TRAUMATOLOGY

MAGIC Tibia

Sanatmetal®

Contents

The following surgical description contains general outlines for intramedullary nailings performed on the tibia with Magic Tibia system. However, the operating surgeon shall adapt the content to the patient, fracture type and all other relevant factors that may have influence on the outcome of the surgery.

Therefore, Sanatmetal Ltd. strongly recommends participation on workshops and trainings prior to the initial operation.

The ***Magic*** Tibia system uses the most modern targeting technique of a wireless magnetic technology. With this the usage of image intensifier is kept to the theoretical minimum for distal locking while avoiding any possible confusions deriving from cables. The learning curve is very short and even a novice to the system can operate it effectively.

1.1 | The implant

The nail

- Cannulated nails
- Locking
- Dynamic
- 10 degree Herzog curvature on the proximal side 3 degree bending on the distal for easier introduction

- Special sagittal hole for accepting the manual targeting device
- Special distal hole for pilon-like fractures (5 mm from the tip of the nail)

- Stainless Steel, Titanium, Anodized Titanium
- 8-14 mm diameter, 255-420 mm length, steps 15 mm

Locking screws

- 3,8 mm (for Ø8 mm nail), 4,8 mm (for Ø9-14 mm nails)
- Locking holes in 4 planes 3 pcs proximal, 4 pcs distal

1.2 | The instrument set

Well-organized instruments that guide the surgeon through the steps of operation, born from the melting of simplicity and minimal radiation load.

Features

- Wireless magnetic distal targeting, lower quality image intensifier does not hinder accurate targeting
- Rotatable colour coded proximal targeting arm for assembly-free targeting of the locking holes (availabe in carbon)
- Manual distal targeting device for image intensifier free distal targeting
- Sleeves are protected against fallout.

1.3 | Indications

- Open and closed fractures
- Comminuted fractures
- Pseudoarthros (sterile hypertrophic and septic)
- Corrective osteotomy
- Pathologic fractures
- Tumor resections
- Simple midshaft fractures (transversal, oblique, spiral)

2.1 | Tibia nail

Diameter (mm)
8
9
10
11
12
13
14

Length (mm)
255
270
285
300
315
330
345
360
375
390
405
420

Raw material
Steel
Titanium
Anodised Titanium

2.2 | Locking screw Ø4,8 mm*

Length (mm)
25 - 100

Raw material
Steel
Titanium
Anodised Titanium

*(For 9-14 mm diameter nails.)

2.3 | Locking screw Ø3,8 mm*

Length (mm)
20 - 80

Raw material
Steel
Titanium
Anodised Titanium

*(For 8 mm diameter nails.)

2.3 | End cap

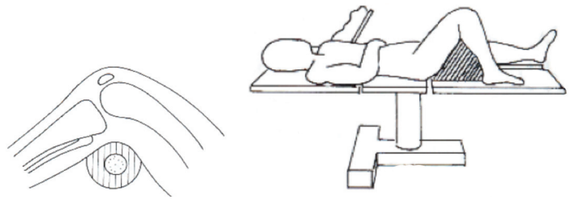
Length (mm)
0
5
10
15
20
25

Raw material
Steel
Titanium
Anodised Titanium

3 | Surgical description

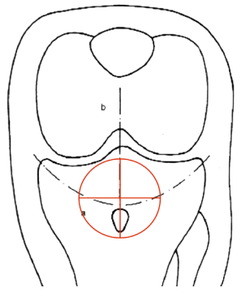
3.1 | Patient positioning

In supine position on extension surgical table. The affected limb in 90 degree flexion on knee support. Make sure that the features of fossa poplitea shall not be under pressure during operation.



3.2 | Incision

The incision shall be made above tuberositas tibiae in 6-9 cm length.

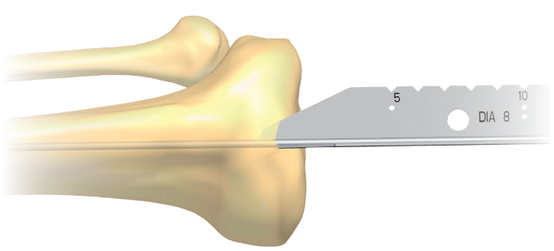


3.3 | Preparation of the intramedullary canal

The intramedullary canal is opened by the awl. The insertion of the guide wire requires the usage of image intensifier control. Make sure that the tip of the olive wire is down to the distal end of the intramedullary canal.

3.4 | Determining nail length

Measure the length of the guide wire part outside of the tibia with a measuring rod. Subtract this value from the length of the guide wire. The result is the required nail length.



3.5 | Assembly of the targeting arm and the implant

Turn the proximal arm into “B” position while pressing the button on the arm. Mount the nail to the targeting arm in this position and fix it firmly with the connecting screw.

