Surgical Technique

SuperCable™

Grip and Plate System*

US and International Patents Pending

*Featuring Agilock™ Technology
CAUTION: Trochanteric grips, cable-plates, and bone screws are supplied in a non-sterile condition. Follow the steam sterilization instructions that are contained in the product package insert.
Introduction

The Kinamed SuperCable™ Trochanteric Grip and Cable-Plate System is designed specifically for use with the SuperCable Iso-Elastic™ polymer cerclage cable. Holes integrated in the grips and plates allow passage of the Iso-Elastic cerclage cable for secure fixation of the plate to bone. Screw fixation may be achieved using locking screws*, compression screws, or a combination of both. The unique figure-of-eight design of the screw fixation holes allows locking or compression screws to be used on either side, giving the surgeon greater flexibility in the management of complex fractures. Trochanteric grips and cable-plates are available in a variety of lengths in both straight and curved configurations for improved anatomic fixation.

Indications

- The SuperCable Grip and Plate System is indicated for use where wire, cable, or band cerclage is used in combination with a trochanteric grip or bone plate.
- The SuperCable Grip and Plate System is intended to be used in conjunction with the SuperCable Iso-Elastic Cerclage System for reattachment of the greater trochanter following osteotomy or fracture, and for fixation of long bone fractures.

The SuperCable Trochanteric Grips are primarily indicated for the following:

- Trochanteric osteotomy
- Extended trochanteric osteotomy
- Trochanteric fracture
- Periprosthetic long bone fractures

The SuperCable Cable-Plates are primarily indicated for the following:

- Periprosthetic long bone fractures
- Comminuted long bone fractures
- Fractures in osteopenic bone

*Featuring Agilock™ Technology
Features

Trochanteric Grips
• Integrated holes designed specifically for use with SuperCable polymer cerclage
• Unique proximal cable hole geometry minimizes cable stress
• Large proximal hooks engage greater trochanter
• Smaller distal hooks provide additional stability
• Proximal screw hole allows for secure fixation using a locking or standard bone screw
• Extended grips allow additional cable placement and compression, locking, or combination screw fixation distal to the lesser trochanter
• Titanium construction

Cable-Plates
• Integrated holes designed specifically for use with SuperCable polymer cerclage
• Screw fixation holes allow for use as compression, locking, or combination plate
• Titanium construction

Screw fixation holes
• Compression screws may be used on either side of the figure-of-eight hole to direct interfragmentary compression in either direction
  • 57° of longitudinal screw angulation
  • 16° of transverse screw angulation
• Locking screws may be used on either side of the figure-of-eight hole for increased placement options

Screws
• 5.0 mm diameter locking screw
• 4.5 mm diameter compression (cortical) screw
• Available in lengths from 10 to 50 mm
• Self-tapping flutes
• Titanium construction
Fixation Principles

Compression Plating

- Fracture is stabilized with the option of imparting interfragmentary compression
- Absolute stability of the fracture is necessary for primary healing response to occur\(^4,7,17\)
- Stability of the construct under loading is dependent on compression of the plate against bone resulting in friction between the plate and bone\(^4,7,25\)
- Not a fixed angle construct; screws may toggle in the plate and loosen independently\(^4,7,14,32\)
- Periosteum may be compressed beneath plate, limiting blood flow\(^4,26\)
- Compression of the plate against bone may not be possible in osteoporotic bone because of poor screw purchase\(^4,7\)
- Works well for good bone, simple fractures\(^26,32\)

Locked Plating

- Screw head and plate hole are threaded to create a fixed angle, single beam construct\(^4\)
- Acts as an “internal fixator”\(^4,17,25,29\)
- Plate does not need to contact bone for stability, thereby preserving the periosteal blood supply\(^4,26,32\)
- Pullout strength is much greater than compression plating since plate and screws act as single construct\(^4,25\)
- Healing is dependent on relative stability of the bone fragments and callus formation\(^4,19\)
- Works well for comminuted fractures, osteoporotic bone\(^3,7,25,32\)
- Pullout strength of a unicortical locking screw is approximately 70% of a bicortical compression screw\(^17\)

