

## TL-HEX SYSTEM OVERVIEW

1 poz. TL-HEX sistema skirta galūnių ilginimui esant metafiziniais ir epifiziniais lūžiams, atvirų ir uždarytų lūžių fiksavimui, ilgųjų kaulų nesuaugimams arba pseudoartrozei gydyti, taip pat kaulinio arba minkštojo audinio pažeidimams arba deformacijoms koreguoti

## INTRODUCTION

The TL-HEX TrueLok Hexapod System™ consists of circular and semi-circular external supports secured to the bones by wires and half pins, and interconnected by six struts. This allows multi-planar adjustment of external supports. The TL-HEX system is intended for limb lengthening by metaphyseal or epiphyseal distractions, fixation of open and closed fractures, treatment of non-union or pseudarthrosis of long bones, and correction of bony or soft-tissue defects or deformities.

## SOFTWARE

The software, starting from the initial fracture or deformity, is able to calculate a prescription for the surgeon's review and approval, indicating the direction and daily amount of adjustment in length for each strut in order to achieve the treatment goals.

## HARDWARE

TL-HEX is a circular external fixator based on Ilizarov's principles. This frame consists of a hexapod made up of two rings (circular external supports - Fig. 1), one ring and one foot plate (U-shaped plate for foot deformity correction - Fig. 2) or two foot plates with the opening in opposite directions and six variable-length struts. The relative strut lengths determine the position of the rings. Due to the rings being attached to bone segments or to a bone segment and foot, their position indirectly determines the position of the bone segment.



Fig.1



Fig.2

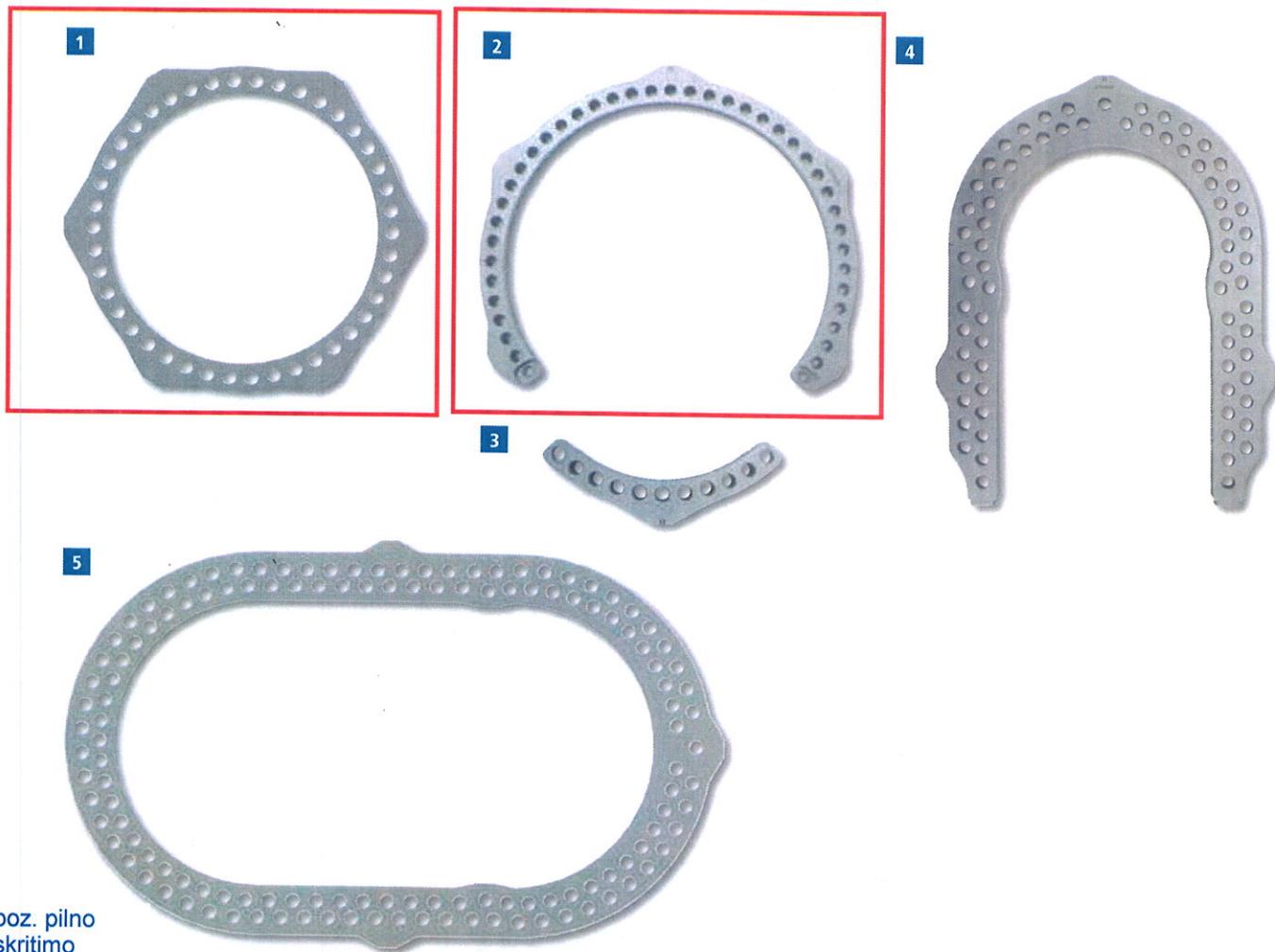
Fig.1 TL-HEX application with two rings and six variable length struts

Fig.2 TL-HEX application with one ring, one footplate and six variable length struts (foot deformity correction)

The frame configuration changes according to the lower-limb bone to correct or to lengthen.