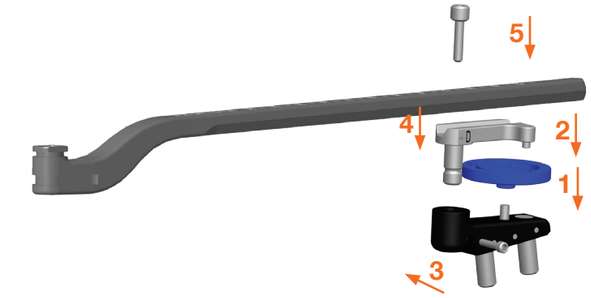
Assemble the distal targeting arm. First place the base into the proximal targeting arm, then according to the illustration, put the turning spiral and the fixer into the appropriate holes. Fixer is locked by a safety-screw in the feet. Set the distal targeting arm according to the length of the selected nail. Distal targeting arm is suited into the above mentioned fixer. The fixing screw is always tightened by the 3,5 mm screwdriver.

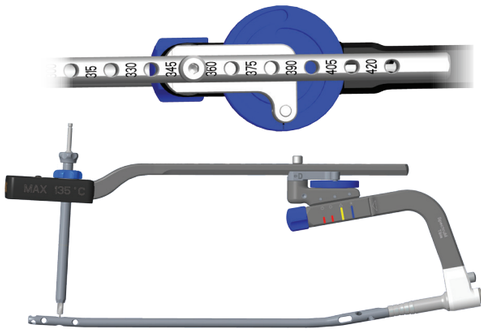
Before the introduction of the nail check the accurate length setting of the distal arm. The soft tissue protector placed into the hole of the distal targeting arm shall be above the sagittal distal hole of the nail. After control the distal arm is removed. Keep the setting position of the arm so that the distal targeting could be started from this position.

Select one of the touch probes according to nail size (8 or 9-11 or 12-14 mm) and assemble it with the manual targeting device.

Click the distal aiming device into the special hole of the nail. Put the soft tissue protector and the drill sleeve into the device and insert the 4,2 mm drillbit. In case of correct assembly the sleeve drives the drillbit into the proper locking hole. After this check remove the distal targeting device.

Set the stop of the signal source rod according to nail length. Read the value in the middle window of the stop. Push the rod into the nail until the stop to check correct stop setting. Remove the rod from the nail.



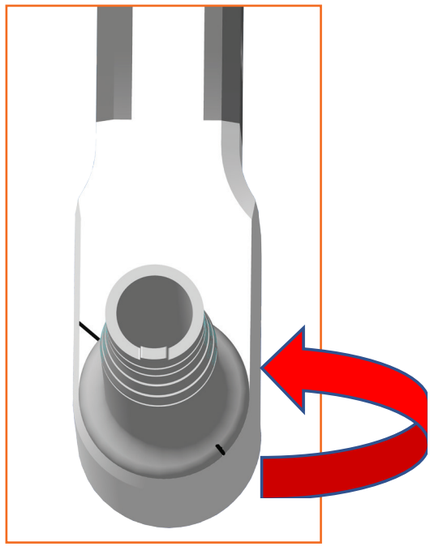


Disassembly of the rotating mechanism

1. This is how you receive your Spectrum Tibia proximal targeting arm.

To disassemble, first press the button and keep it pressed.

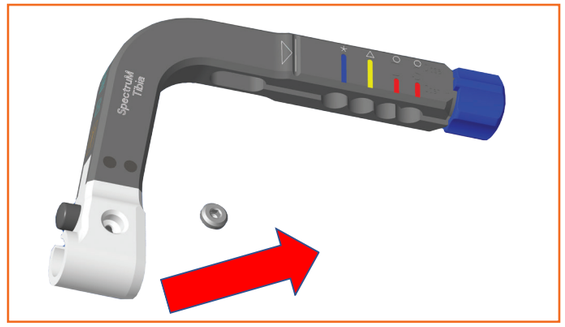
2. Position the proximal arm as per the image while pressing the button. Rotate the connecting part until the black laser marks align.



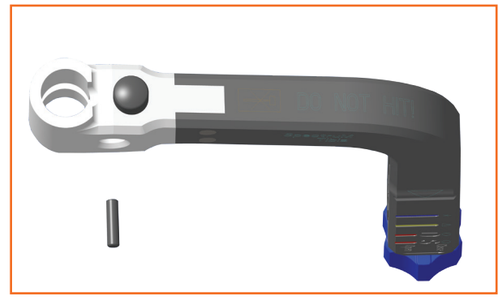
3. Pull the connecting part out of the targeting arm. Mind the position of the targeting arm. Keep the button pressed.

4. While still pressing the button, turn the targeting arm upside down and let the small peg fall into your palm.

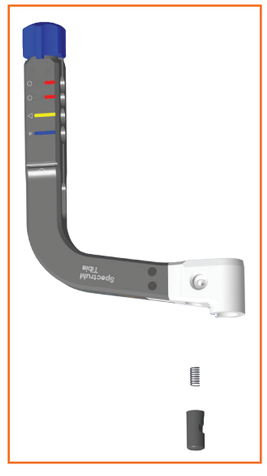
5. Release the button and with a 3,5 mm screwdriver remove the small protective screw.



