40	40mm Expanded Small Reverse Glenosphere	40	28.1	5.0	6.6



Please refer to the Reverse Shoulder section of the Platform Shoulder System with Ergo Instruments Operative Technique for information related to patient positioning, surgical approaches, and the preparation of the humerus (Steps 1 – 3).

## DETAILED OPERATIVE TECHNIQUE



The Equinox Small Reverse implants are inserted using steps similar to those used to insert the standard Equinox reverse shoulder glenoid plate and glenospheres. The steps described in this operative technique addendum address the steps specific to the Equinox Small Reverse implants and related instrumentation.

### INDICATIONS FOR USE

The Equinox Reverse Shoulder System is indicated for use in skeletally mature individuals with degenerative diseases of the glenohumeral joint and a grossly deficient, irreparable rotator cuff. The Equinox Reverse Shoulder is also indicated for a failed glenohumeral joint replacement with loss of rotator cuff function resulting in superior migration of the humeral head.

### CONTRAINDICATIONS FOR USE

Use of the Equinox Shoulder System is contraindicated in the following situations:

- Osteomyelitis of the proximal humerus or scapula; if a systemic infection or a secondary remote infection is suspected or confirmed, implantation should be delayed until infection is resolved.
- Inadequate or malformed bone that precludes adequate support or fixation of the prosthesis.
- Neuromuscular disorders that do not allow control of the joint.
- Significant injury to the brachial plexus.
- Non-functional deltoid muscles.
- Patient's age, weight, or activity level would cause the surgeon to expect early failure of the system.
- The patient is unwilling or unable to comply with the post-operative care instructions.
- Alcohol, drug, or other substance abuse.
- Any disease state that could adversely affect the function or longevity of the implant.



**Figure 1a**

Modular rTSA Reamer and Pilot Tip Driver



**Figure 1b**

Modular rTSA Reamer and  
Cannulated Glenoid Reamer Driver

**REAMING OPTIONS**

The Equinox Reverse System provides two options to ream the glenoid: 1) Pilot Tip and 2) Cannulated (*Figures 1a and 1b*). The Cannulated Reamers rotate a 3.2mm K-wire and provide the surgeon maximum precision. Ensure that the glenoid is reamed up to the appropriate size glenosphere.

**Note:** Avoid applying a bending force to the Pilot Tip Reamer Driver or using the driver to retract the humeral head as this may cause fracture of the 3.2mm K-wire or pilot tip.

## DETAILED OPERATIVE TECHNIQUE

### APPROACH TO GLENOID DRILL GUIDE PLACEMENT



A. DELTOPECTORAL APPROACH

B. SUPEROLATERAL APPROACH

**Figure 2**

Drill Guide Placement on Glenoid

#### STEP A: APPROACH TO GLENOID DRILL GUIDE PLACEMENT

The **Small Reverse Drill Guide Glenoid Baseplate (321-35-20)** should be aligned with the inferior glenoid rim to ensure the glenosphere is properly positioned in the superior-inferior position (*Figure 2*).

Attach the **Small Reverse Glenoid Baseplate Drill Guide (321-35-20)** to the **Modular Glenoid Guide Handle (315-52-11)** by **matching the laser marking on both the Drill Guide and handle**, as shown in *Figure 2*.

**Note:** Two handle orientations (*deltopectoral or superolateral approach*) are offered for the two different surgical approaches.

**Note:** See “Preparing the Glenoid” in the *Equinox Platform Shoulder System with Ergo Instruments Operative Technique* for tips on retractor positioning.

**Note:** While the *Equinox Small Glenoid Plate* does not need to be inferiorly tilted or angled, it should not be implanted with a superior tilt. A neutral orientation is ideal.



**Figure 3**

Drill 3.2mm Pilot Hole Through the K-wire Alignment Guide



**Figure 4a**

Pilot Tip Reaming the Glenoid



**Figure 4b**

Modular rTSA Reamer and Pilot Tip Driver

**STEP B: PILOT-TIP DRILLING & REAMING**

**Pilot-Tip Option: Drill Pilot Hole, Ream the Glenoid and Drill Small Glenoid Plate Hole**

If using the **Pilot Tip Reamers**, the 3.2mm pilot hole is drilled with the **3.2mm Drill W/AO (321-52-07)** through the **K-wire Adapter (315-51-10)** and **Small Reverse Drill Guide Glenoid Baseplate (321-35-20)** to create the central axis for reaming the glenoid (*Figure 3*). It is suggested that the surgeon drill at least to the orange depth marker when making the pilot tip hole.