Refer to *General Principles of TL-HEX Frame Assembly* for detailed instructions on how to build the different frame configurations.

# 1. TL-HEX Components



## 2. poz. pilno apskritimo modulinis žiedas

### 1 Full Rings

56-20320 Full ring, 100mm TL-HEX  
 56-20200 Full ring, 120mm TL-HEX  
 56-20000 Full Ring, 140mm, TL-HEX  
 56-20020 Full Ring, 160mm, TL-HEX  
 56-20040 Full Ring, 180mm, TL-HEX  
 56-20060 Full Ring, 200mm, TL-HEX  
 99-56-20080 Full Ring, 220mm, TL-HEX (Sterile)

99-56-20220 Full Ring, 240mm, TL-HEX (Sterile)

99-56-20240 Full Ring, 280mm, TL-HEX (Sterile)

99-56-20340 Full Ring, 300mm, TL-HEX (Sterile)

56-21460 5/8 Modular Ring 200mm TL-HEX

99-56-21480 5/8 Modular Ring 220mm TL-HEX (Sterile)

99-56-21220 5/8 Modular Ring 240mm TL-HEX (Sterile)

99-56-21240 5/8 Modular Ring 280mm TL-HEX (Sterile)

99-56-21340 5/8 Modular Ring 300mm TL-HEX (Sterile)

### 3

#### 3/8 Rings

56-23000 3/8 Ring 100mm TL-HEX

56-23020 3/8 Ring 120mm TL-HEX

56-23040 3/8 Ring 140mm TL-HEX

56-23060 3/8 Ring 160mm TL-HEX

56-23080 3/8 Ring 180mm TL-HEX

56-23100 3/8 Ring 200mm TL-HEX

99-56-23120 3/8 Ring 220mm TL-HEX (Sterile)

99-56-23140 3/8 Ring 240mm TL-HEX (Sterile)

99-56-23160 3/8 Ring 280mm TL-HEX (Sterile)

99-56-23180 3/8 Ring 300mm TL-HEX (Sterile)

### 4

#### Foot Plates

99-56-22000 Double Row Foot Plate TL-HEX, 120mm (Sterile)

99-56-22020 Double Row Foot Plate TL-HEX, 140mm (Sterile)

99-56-22040 Double Row Foot Plate TL-HEX, 160mm (Sterile)

99-56-22060 Double Row Foot Plate TL-HEX, 180mm (Sterile)

99-56-22080 Double Row Foot Plate TL-HEX, 200mm (Sterile)

99-56-22100 Double Row Foot Plate TL-HEX, 220mm (Sterile)

### 5

#### Full Double Row Footplate

99-56-22440 Full Double Row Footplate, 160mm, TL-HEX (Sterile)

99-56-22450 Full Double Row Footplate, 180mm, TL-HEX (Sterile)

## 3. poz. 5/8 apskritimo modulinis žiedas

### 5/8 Rings

56-21320 5/8 Modular Ring 100mm TL-HEX

56-21200 5/8 Modular Ring 120mm TL-HEX

56-21400 5/8 Modular Ring 140mm TL-HEX

56-21420 5/8 Modular Ring 160mm TL-HEX

56-21440 5/8 Modular Ring 180mm TL-HEX

## EXCELLENT STABILITY

Unique strut head design increases frame stability

2 ir 3 poz. reguliuojamas dinaminis strypas tvirtinamas iš žiedo išorinės pusės integruoto greitojo fiksavimo mechanizmo pagalba

## FAST LOCKING

One set screw locks down both struts

**NEW SET SCREWS DESIGN**



## RAPID ADJUSTMENT

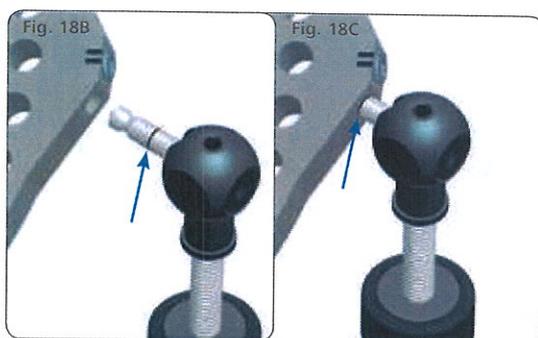
TL-HEX Struts consist of two telescoping aluminum tubes, which can be locked together at various lengths using the side locking bolt and clamp washer

## EASY ADJUSTMENT

Simple pull and click method for patient adjustment

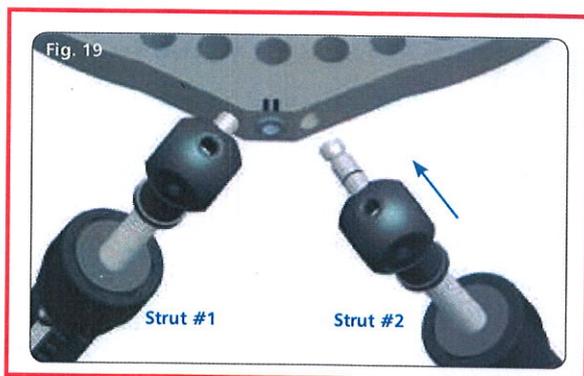


Position the proximal ring with the double-line marked tab facing the surgeon. Insert the mounting stud of strut #1 into the left mounting hole of the anterior tab (which becomes the ring orientation tab) of the ring (Fig. 18A).