6. Press the button and rotate the arm until the fixing pin falls out. Release the button.



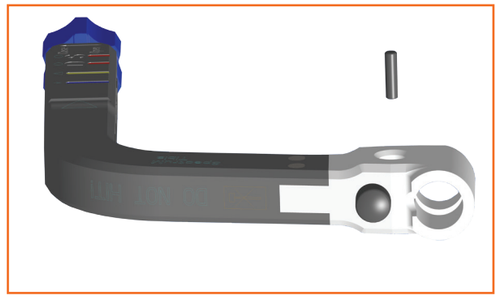
7. Pull out the button and the spring.



Assembly of the rotating mechanism

1. Put the spring and the button into the targeting arm. Mind the position of the button: the groove shall face upwards.

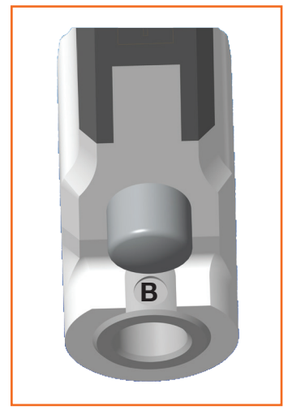
2. Press the button and push the fixing pin into the hole. Release the button: the pin shall keep it from falling out. Drive the protective screw to its position above the fixing pin with a 3,5 mm screwdriver.

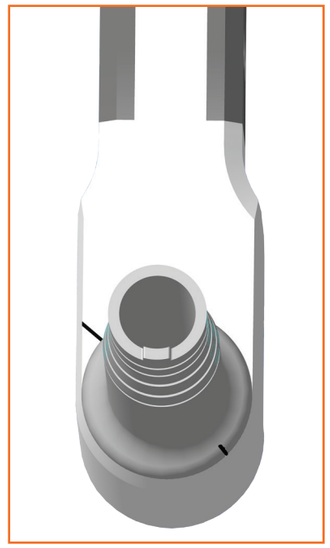


3. While pressing the button put the peg into its groove. Keep the button pressed.

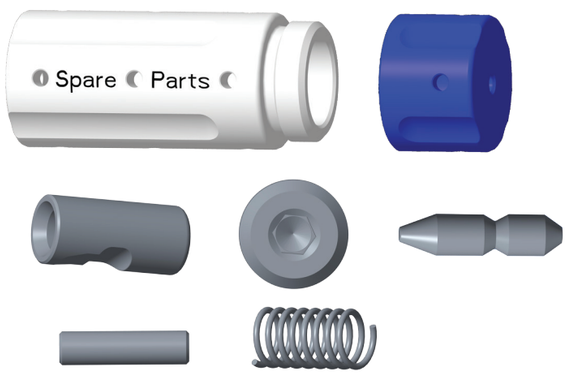
4. While still pressing the button push the connecting part into the hole of the targeting arm in such a position when laser marks align.

5. Rotate the connecting part into „B" (base/ beginning) position. Release the button. Spectrum Tibia proximal targeting arm is ready for use.



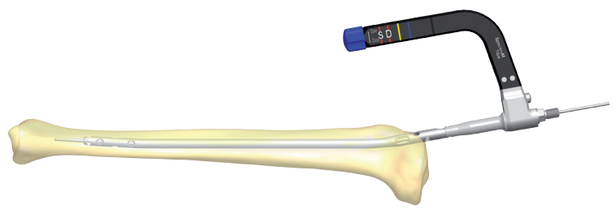


6. Spare parts are included in the instrument set.



3.6 | Introduction of the nail

The nail is inserted into the intramedullary canal through the olive tip guide wire while the targeting arm is in “B” position. Use rotating movements. If the nail insertion is blocked connect the sliding hammer and guide the nail to its final position with light mallet blows. Do not force! If the intramedullary canal is too narrow ream it 1 mm larger than the nail. Apply A-P and M-L image intensifier control when the nail passes the fracture zone and in the final position. Remove the guide wire.

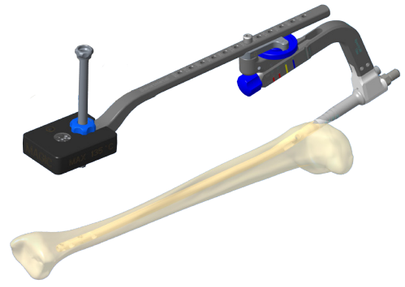


3.7 | Assembly and fixation of the distal targeting arm

Put the pre-assembled distal arm on the proximal arm and fix it.

Place the Magic unit on the distal arm and push the corrugated and laser-marked sleeve into its position.

The sleeve shall be fixed in such height that it should not interfere with the soft tissue when moving the targeting arm. If possible, at the height of the laser mark.



