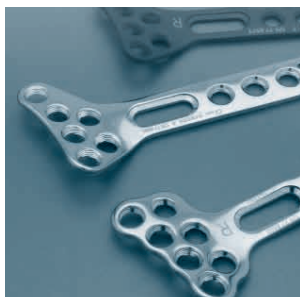
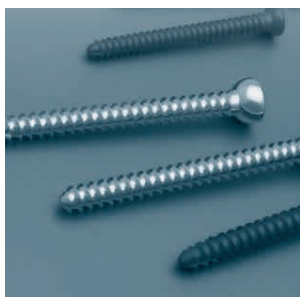




HUMERAL NAIL

O P E R A T I O N I N S T R U C T I O N S



Humeral nail

Operation instructions	1–7
Implants	8–9
Recommended set	10
Instruments	11–12

Information about implants

The humeral nail implant system consists of one humeral nail sized 7, 8 or 9 and at least one cortical, locking, self-tapping screw AO with a diameter of 3.5 mm. The nail can be closed with a stopper 0, 5 or 10, or it is possible to use a compression screw to induce static compression of fractured fragments directly on the operating table.

The humeral nail enables osteosynthesis of the humerus. The nail can be inserted in a retrograde or antegrade manner. Thanks to a number of locking possibilities, good fixation can also be achieved in the case of short distal or proximal fragments.

The humeral nail is intended for the treatment of:

- both stable and unstable fractured fragments
- pathological fractures
- pseudoarthritis

Humeral nails are made of implant steel (according to ISO 5832-1E) or Ti 6Al 4V alloy (according to ISO 5832-3). It is not allowed to combine these materials on nails and screws. They are full and have a circular section of a diameter 7, 8 or 9 mm. The length of nails of a diameter 7 and 8 mm ranges from 190 to 290 mm in 20 mm increments; the length of the nail of a diameter 9 mm ranges from 210 to 310 mm in 20 mm increments. There are holes at both nail ends for locking screws at two planes.

Nail locking is performed by cortical, self-tapping screws AO of a diameter 3.5 mm, the length of the nail ranges from 8 to 70 mm. Nail construction enables both static and dynamic compression. The nail is bent in the distance of 50 mm under angle 8 degrees.

The operation must only be performed by a specialist – a surgeon.

This brochure should be only considered as an illustrative guideline of Humeral nail and the instrumentation. The main purpose of this brochure is to provide a quick orientation for doctors and suture nurses. To show the correct composition and usage of the instrumentation and implant so that the best surgery result would be surgeons.

If you have any queries do not hesitate to contact MEDIN, a.s.



HUMERAL NAIL

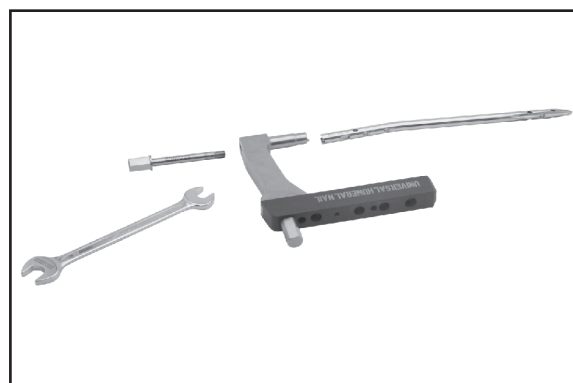
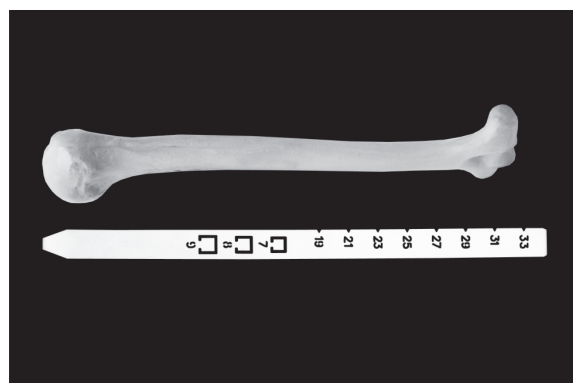
OPERATION INSTRUCTIONS



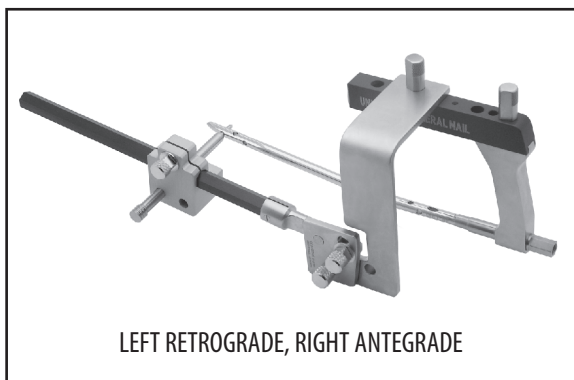
Antegrade nail insertion method.

A patient is placed on the operating table in the supine position, the shoulder of the operated side is loose and the head is turned towards the healthy arm. Approximate reposition is performed under X-ray control in both projections. A **nail** of the required length and diameter is selected with the help of an **X-ray contrast-measuring device** on the operating table.