Confirm that the stud depth insertion line is fully hidden in the mounting hole (Fig. 18B, 18C).

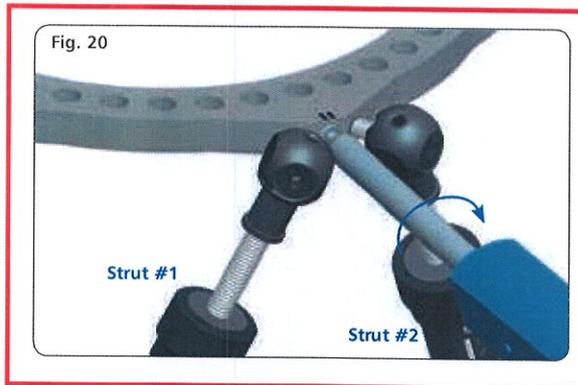
**Note:** If the strut stud does not fully seat in the mounting hole, back out the locking screw to the stop and repeat strut mounting.



While holding strut #1 in place, insert the mounting stud of strut #2 into the right mounting hole of the same tab (Fig. 19).

Be sure that both adjustment knobs on the struts are pointing the same (preferably proximal) direction.

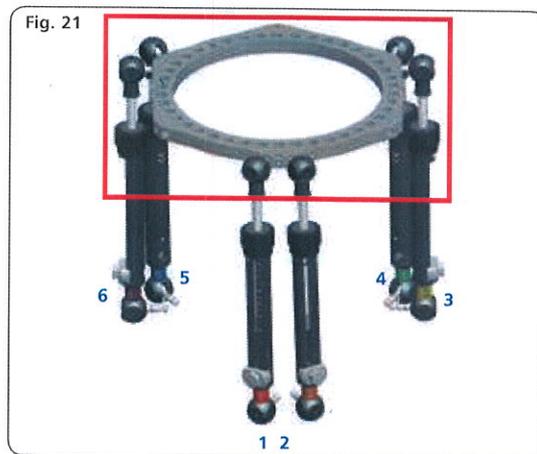
2 ir 3 poz. reguliuojamas  
dinaminis strypas tvirtinamas iš  
žiedo išorinės pusės integruoto  
greitojo fiksavimo mechanizmo  
pagalba



Using the 1/8" HEX Driver, tighten partially the stud locking screw to hold the struts in place (Fig. 20).

**Note:** Do not overtighten the stud locking screw to prevent stripping of the thread.

2 ir 3 poz. reguliuojamas dinaminis strypas tvirtinamas iš žiedo išorinės pusės integruoto greitojo fiksavimo mechanizmo pagalba

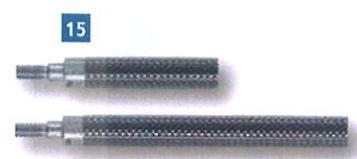
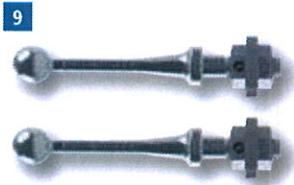
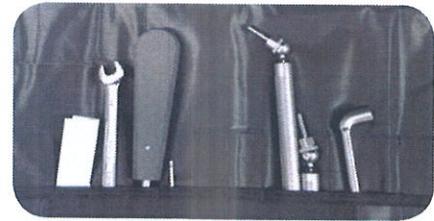
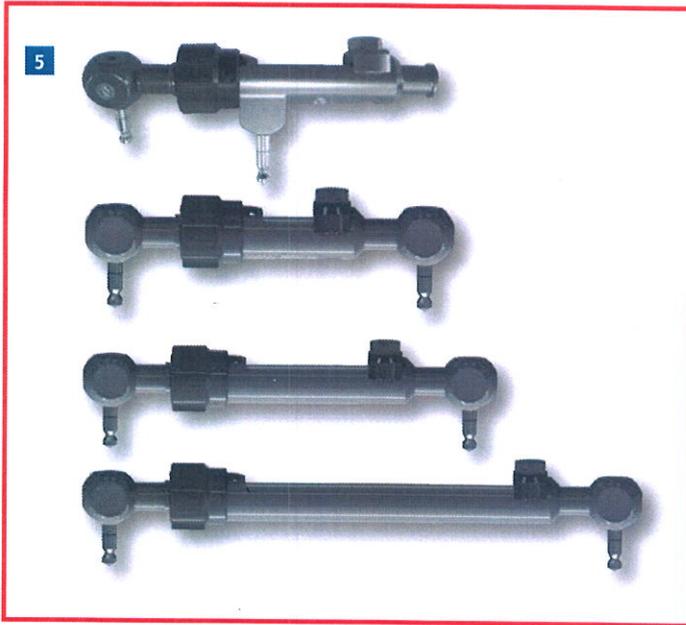


Moving to the right of the ring orientation tab, skip one tab and insert struts #3 and #4 following the same procedure. Continue moving to the right, skip one more tab and insert struts #5 and #6 (Fig. 21). Confirm that all struts are sequentially positioned counterclockwise around the proximal ring.