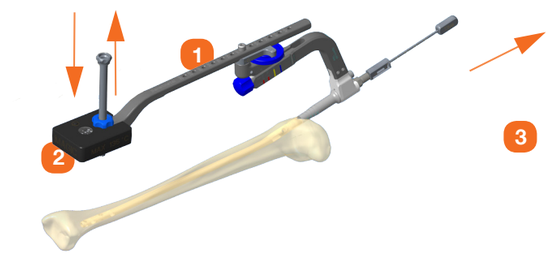
3.8 | Magnetic aiming

Switch the Magic unit on and after the 30 second calibration (when green LED is flashing) push the signal source rod into the nail up to the preset stop. During calibration all movements shall be avoided!

The yellow LEDs of the Magic unit correspond to the direction in which the distal arm shall be moved. Continuous green light indicates that the sleeve is above the special hole of the nail.
Remove the rod from the nail.
Upon the removal the unit switched automatically off.

Without the lateral movement of the targeting arm advance the sleeve to the bone then lift the arm to add tension to the frame and close it with the fixing screw.

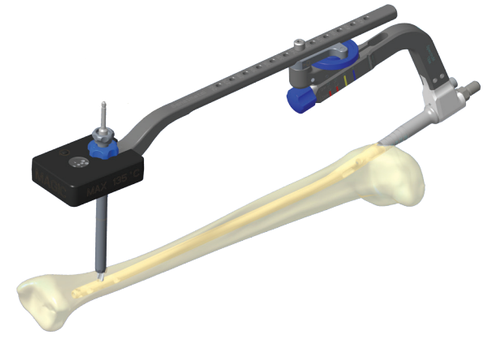
Attention! Before drilling remove the rod from the nail!



3.9 | Drilling with the spiral drill

Drill the closer cortical through the soft tissue protector with the 6 mm spiral drill. Drill carefully. After the drillbit passed the cortical and reached the nail stop drilling.

After drilling the distal arm is removed. Make sure that the spiral won’t be turned, since it signs the correct position of the hole. Remove the Magic unit from the targeting arm.

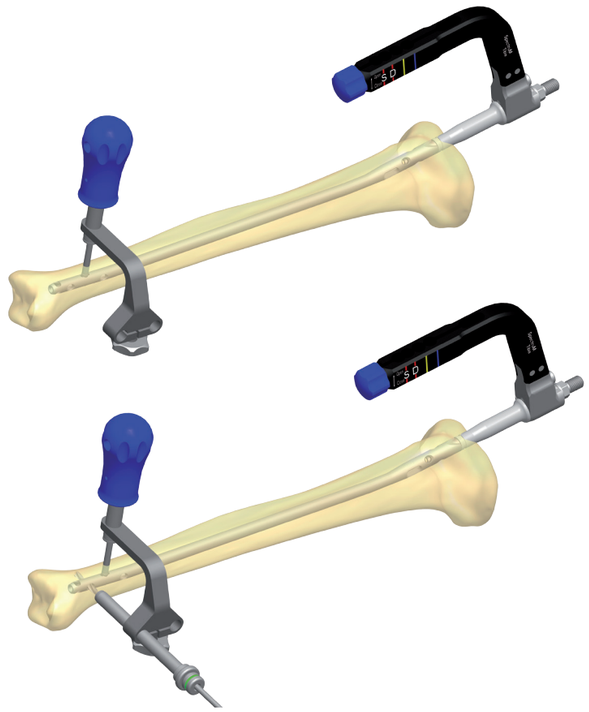


3.10 | Distal locking I.

Put the manual targeting device into the monocortical hole in the bone then click it into the special hole of the nail. Fine movement of the proximal targeting arm will facilitate the finding of the hole.

After skin incision and preparation of the work channel put the tissue protector and the drill sleeve into the manual targeting device, push them to the bone surface. Fix the tissue protector and perform drilling.

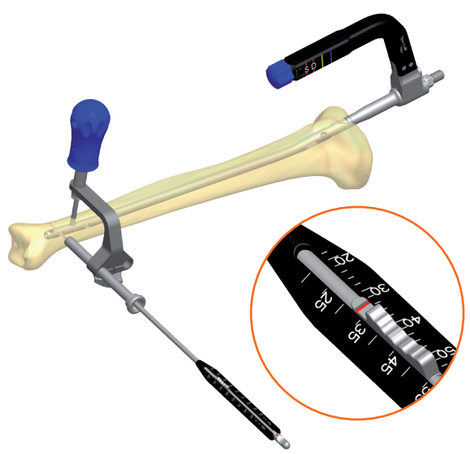
Important
For 8 mm dia nail use 3,2 mm black drillbit and 3,8 mm locking screws for all locking holes. For all the other nail diameters (9-14 mm) use green 4,2 mm drillbit and 4,8 mm locking screws for all locking holes.

