

Operative technique



ST.A.R.90 F4 Knee

Articulated Knee
External Fixator

Surgeons must always decide on the best approach to follow according to their clinical judgement and the patient's needs. Citeffe does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery. The information presented is intended to demonstrate the extent of Citeffe product offerings.

Before use a surgeon must always consult the package insert, product label and/or instructions for use. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets.

Please contact your Citeffe representative if you have questions about the availability of Citeffe products in your area.

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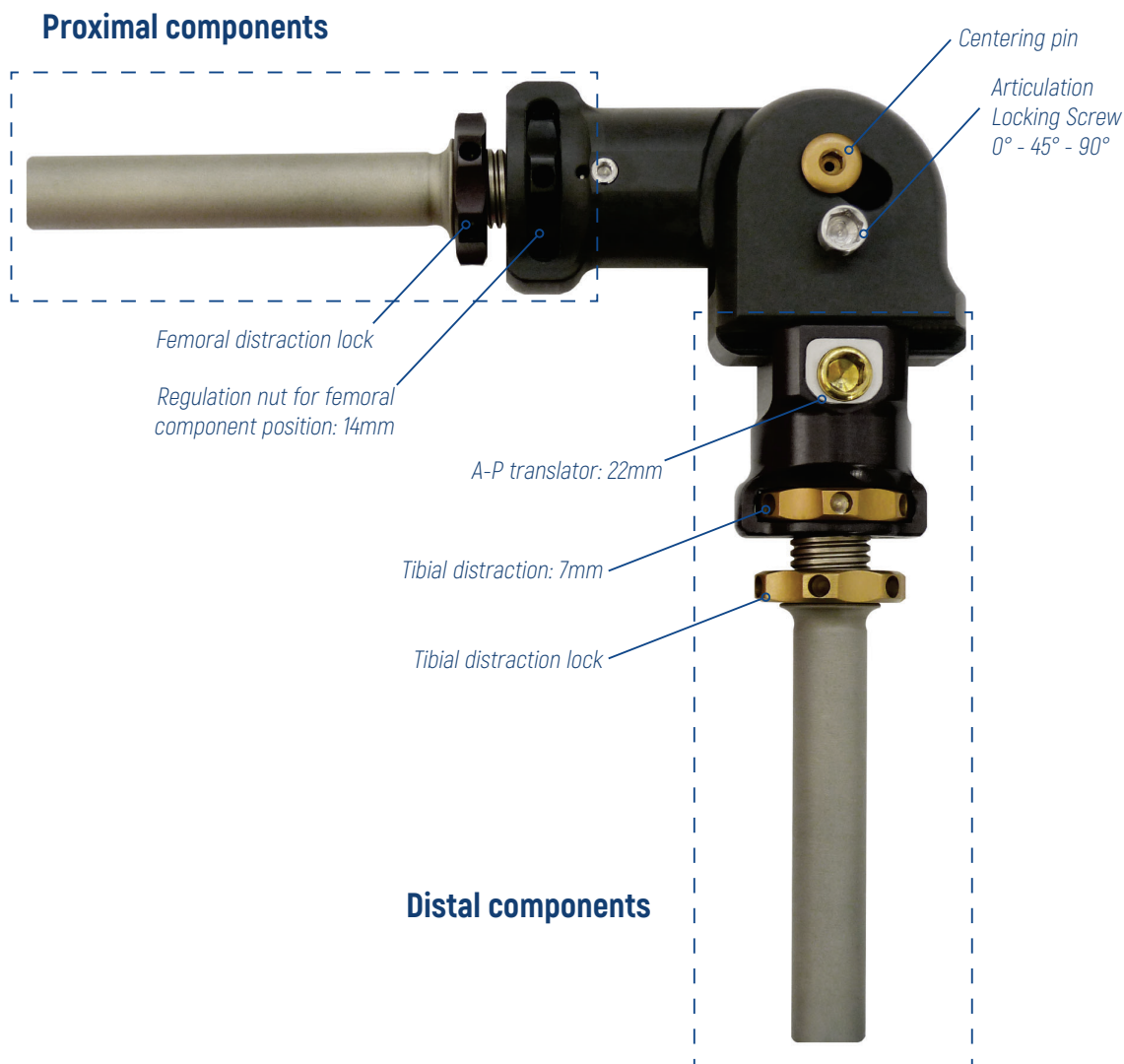
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PRODUCT DESCRIPTION