Align the ring orientation tab of the distal ring with the ring orientation tab of the proximal ring (Fig. 22). Insert the opposite end mounting studs of struts #2 and #3 into the mounting holes of the next tab to the right relative to anterior tab. Secure the struts in place as previously instructed.

## TL-HEX Components



### 4. poz. Greito regulavimo dinaminis strypas: itin trumpas, trumpas, vidutinis, ilgas

- 5**  
**Struts**  
50-10100 UltraShort Strut TL-HEX  
45mm-101mm  
50-10200 Short Strut TL-HEX  
92mm-122mm  
50-10300 Medium Strut TL-HEX  
114mm-184mm  
50-10400 Long Strut TL-HEX  
158mm-318mm

- 6**  
**Number Clips**  
50-10215 Strut Number Clip Kit, TL-HEX (6 pcs)  
Consisting of:  
Strut Number Clip, #1, TL-HEX  
Strut Number Clip, #2, TL-HEX  
Strut Number Clip, #3, TL-HEX  
Strut Number Clip, #4, TL-HEX  
Strut Number Clip, #5, TL-HEX  
Strut Number Clip, #6, TL-HEX

- 7**  
**Direction Clips**  
50-10214 Strut Direction Clip Kit, TL-HEX (6 pcs)

- 8**  
**TL-HEX Strut Exchange Kit (\*)**  
50-10500  
Consisting of:  
1x50-10180 TL Plus Medium Quick Adjust Strut  
1x50-10190 TL Plus Long Quick Adjust Strut  
1x52-10210 TL+ AO 1/8' Hex Power Driver Attachment  
1x52-1018 TL - 1/8' Hex Driver  
1x54-1154 TL - Wrench, Combo, 10mm  
1x54-2226 TL - 90 Degree Tubular Wrench  
2x50-13020 TL+ Extended Nut  
1x50-10214 Strut Direction Clip Kit, TL-HEX (6 pcs)

(\*) For the illustrations of the individual items, see chapter 2, 3 and 4 of section "F. TrueLok"

- 9**  
**Centering Pin Kit**  
56-24020

- 10**  
**Magnification Marker**  
56-24030

- 11**  
**TL-HEX Emergency Tab Kit**  
56-24040

- 12**  
**TrueLok RockerRail (2 items)**  
56-24000

- 13**  
**54-24100**  
**TL Dynamization Module (\*\*)**  
99-54-24100 (Sterile)

- 14**  
**56-24014**  
**Rocker Rail Extension Kit (\*\*)**

- 15**  
**Galaxy TL-HEX Connecting Post (\*\*)**  
93031 L50mm D12mm  
93032 L100mm D12mm

(\*\*) Out of the tray



**4 poz. TL-HEX reguliuojami dinaminiai strypai (4 pav.)** Susideda iš dviejų teleskopinių aliuminio vamzdelių, išorinio vamzdelio (A) ir vidinio vamzdelio (B), kuriuos galima užfiksuoti įvairiais ilgiais, naudojant šoninį fiksavimo varžtą (C) ir fiksatoriaus poveržlę (D).

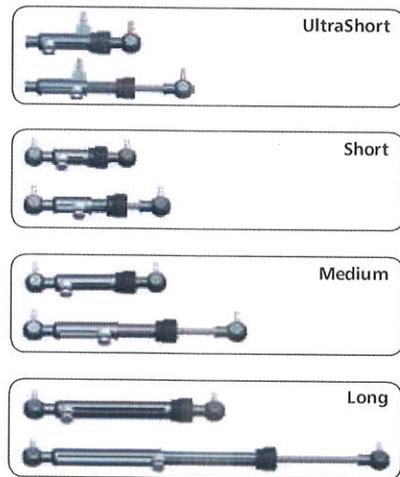
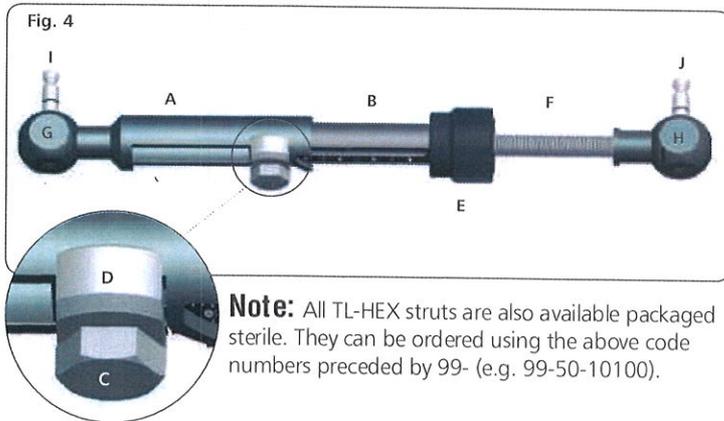
TL-HEX struts (Fig. 4) consist of two telescoping aluminum tubes, an outer tube (A) and an inner tube (B), which can be locked together at various lengths using the side locking bolt (C) and clamp washer (D).

