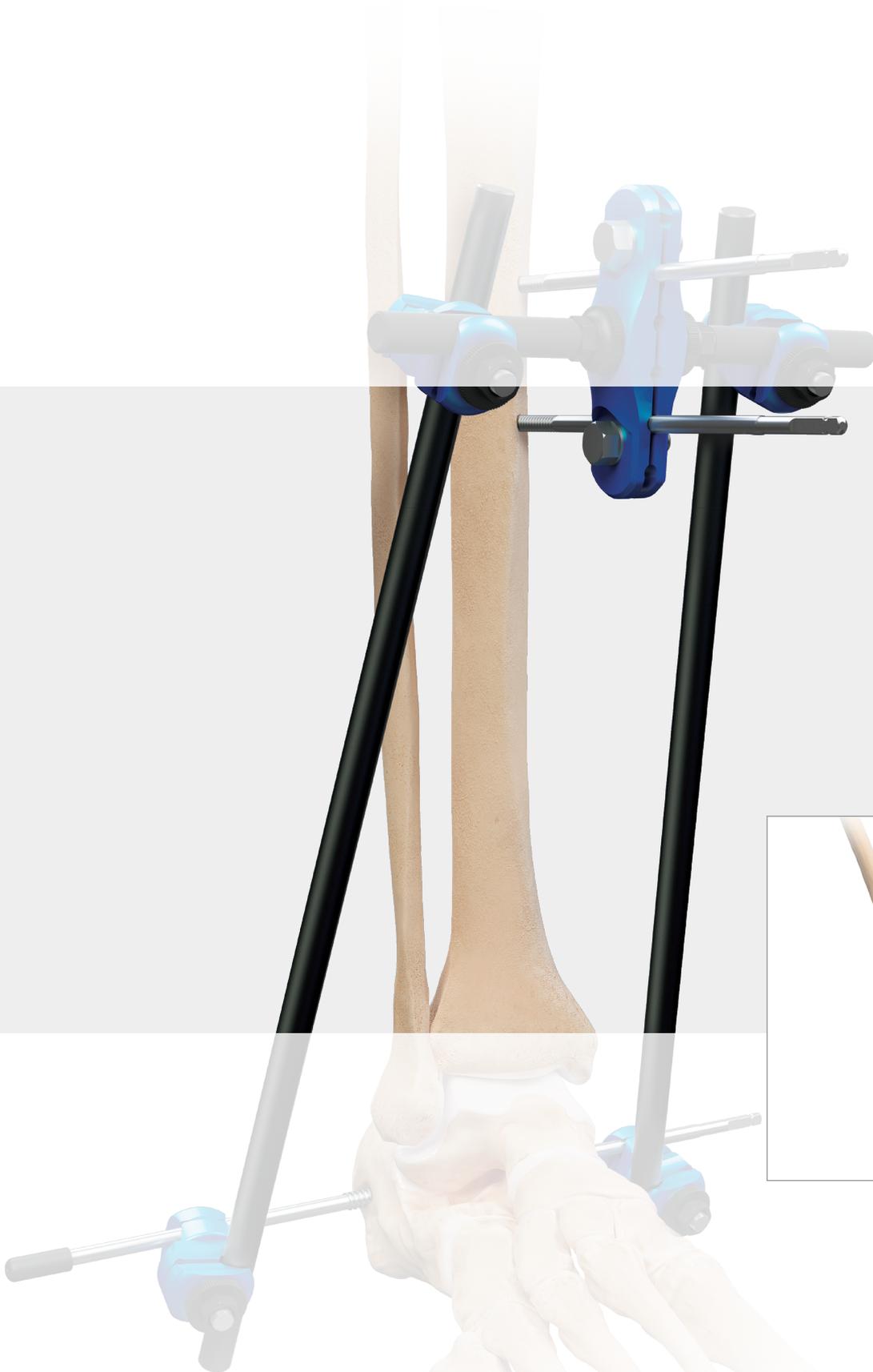


ArthroFX™ External Fixation System

Surgical Technique



Arthrex® 

ArthroFX™ External Fixation System

Introduction



The ArthroFX large external fixation (“ex-fix”) system was designed to provide surgeons a simple, efficient, and versatile solution for temporary or definitive fixation of traumatic orthopedic injuries. The 11 mm carbon fiber rods make the ArthroFX system suitable for several applications, including the distal tibia, femur, pelvis, and humerus. This simple, easy-to-use system is friendly for quick applications in the OR. For delayed open reconstruction in periarticular fractures, the ArthroFX functions as an excellent means of “portable traction.”

Additionally, Arthrex offers a multitude of internal fixation options, including but not limited to titanium and stainless steel distal tibia plates, pilon fusion plates, and mini fragment plates, as well as orthobiologic solutions including the novel JumpStart® antimicrobial wound dressing.