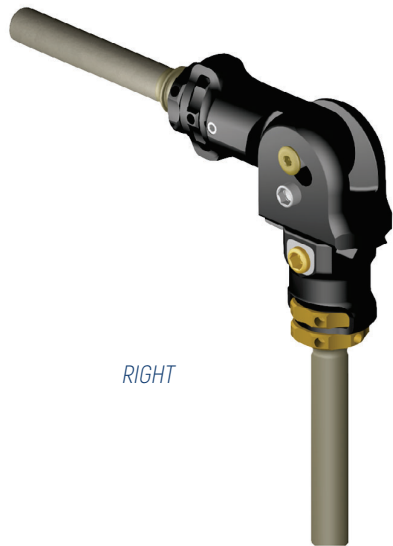
The Citieffe articulated external fixator is aligned with the transcondylar axis of the knee joint and allows stable articulation without stressing adjacent articular structures. The fixator reproduces physiologic movement between 0° and 90° and avoids overloading articular structures without permitting the physiological rotational movements of normal flexion-extension of the knee. It is very important that the articulating body of the external fixator is correctly aligned in both frontal and sagittal planes: the centre of rotation must be aligned with the transcondylar axis.

The main feature of the articulating fixator is to allow active and passive motion of the knee, protecting the joint from the mechanical stresses of movement and facilitating articular distraction when necessary.

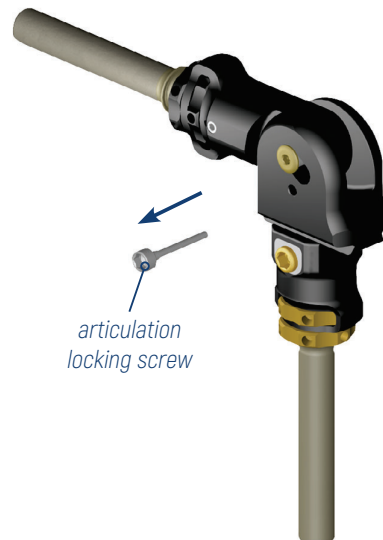
Articulated external fixation is indicated in all those pathological conditions in which it might be necessary to combine bone stabilization and/or ligamentous reconstruction with early mobilization of the articular joint, to avoid the effects of prolonged immobilization.



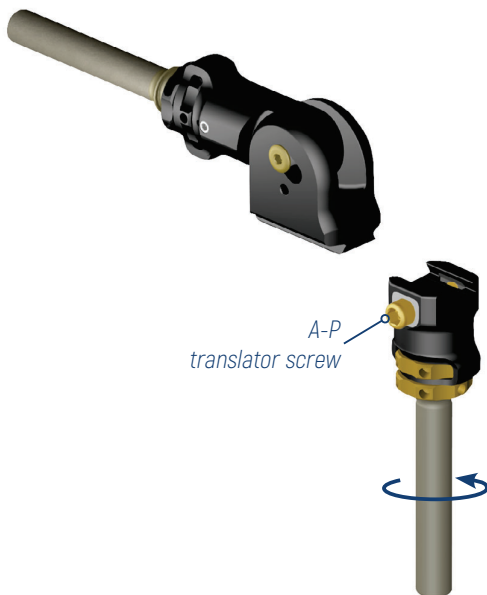
Right to left fixator configuration



The external fixator is supplied in STERILE packaging for the RIGHT knee. If required for the left knee, the assembly should be changed as follows.



Remove the locking screw articulation and reinsert from the opposite side.

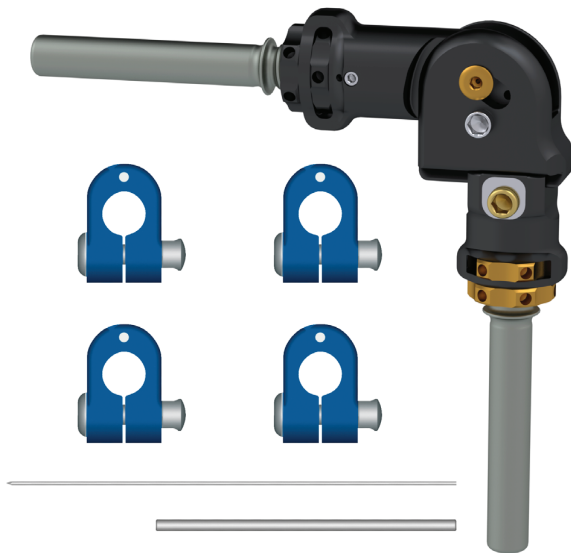


Loosen the A-P translator screw, remove the distal component and turn it 180°.



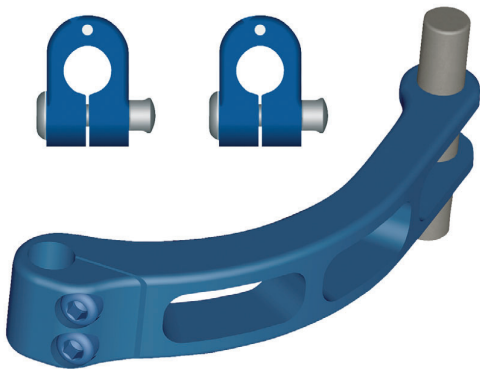
Reinsert the distal component and lock it by tightening the translator screw.