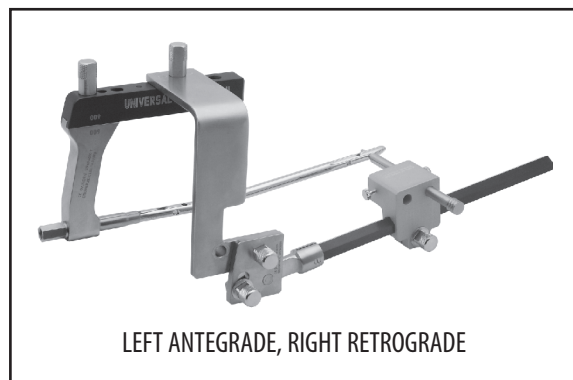
The medullar cavity is opened by an **awl** (on a greater tubercle of humerus) at the place of anatomical neck.



The selected **nail** is assembled with the **aiming H-device** using the screw of the aiming device (see picture). If the **distal aiming H-device** is used, it is necessary to adjust it before the **nail** is inserted. It is recommended to use the **H1 centering pin**.



LEFT RETROGRADE, RIGHT ANTEGRADE

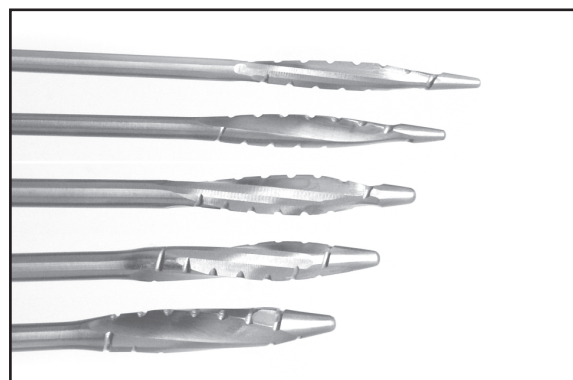


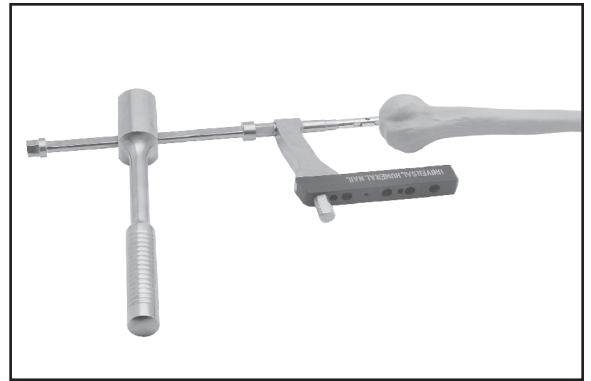
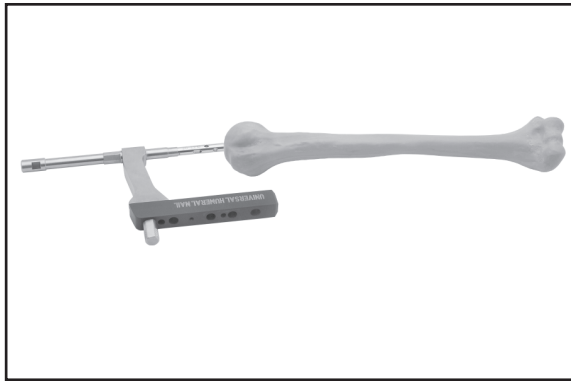
LEFT ANTEGRADE, RIGHT RETROGRADE

After removal of the **distal aiming device**, the **nail** is inserted manually into the medullar cavity as deep as possible. It can be adjusted with a few light taps of a **mallet** aimed either at the **impactor** mounted on the **aiming H-device** and/or at the **axis of the driving mallet** using a **universal mallet**. The nail must be completely inserted into the medullar cavity. In the case of increased resistance during insertion, the **nail** must be removed and the medullar canal must be enlarged by drilling to a diameter 1 mm larger than that of the particular **nail**.

Nail insertion is checked with the x-ray image intensifier; this is particularly important when the nail passes the fracture site.

The depth of nail insertion is influenced by direction of fracture lines

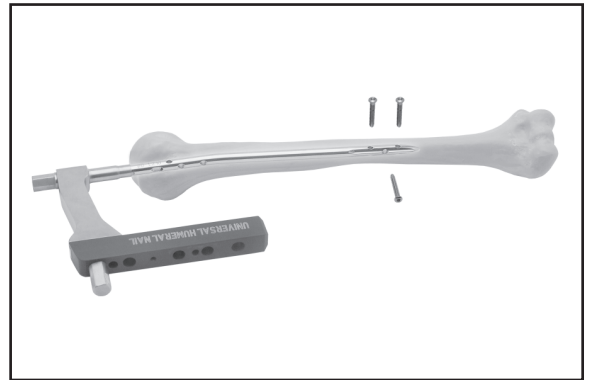




and at the same time by presumed placing of **locking screws**. It is necessary to respect vascular neural bundle and axial nerve during drilling and **locking screws** introduction.