Small Ex-Fix and ArthroFX® Systems Overview

	Small Ex-Fix	ArthroFX Large Ex-Fix
	 <p>Not to scale</p>	 <p>Not to scale</p>
Carbon Fiber Rod Size	5.0 mm	11 mm
Pin Size	2.0 mm and 3.0 mm	4.0 mm and 5.0 mm Schanz pins 6.0 mm transfixation pins
Indications/Applications	Hand, wrist, forearm, foot, ankle, and where soft tissue may preclude the use of other fracture treatments. Not intended for weightbearing.	Limb lengthening, osteotomies, arthrodesis, fracture fixation, and other bone conditions amenable to treatment with external fixation modality.
MR Compatibility 	Not evaluated for MR Compatibility. MR unsafe.	MR conditional

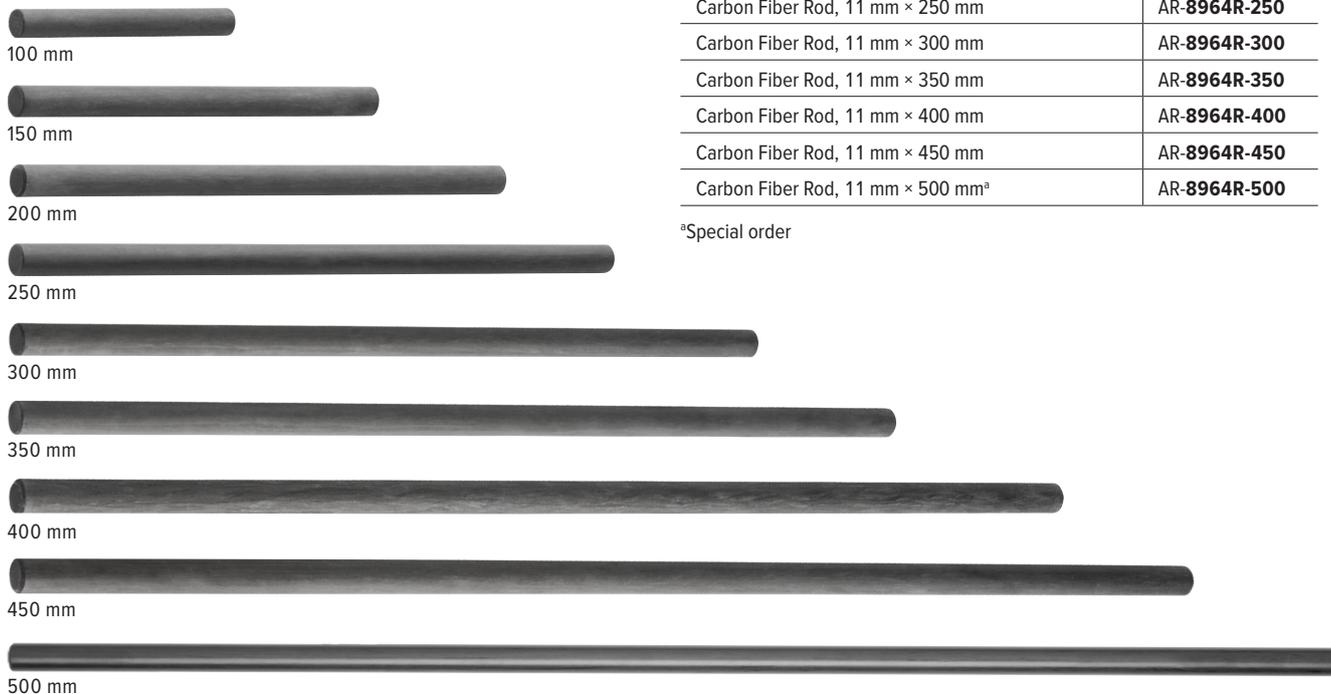
Chart is not meant to suggest interchangeable product use.

Note: For more information on the Small Ex-Fix, see surgical technique guide.

System Components

Carbon Fiber Rods

The 11 mm carbon fiber rods are available in a variety of lengths. Carbon fiber rods are radiolucent and extremely lightweight.



Product Description	Item Number
Carbon Fiber Rod, 11 mm × 100 mm	AR-8964R-100
Carbon Fiber Rod, 11 mm × 150 mm	AR-8964R-150
Carbon Fiber Rod, 11 mm × 200 mm	AR-8964R-200
Carbon Fiber Rod, 11 mm × 250 mm	AR-8964R-250
Carbon Fiber Rod, 11 mm × 300 mm	AR-8964R-300
Carbon Fiber Rod, 11 mm × 350 mm	AR-8964R-350
Carbon Fiber Rod, 11 mm × 400 mm	AR-8964R-400
Carbon Fiber Rod, 11 mm × 450 mm	AR-8964R-450
Carbon Fiber Rod, 11 mm × 500 mm ^a	AR-8964R-500

^aSpecial order

Self-Drilling Schanz Pins

The 4.0 mm and 5.0 mm Schanz pins were designed primarily for temporizing fixation techniques that typically span the joint and zone of the injury. The Schanz pins are secured to the frame with large clamps. All Schanz pins include a self-drilling tip.