External Fixator



- 1 knee articulated external fixator;
- 4 clamps with bone screw holders;
- 1 guide wire $\varnothing 1.5$ mm, L200 mm;
- 1 pin for locking nuts.

The external fixator is supplied in the configuration for RIGHT knee application and 90° locking.



- 1 curved arm for tibial bone screws;
- 2 clamps with bone screw holders.

The curved arm allows insertion of the bone screws into the antero-medial aspect of the tibia, preserving the function of the anterior compartment.

NOTE: the clamp bone screw holders accept bone screws with $\varnothing 6$ mm and $\varnothing 5$ mm stems.

Bone screws



Ensure easier insertion, strength over time and the possibility of retraction, in case of excessive penetration, without loss of strength.

- Stainless steel
- Self-tapping
- Blunt tip (predrilling is required)
- Single thread

$\varnothing 5 \times 180$ mm for tibia
 $\varnothing 6 \times 200$ mm for femur

INDICATIONS AND PATIENT POSITIONING

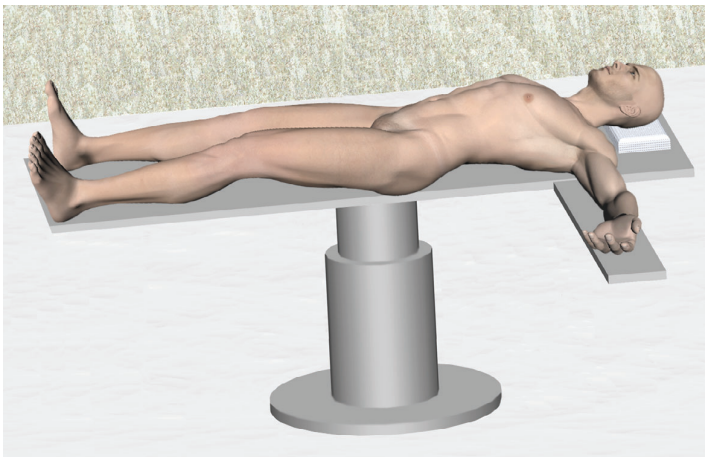
Indications



The knee articulated external fixator is indicated for fixation of:

- Closed or exposed knee dislocations
- Fracture dislocations of the knee joint
- Complex unstable fractures of the knee joint
- Distraction after bone and/or cartilage implant
- Knee ligaments reconstructions
- Removal of infected knee prosthesis

Patient positioning



The patient is supine on a radiolucent operating table with the knee prepared for surgery.

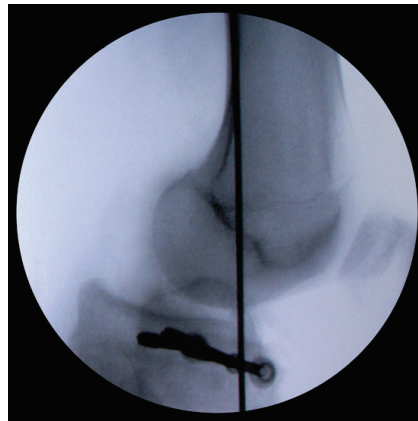
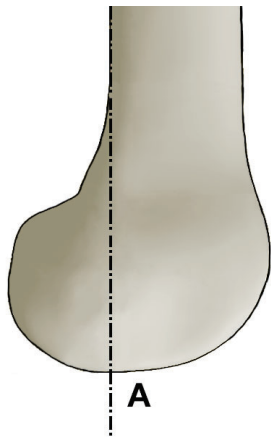
The fixator is positioned according to anatomical landmarks. In a complex fracture it may be difficult to identify landmarks without prior reconstruction of the articular surface. This can be performed more easily after applying a temporary external fixation.

OPERATIVE TECHNIQUE

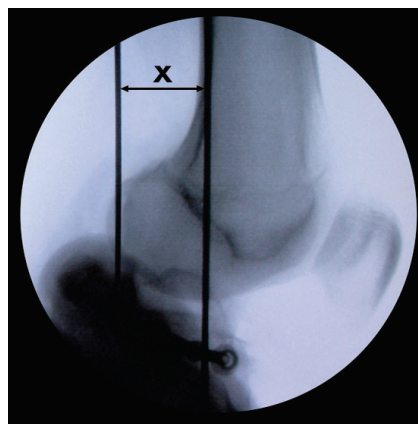
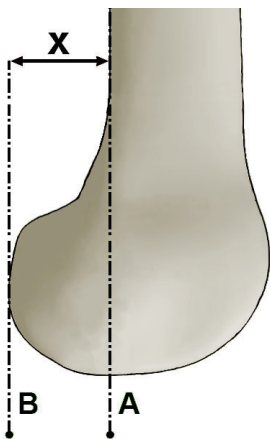
Identify the centre of rotation

Articular fractures must be reduced and stabilized with minimal internal fixation before applying the articulated knee fixator.