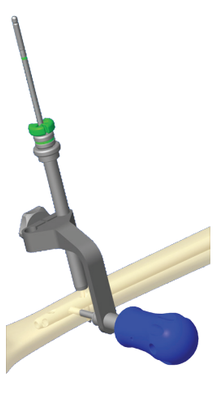


3.11 | Distal locking II.

Remove the drill sleeve and measure length through the tissue protector, push the gauge up to the bone surface. Select the locking screw accordingly.
Check screw length on the scale of the measuring rod. Drive in the screw with 3,5 mm screwdriver.

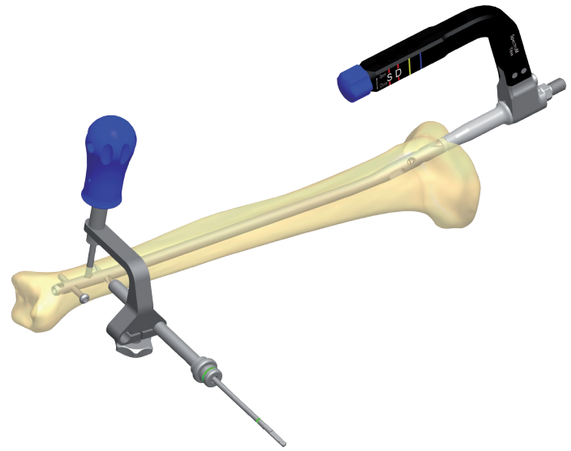
The other method uses the green drill stop over the Ø4,2 mm drillbit just above the spiral part. Perform drilling through the sleeve. The necessary length can be read on the scale of the drillbit at the drill stop's side facing the sleeve.





3.12 | Distal locking III.

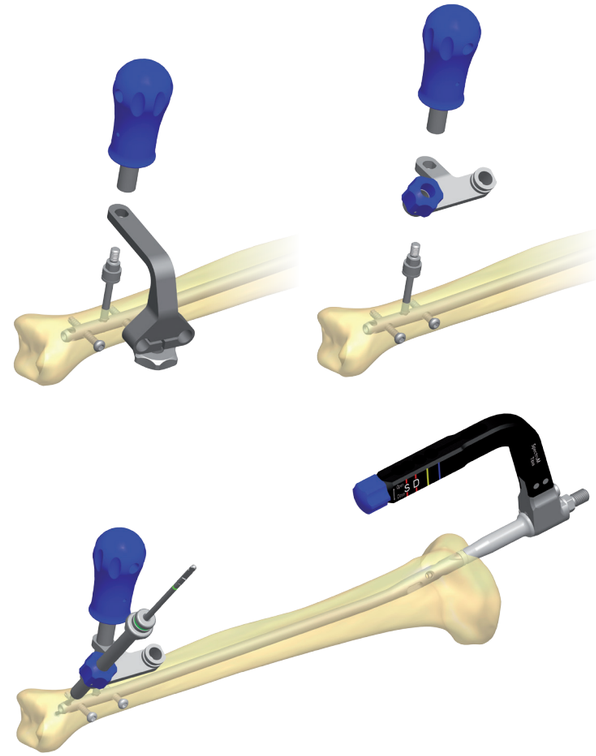
After the first locking leave the manual targeting device in position and repeat drilling, length gauging and screw insertion in the other hole.



3.13 | Distal locking IV.

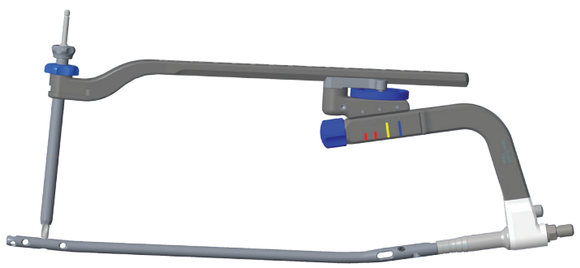
If the fracture is distal periarticular then the screw placed into the „E" hole stabilizes the fracture.
For drilling mount the additional 30 degree E manual targeting device on the touch probe. For this unscrew the handle and remove the 90 degree arm. The touch probe shall always remain in the nail during the change of the arms! Place the E targeting arm on the touch probe.

Important
Use only the distal hole of the E targeting arm. Drilling, length gauging and screw insertion is performed as described earlier. Optimal screw direction is from anterior medial to posterior lateral. Drilling from anterior lateral to posterior medial may damage tendons, nerves or blood vessels! Remove manual targeting device.



3.14 | Distal locking V.