Next connect the **Modular Reverse Reamer** to the **Pilot Tip Glenoid Reamer Driver (315-50-11)**.

Once the pilot tip hole has been made, place the pilot tip on the reamer into the drilled pilot hole and sequentially ream the glenoid until any pre-identified glenoid erosions are corrected, and the glenoid surface has been fully contoured (*Figure 4a*). Reaming begins with the **Modular Reverse Reamer Starter (321-50-01)** and progresses to the other

**Modular Reverse Reamers** sizes 36/38mm (**321-50-38**) and the 40/42mm (**321-50-42**) based upon the anticipated size of the glenosphere (*Figure 4b*).

It is critical to ream to the size of the largest potential glenosphere that the surgeon might use to ensure that the glenosphere will fit on the face of the glenoid without peripheral bony impingement (i.e., the glenoid plate will already be fixed to the glenoid and upsizing the glenosphere during trialing will not be possible if the corresponding reaming has not already been performed) (*Figure 3*).

**Note:** Verify that the handle mechanism is locked on the Drill Guide prior to inserting into the wound.

**Note:** Check that the reamer or drill is engaged on the driver handle before starting.

**Note:** Start the reamer prior to engaging bone.

**Note:** Avoid applying a bending force to the 3.2mm K-wire as this may cause fracture.

## DETAILED OPERATIVE TECHNIQUE

### PILOT-TIP DRILLING & REAMING



**Figure 5**

Pilot Tip Cage Hole Drilling

#### **DRILL CAGE HOLE**

Drill the hole after reaming has been completed.

**Pilot Tip Method:** The inferior aspect of the **Small Reverse Drill Guide (321-35-20)** is realigned with the inferior aspect of the glenoid.

Connect the **Small Reverse Modular Pilot Tip Drill (315-52-60)** to the **Cannulated Glenoid Reamer Driver (315-50-12)**, and drill the cage hole through the **Small Reverse Drill Guide (Figure 5)**. The collar around the Modular Center Peg Drill should be fully seated on the Small Glenoid Plate Drill Guide to ensure the proper depth is drilled for the cage.

**Note:** The Small Reverse size Modular Center Peg Drill and Modular Cannulated Center Peg Drill are indicated with a silver head. Gold is used only for the standard baseplate.





**Figure 6**

Align Small Reverse Drill Guide Glenoid Baseplate and K-wire Adapter Assembly on Glenoid



**Figure 7**

Insert K-wire through Small Reverse Drill Guide and K-wire Adapter Construct

**STEP C: CANNULATED DRILLING & REAMING**

**Cannulated Method:** Align the inferior aspect of the Small Reverse Drill Guide (321-35-20) with the inferior aspect of the native glenoid bone. Attach the **K-Wire Adapter (315-51-10)** into the Small Reverse Drill Guide Glenoid Baseplate (Figure 6).

Insert the 3.2mm K-wire through the assembled guide. Drive the K-wire through the K-wire Adapter connected to the Modular Glenoid Plate Drill Guide (Figure 7). Remove the guide assembly by sliding it over the inserted K-wire adapter.

## DETAILED OPERATIVE TECHNIQUE

### CANNULATED DRILLING & REAMING



**Figure 8a**  
Modular rTSA Reamer and Cannulated  
Glenoid Reamer Driver



**Figure 8b**  
Starter Reamer



**Figure 8c**  
Cannulated Reaming the Glenoid: Start with the Starter  
Reamer, Then Advance to 36/38mm and 40/42mm  
Based Upon Anticipated Glenosphere Size

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**Cannulated Reaming:** Once you have the K-wire in position, reaming begins with the **Reverse Shoulder Starter Reamer (321-50-01)** and progresses to the **36/38mm (321-50-38)** and **40/42mm (321-50-42)** sizes based upon the anticipated size of the glenosphere. Sequentially ream the glenoid over the K-wire until any pre-identified glenoid erosions are corrected and the glenoid surface has been fully contoured (*Figure 8*).