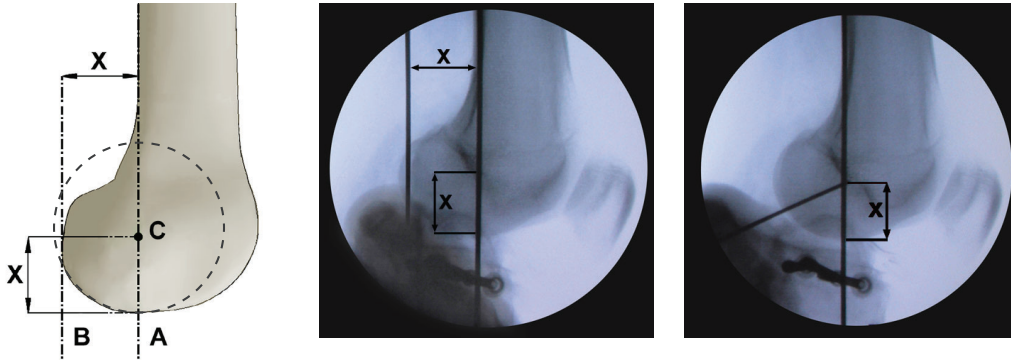
The centre of rotation is identified with a Kirschner wire under image intensifier control.



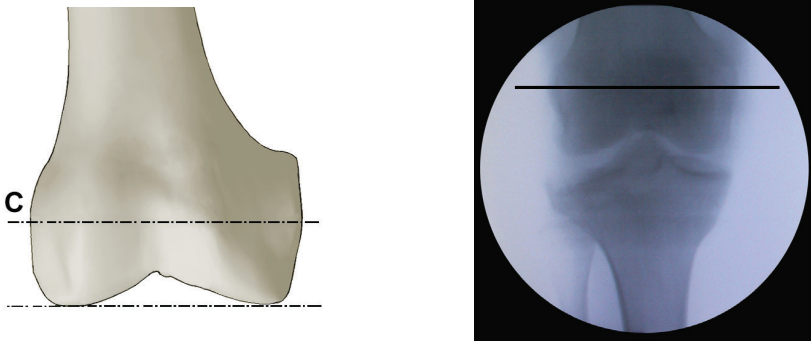
Obtain a true lateral view and continue the line of the posterior diaphyseal surface distally as line **a**



Draw a tangent to the posterior condyle, that is parallel to line **a** and measure distance **X** between lines **a** and **b**



Mark distance on line **a** proximally from the margin of the femoral condyle and identify the theoretical centre of rotation **C**.



Insert the guide wire provided in the kit at point parallel to the bicondylar line, which in the anteroposterior view should be virtually parallel with the articular surface.

INSTRUMENTS REQUIRED

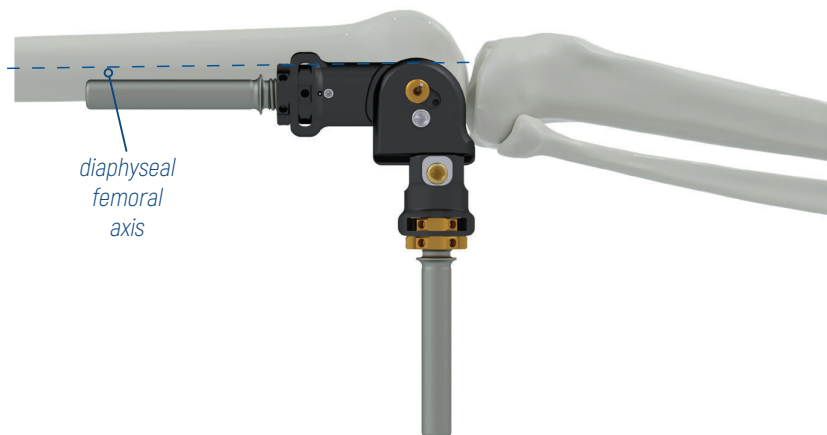
Guide wire $\varnothing 1.5 \times 200 \text{mm}$

NOTE: included in the knee external fixator kit F4-2460

Application of articulated fixator

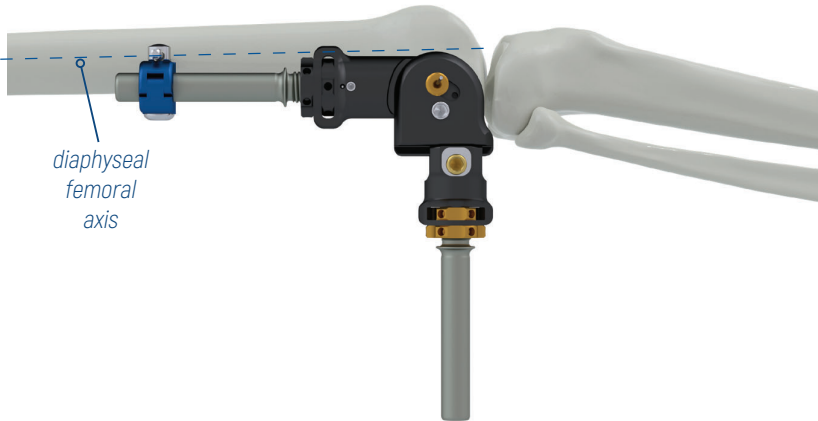


Insert the guide wire in the centering pin holder and slide the fixator over the wire, keeping the fixator locked at 90°.