Product Description	Item Number
Schanz Pin, 4.0 mm × 125 mm	AR-8964-01
Schanz Pin, 4.0 mm × 150 mm	AR-8964-02
Schanz Pin, 5.0 mm × 175 mm	AR-8964-03
Schanz Pin, 5.0 mm × 200 mm	AR-8964-04
Schanz Pin, 5.0 mm × 250 mm	AR-8964-24

6.0 mm Transfixation Pins

The 6.0 mm transfixation pins have a centrally threaded body and a self-drilling tip. These pins are typically used as an anchor in the calcaneus.



Product Description	Item Number
Transfixation Pin, 6.0 mm × 225 mm	AR-8964-05
Transfixation Pin, 6.0 mm × 300 mm	AR-8964-06

Note: Although Schanz pins are self drilling, predrilling pins is always recommended.

Multi-pin Clamp

Slides over the 5.0 mm Schanz pins and can be tightened with the 11 mm wrench. This clamp has 6 spaces to accommodate Schanz pins.

Product Description	Item Number
Multi-pin Clamp, large	AR-8964-08



Straight Attachment Arm

Connects onto the multi-pin clamp. Large combination clamps can then be attached to the straight attachment arm.

Product Description	Item Number
Attachment Arm, straight	AR-8964-27



Large Multi-pin Clamp and Rod Attachment

Connects onto the multi-pin clamp and accepts 11 mm carbon fiber rods.

Product Description	Item Number
Large Multi-pin Clamp/Rod Attachment	AR-8964-09



Large Combination Clamp

Designed for ease of use and rapid locking. A single step lock allows for speed of application and secure purchase on rods; 4.0 mm, 5.0 mm, and 6.0 mm bone screws; and 6.0 mm transfixation pins. The clamp can be tightened with the 11 mm wrench.

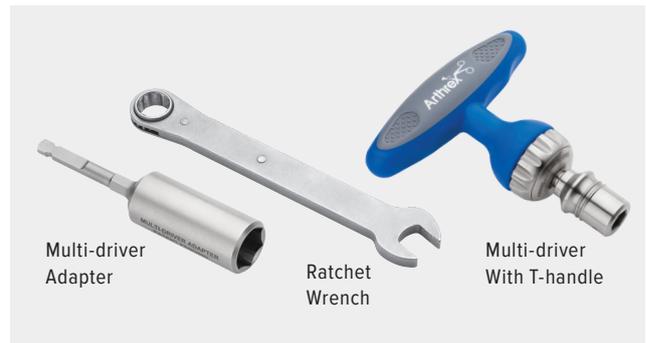
Product Description	Item Number
Combination Clamp, large	AR-8964-07



Instruments in Tray

Multi-driver With T-handle, Ratchet Wrench, and Multi-driver Adapter

Used to tighten Schanz pins and 11 mm nuts.

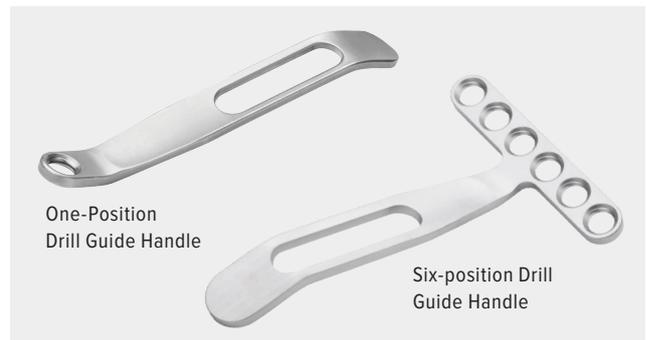


Six-Position Drill Guide Handle

Used to space pins equidistantly apart. In order to use this guide, insert the triple sleeve construct.

One-Position Drill Guide Handle

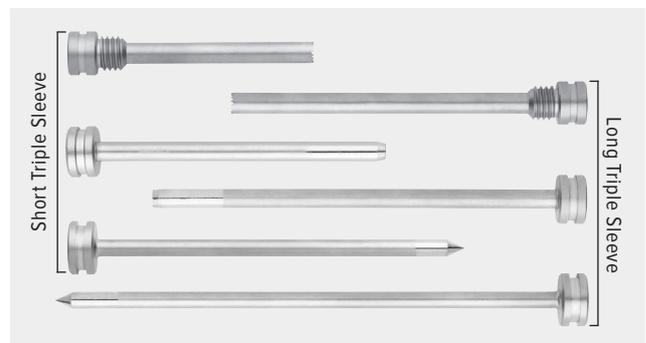
Compatible with the triple sleeve



Triple Sleeves (1 long, 1 short; qty. 2)

Insert into the 6-position drill guide to space pins equidistantly

- 3.5 mm trocar, short and long
- 3.5 mm drill sleeve, short and long
- 5.0 mm threaded sleeve, short and long