It is critical to ream to the size of the largest glenosphere that the surgeon might use to ensure that the glenosphere will fit on the face of the glenoid without peripheral bony impingement (i.e. the glenoid plate will already be fixed to the glenoid and up-sizing the glenosphere during trailing will not be possible if the corresponding reaming has not already been performed).

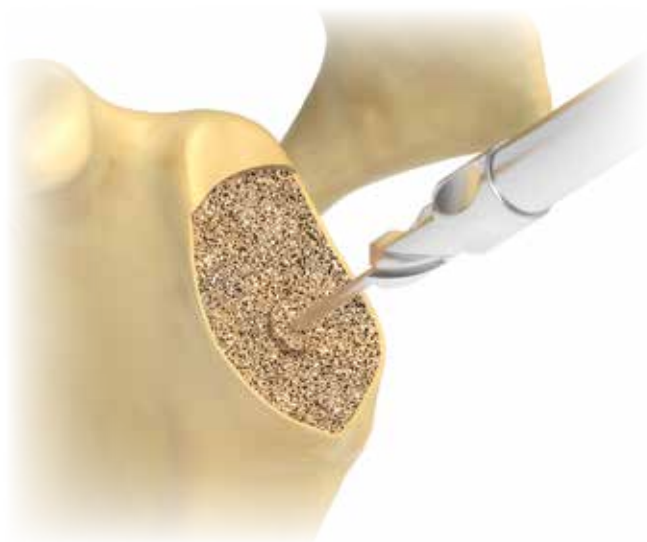
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**SURGICAL TIP**  
Start the reamer prior to engaging bone.

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## DETAILED OPERATIVE TECHNIQUE

### CANNULATED DRILL CAGE HOLE & IMPLANTING THE SMALL GLENOID PLATE



**Figure 9**

Drill Over K-wire with Small Reverse Modular Cannulated Drill



**Figure 10**

Assemble the Small Glenoid Plate with Bone Graft

After reaming over the K-wire, drill over the existing K-wire with the **Small Reverse Modular Cannulated Drill (315-52-66)** until the drill collar is fully seated on the glenoid (*Figure 9*). Remove K-wire once glenoid preparation is complete.

#### STEP D: IMPLANTING THE SMALL GLENOID PLATE

Prior to implanting the **Small Glenoid Plate (320-35-01)**, there are two options that exist for placing bone graft in the small glenoid plate's cage (*Figure 10*).

1) Use the **Glenoid Plate Coring Reamer (321-09-10)** to create a 6mm autograft bone column from the humeral head or other suitable location as deemed appropriate by the surgeon and insert the bone column directly into the cage.

2) Place allograft (e.g., 1cc of either Optecure® with CCC or Optecure® in a syringe) or morselized autograft manually into the cage.

**Note:** Take care to prevent bone graft from getting on the screw-hole threads as this could prevent adequate screw engagement.

## DETAILED OPERATIVE TECHNIQUE

### DRILL AND IMPLANT COMPRESSION SCREWS



**Figure 11**

Glenoid Plate and Baseplate Inserter  
Placement on Glenoid



**Figure 12**

Implanted Glenoid Plate

#### IMPLANTING THE GLENOID PLATE

Once the Small Glenoid Plate is ready for insertion, the Small Glenoid Plate is attached to the **Small Glenoid Plate Inserter (321-35-24)** and connected to the **Modular Impactor Handle (321-09-05)** or **Impactor Handle (321-07-05)**. The inserter connects to the top half of the Small Glenoid Plate such that the central pin aligns with the threaded central hole and the peripheral pegs connect to the top peripheral holes of the Small Glenoid Plate. The Small Glenoid Plate is press-fit into position taking care to respect the correct rotational orientation (*Figure 11*).

**Note:** When inserting the final implant, keep the inserter pointed up with a hand underneath until the implant is in the wound.

**Note:** Remove inserter by pulling straight back. Do not bend and pull.

**WARNING:** Don't assemble or disassemble devices in the surgical field.

#### STEP E: DRILL AND IMPLANT COMPRESSION SCREWS

The four holes on the Small Glenoid Plate provide the surgeon with options to maximize fixation of the Small Glenoid Plate, and each case should be individualized (*Figure 12*). Using all four (4) screw locations will provide maximum fixation and support of the Small Glenoid Plate.