Position the femoral rod of the fixator parallel to the femoral diaphyseal axis (in the lateral projection).

Insertion of first femoral bone screw



Perform pre-drilling before inserting the bone screw using the drill bit $\varnothing 5\text{mm}$.

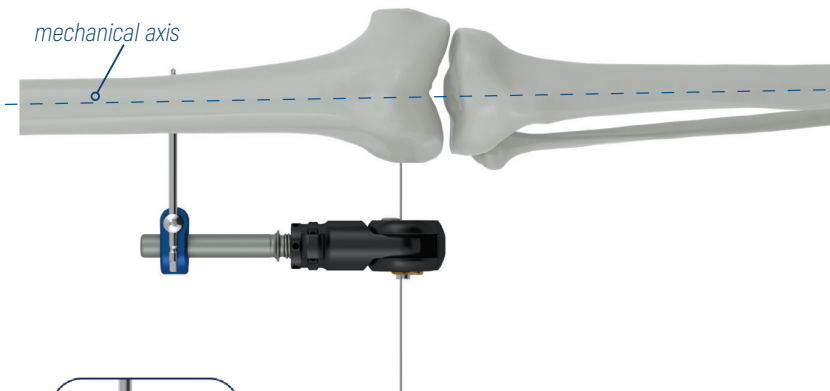
Insert the first proximal bone screw on the femoral side and place it in the centre of the diaphysis using the clamp as a guide.

In order to insert the bone screw it is possible to use power drill with the quick connect adapter or the T-handle $\varnothing 6\text{mm}$.

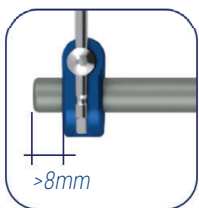
Partially lock the bone screw clamp with the T wrench, 6mm.

With the image intensifier check that:

- the femoral rod of the fixator is parallel to the femoral axis in the lateral view;
- the femoral rod of the fixator is parallel to the mechanical axis of the limb in the anteroposterior view.



NOTE: the mechanical axis is a line drawn from the centre of the femoral head to the centre of the tibio-tarsal joint.



! If you plan to use the distractor, leave at least 8mm from the end of the proximal bar to the first clamp to allow insertion of the distraction device.

INSTRUMENTS REQUIRED



SF1326
Drill bit $\varnothing 5\text{mm}$



SF1306
Quick connect adapter



DF900006
T-handle $\varnothing 6\text{mm}$



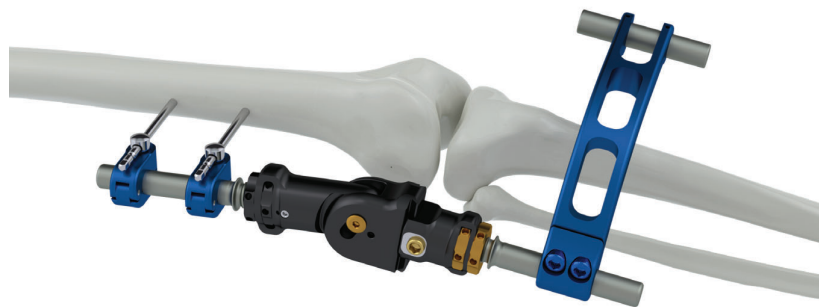
SF1356
T wrench, 6mm

Second femoral bone screw insertion



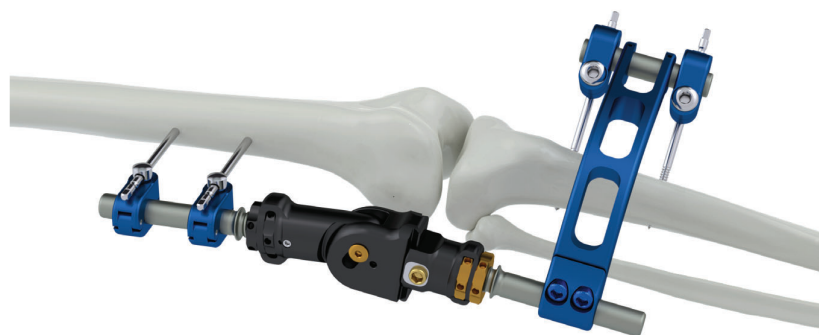
Insert a second distal femoral bone screw parallel to the first and tighten the clamp with the T wrench, 6mm.