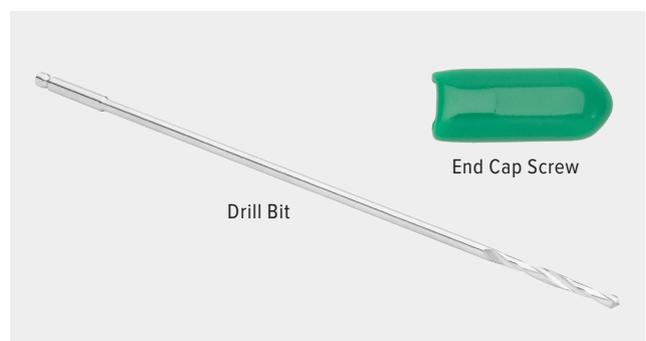


End Cap Screw

Place on ends of Schanz pins for added protection

Drill Bit

Used to predrill the 5.0 mm pins



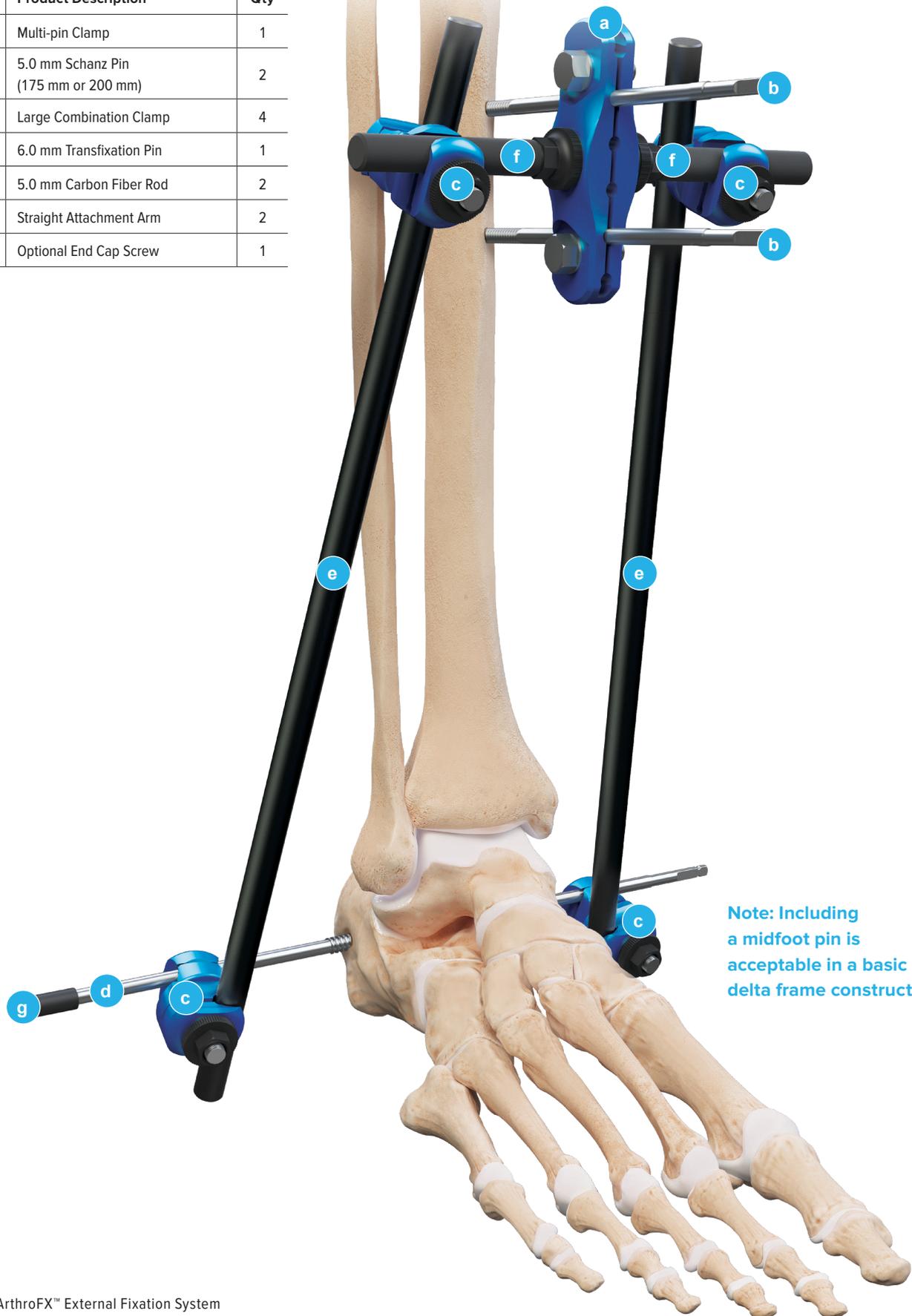
Product Description	Item Number
End Cap Screw (Pin Cover)	AR-8964-22
Drill Bit, QC, 3.5 mm × 195 mm	AR-8964-10