Proximal locking with the help of **aiming device** is performed with maximum of three **screws** in two perpendicular planes.

Distal locking can be performed either „freehand“ or by using the **distal aiming device**. The former uses a common procedure. There is a scale on the **2.7×190 drill** which enables the operator to read the length of the required locking screw. **Locking screws** must be inserted by using a 2.5-mm **hexagonal wrench**.

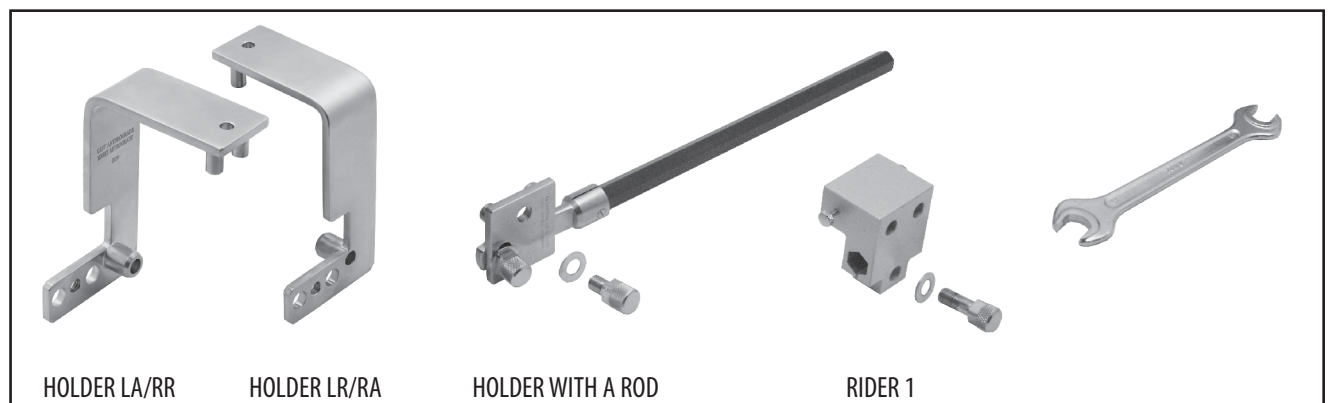


During distal locking, it is necessary to respect artery brachialis and nerve medianus. Ventrodorsal locking is recommended. Lateromedial locking is possible in exceptional indications with the risk of radial nerve affection.

Distal locking using the aiming device

H Aiming device is delivered as a set of three main parts (**rider 1**, **holder with a rod** and **holder H** 2 pcs). Their mutual interchangeability and with other same products is not possible.

If you have any doubts or questions consult them with our sales representative.