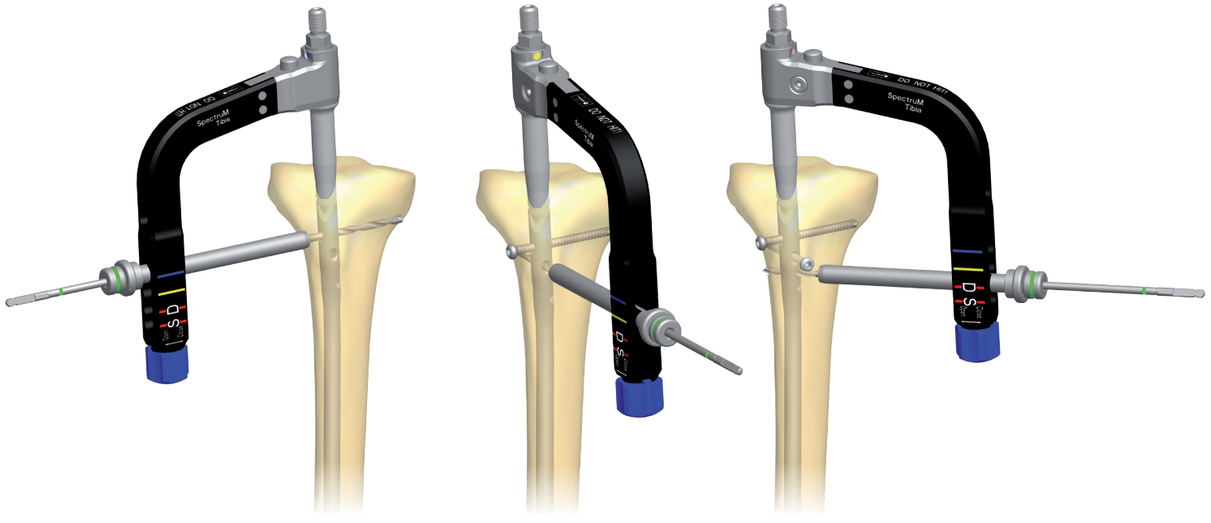
For sagittal locking mount the distal arm onto the proximal arm. In optimal case the turning spiral positions the arm above the hole. If not, the hole can be found by the spiral.
Drill through soft tissue protector and drill sleeve. Drilling, gauging and screw insertion is as per the usual method. Mind that this screw has purchase only in the posterior cortex. Remove the distal arm.



3.15 | Proximal locking

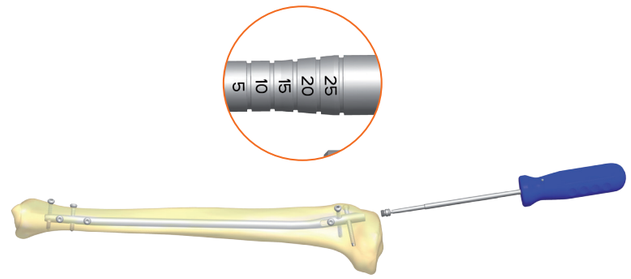
Rotate the proximal arm into blue position. Place the soft tissue protector and the drill sleeve into the blue hole of the targeting arm. Push it to the bone surface and fix with the fixing knob. Drill, measure length and insert screw in the usual manner. Locking is continued with the yellow static hole following the above steps.

The nail enables the dynamization in the later phase of bone healing. To obtain this perform locking in red D hole. For static locking only use red S hole.



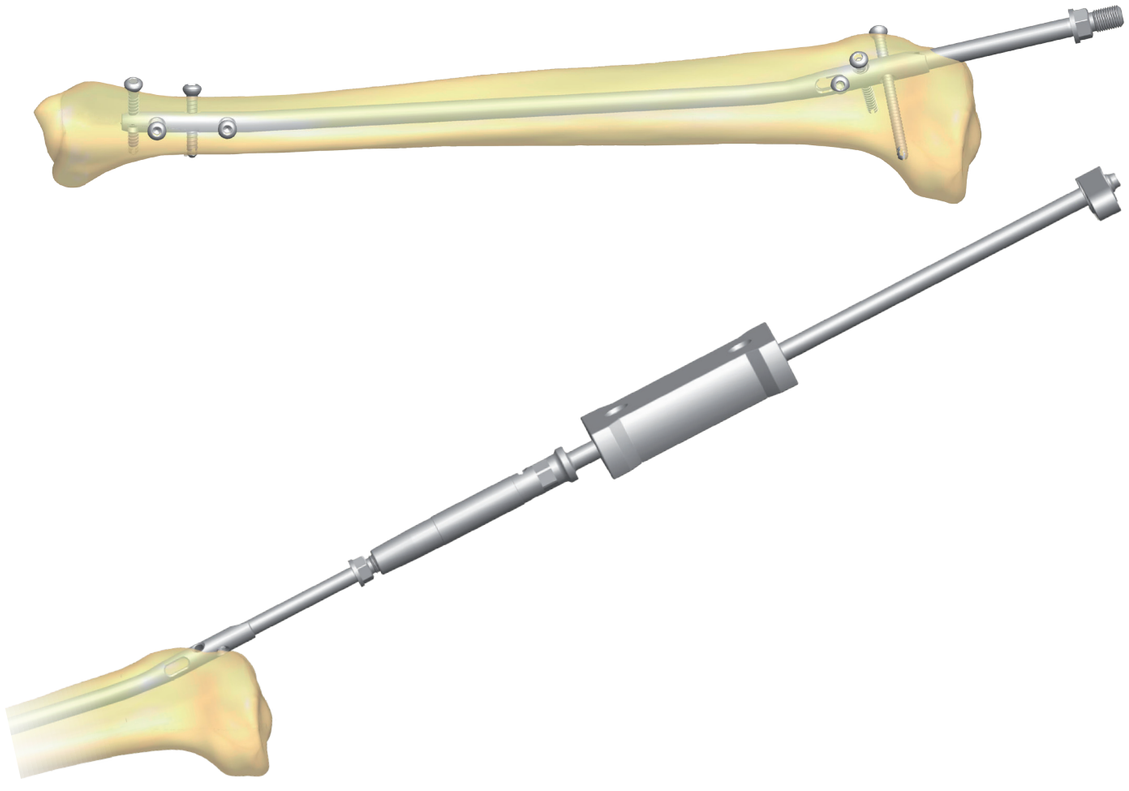
3.16 | Removal of the targeting arm, closing the nail