**Warning:** The locking bolt on the strut is retained and should never be removed for any reason. Struts must be cleaned and sterilized in the assembled state with the locking bolt **only** untightened.

TL-HEX struts are available in four sizes (ultrashort, short, medium, long), providing adjustment range from 45mm to a maximum extension to 318mm (Table 1).

Table 1. Minimum and maximum lengths of TL-HEX struts

Part Number	Description	Minimum Length	Maximum Length
50-10100	UltraShort	45mm	101mm
50-10200	Short	92mm	122mm
50-10300	Medium	114mm	184mm
50-10400	Long	158mm	318mm



The inner tube is attached to a spring-loaded, black knurled adjustment knob (E). The adjustment knob mates with the threaded rod (F) in a manner such that the rod translates relative to the inner tube when the knob is rotated. This will provide gradual changes of overall strut length in 0.5-mm increments. A reference arrow with (+) sign located on the base of the adjustment knob (Fig. 5) indicates the direction of turning to perform strut elongation (distraction).

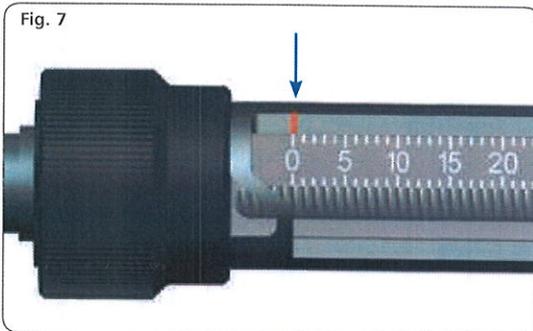
Each strut has two special joints (G) and (H) (Fig. 4), one at the base of the outer tube (tube end joint) and the other at the end of the threaded rod (rod end joint). Each joint has a mounting stud (I) and (J) (Fig. 4), which can be inserted into the mounting holes on the ring tabs and held in place by the locking screw (Figs. 6A, 6B).



When using ultrashort struts, attach them to the ring as described in Figs. 6C-D. Do not insert both central studs into the same tab (Fig. 6E) since this might cause interference between the two struts during assembly and correction manoeuvres.

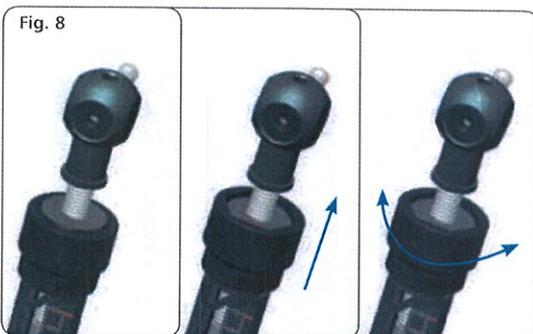
Avoid horizontal placement of the struts. This can lead to software errors.

In some cases (e.g., equinus deformity correction using ultra short struts), there can be interference during the struts tightening when using the configuration shown in Fig. 6D. To avoid this inconvenience, tighten first the set screw in the tab with the most difficult access leaving the other end free. Then connect the free end to the proper tab and tighten the set screw at the opposing ring tab.



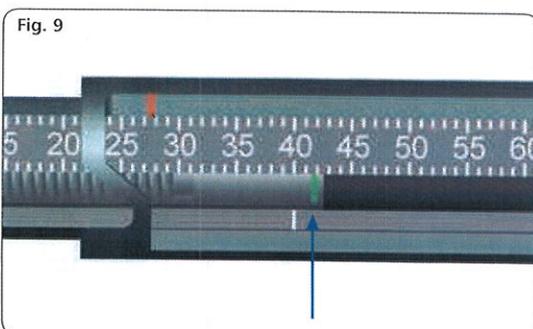
The rapid adjustment of the strut length is achieved by untightening the side locking bolt, sliding the inner tube relative to the outer tube to the desired length and re-tightening the locking bolt. Rapid adjustment is indicated by the inner tube scale in 1-mm increments relative to the orange-line mark on the outer tube (Fig. 7).

Gradual adjustment is achieved by pulling and rotating the adjustment knob resulting in a noticeable detent (click) every 0.5mm of adjustment (Fig. 8).