Combination Plating

- A combination of compression and locked plating techniques may be used for a simple fracture at one level (compression) with a comminuted fracture at a different level (locked)\(^6,25,28\)
- A combination of compression and locking screws may be used in osteoporotic bone; compression screws are placed first to stabilize the fracture, followed by locking screws to provide additional fixation stability\(^14,31\)
- A combination of screws may also be used in periprosthetic fractures around well fixed implants, with unicortical locking screws and cables placed proximally in the region of the implant, and either standard bicortical screw fixation or cerclage cables placed distally\(^21\)
Surgical Technique

Trochanteric Grip Fixation Technique

Step 1. Select Grip
From the SuperCable Grip and Plate System instrument tray, choose the trochanteric grip that is most appropriate for the fractured or osteotomized trochanter fragment. Refer to page 2 for available grip options.

Step 2. Position Grip
Attach the 4.0 mm Threaded Drill Guide 120 mm (35-86U-10/0) to the grip by placing the base of the guide over the threaded hole in the proximal portion of the grip and screwing the handle of the guide so that it fully engages the grip.

Use the guide to place the proximal hooks of the grip into or above the greater trochanter and reduce the assembly into position on the bleeding bone of the femur. The guide handle may be moderately impacted to penetrate the grip hooks into the trochanter.

NOTES:

• Consider advancement of the trochanteric fragment or osteotomy distally so that bone contact is obtained. This also allows the cables to be tensioned more effectively by placing them more perpendicular to the femoral axis, thus decreasing the chance of superior escape (A common reason for trochanteric non-union is inadequate bone contact).13

• It may be advantageous to perform Step 3 prior to Step 2 (i.e. feed the first cable through the grip prior to positioning the grip on the trochanter.)

• The strands of the proximal cable should be passed through or below the lesser trochanter. A 3.2mm drill may be used to create a hole in the lesser trochanter. Distal cables may be passed below the lesser trochanter as an alternative.

CAUTION: Exercise caution in using the cable passer or other instruments to avoid damage to neurovascular structures or grip and plate implants and to minimize soft tissue interposition that could affect proper cable tensioning.

Step 3. Position Cable
Open the desired number of sterile SuperCable Iso-Elastic Ceramic System cables and deliver to the sterile field. Based on the surgical approach, the cable locking clasp should be positioned on the anterior or posterior surface of the femur as shown:

NOTE: When feeding cable through the grip, feed cable in the direction that results in the cable wedge facing towards the grip. This orientation will ensure proper directionality for the tensioning device.
Surgical Technique

Trochanteric Grip Fixation Technique (continued)

Step 4. Secure Cable

Feed the ends of the cable through its locking clasp and pull taut so that each cable strand is the same length and the locking clasp is away from the grip and in contact with the bone or allograft. Based on the planned surgical approach, determine in advance the direction that the cables will be tensioned.

**CAUTION:** Avoid wrapping the cable over sharp implant or bone graft edges or rough surfaces (e.g. porous coating). The locking clasp should not contact the trochanteric grip, screws, or prosthesis.

Step 5. Tension Cable (Refer to SuperCable Surgical Technique for complete details).