HUMERAL NAIL

OPERATION INSTRUCTIONS

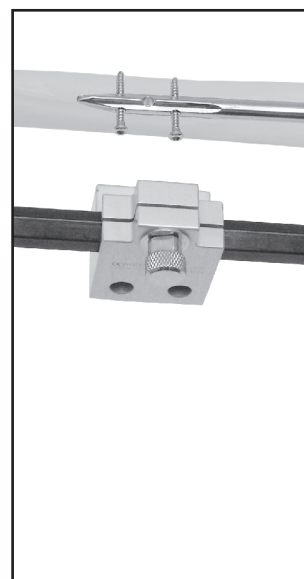
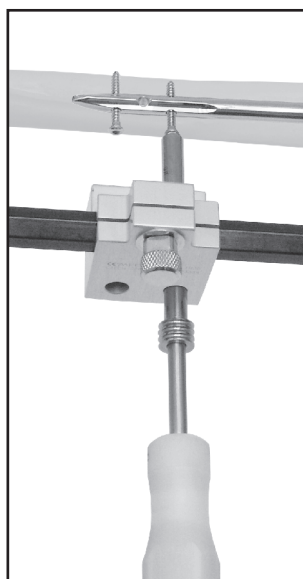
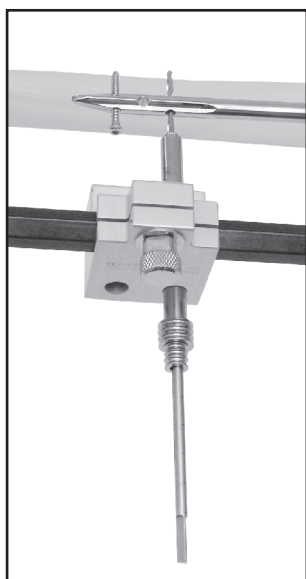
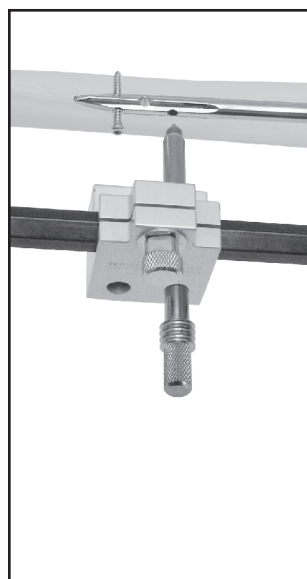
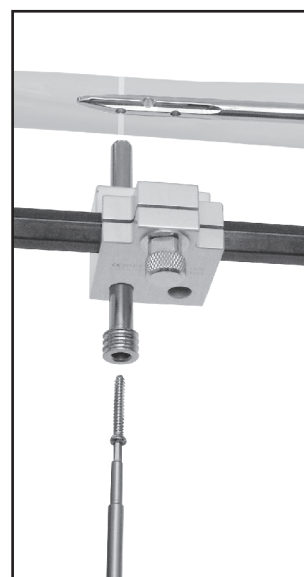
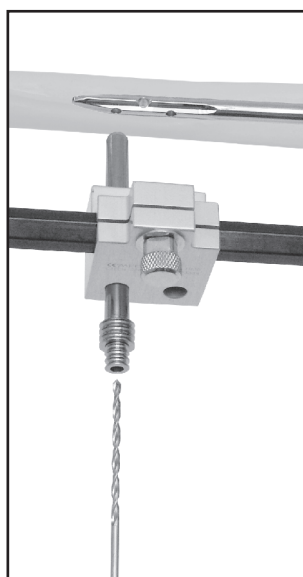
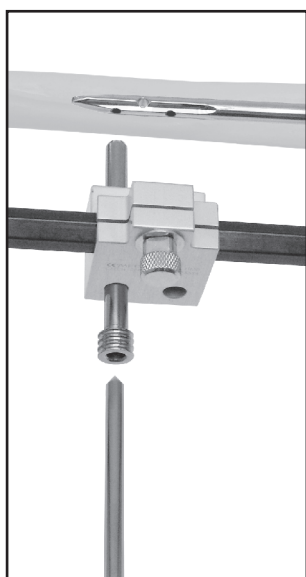
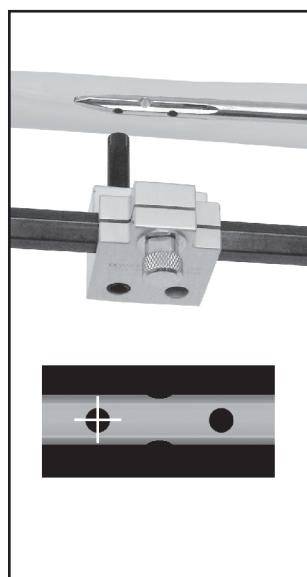
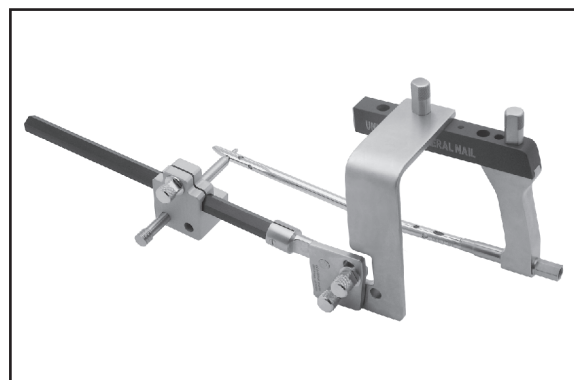


The **distal aiming H-device** is mounted on the **aiming H-device** (the **H-holder** is mounted on the **aiming H-device** and it is locked with the **holder's screw**. Then the **holder with the rod** is mounted on and locked with an **M8×11 screw** followed by mounting **rider 1**).

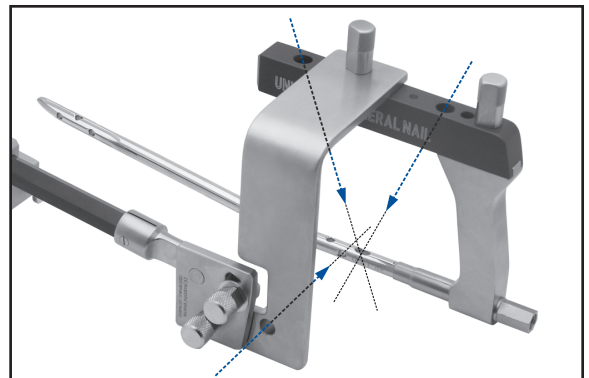
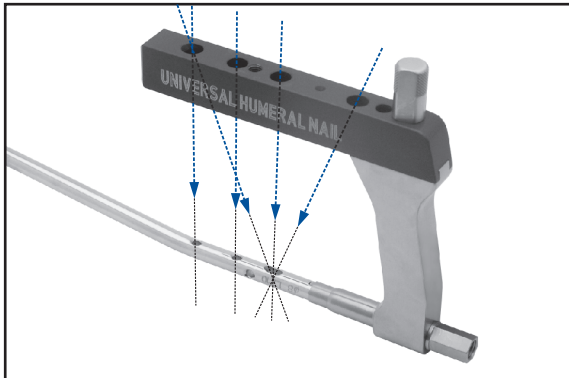
Prior to **nail** insertion, it is necessary to adjust the **distal aiming device** using the **H1 centring pin**.