Length (mm)	Diameter (mm)	Color-code
18	4.5	White
22	4.5	Black
26	4.5	Orange
30	4.5	Blue
34	4.5	Red
38	4.5	Green
42	4.5	Yellow
46	4.5	Purple

**Table 1**  
Compression Screws



**Figure 13**

Drilling Pilot Hole for Compression Screw



**Figure 14**

Compression Screw Insertion

The holes should be drilled using the **Adjustable Angle Drill Guide (321-19-05)** and the **3.2mm Drill W/AO (321-52-07)**, taking note of the depth of each hole using either the color-coded drill or the **Glenoid Screw Depth Gage (321-19-09)** (Figure 13). Each hole on the Small Glenoid Plate allows 20 degrees of angular variability so the orientation of the screws can be selected to maximize bone purchase.

The **4.5mm Compression Screws (Kits: 320-20-18,22,26,30,34,38,42,46 include standard locking caps)** are provided in lengths between 18mm and 46mm in 4mm increments (Table 1). The appropriately sized Compression Screws are inserted into the drilled holes to achieve fixation and compression of the Small Glenoid Plate to the glenoid (Figure 14). If power is used to initially insert the screws, caution should be taken to perform the final seating by hand. This will maximize fixation. A **Ratcheting Screw Driver Handle** and **Hex Screw Driver** are included in the instrument set to facilitate the placement and tightening of the screws.

**Note:** The central cage of the glenoid plate limits the angular variability for converging screws.

## DETAILED OPERATIVE TECHNIQUE

### TIGHTEN LOCKING CAPS

Curvature	Color of Trials
36mm	Green
40mm	Purple

**Table 2**  
Color-Coding of Trials



**Figure 15**  
Standard Locking Cap Insertion



**Figure 16**  
Glenosphere Implant Assembly

#### STEP F: TIGHTEN LOCKING CAPS

After all Compression Screws are tightened by hand as deemed appropriate by the surgeon, the surgeon should insert the **Locking Caps (Kits: 320-20-18,22,26,30,34,38, 42,46 include compression screws)** into each screw hole. This will lock each Compression Screw and prevent the screws from backing out. **Locking Caps are threaded perpendicular to the plate** (Figure 15).

For the Small Reverse Shoulder, the Glenosphere Trial and Humeral Liner Trial colors are shown in Table 2. See "Inserting the Glenosphere Trial" in the Equinox Platform Shoulder System Operative Technique<sup>2</sup> for additional information regarding Glenosphere and Glenosphere Trial insertion instruments and technique.

#### STEP G: INSERT GLENOSPHERE TRIAL OR GLENOSPHERE

The appropriately-sized glenosphere is defined by implanting the largest one that can be inserted based upon exposure and the coracoacromial arch anatomy (ensuring that it was reamed up to that size during the glenoid reaming step).

**Note: Unlike circular baseplates, the anatomical shape of the Equinox Small Glenoid Baseplate mandates that the glenosphere can only fit in one specific orientation.**

A standard and Ergo Equinox glenosphere inserters can be used for insertion of the Small Reverse Glenosphere Trials and Glenospheres. Glenosphere does not have a taper connection and should not be impacted. The glenosphere is secured with a locking screw using the 3.5mm Hex Driver (Figure 16).



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**SURGICAL TIP**

Attaining adequate glenoid exposure is critical for this step, especially posterior glenoid exposure. The Posterior Glenoid Retractor included in the set can help provide the posterior clearance necessary to implant the Glenosphere.

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**Please refer to the reverse shoulder section of the Equinox Platform Shoulder System Operative Technique<sup>2</sup> for information related to the implantation of the humeral components closure and post-operative rehabilitation.**

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**SURGICAL TIP**

If you hear the Glenosphere Locking Screw “squeaking” prior to the screw head being recessed in the glenosphere apical hole—STOP. The glenosphere is not seated on the baseplate correctly. Run an instrument along the backside of the glenosphere to feel for the plate. You should not feel any of the plate if the glenosphere is seated properly. You can also visually assess this anteriorly.