Applications for Distal Tibia

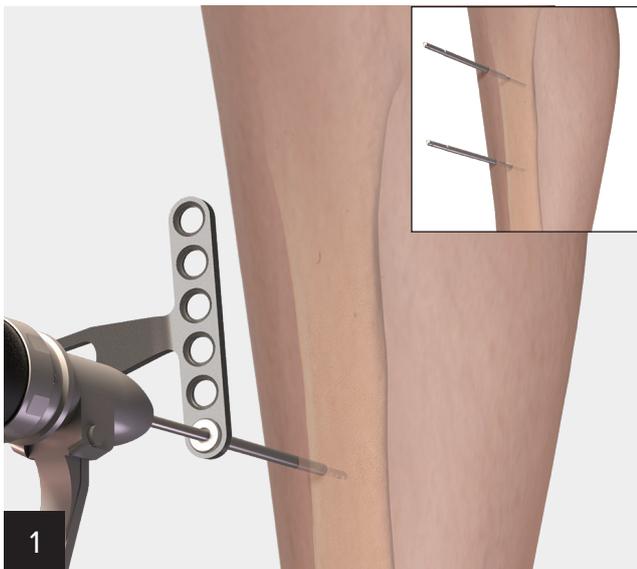
Basic Delta Frame

Supplies Needed

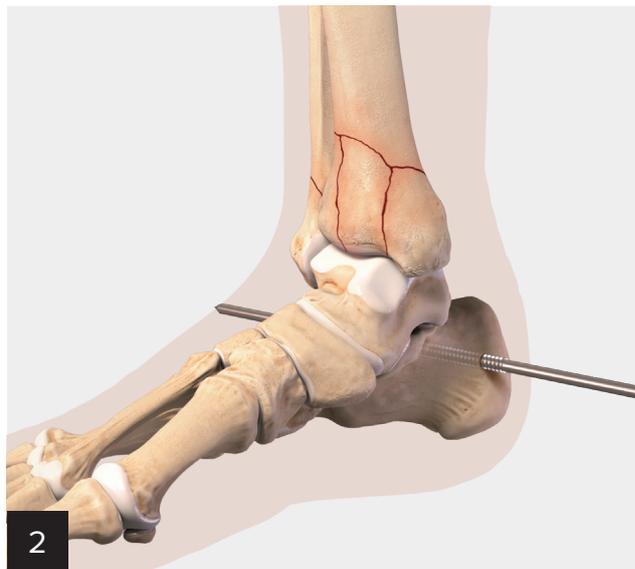
Pic	Product Description	Qty
a	Multi-pin Clamp	1
b	5.0 mm Schanz Pin (175 mm or 200 mm)	2
c	Large Combination Clamp	4
d	6.0 mm Transfixation Pin	1
e	5.0 mm Carbon Fiber Rod	2
f	Straight Attachment Arm	2
g	Optional End Cap Screw	1



Note: Including a midfoot pin is acceptable in a basic delta frame construct.



1 Insert the first and second Schanz pin into the anteromedial tibial shaft. Pins should be placed out of the zone of injury and anticipated hardware placement locations.



2 Insert the 6.0 mm transfixation pin through the calcaneus, perpendicular to the long axis of the calcaneus and parallel to the ankle joint.

Note: Pin placement may vary.



3 Attach a straight attachment arm onto each side of the multi-pin clamp. Then slide the multi-pin clamp over the 5.0 mm Schanz pins.



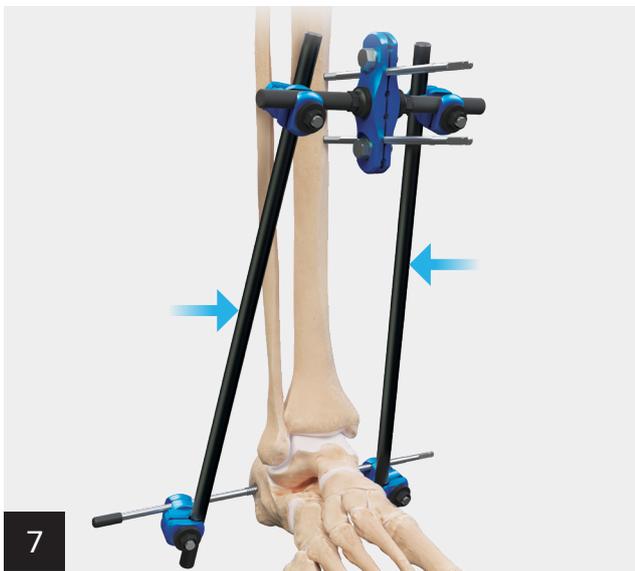
4 Tighten the multi-pin clamp.



5 Attach the large combination clamps to the straight attachment arms.



Attach the large combination clamps to the transfixation pin.



Attach the two 11 mm carbon fiber rods.