The **distal aiming device** is removed and the **nail** is inserted. The **distal aiming device** is then remounted. Exact adjustment of **rider 1** must be performed with the help of an x-ray image intensifier so that the **H centring pin** is inserted into the opening in **rider 1**.

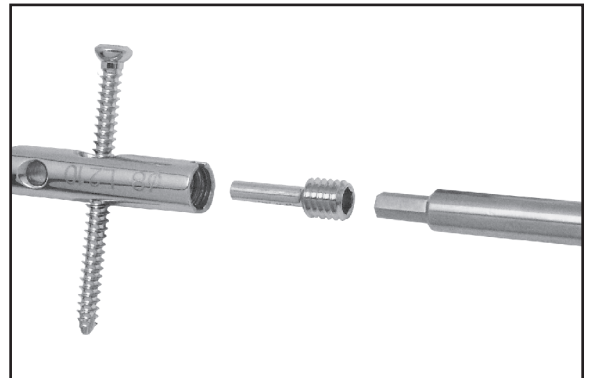
The following steps are performed in the usual manner.



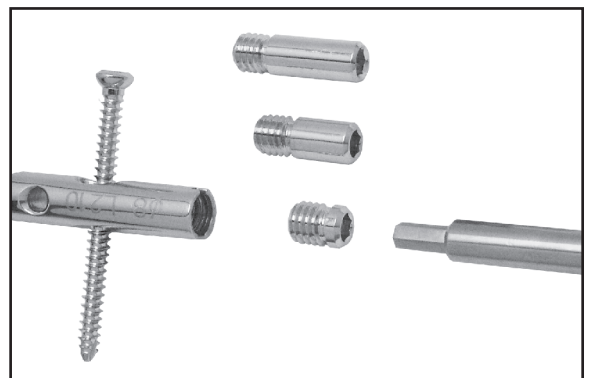
Proximal locking is performed using the **aiming H-device**, or the **H-holder**, respectively.



Static compression can be performed on the operating table by using a **compression screw** inserted into the nail cavity; proximal locking by one screw in the oval opening is necessary and also distal locking by a **screw** against shift.



If a **compression screw** is not used, it is possible to close the end of the **nail** with a **stopper** available in three sizes (extension of the nail by 0, 5 and 10 mm). Both the **compression screw** and the **stopper** (0; 5 or 10) must be inserted or dismantled by a 3.5-mm hexagonal wrench.



Retrograde nail insertion method

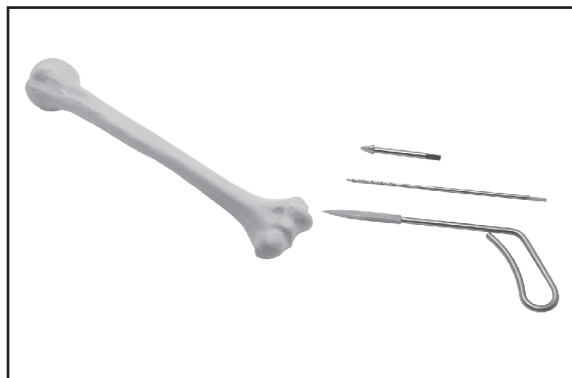
Placing the patient in the prone position with the arm supported is more suitable position. If necessary, the operation can be performed with the patient lying on the side of the healthy arm. The medullar cavity of the humerus is opened from the dorsal side cca 25 mm above fossa olecrani. The opening must be cca 20 mm long and 10 mm wide, the edges should be slanted to facilitate insertion of the nail.

Recommended procedure:

- mark the places for pre-drilling using an **awl**
- predrill using a **drill bit** with a diameter ranging from 3.5 to 4.5 mm
- enlarge both the opening and the slant using a **bone cutter** to ensure easy insertion of the nail. The dimensions of the opening should be roughly 10 x 20 mm.
- mark the places for pre-drilling by an **awl**
- perform the pre-drilling with a **drill** of a diameter ranging from 3.5 to 4.5 mm
- enlarge both the opening and its slant by using the **bone cutter** to ensure easy insertion of the nail. The dimensions of the opening should be roughly 10 × 20 mm.

The following steps are identical to those described in the antegrade nail insertion method.

During the proximal locking, when the placing of locking holes is being specified exactly, it is necessary to consider the position of vascular neural bundle and the axilar nerve. Prevent their damage mainly during locking holes creation and during locking screws introduction.



Recommended procedure for implant extraction

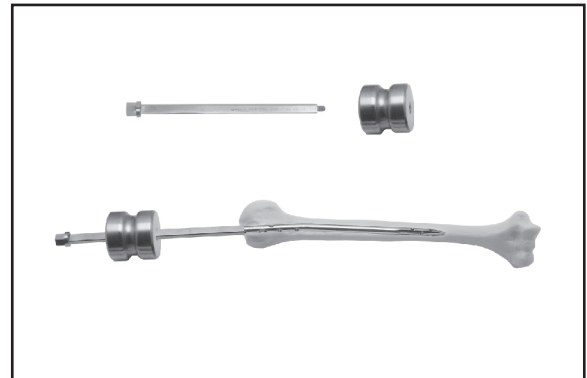
If the **distal screws** were not removed during bone healing, they are removed now.