Curved arm assembly



Remove the Kirschner wire and joint locking screw so that the fixator can be extended. Insert the curved arm in the middle of the distal fixator rod and tighten the two locking screws with the T wrench, 6mm.

! *If you plan to use the distractor, leave at least 8mm from the end of the distal bar to the curved arm to allow insertion of the distraction device.*



Position two clamps on the bar at the end of the arm and start the pre-drilling using the drill bit $\varnothing 4\text{mm}$.

Insert the tibial bone screws through either the power drill with the quick connect adapter or the T-handle $\varnothing 6\text{mm}$.

INSTRUMENTS REQUIRED



SF1326
Drill bit $\varnothing 5\text{mm}$



SF1325
Drill bit $\varnothing 4\text{mm}$



SF1306
Quick connect adapter

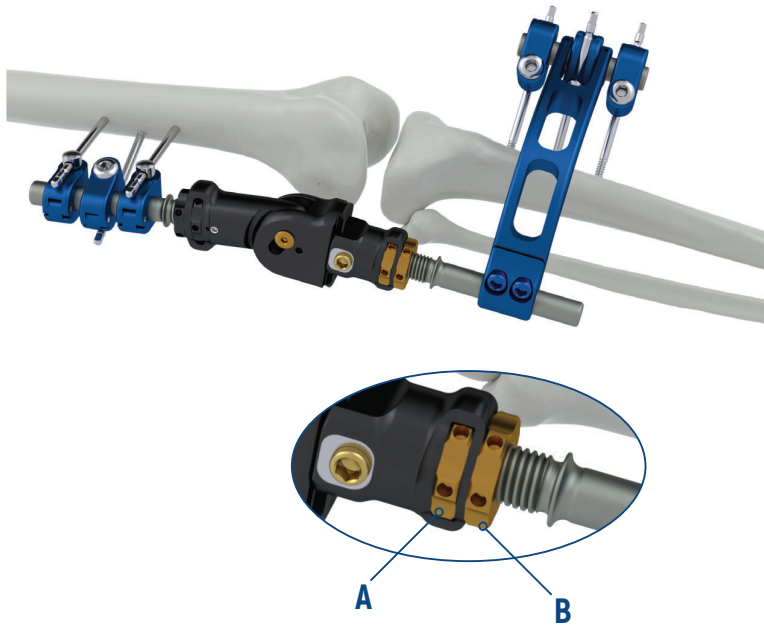


DF900006
T-handle $\varnothing 6\text{mm}$



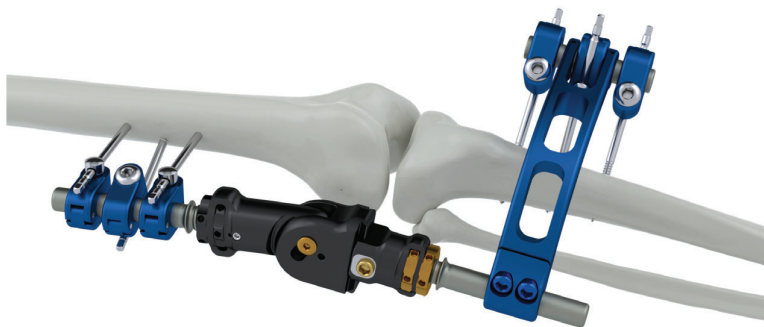
SF1356
T wrench, 6mm

Articulated distraction



Tighten all bone screws clamps firmly. Distract the joint by turning the distraction nut **A** until the desired distraction level is reached and then lock the position by tightening nut **B**. Check joint movement and the maintenance of symmetrical distraction. During flexion-extension movements, no subluxation shifts should be evident on fluoroscopic inspection in lateral projection. Further adjustment can be performed if necessary with locking screw translator and with release of fascia lata.

Final assembly



It is possible to make the assembly more stable by inserting a third bone screw: one on the femoral side and one on the tibial side. They should be placed oblique to the previous screws and preferably between them. Check that all the bone screw clamps are closed tightly.