After locking remove the targeting arm and drive an end-cap into the proximal end of the nail.
To determine end cap size use the scale on the targeting arm.



3.17 | Implant removal

If end-cap was used remove that first. Drive the nail removal pin. Take the locking screws out. Connect the stem of the sliding hammer and hit the nail out of the bone.



4 | Implant list

4.1 | Tibia nail

Length (mm)	Steel						
	d = 8 mm	d = 9 mm	d = 10 mm	d = 11 mm	d = 12 mm	d = 13 mm	d = 14 mm
255	257208255	257209255	257210255	257211255	257212255	257213255	257214255
270	257208270	257209270	257210270	257211270	257212270	257213270	257214270
285	257208285	257209285	257210285	257211285	257212285	257213285	257214285
300	257208300	257209300	257210300	257211300	257212300	257213300	257214300
315	257208315	257209315	257210315	257211315	257212315	257213315	257214315
330	257208330	257209330	257210330	257211330	257212330	257213330	257214330
345	257208345	257209345	257210345	257211345	257212345	257213345	257214345
360	257208360	257209360	257210360	257211360	257212360	257213360	257214360
375	257208375	257209375	257210375	257211375	257212375	257213375	257214375
390	257208390	257209390	257210390	257211390	257212390	257213390	257214390
405	257208405	257209405	257210405	257211405	257212405	257213405	257214405
420	257208420	257209420	257210420	257211420	257212420	257213420	257214420

Length (mm)	Titanium						
	d = 8 mm	d = 9 mm	d = 10 mm	d = 11 mm	d = 12 mm	d = 13 mm	d = 14 mm
255	297208255	297209255	297210255	297211255	297212255	297213255	297214255
270	297208270	297209270	297210270	297211270	297212270	297213270	297214270
285	297208285	297209285	297210285	297211285	297212285	297213285	297214285
300	297208300	297209300	297210300	297211300	297212300	297213300	297214300
315	297208315	297209315	297210315	297211315	297212315	297213315	297214315
330	297208330	297209330	297210330	297211330	297212330	297213330	297214330
345	297208345	297209345	297210345	297211345	297212345	297213345	297214345
360	297208360	297209360	297210360	297211360	297212360	297213360	297214360
375	297208375	297209375	297210375	297211375	297212375	297213375	297214375
390	297208390	297209390	297210390	297211390	297212390	297213390	297214390
405	297208405	297209405	297210405	297211405	297212405	297213405	297214405
420	297208420	297209420	297210420	297211420	297212420	297213420	297214420

Length (mm)	Anodised Titanium						
	d = 8 mm	d = 9 mm	d = 10 mm	d = 11 mm	d = 12 mm	d = 13 mm	d = 14 mm
255	397208255	397209255	397210255	397211255	397212255	397213255	397214255
270	397208270	397209270	397210270	397211270	397212270	397213270	397214270
285	397208285	397209285	397210285	397211285	397212285	397213285	397214285
300	397208300	397209300	397210300	397211300	397212300	397213300	397214300
315	397208315	397209315	397210315	397211315	397212315	397213315	397214315
330	397208330	397209330	397210330	397211330	397212330	397213330	397214330
345	397208345	397209345	397210345	397211345	397212345	397213345	397214345
360	397208360	397209360	397210360	397211360	397212360	397213360	397214360
375	397208375	397209375	397210375	397211375	397212375	397213375	397214375
390	397208390	397209390	397210390	397211390	397212390	397213390	397214390
405	397208405	397209405	397210405	397211405	397212405	397213405	397214405
420	397208420	397209420	397210420	397211420	397212420	397213420	397214420