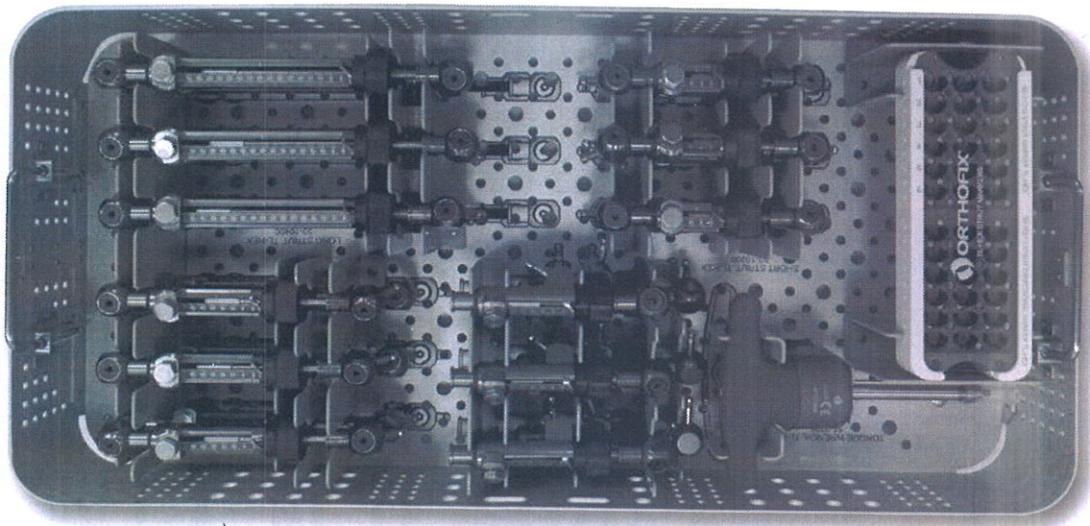
Gradual adjustment is indicated by the same scale relative to the green-line mark on the end of the threaded rod (Fig. 9).

The struts are shipped with the outer tube locked to the inner tube at the zero rapid adjustment position. The threaded rod for gradual adjustment is set in the middle of the scale. This allows the surgeon to rapidly adjust the struts to the desired length followed by gradual compression or distraction.

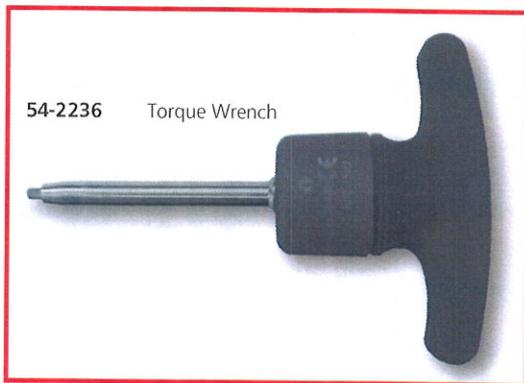


**4. poz. Greitas dinaminio strypo ilgio reguliavimas pasiekiamas atsukant šoninį fiksavimo varžtą, stumdant vidinį vamzdelį išorinio vamzdelio atžvilgiu iki norimo ilgio ir vėl priveržiant fiksavimo varžtą. Nurodomas greitis reguliavimas pagal vidinio vamzdelio skalę 1 mm žingsniu, oranžinės linijos, esančios ant išorinio vamzdelio, atžvilgiu (7 pav.).**

## Sterilization Boxes TL-HEX



2



54-2236 Torque Wrench

5 poz. Dinamometrinis veržliaraktis, ribojantis priveržimo jėgą

2

### Struts Tray cod. 30110087 (empty)

Can accommodate:

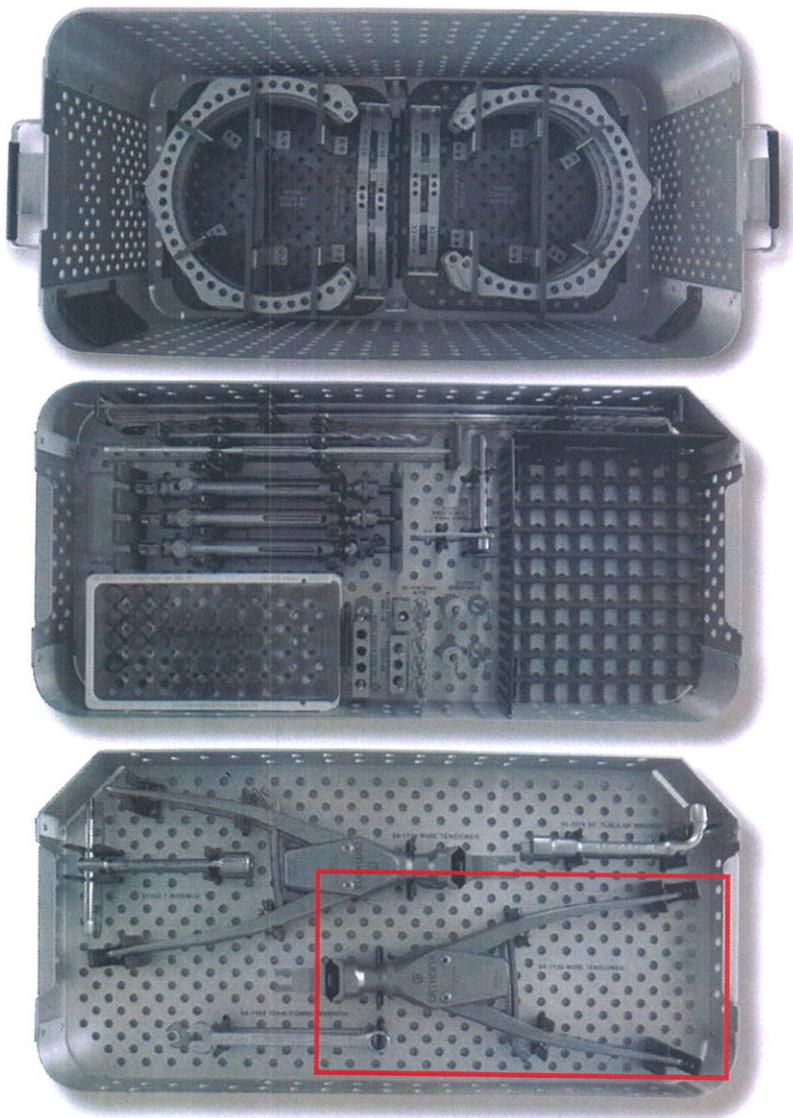
- 3x50-10214 Strut Direction Clip Kit, TL-HEX
- 3x50-10215 Strut Number Clip Kit, TL-HEX
- 1x54-2236 Torque Wrench
- 6x50-10100 UltraShort Strut, TL-HEX  
45mm-101mm
- 6x50-10200 Short Strut, TL-HEX  
92mm-122mm
- 6x50-10300 Medium Strut, TL-HEX  
114mm-184mm
- 6x50-10400 Long Strut, TL-HEX  
158mm-318mm