NOTE: it is available as an additional instrument the torquewrench. [F4-0205]

INSTRUMENTS REQUIRED



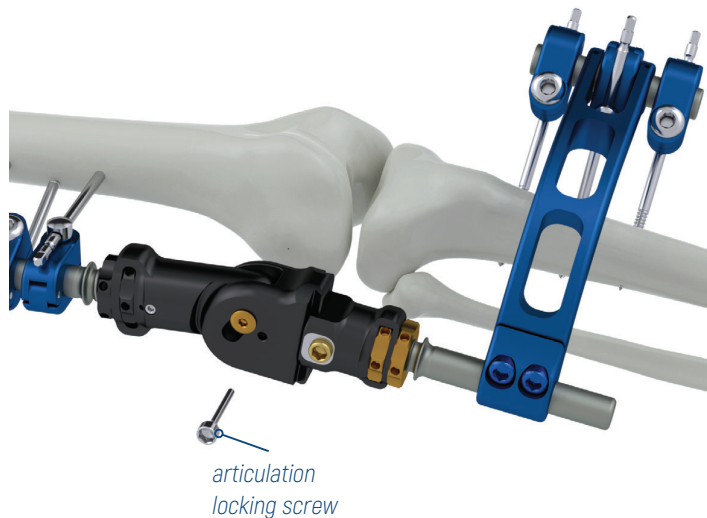
Pin for locking nuts

NOTE: included in the knee external fixator kit F4-2460



SF1356
T wrench, 6mm

Post-operative management



The fixator can be locked in extension by inserting the articulation locking screw. The amount and timing of permitted joint movement are determined by the type of lesion and stability of any fractures.

Weightbearing must also be moderated during the first weeks after surgery, according to the type of injury, and increased progressively.

INSTRUMENTS REQUIRED



SF1356
T wrench, 6mm

Knee fixator distractor (F4-2746)



The knee fixator distractor is an accessory that allows the knee joint to be forced into movement in cases of stiffness or limited extension or flexion.

For correct assembly, loosen the two gold screws using the T wrench, 6mm counterclockwise and the two clamping knobs at the ends of the distractor by turning them counterclockwise so that they slide freely along the threaded bar.

Position the distractor with the clamping knobs externally with respect to the leg and connect the ends of the distractor to those of the fixator body. Screws first the two gold screws using the T wrench clockwise and after locks the two clamping knobs by turning them clockwise.

It is recommended to position the distractor symmetrically with respect to the articulated fixator, leaving the two threaded parts of equal length on both sides.

The extension or flexion movement is forced by acting with the T wrench, 6mm directly on one of the ends of the threaded bar.

In the case of an articulated fixator on the **right limb**, using the T wrench, 6mm on the flexion/extension screw on the proximal part of the distractor:

- turning **clockwise**, the distractor performs an **extension**;
- turning **counterclockwise**, the distractor performs a **flexion**.

In the case of an articulated fixator on the **left limb**, using the T wrench, 6mm on the flexion/extension screw on the proximal part of the distractor:

- turning **clockwise**, the distractor performs a **flexion**;
- turning **counterclockwise**, the distractor performs an **extension**.

INSTRUMENTS REQUIRED



F4-2746
Knee fixator distractor



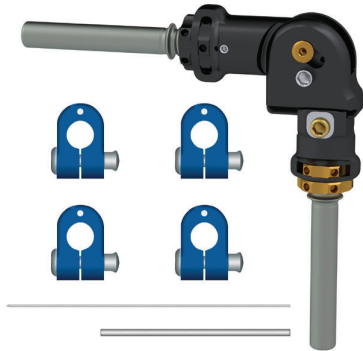
SF1356
T wrench, 6mm



ORDERING INFORMATION

PK-135 Knee Fixator Procedure Kit

CONTENTS



- | 1 x | Code | Description |
|-----|----------------|--|
| | F4-2460 | Knee external fixator kit
<i>Contents:</i>
1 articulated knee external fixator
4 bone screw clamps with holder
1 guide wire $\varnothing 1.5 \times 200 \text{mm}$
1 pin for locking nuts |



- | | | |
|-----|----------------|---|
| 1 x | F4-2745 | Controlateral bone screws curved arm kit
<i>Contents:</i>
1 controlateral bone screws curved arm
2 bone screw clamps with holder |
|-----|----------------|---|



- | | | |
|-----|-----------------|---|
| 3 x | DF485180 | $\varnothing 5 \text{mm}$ cortical bone screw - L. 180-40mm |
| 3 x | DF486200 | $\varnothing 6 \text{mm}$ cortical bone screw - L. 200-45mm |

Code	Thread \varnothing (mm)	Stem \varnothing (mm)	Thread L. (mm)	Total L. (mm)
DF485180	5	6	40	180
DF486200	6	6	45	200



- | | | |
|-----|---------------|--|
| 1 x | SF1325 | Drill bit $\varnothing 4 \times 195 \text{mm}$ |
| 1 x | SF1326 | Drill bit $\varnothing 5 \times 195 \text{mm}$ |



- | | | |
|-----|-----------------|------------------------------------|
| 1 x | DF900006 | T-Handle $\varnothing 6 \text{mm}$ |
|-----|-----------------|------------------------------------|



- | | | |
|-----|---------------|--|
| 1 x | SF1306 | Quick-connect adapter for bone screw (stem $\varnothing 6 \text{mm}$) |
|-----|---------------|--|