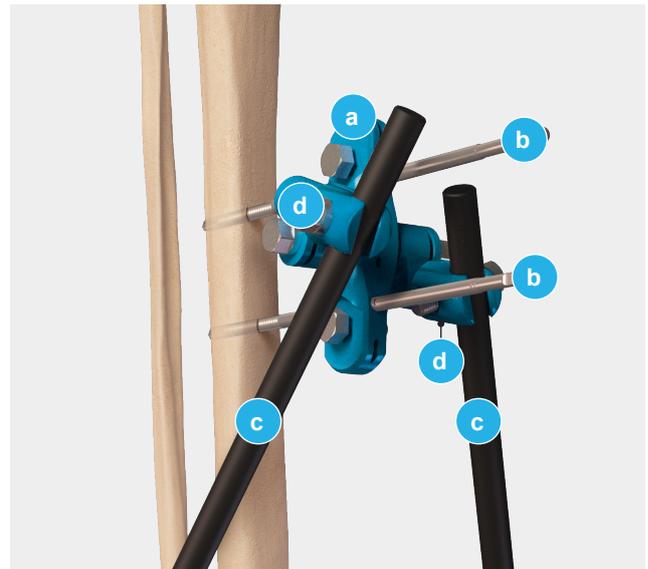


Reduce the fracture. Ensure rods are properly seated in all clamps, then **complete final tightening of all clamps.**

Delta Frame Variation

Supplies Needed

Pic	Product Description	Qty
a	Multi-pin Clamp	1
b	5.0 mm Schanz Pin (175 mm or 200 mm)	2
c	Carbon Fiber Rods (300 mm or 450 mm)	2
d	Rod Attachments	2



Optional: Delta Frame With Metatarsal Pin

Supplies Needed

Pic	Product Description	Qty
a	Large Combination Clamps	2
b	4.0 mm Schanz Pin (175 mm or 200 mm)	1
c	100 mm Carbon Fiber Rod	1



Applications for Femur

Knee Spanning Frame 1

Supplies Needed

Pic	Product Description	Qty
a	5.0 mm Schanz Pin (200 mm or 250 mm)	4
b	Large Combination Clamp	6
c	Carbon Fiber Rod	3





1
Insert the first and second Schanz pins into the femur.



2
Insert the third and fourth Schanz pins into the tibia.

Note: Pin location will vary based on fracture location and surgeon preference.



3a
Attach combination clamps onto all 4 Schanz pins.



3b
Next, attach 11 mm carbon fiber rods at the femur and tibia.



4
Finally, connect the femur and tibial constructs together using two additional combination clamps and a carbon fiber rod.

Perform final tightening of all clamps.