- Feed the free cable ends through the cable gripper of the tensioning instrument (A).
- Attach the tensioning instrument to the locking clasp by engaging the instrument’s nosepiece to the base of the clasp. Maintain proper alignment between the tensioning instrument and locking clasp (B).
- Tension in each cable strand should be equalized. After the two free cable ends are inserted into the tensioning instrument, the ends should be pulled taut so as to equalize their length.
- Turn the tightening lever clockwise to grip the cable ends securely (C).
- While maintaining proper alignment between the tensioning instrument and clasp, apply tension by turning the outer knob on the tensioning instrument clockwise. Be careful to grasp only the outer knurled part of the knob while turning. Once slack has been taken up in the cable and resistance is initially felt, the white line on the outer knob should align with the “zero” dot on the inner knob while turning the knob clockwise (D). Continue turning the knob until the desired tension is achieved. The tension indicator marks (LO, HI) should be read while torque is applied to the outer knob (E and F).
- Lock the cable clasp by depressing the button in the end of the wedge insertion lever and pulling back on the lever fully to insert the wedge (G).
- To release the tensioning instrument from the cable, first turn the knob counter-clockwise to release tension. Then turn the tightening lever counter-clockwise to release the cable ends. The tensioning instrument may then be released from the clasp. Do not cut the free cable ends yet, as these will allow for subsequent re-tightening.

**CAUTION:** Choose the amount of cable tension based on bone quality of the patient. Do not tension the cable such that the line on the knob passes the second solid line, exceeding 120 lbs. (530 N) of compressive force.
Surgical Technique

Trochanteric Grip Fixation Technique (continued)

Repeat steps 3 through 5 for additional cables and pairs of holes in the grip.

**NOTE:** Each cable should be tensioned sequentially so as to compensate for movement in the fracture construct as each cable is tensioned. Due to minor settling of the fracture construct, all cables should be checked for optimal tension prior to trimming their free ends.

If desired, each cable may be re-tightened by re-attaching the tensioning instrument to each clasp, re-tensioning the cable assembly, and fully re-seating the locking wedge (see diagrams A through G on page 7).

**Step 6. Screw Fixation (optional)**

Grips accommodate bone screws in addition to cables. The most proximal fixation hole in the grips accepts a locking or standard bone screw. For placement of screws, refer to the Bone Screw Technique on pages 11-12.

**NOTE:** It may be advantageous to employ a unicortical locking screw proximally for additional trochanteric fixation.

⚠️ **CAUTION:** If a bicortical screw is used, avoid placing the cable in the region of the screw tip. Screws protruding through the far cortex could potentially damage the cable.

**Step 7. Trim Cable Ends**

After all cables have been sequentially tensioned as desired, use a scalpel or scissors to trim the free cable ends flush with the locking clasp. **Cable cannot be retensioned after free ends have been trimmed.**

![Trim cable ends.](image)

**NOTES:**

- The cable clasp should be placed in a region of bone that maximizes the conformity between the clasp and underlying surface (bone or allograft).
- Stainless steel and titanium implants should not be used in combination.
Surgical Technique
Cable-Plate Fixation Technique

Step 1. Select Plate
From the SuperCable Grip and Plate System Instrument Tray, choose the cable-plate that is most appropriate for the fracture. Refer to page 2 for available cable-plate options.

NOTES:
• For comminuted diaphyseal fractures, the recommended plate length is 2 to 3 times greater than the fracture length in a bridge plate technique.6,25
• For internal fixation of periprosthetic fractures around a well-fixed stem in which the implant is retained, the plate should be of sufficient length to overlap as much of the intramedullary implant as possible while allowing adequate screw or cerclage cable fixation distal to the implant and fracture.21,22,24

Step 2. Position Plate
Position the plate accordingly and hold in place using plate holding forceps or other means.

CAUTION: Exercise caution in using the cable passer or other instruments to avoid damage to neurovascular structures or grip and plate implants and to minimize soft tissue interposition that could affect proper cable tensioning.

NOTE: It may be advantageous to perform Step 3 prior to Step 2 (i.e. feed the first cable through the plate prior to positioning the plate on the bone.)

Step 3. Position Cable
Open the desired number of sterile SuperCable Iso-Elastic Cerclage System Cables and deliver to the sterile field. Based on the surgical approach, the cable locking clasp should be positioned on the anterior or posterior surface of the femur as shown to provide for proper access of the tensioning instrument.

NOTE: For a plate placed on the lateral aspect of the femur through a lateral approach, feed cable in the direction that results in the cable wedge facing towards the plate. This orientation will ensure proper directionality for the tensioning device.