Note: see also TrueLok materials section "F. TrueLok"

7 poz. Dėklas dinaminiamis strypams



## Sterilization Boxes TL-HEX



### 30110129C Trauma Tray, TL-HEX, complete

The TL-HEX Trauma case is available to accommodate all the instruments and implantable material necessary for the surgery, so it is ideal for emergency applications when time saving is a priority.

2x56-23060	3/8 Ring, 160mm, TL-HEX
4x56-21420	Modular 5/8 Ring, 160mm, TL-HEX
2x56-23080	3/8 Ring, 180mm, TL-HEX
4x56-21440	Modular 5/8 Ring, 180mm, TL-HEX
6x50-10190	True Lok Plus Long Quick Adjust Strut
1x92050	Transfixing Pin, Thread L 50mm Shaft Ø 4mm, Thread Ø 5mm
6x54-1215	TL, Wire, W/Stopper, 1.8mm x 400mm
2x54-1216	TL, Wire, Bayonet, 1.8mm x 400mm
3x54-11600	TL+ One Hole Post
3x54-11620	TL+ Three Hole Post
3x54-11640	TL+ Five Hole Post

15x54-11540 TL 8mm Half Pin Bolt

#### OPTIONAL

15x54-11530	TL+ Universal Half Pin Fixation Bolt 4mm - 6mm
20x54-1152	TL, Bolt, Wire Fixation, Universal
15x54-1010	TL, Bolt, 16mm
30x50-1008	TL, Nut, Stainless Steel, 10mm
12x54-2235	M6 X 1 Hex, Speednut, TrueLok System
1x1100101	Drill Bit, 4.8mm x 180mm Tin Coated - Quick Connect
or	
1x17976	Short Graduated Drill Bit 4.8X180mm
1x11.105	Drill Guide Ø 4.8mm Length 80mm
1x91150	Universal T-Wrench
1x54-2226	TL, 90 Degree Tubular Wrench
1x54-1154	TL, Wrench, Combo, 10mm
2x54-1139	TL PLUS Wire Tensioner with Tip

#### Material out of the tray (Sterile)

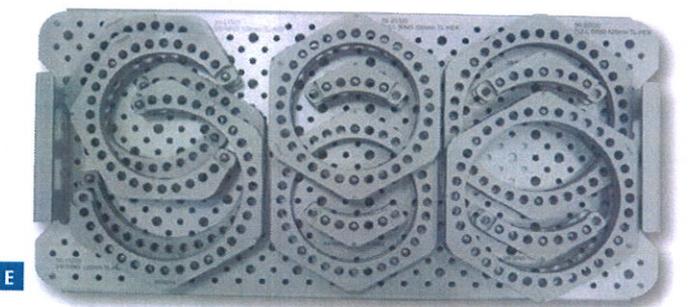
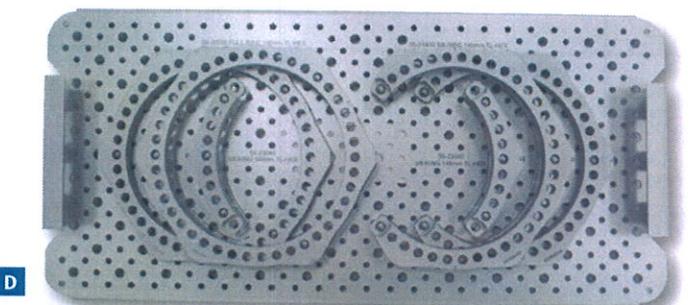
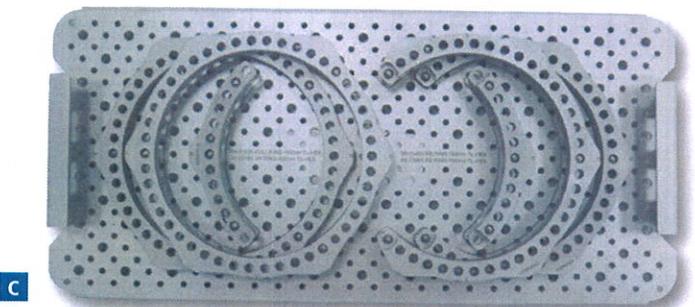
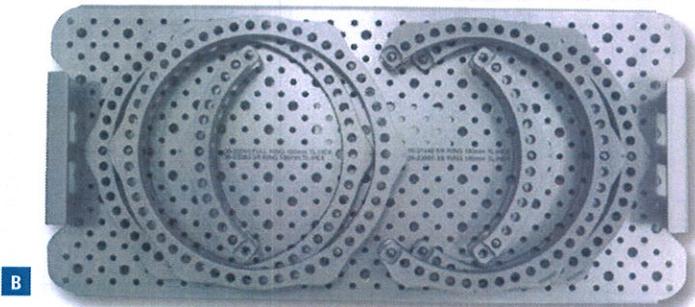
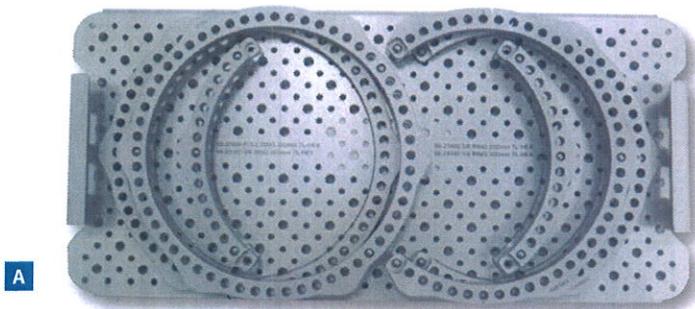
99-56-22040	Double Row Footplate, 160mm, TL-HEX
99-56-22060	Double Row Footplate, 180mm, TL-HEX
99-911530*	XCaliber Bone Screw L150/30mm Thread Ø 6.0-5.6mm
99-911540*	XCaliber Bone Screw L150/40mm Thread Ø 6.0-5.6mm
99-911550*	XCaliber Bone Screw L150/50mm Thread Ø 6.0-5.6mm