- | | | |
|-----|---------------|---------------|
| 1 x | SF1356 | T wrench, 6mm |
|-----|---------------|---------------|



Available components



Code **Description**

F4-2746 Knee fixator distractor



F4-2744 Contralateral bone screws curved arm



F4-2792 Radiolucent rod \varnothing 14mm L120mm

F4-2793 Radiolucent rod \varnothing 14mm L160mm

F4-2794 Radiolucent rod \varnothing 14mm L200mm

F4-2795 Radiolucent rod \varnothing 14mm L240mm

F4-2796 Radiolucent rod \varnothing 14mm L280mm

F4-2797 Radiolucent rod \varnothing 14mm L320mm

F4-2798 Radiolucent rod \varnothing 14mm L360mm

F4-2799 Radiolucent rod \varnothing 14mm L400mm



F4-5100 Clamp



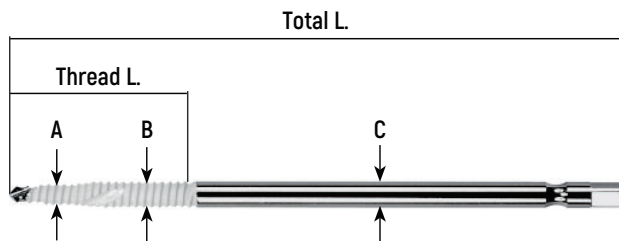
F4-5200 Bone screw holder



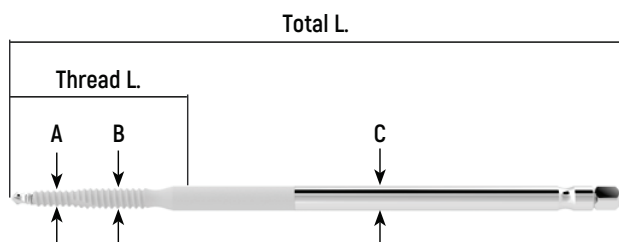
F4-5220 Pin and rod clamp kit



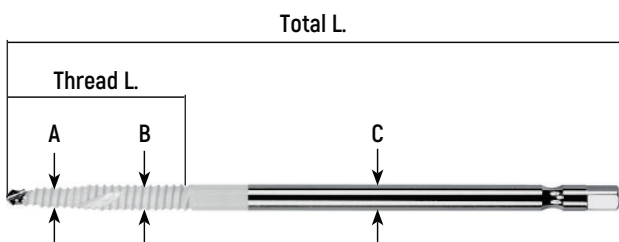
Cortical bone screw with hydroxyapatite coating



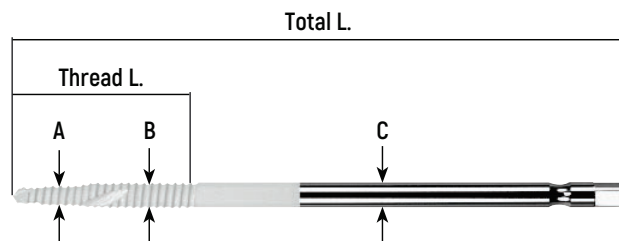
Code	A - B thread ϕ (mm)	C stem ϕ (mm)	Thread L. (mm)	Total L. (mm)
ST256150HA	5 - 6	6	40	150
ST256180HA	5 - 6	6	50	180
ST256200HA	5 - 6	6	60	200



Code	A - B thread ϕ (mm)	C stem ϕ (mm)	Thread L. (mm)	Total L. (mm)
ST360148HA	5 - 6	6	30	150
ST360178HA	5 - 6	6	35	180
ST360198HA	5 - 6	6	40	200








Code	A - B thread ϕ (mm)	C stem ϕ (mm)	Thread L. (mm)	Total L. (mm)
ST360120HA	5 - 6	6	30	120
ST360150HA	5 - 6	6	40	150
ST360180HA	5 - 6	6	50	180



Code	A - B thread ϕ (mm)	C stem ϕ (mm)	Thread L. (mm)	Total L. (mm)
ST156150HA	5 - 6	6	40	150
ST156180HA	5 - 6	6	50	180
ST156200HA	5 - 6	6	60	200

Additional instruments

	Code	Description		
	EBA-0050	6mm hexagonal wrench		
	F4-0205	Torque wrench		
	F4-0215	Bone screw guide		
	DF312020	Drill brace	STERILE	

ST.A.R.90 F4 Knee

Articulated Knee External Fixator



Citieffe s.r.l.

Via Armadori, 21, 40012 Calderara di Reno (BO) - Italy
Tel +39 051 721850 - Fax +39 051 721870
info@citieffe.com | www.citieffe.com

Citieffe Inc.

3692 Grand Ave #473 Miami, Florida 33133 USA
info-usa@citieffe.com | orders-usa@citieffe.com
www.citieffe.com/us/



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the Qrcode

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