4.2 | Locking screw Ø4,8 mm

Length (mm)	Steel	Titanium	Anodised Titanium
25	932148025	922148025	364048025
26	932148026	922148026	364048026
28	932148028	922148028	364048028
30	932148030	922148030	364048030
32	932148032	922148032	364048032
34	932148034	922148034	364048034
35	932148035	922148035	364048035
36	932148036	922148036	364048036
38	932148038	922148038	364048038
40	932148040	922148040	364048040
42	932148042	922148042	364048042
44	932148044	922148044	364048044
45	932148045	922148045	364048045
46	932148046	922148046	364048046
48	932148048	922148048	364048048
50	932148050	922148050	364048050
52	932148052	922148052	364048052
54	932148054	922148054	364048054
55	932148055	922148055	364048055
56	932148056	922148056	364048056
58	932148058	922148058	364048058
60	932148060	922148060	364048060
62	932148062	922148062	364048062
64	932148064	922148064	364048064
65	932148065	922148065	364048065
66	932148066	922148066	364048066
68	932148068	922148068	364048068
70	932148070	922148070	364048070
72	932148072	922148072	364048072
75	932148075	922148075	364048075
76	932148076	922148076	364048076
80	932148080	922148080	364048080
85	932148085	922148085	364048085
90	932148090	922148090	364048090
95	932148095	922148095	364048095
100	932148100	922148100	364048100

4.3 | End cap

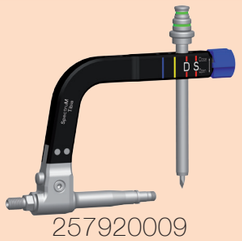
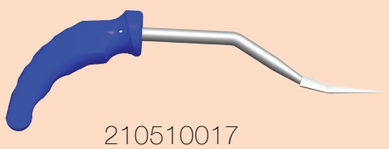
Length (mm)	Steel	Titanium	Anodised Titanium
0	257400001	297400001	397400001
5	257400002	297400002	397400002
10	257400003	297400003	397400003
15	257400004	297400004	397400004
20	257400005	297400005	397400005
25	257400006	297400006	397400006

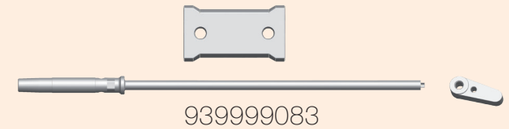
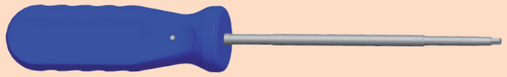
4.4 | Locking screw Ø3,8 mm

Length (mm)	Steel	Titanium	Anodised Titanium
20	224038020	264038020	364038020
22	224038022	264038022	364038022
24	224038024	264038024	364038024
26	224038026	264038026	364038026
28	224038028	264038028	364038028
30	224038030	264038030	364038030
32	224038032	264038032	364038032
34	224038034	264038034	364038034
35	224038035	264038035	364038035
36	224038036	264038036	364038036
38	224038038	264038038	364038038
40	224038040	264038040	364038040
42	224038042	264038042	364038042
44	224038044	264038044	364038044
45	224038045	264038045	364038045
46	224038046	264038046	364038046
48	224038048	264038048	364038048
50	224038050	264038050	364038050
52	224038052	264038052	364038052
54	224038054	264038054	364038054
55	224038055	264038055	364038055
56	224038056	264038056	364038056
58	224038058	264038058	364038058
60	224038060	264038060	364038060
62	224038062	264038062	364038062
64	224038064	264038064	364038064
65	224038065	264038065	364038065
66	224038066	264038066	364038066
68	224038068	264038068	364038068
70	224038070	264038070	364038070
72	224038072	264038072	364038072
76	224038076	264038076	364038076
80	224038080	264038080	364038080

5 | Instrument list

5.1 | Instruments

Proximal targeting arm - TWX-A	 257920009
Magic distal targeting arm	 257920020
Distal targeting device - TWX	 257920003
Extractor	 257920004
Spiral drill (6 mm)	 257930008
T-wrench (12 mm)	 257920008
Awl (10 mm)	 210510017

Measuring rod (500 mm)	 939999072
Impactor for intramedullary nail	 939999083
Screwdriver for collet (3.5 mm)	 210700035
Guide rod with Olive Tip (4/3x900 mm)	210904004
Guide rod (2.7x900 mm)	210510032
Depth gauge for locking screw (3.8-4.8 mm)	 257930016
Spiral drill with quick connecting end (3.2x245 mm)	 257920014
Spiral drill with quick connecting end (4.2x245 mm)	 257920015
Magic signal source	 257920018
Magic sensor	 257920019
Drill stop (3,2 mm; 4,2 mm)	 210510232;210510242
Filled up tray (SpectruM Tibia with Magic)	**257820007**

Product family

TRAUMATOLOGY

1.1. Intramedullary nails
- 1.1.1. Humerus nails
- 1.1.2. Ulna-radius nails
- 1.1.3. Trochanter nails
- 1.1.4. Femur nails
- 1.1.5. Tibia nails
- 1.1.6. Fibula nails
- 1.1.7. Sanat PIN

1.2. Plates

1.3. Screws

1.4. Fixateur externe

1.5. Other

ORTHOPAEDICS

DENTAL

SPINE

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