\* HA half pins also available.

6 poz. Žnyplēs vieloms jtempti



## 2. Sterilization Boxes TL-HEX



7 poz.  
Konteineris  
sterilizavimui  
su modulinių  
žiedų  
dėklais

**1**

### **30110088 Ring Tray, TL-HEX, Empty**

The rings tray includes 5 removable inserts. Four inserts can hold 2 full rings, 2 5/8 rings and 2 3/8 rings of sizes greater than 120mm, while the top insert can hold 2 full rings, 2 5/8 rings and 2 3/8 rings of 100mm and 120mm sizes.

### **30110088-00 Rings Tray, Box and Lid Empty (with no layer)**

#### **A 30110088-01 Ring Layer 1, 200mm**

56-20060 Full Ring, 200mm, TL-HEX  
56-21460 5/8 Ring 200mm TL-HEX  
56-23100 3/8 Ring 200mm TL-HEX

#### **B 30110088-02 Ring Layer 2, 180mm**

56-20040 Full Ring, 180mm, TL-HEX  
56-21440 5/8 Ring 180mm TL-HEX  
56-23080 3/8 Ring 180mm TL-HEX

#### **C 30110088-03 Ring Layer 3, 160mm**

56-20020 Full Ring, 160mm, TL-HEX  
56-21420 5/8 Ring 160mm TL-HEX  
56-23060 3/8 Ring 160mm TL-HEX

#### **D 30110088-04 Ring Layer 4, 140mm**

56-20000 Full Ring, 140mm TL-HEX  
56-21400 5/8 Ring 140mm TL-HEX  
56-23040 3/8 Ring 140mm TL-HEX

#### **E 30110088-05 Ring Layer 5, 100-120mm**

56-20320 Full ring, 100mm TL-HEX  
56-20200 Full ring, 120mm TL-HEX  
56-21320 5/8 Ring 100mm TL-HEX  
56-21200 5/8 Ring 120mm TL-HEX  
56-23000 3/8 Ring 100mm TL-HEX  
56-23020 3/8 Ring 120mm TL-HEX

#### **Material out of the tray (Sterile)**

All the sterile components are supplied out of the tray (see pag.TL-HEX Components)

**NOTE:** Combination of any three layers can be combined to form a full rings tray.

**DĖL ATVIRO KONKURSO (TARPTAUTINIO ARBA SUPAPRASTINTO  
PIRKIMO) „MEDICINOS PRIETAISAI IR INSTRUMENTAI  
ORTOPEDIJOS-TRAUMATOLOGIJOS CENTRUI“ TECHNINĖS  
SPECIFIKACIJOS REIKALAVIMO 4-AJAI PIRKIMO DALIAI**

Šiuo raštu UAB Osteca, esanti oficialiu kompanijos Orthofix atstovu Lietuvoje ir Latvijoje, patvirtina, kad, jeigu mūsų įmonė laimės atvirą konkursą ir pasirašys pirkimo pardavimo sutartį 4-ajai pirkimo daliai „Išorinės fiksacijos osteosintezės rinkinys galūnių deformacijoms koreguoti, 2 kompl.“, mes įsipareigojame nemokamai suteikti prisijungimus prie aukščiau minėto gamintojo sukurtos programinės įrangos, būtinos darbui su šiai pirkimo daliai siūlomomis medicinos priemonėmis, bei atlikti mokymus, kaip šią perkamą sistemą tinkamai naudoti.

Pagarbiai,  
UAB „Osteca“  
Projektų vadovas



Evaldas Ročys