Step 4. Secure Cable
Feed the ends of the cable through its locking clasp and pull taut. Ensure that the locking clasp is in contact with bone or allograft, but not contacting the plate. Based on the planned surgical approach, determine in advance the direction that the cables will be tensioned.

CAUTION: Avoid wrapping the cable over sharp implant or bone graft edges or rough surfaces (e.g. porous coating). The locking clasp should not contact the cable-plate, screws, or prosthesis.
Surgical Technique
Cable-Plate Fixation Technique (continued)

Step 5. Tension Cable
Apply tension and lock the cable clasp as described on page 7 and in the SuperCable Iso-Elastic Cerclage System Surgical Technique. Do not cut the free cable ends yet, as these will allow for subsequent re-tightening.

Repeat steps 3 through 5 for additional cables and pairs of holes in the cable-plate.

NOTE: Each cable should be tensioned sequentially so as to compensate for movement in the fracture construct as each cable is tensioned. Due to minor settling of the fracture construct, all cables should be checked for optimal tension prior to trimming their free ends.

If desired, each cable may be re-tightened by re-attaching the tensioning instrument to each clasp, re-tensioning the cable assembly, and fully re-seating the locking wedge (see diagrams A through G on page 7).

⚠️ CAUTION: Choose the amount of cable tension based on bone quality of the patient. Do not tension the cable such that the line on the knob passes the second solid line marked “HI”, exceeding 120 lbs. (530 N) of compressive force (see page 7, Figure F). Typically, with good bone quality, the cable can be tensioned to the “HI” mark.

Step 6. Screw Fixation (optional)

Cable-plates accommodate bone screws in addition to cables. For placement of screws, refer to the Bone Screw Technique on pages 11-12.

NOTES:

- For periprosthetic fractures, a combination of cerclage cables and unicortical locking screws may be used in the zone of the intramedullary implant.

- To create a bridging construct and promote callus formation in the treatment of comminuted diaphyseal fractures, at least 2 to 3 screw holes should be left open at the level of the fracture when locking screws are placed on both sides of the fracture.⁵,⁶,²⁵

⚠️ CAUTION: If a bicortical screw is used, avoid placing the cable in the region of the screw tip. Screws protruding through the far cortex could potentially damage the cable.

Step 7. Trim Cable Ends

After all cables have been sequentially tensioned as desired, use a scalpel or scissors to trim the free cable ends flush with the locking clasp. **Cable cannot be retensioned after free ends have been trimmed.**

Trim cable ends.
Surgical Technique

Bone Screw Fixation Technique

Based on the quality of bone and stability of the fracture construct, supplemental fixation may be accomplished with either conventional compression (cortical) screws, locking screws, or a combination of both types.

NOTES:

- Locking screws create a fixed-angle construct and will not promote anatomical reduction unless previously accomplished with compression screws, cables, or other means. Once locking screws are secured, the position of the plate becomes fixed relative to the bone.
- Locking and compression screws may be used simultaneously in the grip and cable-plate implants. Always insert and tighten compression screws prior to the insertion of locking screws.
- If a locking screw is inserted first, ensure that the plate is held securely by cables or by other means to avoid spinning of the plate as the locking screw is tightened into the plate.
- If bone screws are inserted under power, final seating should be performed manually to avoid cross-threading, stripping, or over-torquing.
- The use of unicortical locking screws near an intramedullary implant may require supplementary fixation with cerclage cables at this level.
- Contouring or bending the plate at or near a threaded hole may deform the threads and prevent the insertion of a locking screw.

Locking Screw Fixation Technique

Fully insert the 4.0 mm Threaded Drill Guide 60 mm (35-860-1030) into the locking hole of the plate. Ensure that the drill guide is fully threaded into and perpendicular to the plate. Failure to do so will risk damaging the plate and screw threads.