The **stopper** of the nail is removed.



The **pull-out axis** of the **mallet** is screwed in the internal cavity of the nail's proximal end and weight can then be put on it.

The nail can be removed using a **universal mallet** instead of **weight**. The **nail** is hammered out by reversal taps.



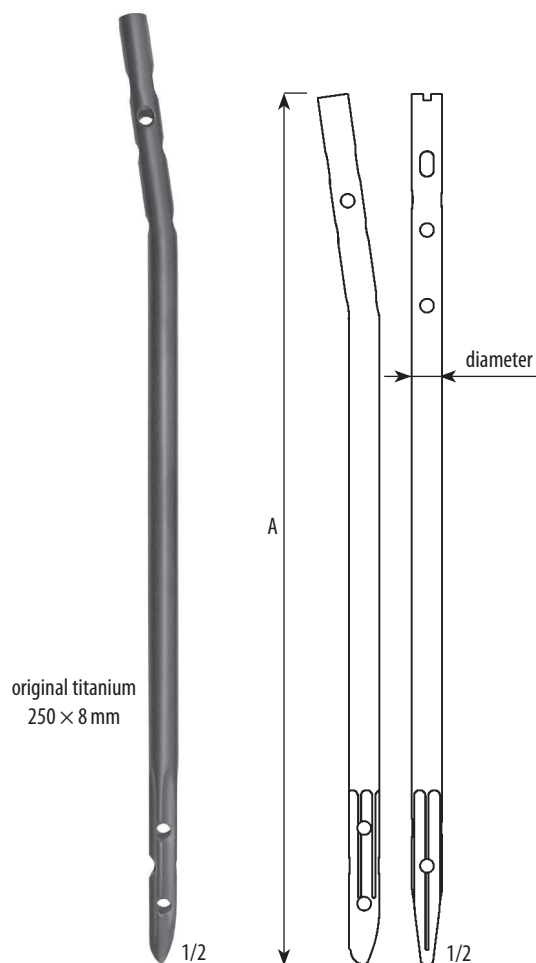
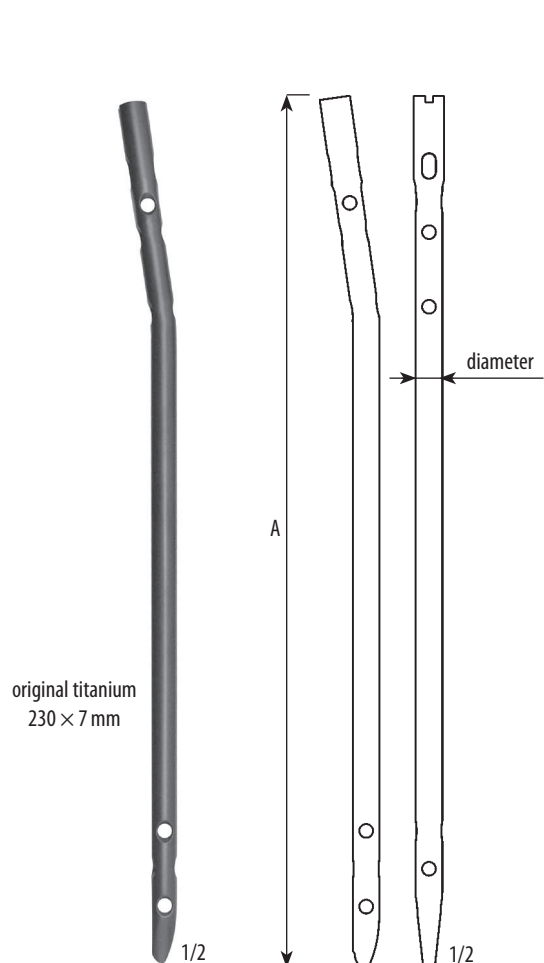
To prevent **nail** pushing into the bone cavity during the **extraction hammer** introduction, it is suitable to keep one **locking screw** before entire completion of the extractor with the **nail**.



HUMERAL NAIL IMPLANTS



HUMERAL NAILS

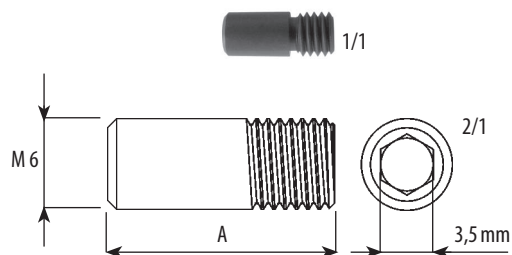


	titanium	A	diameter
129 77 2000	129 77 2003	190 mm	7 mm
129 77 2010	129 77 2013	210 mm	7 mm
129 77 2020	129 77 2023	230 mm	7 mm
129 77 2030	129 77 2033	250 mm	7 mm
129 77 2040	129 77 2043	270 mm	7 mm
129 77 2050	129 77 2053	290 mm	7 mm

	titanium	A	diameter
129 77 2070	129 77 2073	190 mm	8 mm
129 77 2080	129 77 2083	210 mm	8 mm
129 77 2090	129 77 2093	230 mm	8 mm
129 77 2100	129 77 2103	250 mm	8 mm
129 77 2110	129 77 2113	270 mm	8 mm
129 77 2120	129 77 2123	290 mm	8 mm