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## IMPLANT LISTING

### CATALOG NUMBER DESCRIPTION

320-20-18	Compression Screw/Locking Cap Kit, 4.5 x 18mm, White
320-20-22	Compression Screw/Locking Cap Kit, 4.5 x 22mm, Black
320-20-26	Compression Screw/Locking Cap Kit, 4.5 x 26mm, Orange
320-20-30	Compression Screw/Locking Cap Kit, 4.5 x 30mm, Blue
320-20-34	Compression Screw/Locking Cap Kit, 4.5 x 34mm, Red
320-20-38	Compression Screw/Locking Cap Kit, 4.5 x 38mm, Green
320-20-42	Compression Screw/Locking Cap Kit, 4.5 x 42mm, Yellow
320-20-46	Compression Screw/Locking Cap Kit, 4.5 x 46mm, Purple



320-31-36	Small Reverse Glenosphere, 36mm
320-31-40	Small Reverse Glenosphere, 40mm



320-32-36	Small Reverse Expanded Glenosphere, 36mm*
320-32-40	Small Reverse Expanded Glenosphere, 40mm*

*\*Small Reverse Expanded Glenosphere's are not in the Ergo Trays, order OPT-321SMEXPAND.*

320-35-01	Small Reverse Glenoid Baseplate
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320-36-00	Small Reverse Humeral Liner, 36mm, +0
320-36-03	Small Reverse Humeral Liner, 36mm, +2.5mm
320-36-10	Small Reverse Humeral Liner, 36mm, +0mm Constrained
320-36-13	Small Reverse Humeral Liner, 36mm, +2.5mm Constrained



320-40-00	Small Reverse Humeral Liner, 40mm, +0
320-40-03	Small Reverse Humeral Liner, 40mm, +2.5
320-40-10	Small Reverse Humeral Liner, 40mm, +0 Constrained
320-40-13	Small Reverse Humeral Liner, 40mm, +2.5 Constrained



## INSTRUMENT LISTING

**CATALOG NUMBER    DESCRIPTION**

315-52-11            Modular Glenoid Guide Handle



321-35-20            Small Reverse Drill Guide Glenoid Baseplate



315-51-10            3.2mm K-wire Adapter



321-35-24            Small Reverse Inserter Glenoid Baseplate



321-31-36            Small Reverse Glenosphere Trial, 36mm  
 321-32-36            Small Reverse Glenosphere Trial, 36mm Expanded\*



321-31-40            Small Reverse Glenosphere Trial, 40mm  
 321-32-40            Small Reverse Glenosphere Trial, 40mm Expanded\*



*\*Small Reverse Expanded Glenospheres are not in the Ergo Trays, order OPT-321SMEXPAND.*

321-36-00            Small Reverse Humeral Liner Trial, 36mm, +0  
 321-36-03            Small Reverse Humeral Liner Trial, 36mm, +2.5  
 321-36-10            Small Reverse Humeral Liner Trial, 36mm, +0, Constrained  
 321-36-13            Small Reverse Humeral Liner Trial, 36mm, +2.5, Constrained



321-40-00            Small Reverse Humeral Liner Trial, 40mm, +0  
 321-40-03            Small Reverse Humeral Liner Trial, 40mm, +2.5  
 321-40-10            Small Reverse Humeral Liner Trial, 40mm, +0, Constrained  
 321-40-13            Small Reverse Humeral Liner Trial, 40mm, +2.5, Constrained



321-09-36            Humeral Liner Impactor Tip 36mm, Green  
 321-09-40            Humeral Liner Impactor Tip 40mm, Purple



315-52-60            Pilot Tip Drill Bit



315-52-66            Cannulated Drill Bit







## REFERENCES

1. 00-0000121 Rev. B. Platform Shoulder System with Ergo Instruments Operative Technique.
2. 718-01-30 Rev. J, Platform Shoulder System Operative Technique.

## ADDITIONAL RESOURCES

718-04-45 Rev. C Small Reverse Operative Technique with Legacy Instrumentation Addendum

For additional device information, refer to the Equinoxe Platform Shoulder System—Instructions for Use for a device description, indications, contraindications, precautions and warnings. For further product information, please contact Customer Service, Exactech, 2320 NW 66th Court, Gainesville, Florida 32653-1630, USA. (352) 377-1140, (800) 392-2832 or FAX (352) 378-2617.

Exactech, as the manufacturer of this device, does not practice medicine, and is not responsible for recommending the appropriate surgical technique for use on a particular patient. These guidelines are intended to be solely informational and each surgeon must evaluate the appropriateness of these guidelines based on his or her personal medical training and experience. Prior to use of this system, the surgeon should refer to the product package insert for comprehensive warnings, precautions, indications for use, contraindications and adverse effects.

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