⚠️ CAUTION: Application of excessive force to the drill guide may result in stripping of the plate threads.

With the drill guide in place, pre-drill the screw hole using the 4.0 mm Drill Bit 145 mm (35-860-1010). Remove the threaded drill guide and use the Depth Gage (35-860-2070) to determine the appropriate length of screw.

The 3.5 mm Hex Shaft (35-860-2065) can be used with a power drill to initially drive the locking screw into the bone. Use the Hex Driver (35-860-2060) to manually thread and seat the head of the locking screw in the plate. Ensure that all locking screws are securely tightened. Do not use power tools or excessive torque to seat the locking screw.
Surgical Technique

Bone Screw Fixation Technique (continued)

Compression Screw Fixation Technique

Use the Universal Drill Guide 3.2/4.5 mm (35-860-2080) to pre-drill the bone for the 4.5 mm compression head cortical bone screws in a neutral position or eccentrically to allow for dynamic compression. Use the 3.2 mm Drill Bit 145 mm (35-860-2020) to pre-drill for standard fixation or a 4.5 mm Drill Bit 145 mm (35-860-2030) for a lag screw effect.

For neutral (buttress) insertion, center the 3.2 mm guide (spring loaded) portion of the Universal Drill Guide in the screw hole for neutral pre-drilling by pressing the guide down on the edge of the hole. The drill guide will automatically center itself in the neutral drilling position.

To impart interfragmentary compression using dynamic compression (eccentric insertion), position the 3.2 mm guide portion (spring loaded) of the Universal Drill Guide eccentrically at the edge of the screw hole without pressing down so that pre-drilling will be offset from the center of the hole.

After drilling, remove the drill guide and use the depth gage to determine the appropriate length of screw.

**NOTE:** Use a compression screw 2 mm longer than the depth gage indicates, as the head of the compression screw sits above the plate.

**NOTES:**

- Each compression screw allows up to 1.0 mm of bone translation. If an additional screw is used in dynamic compression, the first screw must be loosened slightly to allow further movement of the plate.

- Do not place screws in directly adjacent positions in the figure-of-eight holes (for dynamic compression). For lag screw fixation, the lag screw must be inserted and tightened before any locking screws are inserted and locked.

**CAUTION:** With the exception of a lag screw technique, pre-drill using a 3.2 mm drill for 4.5 mm compression screws or with a 4.0 mm drill for 5.0 mm locking screws. Failure to do so may result in loss of fixation.

Removal of Locking Screws

To avoid possible rotation of the plate, unlock all locking screws from the plate first and then remove each screw completely. Re-use of any threaded hole after a locking screw has been tightened and removed may lead to stripping of the threads.
SuperCable Grip and Plate Instrument Set

Cable-Plates

Customizable “Stoppers”

TOP LEVEL

Spare “Stoppers”

Cable Passers

Tensioner

Drivers

Compression Screw Instruments

Locking Screw Instruments

Screw Caddy (with length gage)

Grips

Customizable “Stoppers”

Spare “Stoppers”

BOTTOM LEVEL

LOCKING SCREW INSTRUMENTS

CABLE PASSERS

TOP LEVEL

CUSTOMIZABLE “STOPPERS”

SPOKE PLATES
CLEANING and MAINTENANCE of INSTRUMENTS

All implants and instruments must be free of packaging material and biocontaminants prior to sterilization. Cleaning, maintenance and mechanical inspection must be performed by authorized personnel trained in the general procedures of contaminant removal. For manual cleaning, completely submerge instruments in neutral pH Endozime detergent for 5 minutes. Use a soft bristled, nylon brush to gently scrub the device until all visible soil has been removed. Particular attention should be given to hard to clean areas. Remove instruments from the enzymatic solution and rinse thoroughly under running tap water. Thoroughly and aggressively brush and flush through cannulated areas using a water jet with the exit end submerged. For automated washing and drying following manual cleaning and rinsing, place instruments in a suitable washer basket and load in an automatic washer/drier. Cycle should be set for a Non-Caustic wash cycle for a duration of 70 minutes using a neutral pH Endozime detergent. The Endozime detergent should be used at a specified concentration in a 14-minute cleaning cycle.