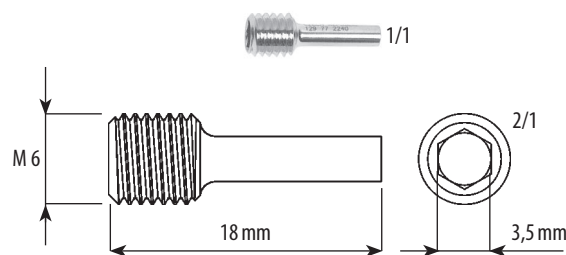
129 77 2140	129 77 2143	210 mm	9 mm
129 77 2150	129 77 2153	230 mm	9 mm
129 77 2160	129 77 2163	250 mm	9 mm
129 77 2170	129 77 2173	270 mm	9 mm
129 77 2180	129 77 2183	290 mm	9 mm
129 77 2190	129 77 2193	310 mm	9 mm

NOTES: ■ TITANIUM version – material: Ti6Al4V ELI, in accordance with ISO 5832-3



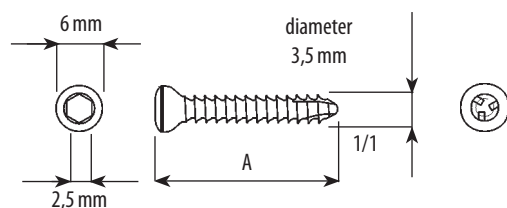
STOPPER

	titanium	A	
129 77 2210	129 77 2213	8 mm	Fig. 0
129 77 2220	129 77 2223	15 mm	Fig. 5
129 77 2230	129 77 2233	20 mm	Fig. 10



COMPRESSION SCREW

	titanium	A
129 77 2240	129 77 2243	18 mm



CORTICAL BONE SCREW HA 3,5

129 79 5281

self-tapping
24 mm

	titanium	A		titanium	A
129 79 5241	129 79 5244	16 mm		129 79 5351	38 mm
129 79 5251	129 79 5254	18 mm		129 79 5361	40 mm
129 79 5261	129 79 5264	20 mm		129 79 5371	42 mm
129 79 5271	129 79 5274	22 mm		129 79 5441	44 mm
129 79 5281	129 79 5284	24 mm		129 79 5451	46 mm
129 79 5291	129 79 5294	26 mm		129 79 5461	48 mm
129 79 5301	129 79 5304	28 mm		129 79 5391	50 mm
129 79 5311	129 79 5314	30 mm		129 79 5401	55 mm
129 79 5321	129 79 5324	32 mm		129 79 5411	60 mm
129 79 5331	129 79 5334	34 mm		129 79 5421	65 mm
129 79 5341	129 79 5344	36 mm		129 79 5431	70 mm

HUMERAL NAIL IMPLANTS



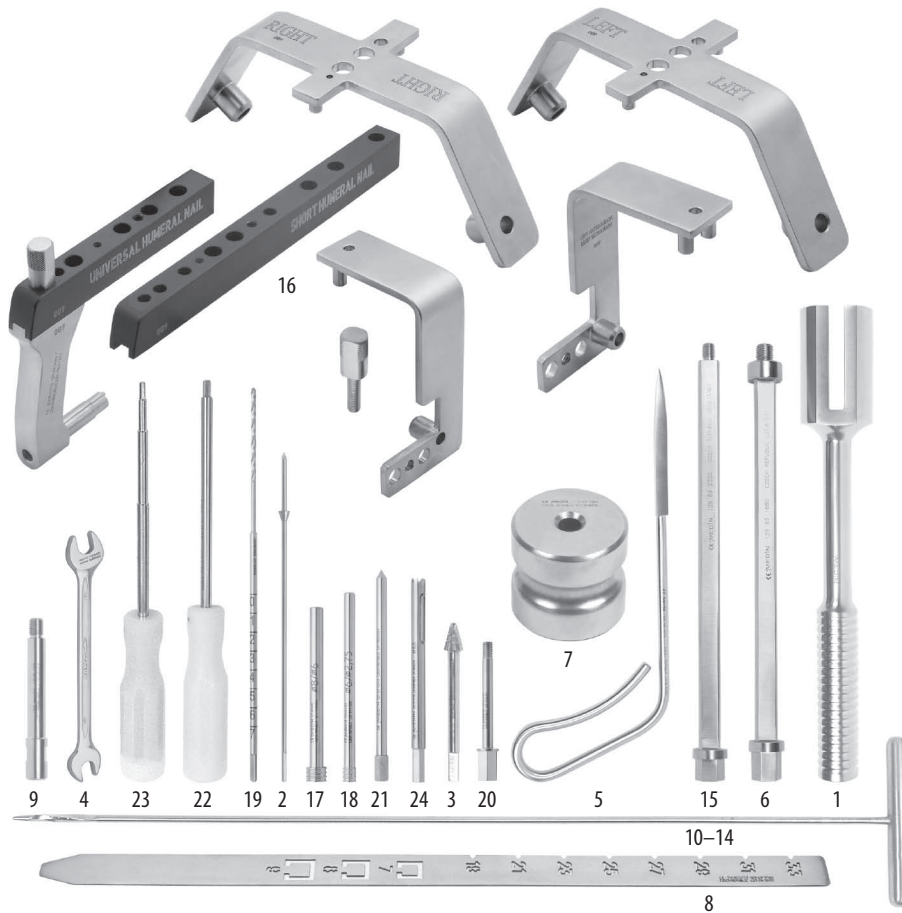
RECOMMENDED SET OF IMPLANTS FOR HUMERAL NAILS