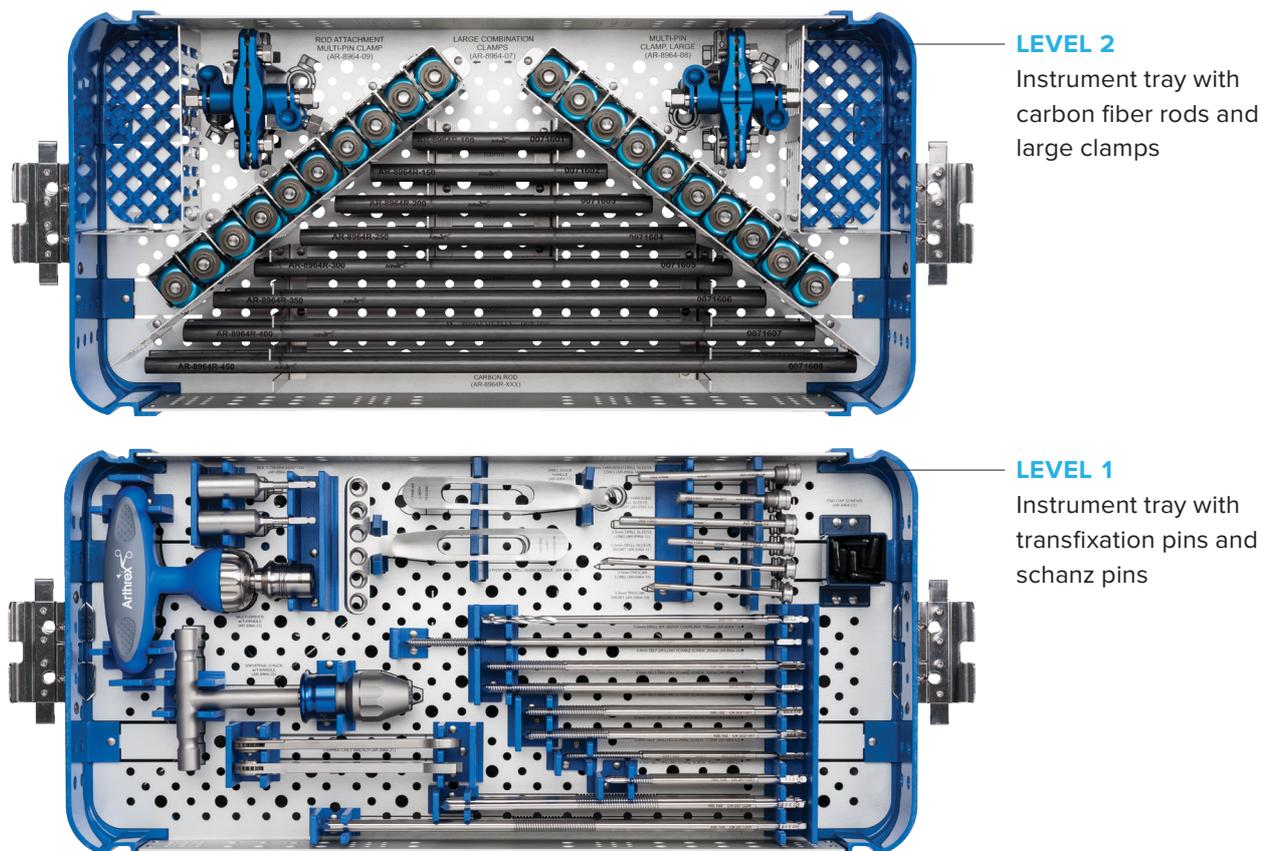
Applications for Femur

Knee Spanning Frame 2

Supplies Needed

Pic	Product Description	Qty
a	Straight Arm Attachment	4
b	11 mm Carbon Fiber Rod	4
c	Multi-pin Clamp	2
d	5.0 mm Schanz Pin	4
e	Large Combination Clamp	6





LEVEL 2
Instrument tray with carbon fiber rods and large clamps

LEVEL 1
Instrument tray with transfixation pins and schanz pins

ArthroFX External Fixation System (AR-8964S)

Product Description	Item Number
Instruments	
Drill Guide Handle	AR-8964-17
Universal Chuck w/ T-handle	AR-8964-20
Ratchet Wrench, 11 mm, qty. 2	AR-8964-21
Multi-Driver Adapter, qty. 2	AR-8964-19
Six-Position Drill Guide Handle	AR-8964-18
Trocar, long, 3.5 mm, qty. 2	AR-8964-16
Trocar, short, 3.5 mm, qty. 2	AR-8964-15
Drill Sleeve, long, 3.5 mm, qty. 2	AR-8964-12
Drill Sleeve, short, 3.5 mm, qty. 2	AR-8964-11
Drill Sleeve, threaded, long, 5.0 mm, qty. 2	AR-8964-14
Drill Sleeve, threaded, short, 5.0 mm, qty. 2	AR-8964-13
Multi-driver w/ T-handle	AR-8964-23
ArthroFX Case	AR-8964C
Disposables	
Drill Bit, 3.5 mm	AR-8964-10

Product Description	Item Number
Implants/Instruments (to be ordered separately)	
Large Combination Clamp, qty. 24	AR-8964-07
Multi-pin Clamp, large, qty. 2	AR-8964-08
Rod Attachment, large multi-pin clamp, qty. 4	AR-8964-09
Attachment Arm, straight, qty. 4	AR-8964-27
Carbon Fiber Rod, 11 mm × 100 mm, qty. 4	AR-8964R-100
Carbon Fiber Rod, 11 mm × 150 mm, qty. 4	AR-8964R-150
Carbon Fiber Rod, 11 mm × 200 mm, qty. 4	AR-8964R-200
Carbon Fiber Rod, 11 mm × 250 mm, qty. 4	AR-8964R-250
Carbon Fiber Rod, 11 mm × 300 mm, qty. 4	AR-8964R-300
Carbon Fiber Rod, 11 mm × 350 mm, qty. 4	AR-8964R-350
Carbon Fiber Rod, 11 mm × 400 mm, qty. 4	AR-8964R-400
Carbon Fiber Rod, 11 mm × 450 mm, qty. 4	AR-8964R-450
Carbon Fiber Rod, 11 mm × 500 mm ^a , qty. 4	AR-8964R-500
Schanz Pin, 4.0 mm × 125 mm, qty. 4	AR-8964-01
Schanz Pin, 4.0 mm × 150 mm, qty. 4	AR-8964-02
Schanz Pin, 5.0 mm × 175 mm, qty. 4	AR-8964-03
Schanz Pin, 5.0 mm × 200 mm, qty. 4	AR-8964-04
Schanz Pin, 5.0 mm × 250 mm, qty. 4	AR-8964-24
Transfixation Pin, 6.0 mm × 225 mm, qty. 3	AR-8964-05
Transfixation Pin, 6.0 mm × 300 mm, qty. 3	AR-8964-06
End Cap Screws, qty. 20	AR-8964-22

Note: Quantities reflect the amounts included in AR-8964I and AR-80964S.