CARE and HANDLING

Use extreme care in handling and storage of implant components. Implants must be handled with care. Bending, notching, or scratching the implant surfaces may reduce the strength, fatigue resistance and/or wear characteristics of the implant system. These, in turn may induce internal stresses that are not obvious to the eye and may lead to fracture of the components. Implants and instruments should be protected during storage from corrosive environments, such as salt air, etc. Only instruments designed for use with this system should be used to assure correct implantation. Review of these handling instructions is important. Damaged instruments may lead to improper implant position and result in implant failure. Thorough familiarity with the surgical technique is essential to ascertain their proper working condition.

PART NUMBER INFORMATION for SuperCable Grip and Plate System

Trochanteric Grips (Titanium)  

<table>
<thead>
<tr>
<th>Description</th>
<th>Catalog No.</th>
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<tbody>
<tr>
<td>Trochanteric Grip, Short, 50 mm</td>
<td>35-200-1010</td>
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<tr>
<td>Trochanteric Grip, 2-Hole Plate, 135 mm</td>
<td>35-200-1020</td>
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<tr>
<td>Trochanteric Grip, 4-Hole Plate, 190 mm</td>
<td>35-200-1030</td>
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<td>Trochanteric Grip, 6-Hole Plate Straight, 245 mm</td>
<td>35-200-1040</td>
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<tr>
<td>Trochanteric Grip, 6-Hole Plate Right, 245 mm</td>
<td>35-200-1042</td>
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<td>Trochanteric Grip, 6-Hole Plate Left, 245 mm</td>
<td>35-200-1044</td>
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Cable Plates (Titanium)

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<tr>
<td>Cable Plate, 6-Hole, 185 mm</td>
<td>35-220-1010</td>
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<tr>
<td>Cable Plate, 8-Hole Straight, 240 mm</td>
<td>35-220-2010</td>
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<tr>
<td>Cable Plate, 8-Hole Curved, 240 mm</td>
<td>35-220-2012</td>
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<tr>
<td>Cable Plate, 10-Hole Straight, 290 mm</td>
<td>35-220-3010</td>
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<td>Cable Plate, 10-Hole Curved, 290 mm</td>
<td>35-220-3012</td>
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Bone Screws (Titanium)

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<th>Description</th>
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<tr>
<td>Bone Screw, 4.5 mm, Compression Head, XX mm Long</td>
<td>35-230-45XX</td>
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<tr>
<td>Bone Screw, 5.0 mm, Locking Head, XX mm Long</td>
<td>35-234-50XX</td>
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XX represents length in mm from 10 to 40 (2 mm increments), or 45 and 50 mm

Instrumentation

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<th>Description</th>
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<tbody>
<tr>
<td>Drill Bit, 3.2 x 145mm, AO</td>
<td>35-860-2020</td>
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<tr>
<td>Drill Bit, 4.0 x 145mm, AO</td>
<td>35-860-1010</td>
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<tr>
<td>Drill Bit, 4.5 x 145mm, AO</td>
<td>35-860-2030</td>
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<tr>
<td>Threaded Drill Guide, 4.0 x 60mm</td>
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<td>Threaded Drill Guide, 4.0 x 120 mm</td>
<td>35-860-1070</td>
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<tr>
<td>Universal Drill Guide, 3.2/4.5mm</td>
<td>35-860-2080</td>
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<tr>
<td>Driver, 3.5mm Hex</td>
<td>35-860-2060</td>
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<td>Driver Shaft, 3.5mm Hex, AO</td>
<td>35-860-2065</td>
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<td>Depth Gage</td>
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<tr>
<td>Grip/Plate System Autoclave Case</td>
<td>35-800-4010</td>
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ISO 13485
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