illuminative photo



			titan
1	129 77 2000	129 77 2003	HUMERAL NAIL; 7 × 190 mm
2	129 77 2010	129 77 2013	HUMERAL NAIL; 7 × 210 mm
3	129 77 2020	129 77 2023	HUMERAL NAIL; 7 × 230 mm
4	129 77 2030	129 77 2033	HUMERAL NAIL; 7 × 250 mm
5	129 77 2040	129 77 2043	HUMERAL NAIL; 7 × 270 mm
6	129 77 2050	129 77 2053	HUMERAL NAIL; 7 × 290 mm
7	129 77 2070	129 77 2073	HUMERAL NAIL; 8 × 190 mm
8	129 77 2080	129 77 2083	HUMERAL NAIL; 8 × 210 mm
9	129 77 2090	129 77 2093	HUMERAL NAIL; 8 × 230 mm
10	129 77 2100	129 77 2103	HUMERAL NAIL; 8 × 250 mm
11	129 77 2110	129 77 2113	HUMERAL NAIL; 8 × 270 mm
12	129 77 2120	129 77 2123	HUMERAL NAIL; 8 × 290 mm
13	129 77 2140	129 77 2143	HUMERAL NAIL; 9 × 210 mm
14	129 77 2150	129 77 2153	HUMERAL NAIL; 9 × 230 mm
15	129 77 2160	129 77 2163	HUMERAL NAIL; 9 × 250 mm
16	129 77 2170	129 77 2173	HUMERAL NAIL; 9 × 270 mm
17	129 77 2180	129 77 2183	HUMERAL NAIL; 9 × 290 mm
18	129 77 2190	129 77 2193	HUMERAL NAIL; 9 × 310 mm
19	129 77 2240	129 77 2243	COMPRESSION SCREW
20	129 77 2210	129 77 2213	STOPPER 0
21	129 77 2220	129 77 2223	STOPPER 5
22	129 77 2230	129 77 2233	STOPPER 10
23	129 79 5241 ÷ 5461	129 79 5244 ÷ 5464	SELF-TAPPING CORTICAL BONE SCREW 3,5

NOTES: ■ TITANIUM version – material: Ti6Al4V ELI, in accordance with ISO 5832-3



129 69 4200

set

number of pcs

1	129 09 6120	UNIVERSAL Mallet	1
2	129 09 9950	WIRE WITH OLIVE	1
3	129 69 1280	BONE CUTTER	1
4	129 69 1630	WRENCH 10/12	1
5	129 69 1670	AWL	1
6	129 69 1680	INTRODUCING AXIS	1
7	129 69 1690	WEIGHT	1
8	129 69 1700	GAUGE	1
9	129 69 1730	IMPACTOR	1
10	129 69 2260	HUMERAL CUTTER 5	1
11	129 69 2270	HUMERAL CUTTER 6	1
12	129 69 2280	HUMERAL CUTTER 7	1
13	129 69 2290	HUMERAL CUTTER 8	1
14	129 69 2300	HUMERAL CUTTER 9	1
15	129 69 2320	EXTRACTING AXIS	1
16	129 69 4080	AIMING DEVICE HUMERUS, TYPE 3	1
17	129 69 4110	SLEEVE 1	1
18	129 69 4120	SLEEVE 2	1
19	129 69 4130	DRILL; diameter 2,7 mm; 210 mm	1
20	129 69 4140	SCREW OF AIMING DEVICE	1
21	129 69 4240	TROCAR HUMERUS	1
22	129 79 3900	SCREWDRIVER 3,5	1
23	129 79 4340	SCREWDRIVER 2,5	1
24	129 79 9770	CUTTER; diameter 8,5 mm	1

INSTRUMENTS FOR HUMERAL NAILS



RIGHT ARM OF THE AIMING DEVICE



LEFT ARM OF THE AIMING DEVICE



BOLT



HOLDER LA/RR



HOLDER LR/RA



STIRRUP WITH A KNEE



CROSSBAR UNIVERSAL



CROSSBAR FOR SHORT NAIL

AIMING DEVICE HUMERAL, TYPE 3

129 69 4080

complete

NOTES: Aiming device for humeral nails and short humeral nails.

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HUMERAL NAIL

2008