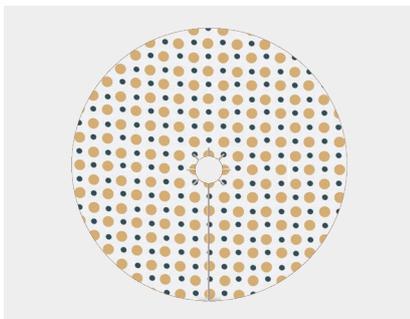
JumpStart® Pin Site Dressing Kit for External Fixation

Featuring V.Dox™ technology, JumpStart antimicrobial wound dressing includes an embedded dot matrix of elemental silver and zinc microbatteries that preserve the naturally produced electrical currents of the skin that are essential for healing. In the presence of a conductive fluid such as wound exudate, water-based wound hydrogel, saline, or water, JumpStart dressing’s microcurrents minimize and prevent the growth of a broad spectrum of bacteria.¹⁻³

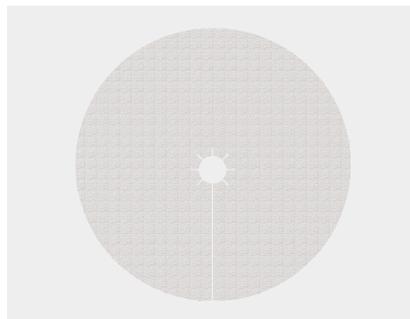
The JumpStart pin site dressing kit is intended for the management of wounds and is indicated for partial-thickness wounds (those involving the epidermis and dermis) and full-thickness wounds (those involving the dermis, subcutaneous fat, and sometimes bone), including external fixation pin sites and surgical incisions. The JumpStart pin site kit allows surgeons to focus on the procedure at hand rather than the worry of infection, Helping Surgeons Treat Their Patients Better™.

- Pin-tract infection (PTI) is the most common complication in external fixation procedures⁴
- These infections create a significant burden for the patient and health care system, including an increased number of clinic visits, the possible need for additional surgery, and compromised patient outcomes⁵
- *Staphylococcus epidermidis*, *Staphylococcus aureus*, and *Escherichia coli* are the three most common infective agents of external fixation constructs. JumpStart dressing’s antimicrobial properties impact all three.⁴

Kit Components



JumpStart Antimicrobial Wound Dressing
Broad-spectrum antimicrobial wound contact layer



Absorbent Disk
Polyester-based absorbent layer



Holding Clip
Keeps the dressings in place and helps maintain a moist wound environment

Note: Product is not made with natural rubber latex.

Product Overview

The JumpStart® pin site kit includes one each of three products: JumpStart dressing, absorbent gauze, and a holding clip. JumpStart dressing has a 2 in diameter and can be easily placed over external fixation device pins to protect against a broad spectrum of bacteria and promote a more natural healing process. The absorbent disk and holding clip help maintain a moist wound environment, which is optimal for healing when using JumpStart dressing.

Key Features and Benefits

- Sized to fit around external fixation devices
- Effective against multidrug-resistant bacteria; disrupts biofilm matrix¹⁻³
- Promotes healing⁶
- Easy and simple to use
- Single use
- Can be left on for up to 7 days (can be changed if exudate levels are high)

V.Dox technology is a trademark of Vomar Innovations, Inc.

Ordering Information

Product Description	Item Number
JumpStart Pin Site Dressing Kit	ABS-4059
JumpStart Antimicrobial Wound Dressing, qty. 5 Absorbent Disk, qty. 5 Holding Clip, qty. 5 (compatible with 4.0 mm, 5.0 mm, and 6.0 mm pins)	

References

1. Kim H, Makin I, Skiba J, et al. Antibacterial efficacy testing of a bioelectric wound dressing against clinical wound pathogens. *Open Microbiol J.* 214;8:15-21. doi:10.2174/18742858014080100152
2. Banerjee J, Das Ghatak P, Roy S, et al. Silver-zinc redox-coupled electrochemical wound dressing disrupts bacterial biofilm. *PLoS One.* 2015;10(3):e0119531. doi:10.1371/journal.pone.0119531
3. Kim H, Izadjoo MJ. Antibiofilm efficacy evaluation of a bioelectric dressing in mono- and multi- species biofilms. *J Wound Care.* 2015;24(Suppl 2):S10-S14. doi:10.12968/jowc.2015.24.Sup2.S10
4. Ceroni D, Grumetz C, Desvachez O, Pusateri S, Dunand P, Samara E. From prevention of pin-tract infection to treatment of osteomyelitis during paediatric external fixation. *J Child Orthop.* 2016;10(6):605-612. doi:10.1007/s11832-0160787-8
5. Kazmers NH, Fragomen AT, Rozbruch SR. Prevention of pin site infection in external fixation: a review of the literature. *Strategies Trauma Limb Reconstr.* 2016;11(2):75-85. doi:10.1007/s11751-016-0256-4
6. Nuccitelli R. A role for endogenous electric fields in wound healing. *Curr Top Dev Biol.* 2003;58:1-26.



This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product's directions for use. Postoperative management is patient-specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level or outcomes.

View U.S. patent information at www.arthrex.com/corporate/virtual-patent-marking

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